ENVIRONMENTAL ASSESSMENT

Bentonite Mine Plan of Operation
Amendment to Wyoming Mining Permit 321C
Meeteetse Draw; WYW-165167

August 2012

BLM

Worland Field Office, Wind River/Bighorn Basin District, Wyoming

The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

DOI-BLM-WY-R010-2011-0069-EA

Project Title: Meeteetse Draw Mine Plan
NEPA Number: DOI-BLM-WY-R010-2011-0069-EA
Project Type: Bentonite Mining Plan of Operations

Location:
T. 43 N, R. 95 W Sec. 4 - 6, 8 - 11
T. 44 N, R. 95 W Sec. 30, 31, 32
T. 44 N, R. 96 W Sec. 25, 36

Name and Location of Preparing Office:
Worland Field Office
101 S. 23rd St.
Worland, WY 82401
Case File Number: WYW165167
Applicant/Address:
Wyo-Ben, Inc.
Greybull, WY

1.0 INTRODUCTION

1.1 Background Information

Wyo-Ben, Inc. staked claims in Meeteetse Draw starting in 1967 through 1979. Additional claims were staked in 1980. Initial drilling exploration occurred in the 1970s. Recent reclaimed drill holes (450) achieved bond release in 2008. An easement was established in 1981 and construction for the existing haul road was begun in 1981. Permitting and bonding for the haul road occurred during Mine Amendment 5, in 1985.

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of the Meeteetse Draw Mine Plan Amendment to permit 321C as proposed by Wyo-Ben, Inc. The EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or alternatives to the proposed action.

This plan of operation would allow the operator the ability to mine and remove the minerals the operator has claimed pursuant to Subpart 3809 -Surface Management to Title 43 of the CFR; which requires the submission of a plan of operation when mining of locatable minerals is proposed. The operator has submitted a proposal to mine in accordance with §43 CFR 3809.401.

The EA assists the Bureau of Land Management (BLM) in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any "significant" impacts could result from the analyzed actions. "Significance" is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record may be signed for the EA approving the selected alternative, whether the proposed action or another alternative. A Decision Record (DR), including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts (effects) beyond those already addressed in the Grass Creek Resource Management Plan, September, 1998.

1.2 Purpose and Need of the Proposed Action

The BLM is responsible for managing mineral rights and access on federal lands as authorized by the General Mining Law of 1872, as amended. Under the law, persons are entitled to reasonable access to

explore for and develop mineral deposits on public domain lands that have not been withdrawn from mineral entry.

In order to use public lands managed by the BLM for locatable mineral exploration and development, Wyo-Ben, Inc. must comply with the BLM's Surface Management Regulations (43 CFR 3809), Use and Occupancy Under the Mining Laws Regulations (43 CFR 3715) and other applicable statutes, such as the FLPMA 1976.

The BLM's purpose is to respond to Wyo-Ben, Inc.'s proposed project PoO Amendment. Wyo-Ben, Inc. is proposing to mine bentonite on public, private, and state lands, which are locatable minerals. In responding to Wyo-Ben, Inc.'s proposed project, the BLM would determine whether to approve, approve with modifications, or deny the proposed project.

The BLM's need for the action is based on Wyo-Ben, Inc.'s proposed project. The BLM is required to respond to Wyo-Ben, Inc.'s proposed project to conduct mining operations for locatable minerals in accordance with the Surface Management Regulations (43 CFR 3809), the Use and Occupancy under the Mining Laws Regulations (43 CFR 3715) and other applicable laws such as FLPMA and the NEPA. In considering the need for the proposed project, the BLM must determine if the proposed project would create unnecessary or undue degradation to the public lands involved in the action. The NEPA mandates that the BLM evaluate or analyze the impacts of the proposed project and develop alternatives and mitigation, when necessary, to lessen any impacts to the resources.

1.3 Decision to be Made:

The Authorized Officer (AO) must determine whether 1) to approve the plan of operation as received, 2) to approve the plan subject to changes or conditions to meet the performance standards of §43 CFR 3809.420 and to prevent unnecessary or undue degradation; or 3) disapprove the plan because the proposed operations would result in unnecessary and undue degradation of the national system of public lands (see §43 CFR 3809.411(d)).

If it is decided to issue the permit, the AO must decide what Conditions of Approval would apply to the mine plan. Conditions of Approval could include specification of operations, production and reclamation activities for the proposed project area.

Finally, the AO must determine whether or not the proposed action could result in significant impact to the human environment. If not, this determination would be documented in a FONSI. If the impacts could be significant, an environmental impact statement would be necessary.

1.4 Relationship to Statutes, Regulations, or Other Plans

This environmental assessment was prepared in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA) and other statutes relevant to the proposal. Authority for the proposed action and alternatives is contained in the Federal Land Policy and Management Act of 1976, as amended (FLPMA) and the regulations in 43 CFR 2200.

§43 CFR 3809. 2 applies to all operations authorized by the mining laws on public lands where the mineral interest is reserved to the United States, including Stock Raising Homestead lands as provided in §43 CFR 3809.31(d) and (e). When public lands are sold or exchanged under 43 U.S.C. 682(b) (Small Tracts Act), 43 U.S.C. 869 (Recreation and Public Purposes Act), 43 U.S.C. 1713 (sales) or 43 U.S.C. 1716 (exchanges), minerals reserved to the United States continue to be removed from the operation of the mining laws unless a subsequent land-use planning decision expressly restores the land to mineral entry, and BLM publishes a notice to inform the public. This subpart does not apply to private land except as provided in paragraphs (a) and (c) of this section.

1.5 Scoping and Issues

1.5.1 **Public Participation**

The public was invited to comment on the proposed project during a Public Review process for 30 days beginning August 1, 2011 and ending on August 30, 2011.

Native American consultation was initiated by the BLM and included the Crow, Eastern Shoshone, Northern Arapaho, Northern Cheyenne, Salish-Kootenai, and Shoshone-Bannock.

1.5.2 **Summary of Public Participation**

Comments were received from public scoping. The issues identified and carried forward for analysis are:

How does the BLM and the proponent plan to address the increased traffic that this project would bring to this area?

How would the BLM and proponent protect cultural resources from vandalism?

How would fugitive dust from the haul road affect cultural resources, vegetation, and private landowners; and how dust would be prevented from being created?

Would removing vegetation in the mine area increase run off and wash bentonite and/or other deleterious materials into our water delivery system and onto private lands?

Would mining operations affect big game populations and nesting raptors?

Additional comments were received generally supporting the mining operations. These comments did not raise any environmental issues and were therefore not considered substantive for analysis purposes.

1.5.3 **Interested parties:**

During the section 106 process, the BLM initiated a programmatic agreement with consulting parties and invited parties, as listed in Chapter 5 of this document. Mitigation measures discussed during this process have been analyzed and are incorporated by reference in this EA.

1.5.4 **Internal Scoping**

Internal scoping was conducted in the BLM Worland Field Office (WFO) beginning in March 2010, and concluding in March, 2012.

1.5.4.1 Issues Identified

Internal scoping resulted primarily in the following BLM specialist concerns:

What would be the affect to air quality by the dust associated with bentonite mining and hauling operations?

Would bentonite mining in this area increase sedimentation, bentonite and water run-off into surface and ground water?

How would drainages be affected by disturbance caused by the proposed bentonite mining in the proposed mine area?

How difficult is vegetating areas disturbed by mining due to changes in post-mining soil characteristics, the areas dry climate, and the presence of invasive weeds?

Would cultural sites be affected by mining operations?

Would mining operations create access and setting issues for Native Americans visiting the site?

How would the sage brush environment be established during reclamation?

What would be the effects to visual resources in the area?

Would the removal of allotment fences due to mining operations cause changes in livestock grazing?

How would wildlife dependent on sage brush be affected by the disturbances associated with mining?

Would the construction/maintenance of the haul road have an effect on prairie dog populations?

Would there be a measurable loss in available forage for livestock or wildlife?

What would be the socio-economic effect of the proposed action?

Would mining operations impact existing rights-of-ways?

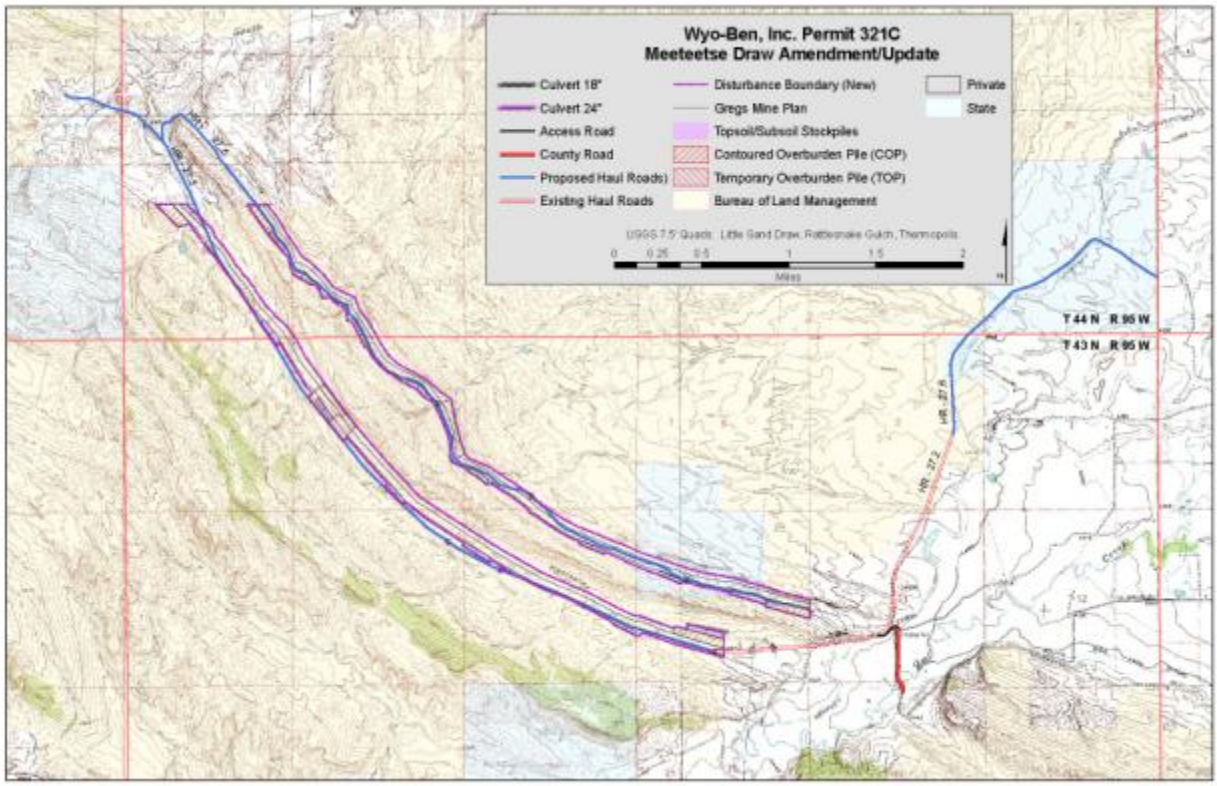
1.6 Conformance with Land Use Plans

The proposed action conforms to the Record of Decision and Approved Resource Management Plan for the Grass Creek area dated 1998. The decisions in the Grass Creek Resource Management Plan provide general management direction and allocation of uses and resources on the public lands in the area. The Grass Creek RMP provides that plans of operations are required for locatable minerals development consistent with regulations (§43 CFR 3809), on lands open to the staking of mining claims and operation of the mining laws for locatable minerals.

2.0 DESCRIPTION OF ALTERNATIVES

2.1 Introduction

The proposed action involves the mining of bentonite in proposed surface mining pit location where Wyo-Ben Inc., the operator, has located placer claim locations within Hot Springs County within the 6th Principle Meridian. The public lands proposed to be mined are landlocked 'behind' private lands. Landowner access agreements are in place and on file with the BLM (WYW165167). There are existing dirt roads that the operator would maintain to BLM standards or upgrade as needed, that would be used as transportation routes for the mined product that would be hauled to a processing plant in Lucerne. An easement was established in 1981 and construction for the existing haul road (HR 27.2) was begun in 1981. Permitting and bonding for the haul road occurred during Mine Amendment 5, in 1985. Additional haul roads are proposed. The cast-back method of mining proposed is intended to promote the practice of concurrent reclamation and would minimize the size of disturbances at any particular time (as detailed in Appendix 1). This plan of operation has been assigned serial number WYW165167 which is on file with the Worland Field Office



Map of project area

2.2 Alternative 1-- Proposed Action

The Meeteetse Draw Mine Plan of Operations proposes an open pit bentonite mine of no more than 500.4 acres of disturbance that would occur on haul roads and be excavated in multiple phases using standard castback mining techniques and procedures (Appendix 1). A pit sequence can take between five to ten years to complete.

The mining activity proposed with this submission consists of two proposed pit sequences on the Rusty and Frontier 3 bentonite beds (71T and 99T) to begin August of 2011 or as soon as this mine application is approved. The following table includes a listing of projected legal descriptions and disturbance acreages for each proposed pit sequence.

Table 2.1 Pit locations and total proposed disturbance

PROPOSED PITS (BENTONITE BEDS)	TOWNSHIP	RANGE	SECTION	PROPOSED DISTURBANCE AREA[1,2,3]	CLAIMS
99T (F3 BED)	T44N	R95W	30, 31, 32		SONG 2, 4, 5
	T43N	R95W	4, 5, 9 - 11	123.7	HAT 22 – 29
					SALT 2
71T (RUSTY BED)	T44N	R96W	25, 36		SONG 2, 3
	T44N	R95W	31, 32	147.4	HAT 22 -27
	T43N	R95W	5, 6, 8, 9, 10		DOTTI 27 – 41, 43 - 45
POTENTIAL DISTURBANCE AREA	T44N	R96W	25, 36		SONG 2 – 5
	T44N	R95W	30, 31, 32	203.6	HAT 22 – 29
	T43N	R95W	4, 5, 6, 8-11		DOTTI 27 – 41, 43 - 45

1) The extended potential disturbance area allows a little extra room for Wyo-Ben, Inc. to be able to expand their pits if the production of bentonite is discovered to be economically advantageous, or if additional stockpile area is needed. This will avoid the use of additional limited time to review paperwork by Wyoming Department of Environmental Quality-Land Quality Division (WDEQ-LQD) and BLM for post approval modifications.
2) C.O.P. = Contoured Overburden Pile – this area may include overburden stockpile area, temporary bentonite stockpiles, camp site, and will be reclaimed as a permanent contoured overburden area once mining is complete to reflect the surrounding topography.
3) T.O.P. = Temporary Overburden Pile – this area may include temporary overburden stockpile area, temporary bentonite stockpiles, camp site, and will be reclaimed similar to the original topography.

Table 2.2 PROJECTED DISTURBANCE ACREAGE AND MINING DATES					
PROPOSED PITS BEDS # OF PHASES	PROJECTED OPENING DATE	PROJECTED ENDING DATE	APPROXIMATE DISTURBANCE PER YEAR ACRES	AVERAGE OVERBURDEN PER PHASE* CUBIC YARDS	PROPOSED DISTURBANCE ACREAGE
71T (Rusty Bed)	August, 2011	2024	12.0	54,336	147.4
99T (F3 BED)	August, 2011	2023	12.0	49,264	123.7
HAUL ROADS					25.7
POTENTIAL DISTURBANCE AREAS					203.6

Summary of Proposed Disturbance	
Total Proposed Pit and Stockpile Disturbance	270.9 Acres
Remaining Potential Disturbance Area	203.6 Acres
Haul Roads Outside of Potential Disturbance*	25.9 Acres
Total Potential and Proposed Disturbance Area	500.4 Acres

Proposed Haul Roads

New Haul Road HR 27.3 (Primary Haul Road from existing HR 27.2 travels northwest and would connect with existing HR 27.4). This road would route along the Thermopolis Shale side. Measurements: 27,093 lineal feet x 60 feet wide = 37.3 acres total acres. Only 8,325 linear feet x 60 feet wide = 11.5 acres is outside of the potential disturbance area on Federal lands.

New Haul Road HR 27.5 (Primary Haul Road for the Frontier Formation. It would merge into new HR 27.3 on the northwest end of Thermopolis Shale and would travel along the frontier formation to the beginning COP area in Section 10 T43NR95W. The proposed road is 29,565 lineal feet x 60 feet wide = 40.7 acres. All of the new HR 27.5 lies within the potential disturbance area or on private land.

New Haul Road HR 27.6 (Extension of HR 27.2) This haul road would connect with the existing bonded HR 27.2 in T43N R95W Section 2 where the haul road begins to turn to the east after the culvert and then would continue north across section 2 passing through the south east corner of T44N R95W Section 35, then heads northeast to the center of the section and joins our haul road on Wyo-Ben, Inc.'s private land in section 31. The road consists of 10,313 lineal feet X 60 feet wide with a 100' ROW = 14.2 Acres for new road construction.

2.2.1.1 Haul Road Culverts

Three haul roads proposed for this Amendment would require culverts to be installed at some drainage crossings. Based on hydrology calculations (from the head of the drainage to the point of drainage crossing) for a 10 year/ 6 hour event, and the culvert sizing table below (Reference Federal Highway Culvert sizing software HY-8), 17 corrugated metal pipe (CMP) drainage crossings are proposed for haul road HR-27.3, 6 CMP drainage crossing for HR 27.5, and 5 CMP drainage crossing for HR 27.6. Low-water crossings may be used in place of 18" CMP where deemed appropriate (drainages of 4-foot in depth or less). In those cases, drainage flows are below the required 9 cubic feet per second (cfs).

The culvert sizing table below is intended for corrugated metal (CMP) culverts at 60 feet long. Inlet and outlet would be projected beyond side slopes of road surface. Culverts would be set at a 2% slope or set on the bottom of the channel based on BLM Section 9113.

Haul Road HR 27.3 - Primary Haul Road from existing HR 27.2 travels northwest along the Thermopolis Shale side and would connect with existing HR 27.4. Projected new culvert

installations – there would be a total of (11*) 18-inch diameter CMP if deemed necessary, five (5) 24-inch CMP, and (1) 120-inch CMP at Coal Draw crossing. Three of the 18-inch CMP crossings would be installed in existing HR 27.2.

Haul Road HR 27.5 - Primary Haul Road for the Frontier Formation. It would merge into existing HR 27.2 on the southeast end and would travel northwest along the Frontier Formation and connect with proposed HR 27.3 at the South Fork Coal Draw. Projected new culvert installations – there would be a total of (5*) 18 inch diameter CMP if deemed necessary, and (1) 36 inch diameter CMP.

Haul Road HR 27.6 – Extension of Haul Road 27.2 in T43NR95W Section 2 at the culvert and travels north across the corner of Section 35, then turns to the northeast and would join Wyo-Ben's private land in Section 31 to US HWY 789. Projected new culvert installations – there would be a total of (3*) 18 inch diameter CMP if deemed necessary, (1) 24 inch diameter CMP, (2) 30 inch diameter CMP, and (1) 36 inch diameter CMP. Two of the culverts, an 18" and 30" that are listed in HR 27.6 are part of the existing HR 27.2.

Channel design for both temporary and permanent diversions would match pre-mine channel gradients and cross-sectional shapes. A typical velocity is used for these drainages for hydrology calculations.

Culvert Sizing Table (Based on 10 year-6 hour event)

2.2.2 **Reclamation Plan**

The reclamation/revegetation process is designed to restore a mosaic vegetation scheme consisting of site specific dominance of various life forms (shrubs, grasses, and forbs) with a diverse species composition. Additional revegetation goals include site stabilization/erosion control and visual aesthetics. Land use restoration goals include wildlife habitat and livestock grazing.

Reclamation backfill would be achieved during the castback mining process using variously sized Caterpillar tractor-scrapers depending on availability. Wyo-Ben, Inc.'s mining contractors typically use Caterpillar 627 and 631 tractor-scrapers. These are supplemented with Caterpillar tractor-dozers ranging from D-8 to D-10 in size, used for backfilling and contouring. Most drainage construction would be done with a backhoe excavator.

Final reclamation contours would be consistent with those necessary to reestablish the projected post-mining land use goals of domestic livestock grazing and wildlife habitat. Final slopes and surface contours would approximate native gradients and would blend with adjacent topography. Through drainage would be reestablished in all backfilled phases. Ephemeral channels to be impacted by this proposed mining activity would be temporarily directed around open pits during active mining stages. Channel design for both temporary and permanent diversions would match pre-mine channel gradients and cross sectional shapes. Temporary diversions would allow passage of peak runoff from a 2 year, 6 hour precipitation event in an erosive manner. Permanent diversions (including reconstructed channels and adjacent topography) would be erosionally stable during the passage of the peak runoff from a 100 year, 6 hour precipitation event.

Following backfilling and contouring, all compacted surfaces would be ripped to improve water infiltration and retention. Subsoil and topsoil would be replaced from stockpiles or hauled directly during the castback mining sequence. Where necessary on initial pit cuts, out-of-pit overburden stockpiles would be contoured in-place and used for temporary bentonite and soil stockpile locations (C.O.P. locations on the Mine Plan Map).

Final reclamation of these areas would include deep-ripping, spreading topsoil/subsoil and seeding. Reclamation of the steep-sloped A and B beds of the Mowry Formation may include leaving the upper portion of the post mine base rock exposed, with backfilling and contouring of overburden occurring

below that point. Contouring would simulate the "pie-pan" nature of pre-mine topography, with the lateral outside edges of those features fanning reclaimed drainages that would tie into native drainages.

Wyo-Ben, Inc. would comply with the requirements regarding the timeliness of reclamation.

Wyo-Ben, Inc. would coordinate with both Wyoming DEQ and BLM to consider alternative innovative techniques for reclamation in order to achieve bond release. Some of these innovative techniques may include pitting, broadcasting, drilling, or hydro-seeding, the crimping of straw, candy-striping of soil where there is little to spread, seed coating, additives to the soil (including but not limited to mycorrhizac, boron, gypsum, limestone, fertilizers, mulch, grass clippings, wood chippings, weed free manure/compost, polymers, sugar), sagebrush seedlings, fencing, spraying of invasive species before and/or after mining, alternative irrigation techniques, alternative seed mixtures which may include approved non-native species, or other methods that would require BLM and DEQ approval prior to application.

2.2.3 **Isolation and Control of Acid-forming, Toxic, or Deleterious Material**

Wyo-Ben, Inc. characterizes the overburden from the surface down to the bentonite in each pit it plans to mine at a rate of approximately 1 hole per mile of proposed pit. In this process, a material sample is obtained every five feet down to the bentonite and sent to Intermountain labs in Sheridan, Wyoming for testing of chemical and physical parameters. If it is shown that a particular pit has the potential for acidic, deleterious or toxic material near the surface, Wyo-Ben, Inc. would attempt to cover it with at least two feet of a more neutral spoil material from adjacent pits in a lateral castback procedure, or bury that layer deeper in the profile during backfill. If deleterious material (bentonite, spoil) would be intentionally placed on the surface, it then would be bermed to prevent off-site sedimentation of the material.

In the situation of unintentional placement of deleterious materials on native lands (i.e. a large bentonite spill) Wyo-Ben, Inc. is committed to remove the deleterious material from the lands as soon as possible and reseed the disturbed area with an appropriate seed mixture.

2.2.4 **Post Closure Management**

Wyo-Ben, Inc. would monitor all of its reclaimed lands post closure for off-site sedimentation, erosion and seeding failures. Off-site sedimentation is controlled by installation of straw bale, fabric check dams, or Nilex GeoRidge biodegradable check dams into affected drainages. If unacceptable erosion is detected, it is repaired at the first available opportunity. Repair in the past has mostly been accomplished by reconstructing the drainage and lining it with erosion control fabric, rock, or installation of rock gabions. Seeding is monitored on a regular basis. If after two to four growing seasons vegetation establishment is not adequate, Wyo-Ben, Inc. would determine the reason for failure and mitigate the problem including reseeding of the site.

2.2.5 **Revegetation Techniques and Seed Mixtures**

Revegetation considerations include use of the area for domestic livestock grazing and wildlife habitat. Revegetation procedures would begin following contouring and topsoiling of the disturbed areas as previously described.

Seedbed preparations may include deep-ripping of compacted surfaces prior to soil replacement to break up the surface and loosen the contoured overburden. Additional surface manipulations such as deep parallel furrows on contour or pitting may be used to enhance moisture harvesting capacities of the areas receiving seed. Seed mixtures would normally be broadcast seeded; however they may be hydro-seeded or drilled as deemed necessary. In general, seeding would be conducted in the fall and early winter (prior to freeze-up) to take full advantage of fall, winter and spring moisture. From time to time, we may exercise our discretion to attempt spring seeding on areas where live topsoil has been directly placed during winter months to reduce destruction of native species volunteering during the first growing season and prior to what would be the fall seeding period. A cover crop may be planted in the situation that the anticipated seeding would not be done for more than a year. Although no negative grazing impacts are

anticipated on newly seeded areas, attempts would be made to coordinate timing of use with the grazing permittee if problems develop. Reclaimed areas may be fenced if it is determined grazing may be detrimental to reclamation efforts.

Reclamation of haul roads would be accomplished by contouring to restore drainage patterns, remove culverts, and blend with surrounding topography. These areas would then be deep-ripped, subsoiled/topsoiled and seeded.

Composition of the proposed seed mixture is detailed below. Use of all species depends on seed availability in the year of seeding. Due to the mostly poor quality soils of the proposed disturbance area, Wyo-Ben, Inc. would use a less diversified seed mix as shown for the Mowry and Thermopolis Shale formations.

Seed Species	Rate-lb PLS/acre
Gardner saltbush (*A. gardneri*)	3.0
Big sagebrush (*A. tridentata*)	2.0
Fourwing saltbush (*A. canescens*)	2.0
Rubber Rabbitbrush (*Chrysothamnus nauseosus*)	2.0
Russian wildrye (*Elymus junceus*)	1.5
Sandberg bluegrass (*Poa sandbergii*)	1.5
Bluebunch Wheatgrass (*Agropyron spicatum*)	1.0
Western Wheatgrass (Agropyron smithii)	0.5
Evening primrose (*Oenothera pallida*)	0.5
Annual sunflower (*Helianthus annuus*)	1.0
Biscuitroot (*Lomatium ambiguum*)	1.0
	16.0 lb/acre

This mixture may be supplemented with Basin wildrye (*Elymus cinereus*) broadcast onto uplands and reconstructed drainages and other low-lying areas at a rate of 0.5 to 2 pounds per acre and Fringed Sagewort (*A. frigida*) at a rate of 0.5 to 1.0 pounds per acre. Monitoring of past reclamation successes and failures may influence seed mixture composition and surface preparation techniques. In areas where significant sagebrush communities are disturbed, they would be targeted to be reclaimed to a sagebrush habitat.

2.2.6 **Quality Assurance**

Wyo-Ben, Inc. utilizes two drill trucks to characterize the volume and quality of bentonite in the various beds during the development of pits. This allows the company to tighten planned disturbance boundaries of the pits, which in many cases, reduces the amount of disturbance that would otherwise occur. Soils of proposed mine areas are characterized to an order 2 level. This allows the company to determine the quality and volume of soils that can be saved to produce quality reclamation. As stated previously, Wyo-Ben, Inc. commits to save all available top and subsoil for reclamation during the initial stripping part of the mining process, and would either stockpile or spread it live. The stripping of pit phases is accomplished using a castback mining procedure. This practice allows reclamation to be concurrent with mining. Typically, previously mined phases of a pit are reclaimed through backfilling and contouring almost adjacent to the open phase of a pit, with soiled and seeded phases not far from this. Before a pit is backfilled, bentonite cleanings are pushed against the bottom of the highwall to ensure they are buried deep. In the reclamation of bentonite stockpile areas, the pad (portion of bentonite near the bottom of a stockpile that is not used) is buried, followed by the ripping and soiling of the area. All compacted areas, such as roads and other stockpile areas are also ripped prior to soiling to reduce compaction. The movement of overburden during the mining process is done in a tiered castback process, which places material from the current phase of mining into a previous open pit in approximately the same order as it was removed. This process is employed unless overburden testing reveals the need to place at least two

feet of neutral spoil material over a toxic layer near the surface (i.e., very high Sodium Absorption Rate (SAR) or acid potential).

2.2.7 **Monitoring Plan:**

Wyo-Ben, Inc. utilizes contractors to conduct the mining and reclamation operations of their business. The mining supervisor works with the contractor's field supervisors to ensure that mining is being conducted in a lawful and environmentally responsible manner. He also supervises and directs the reclamation of pits. Monitoring of field operations and contact with the contractor's field supervisors occurs on an almost daily basis. Wyo-Ben, Inc. would plan to monitor its reclaimed lands as explained above in post closure management.

Wyo-Ben, Inc. personnel plans to record the number and locations of pronghorn and mule deer noted when they observed are in the Meeteetse Draw Mine Area. Any known raptor nests in the Amendment area would be monitored for activity starting in February and continuing to July 15th. Migratory Birds or High Federal Interest (MBHFI) nest searches would be conducted prior to any initial surface disturbing activities during the dates April 15 to July 15.

2.2.8 **Interim Management Plan:**

In the event Wyo-Ben, Inc. temporarily closes a pit, interim management procedures as per 43 CFR 3809.401 (5) would be implemented as follows: A berm would be placed in all areas around the pit phase where a highwall occurs. A berm would also be installed at the ramps of the pit to prevent entrance. Temporary water diversions would be made around the pit to prevent water from entering the particular pit phase. Bentonite stockpiles and stockpiles with potential deleterious material (spoil piles, etc.) would be bermed to prevent off-site sedimentation. Ephemeral drainages that have the potential to receive deleterious material would have check damns installed. All equipment and supplies would be kept within the disturbance area. Any fuel storage tanks would either have a perimeter berm or placed within an excavated containment pit to control any potential spills. Annual and semi-annual inspections would be completed by Wyo-Ben, Inc. employees, a representative from the DEQ, and a representative from the BLM.

2.3 Wyo-Ben, Inc. Operator Committed Measures & Best Management Practices

Mining Operations:

- Equipment operators and other contractors would be monitored on a regular basis in order to maintain control of acceptable standards of mining and reclamation.

Topsoil and Subsoil Handling:

- Wyo-Ben, Inc. would save all available soil for reclamation during the initial stripping part of mining. If soil piles are expected to be in place for an extended period due to the temporary closure of the pit or if the soil piles would be in place for more than 1 year, then they would be seeded to prevent erosion and loss of soil. The pit area would be monitored on a regular basis to determine if problems are occurring that need to be addressed.

Surface water/Groundwater/Riparian:

- Wyo-Ben, Inc. would install check dams, where necessary, in newly constructed drainages, and establish vegetation communities in those reclaimed drainages to control sediment runoff in the waterways.
- Through drainage would be reestablished during final reclamation. Table D-6.1 (below) summarizes characteristics of pre-mine drainage basins.
- Significant ephemeral channels (drainage basins of greater than 5 acres) would be temporarily directed around open pits during active mining stages. Channel design for both temporary and permanent diversions would match pre-mine channel gradients and cross-sectional shapes.
- Temporary diversions would comply with BLM regulations and Noncoal rules, chapter 3, section 2(e)(ii)(F) to allow passage of peak runoff from a 2 year, 6 hour precipitation event in a non-

erosive manner. Permanent diversions (including reconstructed channels and adjacent topography) would comply with BLM regulations and Noncoal rules, chapter 3, section 2(e)(iv), to be erosionally stable during the passage of the peak runoff from a 100 year, 6 hour precipitation event. If necessary, sediment control fabric fences would be installed at discharge points into natural channels. These structures would be moved periodically to accommodate active mining areas.

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Rainfall is based on SCS Type II Distribution. Latitude 43-42-35 Longitude 108-17-30. Precipitation reported in tenths of an inch.

2 Year 6 Hour = 0.93	Event used for temporary diversions.
5 Year 6 Hour = 1.32	
10 Year 6 Hour =1.65	Event used for corrugated metal pipe (CMP) Road Crossings.
25 Year 6 Hour = 1.88	
50 Year 6 Hour = 2.31	
100 Year 6 Hour = 2.44	Event used for stability of permanent diversions.

Proposed Big Game Mitigation

- A 30 miles per hour (mph) speed limit in all areas of Meeteetse Draw that are within crucial winter range.
- Targeting reclamation of sagebrush stands and other native shrubs that Mule Deer rely on in the winter months to recreate better value wildlife habitat.
- Wyo-Ben, Inc. proposes to mitigate impacts to winter big game use of the area by implementing a periodic big game monitoring program during the months of December through March in areas that are within ½ mile of active mining or hauling.
- Every fall, Wyo-Ben, Inc. personnel and the Wyoming Game and Fish Department (WGFD) biologist will visit to review Wyo-Ben, Inc.'s survey numbers and address any trends in the population of the Mule Deer population.
- In times of high stress conditions, during the winter months (December 15 through March 15) either Wyo-Ben, Inc. will contact the WGFD local biologist or they will contact Wyo-Ben, Inc. to address mule deer mitigation measures relative to proposed mining.
  Wyo-Ben, Inc. will voluntarily restrict mining operations to ½ hour before sunrise to ½ hour after sunset during the winter months (December 15 through March 15) in those areas considered to contain big game crucial winter range.

Raptors/Migratory Birds of High Federal Interest (MBHFI)

- Wyo-Ben, Inc would follow raptor nesting survey and buffer protocols outlined by the U.S. Fish Wildlife Service (FWS). These include conducting at least three surveys during nesting periods from early March through early June and maintaining a disturbance-free zone around active golden eagle nests of at least 0.5 miles and 0.25 miles for other active raptor nests during the nesting season (February 1 to August 15), or until it is determined that the young have fledged.

- Wyo-Ben, Inc. also proposes to address other MBHFI by conducting ground surveys within immediate areas to be affected prior to disturbance by heavy equipment if initial ground disturbing activity occurs during nesting or brood-rearing periods (April 1 through July 15). If MBHFI nests/broods are noted, operations would be delayed in the affected areas until young have fledged or the WDEQ-LQD, BLM WFO field office and FWS consulted for alternative mitigation suggestions.

Sage Grouse

- WGFD has indicated a concern for sage grouse use associated with the 2 historic leks within the Meeteetse Draw study area. Wyo-Ben, Inc. proposes the following to mitigate potential impacts:
- During the mating season, from March 1 through May 15, no mining or hauling activity would occur within ½ mile of a lek during the consecutive hours between 6:00 pm and 8:00 am to reduce impacts to mating birds due to audio and visual distractions.
- No initial surface disturbing activities would occur between May 15 (nesting season) and July 15 (brooding season) in areas that are within a quarter mile of active leks. Areas planned for disturbance that are further than ¼ mile from active leks would be checked for possible nesting or brooding sage grouse during appropriate times of the year immediately before any activities begin. If nesting or brooding sage grouse hens or chicks are found, mining would be halted until the birds can survive independent of the immediate nest habitat.
- Wyo-Ben, Inc. agrees to monitor sage grouse lek activity and provide yearly reporting of populations in the Annual Report, unless private property concerns prevent access. Wyo-Ben, Inc. would conduct lek surveys with WGFD and BLM WFO to ensure lek surveys are completed.
- Concurrent reclamation, including soil separation and saving or live spreading of topsoil and subsoil.
- Using reclamation seed mixtures that encourage establishment of a diverse population of vegetation. Wyoming big sagebrush seed would be targeted to areas most likely to support initial sagebrush establishment at a rate of two to four pounds per acre.
- Constructing supplemental open water sources, when appropriate conditions allow for such structures.

Threatened and Endangered Species (T&E)

The FWS has indicated the presence of other Threatened and Endangered (T&E) species to be unlikely within the study area. However, it should be noted that field surveys have located several active white-tailed prairie dog colonies within the two-mile study area buffer associated with this proposal. Current plans do not anticipate any direct disturbance within these colonies. Any potential deviations from current plans that would result in disturbance within these colonies would be reported in upcoming Annual Reports to Permit 321C. Particular concern within these colonies is potential habitat for black-footed ferrets and Mountain Plover (MBHFI not T & E). Potential mountain plover impacts would be mitigated by previously described MBHFI nest surveys. No black-footed ferret impacts are currently anticipated from this proposed activity.

Sensitive Species

Wyo-Ben, Inc. also proposes to address other BLM sensitive species by conducting ground surveys within immediate areas to be affected prior to disturbance by heavy equipment if initial ground disturbing activity occurs during nesting or brood-rearing periods (April 1 through July 15). If sensitive specie nests/broods are noted, operations would be delayed in the affected areas until young have fledged or the WY-LQD, Worland BLM field office and USFWS consulted for alternative mitigation suggestions.

Other Wildlife and Aquatic Considerations

Although this study area includes potential habitat for frogs, salamanders or fish associated with the South Fork Coal Draw, none of these species were observed during regular wildlife surveys or incidental observations. In addition, mining/hauling activity proposed with this Amendment area would not directly impact this habitat, although a haul road crossing would be installed across South Fork Coal Draw. Concerns for erosion and sedimentation would be addressed by using straw bale check dams and/or coarse rock/rocky overburden rip-rap used as necessary.

Spill Management Plan:

- Wyo-Ben, Inc. would immediately notify both the Wyoming Water Quality Division of the DEQ and the BLM WFO for any accidental spills of petroleum or other industrial products involving more than twenty-five gallons. Soils contaminated by smaller spills would be removed to the Wyo-Ben, Inc. Stucco Mill Site for natural weathering treatment.
- No solid wastes, either hazardous or non-hazardous, would be disposed of at these sites. All bulk fuel storage tanks would either be bermed for spill containment or placed in an excavated containment pit.

Noxious Weed Management Plan for Federal Lands:

Wyo-Ben, Inc. would implement the following management plan to address noxious weed control on all of its activities conducted on Federal lands:

- The list of Prohibited and Noxious Weeds, located in the WDEQ/LQD Guideline2, Appendix I, or in the approved BLM list of Prohibited or Noxious Weeds located at the following website: http://www.wyoweed.org/statelist.html would be used to identify noxious weeds and other weeds that may reduce wildlife habitat. This list of noxious weeds would be monitored and addressed for treatment once they are identified.
- All Wyo-Ben, Inc. activity areas and access routes would be inventoried for infestations of noxious weeds of particular concern. Wyo-Ben, Inc. personnel would conduct on-going monitoring of noxious weed presence at all of our activity sites and their access routes and take action, in cooperation with the Hot Springs County Weed and Pest, to remove noxious weeds when located, under terms of BLM permits when on public lands.
- All off-road access would be limited to only necessary routes to minimize impacted areas and reduce spread of weeds.
- Wyo-Ben, Inc. would control its access through infested areas until weed removal is accomplished. Wyo-Ben, Inc. would not be responsible for multiple use on the federal lands administered by the BLM which might include hikers, hunters, recreation users, rock hounds, ATV use, motorcycles, cattle, sheep, wildlife, etc. The spreading of noxious weeds is more likely to occur from wildlife, livestock, and the general public. Wyo-Ben, Inc. would train mining personnel (including contractor representatives) to identify noxious weeds of particular concern to assist in the monitoring process. Weed identification materials would be made readily available to assist in field identification.
- Wyo-Ben, Inc. would manage field and mining equipment to reduce the possibility of spreading noxious or invasive weeds on Federal Lands. Wyo-Ben, Inc. would agree to monitor and, if necessary, treat areas of disturbance and to the use of weed free certified materials (seed, straw, and gravel). Wyo-Ben, Inc. would inspect and clean equipment as needed when leaving areas of noxious or invasive weed concern if the equipment would next be used in an area that is void of any noxious or invasive weeds of concern.
- Vegetation would be reestablished on all vegetated soil disturbed by construction, reconstruction or maintenance activities at the first available window of opportunity. This may mean waiting until the fall planting season to help ensure the success of vegetation establishment.
- All seed obtained from commercial sources would be laboratory tested for the presence of noxious weed seed. Native seed offered by local collectors would only be utilized after Wyo-Ben, Inc. personnel have consulted with the collectors to ensure they possess the skills necessary to recognize noxious weeds of concern and sign a statement certifying that they have not collected seed in areas with noxious weed infestations.

- All hay or straw used for check-dam construction or mulching would be certified weed-free.
- All herbicides used on the BLM-administered public land would be approved by the BLM prior to its application.

Vegetation/Invasive Plant Species:

- Yearly monitoring of the proposed disturbance area for noxious weeds would occur. If any are found, Wyo-Ben, Inc. would contract Hot Springs County Weed and Pest (or a licensed herbicide applicator contractor) for treatment of those noxious species after obtaining proper permits from BLM.

2.3.1 Standard Stipulations

2.3.1.1 Cultural/Paleontology

The operator is responsible for informing all persons in the area who are associated with this project that they would be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If paleontological, historical or archaeological materials are uncovered during operations, the operator is to immediately stop work that might further disturb such materials, and contact the authorized officer (AO).

> (i) Operators shall not knowingly disturb, alter, injure, or destroy any scientifically important paleontological remains or any historical or archaeological site, structure, building or object on Federal lands.
>
> (ii) Operators shall immediately bring to the attention of the authorized officer any cultural and/or paleontological resources that might be altered or destroyed on Federal lands by his/her operations, and shall leave such discovery intact until told to proceed by the authorized officer. The authorized officer shall evaluate the discoveries brought to his/her attention, take action to protect or remove the resource, and allow operations to proceed within 10 working days after notification to the authorized officer of such discovery.
>
> (iii) The Federal Government shall have the responsibility and bear the cost of investigations and salvage of cultural and paleontology values discovered after a plan of operations has been approved, or where a plan is not involved.

2.4 Alternative 2 – No Action

No action implies that on-going development and other land use activities would be allowed to continue in the area, but the proposed action would be disapproved. Additional plans of operation would be considered by the BLM on a case-by-case basis.

2.5 Alternatives Considered but Eliminated from Detailed Analysis

The surface location of the proposed action could be situated at different locations. Different surface locations may result in a deviation of effects from the proposed alternative, and may result in a net positive or net negative change in potential effects. Relocation may remove the operation from lands where the quality or quantity of bentonite is known through exploration and would not meet the operator needs, may be outside of placer claims located by Wyo-Ben, Inc., or beyond the outcropping of the bentonite clay layer itself. The proposed locations appear to be the best feasible to minimize potential direct effects upon protected resources. This left no unresolved resource conflicts and no identified needs to consider additional alternatives.

During consultation on the Programmatic Agreement for the Meeteetse Draw Bentonite Mine, an alternative road was proposed by an invited consulting party. It was proposed that this alternative road would minimize or avoid the adverse effects to 48HO1023 and 48HO188. In addition, it was suggested

the alternative road could be used in lieu of a bonded haul road within T. 44 N, R. 95 W Section 11. The alternative road would be used in lieu of the bonded haul road. The alternative road departs from the current proposed road in T. 43 N, R. 95 W Section 2 and travels west through sections 3 and 4 entering the draw in the SW ¼ of section 4 for a total length of approximately 2.5 miles.

The alternative road is not considered an appropriate mitigation measure for the Wyo-Ben, Inc. Meeteetse Draw Bentonite Mine project because it would not eliminate adverse effects to historic properties within the Area of Potential Effect (APE) and has the potential for increasing impacts on known and/or unknown cultural resources and therefore is not analyzed further in this EA.

3.0 AFFECTED ENVIRONMENT

Resources and features not present, and not discussed in this EA, include: Environmental Justice, Class I and Class II visual management areas, Class I Airsheds, prime or unique farmlands, T&E Plant/Animals, Wild and Scenic Rivers, fisheries, floodplains, wetlands, wilderness, and lands with wilderness characteristics.

3.1 Land Use

Historically, these lands have been used for livestock grazing, wildlife habitat, recreational hunting, and bentonite exploration activities. The area within the DEQ Permit Boundary is approximately 4839 acres.

Percent BLM (3509.54): 72.5%
Percent Private (862.99): 17.8%
Percent State (465.85): 9.6%

Total Disturbance Acreage within the DEQ Permit Boundary:
Percent BLM (428.98): 8.8%
Percent Private (4.33): 0.00089%
Percent State (41.41): 0.0085%

The remaining disturbance proposed in the mine plan (approximately 25.4 acres) involves permitted, bonded haul roads.

Two private land owners have raised concerns over the proximity of the haul road to their private residences. Residence A is located approximately 0.2 miles northwest of the intercection of the haul road with West Sunnyside Lane. Residence B is located 1.2 miles southwest of the intersection of the haul road (Coal Draw Road) and Lower Owl Creek road used to access the property.

The Meeteetse Draw Amendment area is located approximately 12-14 miles northwest of the Town of Thermopolis. Established roads in the area include US HWY 120 that travels to the northwest from Thermopolis to Meeteetse and then intersects US HWY 14/16/20 at Cody. Also, US HWY 16/20 travel north to Greybull. A haul road would be constructed from US HWY 16/20 at the junction of Black Mountain Road 172 and route to the existing Haul Road 27.2 across private and public lands. The Burlington Northern/Santa Fe railroad has a rail line traveling north and south approximately 2.5 miles from the proposed southeast disturbance corner.

<u>Lands and Realty</u>
The proposed potential disturbance boundary is encumbered by rights-of-way WYC-044777, a natural gas pipeline and WYW-123840, a power line. WYC-044777 was issued December 4, 1924. The pipeline is located along the portions of the proposed project in T. 44 N., R. 95 W., sec. 31, NW¼SE¼, E½SE¼; approximately 2,500 feet length, 50 foot width for 2.869 acres more or less, and T. 43 N., R. 95 W., sec. 5, W½NW¼, N½SW¼; approximately 3,000 feet length, 50 foot width for 3.443 acres more or less and in T. 43 N., R. 95 W., sec. 6, NE¼NE¼; approximately 600 feet length, 50 foot width for 0.688 acres more or less. The current holder of the right-of-way is Natural Gas Processing. Right-of-way WYW-123840, issued to PacifiCorp on February 24, 1993 includes T. 43 N., R. 95 W., sec. 10, roughly the SW¼NE¼, NW¼SE¼; approximately 2,500 feet length, 100 foot width for 5.739 acres more or less in the proposed project area.

3.2 Geology

The Big Horn Basin is an area bounded by Laramide mountain building to the northwest, north, and east, along with Absoraka volcanics to the west. The center of the basin is filled with flat-lying Eocene

sedimentary rocks, with progressively more complex folding and faulting in Mesozoic and Paleozoic strata as the flanks of the mountains are approached. Economically-important bentonite is limited to middle-lower Cretaceous, identified as the Frontier, Mowry, and Thermopolis Formations. The mining activity proposed with this application would eventually affect bentonite beds in two of the major bentonite bearing formations of the Northern Big Horn Basin.

Overburden associated with each of these beds was sampled in five-foot increments to the contact with the top of the bentonite.

F3 Bed – No suitable plant growth medium was identified in sampled profiles of this bed. The data indicates there would be some soils with acidic, saline, and sodic conditions. No special handling is proposed in material handling of this bed.

Rusty Bed – No suitable plant growth medium was identified in sampled profiles of this bed. The data indicates there would be some soils with acidic, saline, and sodic conditions. No special handling is proposed in material handling of this bed.

Topography

The proposed disturbance area is located in the U.S. Geological Survey (USGS) Quadrangle of Rattlesnake Gulch, Wyoming. The intervals are in 20 foot increments. The topography of the area planned for disturbance in the Meeteetse Draw Amendment is typical of bentonite geology in the area being topography of a steeply dipping Mowry Formation bounded by more gentle topography laterally on both sides, including the Thermopolis Shale formation and associated bentonite beds and Frontier formation with its associated beds.

3.3 Hydrology

3.3.1 **Surface Water / Surface Water Quality / Riparian.**

Surface Water

The proposed action is located within the Bighorn River Coal Draw and the Owl Creek sub-watersheds. There is a watershed divide in the center of the proposed pit areas and the drainage direction is varied by the topography.

These sub-watersheds are located within a 10-14" precipitation zone. Meeteetse Draw is in the Owl-Creek sub-watershed and is an ephemeral tributary to Owl Creek that trends in a southeastern direction adjacent to the proposed disturbance. Owl Creek is located east and down drainage of the proposed mining area. The portions of the pits to the northwest are located in the Bighorn River Coal Draw sub-watershed. The channels trend in a northern and western direction to confluence with the South Fork of Coal Draw that is located just north of the proposed disturbances.

The current disturbances that affect the hydrology of the watershed on public land consist of a two track road and grazing that occurs within the sub-watershed. These sub-watersheds in the area are low lying semi-arid watersheds where evaporation and transpiration rates greatly exceed received precipitation. The drainages are typically losing stream segments where the water table is below the land surface elevation.

Several stock ponds and reservoirs are located adjacent to the Amendment area. Wyo-Ben, Inc.'s mining activity would not disturb any of these ponds or reservoirs.

3.3.2 **Groundwater/Water Quality**

Ground Water

Information obtained from the State Engineer's Office online database indicated permitted water wells within three miles of the amendment areas. Most water wells are reported to be far below the depth that Wyo-Ben, Inc. would mine; however there are some permits that are -1 to 30 feet in depth. These wells

are located on or near the floodplain of Owl Creek that is in a different unconfined aquifer that is located southeast of the proposed disturbance area. Additionally, no ground water was encountered during developmental drilling of the pits of this Amendment. There is one spring named the Hart Spring that is located in the NW ¼ NW ¼ of Section 9 of T. 43 N, R. 95 W. This is located approximately 700 feet upslope of the mining area where isolated perched ground water likely occurs from the shale bedrock outcrop.

Water Quality

Historical water quality data from the area is very limited due to the ephemeral characteristics of the watershed. General water quality from runoff of shale type outcrops and saline areas in the basin is of poor quality with elevated PH and total dissolved solid parameters as evidenced by BLM reservoir water quality monitoring in similar areas in the Bighorn Basin.

3.4 Air Quality

The primary air-borne pollutant within the area impacted by mining would be Particulate Matter (PM) in the form of fugitive dust (uncontrolled wind-carried particulates) generated from mining and traffic along haul roads. Exhaust from vehicles and mining equipment would be a secondary contributor. Field observations indicate that the soils in the area are naturally high in silt size particles, making them more susceptible to blowing.

Site-specific meteorological data is not available for the mine area though comprehensive meteorological data is available for the Thermopolis Airport. The Thermopolis data was used to generate site-specific climatic parameters using the Rock:Clime climate generator that is available on the U.S. Forest Service web based Water Erosion Prediction Project (WEPP). These meteorological parameters are summarized in the table below.

Table 3.1 Average Monthly Climatic Information

Rock:Clime generated data based on 38 years of record at Thermopolis, Wyoming

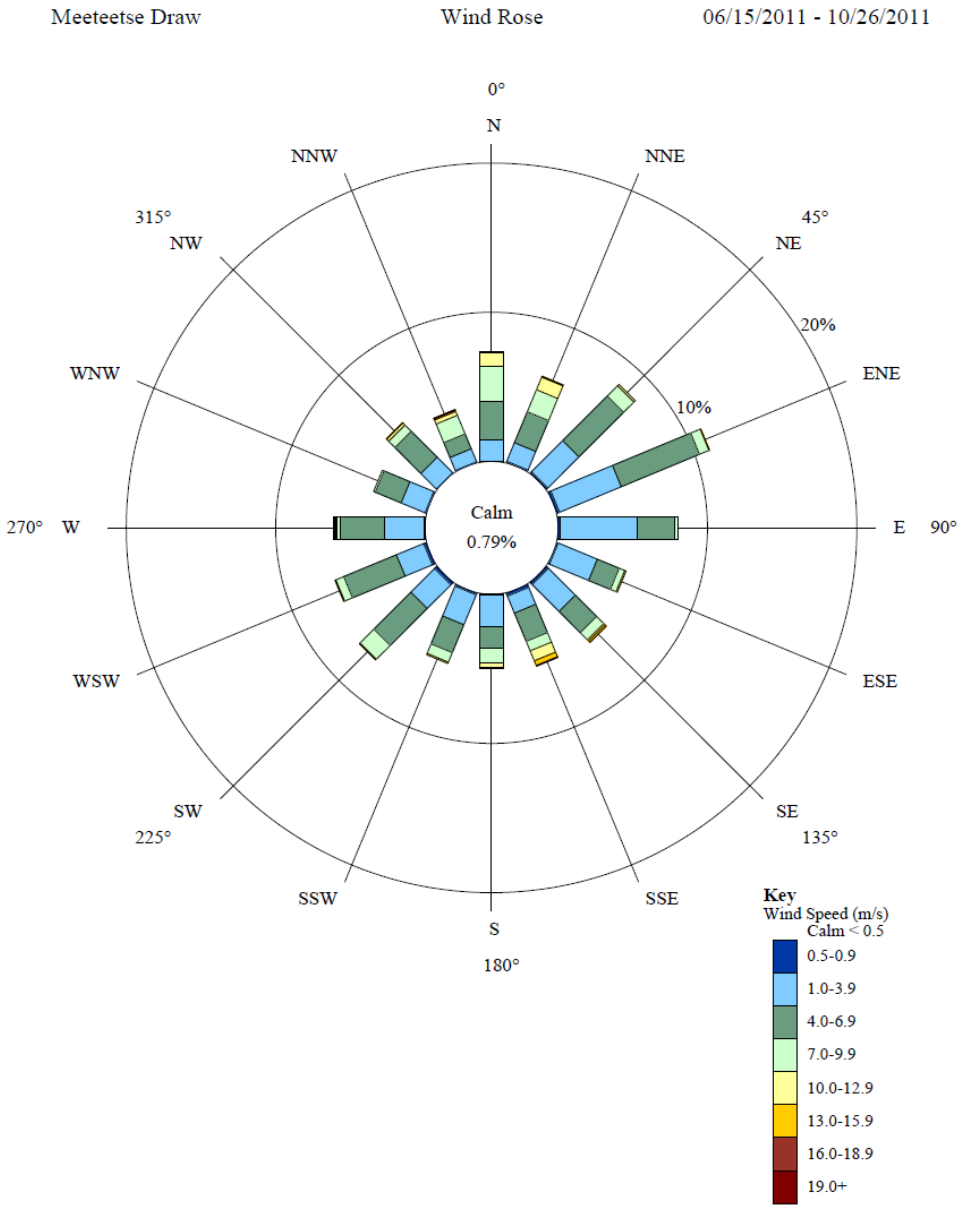
	Mean Maximum ***Temperature*** ***(°F)***	**Mean Minimum** ***Temperature*** ***(°F)***	**Mean Precipitation(in)**	**Number of Wet Days**
January	**39.3**	**9.9**	**0.32**	**3.2**
February	**43.3**	**15.8**	**0.27**	**3.0**
March	**49.5**	**21.3**	**0.65**	**4.6**
April	**58.7**	**29.5**	**1.26**	**5.3**
May	**68.0**	**38.8**	**2.14**	**7.6**
June	**77.6**	**46.3**	**1.85**	**7.7**
July	**84.9**	**51.5**	**1.31**	**7.3**
August	**83.4**	**49.6**	**1.06**	**5.6**
September	**73.3**	**40.0**	**1.03**	**4.3**
October	**63.0**	**31.2**	**0.70**	**2.9**
November	**47.6**	**19.2**	**0.45**	**3.0**
December	**40.7**	**12.8**	**0.30**	**3.0**
Annual			**11.33**	**57.5**

The nearest air quality monitoring station is located 39 miles to the north northeast near Basin, Wyoming in T. 50 N, R. 94 W Section 28 (44.27990ºN 108.04086ºW). This station is part of the Wyoming Air Resource Monitoring System (WARMS) collecting basic meteorological parameters (air temperature, wind speed and direction, relative humidity, barometric pressure and precipitation) in addition to aerosols, $PM_{2.5}$ and ozone.

Reliable data reflecting wind speed and direction are not available for the proposed mining location. The BLM has placed an anemometer on the upper portion of mining area in the unnamed draw located in T. 43 N, R. 95 W Section 9 (43.71482ºN 108.25987ºW). Data from this devise is not considered reliable for multiple reasons: 1) data has not been collected over a sufficient time frame, 2) data has been collected at two different locations and, 3) the protocol is for the anemometer to be placed 10 meters above the surface; the current device is only 2 meters above the surface.

Given the lack of reliable data for wind speed and direction, data from the Basin WARMS station will be used in this analysis. To represent seasonal variations of wind speed and direction, these data have been summarized on a quarterly basis, and depicted by a series of wind roses. Despite the questionable quality of the BLM anemometer data, a wind rose was created for comparison to the WARMS Data.

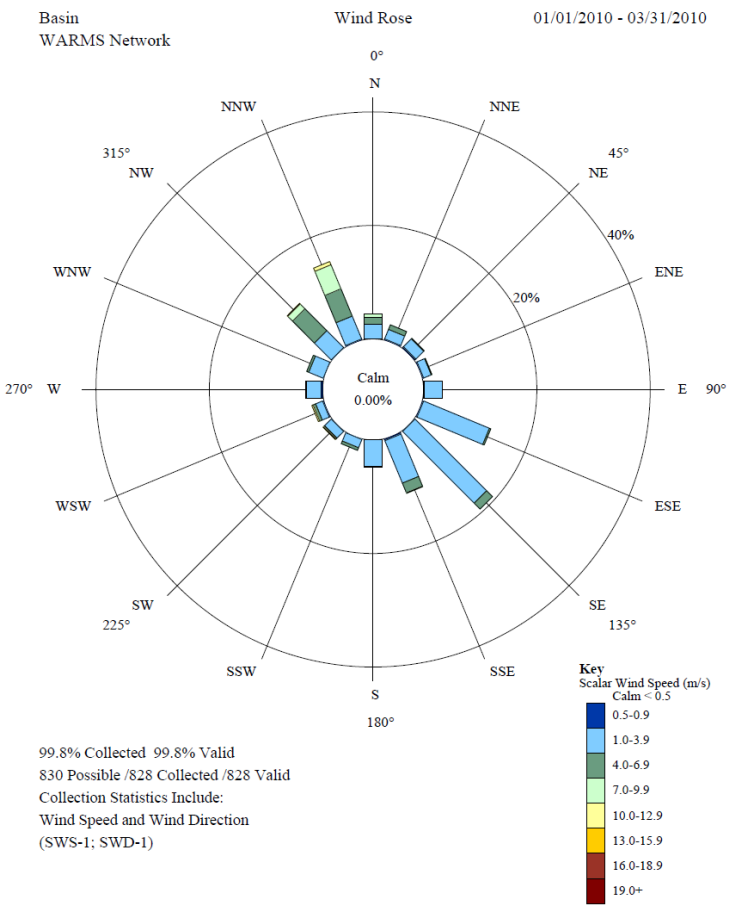
A brief summary of the WARMS data indicates that there are few periods of calm wind speeds. The highest sustained winds occur in the spring when winds of 30 miles per hour (mph) occur. Peak wind



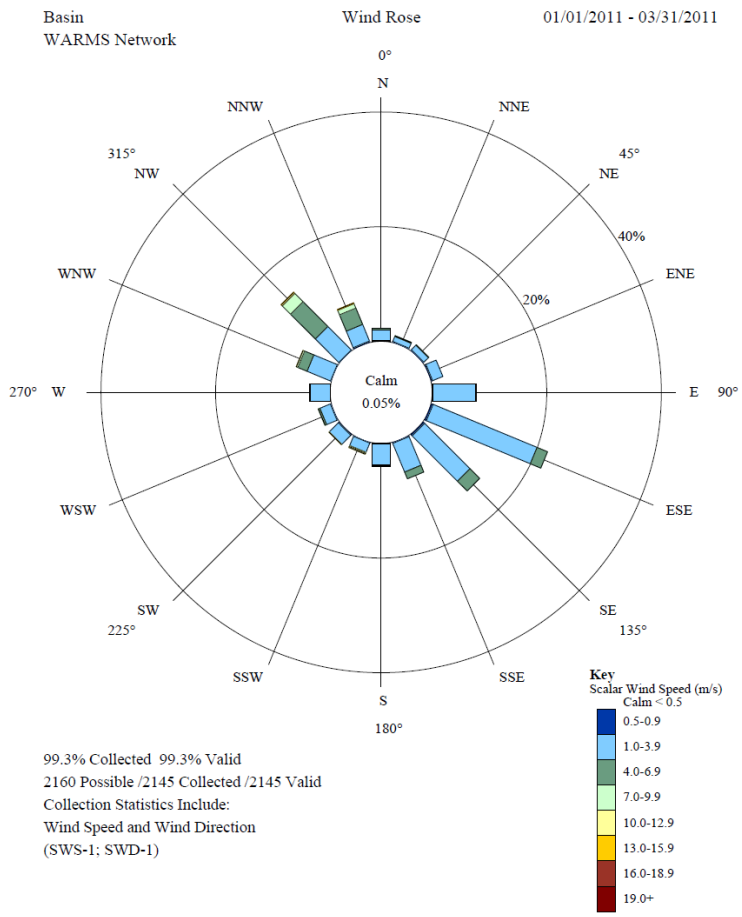
BLM data collected June-October 2011

speeds throughout the remainder of the year are generally 2 to 22 mph. Winds have been recorded from every direction but they are generally out of the southeast or northwest. In the winter, southeast winds occur more frequently and winds form the northwest are more common in the spring. BLM data indicates the possibility that winds could take on more of a northeast flow at this location. The wind roses that follow depict wind speed and direction. Note that wind speed is depicted as meters per second.

Winter Wind Speed and Direction-- Basin WARMS Network Data

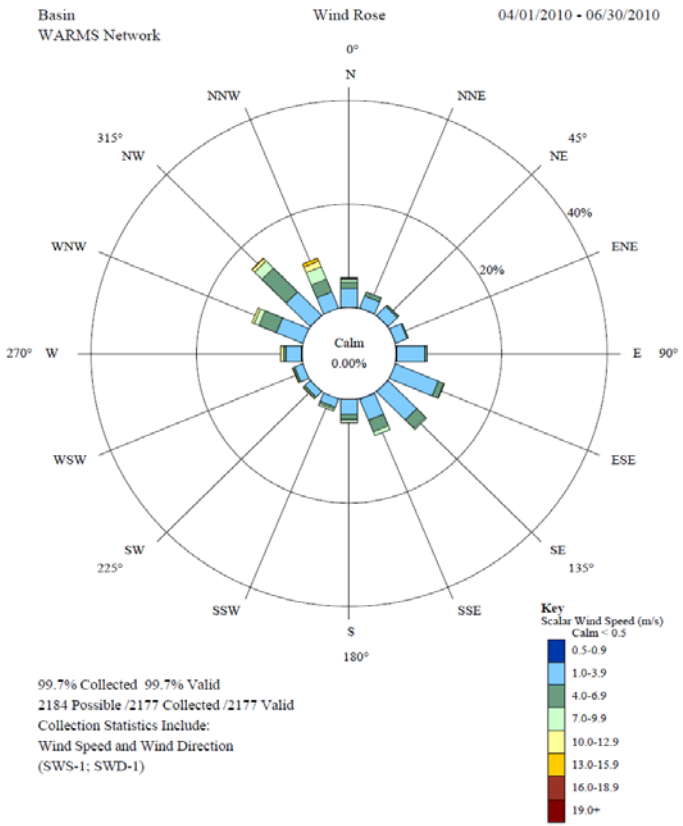


January - March 2010

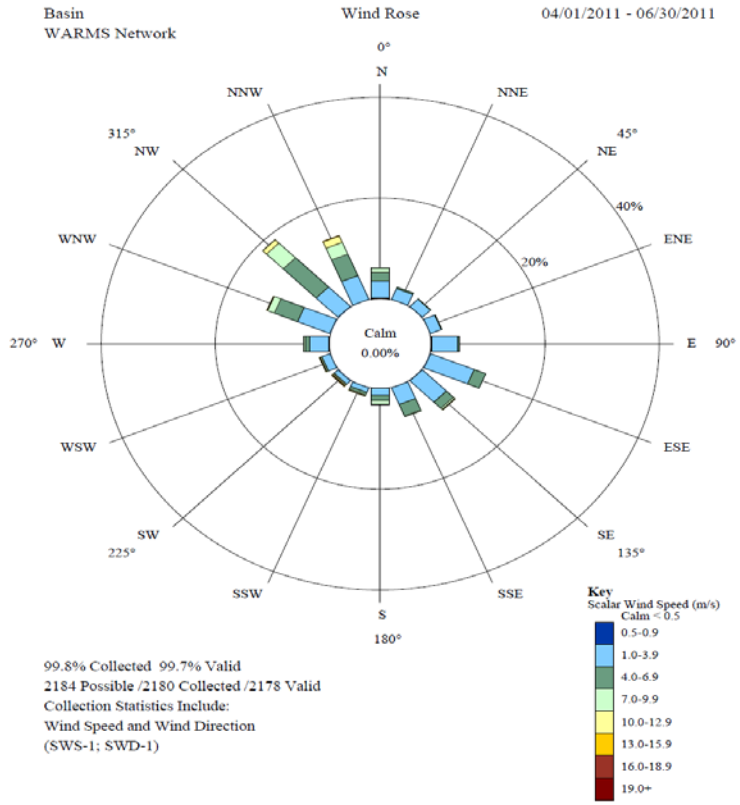


January - March 2011

Spring Wind Speed and Direction – Basin WARMS Network Data

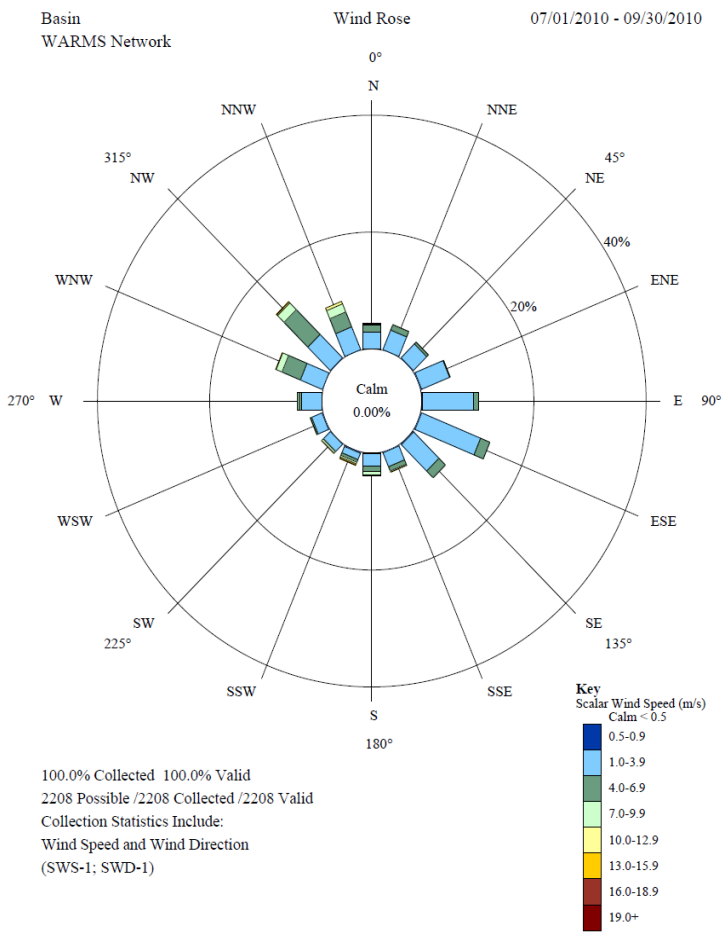


April - June 2010

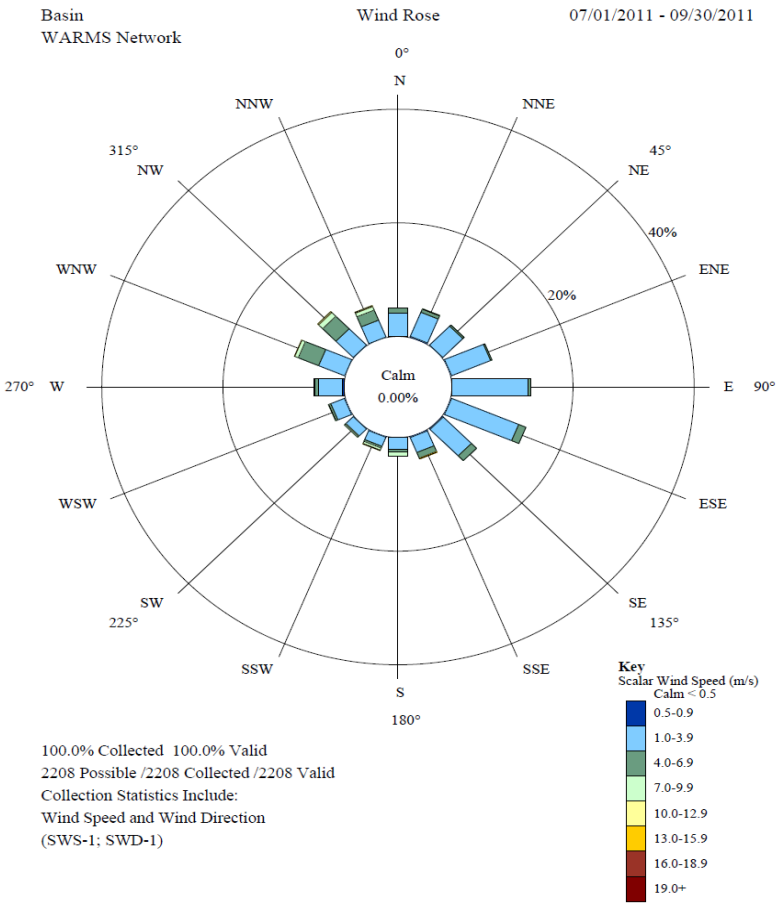


April - June 2011

Summer Wind Speed and Direction-- Basin WARMS Network Data

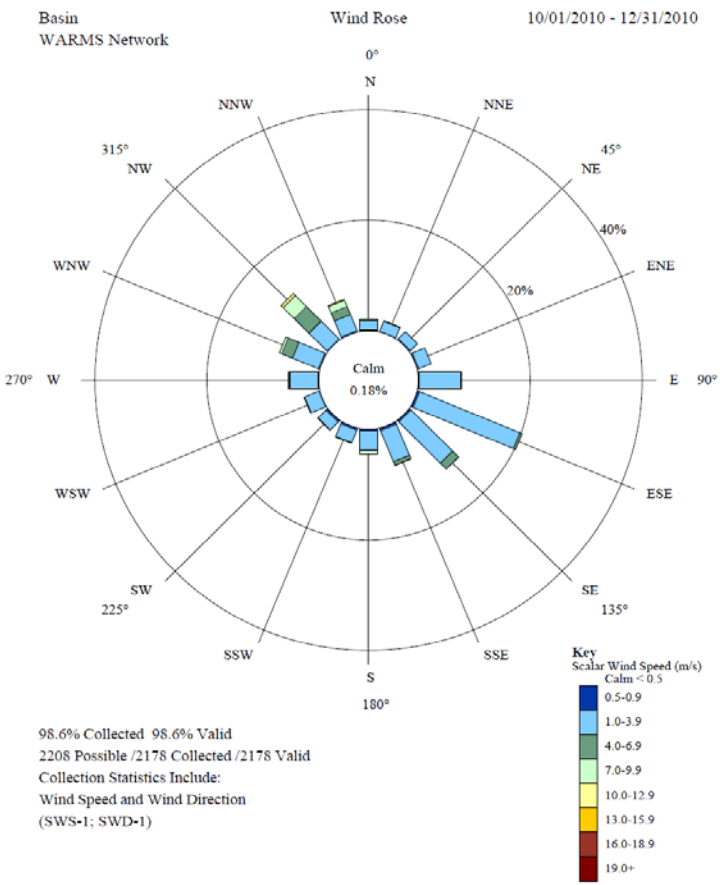


July- September 2010 1

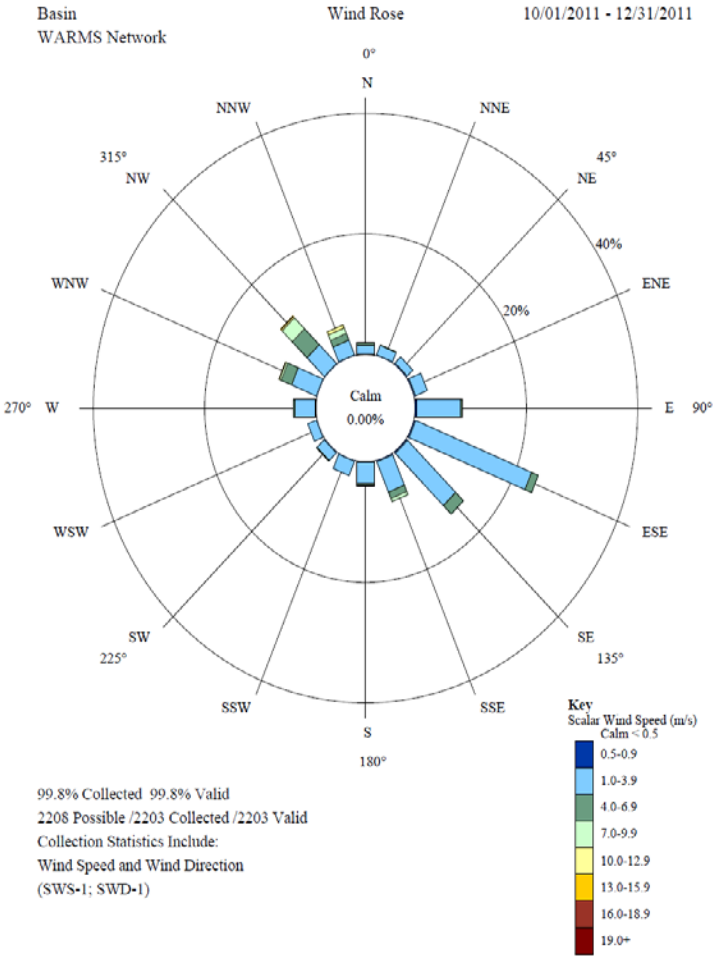


July - September 2011 1

Fall Wind Speed and Direction-- Basin WARMS Network Data



October - December 2010



October - December 2011

3.5 Soils

Soil Properties

Shell Valley Consulting, Inc. (SVC) conducted a soil inventory for the Wyo-Ben, Inc. Meeteetse Draw Amendment area. The objective of the SVC study was to 1) develop soil map units and delineate boundaries aerial photographs; 2) define soil physical and chemical characteristics and; 3) determine suitability and salvage depths of topsoil/subsoil. The soil map produced by SVC and the overall quality of the document will be instrumental in determining the suitability and depth of the topsoil and subsoil resources, and would be critical for reclamation activities.

The mine area is located on a semi-arid upland position consisting of ridges and valleys associated with uplifting Cretaceous Era members of the Thermopolis Shale, Mowry and Frontier geologic formations. The extreme eastern edge of the study area occupies a narrow corridor of alluvial valley fill deposited by Owl Creek (a perennial tributary of the Big Horn River) and Meeteetse Draw (an ephemeral tributary). Additionally, the mine site is dissected into eastern and western portions by intermittent flows in Coal Draw, which is also associated with alluvial depositions and perpendicular breaches in the otherwise east-west directions of Mowry and Frontier Ridges and outcrops. Surface topographies vary from gentle gradients (<1%) that are associated with dissecting drainage channels, to moderate backslopes (5-15%) and steep scarp-faces (15%-50%) on Mowry Ridges. Aspects vary but are predominately north and south on ridge backslopes and scarp faces.

Generally, soils on the study area have formed from parent material represented by alternating beds of incompetent and resistant sedimentary rocks from ancient inter-bedded lacrustine deposits of shale, clays and calcareous sandstones associated with the Frontier, Mowry and Thermopolis Shale geologic formations. These beds have been affected by geologic folding, hydrologic runoff and erosional patterns to form a landscape of low rolling ridges, relatively steep escarpment slopes and eroded drainages. Soil chemical and physical properties vary accordingly. Overall topographic aspects vary and elevations generally range between approximately 4,200 and 5,100 feet above sea level.

Further details concerning the soil resource are included in the Wyo-Ben, Inc. Meeteetse Draw Amendment located in Appendix D-7 of the mine plan. This document includes detailed profile descriptions, a profile summary, soil laboratory data, and the soil map of the mine area. The reader is directed to this document for further details concerning the soils resource.

3.6 Native Vegetation and Noxious/Invasive Plant Species

3.6.1 **Native Vegetation**

The project area lies in the low end of the 10-14 precipitation zone. The majority of the project area would be characterized as Shallow Loamy, Shallow Clayey, and Saline Upland sites. The project area is in uplifted terrain with many “micro-sites” present which has resulted in a mix of these sites occurring on the area. Also, being in the low end of the 10-14 with local terrain affecting precipitation, there are no doubt lower precipitation (5”-9”) vegetation characteristics present.

Based on observations made on the field trip to the site with the project proponents, the area does not seem to represent the Historic Climax Plant Community for the Shallow Loamy and Shallow Clayey sites, but a lower state in the State and Transition model for the site. With the foregoing in mind the following vegetation descriptions would apply:

Shallow Loamy 10-14

Perennial Grass/Mixed Shrub Plant Community

Historically, this plant community evolved under grazing and a low fire frequency. Currently, it is found under moderate, season-long grazing by livestock and will be exacerbated by prolonged drought conditions. In addition, the fire regime for this site has been modified and extended periods without fire are now common. This plant community is still dominated by cool-season grasses, while short warm-season grasses and miscellaneous forbs account for the balance of the understory. A variety of shrubs is now a conspicuous part of the overall production.

The dominant grasses include bluebunch and Griffith's wheatgrasses, rhizomatous wheatgrasses, and needleandthread. Grasses and grass-like species of secondary importance include prairie junegrass, blue grama, Sandberg bluegrass, and threadleaf sedge. Green needlegrass and spikefescue occur on sites in the upper limit of this precipitation zone. Forbs commonly found in this plant community include scarlet globemallow, fringed sagewort, fleabanes, leafy wildparsley, and phlox. Big sagebrush, black sagebrush, green rabbitbrush and winterfat dominate the overstory. Shrubs can make up to 20% of the annual production. The overstory of shrubs and understory of grass and forbs provide a diverse plant community.

When compared to the Historic Climax Plant Community, shrubs, prairie junegrass, and blue grama have increased. Plains pricklypear cactus may also have invaded, but occurs only in small patches. Indian ricegrass and bluebunch and/or Griffiths wheatgrasses has decreased and Indian ricegrass may occur in only trace amounts under the sagebrush canopy or within the patches of pricklypear. In addition, the amount of winterfat may or may not have changed depending on the season of use.

Shallow Clayey 10-14

Perennial Grass/Mixed Sagebrush Plant Community

Historically, this plant community evolved under grazing and a low fire frequency. Currently, it is found under moderate, season-long grazing by livestock and will be exacerbated by prolonged drought conditions. Fire is a rarity and extended periods without fire is common as fire suppression has changed the natural fire regime. This plant community is still dominated by cool-season grasses, while short warm-season grasses and miscellaneous forbs account for the balance of the understory. A variety of shrubs is now a conspicuous part of the overall production. The dominant grasses include Bluebunch or Griffith's Wheatgrass, Rhizomatous Wheatgrasses, and Bottlebrush Squirreltail. Green Needlegrass is considered a major grass, however, it is usually found in the higher precipitation areas of this zone. Grasses and grass-like species of secondary importance include Prairie Junegrass, Blue Grama, and Sandberg Bluegrass. Forbs commonly found in this plant community include Scarlet Globemallow, Wild Onion, Smooth Woodyaster, Leafy Wildparsley, and Hood's Phlox. Big Sagebrush, Black Sagebrush, Birdfoot Sagebrush, Gardner's Saltbush, and Shadscale Saltbush dominate the overstory. These shrubs can make up to 20% of the annual production. Plains Pricklypear Cactus can also invade.

When compared to the Historic Climax Plant Community, Big Sagebrush, Black Sagebrush, Birdfoot Sagebrush, Rhizomatous Wheatgrasses, Prairie Junegrass, and Blue Grama have increased. Plains Pricklypear Cactus may have invaded, but occurs only in small patches. Indian Ricegrass and Bluebunch Wheatgrass have decreased and may occur in only trace amounts under the sagebrush canopy or within the patches of pricklypear. In addition, Winterfat may or may not have changed depending on the season of use.

3.6.2 Invasive Species

The project area encompasses drainages and reservoirs, which have been invaded to some extent by *Tamarisk* (Saltcedar). *Downy brome* (Cheatgrass) has invaded the native rangeland, but is not presently dominant throughout.

3.7 Livestock Grazing

The following allotments would be affected by the proposed action:

Coal Draw #00574:	No Current grazing permit		
Meeteetse Draw #00566: (AUMs)	30 cattle 60 cattle	5/27 to 6/9 6/10-9/30	92% PL13 Animal Unit Months 92% PL205 AUMs
Buchanan Allotment #00643:	271 cattle	10/01 – 12/11	85% PL545 AUMs
South Coal Draw #00645:	159 cattle	9/1-1/31	68% PL544 AUMs

3.8 Wildlife

The wildlife habitat within the proposed mining areas consists of linear rolling uplands with several incised drainages bounded by rim rock outcrop to the north and south. The upland vegetative community is primarily a Wyoming sagebrush bunch grass community, and vegetation around the rim rock consists of scattered sagebrush and bunchgrass, juniper and limber pine. The area does provide habitat for numerous wildlife species, some seasonally and some yearlong.

The mining areas and proposed access route provides yearlong habitat for mule deer and antelope, and all of the proposed mining areas are within crucial winter range for mule deer.

The proposed disturbance is not within core sage-grouse habitat, but there is an active lek and a winter concentration area approximately .3 miles north of the northern most proposed mining, and most of the proposed mining is within the 2 mile lek buffer for nesting and brood rearing. The Dempsy 2 lek mentioned above has had only 2 males attending the lek for the past several years, and the winter concentration area was identified in the winters of 2006 and 2007 when approximately 15 birds were observed. Sagebrush habitats within the proposed mining areas, particularly those along the southern line, do appear to be suitable for sage-grouse nesting and early brood rearing.

Primarily because these sagebrush communities have suitable canopy covers for nesting and they are largest, most contiguous, and closest, patches of sagebrush within proximity to the lek and winter concentration area. These sagebrush habitats are also likely providing some nesting and foraging habitat for sagebrush obligate passerines like the Sage thrasher, Sage and Brewers sparrows.

The surrounding rim rock mentioned above is suitable for raptor nesting and foraging and there is a known Golden eagle and osprey nest within proximity to the proposed mining and/or traffic disturbance. Portions of the proposed access road to the northeast of the mining operation are occupied by a white-tailed prairie dog colony, and this colony could also be providing nesting and/or foraging habitat for Mountain plover, burrowing owl and the Ferruginous hawk. There are numerous other small mammals, predators, passerines, and raptors that use this area, some yearlong.

No known threatened or endangered animal species are known to inhabit this area, but the sagebrush obligates like the sage-grouse, Sage thrasher, Sage and Brewers sparrow, as well as the Mountain plover, burrowing owl and ferruginous hawk are all Wyoming BLM Sensitive Species.

3.9 Visual Resource Management (VRM)

BLM manages the project area as VRM Class III. The project area is located on BLM –administered public lands identified as Visual Resource Inventory (VRI) Class II. The Scenic Quality Rating Unit (SQRU) was inventoried and scored with a scenic quality B rating, and low sensitivity level. The SQRU is composed of repeating angular forms, contrasting natural elements of color and lines, and back dropped by the Absaroka and Owl Creek mountains to the south and west, and the Bighorn Mountains to the east. The characteristic of the landscape is similar to what may be observed in most other areas within the Bighorn Basin, and is not assessed as unique. The SQRU rated with a low sensitivity level encompasses BLM and private lands allocated for agricultural use, and allows for moderate surface disturbing activities which are both accepted land uses.

3.10 Cultural and Historic Resources

The Area of Potential Effect (APE) is defined by the Wyoming State Protocol Agreement between the BLM and the State Historic Preservation Office (SHPO) (State Protocol) as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effect is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. The Project APE for historic properties was defined by the BLM to include the physical footprint of the proposed surface disturbance and the foreground of the proposed surface disturbance.

A Class III cultural resource inventory was conducted of the proposed surface disturbance plus a buffer by High Country Archeology in 2010 and 2011 for a total of 1,027 acres surveyed. In addition to the Class III survey, a reconnaissance inventory was conducted of the foreground of the proposed disturbance. The inventories identified fourteen (14) cultural sites within the Area of Potential Effect (APE). Eleven (11) of the sites were determined eligible for the National Register of Historic Places (NRHP) and three (3) were determined not eligible. Identified site types within the APE include a historic canal, historic power line, prehistoric rock art, and prehistoric lithic scatters. Two of the NRHP eligible sites are historic. Nine of the NRHP eligible sites are prehistoric rock art.

Native American consultation was also initiated by the BLM and included the Crow, Eastern Shoshone, Northern Arapaho, Northern Cheyenne, Salish-Kootenai, and Shoshone-Bannock. The purpose of the consultation was to determine if any of the tribes have concerns with the proposed project. Initial letters were sent to the tribes in September of 2010 and followed up with phone calls and emails to the Tribal Historic Preservation Officer (THPO) for each tribe. The BLM hosted site visits to the project area with the Eastern Shoshone (October 2010), the Northern Arapaho (January 2012), and Northern Cheyenne (May 2012). Site visits are planned with the Crow.

3.11 Paleontology

The surface formations within the proposed disturbance area are Mowry Shale, Cody Shale and Frontier Formation which have a PFYC (Potential Fossil Yield Classification) rating of 3 or moderate. This means the formations have a moderate sensitivity for paleontological resources. Typical fossils within these formations include invertebrates and marine vertebrates. Significant localities are not common within these formations. Due to the low probability for affecting significant localities no paleontological inventory was required.

3.12 Socioeconomics

The proposed mine plan of operations is within Hot Springs County, Wyoming. The principal industries in Hot Springs County are gas and oil development, bentonite mining, farming, ranching, and tourism. According to the US Census Bureau the population of Hot Springs County in 2011 was 4,812. From 2006-2010 the average per capita income from was $25,269 and the median income was $42,469.

The population of Hot Springs County consisted of White at 94.6 percent and 5.4 percent who are classified as minority (non-White). Within that population 9.1 percent are low income; i.e., that live below the poverty level. Bureau of Land Management Instruction Memorandum No. 2002-164 implements Executive Order 12898 of Feb. 11, 1994 “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.” Such populations would be able to review information about this mine plan during a 30 day review period this is a requirement of 43 CFR 3809.411(c).

Mining at 30 percent and government at 25 percent were the largest contributors to earnings by place of work within the County, with health care and social assistance at 10 percent. For a complete listing see Table 2-50 in the Analysis of the Management Situation for the Bighorn Basin Resource Management Plan Revision Project, BLM 2009. The mining sector includes jobs in oil and gas sector.

3.13 Hazardous Materials/Public Health and Safety

Hazardous Substances, Hazardous Wastes and Solid Wastes

Throughout the life of the mine there is a potential for the operator to use chemicals that could be classified as hazardous substances, hazardous materials or hazardous chemicals. A list of potential substances that would likely be used in the mining operation follows.

Table 3.2 Potential Hazardous Substances List

Hazardous Material	Purpose
Diesel Fuel	Fuel
Gasoline (unleaded)	Fuel
Grease and Lubricants	Equipment lubrication
Engine Oil	Engine lubrication
Ethylene Glycol	Engine coolant
Hydraulic Fluid	Hydraulic equipment and lines
Acetylene	Welding and cutting
Propane	De-icing as required

There is little potential for hazardous wastes to be generated from routine mining operations other than a limited potential to generate contaminated fuels. Used oil would be generated; though not considered hazardous, the disposal of used oil is regulated. Solid Waste, including but not limited to paper and card board, beverage containers, oil and lubricant containers and used tires, would be generated through mining operations.

4.0 ENVIRONMENTAL EFFECTS

4.1 Land Use

4.1.1 **Alternative 1**

The dominant land use for the proposed mine areas is domestic grazing. Additional uses include wildlife habitat, hunting and other recreational opportunities.

Disturbances over the life of the mine would potentially disturb up to 500.4 acres over a period up to 20 years in length, changing the land use for this period of time.

The operator proposes a castback mining method that would minimize the acreage disturbed at each pit at any particular time and promotes concurrent reclamation. The WDEQ-LQD would hold a reclamation bond that is only releasable when the reclamation is found to be to the satisfaction of both the BLM and the DEQ. The bond amount held by the DEQ is re-evaluated annually.

There could be impacts from fugitive dust and vehicle exhaust to two adjacent landowners. Refer to Section ***4.4 Air Quality*** for a more detailed discussion.

Lands and Realty

New surface disturbance as a result of the proposed potential disturbances boundary would increase the potential for disturbance of existing rights-of-way. The mining operations in the vicinity of the rights-of-way could create potential safety hazards to Wyo-Ben, Inc. employees as well as the general public. Wyo-Ben, Inc. would be responsible for protecting the existing pipeline and power line.

Mitigation:

The operator will inspect the construction area for the presence of utility facilities both surface and subsurface, and notify the Wyoming One Call System 1-800-849-2476 before construction activities begin. The operator will use extra safety precautions when working near or around pipelines, power lines, power poles, underground cables, or other utility installations. The operator will be responsible for taking such measures as may be necessary to protect other authorized facilities on public lands from damage due to mining operations. The operator is responsible for contacting those other users and coordinating with them.

4.1.2 **Alternative 2**

Under the No Action Alternative, the development of the Proposed Action would not occur. No effects on additional land resources would be expected to occur beyond the current land uses of the project area.

4.2 Geology

4.2.1 **Alternative 1**

The continued mining of bentonite would result in a depletion of that locatable mineral by the amount of bentonite removed in total wet bank tons. There is no established threshold of significance regarding removal of minerals although the resource management planning decisions permit such activities. Surface mining of bentonite is practiced in many other parts of the Bighorn Basin where beds of bentonite are exposed at the surface.

4.2.2 **Alternative 2**

Under the No Action Alternative, the development of the Proposed Action would not occur. No effects on additional land resources would be expected to occur beyond the current land uses of the project area.

4.3 Hydrology

4.3.1 **Alternative 1**

4.3.1.1 Surface Waters/Water Quality (surface) Riparian

Surface Water

The hydrology of the drainages would be altered temporarily by the re-routing of water around the overburden storage area. This would change the nature of the flow patterns surrounding the pits and downstream of the pits. Rill and gully formation would likely occur and exposed areas with no vegetative cover and on slopes greater the 5 percent. These rills and gullies that fall outside of the contained pit area are likely to transmit new sediment that would be introduced into the watershed if the area received a precipitation even greater than 2 year, 6 or the 100 year 6 hour maximum precipitation events.

The installation of seven 18 inch and three 24 inch culverts would be placed along drainage crossings from the three proposed haul roads. The culverts design and flow capacities were estimated using runoff calculations that were modeled using the Soil Conservation Service (SCS) curve number for the area, the hydrologic soils group, and storm estimates for 2, 5, 10, 100 year hour events using the Federal Highway Culvert sizing software. Typical velocities were used for average drainages for hydrology calculations. The placement of the culverts and mined areas would alter the natural drainages morphology and runoff velocity until reclamation occurs. During reclamation the channel design for both temporary and permanent diversions would match pre-mine channel gradients and cross-sectional shapes.

The operator has submitted a Storm Water Pollution Prevention Plan (SWPPP) as required by the State of Wyoming Department of Environmental Quality (WYDEQ). This plan outlines best management practices to be used in conjunction with the proposed action to reduce overall amounts of erosion into adjacent downstream drainages and prevent unnecessary and undue degradation to the hydrology of the watershed. Surface flow may be diverted on the up-slope side of pits and other affected areas to prevent accumulation of water in pits, and to prevent down slope sedimentation.

4.3.1.2 Ground Water/Water Quality

Ground Water

Wyo-Ben, Inc. mining activities should not affect any permitted water wells. The overall transmissivity of the geologic unit is very low. The surface geology consists of the Thermopolis shale and Frontier formations that are locally confining units. Therefore any potential impacts to ground water in the area or movement of ground water from the site is very low. The Thermopolis Shale and Frontier formations have a moderate to low sensitivity to groundwater contamination due to relatively low water transmission rates (Hamerlinck and Arnerson,1998). No other ground water impacts are expected.

Water Quality

Any potential impacts to water quality would only be detected following storm events that are capable of producing runoff due to absence of connected perennial flowing water near the proposed action. The ephemeral channels, and lack transport would make impacts negligible. The specific impacts from the proposed action are of too small of a scale and difficult to model due to the ephemeral flow regime of the sub-watershed. The overall change in water quality from runoff below downstream of the pit areas from the proposed action is unknown. However, overall general best management practices in the mine plan and Storm Water Pollution Prevention Plan (SWPPP) are in place to reduce potential impacts to water quality.

4.3.2 **Alternative 2 (Surface Water, Ground Water, Water Quality)**

Under the No Action Alternative, the development of the proposed action would not occur. The additional roads, pits, stockpiles in the sub-watershed would not occur. The current infiltration rates and runoff conditions in mining area of the Bighorn River-Coal Draw and Owl Creek sub-watersheds would remain

unchanged. The native channel conditions and runoff conditions from the area would remain unchanged from current conditions.

4.4 Air Quality

4.4.1 **Alternative 1**

Climatic conditions dry enough to generate fugitive dust occur 85 percent of the time. Depending on the diligence to which dust abatement activities are conducted (wetting of road surface by water truck), and the time frame over which dust abatement remains effective, this potential could be mitigated. During the hotter summer months, the haul road would dry faster with the return to dusty conditions occurring more rapidly and frequently. During sub-freezing conditions, when water cannot be applied on the haul road, the potential for the generation of fugitive dust would remain. However the adjacent residences are more likely to be closed up reducing the potential for dust to settle in living spaces.

Few impacts from fugitive dust or vehicle emissions are anticipated to the two residences as a direct result of mining activities. Impacts resulting from fugitive dust are more likely to be the result of traffic along the haul road. The *Residence A* is the closest to the haul road. Assuming dry road conditions, this location would be impacted most when the winds blow from the southwest. However, winds from the southwest are not common, occurring less than 10 percent of the time. Periods of relative calm, though not frequent, could also impact this residence. Winds from the southeast, occurring 35 percent of the time, would have little effect on this residence. The impacts to this residence would likely consist of an increase in the amount of dust settling within the residence and on vehicles.

Residence B is located 1.2 miles southwest of the haul road. Winds from the northeast would have the greatest potential to impact this residence. Northeast winds are more common during the summer months, occurring nearly 20 percent of the time. Throughout the remainder of the year, northeast winds occur less than 20 percent of the time. There would be some potential for wind-blown dust to reach this residence during periods of sustained northeast winds. During periods of relative calm, fugitive dust is not likely to reach this residence. The impacts to this residence would likely consist of an increase in the amount of dust settling within the residence and on vehicles.

4.4.2 **Alternative 2**

Under this alternative there would be no mining and no subsequent increase in use of the haul road. Fugitive dust would remain at its current level and there would be no increases in vehicle emissions.

4.5 Soils

4.5.1 **Alternative 1**

Surface disturbance from mining activities would consist of removing of the vegetative cover, the excavation of the overburden, and segregating and storing topsoil and subsoil resources. The excavation of the overburden would totally alter the soil profile. Soil horizons would be obliterated and mixed. The overall soil health would be impacted through the alteration of the soil physical properties. There would be potential for reduction in organic matter. The soil surface layers, soil structure and soil depths would be altered. The exposed soil would be susceptible to the erosive forces of raindrop impact and overland flow.

The proposed action would allow for a more rapid recovery of soil health with respect to soil physical properties. Concurrent reclamation practices would reduce the time that the soil is bare. The soil reclamation material, including both subsoil and topsoil, would not be stockpiled for a long periods of time and, would retain much of its original physical properties such as organic matter content and structure, thus ensuring better reclamation.

Surface disturbance would increase runoff and erosion. During active mining, the Water Erosion Prediction Project (WEPP), U.S. Forest Service web based interphase; Disturbed WEPP model predicts a 56 percent probability of runoff with a 44 percent probability of erosion averaging 0.42 tons per acre per year, when modeled for 50 years. In the event of a 50-year storm cycle erosion could be as high as 8.7 tons per acre per year.

During the reclamation phase as herbaceous species become established, WEPP predicts an 18 percent probability of runoff and a 12 percent probability of erosion with erosion rates averaging only 0.03 tons per acre per year, again, when averaged over 50 years. In the event of a 50-year storm cycle erosion could be as high as 1.1 tons per acre per year.

A soil loss threshold of 5 tons per acre per year has historically been the established threshold for agricultural lands. Given the arid setting of the proposed action, the extent soils with depths less than 40 inches, and the minimally developed topsoil layer, a threshold of 2 tons per acre per year has been established. Average erosion rates predicted by WEPP during the reclamation period are within this threshold.

Runoff and erosion would be generated by the proposed haul road. The WEPP: Road model predicts that for every 200 feet of road surface there would be 243 pounds of sediment generated annually of which 100 pounds is projected to be available for transport beyond the 100 foot right-of-way.

Mitigation measures required under the Storm Water Pollution Prevention Plan are designed to keep sediment from leaving the mine site and haul road. No off-site impacts are anticipated.

4.5.2 **Alternative 2**

Under the No Action Alternative, the development of the Proposed Action would not occur. There would be no additional impacts to the soil resources. Runoff and erosion rates would remain at background levels.

4.6 Native Vegetation and Noxious/Invasive Plant Species

4.6.1 **Alternative 1**

4.6.1.1 Native Vegetation

Mining Activity would disrupt the present vegetation due to the required soil removal to access bentonite layers. Total disruption without reclamation would result in a change in vegetation state approximating the mixed sagebrush/bare ground or Salt Tolerant Shrub/ Bare Ground state in the State and Transition model for the sites described below.

Shallow Clayey Sites

Mixed Sagebrush/Bare Ground Plant Community

This plant community is the result of frequent and severe yearlong grazing and no fire. Soils on these sites are usually less saline. It is dominated by shrubs but areas of blue grama sod can occur. Big sagebrush, black sagebrush, and birdfoot sagebrush are the most common shrubs in this plant community. Pricklypear cactus can become dense in areas so that livestock cannot graze forage growing within the cactus clumps.

Perennial cool season mid-grasses have been removed leaving mostly bare ground amongst the shrub component but patches of blue grama and annuals are noticeable. Cheatgrass and weedy annual forbs such as halogeton, Russian thistle, and kochia, would occupy the site if a seed source is available. Noxious weeds such as Russian knapweed may also invade this state.

When the historic climax plant community is replaced by warm season grasses total annual production is reduced.

The total annual production (air-dry weight) of this state is about 250 pounds per acre, but it can range from about 100 lbs./acre in unfavorable years to about 350 lbs./acre in above average years.

This state is relatively stable as the shrubs become more dominant. Patches occupied by the grass sod are protected from excessive erosion. The sod formed by these grasses is resistant to water infiltration. While the soil is protected by the sod areas, excessive runoff may occur outside the sodded area. As a result, rills or other more severe erosion can occur on unprotected areas. The watershed may or may not be functioning, as runoff may affect adjoining sites. The biotic integrity of this plant community is not intact. Plant diversity is low.

Transitional pathways leading to other plant communities are as follows:

• Grazing land mechanical treatment (chiseling etc.) followed by prescribed grazing and if necessary seeding would return this plant community to near Historic Climax Plant Community (HCPC).

Salt Tolerant Shrub/Bare Ground Plant Community

This plant community can occur on sites subjected to frequent and severe grazing and on soils influenced by elevated amounts of soluble salts. Salt tolerant shrubs would replace the characteristic shrub species as the major overstory species, while the preferred cool season grasses have been eliminated or greatly reduced. Bare ground and weedy grasses and forbs dominate the understory.

This state is dominated by an overstory of salt tolerant shrubs, such as greasewood, birdfoot sagebrush and saltbushes, which can vary widely in their composition and production. The leaves of some of these plants contain high amounts of sodium and other salts, and when shed, these soluble salts are transferred to the soils underneath the plants. Consequently, the soil can exhibit wide variations in soluble salts, which can explain the variation in shrub composition.

Big sagebrush and rubber rabbitbrush are present but are mostly in small patches.

Perennial cool season mid-grasses have been removed leaving mostly patches of blue grama and annuals. Cheatgrass and weedy annual forbs such as halogeton, Russian thistle, and kochia, would occupy the site if a seed source is available. Noxious weeds such as Russian knapweed may also invade the site. Plant diversity is moderate to poor.

When compared to the HCPC, grass production has diminished but is somewhat offset by the increase in shrub production. The interspaces between plants have expanded leaving the amount of bare ground more prevalent. Surface salts have increased, especially on sites dominated by greasewood and saltbushes.

This plant community is resistant to change. These areas are actually more resistant to fire as less fine fuels are available and the bare ground between the shrubs has increased. Continued frequent and severe grazing or the removal of grazing does not seem to affect the composition or structure of the plant community. Plant diversity is moderate to poor. The biotic integrity of this state is mostly dysfunctional because of the predominant salt tolerant shrub overstory and absence of perennial cool season grasses.

Soil erosion is accelerated because of increased bare ground. Water flow patterns and pedestalling are obvious. Infiltration is reduced and runoff is increased. Rill channels may be noticeable in the interspaces and gullies may be establishing where rills have concentrated down slope.

Transitions or pathways leading to other plant communities are as follows:

• Prescribed grazing or possibly long-term prescribed grazing, would convert this plant community to the Salt Tolerant Shrub/Rhizomatous Wheatgrasses Plant Community. Recovery to near HCPC condition is difficult to impossible due to the resistance of these shrubs to herbicides and other brush management techniques. In addition, the increase in surface salts has had accumulated effects on the soil so most of the plants associated with the HCPC are no longer suitable for this site. The most notable exception is the rhizomatous wheatgrasses and bottlebrush squirreltail. Soil remediation to reduce the surface salts is

mostly ineffective and extremely costly. Seeding more salt-tolerant native grasses and forbs would improve the productivity of the site and also improve plant cover.

Shallow Loamy 10-14

Mixed Shrub/Bare Ground Community

This plant community is the result of frequent and severe grazing and protection from fire. Soils on these sites are typically low in soluble salts. Shrubs and especially sagebrush dominate this plant community, as the annual production of sagebrush exceeds 20 percent. Shrubs are significant components of the plant community and the preferred cool season grasses have been eliminated or greatly reduced.

The dominant grasses/grasslikes are prairie junegrass, Sandberg Bluegrass, Threadleaf Sedge, and Blue Grama. Weedy annual species such as cheatgrass may occupy the site if a seed source is available. Cactus often invades. Noxious weeds such as Russian Knapweed, Leafy Spurge, or Canada thistle may invade the site if a seed source is available. The interspaces between plants have expanded leaving the amount of bare ground more prevalent. As compared with the Historic Climax Plant Community (HCPC) or the Perennial Grass/Mixed Shrub Plant Communities, the annual production is reduced, but the shrub production compensates for some of the decline in the herbaceous production.

The total annual production (air-dry weight) of this state is about 250 pounds per acre, but it can range from about 150 lbs/acre in unfavorable years to about 350 lbs/acre in above average years.
This plant community is resistant to change as the stand becomes more decadent. These areas may actually be more resistant to fire as less fine fuels are available and the bare ground between the sagebrush plants is increased. Continued frequent and severe grazing or the removal of grazing does not seem to affect the composition or structure of the plant community. Plant diversity is moderate to poor.

Soil erosion is accelerated because of increased bare ground. Water flow patterns and pedestalling are obvious. Infiltration is reduced and runoff is increased. Rill channels may be noticeable in the interspaces and gullies may be establishing where rills have concentrated down slope.

Transitions or pathways leading to other plant communities are as follows:

• Brush management, followed by prescribed grazing, would return this plant community at or near the HCPC. Reseeding after brush management with native species may be necessary to ensure a more rapid transition. If prescribed fire is used as a means to reduce or remove the shrubs, sufficient fine fuels would need to be present. This may require deferment from grazing prior to treatment. Post management is critical to ensure success. This can range from two or more years of rest to partial growing season deferment, depending on the condition of the understory at the time of treatment and the growing conditions following treatment. In the case of an intense wildfire that occurs when desirable plants are not completely dormant, the length of time required to reach the HCPC may be increased and seeding of natives is recommended

Salt Tolerant Shrub/Bare Ground Plant Community

This plant community can occur on sites subjected to frequent and severe grazing and on soils influenced by elevated amounts of soluble salts. Salt tolerant shrubs replace Wyoming Big Sagebrush as the major overstory species while the preferred cool season grasses have been eliminated or greatly reduced. Bare ground and weedy grasses and forbs dominate the understory.

This site is dominated by an overstory of salt tolerant shrubs, such as Greasewood, Birdfoot Sagebrush and saltbushes, which can vary widely in their composition and production. The leaves of some of these plants contain high amounts of sodium and other salts, and when shed these soluble salts are transferred to the soil underneath the plants. Consequently, the soil can exhibit wide variations in soluble salts, which can explain the variation in shrub composition.

Big Sagebrush and Rubber Rabbitbrush are present but are mostly in small patches.

Perennial cool season mid-grasses have been removed leaving mostly patches of blue grama and annuals. Cheatgrass and weedy annual forbs such as Halogeton, Russian thistle, and Kochia, would occupy the site if a seed source is available. Noxious weeds such as Russian Knapweed may also invade the site. Plant diversity is moderate to poor.

When compared to the HCPC, grass production has diminished but is off set by the increase in shrub production. The interspaces between plants have expanded leaving the amount of bare ground more prevalent. Surface salts have increased, especially on sites dominated by greasewood and saltbushes.

The total annual production (air-dry weight) of this state is about 225 pounds per acre, but it can range from about 125 lbs./acre in unfavorable years to about 300 lbs./acre in above average years.

This plant community is resistant to change. These areas are actually more resistant to fire as less fine fuels are available and the bare ground between the shrubs has increased. Continued frequent and severe grazing or the removal of grazing does not seem to affect the composition or structure of the plant community. The biotic integrity of this state is mostly dysfunctional because of the predominant salt tolerant shrub overstory and absence of perennial cool season grasses.

Soil erosion is accelerated because of increased bare ground. Water flow patterns and pedestalling are obvious. Infiltration is reduced and runoff is increased. Rill channels may be noticeable in the interspaces and gullies may be establishing where rills have concentrated down slope.

Transitions or pathways leading to other plant communities are as follows:

Prescribed grazing or possibly long-term prescribed grazing, would convert this plant community to the Salt Tolerant Shrub/Rhizomatous Wheatgrass Plant Community. Recovery to near HCPC condition is difficult to impossible due to the resistance of these shrubs to herbicides and other brush management techniques. In addition, the increase in surface salts has had accumulated effects on the soil so most of the herbaceous plants associated with the HCPC are no longer suitable for this site. The most notable exceptions are the rhizomatous wheatgrasses and bottlebrush squirreltail. Soil remediation to reduce the surface salts is mostly ineffective and extremely costly. Seeding more salt-tolerant native grasses and forbs would improve the productivity of the site and the plant cover.

Required reclamation of these sites should be designed to approximate HCPC composition as closely as feasible given site soil characteristics plant material availability and reclamation legal requirements.

4.6.1.2 Noxious and Invasive Species

The disturbance associated with bentonite mining would increase risk for noxious weed and invasive species establishment and spread. Sources for weed seeds exist within and around the project site, and equipment can serve as a vector for spread. Appropriate measures for monitoring and treatment for invasive and noxious weeds have been addressed in Wyo-Ben, Inc's Noxious Weed Management Plan for Federal Lands.

4.6.2 **Alternative 2**

Under the No Action Alternative, the development of the Proposed Action would not occur. No change from present risk for noxious/invasive species establishment and spread would be expected to occur beyond the current land uses of the project area.

4.7 Livestock Grazing

4.7.1 **Alternative 1**

Coal Draw- Proposed action would disturb approximately 24 acres and 3 AUMs. Since there is no current permit, no livestock reduction would result.

Meeteetse Draw- Proposed Action would disturb approximately 170 acres and 19 AUMs. This action could result in a reduction of 5 cattle on the permit. However, since the mining activity is "phased in" over time, a reduction in cattle numbers would not be implemented.

Buchanan – Proposed Action would disturb approximately 93 acres and 16 AUMs. This action could result in a reduction of 8 cattle on the permit. However, since the mining activity is "phased in" over time, a reduction in cattle numbers would not be implemented.

South Coal Draw- the proposed action would disturb approximately 64 acres within the allotment. The allotment is currently stocked at 8.7 acres per animal unit month therefore approximately 7.4 AUMs would be displaced annually for the life of the project if the entire area were to be mined all at once. The reality of the entire area being mined at one time is not planned to occur therefore fewer AUMs would actually be displaced.

The fences between this allotment and others are planned to be removed by mining. If the fences were to be removed it is likely that cattle would disperse to neighboring allotments thereby creating a situation of cattle grazing in trespass. The grazing allotments at hand all permit different cattle numbers, are run by different permittees with different cattle operations, and are for differing seasons of use.

Reclamation could be successful if proper topsoil handling and drought do not make it exceptionally difficult for seedlings to germinate and grow. Once the reseeding is successful, the vegetation would be reestablished well enough to provide forage for wildlife and livestock.

Usually reclaimed mining areas are not fenced out of grazing allotments. Because of this, cattle are rarely prevented from grazing on reclaimed lands where seeds are trying to germinate and establish themselves. This can be detrimental to both the grazing and the mining effort. Grazing before plants have established stresses seedlings and makes it very difficult for them to survive, spread, or create healthy rangeland. Grazing during the early stages of revegetation can lead to an increase of weed growth; native seeds in the seed mix are more desirable to cattle and are quickly grazed off, leaving the barren area to be established by weeds.

Wyo-Ben, Inc. would be responsible for successful reseeding - revegetation and would be held accountable for the reseeding - revegetation by WDEQ-LQD and the BLM until an acceptable vegetative community has established.

Livestock would be present during portions of the mining activity. It is not expected that the activity would affect the livestock and prevent them from grazing.

Mitigation:

Wyo-Ben, Inc. has agreed to restore or repair fencing affected by their disturbance in the Coal Draw, Meeteetse Draw, Buchanan, South Coal Draw allotments near the modification area, and will contact BLM-WFO to determine the effect of the timing of their activity on grazing.

4.7.2 **Alternative 2**

There would be no effect on livestock, grazing under Alternative 2, except that cattle grazing would not have to halt for the proposed mining disturbance, and the forage would not change to post-mining species.

4.8 Wildlife

4.8.1 **Alternative 1**

The proposed mining disturbance, habitat removal and related disruptive activities would likely cause both short term and long term impacts to wildlife in the area. Disruptive activities like actual mining and motor vehicle traffic, during breeding and nesting periods for raptors, and the sagebrush obligates mentioned above, may cause disruption of breeding activities and unnecessary impacts to nesting birds, such as egg or hatchling abandonment, or actual nest destruction for those species nesting on or near the

ground. Depending on when surface disturbing and disruptive activities associated with potential mining operations occur, there could be potential impacts to Mountain plover, burrowing owl and white-tailed prairie dog, from the hauling and related motor vehicle traffic on the proposed haul road northeast of the mining operation. Surface disturbing activities and associated motor vehicle traffic from April through June could potentially destroy and or disturb Mountain plovers and their nests. This same disturbance later in the summer could potentially result in displacement of, or increased road collision mortality to white-tailed prairie dogs and borrowing owls as well. Surface disturbing and disruptive activities during the crucial big game wintering period could cause unnecessary impacts to wintering mule deer, such as displacing animals to less desirable winter habitat and conceivably the displacement could result in increased stress and predation levels, and decreased pregnancy rates and therefore population levels. Numerous small mammals, predators, passerines, and reptiles which may be present would likely be displaced and would likely move to adjacent areas where suitable habitat is available, or destroyed, in the case of reptiles and small mammals that occupy burrows for the majority of the year.

Once mining operations and disruptive activities have ended the sagebrush habitat removed through mining of potentially 500 acres would continue to have more long term impacts on the wildlife. Post mining, or habitat removal, wildlife would likely avoid the area until reclamation success was complete. Full reclamation of these mined sites is anticipated to take 10 to 20 years. If the vegetative community would be drastically changed post-mining, wildlife species using the area would change as well. The change in vegetative community from pre-mine conditions to post-mine conditions may result in a shift to plant species not specifically adapted to the local site and would provide lesser quality of habitat across all acres affected.

Mitigation

To minimize and mitigate potential impacts described above, Wyo-Ben, Inc. proposes Operator Committed Measures, as outlined in Section 2.3.1 of this document.

In addition to the Operator Committed Measures that Wyo-Ben, Inc. has proposed, the following additional mitigation would be included to reduce the risk of disturbance to White-tailed prairie dogs and burrowing owls:

For the proposed access road northeast of the mining operation, to reduce potential impacts to White-tailed prairie dogs and burrowing owls from potential development and motor vehicle traffic, burrows should be avoided where ever possible when laying out and constructing the proposed access road.

4.8.2 **Alternative 2**

Under the No Action Alternative, the surface disturbing and disruptive activities proposed for the Meeteetse Draw Mining operation would not occur. No resulting effects on wildlife resources would be expected to occur beyond the current situation.

4.9 Visual Resources

4.9.1 **Alternative 1**

Impacts to visual resources from the proposed activities would be minor, and are within VRM Class III objectives. The footprint observed during bentonite extraction would be noted as a slight alteration of form, line, color, and texture. The form, line, color, and texture exhibited from the linear pits would contrast against the surrounding natural elements. The pits would create distinct lines, more defined and blocky forms, light colors, and smooth textures against the surrounding elements. These impacts would be observed in the immediate disturbance area. Because of the naturalness of the extraction (i.e. no permanent facilities, and mosaics of undisturbed land between pits), and the extraction process (cast-back method, the rounded forms exhibited from the stock piles, and the natural linear weaving of the pits other than straight lines), these contrasts would be minor, and would echo the surrounding forms. The element of color may exhibit a higher degree of contrast due to introducing light colors (white, off-white, and

gray) against the surrounding green, gray, and tan landscape. Because of the surrounding landscape and bentonite recovery would be restricted on the flats and not up the ridges, these contrasts would be observed at the immediate project site. These impacts would be temporary and observed during extraction phases. After extraction is complete, and reclamation is implemented, these contrasts may be unnoticeable to the casual observer.

The SQRU's visual inventory would be altered to a lower VRI Class due to lower scenic quality ratings because of the contrasting elements exhibited by the extraction activities. However, the current VRI class and scenic quality ratings may not change once reclamation is applied.

Indirect impacts would be observed by those who live within the immediate area. These contrasts would be noticeable during extraction, but would be minimized, or not observed at all during reclamation. Other visual disturbances may be observed through fugitive dust during extraction, and from the haul roads. These contrasts would be minimized by dust abatement practices written in the mine plan.

Class III objectives are to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

4.9.2 **Alternative 2**

Under the No Action Alternative, the development of the proposed Action would not occur. No resulting effects on visual resource inventories (scenic quality and sensitivity levels) would be expected to occur beyond the current situation.

4.10 Cultural Resources

4.10.1 **Alternative 1**

Impacts occur to historic properties (cultural resources listed in or eligible for inclusion in the NRHP) when a proposed project would directly or indirectly alter any of the qualities of that property that qualify it for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, material, workmanship, feeling, or association. In addition to the impacts caused by the initial proposed construction and operation, impacts may include reasonably foreseeable adverse effects caused by a proposed project that may occur later in time and or farther removed in distance (indirect impact) or be cumulative. These types of impacts are anticipated from the proposed Project:

Physical destruction of or damage to all or part of a NRHP eligible resource (direct impact);

Change of the character of the property's use or of physical features within the property's setting that contributes to its historic significance (direct or indirect impact); and

Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features (36 CFR 800.5(a) (1) and 800.5(a) (2)) (indirect impact).

The proposed mine, associated surface disturbance, and haul road have the potential to adversely affect cultural resources and would result in direct, indirect, and cumulative impacts. There are 15 known sites within the APE. A total of 11 NRHP eligible (2 historic and 9 prehistoric) were identified within the project APE. Two eligible sites (48HO472 and 48HO849) are located within the area of direct impacts (i.e. proposed disturbance). However, the portions of these sites within the area of direct impact are considered non-contributing. The effects would not diminish the characteristics that make the property eligible for listing in the National Register of Historic Properties.

Anticipated indirect impacts to the nine prehistoric rock art sites eligible for the NRHP include the negative effects of dust, potential vibration related to increases in traffic, changes to the setting, and inadvertent damage and advertent damage (i.e., vandalism) due to increased visitation.

Dust especially that which contains binding agents and pollutants, such as those derived from vehicle exhaust, present potential indirect impacts to the rock art in the APE. There have been few scientifically based studies directly examining the correlation between particulates and any associated detrimental effects of dust on rock art. However, observations made for other federal actions indicate that rock art panels immediately adjacent to the major roads can become obscured by the accumulation of dust (Silver, 2008). Wyo-Ben, Inc. has committed to measures which could decrease the potential for impacts from dust. Specifically, the proposed action includes dust suppression efforts, including watering of the haul roads and seeding of the topsoil/subsoil piles.

Vibration, resulting from increased traffic and construction activities, may also have effects on rock art and other associated sites (e.g., sites with standing architecture) that are adjacent to the proposed haul roads in the project area. The major concern with vibration is the potential for collapsed cliff faces, or portions thereof, containing rock art panels or the collapse of standing architecture. Several studies considering the effects of vibration on prehistoric standing structures have been conducted. The results from vibration studies at Chaco Canyon National Park (King et al. 1985) conclude that vibration should not exceed 1.0 mm/second peak particle velocity at the base of standing prehistoric structures. The authors of these studies provide minimum distances that various vibration-inducing activities should be kept away from the resource. For automobile traffic, the distance is 30 meters for normal traffic and 65 meters for industrial traffic. The resources at Chaco Canyon and Meeteetse Draw cannot be assumed to be identical and different vibration thresholds can be expected for exposed bedrock and cultural standing structures. The potential for traffic induced vibration resulting in the collapse of a rock art panel or standing architectural structure are seemingly low but no comprehensive studies have been done to confirm this within the project area. Wyo-Ben, Inc. has committed to measures which could decrease the potential for impacts from vibration. Specifically, the proposed action places a speed limit of 35 mph on the haul roads and no blasting agents would be used in mining operations or construction.

Impacts to the cultural setting could occur from increases in traffic and human activity and mining operations in the APE. Under the Proposed Action, Wyo-Ben, Inc. plans to construct a haul road contained within mining disturbance within two parallel draws. The presence of features associated with mining operations, including stock piles, overburden piles, open pits, and the haul road, would introduce visual and audible elements that could diminish the integrity of the cultural setting. These features would be in place for more than one year. Wyo-Ben, Inc. has committed to measures which could decrease the potential for impacts to the setting. Specifically, the proposed action calls for concurrent reclamation.

Improved accessibility and subsequent increased visitation to rock art sites in the APE as a result of road upgrades and maintenance, is likely to occur under the Proposed Action. Potential effects to rock art directly related to visitation include unintentional and intentional damage (e.g., vandalism) to rock art and illegal collection of surface artifacts. Increased tourist and recreation traffic would also contribute to vibration and dust. Wyo-Ben, Inc. has committed to measures which could decrease the potential for impacts from improved accessibility. Specifically, the proposed action states a lockable gate would be maintained on the private haul road and personel involved in the Meeteetse Draw Project would take part in an Environmental Training Program.

Concerns identified by the tribes compare to those discussed above. No additional potential impacts were identified by Native American consultation.

The proposed action would have an adverse effect on historic properties within the APE. In order to mitigate these adverse effects, a Programmatic Agreement (PA) would be written through consultation with SHPO, tribes, Wyo-Ben, Inc., and interested parties and implemented to mitigate the impacts caused by project as proposed.

4.10.2 **Alternative 2**

Under the No Action Alternative, the development of the proposed Action would not occur. No resulting effects on cultural resources would be expected to occur beyond the current situation.

Existing primitive two-tracks currently provide access to the project area. Private landowners generally control access, but there remains opportunity for the general public to access the area, which provides a potential for vandalism to historic properties.

4.11 Paleontology

4.11.1 **Alternative 1**

Surface formations within the project area have a moderate sensitivity for paleontological resources and significant localities are not common. No significant impacts to paleontological resources are anticipated under Alternative 1. Standard paleontology stipulations apply (43CFR§3809.420(8)).

4.11.2 **Alternative 2**

Under the No Action Alternative, the development of the proposed Action would not occur. No resulting effects on paleontological resources would be expected to occur beyond the current situation.

4.12 Socioeconomics

4.12.1 **Alternative 1**

Under the Proposed Action, the proposed Meeteetse Draw Mine Plan would be approved and bentonite mining would proceed in the proposed mining area. The proposed mining area would be a job site for Wyo-Ben, Inc. workers in future years once Wyo-Ben, Inc. begins mining the area.

4.12.2 **Alternative 2**

There would be an affect to Wyo-Ben, Inc. and its employees if Alternative 2 was selected because the company would not have access to the bentonite resource; if the bentonite could not be mined, the workers could lose their respective jobs or additional new employment positions would not be needed. The supply of bentonite may be reduced, potentially causing a rise in the price of bentonite products, affecting those who use them.

4.13 Hazardous Materials/Public Health and Safety

4.13.1 **Alternative 1**

Should hazardous substances be used in an improper manner, there could be environmental impacts resulting from an accidental spill or an inappropriate discharge. This could result in impacts to the soil, water, air, wildlife, and cultural resources, in addition to impacts to human health and safety.

Proper containment of fuels, oil and other hazardous substances in appropriately designed and maintained storage facilities and an immediate response in the event of a release would greatly reduce any potential impacts.

The Operator and their contractors would comply with all applicable federal and state laws and regulations as they relate to hazardous substances, hazardous waste, used oil and solid waste. Hazardous substances are those chemicals listed in Title III List of Lists, Environmental Protection Agencies' (EPA's) Consolidated List of Chemicals Subject to Emergency Planning and the Community Right to Know Act (EPCRA) and Section 112(r) of the Clean Air Act, as amended, or the 40 CFR 302.4 Table-List of Hazardous Substances and Reportable Quantities, as amended. In the event any hazardous substances are used, they would be handled in an appropriate manner to prevent environmental contamination. Any release of hazardous substances of reportable quantities, would be reported both to the National Response Center (NRC), as required in the National Oil and Hazardous Substances Pollution

Contingency Plan (40 CFR 300), and the Oil and Hazardous Pollution Contingency Plan for the Wind River/Bighorn Basin District. Solid waste and used oil are defined and regulated under the Resource Conservation and Recovery Act (RCRA).

Public Safety

Existing dirt roads were constructed to resource functional classification as per BLM manual section 9113. Wyoming allows a speed limit of 55 mph when roads are not posted. Wyo-Ben, Inc. personnel and its contractors would observe a haul road maximum speed limit of 45 mph, unless situations dictate a slower rate of speed. The operator has committed to dust control measures as needed when bentonite is actively being hauled along the dirt portions of their existing designated haul roads and to upgrade and maintain such segments to the standards in the BLM's road standards manual section 9113.

4.13.2 **Alternative 2**

Under the No Action Alternative, the development of the proposed Action would not occur. No resulting effects on public lands and health and safety would be expected to occur beyond the current situation.

4.14 Cumulative Effects

The CEQ regulations define cumulative effects as "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions"

No cumulative effects were identified in this project area..

Past actions in the project area include livestock and wildlife consumption of available forage. During mining operations, vegetative resources would be unavailable for livestock and wildlife use. Once operations have concluded and reclamation deemed successful, these resources would again be available and past uses would foreseeably be re-established.

4.15 Residual Effects

4.15.1 **Alternative 1**

The following are potential residual impacts that could occur as a result of the Proposed Action:

Geology

Under the Proposed Action, the projected maximum incremental amount of new disturbance per year by Wyo-Ben, Inc. would be between 10 and 15 acres, anticipated over the life of the mine. The Proposed Action would potentially add up to 500.4 acres of disturbance associated with mining within the CEA area. Of those 500.4 acres, 270.9 is actual proposed disturbance, 203.6 is potential disturbance, and the remaining 27 ± acres is due to haul road improvement or building. Mining of the Meeteetse Draw Mine Plan could eventually result in 94,627 wet bank tons of material being permanently deleted from the total resources over the life of the mine plan.

Though recontouring and reseeding of the land would follow the proposed mining process, the landscape would not look exactly as it did prior to mining and an interruption of surface resources, such as vegetation and habitat, would happen for the duration of the project. Ridge contours may be temporarily altered, reclaimed road beds may be present, drainages would be altered, and vegetation would be modified. Until reclamation is deemed successful the aesthetics of the area could be affected during mining operations.

4.15.2 **Alternative 2**

There would be no residual effects under the No Action Alternative, as the proposed mining would not be approved; there would be no new disturbance or impact on the land.

5.0 CONSULTATION AND COORDINATION

5.1 Tribes, Individuals, Organizations, or Agencies Consulted

Tribal Consultation with Eastern Shoshone, Crow, Northern Arapaho, and Northern Cheyenne tribes was conducted with regards to this project.
Air Quality Division, Wyoming Dept. of Environmental Quality, Cheyenne and Lander Offices
Land Quality Division, Wyoming Dept. of Environmental Quality, Lander District Office
Wyoming Game & Fish Department, 5400 Bishop Blvd., Cheyenne, WY 82006
Wyoming State Office, Bureau of Land Management

PA Consulting Parties
Rebecca Spurgin, Field Manager
Buddy Green, Deputy State Director
Resources Policy and Management
Mary Hopkins, SHPO
Rick Magstadt, Vice President Manufacturing

PA Invited Parties
American Rock Art Research Association
Alliance for Historic Wyoming
Greater Yellowstone Historical Society
Utah Rock Art Research Association
Eastern Shoshone Tribe
Northern Cheyenne Tribe
Northern Arapaho Tribe
Crow Tribe
Owl's Watch Ranch
Mike and Phyllis Baker
James Stewart
Hot Springs County
Western Wildlife Conservancy

5.2 BLM Reviewers

Name	Title	Responsible for the Following Section(s) of this Document
Marilyn D. Wegweiser	Geologist; CME	Project Lead/Geology
Mike Bies	Archaeologist	Cultural Resources
Marit Bovee	Archaeologist	Cultural Resources/Paleontological Resources
Carol Sheaff	Realty Specialist	Land Use
Teryl Shryack	Range Management Specialist	Range, Forage, Vegetation
Mike Tietmeyer	Range Management Specialist	Range, Forage, Vegetation
John Elliott	Range Management Specialist	Range, Forage, Vegetation
Tim Stephens	Wildlife Biologist	Wildlife
CJ Grimes	NRS	Invasive Species/Noxious Weeds
Paul Rau	Outdoor Recreation	Recreation/Visual Resources

	Planner	
Steve Kiracofe	Soil Scientist/Hazmat Specialist	Soils
Karen Hepp	T&E/Range Management Specialist	Range, Forage, Vegetation, T&E Plant Species
Monica Goepferd	Civil Engineer	Engineering
Jared Dalebout	Hydrologist	Water Resources
Holly Elliott	Planning & Environmental Coordinator	NEPA compliance, RMP conformance

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Appendix 1 -- Castback Mining Technique

These would all be open pit bentonite mines excavated using standard castback mining techniques and procedures. Castback mining is a technique that is beneficial both environmentally and economically on many levels. The figure below shows a model of the castback system as described:

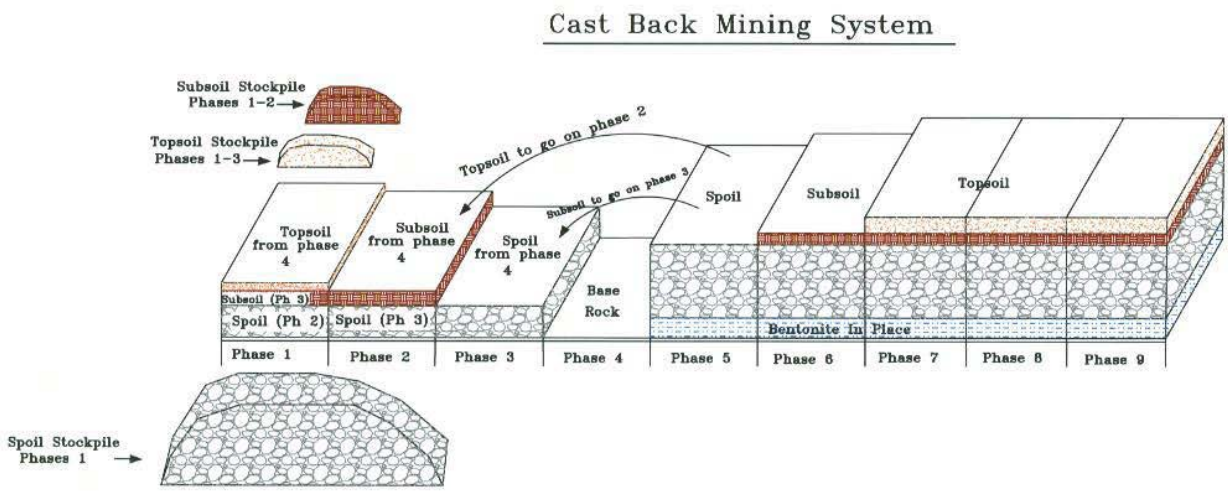
In this process, overburden from the first open pit (phase 1) of a pit sequence is usually piled and contoured adjacent to the first open hole (sometimes referred to as an out-of-pit overburden pile). Top and subsoil are also stockpiled separately in the same general area. At the earliest opportunity, the original overburden pile from Phase 1 is then contoured to match existing topography, after which at a later date, subsoil and topsoil is spread from existing soil piles in preparation for seeding. If soil stockpiles would be in place longer than one year, they would be seeded with a BLM approved perennial grass species.

Once the bentonite is removed from phase 1, topsoil and subsoil is stripped from phase 2 and placed on existing piles from Phase 1; and the remaining overburden from the next open pit of the sequence (Phase 2) is cast into the open hole of phase 1.

Once the bentonite is removed from Phase 2, topsoil from Phase 3 is removed and placed on the existing pile from Phase 1 and 2. The subsoil is then castback into Phase 1 and the remaining overburden is cast back into Phase 2.

After the removal of bentonite from Phase 3, topsoil from Phase 4 is then cast onto contoured and previously subsoiled Phase 1; the subsoil is then cast onto Phase 2; and the remaining overburden from phase 4 is cast into Phase 3.

This process repeats itself until the end of the pit sequence. At this time, since there is not overburden available from another phase of mining, material to fill the last hole is acquired by reducing the highwalls steep grade, also known as a highwall reduction. The castback/ highwall reduction process provides ecological and economic pragmatism by promoting live topsoil distribution, as well as eliminating the need for long-distance transport of the original overburden from phase 1. In many cases this distance can exceed a mile. The cost, energy, and equipment necessary for that effort are well above accepted norms.



Castback Mining illustration

Environmentally, castback mining with a highwall reduction is beneficial on many levels. First, a pit sequence can take between five to ten years to complete. In this time, micro fauna residing in a deep stockpile

effectively die before soils are spread. Degradation can occur due to soil compaction. Both of these conditions degrade a soil's ability to support desirable vegetation on reclaimed sites. Wyo-Ben, Inc. practices concurrent reclamation with the spreading of "live" soils to reestablish vegetation, resist erosion, and develop stable and productive habitats following disturbance. Complete blocks of reclamation started behind the final phases of mining would be impossible because of the need for access corridors to accommodate the hauling of material. Using the castback mining procedure greatly reduces the amount of disturbance created when compared to older mining techniques where overburden was piled on the highwall and outcrop sides of the pit until commencement of backfilling.

The mining proposed would have two highwall reduction sites, the first being at the last phases of the Thermopolis Shale pits which would be a gentle slope highwall reduction. The second highwall reduction is at the last phase of mining of the Beaver Bed. This would also be a gentle-sloped highwall reduction. Those areas included in the mine plan are considered to be the limit of necessary disturbance required to accomplish reclamation of the last phase in a pit sequence. In most cases, usually less area than that requested to disturb during mining would be needed to accomplish final fill and contour of the last phase.

A highwall reduction is accomplished by removing top and subsoil adjacent to the last phase, and dozing the underlying material adjacent to the highwall into the open hole of the last phase. Once contouring of the last phase is complete, the area is then soiled using both material from the highwall reduction area, and a partial amount of saved soil from two or three previous phases.

The area of disturbance in the highwall reduction is determined by three factors. One is the depth of the highwall of the last phase. The second factor is the size of the phase; and the last factor is swelling of overburden as it breaks up during mechanized removal from the previous phase. In general, a deep highwall would require more disturbances in the highwall reduction area. Similarly, larger pits would require a larger reduction disturbance. Finally, if the overburden in the next-to-last phase has a high swell factor, there would be more material to go into the last phase of mining. This opportunity, when present, minimizes the area of disturbance required for the highwall reduction. Wyo-Ben, Inc. has the mining practice of intentionally reducing the size of its phases of mining as mining progresses through the pit sequence. When the last phase is reached, it is usually smaller than the first phases of mining, thus reducing the area needed for the highwall reduction.

Soil handling in castback mining is also more economically and environmentally sound than in older mine techniques. Stockpiling soil for long periods of time can be detrimental to the resource. Castback mining reduces or eliminates stockpiling time. After the first phase of overburden is contoured in-place, it can be soiled with stockpiled top and subsoils obtained from the first few phases of mining. Upon backfilling and contouring of the first and subsequent phases of mining, soils can be spread "live" as it is being removed from subsequent phases. This reduces the degradation of soil microbes, and increases vegetation establishment due to seed propagules contained in the soil. It reduces the cost of soil redistribution by decreasing the amount of material handling. Wyo-Ben, Inc. would also salvage suitable material below subsoil that is chemically and physically beneficial or neutral to vegetation establishment. This practice allows placement of a buffer between the more detrimental spoil material and the top and subsoil, thus increasing the chance of establishing a diversity of desirable vegetation.

Pit delineation boundaries establish the limit of the resource that is economically viable to extract, based on market demands. Those delineated areas are considered to be the limit of necessary disturbance required to accomplish reclamation of the last phase in a pit sequence. In most cases, less area than that shown on the mine plan map is needed to accomplish final fill and contour of the last phase. Often, due to various economic or physical conditions, Wyo-Ben, Inc. may not disturb to the limits shown or requested in the proposal. This routinely results in less acreage of disturbance than originally proposed. The width of disturbance is based on the geologic dip of the bentonite bed of interest. Steeply dipping beds usually result in a narrower pit than flatter-lying beds. When practical, Wyo-Ben, Inc. would leave mosaics of undisturbed lands within the proposed pit sequence or between adjacent pit sequences which enhance reclamation aesthetics, and serve as a seed source for reclaimed lands. Pit area locations, boundaries and stockpile sites would be staked prior to disturbance. The C.O.P. and T.O.P. areas may consist of the following items: topsoil stockpiles, subsoil

stockpiles, temporary bentonite stockpiles, camp sites for mine equipment, and overburden material from initial or subsequent phases of mining.