

**U.S. Department of the Interior
Bureau of Land Management**

**ENVIRONMENTAL ASSESSMENT
Wyo-Ben Pit 108T Extension**

September 2016



PREPARING OFFICE

U.S. Department of the Interior
Bureau of Land Management
Worland Field Office

1. Introduction

Identifying Information:

Title, EA number, and type of project:
Pit 108T Extension Plan of Operations
DOI-BLM-WY-R010-2015-0041-EA
Locatable Mineral Plan of Operations (Bentonite Mine)

General Location of Proposed Action:

6th PM, T. 43 N., R. 95 W., Sec. 19, 20, & 29; T. 43 N., R. 96 W., Sec. 24 & 25

Name and Location of Preparing Office:

Worland Field Office
101 S. 23rd St.
Worland, WY 82401

Lease/Serial/Case file number:

WYW-165327

Applicant Name:

Wyo-Ben, Inc.

Background Information:

This Environmental Assessment (EA) has been prepared to analyze and disclose the environmental consequences of the Pit 108T Extension Mine Plan of Operations (Plan) under Permit 321C as proposed by Wyo-Ben, Inc. (Wyo-Ben). 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.

The 108T project area is located approximately 5 miles west-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 travels north from Thermopolis to Greybull. The Burlington Northern/Santa Fe railroad has a rail line traveling north and south approximately 5 miles from the proposed disturbance.

Historically, these lands have been used for livestock grazing, wildlife habitat, and outdoor recreation and hunting. The disturbance area of the proposed project is 376.5 acres, and includes open pit mine sequences, topsoil piles, overburden piles, and bentonite stockpiles, as well as highwall reduction areas and haul roads.

No existing surface or underground mining activities are located within the proposed plan area. Bentonite mining activities have been conducted within the Project Area and immediate surrounding lands since the

mid-1980s. No mining activities for other minerals are located either within the permit area or in the immediate vicinity of the permit area.

Public lands included in this proposal are managed by the Bureau of Land Management (BLM). These lands are covered by unpatented placer mining claims, which under the General Mining Law of 1872 (as amended), give the applicant, Wyo-Ben, the right of access to extract the minerals claimed and to use the surface of the claim area in as careful and prudent a manner as may be necessary to facilitate this extraction. Approval of this Plan of Operations through the signing of a Decision Record (DR) by the BLM, under the terms of §43 CFR 3809, and the Cooperative Agreement between the BLM and the State of Wyoming, Department of Environmental Quality (DEQ), and the issuance of the Plan Approval letter from BLM, may be completed upon determination of a Finding of No Significant Impact (FONSI).

Purpose and Need for Action:

The purpose of this federal action is to respond to Wyo-Ben's submitted Plan of Operations. Wyo-Ben is proposing to mine bentonite, which is a locatable mineral on their unpatented mining claims on BLM administered public lands.

The BLM is required to respond to Wyo-Ben'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 the Federal Land Policy and Management Act (FLPMA) and the National Environmental Policy Act (NEPA).

Decision to be Made:

The Authorized Officer (AO) must determine whether to (1) Approve the Plan of Operations as received, (2) Approve the Plans 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 Plans because the proposed operations as proposed would result in unnecessary or undue degradation of the public lands, see §43 CFR 3809.411(d).

If it is decided to approve the Plan, the AO must decide what conditions, mitigation and monitoring measures would apply to the approval. Mitigation and monitoring measures could include specification of operations, production and reclamation activities for the proposed project area.

Conformance:

As required by 43 CFR 1610.5, the Record of Decision (ROD)/Approved Resource Management Plan (RMP) for the Worland Field Office (September 2015), has been reviewed to determine that the Proposed Action conforms to the land use plan terms and conditions. Specifically, the Proposed Action conforms to the above land use plan as identified in the following decisions of the ROD:

Record #2002 – Lands not formally withdrawn or segregated from mineral entry are available for mineral entry for bentonite, gypsum, and other locatable minerals.

Goal/Obj. MR: 1.1 Provide opportunities to explore for, sell and/or permit, and develop leasable, salable, and locatable mineral resources.

Goal/Obj. MR: 5.1 Provide opportunities for exploration and development of locatable minerals while reducing and mitigating effects of mining on other natural resources.

4119 - Avoid taking migratory birds through timing limitations, project design modifications, pre-disturbance surveys and buffers.

4083 - Postpone or modify projects that may negatively affect special status species to protect these species.

4084 - Consult with stakeholders early in the permitting process to design projects in a manner that would minimize or avoid potential adverse effects to special status species.

4108 - Outside PHMAs, prohibit surface-disturbing and/or disruptive activities in Greater Sage-Grouse nesting and early brood-rearing habitat within a 2-mile radius of the perimeter of occupied Greater Sage-Grouse leks from March 15 to June 30.

Relationship to Statutes, Regulations, Plans or Other Environmental Analysis:

This Environmental Assessment (EA) is prepared in accordance with the National Environmental Policy Act of 1969, as amended (NEPA) and complies with applicable regulations and laws passed subsequent to the Act. Authority for the Proposed Action and alternatives is contained in the Federal Land Policy and Management Act of 1976, as amended (FLPMA), which provides BLM the authority to manage the use, occupancy, and development of the public lands under the principals of multiple use and sustained yield in accordance with land use plans and the regulations in 43 CFR 3809.

BLM's authority to manage mineral rights and access on federal lands is the National Mining and Minerals Policy (30 U.S.C. 21a) and the General Mining Law of 1872, as amended (30 U.S.C. 22 et seq.). Under the General Mining 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. The National Mining and Minerals Policy declares that it is the continuing policy of the Federal Government in the national interest to foster and encourage private enterprise in:

- (1) the development of economically sound and stable domestic mining, minerals, metal and mineral reclamation industries,
- (2) the orderly and economic development of domestic mineral resources, reserves, and reclamation of metals and minerals to help assure satisfaction of industrial, security and environmental needs,
- (3) mining, mineral, and metallurgical research, including the use and recycling of scrap to promote the wise and efficient use of our natural and reclaimable mineral resources, and

(4) the study and development of methods for the disposal, control, and reclamation of mineral waste products, and the reclamation of mined land, so as to lessen any adverse impact of mineral extraction and processing upon the physical environment that may result from mining or mineral activities.

For the purpose of this section “minerals” shall include all minerals and mineral fuels including oil, gas, coal, oil shale and uranium.

It shall be the responsibility of the Secretary of the Interior to carry out this policy when exercising his authority under such programs as may be authorized by law other than this section.

In order to use public lands managed by the BLM for locatable mineral exploration and development, Wyo-Ben 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 Federal Land Policy and Management Act of 1976 (FLPMA).

The Surface Management regulations 43 CFR 3809 promulgate BLM’s policy: (a) Prevent unnecessary or undue degradation of public lands by operations authorized by the mining laws. Anyone intending to develop mineral resources on the public lands must prevent unnecessary or undue degradation of the land, and reclaim disturbed areas. This subpart establishes procedures and standards to ensure that operators and mining claimants meet this responsibility; and (b) Provide for maximum possible coordination with appropriate State agencies to avoid duplication and to ensure that operators prevent unnecessary or undue degradation of public lands.

Scoping, Public Involvement and Issues:

Scoping

Internal scoping was conducted in the BLM WFO beginning in December 2014, and concluding in July 2015. The proposed action was reviewed by an interdisciplinary team. Based on the size and routine nature of the proposed project, it was determined that external scoping was not necessary.

Public Involvement

The public is invited to comment on this EA and the Proposed Action during a 30-day public review process after preparation of the analysis. Comments received would be reviewed by BLM after the 30-day public comment period and incorporated as appropriate.

Issues Identified

- How would the mining operations to produce bentonite affect mineral resources in the area?
- How would the proposed project affect the native upland vegetation within the ecological sites connected to the disturbance?
- How would the project affect the range administration in the South Owl Creek and Shumway allotments?
- How would the proposed surface disturbance, disruption and 376 acres of sagebrush habitat removal impact avian sagebrush obligates like the sage-grouse, sage thrasher, sage and Brewer's sparrows?
- How would the proposed surface disturbance affect cultural resources eligible or unevaluated for the NRHP?

- How would the visual impacts from the proposed mine affect cultural resources eligible or unevaluated for the NRHP?
- How would the proposed surface disturbance and/or associated visual impacts affect cultural resources of concern to the Tribes?

2. Proposed Action and Alternatives

Description of the No Action Alternative:

Under the No Action Alternative no additional mining would be approved as submitted. Ongoing (previously approved) mineral development and other land use activities would continue in the area, but the Proposed Action would not be approved by BLM. Rejection of the submitted Plan would not preclude future new or revised mining plans from being considered by the BLM on a case-by-case basis.

Description of the Proposed Action:

The Pit 108T Extension Mine Plan of Operations proposes an open pit bentonite mine totaling no more than 376.5 acres of disturbance, all on federal land. The project would consist of a single mine pit sequence in three mine development blocks, out of pit topsoil, overburden, and bentonite stockpiles, and haul roads. The pit sequences would be excavated in phases utilizing standard cast-back mining techniques and procedures. The pit sequence would take up to ten years to complete the active stripping and mining process, with the overall project taking additional time for reclamation activities to conclude. The mining activity proposed with this submission consists of a single pit sequence in the F3 Bed in the Frontier Formation to begin in 2015, or as soon as this Plan is approved. The following tables include listings the proposed mining features, including the projected development date, ending date, approximate disturbance per year, projected legal descriptions, and unpatented mining claim locations.

Table 1. Proposed mine feature locations and disturbance.

PROPOSED FEATURE	LOCATION	PROJECTED OPENING DATE	PROJECTED ENDING DATE	APPROXIMATE DISTURBANCE PER YEAR	AVERAGE OVERBURDEN PER PHASE* (CUBIC YARDS)	PROPOSED DISTURBANCE AREA
Pit 108T Extension (F3 BED)	T44N, R96W	2015	2024	37.5	107,000	375.5
HAUL ROADS	T44N, R96W					1.0
TOTAL						376.5

Table 2. Mine Claim locations

Claim Name	BLM Serial Number	Legal Description	Section	Township/Range	Acres	Acres of Proposed Disturbance
WIND #1	WMC173913	E $\frac{1}{2}$ SE $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, N $\frac{1}{2}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$	19	T43N, R95W	140.0	72.7
WIND #2	WMC173914	NE $\frac{1}{4}$ SW $\frac{1}{4}$, N $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$, S $\frac{1}{2}$ Lot 9, NE $\frac{1}{4}$ Lot 9, Lot 10	19	T43N, R95W	134.7	122.7
WIND #3	WMC173915	SW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$, S $\frac{1}{2}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$, N $\frac{1}{2}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$	24	T43N, R96W	120.0	52.9
WIND #4	WMC173916	NE $\frac{1}{4}$ NW $\frac{1}{4}$, NW $\frac{1}{4}$ NE $\frac{1}{4}$, S $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$, N $\frac{1}{2}$ S $\frac{1}{2}$ NE $\frac{1}{4}$	25	T43N, R96W	140.0	40.8
WIND #23	WMC194117	SW $\frac{1}{4}$ SW $\frac{1}{4}$, S $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$, S $\frac{1}{2}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$	20	T43N, R95W	80.0	56.7
WIND #27	WMC311176	N $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$	30	T43N, R95W	20.0	1.5
WIND #52	WMC311177	N $\frac{1}{2}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$	29	T43N, R95W	20.0	8.9
Owl #7		E $\frac{1}{2}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$	24	T43N, R96W	19.3	19.3
		E $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$	25	T43N, R96W		
		NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$	30	T43N, R95W		

Mine Life

Active mining operations are anticipated to last ten (10) years, while active reclamation activities such as recontouring and topsoil spreading may last another two to three years once the mining and removal of bentonite is completed. Mining would commence upon approval from the WDEQ/LQD and the BLM-WFO. Proposed mining features are located on public lands administered by the BLM.

Equipment Used for Mining & Reclamation

Mining and reclamation activities would utilize the following equipment:

- Caterpillar 627 & 637 Tractor-Scrapers
- Caterpillar D8-D10 size Tractor-Dozers with attachments
- Excavator/rock truck systems
- Front-End Loaders
- Caterpillar 140 Motor Graders
- Over-the-road trucks with belly-dump trailers
- John Deere Tractors

- John Deere Chisel Plows
- John Deere V-Rippers
- John Deere Disks
- Wishek Heavy Duty Disks

Wildlife Mitigation Measures

Wyo-Ben proposes the following voluntary mitigations for 108T Extension:

Birds

Migratory Bird Treaty Act (MBTA) bird species occur in the area of proposed mining. Wyo-Ben would implement measures to protect these birds as follows: Nest surveys would occur in areas planned for topsoil removal when either new phases of the pit are stripped, where C.O.P or T.O.P areas would be striped of topsoil, or during new road construction. These searches would be conducted starting April 15 and continue through July 15 whenever an activity occurs involving the removal of topsoil. If an active nest is discovered during the search, planned topsoil removal of that area would be halted until the chicks can survive independent of the nest. Wyo-Ben has three days from the time of the search to the time of topsoil is removed. If topsoil removal does not occur within that time frame, Wyo-Ben would conduct another nest search before topsoil would be stripped. As explained above, Wyo-Ben commits to remain current with reclamation as mining progresses. This practice would further mitigate impacts to MBTA birds by returning useable habitat in a timely manner. Although encounters with mountain plovers (*Charadrius montanus*) is not likely to occur based on habitat types present, Wyo-Ben would protect those birds, if encountered, as described in the BLM Mountain Plover Protection

Protocol Additional Proposed Sage Grouse Mitigation

Wyo-Ben's protocol is to determine the permitted mine boundary with GPS and only conduct mining operations within that boundary. This protocol would ensure no disturbance occurs in the Thermopolis sage grouse core area.

a) Additional Proposed Sage Grouse Mitigation:

To be in compliance with the Governor of Wyoming's Greater Sage Grouse Executive Order 2015-4, and the recently approved BLM Worland Field Office Resource Management Plan, Wyo-Ben will commit to the following restrictions:

- No new surface disturbance or overburden removal will occur between March 15th to June 30th in areas within 2-miles of active leks
- Support activities will be allowed within the 2-mile perimeter, restricted to:
 - Bentonite haulage, field drying of bentonite stockpiles, development drilling, environmental compliance activities (for example, stormwater management or dust abatement), wildlife monitoring, surveys, and similar low-impact scientific assessments. In no case shall more than one piece of equipment be running at any time.

Raptors

As a standard operating procedure of Wyo-Ben, Inc., when raptor nesting activity occurs within ½ mile of unobstructed sight distance, we would proceed as follows: (1) In areas where mining or hauling activity is ongoing prior to February and raptor activities such as nest prepping occurs within ½ mile unobstructed view, Wyo-Ben would continue mining operations and monitor the nest on a regular basis. At the sign of

permanent residency of the nest, mine activity would cease, and DEQ and FWS would be notified to determine mitigation measures; (2) in areas where nesting occurs within ½ mile unobstructed sight distance prior to commencement of mining or hauling activity, Wyo-Ben would not initiate activity until consultation with the DEQ and FWS has allowed evaluation of site specific mitigation options. As a general measure, If nesting activity of eagles occurs within ½ mile unobstructed sight distance of an active mining or hauling area (1/4 mile obstructed sight), Wyo-Ben, Inc. would mitigate impacts to that nest by avoiding activity from February 1 through August 15, or until it has been determined that the young have fledged and can survive independent of the nest.

Aquatic Invasive Contamination

AIS contamination from mine and water pump equipment would not be a problem in this area because mine equipment never encounters waters from potentially contaminated streams, and haul road water is obtained from the town of Thermopolis water station.

Spill Management Plan

Wyo-Ben Inc. would immediately notify both the Water Quality Division of the Wyoming Department of Environmental Quality and the Worland Office of the BLM for any accidental spills of petroleum or other hazardous products involving more than twenty-five gallons. Soils contaminated by smaller spills would be removed to the Wyo-Ben Lucerne 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.

Interim Management Plan

In the event Wyo-Ben temporarily closes a pit, interim management procedures would be implemented as follows: A berm sufficient in size to mitigate accidental vehicle and individual falls 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 runoff 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. Drainages with ephemeral stream flow that have potential to receive deleterious material would have check dams installed. If topsoil piles are expected to be in place for an extended period due to the temporary closure of the pit, they would be seeded to prevent erosion and loss of topsoil. All equipment and supplies are to be kept within the disturbance area. Fuel storage tanks would have a perimeter berm or be placed within an excavated containment pit. Mine Site inspections are to be completed semi-annually by Wyo-Ben employees, and appropriate representatives from the WDEQ, and the BLM. Finally, the pit closure area would be monitored on a regular basis to identify and address potential issues of concern.

Monitoring Plan

Wyo-Ben utilizes contractors to conduct the mining and reclamation operations. The Wyo-Ben mining supervisor coordinates with field contractor's 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 our contractor's field supervisors occurs on an almost daily basis. This ensures that mining and reclamation are being conducted according to Wyo-Ben's high standards of

mine regulation compliance, reclamation and safety. Wyo-Ben would monitor its reclaimed lands as explained below in the; *Reclamation Plan – post closure management* paragraph.

Wyo-Ben personnel would monitor all known raptor nests in the Update area for activity starting in February 15th and continue to July 15th. MBHFI nest searches would be conducted prior to any initial surface disturbing activities during the dates April 15 to July 15.

Quality Assurance Plan

Wyo-Ben utilizes two drill trucks to characterize the volume and quality of bentonite in the various beds during the development of pits. This allows for the tightening of planned disturbance boundaries of mine 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, allowing for the determination of quality and volume of soils that can be saved to facilitate quality reclamation. Wyo-Ben 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 would be 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 SAR or acid potential).

Reclamation Plan

The reclamation/revegetation process would be 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-scrappers depending on availability. Wyo-Ben, Inc.'s mining contractors typically use Caterpillar 627 and 631 tractor-scrappers. 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 postmining 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. Typically, due to relatively thin bentonite beds, and swell of displaced overburden, final contoured and reclaimed grade

that equals native grade is achievable. 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 premine channel gradients and cross-sectional shapes. Temporary diversions would comply with Noncoal rules, section 2(e)(ii)(F) to allow passage of peak runoff from a 2 year, 6 hour precipitation event in a nonerosive manner. Permanent diversions (including reconstructed channels and adjacent topography) would comply with Noncoal rules, section 2 (e) (iv), to be erosionally stable during the passage of the peak runoff from a 100 year, 6 hour precipitation event.

Reclamation backfill would follow the castback mining sequence illustrated in Figure MP-2 in the Mine Plan Section. 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. Average topsoil and subsoil redistribution depths are reported in Table D-7.5. 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.

Wyo-Ben, Inc. would begin backfill no longer than two years after any lands are affected; and those lands would be reclaimed through seeding no longer than four years after disturbance unless an interim stabilization plan has been approved. A three-year backfill/five-year final reclamation schedule would be followed in areas where field drying of mined material is occurring.

Wyo-Ben, Inc. would 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-stripping of soil, or mosaics of deeper soil where there is little to spread, seed coating, additives to the soil (including but not limited to mycorrhizae, 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.

Drill-Hole Plugging

All drill holes are filled with overburden that is augured out of the hole during the drilling process immediately after the intended drill sample has been obtained. Top and subsoil is placed back on top to allow the regrowth of native vegetation.

Feasibility of Pit Backfill

As previously mentioned, Wyo-Ben utilizes a castback mining procedure when stripping pits. This method of mining is both economical and environmentally compatible. The fact that overburden is handled only once in the process of material movement during the stripping and reclamation process is an economical method of mining. Also, using the castback method allows reclamation to stay concurrent with mining as backfilling and contouring of a previous phase is occurring at the same time the current phase of a pit is being stripped. Finally, moving material between phases of a pit is safer than pushing it laterally into the open hole over the highwall.

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 (reported in D-5). 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 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) is intentionally placed on the surface, it 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 would remove the deleterious material from the lands as soon as possible and reseed the disturbed area with an appropriate seed mixture.

Post Closure Management Plan

Wyo-Ben monitors all of its reclaimed lands post closure for off-site sedimentation, erosion, and seeding failures. Off-site sedimentation is controlled by installation of straw bail, 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. Finally, seeding is monitored on a regular basis. If after two to four growing seasons vegetation establishment is not adequate, Wyo-Ben would determine the reason for failure and mitigate the problem including reseeded of the site.

Hydrology

No perennial or intermittent streams would be affected by this proposed disturbance. Temporary diversions would comply with Wyoming DEQ 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 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 or certified weed-free straw bales would be installed at discharge points into natural channels. These structures would be moved periodically to accommodate active mining areas.

In addition to the above commitments and practices, Wyo-Ben would apply the following operator-committed hydrology practices suggested by Brian Wood of WDEQ/LQD District II in the year 2010:

Post-mine Slope Restoration

Unless otherwise approved by the DEQ/LQD, slopes would be reconstructed to have a concave to complex profile with a gradient similar to that which existed premine, and be designed to blend with adjacent native and previously reclaimed areas. Wyo-Ben strives to keep slopes within angles where they can be safely ripped along the contour with a farm tractor. Draws would be reconstructed within these

slopes, consistent in size and position to existing native features both above and below the reclamation. These draws are critical for the management of down slope drainage and for the aesthetic transition between disturbed lands and the adjacent native landscape.

Post-mine Drainage Reconstruction

Post-mine drainage systems would be constructed such that drainages would be replaced at a density similar to or greater than what existed on the pre-mine landscape. During the construction of any reclaimed drainage, coarse rock would be imbedded in the backfill (if coarse rock is available) of the reconstructed channel. Energy dissipating elements such as the placement of straw bales, waddles, or rock armoring would be used at transition zones between native and reclaimed channels, zones where there is an unavoidable steep break in gradient, and any other place where accelerated erosion is likely to occur.

Many of the pre-mine drainages within the Update area are well incised with a fairly narrow bottom width and steep side slopes. During reconstruction of a drainage, Wyo-Ben's ability to replicate the original channel profile is limited by the equipment available for this purpose. Channel reconstruction is typically accomplished with scrapers and dozers, which results in an average channel bottom width of 12 feet. The reclaimed slopes that tie into the undisturbed, native channel bank would not exceed a slope of 3(H):1(V). Reclaimed slopes that tie into undisturbed, native channel banks would not exceed a slope of 3(H):1(V). It is assumed that a pilot channel would eventually develop, within the reclaimed channel bed that is anticipated to be similar to the typical native condition of two to five feet in width and approximately one foot in depth. The exact morphology of the pilot channel that develops would be a function of the bankful event's (generally assumed to be a flow event with an approximate return period of two years) characteristics.

Reclaimed channels would have a slope and sinuosity that approximates the pre-mine condition. On occasion, Wyo-Ben would meander a reclaimed drainage to a greater degree than what occurred pre-mine. This practice is intended to decrease velocity of runoff, and allow a greater amount of water to remain on reclaimed sites. To promote long term stability, Wyo-Ben would create a channel transition zone a minimum of 50 feet in length to allow the reclaimed channel to gradually taper into the native channel. Headcut development potential would be minimized by ensuring that the reclaimed channel slope through the transition zone would be that of the connecting native channel. Where possible, the transition zone would be set to occur on bedrock outcrop. If this is not possible, Wyo-Ben may elect to construct a buried riprap grade control structure. If a headcut were to begin to develop and was intercepted by this structure, the release of rock would prevent any upstream migration. In all cases the reclaimed channels would be designed and constructed to be stable for an event with a return period between two and five years and have sufficient capacity to carry the flow associated with the 100-year, 6-hour event.

Revegetation Practices and Seed Mixtures

Revegetation considerations include use of the area for domestic livestock grazing and wildlife habitat. Revegetation procedures would begin following contouring and re-distribution of top soil over the disturbed areas as previously described.

Seedbed Preparation and Timing

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, Wyo-Ben may exercise 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 where anticipated seeding would not be completed 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. Additionally, 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, sub and topsoil replaced, and seeded.

Permanent Seed Mixture

Composition of the proposed seed mixture is detailed below. Use of all species depends on seed availability in the year of seeding.

Table 3. Proposed seed mixture for reclamation.

Seed Species	Rate-lb PLS/acre
Gardner saltbush (<i>A. gardneri</i>)	4.0
Fourwing saltbush (<i>A. canescens</i>)	4.0
Rubber Rabbitbrush (<i>Chrysothamnus nauseosus</i>)	2.0
Wyoming Bigsagebrush (<i>Artemisia tridentata</i>)	2.0
Indian ricegrass (<i>Oryzopsis hymenoides</i>)	2.0
Bottlebrush squirreltail (<i>Sitanion hystrix</i>)	0.5
Sandberg bluegrass (<i>Poa sandbergii</i>)	0.5
Bluebunch Wheatgrass (<i>Pseudoroegneria spicata</i>)	1.0
Sand Dropseed (<i>Sporobolus cryptandrus</i>)	0.5
Rocky Mountain Bee Plant (<i>Cleome serrulata</i>)	0.5
Annual sunflower (<i>Helianthus annuus</i>)	0.5
Lewis Blueflax (<i>Linum Lewisii</i>)	0.5
	18.0 lb/acre

In areas where significant sagebrush communities are disturbed, they would be targeted to be reclaimed to sagebrush habitat by increasing the rate of sagebrush seed to 3 lbs/acre. Other species may be seeded separately based on soil quality and topographic features including 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.

Noxious Weed Management Plan

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 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.
- All off-road access would be limited to only necessary routes to minimize impacted areas and reduce spread of weeds.
- Access would be controlled through infested areas until weed removal is accomplished.
- 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.
- Vegetation would be reestablished on all 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 Bureau of Land Management (BLM)-administered public land would be approved by the BLM prior to its application.

Alternatives Considered but not Analyzed in Detail:

The surface location of the proposed action could be moved to 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 aggregate deposits is known through exploration and would not meet the operator needs, or beyond the gravel terrace expanse 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.

3. Affected Environment and Environmental Effects

This chapter characterizes the resources and uses that have the potential to be affected by the proposed action, followed by a comparative analysis of the direct, indirect and cumulative impacts of the alternatives. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Cumulative impacts result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions.

Introduction

General Setting and Geographic Scope of the project area

Topography of the area planned for disturbance in the Pit 108T Extension Amendment/Update is mostly gently sloping to the north and north east, and moderately dissected by somewhat deep ephemeral drainages.

The mining activity proposed with this submission consists of one proposed pit sequence on the Frontier 3 bentonite bed (108T Extension). Two separate areas will be mined in the proposed pit 108T extension, those being mine areas west of currently permitted 108T and east of pit 108T. The west portion of pit 108T Extension will be mined first. The first phase overburden would be cast into the last phase open hole of currently permitted and active pit 108T. This would initiate the castback mining sequence of proposed pit 108T Extension. Although mining would begin on the west portion of the proposed pit 108T Extension, it is anticipated that phases on the east portion would also be opened not long after west area mining has begun. Mining is projected to begin as soon as the proposal is approved, or when the last phase of currently permitted pit 108T is mined (expected within a year).

Resources Not Analyzed

Resources and features not present or not effected by the proposed action or alternatives, and not discussed in this EA, include: Environmental Justice, Prime or Unique Farmlands, Flood Plains, Class I visual management areas, Class I Airsheds, ACECs, Climate Change and Greenhouse Gases, Fire/Fuels Management, Fluid Mineral Resources, Invasive Species, Lands/Access, Wild and Scenic Rivers, Wilderness Study Areas, Wild Horse and Burros, Travel and Transportation, Wilderness Values or Inventoried Lands with Wilderness Characteristics, Recreation, T&E, Candidate or BLM Sensitive Wildlife/Plant Species .

Resources Carried Forward for Analysis

Geology & Mineral Resources

Issue(s) Identified

How would the mining operations to produce bentonite affect mineral resources in the area?

Affected Environment

Geologic Structure – Bighorn Basin and Project Area:

The Bighorn Basin is bounded by the Bighorn Mountains to the north and east, the Owl Creek Mountains to the south, and the Absaroka Mountains 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. The Bighorn and the Owl Creek Mountains are a result of the Laramide Orogeny, a regional mountain building event, which occurred during the late Cretaceous to early Tertiary, approximately 40 to 80 million years ago (mya), ending the Western Interior Seaway. The various anticlines and synclines found in the Bighorn Basin were also formed during the Laramide Orogeny; this episode caused a discontinuous series of incidental folds and faults along the perimeter of the basin, which are responsible for the variable dip angles, and thus the variable outcrop patterns, of bentonite beds targeted by BHB for bentonite production. Alternating beds of incompetent and resistant sedimentary rocks, structurally affected by low-angle folding, have been carved by cyclic runoff into a pattern of broad bedding plane surfaces with steep scarp slopes and deeply incised drainages.

Stratigraphy –proposed mine area:

In the Bighorn Basin, commercial bentonite is limited to the Cretaceous-age Thermopolis Shale, Mowry Shale, and Frontier Formation.

The Lower Thermopolis Shale forms the bottom of this sequence, followed by, in ascending order, the Muddy Sandstone and Shell Creek Shale members of the Thermopolis Shale, the Mowry Shale, and the Frontier Formation.

These bentonite-bearing strata are generally composed of sodium bentonite beds of varying thicknesses, interbedded with gray, marine shales and claystones which were deposited in the Western Interior Seaway around 100 mya. The Wyo-Ben Plan under analysis proposes to mine a single bentonite bed in the Frontier Formation.

Lithologic Description of Strata

Bentonite clay is a fine-grained mineral composed primarily of montmorillonite clay. Bentonite forms as a result of in-situ alteration of rhyolitic volcanic ash. Pyroclastic material was ejected into the atmosphere by volcanic activity during Cretaceous time, and deposited in a marine environment.

The Frontier Formation is a diverse marine-deltaic formation composed of alternating beds of shale, siltstone, sandstone, and bentonite, with minor amounts of conglomerate and coal. Bentonitic clays are prevalent throughout, with three beds commercially produced in the basin which are, in ascending order, the Beaver, the Flat, and the Upper beds. Many of the sandstones are laterally discontinuous; however, a lower Peay Sandstone Member and an upper Torchlight Sandstone Member are well-documented basin-wide (Rea and Barlow 1975). The Torchlight Sandstone is commonly conglomeratic, with chert and andesite pebbles documented up to three inches in diameter (Van Houten 1962). Interbedded minor sand and shale units are between these two major sandstone units. Unconformities exist within the Frontier Formation based on paleontological evidence which shows that certain fossil zones known to occur elsewhere are not present in the Bighorn Basin. The Frontier Formation is known for its ammonite fossils used to correlate areas across a geographic range (Keefer et al. 1998).

Soils and subsoils were sampled via shovel and backhoe soil test pits to determine suitability and salvage depth. Overburden associated with this bentonite bed was sampled via truck-mounted auger in five-foot increments to the contact with the top of the bentonite.

Direct and Indirect Effects

No Action

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

Proposed Action

Under the Proposed Action, open pit mining sequences totaling 369.1 acres of surface disturbance including attendant haul-roads, stockpiles, and other facilities would be authorized to remove commercial quantities of bentonite from one known bentonite bed in the Frontier Formation. The long-term impact to mineral resources in the project area would be the production and sale of bentonite resulting in the permanent removal of bentonite reserves. Mining would also disrupt the natural stratigraphic order of beds within open pit areas, and disturb overburden, as well as topsoil and subsoil profiles, as described in the Mine Plan.

Under the General Mining Law of 1872 as amended by the Federal Land Policy and Management Act of 1976 and the National Mining and Minerals Policy, it is in the national interest to foster and encourage private enterprise in: the development of economically sound and stable domestic mining, minerals, metal and mineral reclamation industries, the orderly and economic development of domestic mineral resources, reserves, and reclamation of metals and minerals to help assure satisfaction of industrial, security and environmental needs, and the study and development of methods for the disposal, control, and reclamation of mineral waste products, and the reclamation of mined land, so as to lessen any adverse impact of mineral extraction and processing upon the physical environment that may result from mining or mineral activities.

No solid or fluid mineral resources other than the intended bentonite beds have been identified in the project area within the formations which would be affected by the proposed action. Due to the relatively shallow depth of the proposed mining activity, maximum depth of pits would be 50ft and possibly less depending on the economic value of the bentonite beds and the cost of removing overburden, there would be no impact upon oil or gas deposits or groundwater zones.

Cumulative Effects

The cumulative effects on geologic resources associated with the proposed action are that over time, this project combined with previous projects in surrounding areas, is the extraction and permanent removal of a solid mineral resource (bentonite) from the area. There is no established threshold of significance regarding the extraction of mineral resources although the resource management planning decisions permit such activities. Surface mining of bentonite has been conducted for over 30 years on lands in the immediate vicinity of the project area, and more than 50 years in many other parts of the Bighorn Basin

Cultural Resources, Traditional Cultural Properties, Native American Religious Concerns

Issue(s) Identified

- How would the proposed surface disturbance affect cultural resources eligible or unevaluated for the NRHP?
- How would the visual impacts from the proposed mine affect cultural resources eligible or unevaluated for the NRHP?
- How would the proposed surface disturbance and/or associated visual impacts affect cultural resources of concern to the Tribes?

Affected Environment

The area of potential effect (APE) is defined by the Wyoming State Protocol Agreement between the BLM and the 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 (cultural resources eligible or unevaluated for the National Register of Historic Places), 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 APE was defined for the current undertaking to include the proposed surface disturbance (direct), approximately 376 acres, and the viewshed from the proposed mine and associated surface disturbance up to 3 miles (indirect). A class III cultural resources inventory was completed for the direct APE which includes the proposed mine, haul roads, stockpiles, etc. (BLM cultural project #010-2013-001). Approximately 608 acres were inventoried to determine effects to historic properties within the direct APE. Cultural resources identified within the APE include one prehistoric site evaluated as eligible for the NRHP (48HO1074), one historic site evaluated as not eligible for the NRHP (48HO661), and one prehistoric isolated resource. The APE includes one historic property, a prehistoric site eligible for the NRHP under criteria A and D.

Native American consultation was initiated by the BLM and included the Northern Arapaho Tribe and Eastern Shoshone Tribe of the Wind River Reservation. Letters were sent to the tribal councils in January of 2015 and followed up with phone calls and emails to the Tribal Historic Preservation Office (THPO) for each tribe. The BLM hosted site visits to the project area with representatives of both Tribes during the summer of 2015. The purpose of the consultation was to determine concerns with the proposed project.

Direct and Indirect Effects

No Action

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.

Proposed Action

Impacts occur to historic properties when a proposed project would directly or indirectly alter any of the qualities of that property that qualify it for inclusion in the NRHP. Under the proposed action open pit

bentonite mining would occur. Potential impacts from the proposed action include; physical destruction or damage to all or part of a property (direct impact) or introduction of visual or atmospheric elements that diminish the integrity of a property's significant features (indirect impact).

No historic properties were identified within the project's direct APE. Surface disturbance resulting from the proposed action, approximately 376 acres, would have no effect on known historic properties. As with the No Action alternative, the Proposed Action will have no direct effect on known historic properties. However, unknown cultural resources may be affected by surface disturbing activities.

One historic property was identified within the project's indirect APE. Surface disturbing activities as described under the Proposed Action would add new elements (e.g. open pit mines, haul roads, and stockpiles) within the viewshed of the property. The new elements within the viewshed will result in a strong visual contrast and an adverse effect to the property. Unlike the No Action alternative, the Proposed Action will adversely affect one historic property. Consultation occurred with the State Historic Preservation Office (SHPO) under the State Protocol. Concurrence was received on the NRHP eligibility status and effect determination for the historic property.

The same historic property is of tribal concern. No additional potential impacts and concerns were identified during Native American consultation.

Mitigation

As described in the Proposed Action, unknown cultural resources may be affected by surface disturbing activities. For the protection of unknown cultural resources the standard cultural stipulations apply and are included in the conditions of approval. The standard cultural stipulations include measures for mitigating adverse effects discovered during surface disturbing activities.

To mitigate the adverse effect to historic properties resulting from the Proposed Action a Memorandum of Agreement (MOA) was written through consultation with SHPO, Tribes, Wyo-Ben, and interested parties. The executed agreement will be attached to the Decision Record as part of the mitigation package for the project.

Cumulative Effects

Construction and development of mineral resources impact cultural resources through ground disturbance, unauthorized collection, and visual intrusion to the setting of historic properties. Potential impacts to historic properties are mitigated under the proposed action. The Cumulative Impact Assessment Area (CIAA) for this action is the indirect APE, viewshed up to 3 miles, for the Proposed Action. The time frames for the cumulative effects that have occurred are post 1900 when homesteading and subsequent development for mineral resources occurred in the CIAA.

There have been previous mining claim developments and housing (including associated infrastructure) developments which are the dominant land uses in the area. The previously permitted activities within the CIAA have impacted the viewshed by adding human-made elements to the landscape. Historic additions include open pits, roads, houses, power lines, and fences. The impacts to the setting have

caused indirect impacts to historic properties eligible for the NRHP under criteria A and C. It is also assumed that increased development also increases the potential for unauthorized collection.

Under the Proposed Action new elements (e.g. open pit mines, haul roads, and stockpiles) would be added, impacting the viewshed to historic properties within the CIAA. Best Management Practices incorporated in the Proposed Action and mitigation described in the MOA will minimize the cumulative adverse effect.

Native Vegetation

Issue(s) Identified

How would the proposed project affect the native upland vegetation within the ecological sites connected to the disturbance?

Affected Environment

The vegetation in the project area involves primarily Loamy (R032XY322WY) and Shallow Loamy (R032XY362WY) 10 – 14 inch ecological sites.

The plant community for the Loamy ecological sites is primarily Perennial Grass/Big Sagebrush while the plant community for the Shallow Loamy ecological sites is primarily Perennial Grass/Mixed Shrubs. These plant communities are still dominated by cool-season grasses, while short warm-season grasses and miscellaneous forbs account for the balance of the understory. Big Sagebrush and a variety of shrubs are a conspicuous part of the overall production.

There is approximately 1977 public land acres of native vegetation in the project area. Of this, 189 acres of vegetation are disturbed by active mining and 58 acres is in the processing of being reclaimed for a total of 247 acres of vegetation presently affected by mining.

Direct and Indirect Effects

No Action

No additional bentonite mining would be authorized. As a result there would be 189 public land acres of vegetation affected in the project area affected by active mining. This would affect 10% of the native vegetation. These acres would return to their ecological state in approximately five years with successful reclamation.

Proposed Action

The proposed action would disturb approximately 376 acres of native vegetation over a ten year period with approximately 37 acres of disturbance per year. The timeframe of this impact would be 15 years beginning in 2016. Years 1 – 10 are when active mining is taking place. The maximum amount of acres disturbed at one time would be 185 acres in years 5 through 10. In year 5, the acres in year 1 have been reclaimed and so on. In year 11, no more mining is taking place and by year 15 all the 376 disturbed acres have been reclaimed.

Table 4. Acres of disturbance during mining operations.

Year 1	Year 2	Year 3	Year 4	Year 5
37 Acres	74 Acres	111 Acres	148 Acres	185 Acres
Year 6	Year 7	Year 8	Year 9	Year 10
185 Acres				
Year 11	Year 12	Year 13	Year 14	Year 15
148 Acres	111 Acres	74 Acres	37 Acres	Reclaimed

The proposed action would disturb approximately 376 acres of the 1977 acres of Perennial Grass/Big Sagebrush Plant Community and Perennial Grass/Mixed Shrub Plant Community ecological sites. These 376 acres represents 19 percent of the total affected ecological sites. When compared to the no action alternative there is an additional reduction of 189 acres that have been removed and 58 Acres are in the process of being reclaimed. This affects 13 percent of 1977 ecological acres in the project area. There are no significant impacts to the native vegetation as by year 15, the entire 376 acres will return to the original ecological states with successful reclamation.

Cumulative Effects

Cumulative Impact Assessment Area

Geographic Scope

The geographic scope of the cumulative impact assessment area (CIAA) is approximately 1977 acres of Perennial Grass/Big Sagebrush and Perennial Grass/Mixed Shrub Plant Community.

Timeframe of the Cumulative Effects Analysis

The timeframe of the cumulative analysis would be 15 years.

Past Actions

There are 58 acres that have been reclaimed or are in the process of reclamation.

There has been no previous mining in the CIAA other than that occurring in the No Action Alternative.

Present and Ongoing Actions

There is presently 189 acres of active bentonite mining in the project area. There are 58 acres in the either reclaimed or in the process of reclamation. There would be an additional 376 acres of mining proposed. This is a total of 623 acres of native vegetation cumulatively removed with 1354 acres of native vegetation remaining.

Foreseeable Future Actions

There are no known foreseeable future actions other than the current mining taking place and the proposed action.

Range Administration

Issue(s) Identified

How would the project affect the range administration in the South Owl Creek and Shumway allotments?

Affected Environment

The proposed project occurs in the following two grazing allotments:

South Owl Creek Allotment #00610

This allotment is authorized for 36 Cattle from 7/15 – 10/15. There are approximately 880 public land acres authorized for 82 public AUMs. This is a stocking level of approximately 11 acres per AUM.

Shumway Allotment #00648

The proposed project would take place in the Home Pasture of the allotment. This pasture is authorized for 16 Cattle from 7/15 – 8/31. There are approximately 320 public land acres authorized for 18 public AUMs. This is a stocking level of approximately 17 acres per AUM.

Direct and Indirect Effects

No Action

No additional bentonite mining would be authorized. As a result there would be 67 public land acres of active mining occurring in the South Owl Creek Allotment. This affects six AUMs. There would be one-half acre of mining in the Home pasture of the Shumway Allotment. This would affect less than one AUM.

Proposed Action

The proposed action would involve 298 acres of disturbance in the South Owl Creek Allotment and 75 acres in the Home Pasture of the Shumway Allotment. This would occur over a 10 year period. This would involve approximately 30 acres per year in the South Owl Creek Allotment and 8 acres per year in the Home Pasture of the Shumway Allotment. Bentonite mining removes vegetation and it is not available to livestock. The South Owl Creek Allotment is stocked at 11 acres per AUM so there would be a yearly loss of approximately three AUMs. The Home Pasture is stocked at 17 acres per AUM so there would be a yearly loss of approximately one AUM. This would occur until year five when the first year of disturbance is rehabbed.

Table 5. AUMS lost during mining operations in South Owl Creek Allotment #00610.

Year 1	Year 2	Year 3	Year 4	Year 5
3 AUMs	6 AUMs	9 AUMs	12 AUMs	15 AUMs
Year 6	Year 7	Year 8	Year 9	Year 10
15 AUMs				
Year 11	Year 12	Year 13	Year 14	Year 15
12 AUMs	9 AUMs	6 AUMs	3 AUMs	Reclaimed

Table 6. AUMS lost during mining operations in Shumway Allotment #00648 – Home Pasture.

Year 1	Year	Year 3	Year 4	Year 5
1 AUM	2 AUMs	3 AUMs	4 AUMs	5 AUMs
Year 6	Year 7	Year 8	Year 9	Year 10
5 AUMs				
Year 11	Year 12	Year 13	Year 14	Year 15
4 AUMs	3 AUMs	2 AUMs	1 AUMs	Reclaimed

The proposed action would remove up to 15 AUMs for six years in the South Owl Creek Allotment before the acres in year one are completely rehabbed. It would remove up to five AUMs for six years in the Shumway Allotment before the acres in year one are completely rehabbed. When compared to the No Action Alternative there would be an additional 67 acres disturbed involving six AUMs removed in the South Owl Creek Allotment. There would be ½ acre disturbed in the Shumway Allotment involving less than one AUM removed. The proposed action would remove from grazing a maximum of 365 acres from the South Owl Creek Allotment. This would leave 515 acres available for grazing. According to the ecological site guides for Loamy and Shallow Loamy 10-14 inch precipitation zone these acres could be stocked at approximately five acres per AUM or a total of 103 AUMs. The grazing permit authorizes 82 AUMs. Therefore the threshold is not exceeded and there would be no reduction in the grazing permit. The proposed action would remove from grazing a maximum of 76 acres from the Shumway Allotment. This would leave 244 acres for grazing. According to the ecological site guides for Loamy and Shallow Loamy 10-14 inch precipitation zone these acres could be stocked at approximately five acres per AUM of a total of 49 AUMs. The grazing permit authorized 18 AUMs. Therefore, the threshold is not exceeded and there would be no reduction in the grazing permit.

Cumulative Effects

Cumulative Impact Assessment Area

Geographic Scope

The geographic scope of the cumulative impact assessment area (CIAA) is approximately 880 acres and 82 AUMs in the South Owl Creek Allotment and 320 acres and 18 AUMs in the Home Pasture of the Shumway Allotment.

Timeframe of the Cumulative Effects Analysis

The timeframe of the cumulative analysis would be 15 years.

Past Actions

There has been no previous mining in the CIAA other than that occurring in the No Action Alternative.

Present and Ongoing Actions

Present and ongoing actions include 67 acres of active mining in the South Owl Creek Allotment and ½ acre in the Home Pasture of the Shumway Allotment. This results in a loss of approximately 6 AUMs occurring already in the South Owl Creek Allotment and less than one AUM loss in the Home Pasture of the Shumway Allotment.

Foreseeable Future Actions

There are no known foreseeable future actions other than the current mining taking place and the proposed action.

Paleontological Resources

Issue(s) Identified

How would the proposed surface disturbance affect significant paleontological localities?

Affected Environment

The project area is located within the Mowry and Thermopolis Shales (Kmt). These formations have been given a PFYC rating of 3, meaning they have moderate sensitivity for paleontological resources.

Typical fossils found within these formations include invertebrates and marine vertebrates.

Paleontological resources are determined to be significant when they are scientifically important because it is rare, of high quality and well-preserved, provides new information, or has educational value (IM2009-011).

The area of potential effect (APE) was defined to include the proposed surface disturbance, approximately 376 acres. Significant localities are widely scattered within these formations and none have been recorded within 1 mile of the project area. Due to the low probability for affecting significant localities, no paleontological inventory was required.

Direct and Indirect Effects

No Action

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.

Proposed Action

Surface disturbance, approximately 376 acres, would occur as a result of approving the proposed action. Significant localities have been recorded but are not common within the target formations. Surface disturbance resulting from the proposed action will have no effect on known significant fossil localities located on the surface. Unknown fossil localities may be affected once disturbances are implemented as proposed.

Mitigation

As described in the Proposed Action, unknown paleontology localities may be affected by surface disturbing activities. To mitigate affects to unknown subsurface significant paleontology localities standard paleontology stipulations apply and are included in the conditions of approval. The standard paleontology stipulations include measures for mitigating adverse effects discovered during surface disturbing activities.

Residual Effects

Unknown paleontology resources may be affected.

Cumulative Effects

Construction and development of mineral resources impact significant paleontological localities through ground disturbance and unauthorized collection. Potential impacts to significant localities are mitigated under the proposed action. Since there would be no direct or indirect effects on known significant paleontological localities, there can be no cumulative effects.

Soils

Issue(s) Identified

What is the potential for soils loss due to wind and water erosion? What is the potential for local soils and soils management practices to detrimentally affect reclamation success?

Affected Environment

Approximately 5.4 acres of phase 1 is planned to occur in the Uffens-Rairdent complex soils with slopes approximately 5-9% at the project. Soils in this complex are typically loamy, with clay restrictive layers present within the top 5 to 18 inches. Restrictive layers are typically overlaid over well drained gravelly and sandy loams. Soils in the Uffens-Rairdent complex are typically saline, although with a highly variable range of salinity, from mildly to strongly saline.

Direct and Indirect Effects

No Action

The No Action Alternative would result in no disturbance or effects to soils within the area potentially affected by the Proposed Action.

Proposed Action

The proposed action would disturb approximately 376 acres over a ten year period with approximately 37 acres of disturbance per year. The timeframe of this impact would be 15 years beginning in 2016.

It is expected that approximately 6" of surface soils would be suitable and available as topsoil for reclamation, and that this layer of suitable soils overlay soil horizons which are strongly saline and alkaline. Care should be taken to avoid mixing these soil components, and they should not be stored together. Personnel capable of identifying the layer which is appropriate for topsoil should be onsite during capture of this soil type.

Based on experiences with reclamation at existing gravel operations in the immediate vicinity of the proposed activities, and issues experienced at those sites, reclamation seed mixes should include plants which are tolerant of highly saline and highly alkaline soil conditions, such as fourwing saltbush (*Atriplex canescens*) and greasewood (*Sarcobatus vermiculatus*). Planting of seedlings should also be considered in concert with seeding operations in order to enhance probability of overall reclamation success in the event that weather and soil conditions are not conducive to seedling establishment from direct seeding. Using the USDA Water Erosion Prediction Project (WEPP) model, it is predicted that given the average slope, soil types, and the nature of the disturbance and reclamation, the area impacted by the proposed action is not particularly at risk from water erosion. The project area would experience the highest risk of erosion after slope-recontouring and reclamation efforts, before seeding and/or planting efforts result in

stabilized soils. Using the WEPP model, it is predicted that annual water runoff would be as little as 0.05 inches/acre/year and as high as 0.14 inches/acre/year during the first year, with an associated sediment movement of 0.02 tons/acre and 0.205 tons/acre respectively. Successful reclamation would result in a decreased risk and rate of water erosion beginning the second season after reclamation, with the risk of water erosion decreasing over time.

Mitigation

In order to protect the top 6" of surface soils, care should be taken to avoid mixing these soil components, and they should not be stored together. Personnel capable of identifying the layer which is appropriate for topsoil should be onsite during capture of this soil type.

Cumulative Effects

Cumulatively, with all other past, present, and RFFAs, the implementation of the proposed action, including reclamation as described in the reclamation plan submitted by the proponent, would not result in substantial impacts to soils or soil resources within the area analyzed.

Water Resources (Water Quality and Ground Water, Floodplains, Wetlands and Riparian Zones)

Issue(s) Identified

How would the proposed action impact the runoff conditions below proposed mining areas and associated haul roads?

What would be the change in water quality, in particular amount of total dissolved solids (TDS) of runoff from the proposed mined areas and haul roads?

What is the likelihood of encountering ground water from the proposed mining activity?

Affected Environment

The proposed mine area is located within the Lower Owl Creek (HUC# 100800070401) level 6 sub-watersheds as defined by the USGS (United States Geological Survey). This sub-watershed consists of the lower ephemeral portions of Owl Creek that is located downstream 2-3 miles to the northeast the proposed extension area.

The topography of the area consists of ephemeral drainages that are dissected by outcrops of mudstone, sandstone, shale and various alluvial deposits on the flanks of the Owl Creek Mountains. Topography of the area planned for disturbance in the Pit 108T Extension Amendment/Update is mostly gently sloping to the north and north east, and moderately dissected by somewhat deep ephemeral drainages. The flow regime of the drainages of the watershed in the proposed mining area are generally ephemeral which is defined as having flow within these channels primarily following storm events that are capable of producing runoff during the summer and fall months. There is also a snow melt period in the central region of the Bighorn Basin that typically occurs in the months of March and April from watershed elevations such as these watersheds located below 6000 feet. Many of the pre-mine drainages within the Update area are well incised with a fairly narrow bottom width and steep side slopes. There are various road and other watershed disturbances that have occurred in the watershed and are associated with other land uses such as ranching operations, and recreational use.

Within the proposed mining area there are 5 watershed areas with drainages characteristics that meet the EPA definition as an ephemeral channel. There exist sufficient characteristics such as a water course with side banks and likely transmits smaller amounts of runoff throughout portions of the year. These ephemeral drainages that reveal incised channels with narrow terraces that are classified as Rosgen F and G type channels (Rosgen, 1996) These drainages were analyzed for runoff volume amounts according to various precipitation runoff scenarios with the main design from a 2 year 6 hour storm event scenario. This detailed information in the hydrology section of the submitted mine plan. Overall these drainages are losing stream segments where the water table is below the land surface elevation throughout the water year. The pre-mine surface topography associated with the drainages to be affected by these proposed activities is illustrated on the Hydrology Map in the mine plan.

Groundwater

Information obtained from the State Engineer's Office online database indicated several permitted water wells and springs within three miles of the Amendment area (See Ground/Surface Water Map, page 20.2 of submitted mine plan). Two springs permitted by the BLM are recorded within the planned mine area of proposed pit 108T Ext in SE SE section 19 T43N, R95W and SW SW section 20 T43N, R95W. Upon further research and field investigation in 2014 of the sites by BLM personnel, it was determined that the spring recorded in section 20 is actually located in section 29 and will not be impacted by proposed mining. Additionally, BLM personnel are not certain the spring permitted in section 19 is active. Other water wells are recorded to the north, east and west, some in close proximity to the planned mine disturbance. Those wells are associated with residences adjacent to county road 25 (Missouri Flats road) and State highway 120, and are recorded as domestic use. Other wells in the area are recorded as being used for livestock watering.

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. Any changes in runoff would be present downstream in Owl Creek following storms of sufficient size to produce runoff.

Direct and Indirect Effects

No Action

Under the No Action Alternative, the development of the proposed action would not occur. The additional roads, pits, and stockpiles in the Lower Owl Creek sub-watershed would not occur. The current infiltration rates and runoff conditions in proposed disturbance area of the sub-watershed would remain unchanged. The native channel conditions would remain unchanged and would not be altered from their current condition. There would be no installation of a culverts, low-water crossings or check dams in any of the drainage areas. There would be no change to water quality or ground water conditions in the area from this alternative.

Proposed Action

Surface Water

The hydrology of the drainages would be altered temporarily by the re-routing of runoff 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 will likely occur and exposed areas with no vegetative cover and on slopes greater than 5 percent. These rills and gullies that fall outside of the contained pit areas are likely to transmit new sediment that would be introduced into the watershed if the area received a precipitation event greater than 2 year, 6 or the 100 year 6 hour maximum precipitation events.

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. The diversion of surface flows will be accomplished by constructing small v-ditches on the up-slope sides of pits and other mine development to divert surface flows away from these areas. These small v-ditches will normally be constructed with a motor grader or a dozer. Topsoil will be removed and stockpiled prior to constructing drainage diversions. If erosion occurs on the diversion areas, rock check dams, straw bales or water bars may be used to stabilize erosion and reduce sedimentation.

The other drainages design and flow capacities were estimated using runoff calculations that were modeled using the SCS curve number for the area, the hydrologic soils group, and storm estimates for 10 year, 6 hour event of 1.73 inches using the Carlson Software SurvCADD 2006 Hydrology Module sizing software. In addition the 2 year, 6 hour and 100 year, 6 hour events were modeled for runoff volume and velocity for the 12 drainage basins inside the proposed mine area. Typical velocities were used for average drainages for hydrology calculations. There would be material moved along route 26.1 at one drainage crossing along the route.

During reclamation the channel design for both temporary and permanent diversions will match as closely as possible to pre-mine channel gradients and cross-sectional shapes. This entails a minor disturbance from the high water line to the upland terrace that would be altered to a lower slope.

The proposed mined area of 369 acres was modeled using the TR-55 NRCS small watershed model to estimate potential changes in runoff from the proposed mined area. The inputs into the model were 369 acres, Thermopolis Wyoming climate data, Type C (closest overall average) hydrologic runoff soils, 4 percent average slope, clay loam soils, Pinon Juniper and mixed sagebrush/grass native rangeland conditions, Curve Number of 63 for current conditions and 86 for the post treatment number as nearest estimation for compaction and land use change for the area.

The results for the 2 year 6 hour event were chosen to represent a return interval of normal runoff events to the proposed disturbance. There was a change in peak runoff for all combined drainages within the disturbed area from 12 cfs to 14 cfs following modeled storm events, change in total runoff from 16 acre feet to 18.5 acre feet, due to the impervious change around compacted areas and roads, decrease in runoff

depths from 1.9 to 1.3 inches. The change in rainfall depth from the disturbed areas decreased from 2.8 to 2.6 inches. The numbers reflect a scenario without additional channel best management practices to reduce erosion volumes (which is beyond the scope of the model) however it quantifies runoff volumes, time to peak flow, and erosion potential of the watershed from the proposed action.

The estimate erosion rate using the WEPP ROAD model (Elliott,2014) from the roads outside of the proposed disturbance area output for this model was an average 2 tons of sediment annually.

Ground Water

The potential to impact ground water within the proposed mining area is low due to the water table levels of the production formations being well below the mining operation depths. The likely hood of encountering perched ground water or isolated ground water in these formations is also low. Further monitoring of the spring located in section 19, the design feature of the submitted mine plan. If it is determined that the spring is not active due to the lack of a visible seep or running water, Wyo-Ben will mine the area in question. If it is determined the spring is active, Wyo-Ben will consult with BLM to determine an appropriate disturbance-free buffer from the spring which is 500 feet or ¼ mile and will be determined if necessary.

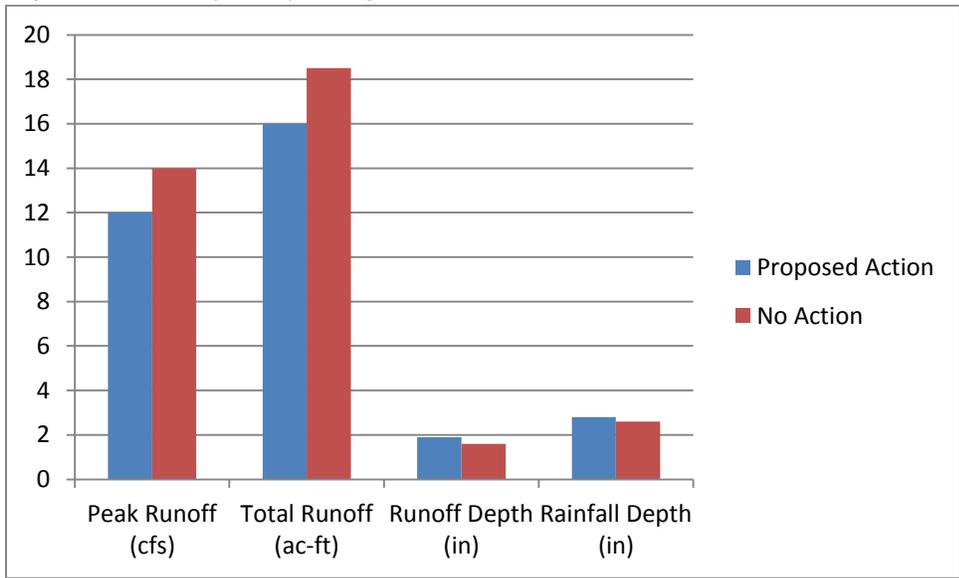
Due to the mixing and removal of soil profiles the ground water flow paths in the disturbed areas would be altered, however most precipitation received in the area is lost to surface water runoff or evaporation in the vadose zone.

It is not anticipated that mining will encounter any permitted developed wells during mining activities associated with this proposal. Additionally, those permitted wells outside of planned mining should not experience pollution due to mining as the bentonite pits are relatively shallow, and no acidic or toxic forming substances are present in the overburden that will be mined. Additionally, no ground water was encountered during developmental drilling of potential pits. Thus the mining activities should not affect any permitted ground water associated with the water wells within the buffer area of the mine plan.

Water Quality

Any potential impacts to water quality would only be detected following storm events that are capable of producing runoff due to the absence of connected perennial flowing water near the proposed action. The impact indicator would be the amount of total dissolved solids (TDS) in the runoff in association with peak runoff times which would increase in correlation with disturbance levels. The scale of the disturbance (369 acres) compared to the sub-watershed size (40,000 acres), along with ephemeral channels, would make impacts negligible and difficult to quantify. The specific impacts from the proposed action are too small in scale and difficult to model due to the ephemeral flow regime of the sub-watershed however minor increases in volume and sediment would likely be observed in peak flows downstream in Owl Creek as a result. With increased runoff volumes from the area there would likely be a reduction in water quality and increased TDS in runoff from disturbed areas. However, overall general best management practices in the mine plan and SWPP are in place to reduce potential impacts the water quality of runoff from the potentially disturbed area. The duration of the impact to water quality would be until successful reclamation has been completed according to the BLM Wyoming Reclamation policy and could be up to 10 years or more and would coincide with the amount of actively disturbed mining areas.

Figure 1-Summary of Hydrologic Results



Cumulative Effects

The following cumulative effects have been outlined in the table below. There would be an additional 369 acres in the watershed of disturbance. This would be in addition to historically and currently mined areas in the Lower Owl Creek sub-watershed. The duration of the impacts for the foreseeable future would be for the length of the mining activity.

Table 7. Cumulative Effects Impacts to Watershed.

Cumulative Effects Table impacts to Watershed																
Alternative	Cumulative Impact Assessment Area (CIAA)/Geographic Scope	CIAA/Temporal Scope	Past-Present Actions	Future Actions	Direct-Indirect Effects											
Action	Lower Owl Creek Sub-watershed (HUC # 100800070401)	10-50+ years (or length of active mining operation)	Previous mining operations have been occurring 30 years, the present action would expand additional disturbed acres as a result of surface mining	Continued amendments to plans of operation along with and development associated with mining operations in the watershed. Alteration of the topography of the watershed around mined areas would continue to occur.	There would be an additional estimated 369 acres of disturbance throughout the duration of the mining activities. The removal would occur in stages and have indirect effects of increased annual runoff from disturbed areas (estimated at rate of 2 tons sediment/yr and a .3 inch reduction in runoff depth annual average). Alterations to topography and natural ephemeral channels would occur as a result.	<table border="1"> <tr> <td colspan="2">Output Summary</td> </tr> <tr> <td>Peak Runoff (cfs)</td> <td>14</td> </tr> <tr> <td>Total Runoff (ac-ft)</td> <td>18.5</td> </tr> <tr> <td>Runoff Depth (in)</td> <td>1.6</td> </tr> <tr> <td>Rainfall Depth (in)</td> <td>2.6</td> </tr> </table>	Output Summary		Peak Runoff (cfs)	14	Total Runoff (ac-ft)	18.5	Runoff Depth (in)	1.6	Rainfall Depth (in)	2.6
Output Summary																
Peak Runoff (cfs)	14															
Total Runoff (ac-ft)	18.5															
Runoff Depth (in)	1.6															
Rainfall Depth (in)	2.6															
No Action	Various Subwatersheds located within the Nowood River-Joe Emge Creek watershed (HUC # 100800080506)	10-50+ years (or length of active mining operation)	Previous mining has occurred in the watershed and alterations have occurred. Under this alternative the amendments or expansion of additional acres would not occur.	The amendments would not be allowed. The mining operations would occur in other non-federal administered areas of the watershed. There would be no future alteration of topography or change in runoff from mined areas in the watershed.	There would not be an additional estimated 369 federal acres of surface disturbing activity associated with the mining operations. There would be no additional changes to topography around mined areas, or changes to natural runoff conditions from federal land within the Lower Owl Creek sub-watershed.	<table border="1"> <tr> <td colspan="2">Output Summary</td> </tr> <tr> <td>Peak Runoff (cfs)</td> <td>12</td> </tr> <tr> <td>Total Runoff (ac-ft)</td> <td>16</td> </tr> <tr> <td>Runoff Depth (in)</td> <td>1.9</td> </tr> <tr> <td>Rainfall Depth (in)</td> <td>2.8</td> </tr> </table>	Output Summary		Peak Runoff (cfs)	12	Total Runoff (ac-ft)	16	Runoff Depth (in)	1.9	Rainfall Depth (in)	2.8
Output Summary																
Peak Runoff (cfs)	12															
Total Runoff (ac-ft)	16															
Runoff Depth (in)	1.9															
Rainfall Depth (in)	2.8															

Fish/Wildlife (Including Threatened, Endangered, Candidate and BLM Sensitive Species)

Issue(s) Identified

How would the proposed surface disturbance, disruption and 376 acres of sagebrush habitat removal impact avian sagebrush obligates like the sage-grouse, sage thrasher, sage and Brewer's sparrows?

Affected Environment

This area does provide habitat for numerous wildlife species, many are sagebrush obligates, some use this area seasonally and some yearlong. The wildlife habitat within and around the proposed mining area consists of rolling to sloping topography with Wyoming sagebrush/bunchgrass uplands bounded by ephemeral and incised drainages sloping north towards the private agricultural lands along Owl Creek.

Immediately to the south and west of this proposed mining area is PHMA for sage-grouse. This is the 26,000 acre Thermopolis Core area polygon that is a large and relatively un-fragmented Wyoming sagebrush community generally more suitable for sage-grouse habitation. The boundary of this PHMA or core area polygon is a tenth of a mile south from the proposed mining, and it also contains 3 known sage-grouse leks, Rattlesnake Gulch 1 and 3 on BLM land and 1.5 and 1.7 miles south of the proposed mining, and Spring Draw lek approximately 3.5 miles west. Between this proposed 376 acres of mining and the PHMA immediately south, there already exists approximately 40 acres of disturbed and fragmented habitat where the vegetation has been removed from past or ongoing bentonite mining operations.

There are also 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 sage-grouse sage thrasher, sage and Brewers sparrow are all Wyoming BLM Sensitive Species.

Direct and Indirect Effects

No Action

Under the No Action Alternative, the long term surface disturbance impact of 376 acres of sagebrush habitat removal, and the short term disruptive impact from actual mining activities displacing wildlife would not occur. No resulting effects on wildlife resources would be expected to occur beyond the current situation.

Proposed Action

The surface disturbance would result in the removal of approximately 376 acres of sagebrush habitat that would be removed through mining and road construction. Direct impacts from this proposed mining would be the long term surface disturbance and habitat removal impact and a short term disruption impact during the actual mining. While these disturbed sites would be reclaimed the sagebrush component would likely not be reestablished for the next 30 to 50 years, depending on weather. The disruptive activities associated with the mining operations, primarily vehicle and equipment noise, would likely disrupt and displace avian sagebrush obligates in the area for as long as the disruption is occurring, which is anticipated to be off and on mining activity for the next 10 years. The majority of the proposed mining area includes sagebrush communities with varying densities in canopy cover. The majority of this area has sagebrush canopies too light to provide suitable sage-grouse nesting habitat, but these areas are adequate nesting and foraging habitat for the other avian sagebrush obligate species like the sage thrasher, sage and Brewers sparrows. Approximately 20% or 70 of the 376 acres appear to have sagebrush canopy cover densities suitable for sage-grouse nesting, and wintering also. Nesting sage-grouse typically prefer canopy densities from 15 to 25%, and for wintering 10 to 30% (Connelly et al. 2000). These disruptive activities during breeding, nesting and foraging periods for the avian sagebrush obligates mentioned above, may cause disruption of their life cycle behaviors and unnecessary impacts to nesting birds, such as egg or hatchling abandonment, or actual nest destruction for those species nesting within the proposed mining area. In an analysis of sage-grouse studies conducted in 7 areas in Wyoming since the mid-1990s, Holloran and Anderson (2005) found that 45% of nests were located within 2 miles (3km) of the lek where the hen was bred, and 64% of the nests were within 3 mile (5 km) of the lek. Indirect effects from this proposed surface disturbance or habitat removal in these sagebrush habitats currently void of surface disturbing or disruptive activities would be additional habitat fragmentation, which, depending on potential neighboring disturbances, vegetative cover and terrain, could affect the viability of those remaining sagebrush habitats and for the species mentioned above that depend on them.

Mitigation

To minimize or mitigate the potential impacts to nesting sage-grouse and the other avian sagebrush obligates mentioned the proposed mitigation would be sufficient protection. Hauling would be 1 truck in and out with potential traffic up to 10hr/day, but that the hours/day of hauling traffic would vary considerably depending on demand at the plant. Specifically this amount of disruption would be confined

to an existing mining area and road. Because this road does receive other unregulated vehicle traffic, and also this amount of disruption, and more, have been occurring here unregulated for quite some time, and we could assume that most nesting sage-grouse in this vicinity, if present, have habituated to this activity by deferring away from the noise.

Cumulative Effects

Cumulative Impact Assessment Area:

The cumulative impacts of this mining proposal and other neighboring mining disturbances were examined within the cumulative impact assessment area (CIAA) for avian sagebrush obligates or sagebrush/bunchgrass habitats. This CIAA geographically is the 27,158 acre polygon of un-fragmented sagebrush habitat remaining in both the 26,038 acre PHMA or Thermopolis core area polygon and the 1,120 acres of Wyo-Ben claims north and outside of the PHMA. And the temporal scale for this CIAA is the approximate time necessary to reestablish sagebrush on disturbed areas, 30 – 50 years.

Past, Present, and Reasonably Foreseeable Future Actions (RFFAs):

To date approximately 40 acres of sagebrush habitats have been removed do to actual bentonite mining and habitat fragmentation from related facilities and access/haul roads. We know from this mining proposal action that Wyo-Ben plans on removing another 376 acres over the next 10-15 years within this proposal. This would constitute a loss of 410 acres of sagebrush habitats and the fragmentation of the remaining habitats near to the disturbances.

Cumulative Impacts:

Cumulatively, sagebrush obligates would be incrementally affected by all of the past, present and future activities because they are common in these types of undisturbed un-fragmented sagebrush/bunchgrass habitats around the proposed mining area, and are highly mobile. The primary mechanism of the effects is usually from direct habitat loss and/or fragmentation. In this case sagebrush obligates are displaced because habitats have been removed or disturbed. But with the 376 acres proposed and 40 acres of habitat already removed, there would likely remain around 26,748 acres of suitable habitat available to displaced birds, even though these habitats would have likely been occupied to some level. Cumulatively this amount of habitat removal would not result in substantial impacts to avian sagebrush obligates within the larger CIAA area analyzed.

4. Tribes, Individuals, Organizations, or Agencies Consulted:

List of Persons, Agencies and Organizations Consulted

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
Mary Hopkins, SHPO	Section 106 of NHPA/ Wyoming State Protocol	Concurrence received 12/21/2015; MOA signed xxx
Craig Smith		

List of Preparers

Name	Title	Responsible for the Following Section(s) of this Document
Joe Scyphers	Geologist	Solid Minerals/Public Health & Safety
Marit Bovee	Archaeologist	Cultural Resources/ Paleontological Resources
Eric Baxter	Natural Resource Specialist	Soils/Weeds & Invasive Species
Tim Stephens	Wildlife Biologist	Wildlife including T & E Species

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