ENVIRONMENTAL ASSESSMENT

WYW-165311 – Ten Claims Bentonite Mine Plan of Operations

BLM

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

December 2015

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

DOI-BLM-WY-R010-2014-0058-EA

Environmental Assessment

Introduction

Title, EA number, and type of project:

Ten Claims Bentonite Mine Plan of Operations

DOI-BLM-WY-R010-2014-0058-EA

Bentonite Mine Plan of Operations

General Location of Proposed Action:

6th PM, T. 47 N, R. 89 W, Sec. 20 - 23, 25 - 28

Name and Location of Preparing Office:

Worland Field Office

101 S. 23rd St.

Worland, WY 82401

Lease/Serial/Case file number:

WYW-165311

Applicant Name:

Wyo-Ben, Inc.

Background Information:

This Environmental Assessment (EA) has been prepared to analyze and disclose the environmental consequences of the Ten Claims Mine Plan of Operations (Plan) under Wyoming Department of Environmental Quality (DEQ) Permit New Permit 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.

Federal 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 federal law of the General Mining Act 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 through the signing of a Decision Record (DR) by the BLM, under the terms of §43 CFR 3809, and the Memorandum of Understanding between the Bureau 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).

The Ten Claims project area is located approximately 1 mile west of the Town of Ten Sleep, and extends a further 4 miles west, paralleling US HWY 16. Established roads in the area include US HWY 16 that travels from Worland to Ten Sleep and the old highway to the north of and through the project area. A new haul road segment would be constructed from the proposed mining area to Black Hills' existing permitted haul road network which in turn connects to US HWY 16.

Historically, these lands have been used for livestock grazing, wildlife habitat, recreational hunting, and bentonite mining. The area of the Proposed Disturbance is 523.9 acres, and includes mine development areas, stockpiles, and haul roads.

No existing surface or underground mining activities are located within the proposed permit area. Bentonite mining activities have been conducted on a continuous basis in the vicinity since 1975. No mining activities for other minerals are located on 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) Worland Field Office. These lands are open to location of mining claims, and development of locatable minerals under the approved Worland Field Office Resource Management Plan. Approval of this Mine Plan of Operations through the signing of a Decision Record (DR) by the BLM, under the terms of §43 CFR 3809, and the Memorandum of Understanding (MOU) between the BLM and the State of Wyoming, Department of Environmental Quality (DEQ), and the issuance of the Plan Decision and Conditions of 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 proposed Plan. Wyo-Ben is proposing to mine bentonite, which is a locatable mineral on BLM administered public lands West of Ten Sleep, WY.

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 and 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:

Land Use Plan Name: Rocky Mt ROD/Worland RMP

Date Approved/Amended: September 2015

The proposed action is in conformance with the applicable LUP because it is specifically provided for in the following LUP decision(s): Rocky Mt ROD /Worland RMP pages 58- 60:

GOAL MR:1 Provide opportunities for mineral extraction and energy exploration and development to meet national and local needs, while avoiding or mitigating impacts on other resources.
Objectives:
MR:1.1 Provide opportunities to explore for, sell and/or permit, and develop leasable, salable, and locatable mineral resources.

GOAL MR:5 Manage locatable minerals activities on lands open to mineral entry, while preventing unnecessary and undue degradation of public lands as defined in 43 CFR 3809.5, and while avoiding or mitigating effects of exploration and production on other resources.
Objective:
MR:5.1 Provide opportunities for exploration and development of locatable minerals while reducing and mitigating effects of mining on other natural resources.

2002 **--**Lands not formally withdrawn or segregated from mineral entry are available for mineral entry for bentonite (Map 3-2), gypsum (Map 3-3), and other locatable minerals.
2003 -- 2,661,343 acres are available for locatable mineral entry in the planning area.

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.

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 their 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 July 2014, and concluding in August 2014. 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 Participation

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, if any would be reviewed by BLM after the 30-day public comment period and incorporated as appropriate.

Issues Identified

Lands and Access: Would the proposed action impact access to County Road & or impact rights-of-ways for TCT West Fiber Optic Line are within the boundaries of the project?

Geology: How would the proposed action affect geologic resources in the area?

Soils: How would the soil resources be impacted as a result of up to 523.9 acres of disturbance associated with the mining operations?

Would the Proposed Action result in substantial issues with soil erosion from wind or water? What effect would soils and soils management have on reclamation success?

Invasive Species and Noxious Weeds: Would the proposed mining operations, attendant surface disturbance and subsequent reclamation increase the distribution and cover of invasive and/or noxious weeds particularly cheatgrass?

Cultural: How would the proposed surface disturbance 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?

Paleontology: How would the proposed surface disturbance affect significant paleontological localities?

Fluid Minerals Surface: Only section 20 is part of an existing oil and gas lease. There are no existing wells in the project area, and the bentonite mining is not anticipated to affect future oil and gas operations in the area.

Hydrology: How would the proposed action impact the runoff conditions below proposed mining areas?

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

Vegetation: Would the proposed action affect vegetation within the areas of mining?

VRM - How would the proposed action impact VRM Class II areas and could post mining reclamation meet VRM Class II objectives?

Proposed Action and Alternatives

Description of the No Action Alternative:

The No Action alternative involves no additional mining being 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. Additional or revised plans of operation would be considered by the BLM on a case-by-case basis.

Description of the Proposed Action:

The Ten Claims Bentonite Mine Plan of Operations proposes an open pit bentonite mine of no more than 523.9 acres of disturbance that would consist of pits, out of pit stockpiles, and haul roads and be excavated in multiple phases using standard castback mining techniques and procedures (Appendix A).

The mining activity proposed with this submission consists of five proposed pit sequences on the Frontier F2 and F3 beds, as well as the Beaver and Mowry A & B bentonite beds (TEN 1 through 5). The following table includes a listing of legal descriptions and disturbance acreages for each proposed pit sequence.

Proposed mine feature locations and disturbance

PROPOSED FEATURE (BENTONITE BED)	TOWNSHIP	RANGE	SECTION	PROPOSED DISTURBANCE AREA (acres)[1,2,3]	CLAIMS
PIT - TEN 1 (F2)	T47N	R89W	20 - 23, 25, 26	55.4	TEN 4, 6 - 9, 22 - 41, 44 - 47
PIT - TEN 2 (F3)	T47N	R89W	20 - 23, 25, 26	20.2	TEN 4, 6 - 10, 24 - 42, 44 - 48
PIT - TEN 3 (BEAVER)	T47N	R89W	20 - 23, 25, 26	49.5	TEN 6 - 11, 24 - 48
PIT - TEN 4 (MOWRY A)	T47N	R89W	20 - 23, 25, 26	55.7	TEN 6 - 12, 25 - 43, 45 – 50
PIT - TEN 5 (MOWRY B)	T47N	R89W	20 - 23, 25, 26	25.5	TEN 6 - 13, 16, 17, 26 - 43, 45 - 50
C.O.P., T.O.P., HIGHWALL REDUCTION[2,3]	T47N	R89W	20 - 23, 25, 26	22.2	TEN 6 - 13, 16, 17, 26 - 43, 45 - 50
POTENTIAL DISTURBANCE AREA	T47N	R89W	20 - 23, 25, 26	274.6	TEN 4, 6 - 13, 15 - 18, 24 - 50
HAUL ROADS OUTSIDE POTENTIAL DISTURBANCE	T47N	R89W	20 - 23, 25 - 28	20.8	
TOTAL PROPOSED DISTURBANCE AREA	T47N	R89W	20 - 23, 25 - 28	523.9	

1) The extended potential disturbance area allows extra room for Wyo-Ben, Inc. to be able to expand their pits if the production of bentonite is discovered to be economically advantageous, or if

additional stockpile area is needed. This will avoid the use of additional time to review paperwork by WDEQ-LQD and BLM for post approval modifications.

2) C.O.P. = Contoured Overburden Pile – this area may include overburden stockpile area, temporary bentonite stockpiles, camp site, and will be reclaimed as a permanent contoured overburden area once mining is complete to reflect the surrounding topography.

3) T.O.P. = Temporary Overburden Pile – this area may include temporary overburden stockpile area, temporary bentonite stockpiles, camp site, and will be reclaimed similar to the original topography.

Mine Life

Mine life would begin January of 2015 or as soon as this mine application is approved. A pit sequence may take up to ten years to complete, with the overall project taking up to 17 years to conclude, assuming operations remain active at the projected rates and are not temporarily suspended due to economic or other factors.

Equipment Used for Mining & Reclamation

Mining and reclamation activities would be conducted using the following equipment:

- Caterpillar 627 & 631 Tractor-Scrapers
- Caterpillar D8 to D10 Tractor-Dozers
- Caterpillar 966 Front-End Loaders
- Volvo L120 & L150 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

Design Features of the Proposed Action Alternative

The BLM can set forth design features that are necessary for the protection of the surface resources, uses and the environment; and for the reclamation of the disturbed lands. Design features are those specific means, measures, or practices that make up the proposed action and alternatives. Additional design features are added as needed to the proposed action or alternatives. Regulations, standard operating procedures, stipulations, and operator committed measures, and best management practices are usually considered design features. Design features are incorporated into the Proposed Action or alternatives to reduce or avoid adverse effects.

For the purpose of this analysis, the following design features are considered part of the Proposed Action Alternative:

Access

Haul Roads

There is a total of 28.5 acres of haul roads included in this Plan; 20.8 acres are located outside of the Potential Disturbance Area. All other haul roads will be within the proposed disturbance boundaries. Wyo-Ben will also be hauling on the Washakie County Road (Old Ten Sleep Road), as well as the Black Hills Haul Road which are not included in the numbers below.

Wyo-Ben will consider the installation of cattle guards on the haul roads as necessary.

New Haul Road HR 63 - Primary haul road for the west end of the Ten Claims Mining to the F2 bed with additional spurs going to the Mowry and Beaver beds. The road will intersect with US HWY 16.

2,083 lineal feet x 60 feet wide = 2.9 acres

New Haul Road HR 63.1 - Access to the mining west of Little Cottonwood Creek, access all of the proposed pits. This road has a total length of 2,262 feet with 932 feet outside of the potential disturbance. A 30 inch culvert will be required for this proposed new haul road on the northern end and a low water crossing is proposed for the southern crossing with the possibility of an 18" culver if deemed necessary.

932 lineal feet X 60 feet wide = 1.3 acres

New Haul Road HR 63.2 - Access to the mining east of Little Cottonwood Creek, starts at Washakie County Road (aka Old Ten Sleep Road) and travels north to access all of the proposed pits. This road has a total length of 3,085 feet with 1,564 feet outside of the potential disturbance.

1,564 lineal feet X 60 feet wide = 2.2 acres

New Haul Road HR 63.3 - Access to the mining from Washakie County Road (aka Old Ten Sleep Road) and travels north to access all of the proposed pits in the middle of the proposed mining. This road has a total length of 1,888 feet and is confined within the potential disturbance.

New Haul Road HR 63.4 - Starts where the Castle Garden road comes off of the Washakie County Road (aka Old Ten Sleep Road) and travels south approximately ½ mile then travels east on a two track road to where it goes through the State of Wyoming Lands to connect back to the Old Ten Sleep Road. This road has a total length of 10,246 feet with 8,948 feet outside of the potential disturbance.

8,948 lineal feet x 60 feet wide = 14.1 acres

New Haul Road HR 63.5 - Intersects Haul Road 63.4 on the eastern end of the proposed mining. This road will provide access to our proposed mining on the eastern portion. This road has a total length of 1,099 feet with 232 feet outside of the potential disturbance.

232 lineal feet X 60 feet wide = 0.3 acres

HR 63.3 and HR 63.4 are primarily to be used as access and equipment transfer roads. Two existing culvers would need to be replaced on HR 63.4 if the road were to be used for full hauling activities.

Wyo-Ben would sign all roads as an active mining area to alert the public of the possibility of heavy truck traffic.

Culverts

Of the 5 haul roads proposed for this amendment/update, one will require a culvert. Based on hydrology calculations for a 10 year/ 6 hour event, the drainage crossing of proposed haul road HR-63.1 will require a 30-inch culvert. Low-water crossings may be used in place of CMP where deemed appropriate (i.e. drainages that are less than 4-foot in depth). There are existing culverts in the County road (aka Old Ten Sleep highway). At the crossing of Little Cottonwood Creek there is an existing 10 foot culvert that is in good condition and will not be replaced. In regards to proposed HR 63.4 (Cattle Stock Driveway), there are two existing culverts that will need to be replaced to accommodate the proposed heavy truck traffic.

Drainages reported in B, F, G, H, and L are representations of typical drainages that traverse proposed pits on the Frontier formation that originate from the steep slope to the north and drain to the south.

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

Water Wells

Information obtained from the State Engineer's Office online database indicated several permitted water wells within three miles of the amendment areas (See Ground Water and Surface Water Map on page 10.1 of the mine plan). There are many water wells within the 3 mile radius boundary with the closest well over 1 mile from the proposed disturbance area. Additionally, no ground water was encountered during developmental drilling of the pits of this Amendment/Update.

Mining Operations

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

Topsoil and Subsoil Handling

Wyo-Ben would save all available soil for reclamation during the initial stripping part of mining. Due to the limited amount of soil resources in this area, subsoil would be saved separately from topsoil to allow a buffer between topsoil and the more chemically detrimental overburden material. Soils would be saved by one of two methods. Soils would be stockpiled with topsoil and subsoil being stockpiled separately and signed to distinguish the two qualities. Alternatively, soils may be spread directly on a previously backfilled and contoured phase of mining, behind the current phase, when a new phase of mining is being opened (spreading soils live in a castback sequence). If soil piles are expected to be in place for an extended period due to the temporary closure of the pit or if the soil piles would be in place for more than 1 year, then they would be seeded to prevent erosion and loss of soil.

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. 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 overburden material from adjacent pits in a lateral castback procedure, or bury that layer deeper in the profile during backfill. If deleterious material (bentonite, overburden) would be 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.

Surface water/Groundwater/Riparian

- Wyo-Ben would install check dams, where necessary, in newly constructed drainages, and establish vegetation communities in those reclaimed drainages to control sediment runoff in the waterways.

- Through drainage would be reestablished during final reclamation.

- Significant ephemeral channels (drainage basins of greater than 5 acres) would be temporarily directed around open pits during active mining stages. Channel design for both temporary and permanent diversions would match pre-mine channel gradients and cross-sectional shapes.

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

Rainfall is based on SCS Type II Distribution. Latitude 44-20 Longitude 107-30-00. Precipitation reported in tenths of an inch.

2 Year 6 Hour = 1.00 Event used for temporary diversions.
10 Year 6 Hour = 1.73 Event used for corrugated metal pipe (CMP) Road Crossings.
100 Year 6 Hour = 2.57 Event used for stability of permanent diversions.

Quality Assurance

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 the company to tighten planned disturbance boundaries of the pits, which in many cases, reduces the amount of disturbance that would otherwise occur. Soils of proposed mine areas are characterized to an order 2 level. This allows the company to determine the

quality and volume of soils that can be saved to produce quality reclamation. As stated previously, Wyo-Ben commits to save all available top and subsoil for reclamation during the initial stripping part of the mining process, and would either stockpile or spread it live. The stripping of pit phases is accomplished using a castback mining procedure. This practice allows reclamation to be concurrent with mining. Typically, previously mined phases of a pit are reclaimed through backfilling and contouring almost adjacent to the open phase of a pit, with soiled and seeded phases not far from this. Before a pit is backfilled, bentonite cleanings are pushed against the bottom of the highwall to ensure they are buried deep. In the reclamation of bentonite stockpile areas, the pad (portion of bentonite near the bottom of a stockpile that is not used) is buried, followed by the ripping and soiling of the area. All compacted areas, such as roads and other stockpile areas are also ripped prior to soiling to reduce compaction. The movement of overburden during the mining process is done in a tiered castback process, which places material from the current phase of mining into a previous open pit in approximately the same order as it was removed. This process is employed unless overburden testing reveals the need to place at least two feet of neutral spoil material over a toxic layer near the surface (i.e., very high Sodium Absorption Rate (SAR) or acid potential).

Monitoring Plan

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

In 2015, an active eagle nest between US HWY 16 and our proposed disturbance. The nest is located approximately 0.75 miles from our proposed disturbance boundary was discovered. Therefore, Wyo-Ben will maintain at least a 0.5 mile buffer from the eagle nest and will monitor the nest for activity between January 15 and July 31.

Migratory Birds and BLM sensitive species nest searches would be conducted prior to any initial surface disturbing activities during the dates April 15 to July 15.

Areas planned for disturbance that are further than ¼ mile from active leks will be checked for possible nesting or brooding sage grouse between April 15 and July 15 before any activities begin. If nesting or brooding sage grouse hens or chicks are found, mining will be halted until the birds can survive independent of the immediate nest habitat.

Interim Management Plan

In the event Wyo-Ben temporarily closes a pit, interim management procedures as per 43 CFR 3809.401 (5) would be implemented as follows: A berm would be placed in all areas around the pit phase where a highwall occurs. A berm would also be installed at the ramps of the pit to prevent entrance. Temporary water diversions would be made around the pit to prevent water from entering the particular pit phase. Bentonite stockpiles and stockpiles with potential deleterious material (overburden piles, etc.) would be

bermed to prevent off-site sedimentation. Ephemeral drainages that have the potential to receive deleterious material would have check dams installed. If soil piles are expected to be in place for an extended period due to the temporary closure, they will be seeded to prevent erosion and loss of soil. All equipment and supplies would be kept within the disturbance area. Any fuel storage tanks would either have a perimeter berm or placed within an excavated containment pit to control any potential spills. Annual and semi-annual inspections would be completed by Wyo-Ben employees, a representative from the DEQ, and a representative from the BLM. Finally the pit area would be monitored on a regular basis to determine if problems are occurring that would need to be addressed.

Spill Management Plan

Wyo-Ben Inc. would immediately notify both the Wyoming Water Quality Division of the Department of Environmental Quality and the Worland Field Office of the BLM for any accidental spills of petroleum products involving more than twenty-five gallons. Soils contaminated by smaller spills would be removed to the Wyo-Ben Stucco Mill Site for natural weathering treatment.

No solid wastes, either hazardous or non-hazardous, would be disposed of at these sites. All bulk fuel storage tanks would either be bermed for spill containment or placed in an excavated containment pit.

Reclamation Plan

The reclamation/revegetation process will be designed to reclaim a mosaic vegetation scheme consisting of site specific dominance ofvarious life forms (shrubs, grasses, and forbs) with a diverse species composition. Additional reclamation goals include basic landscape design principles, which include repeating landscape character elements, minimizing surface disturbance, proper siting and location, site stabilization with erosion control and maintaining visual aesthetics. The primary land use and reclamation goals are directed towards wildlife habitat, livestock grazing, and low visual impact to the western portion of the proposed mining.

The potential disturbance area is a landscape dominated by concave slope, to complex eroded gradient toe slopes. The area proposed for development is topographically dominated on the South/ East side with gentle slopes which radiate with a rise to the west end with medium level of rounding concave inclines. Hogback formations run east to west with a degreed angled slope at the highest 40-60%. The color of the area is gray longitude and some blue banding soils.

Wyo-Ben will utilize the standard castback mining techniques for mining and reclamation. Backfill will be achieved during the castback mining process using variously sized Caterpillar tractor-scrapers depending on availability. Wyo-Ben, Inc.'s mining contractors typically use Caterpillar 627 and 631 tractor-scrapers, supplemented with Caterpillar tractor-dozers ranging from D-8 to D-1 0 in size, track excavators and rock trucks. The equipment used will depend on availability of equipment, topography of a particular area, size and width of proposed pit and other environmental considerations. Dozers will be used in the backfilling of pits and for the final reconstruction of contouring and shaping of the slopes. Most drainage construction will be done with an excavator in order to minimize the disturbance.

Final reclamation contours will be consistent with those necessary to reestablish the projected postmining land use goals of domestic livestock grazing, wildlife habitat, and low visual impact to the

western portion of the proposed mining. Final slopes and surface contours will approximate native gradients and will blend with adjacent topography. Through drainage will be reestablished in all backfilled phases. Ephemeral channels to be impacted by this proposed mining activity will be temporarily directed around open pits during active mining stages. Channel design for both temporary and permanent diversions will match premine channel gradients and cross-sectional shapes. Temporary diversions will 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) will 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 will follow the castback mining sequence illustrated in Figure MP-2 in the Mine Plan Section. Following backfilling and contouring, all compacted surfaces will be ripped to improve water infiltration and retention. Subsoil and topsoil will 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 will 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 will include deep ripping, spreading topsoil/subsoil and seeding.

Reclamation of the steep-sloped bentonite beds like the A and B beds of the Mowry Formation may include leaving the upper portion of the post mine base rock exposed, in VRM Class III & IV areas, with backfilling and contouring of overburden occurring below that point, in small areas. Contouring will simulate the "pie-pan" nature of premine topography, with the lateral outside edges of those features forming reclaimed drainages that will tie into native drainages.

Wyo-Ben, Inc. will comply with the requirements listed in Noncoal rules, Chapter 13, Section 3 (a) (vi) regarding the timeliness of reclamation.

Without precedence or prejudice, Wyo-Ben agrees to the following voluntary measures as a site specific basis, for the area that is specifically located within the VRM Class II area to address additional reclamation and visual viewshed solutions:

Landform
Wyo-Ben will minimize the amount of disturbance in this area by:

• Highwall Buffer- typically Wyo-Ben will place a dozer blade width above the highwall (8' - 12') to place a highwall berm, when there is potential for activity above the highwall, and a void space between the native vegetation and the disturbance. For the VRM Class II area, Wyo-Ben will limit the size of the highwall buffer from (8' -12') to (3' - 5'), it has been determined that there is limited potential for activity above the high wall area and in order to limit the amount of the disturbance and make the disturbance less visible. If at any later time, it is determined that there is a potential hazard, then this buffer will be increased to a safe distance as determined by the Mining Supervisor.

• Associated Disturbance -Normally an area preceding the open pit will be approx. 150' to 200' depending on the equipment being operated and the required turning radius and a safe slope of the

ramps of3:1. For the VRM Class II area Wyo-Ben will limit this amount of disturbance to 1 00' to 150' depending on the required amount of room to maneuver the equipment. This will help to limit the size of the disturbance and make it less visible.

• Wyo-Ben will commit to keeping the haul roads contained within the bentonite bed disturbance and off of the ridgelines, where possible. This will reduce the amount of disturbance and make it less visible and lower the impact of sensitivity.

• Wyo-Ben normally constructs a haul road up to a 60 foot disturbance footprint. For this area we will reduce the haul road to a 3 5 foot footprint for the VRM Class II area to minimize the disturbance and make it less visible.

• Wyo-Ben will commit to locating bentonite stockpiles into the adjacent lower VRM Class IV area. This will help to reduce the visibility of the stockpiles, place the stockpiles in a less sensitive area and help to reduce the color contrast of the bentonite stockpiles in the VRM Class II.

• Wyo-Ben will commit to locating top soil and sub soil stockpiles behind existing geological structural features or shape the stockpiles to repeat the landscapes basic elements. This will help to reduce the visual impact or relocate them into a less sensitive VRM classification.

• Wyo-Ben will commit to maintain all equipment "camp" areas outside of the VRM Class II area in order to reduce the visual impact and to place them in a less sensitive VRM Classification.

• Wyo-Ben will maintain partial contouring with the castback mining technique to mimic the original premine contour to reduce the visual impact.

• Premine landform pictures have been taken in the VRM Class II area for reference when reestablishing the landform after mining along with the GPS coordinates. These will assist Wyo-Ben and our contractor in reestablishing the land form after mining. Please refer to the VRM Class II- Premine Pictures located on page 82.3 of the mine plan.

Vegetation

• Wyo-Ben has completed vegetation transects for the Ten Claims and has designed the seed mix to reflect similar vegetation that is found within the Ten Claims disturbance boundary. This seed mix is a diversified seed mix including native grasses, forbs, and shrubs and is listed in the Revegetation Techniques and Seed Mixtures on Page 85 of the mine plan. As per the BLM IM-2006-073 all seed mixtures will be certified to be free of noxious weed seed.

• Normally, Wyo-Ben prefers to seed all topsoiled lands in the fall however for the VRM Class II area, Wyo-Ben will commit to concurrent reclamation with seeding to be completed in the fall and spring season as the mine sequence advances to minimize the amount of disturbed lands and to get the vegetation started as quickly as possible.

• Wyo-Ben will seed soil stockpiles with a 3 grass seed mixture as determined by per the vegetation transects. As a substitute to one of the grass seeds, Wyo-Ben will consider using a nitrogen fixing plant

such as a Vetch (American), Scarlet Globemallow, Purple Prairie clover, and/or a low lying penstemon as per BLM Management suggestion, subject to price and availability.

• Wyo-Ben uses a broadcast pitter for the seeding of a majority of our disturbance. The pits that are created by the pitter are beneficial by helping to harvest moisture with the roughened surface pitted area and breakup the landscape with more native random vegetation pattern and avoiding uniform harrow lines in the final reclamation. With the pitting, the vegetation resembles more of the natural random setting and creates a microhabitat to harvest moisture that promotes seed growth and helps to reestablish the vegetation quicker.

• Wyo-Ben may use a hydro seeder to help re-establish and stabilize the vegetation in a timely manner. The hydro seeder may be used in areas of concern of highly erosive soils and areas that we are unable to get the pitter on.

• Minimize the removal of native vegetation by reducing the physical footprint of our mining activity as indicate above in the landform section.

• Limit access to and from the site with a single haul road access. Wyo-Ben will commit to keeping the haul roads contained within the bentonite bed disturbance and off of the ridgelines, where possible. Wyo-Ben normally constructs a haul road with a 60 foot disturbance footprint and will reduce the haul road to a 35 foot footprint for the VRM Class II area. This will minimize the impact to the native vegetation, reduce the foot print of our mining operations and place the roads in a less visible area.

• Wyo-Ben will recommend that our contractor utilize carpooling for the mining crew in order to reduce the amount of traffic in this area.

• Limit the amount of equipment working in the Class II area to a single crew of (Rock Truck, Scraper, Dozer, and Excavator) as not to distract the eye of the casual observer and make the activity less visible.

• Reclamation will be feathered back into the original native soils to minimize the contrast of the disturbance and to establish a diffuse edge.

• Wyo-Ben typically monitors the vegetation on all our mine sites in the spring of each year. Wyo-Ben will monitor the area within the VRM Class II, every spring and fall to visually see the vegetation growth, growth of invasive species, and any erosion issues. Typically, Wyo-Ben monitors the sites for 2 or 3 years before making the determination that an area will need additional supplements or reseeding of the area. Wyo-Ben will commit to soil testing in areas that are struggling after 2 growing season to determine what supplement(s) may need to be added to a particular area. Monitoring results are reported in the Annual Report under the Pit Summary.

• If noxious weeds are discovered we will treat them as identified in the "Wyo-Ben. Inc.'s Noxious Weed Management Plan for Federal Lands" on page 76.

• Bentonite mining is a short term linear transitory effect to the lands following the geological outcrops of the various bentonite beds. Our mine plan for the VRM Class II area will progress from Little

Cottonwood Creek and work westerly to US HWY 16. The disturbance will be in various phases as a result of the cast back mining technique. The long term goals for any mining activity are achieving bond release as quickly as possible. The State of Wyoming requires that the earliest that an area can be bond released is 5 years. It is Wyo-Ben's goal to try to achieve bond release at the 5 year threshold but is also realistic that some landscapes take a little more time to achieve the Wyoming Department of Environmental Quality and Bureau of Land Management Reclamation Standards.

Structures

• Wyo-Ben will not have any structures within the VRM Class II area.

• All Camp Equipment sites, porta potties, and bentonite stockpile areas will be located in adjacent higher VRM sites of III & IV.

• Wyo-Ben will commit to locating top soil and sub soil stockpiles behind existing geological structural features or shape the stockpiles to repeat the landscapes basic elements. This will help to reduce the visual impact or relocate them into a less sensitive VRM classification.

• Haul roads and all disturbances will be minimized and located to have the least visual impact within the VRM Class II Area.

Wyo-Ben, Inc. will consider alternative innovative techniques for reclamation in order to achieve bond release. Some of these innovative techniques may include pitting, broadcasting, drilling, hydro-seeding, the crimping of straw, candy-striping of soil where there is little to spread, seed coating, additives to the soil (including but not limited to mycorrhizae, boron, gypsum, limestone, fertilizers, mulch, grass clippings, wood chippings, weed free manure, biosolids, 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 will require BLM and DEQ approval prior to the application.

Timing of Construction Activities within the VRM Class II (West)

For the western portion of the Ten Claims proposed disturbance boundary, there is an overlap of the VRM Class II and the proposed disturbance boundary that is visible from KOP #2. The area that is in solid blue and overlaid with the green hatching is the area that the Timing of Construction Activities will be restricted to. For this area:

• Wyo-Ben will agree to mine only during the months of September through May and that any mining disturbance will be back filled, contoured, sub soiled, topsoiled and seeded each spring.

• In the case that the demand for bentonite decreases drastically while mining in this particular area, then Wyo-Ben will consult with the Worland Field Manager to discuss interim stabilization for a period of time and to address the visual impact of the disturbance.

• Wyo-Ben will disturb only that portion that is necessary as identified in the Potential Disturbance Area between the bentonite bed and the northern boundary. This would result in an anticipated reduction in potential disturbance of over 56% of potential disturbance in this area.

Revegetation Techniques and Seed Mixtures

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

Seedbed preparations may include deep-ripping after soil replacement to break up the surface and loosen the soil. Additional surface manipulations such as deep parallel furrows or pitting may be used to enhance moisture harvesting capacities of the areas receiving seed. Seed mixtures would be broadcast seeded when using the pitter or 4-wheeler and no till drill seeded with the Truax depending on the terrain and soil conditions. 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 their 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. Although no negative grazing impacts are anticipated on newly seeded areas, attempts would be made to coordinate timing of use with the grazing permittee if problems develop. Reclaimed areas may be fenced if it is determined grazing may be detrimental to reclamation efforts.

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

Composition of the proposed seed mixture is detailed below. Use of all species depends on seed availability in the year of seeding. Due to the mostly thin and low reclamation potentialof soils in the proposed disturbance area, Wyo-Ben would use a less diversified seed mix as shown for the Juniper, Steep Complex, and Greasewood/Annual map units as shown below.

Seed Species	Rate-lb PLS/acre
Gardner saltbush (A. gardneri)	4.0
Fourwing saltbush (A. canescens)	2.0
Rubber rabbitbrush (Chrysothamnus nauseosus)	1.0
Bluebunch wheatgrass (Agropyron spicatum)	2.0
Indian ricegrass (Oryzopis hymenoides)	1.5
Red threeawn (Aristida longiseta)	1.0
Sandberg bluegrass (Poa sandbergii)	1.0
Western wheatgrass (Agropyron smithii)	1.0
American vetch (Vicia americana)	1.0
Rocky mountain bee plant (Cleome serrulata)	1.0
Tansyleaf tansyaster (Machaeranthera tanacetifolia)	1.0
	16.5 lb/acre

This mixture would be supplemented with Big sagebrush (Artemisia tridentata) at a rate of 1 to 2 pounds per acre in targeted areas of greater moisture potential (i.e. drainages and depressions), in the Juniper

and Mixed Shrub Complex (MSC) map unit, and higher quality soils, 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. Monitoring of past reclamation successes and failures may influence seed mixture composition and surface preparation techniques.

Noxious Weed Management Plan for Federal Lands:
Wyo-Ben Inc. would implement the following management plan to address noxious weed control on all of its activities conducted on Federal lands:

- The list of Prohibited and Noxious Weeds, located in the DEQ/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 activity sites and their access routes and take action, in cooperation with the Washakie 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.

- Wyo-Ben would control access 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 vegetated soil disturbed by construction, reconstruction or maintenance activities at the first available window of opportunity. This may mean waiting until the fall planting season to help ensure the success of vegetation establishment.

- All seed would be laboratory tested for the presence of noxious weed seed. Native seed offered by local collectors would only be utilized after Wyo-Ben, Inc. personnel have consulted with the collectors to ensure they possess the skills necessary to recognize noxious weeds of concern and sign a statement certifying that they have not collected seed in areas with noxious weed infestations.

- All hay or straw used for check-dam construction or mulching would be certified weed-free.

- All herbicides used on the BLM administered public land would be approved by the BLM prior to its application.

Allotment Fences
Wyo-Ben would maintain temporary fences as mining progresses through particular areas, and to coordinate with the ranchers the timing of their leases. Once an area has been fully mined out,

stockpiles have been removed, and soil has been replaced and seeded then Wyo-Ben would replace the temporary fence with permanent fencing.

Wildlife

Threatened and Endangered Species (T&E)

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

Raptors/Migratory Birds

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

In 2015 an active eagle nest between US HWY 16 and our proposed disturbance was discovered. The nest is located approximately 0.75 miles from our proposed disturbance boundary. Therefore, Wyo-Ben will maintain at least a 0.5 mile buffer from the eagle nest and will monitor the nest for activity between January 15 and July 31.

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

Migratory Birds and BLM sensitive species nest searches would be conducted prior to any initial surface disturbing activities during the dates April 15 to July 15.

Sensitive Species

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

fledged or the WY-LQD, Worland BLM field office and USFWS consulted for alternative mitigation suggestions.

Sage Grouse

Wyo-Ben would mitigate potential impacts to sage-grouse in the proposed mining area by the following voluntary mining restriction:

- During the mating season, from March 15 through May 30, no mining or hauling activity would occur within ½ mile of a lek during the consecutive hours between 6:00 pm and 8:00 am to reduce impacts to mating birds due to audio and visual distractions.

- No initial surface disturbing activities would occur between May 15 (nesting season) and July 15 (brooding season) in areas that are within ¼ mile of active leks.

- Areas planned for disturbance that are further than ¼ mile from active leks would be checked for possible nesting or brooding sage-grouse between April 15 and July 15 before any activities begin. If nesting or brooding sage-grouse hens or chicks are found, mining would be halted until the birds can survive independent of the immediate nest habitat.

- Wyo-Ben would practice concurrent reclamation, including the separation and saving or direct, live spreading of topsoil and subsoil in order to increase the chances of quick revegetation success.

- Wyo-Ben would use a seed mix that would establish a diverse population of vegetation. Wyoming big sagebrush seed would be targeted to areas most likely to support initial sagebrush establishment at a rate of two to four pounds per acre.

Post Closure Management

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

Alternatives Considered but not Analyzed in Detail:

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

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

The area of the Proposed Action is situated west of the town of Tensleep, Wyoming, south of the Tensleep Highway, along an east-west-trending structure dominated by outcrops of Cretaceous-age bentonite-bearing strata. Geographically, the project area includes federal lands proposed to be disturbed by mining and related activities, as Wyo-Ben, Inc. New Permit area, a total of approximately 1,500 acres of land. Figure 1 above illustrates specific locations of proposed new mining under this project as three distinct areas under BLM serial case file WYW-165311. The total amount of land proposed for new mining and related disturbance is 523.9 acres within the larger 1,500 acre DEQ Permit area, all of which is located within unpatented mining claims on federal land.

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, Native American Religious Concerns, Riparian Areas, Class I visual management areas, Class I Airsheds, Wild and Scenic Rivers, Wetlands, Wilderness Values or Inventoried Lands with Wilderness Characteristics, Paleontology, Air Quality, Socioeconomics, Fuels, Wildlife, Threatened or Endangered Wildlife species, Forests.

Resources Carried Forward for Analysis

Land Use/Access

Issue(s) Identified

Would the proposed action impact access to County Road & or impact rights-of-ways for TCT West Fiber Optic Line are within the boundaries of the project?

Affected Environment

Historically, these lands have been used for livestock grazing, wildlife habitat, recreational hunting, and bentonite mining. The area within the Proposed Disturbance Boundary is approximately 503 acres. The remaining disturbance proposed in the mine plan (approximately 20.8 acres) involves haul roads under the surface management regulations.

The Ten Claims project area is located approximately 1 mile west of the Town of Ten Sleep. Established roads in the area include US HWY 16 that travels from Worland to Ten Sleep, to the north of the project

area. Also, the old Worland – Ten Sleep county road bisects the proposed disturbance area and pit sequences. Haul roads would be constructed from US HWY 16 to the west end of the proposed pit sequences and from the county road to the middle and east pits across public lands.

Direct and Indirect Effects

No Action

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

Proposed Action

The proposed potential disturbance boundary is encumbered by rights-of-way WYW-012260, the old Worland – Ten Sleep county road and WYW-165124, a buried fiber optic telecommunications line. WYW-012260 was issued April 30, 1968.

Mitigation

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

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 stratigraphic column for the proposed mining area is shown in Figure 1 of the Mine Plan. 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 five (5) bentonite beds in these formations.

Lithologic Description of Strata (in descending order younger to older)

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).

The Mowry Shale represents the uppermost strata of the Lower Cretaceous, and is approximately 330 feet thick. It consists of brownish gray to dark gray siliceous shale that weathers to hard, brittle, light silvery-gray chips. The interbedded shale is a brownish, silty mudstone, and fish fossils (scales) are abundant in portions of the Mowry Shale. Bentonite beds are usually less than six inches thick, and are common throughout this formation.

Overburden associated with each of these beds was sampled 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 523.9 acres of surface disturbance including attendant haul-roads, stockpiles, and other facilities would be authorized to remove commercial quantities of bentonite from five known bentonite beds in the Mowry Shale, and 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 40 years both on lands in the immediate vicinity of the project area, as well as many other parts of the Bighorn Basin where beds of bentonite are exposed at the surface.

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 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, 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 physical footprint of the proposed surface disturbance (direct) and the viewshed of the proposed surface disturbance up to three miles (indirect).

A class III cultural resources inventory was conducted for the direct APE (BLM cultural project #010-2012-019), approximately 523.9 acres. A total of 1168 acres were inventoried to determine effects to historic properties, cultural resources eligible or unevaluated for the National Register of Historic Places (NRHP), within the APE. Ten cultural resource sites and fifteen isolated resources were identified. Typical for the region, site types identified include a historic road, historic debris, prehistoric lithic scatter, prehistoric open camp site, and prehistoric cairn. The historic road (48WA1220) is eligible for the NRHP under criteria A. One prehistoric site (48WA2382) is eligible for the NRHP under criteria D. The remaining identified sites and isolates are not eligible for the NRHP. Within the indirect APE no historic properties eligible for the NRHP under criterion A or C were identified.

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 February of 2014 and followed up with phone calls and emails to the Tribal Historic Preservation Office (THPO) for each tribe. 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. Potential impacts from the proposed action include physical destruction of 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).

A class III cultural resources inventory identified two historic properties within the APE. Two segments of site 48WA1220 within the APE were determined to be non-contributing to the site's overall eligibility. The portion of site 48WA2382 within the APE was also determined to be non-contributing. The effects to both sites will not diminish the characteristics that make the properties eligible for listing in the NRHP. To prevent inadvertent surface disturbance and adverse effects to known historic properties, a

temporary barrier fence will be installed between the proposed surface disturbance and contributing portion of site 48WA2382. The fence will be in place prior to and during surface disturbing activities in the vicinity of the site.

Surface disturbance resulting from the proposed action, approximately 523.9 acres, will have no adverse effect on historic properties. 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. Consultation occurred with the State Historic Preservation Office (SHPO) under the State Protocol. Concurrence was received on eligibility status and effect determinations.

No historic properties were identified that would be indirectly affected by changes to the setting or introduction of atmospheric elements (e.g. dust). Additional indirect effects (e.g. heightened awareness of site location/vandalism and inadvertent/accidental impact) would be mitigated through implementation of the standard cultural stipulation.

A prehistoric feature of tribal concern is located outside the APE and will not be impacted by the proposed surface disturbance. No additional potential impacts were identified during Native American consultation.

Mitigation

Wyo-Ben will install a temporary barrier fence between the proposed surface disturbance and contributing portion of site 48WA2382. The fence will be in place prior to and during surface disturbing activities in the vicinity of the site.

Cultural Resources Mining Stipulations (compatible with the current 43 CFR § 3809 regulations): The operator is responsible for informing all persons associated with this project that they may be subject to prosecution for knowingly disturbing, altering, injuring, excavating, removing or destroying any historical or archaeological site, structure, building, or object on Federal lands.

The operator shall immediately bring to the attention of the Authorized Officer any cultural resources that might be altered or destroyed on Federal lands by his/her operations. If archaeological, historical, or Native American resources are discovered, the operator is to suspend all operations that further disturb such materials and immediately contact the Authorized Officer. Any such discovery shall be left intact until the operator is told to proceed by the Authorized Officer.

The Authorized Officer shall evaluate the discoveries brought to his/her attention, take action to protect or remove the resource, and allow operations to proceed within 10 working days after notification to the Authorized Officer of such discovery. The decision as to the appropriate measures to mitigate adverse effects to cultural or paleontological resources shall be made by the Authorized Officer after consulting with the operator.

Before a Plan of Operations is approved, the operator is responsible for the cost of any investigations necessary and any mitigation measures required by the Authorized Officer. The Authorized Officer will provide technical and procedural guidelines for the conduct of the required evaluation and mitigation.

After the Plan of Operations is approved, or where a Plan of Operations is not involved, the Federal Government (BLM) shall have the responsibility and bear the cost of investigations and salvage of any cultural (and paleontological) values discovered by the operator.

Archaeological Resources Protection Act

No person may excavate, remove, damage, or otherwise alter or deface or attempt to excavate, remove, damage, or otherwise alter or deface any archaeological resource located on public lands or Indian lands unless such activity is pursuant to an issued permit.

Human Remains: If human remains are discovered or suspected, the operator shall suspend operations immediately, physically guard the area, and notify BLM immediately.

Cumulative Effects

Construction and development of mineral resources impact cultural resources through ground disturbance, unauthorized collection, and visual intrusion of the setting of historic properties. Potential impacts to historic properties are mitigated under the proposed action. Since there would be no direct or indirect effects on contributing portions of known historic properties, there can be no cumulative effects.

Paleontology

Issue(s) Identified

How would the proposed surface disturbance affect significant paleontological localities?

Affected Environment

The project area is located within the Thermopolis Shale (Kc), Frontier Formation (Kf), and Mowry Shale (Kmr). 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 523.9 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 523.9 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. To mitigate affects to unknown subsurface significant paleontology localities standard paleontology stipulations apply and are included in the conditions of approval.

Mitigation

Paleontological Resources Mining Stipulations (compatible with the current 43 CFR § 3809 regulations):

1. **Collecting:** The project operator is responsible for informing all persons associated with this project including employees, contractors, and subcontractors under their direction that they shall be subject to prosecution for damaging, altering, excavating or removing any vertebrate fossils or other scientifically significant paleontological resources from the project area. Collection of vertebrate fossils (bones, teeth, turtle shells) or other scientifically significant paleontological resources is prohibited without a permit. Unlawful removal, damage, or vandalism of paleontological resources will be prosecuted by federal law enforcement personnel.

2. **Discovery:** If vertebrate or other scientifically significant paleontological resources (fossils) are discovered on BLM-administered land during operations, the Operator shall suspend operations that could disturb the materials, stabilize and protect the site, and immediately contact the BLM Worland Field Office Manager (Authorized Officer).

3. **Avoidance:** All vertebrate or scientifically significant paleontological resources found as a result of the project/action will be avoided during operations. Avoidance in this case means, "No action or disturbance within a distance of at least 100 feet of the outer edge of the paleontological locality."

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.

Visual Resource Management

Issue(s) Identified

How would the proposed action impact VRM Class II areas and could post mining reclamation meet VRM Class II objectives?

Affected Environment

Landscape Description Affected Environment

The area disclosed for construction activities found under the mine plan is characterized as a landscape dominated by concave slope, to eroded gradient toe slopes. The area proposed for development is rolling with simple topography on the Southeast side with gentle rising slopes which radiate to the west end with medium level of rounding concave inclines. The hogback formation

running east to west with smooth wrapping slopes at an angle of 40-60%. The color of the area is gray/ brown mixed soils. The vegetation is irregular Juniper and very low grasses.

Location (Zone of Visual Influence)

In accordance with VRM II management standards the proposed project cannot be a dominating influence on the landscape from the viewing public. Due to the layout of the proposed project Key Observation Points (KOPs) were developed to assist in the analysis of public viewership. Other factors of consideration were also identified under the degree of contrast.

Portions of the proposed project are adjacent to US highway 16 and BLM road 508. US Highway 16 runs from Worland to Buffalo, WY. This highway meanders from a high point that may give the viewing public the ability to look down at an angel into the proposed project area. There is a portion of the highway that dips down, therefor providing a screening opportunity from the proposed project. Factors consider through the degree of contrast form the KOPs will assist in eliminating or defining direct or indirect effect. Distance, relative size and scale, season of use are all a consideration that exists along with critical visitor use season when considering the degree of contrast.

Direct and Indirect Effects

No Action

Proposed Action

Two key observation points had been identified and used for the viewshed analysis process. This was based on traffic information and location of traffic viewablity of the proposed project area.

US Highway 16 is a paved state highway that has an estimated monthly average daily traffic (MADT) of 247 (Wyoming Department of Transportation , 2014/ 2015)**.** Traffic Data compiled from Wyoming DOT identifies that the time of year for higher visitor use is from June to August of any given year. The critical use season would be those months were the higher peak traffic occurs. July would be the peak use month so any construction activity during that month would be the most visually influential.

Month	Monthly Average Daily Traffic (MADT)	Monthly Average Weekend Traffic (MAWDT)
May	869	936
June	1288	1415
July	1682	1954
August	1511	1673
September	1176	1242

2014 Automatic Traffic Recorder reporter Wyoming DOT pg17

http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Planning/Traffic%20Data%20ATR%20&%20VMB%20Book%20PDF's/ATR%20Books/ATR%202014%20Book.pdf

Traffic counter data extracted from the BLM Recreation Information Management System (RIMS) for BLM route 508 is found to have on average 3690 visits per year.

Environmental Consequences/ Cumulative Effect Study

This proposed project would remove soil and vegetation in VRM class II. The amount of acres disturbed that will be viewable by the recreating public from KOP#1 is 69.127. The removal of soil and vegetation along with the excavation activities can create a visual contrast. However, with appropriate timing of construction activities and immediate reclamation proposed for this project, impacts would not be incompatible with the current management objectives for the VRM II management class, nor will it create a permanent long-term cumulative impact.

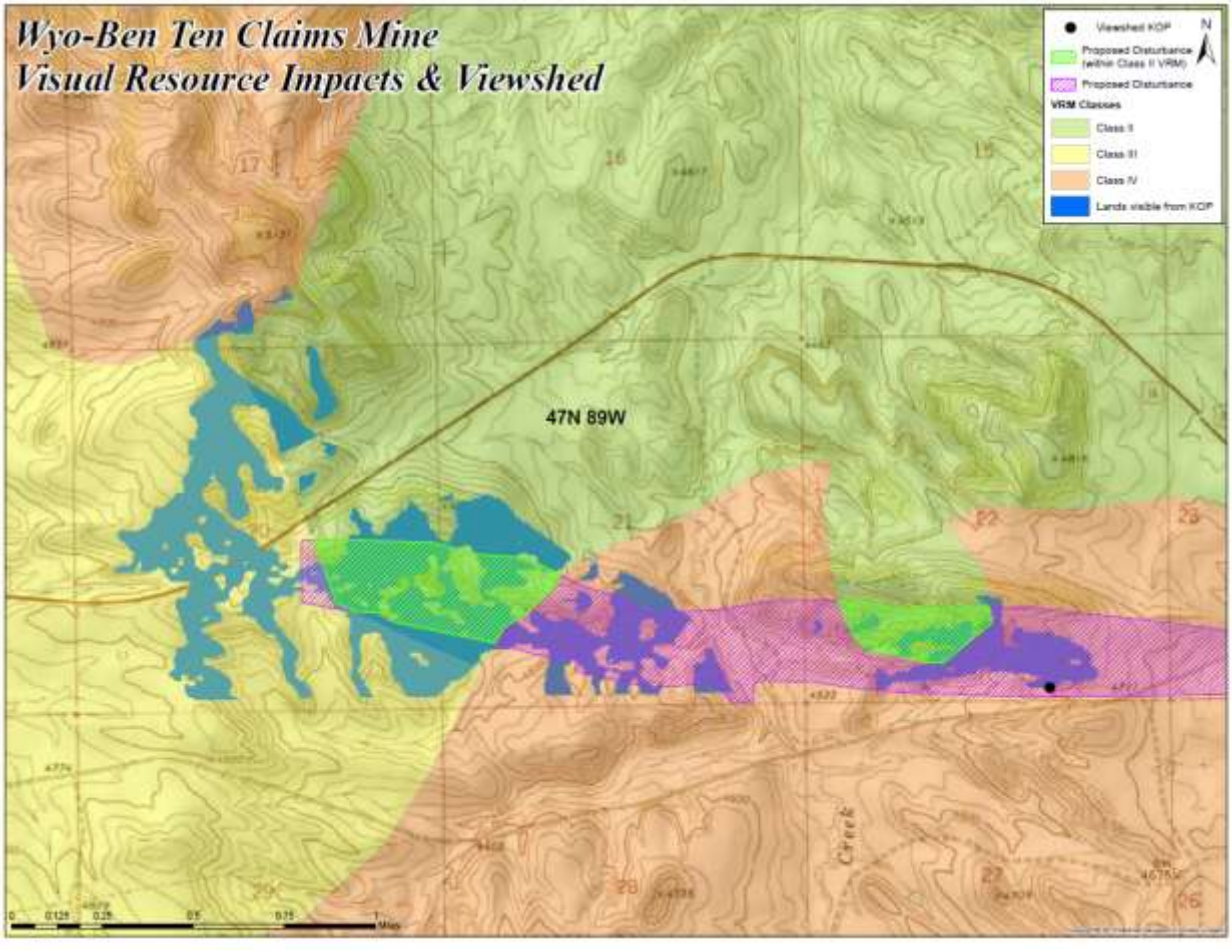
Other future actions could result in individually substantial impacts and could exceed applicable VRM Class II criteria.

KOP #1 BLM Road 508.

The view from this point is weak to moderate. The degree of contrast has to consider the distance from the road to the project area, angle of observation, and season of use/ timing of operation. Identified in the reclamation plan was timing requirements for construction activities in the VRM Class II management area. The proponent has agreed to only construct during times when there would be less of the recreating public traveling through the area. This will lower the direct effect for the general onlooker.

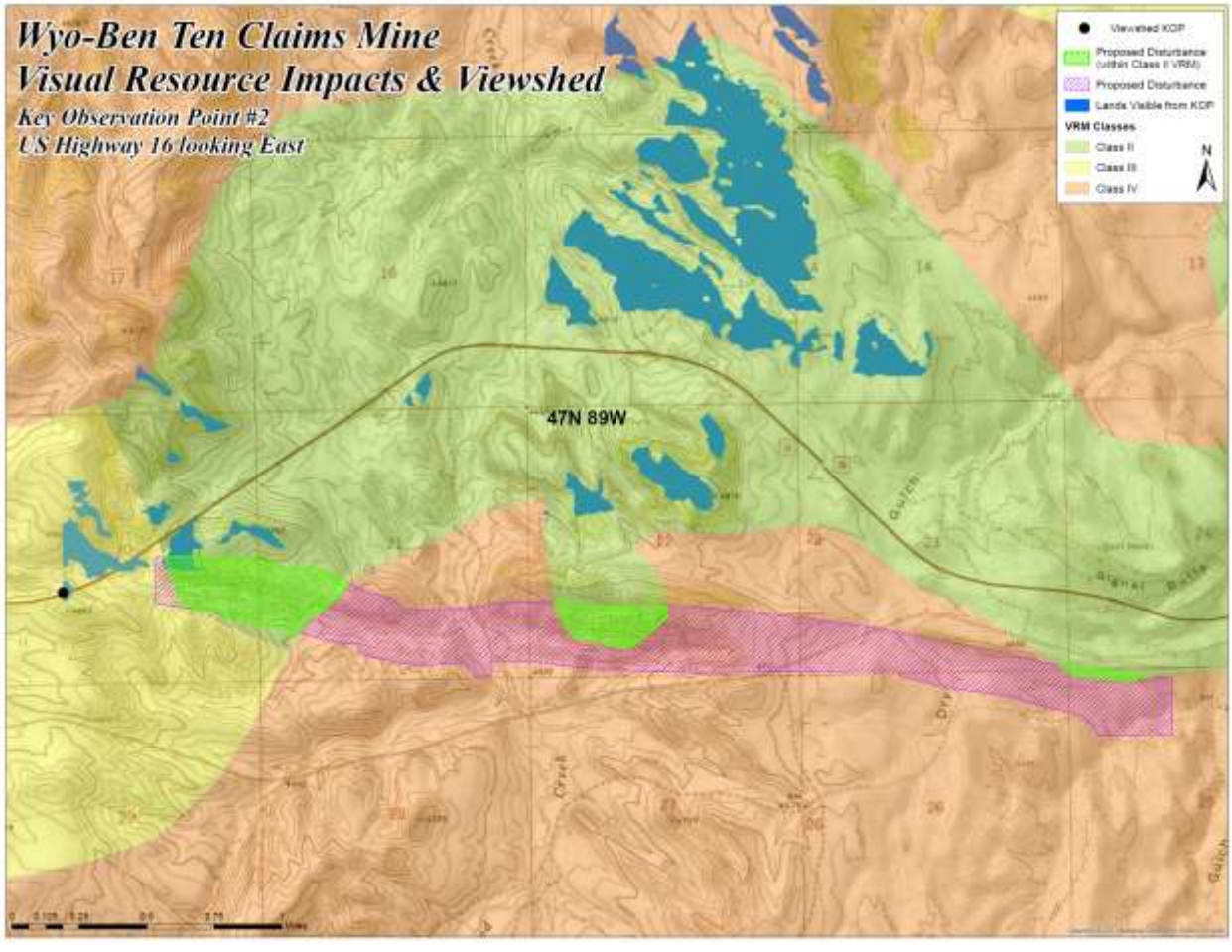
KOP#1 & #2 Matrix

Proposed Pits	VRM Class II sec 22	VRM Class II sec 21	VRM Class II sec 25
Mowery B Bed	None, not seen	weak due to distance, angle, season	weak due to distance
Mowery A Bed	Moderate due to angle / season	weak due to distance, angle, season	NA
Beaver Bed	Moderate due to angle / season	weak due to distance, angle, season	NA
F3 Bed	None, not seen	weak due to distance, angle, season	NA
F2 Bed	None, not seen	weak due to distance, angle, season	NA


Wyo-Ben Ten Claims Mine
Visual Resource Impacts & Viewshed
Viewshed KOP
Proposed Disturbance (within Class II VRM)
Proposed Disturbance
VRM Classes
Class II
Class III
Class IV
Lands visible from KOP
N
47N 89W
Creek
Miles

KOP #2 Located on highway 16

The view from this point is none. The degree of contrast is not visible from this point. Therefore the direct effect to the public will be none.



The castback process will both accelerate the construction process and the reclamation process. The POD identified that topsoil can be hauled directly during the castback mining sequence. The faster the topsoil is placed back the less intrusive the activities will be in the VRM II area.

The composition coloring of the topsoil is dark grayish and olive brown in color. Topsoil will be pulled and stored in the VRM Class IV and then placed back during the reclamation castback process. Due to the color of the topsoil this will be a very important process and will need to be carried out thoroughly for the reclamation process to maintain the color of the landscape located in the VRM II. Some erosion will happen on its own over time and will blend with the rest of the natural area.

This proposed project includes surface disturbing activities and will incorporate techniques and methods designed to mitigate visual impacts to the characteristic landscape. All proposed construction standards while excavating in the VRM Class II have been lower to meet those class standards. The highwalls, road width, and soil piles are proposed to be scaled to an average of 50%. Timing stipulations are proposed to construct only during a time when there is less of the general public traveling the area.

Reclamation Feature for VRM Class II:

The line, color, and formation also known as (form) have been addressed for the proposed project area under the soil and site depiction found in the POD. The line and formation of the area are discussed on detail under landscape description. As state the area is a rolling smooth gradient area with concave land shape. The reclamation plan discusses in detail how the excavation and reclamation will be performed, contoured, and re-vegetated. Color has been addressed through timing of construction activities.

Rapid topsoil placement procedure will assist with a completer reclamation planning process. This can contribute to the description of how land features will be reconstructed and natural color placement which had not been fully addressed previously.

This diagram depicts a comparison of what techniques will be used to lower the visual proposed activates for the project located in VRM II.

Construction Activity	VRM Class II	VRM Class IV	Result
High Wall Buffer	3-5 feet	8-12 feet	60%
Associated Disturbance Open Pit	100-150 feet	150-200 feet	25%
Haul Roads	60 feet	35 feet off of ridgeline	45%
Stock Piles	Not located in the VRM II,	Always located on site in pits	100%
Top soil	Behind existing formations, Hauled directly during castback sequence.		100%
Stationed Equipment	Not located in the VRM II		100%
Contouring	Partial countering Timing of construction activities. And possible screening in the most visual area of the project.	Not general practices	
Vegetation	Additional to the broadcasting practices, The placement of mature vegetation would really assist in the visual reclamation process.	Not general practices	

Vegetation

Issue(s) Identified

Would the proposed action affect vegetation within the areas of mining?

Affected Environment

Table D-8.1. Vegetation Map Units; Affected Acreages MAP UNIT	**Ten 1 (F2)**	**Ten 2 (F3)**	**Ten 3 (Beaver)**	**Ten 4 (Mowry A)**	**Ten 5 (Mowry B)**	**COP/TOP HW & SOIL PILES**	**Total By Map unit**
Juniper	3.2	7.7	13.4	15.0	12.3	3.1	54.7
Mixed Shrub Complex (MSC)	25.3	7.3	27.6	14.9	11.9	13.4	**100.4**
Barren Outcrop	0.7	0.4	1.2	22.5	0.1	2.4	27.3
Steep Complex	25.8	1.5	1.9	2.5	1.1	2.4	35.2
Greasewood/Annual Grasses	0.8	3.7	5.8	1.2	0.5	2.7	14.7
Totals	**55.8**	**20.6**	**49.9**	**56.1**	**25.9**	**24.0**	**232.3**

Juniper (Map Unit 1)

This map unit generally occurs on shallow, varied soils in the Mowry geologic formation associated with this proposal. This unit is associated with bentonitic shale outcrops and, in some areas, littered with small to medium sized stones. Terrain is variable, ranging from 0 to 60 percent on varied aspects. The primary vegetation for this map unit is Utah Juniper trees with varied understories. In areas with better soil qualities the primary understory shrub is Wyoming big sagebrush and in areas of lesser soil quality the primary understory shrub is sparse dwarfed Wyoming big sagebrush. At the top of the map unit there is a band of Rubber rabbit brush as the dominate shrub. The grasses include Bluebunch Wheatgrass and Cheatgrass. Several photographs included in Appendix D-8.4 illustrate different aspects of this vegetation map unit.

Mixed Shrub Complex (MSC) (Map Unit 2)

This map unit occurs across all geologic formations associated with this proposal, and contains a variety of soils, topographic aspects and slopes ranging from 0 – 50 degrees. Vegetation dominance within this map unit ranges dramatically reflecting the diversity. In general, this map unit is dominated by Wyoming big sagebrush with about 20% Utah Juniper. All of which occur either alone or in various combinations of abundance and dominance throughout the map unit. Other locally occurring shrubs/subshrubs within this map unit include Gardner saltbush, Rubber rabbitbrush, and Prickly gillia.

Occasional areas of perennial grass include Blue Gramma, Needle and Thread, Sandberg bluegrass, Red threeawn, Indian Rice Grass and cheatgrass. Cheatgrass drastically increases in areas where shrub density is very low. Other common understory species include prickly pear cactus, Sego lily, and Prairie pepperweed.

Numerous photographs of these groups illustrate various visual aspects of each within both the proposed disturbed areas and the reference areas in Appendix D-8.4.

MSC Mowry

The MSC Mowry map unit is very similar to the MSC Complex described above with the exception that there is a lot more Rubber rabbitbrush present on the higher elevations of the Mowry formation.

MSC Frontier

On the Frontier beds in steep uplift areas, the shrub dominance decreases and the grass abundance increases on the north facing slopes and Juniper abundance increase on south facing slopes.

Barren Outcrop (Map Unit 3)

This map unit consists of areas mostly devoid of vegetation establishment with small intermittent inclusions of wild buckwheat. Occasional crosscutting drainages bisect the bare outcrop supporting small areas of increased vegetation in the drainages. Soils tend to be mostly salt and sodic affected clay. Slopes are variable, ranging between 0 and 40 percent with varied aspects

Steep Complex (Map Unit 4)

This map unit generally occurs on shallow, varied soils on the Frontier and Mowry geologic formation associated with this proposal. This unit is associated with steep bentonitic shale outcrops. Terrain is steep with slopes ranging from 30 - 60 degrees with varied aspects. This complex is a barren area with sparse vegetation influence from the surrounding features including Mixed Shrub Complex with Wyoming big sagebrush and Rubber rabbitbrush. Several photographs included in Appendix D-8.4 illustrate different aspects of this vegetation map unit.

Greasewood/ Annual Grasses (Map Unit 5)

This map unit occurs across all geologic formations associated with this proposal, and contains a variety of soils, topographic aspects and slopes (0 – 50 degrees).

It occurs mainly in the flood plains of the base drainages that bisect the project with primary vegetation of Greasewood, annual grass, and forbs such as Cheatgrass and Prairie pepperweed. There is occurrence of this unit on the toe of the Thermopolis Shale and Frontier formation. Where perennial grasses occur it is mostly Western Wheatgrass and Sand Dropseed. Clasping pepperweed is a common forb for this unit as well as annual wheatgrass.

Threatened or Endangered Plant Species

In reviewing the U.S. Fish and Wildlife Service (FWS) website at www.fws.gov for threatened and endangered plants, it indicates the possible occurrence of Ute ladies'-tresses (*Spiranthes diluvialis*) in Washakie County, a threatened Orhchidaceae species in the Big Horn Basin. This herbaceous plant occurs in moist meadows associated with wetlands, springs, lakes, or perennial streams.

This species was not encountered during vegetation sampling or species inventory fieldwork. In order to identify potential encounters of this species, Wyo-Ben's field staff has been instructed on the

identification and characteristics of the plant. Furthermore, Wyo-Ben does not anticipate mining through these environments and thus will most likely not encounter this species. Wyo-Ben personnel will contact the FWS and take measures to protect this species should it be encountered during mining activities.

The other species on the FWS website are not located in the Big Horn Basin, the locality of these species have been located in the southern part of Wyoming. Those species include threatened species Butterfly plant, Colorado (*Gaura neomexicana var. coloradensis*), Yellowhead, desert (*Yermo xanthocephalus*), and endangered Penstemon, blowout (*Penstemon haydenii*).

Direct and Indirect Effects

No Action

The No Action Alternative would result in no disturbance or effects to vegetation within the area potentially affected by the Proposed Action, the native vegetation conditions would remain unaltered.

Proposed Action

The direct result of mining activities would be the removal of 523.9 acres vegetation. As planned, this would occur incrementally over a period of 11-16 years. The initial year of mining could result in approximately 26.7 acres of disturbance on BLM administered lands and 0.8 acres on private and State lands, and thereafter approximately 30 acres annually. The mine plan prescribes a cast back system which results in a reclamation effort that would begin establishment of a native vegetative cover during year three of a pit's life. The plan anticipates a 5 year span from reclamation initiation to reclamation completion with monitoring to ensure adequate native vegetative cover establishment.

If the reclamation of the disturbed acreage of the proposed action were successful, the result would not be a significant change to the vegetative community.

Soils

Issues 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

The proposed project area is located in Washakie County, Wyoming. The study area sits in the east central part of the Bighorn Basin and is characterized as having dry shrub and subshrub communities with the mean annual precipitation between 10 and 14 inches. The elevation of the site ranges from about 4500 feet on the lowest portion of the Frontier formation of the survey area to about 4700 feet on the highest portion of the Mowry Formation.

The landscape is dominated by steep to gentle slopes vegetated with annual grasses, big sagebrush and Junipers on the Thermopolis shale formation to moderate to steep slopes dissected by deep ephemeral drainages on the Mowry formation vegetated with sparse big sagebrush and Junipers in mixed shrub

communities (MSC). The Frontier formation includes topographies that are gentle to moderately steep and vegetated with big sagebrush, Junipers, and rubber rabbitbrush.

The soils of the study area have formed in residuum, colluvium, and slopewash of shale and sandstone, and from alluvium in drainages. They are generally well to moderately well drained soils. Most of the soils contain a suit of neutral salts, such as the sulfates, carbonates, and chlorides of sodium and calcium. In addition, some have a considerable amount of exchangeable sodium, and with the salts they are classified as saline-sodic soils. Detailed soil analysis and laboratory work has been completed for potentially effected soils and bentonite production zones. There is also detailed criteria for soils and reclamation potential of soil from disturbed areas and associated stock piles in the submitted mine plan.

Alluvial soils are generally deep (greater than 40 inches) and have coarse to loamy textures. Soils derived from sedimentary rocks have a clay texture and are generally very shallow (less than 10 inches) and shallow (less than 20 inches). The soils in each map unit are classified below followed by descriptions of the soil map units.

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. There would be no additional erosion, compaction, or disturbance to soil resources as a result. The native soil conditions would remain.

Proposed Action

Soil horizons would be mixed, and topsoil particularly the organic component could be diluted by the inclusion of unsuitable material in the salvage process. The salvage and stockpiling or live-spread process could also affect the soil salinity and pH. These changes could affect the soils ability to support a native vegetative community during reclamation. Best management practices for top soil storage and reclamation will be followed according to the submitted mine plan. Potential wind erosion from exposed areas and stock piles would likely occur

The removal of vegetation during the stripping process could also increase the erosion rates from both wind and rain/runoff. The amount of sediment and delivered off-site or downstream in the watershed is discussed in the Water Resources section.

Water Resources (Water Quality and Ground Water)

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 Nowood River- Bobcat Gulch, Little Cottonwood Creek, and Nowood River-Joe Emge creek level 6 sub-watersheds as defined by the USGS (United States Geological Survey). These sub-watersheds are all sub-watersheds of the Nowood River that is located downstream several miles to the northeast. The Nowood River is the closest permanent perennial water source and is located approximately 3 miles northeast of the project area.

The topography of the area consists of ephemeral drainages that are dissected by outcrops of mudstone, sandstone, shale and various alluvial deposits. The largest drainage in the proposed area is Little Cottonwood Creek which flows through the proposed disturbance area in a northern direction. 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. There are various road and other watershed disturbances that have occurred in the watershed and are associated with other land uses such as oil and gas development, ranching operations, and recreational use.

The current disturbances that affect the hydrology of the watershed on public land consist of two track roads and grazing that occurs within these sub-watersheds. These sub-watersheds in the area are low lying semi-arid watershed where evaporation and transpiration rates greatly exceed received precipitation throughout the year.

Within the proposed mining area there are twelve 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.

Several stock ponds and reservoirs are located adjacent to the proposed mining area. These stock ponds are located along drainages that are above the proposed mining area. Wyo-Ben's mining activity will not affect any of these ponds or reservoirs and therefore are not analyzed in detail.

Groundwater

The estimated depth to groundwater in the proposed mined area is anticipated to be greater that the proposed mining depth and is likely greater than 100 feet in the area as estimated from data from test pits along with other groundwater information from the Bighorn Basin Groundwater upadate (Bighorn Basin Water Plan, 2010) . Information obtained from the State Engineer's Office online database indicated permitted water wells within three miles of the amendment areas. Most water wells within this radius are reported to be far below the depth that Wyo-Ben will mine; however there are some permits that are -1 to 30 feet in depth. These wells are found within Quaternary deposits surrounding the Nowood River area or other geologic formations and do not represent ground water conditions within the ground water formations of the proposed disturbance area. Additionally, no ground water was encountered during developmental drilling of the pits of this area.

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. Reservoir water quality monitoring in the watershed by the BLM in 2003 and 2004 supports this analysis. High levels of suspended sediment in runoff of Big Cottonwood, Little Cottonwood, and Sand Creek all of which are similar drainages have been observed from historic BLM monitoring of grab samples collected following storm events. Other watershed studies as performed by the Wyoming Water Development Commission (Anderson Consulting, 2009), indicate high intensity, and short duration hydrographs following storm events with elevated amounts of TDS present in runoff from watersheds located west of the Nowood River.

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 sub-watersheds would not occur. The current infiltration rates and runoff conditions in proposed disturbance area of the Nowood River-Bobcat Gulch, Little Cottonwood Creek, and Nowood River-Joe Emge Creek sub-watersheds would remain unchanged. The native channel conditions would remain unchanged. There would be no installation of a culvert or check dams in any of the twelve 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 the 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 even 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 installation of one 18 inch culvert would be placed along route 61-3 at the drainage crossing. The installation of the culvert would concentrate flow above and below the culvert and likely increase in-channel erosion in that area. There is currently one existing culvert located on Little Cottonwood Creek that is ten foot wide by 60 foot long at the old Highway route. The culverts 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. The placement of the culvert and mined areas will alter the natural drainages morphology and runoff velocity until reclamation occurs. 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. Other areas where depth is less than four feet low water crossings would be chosen. 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 523.9 acres was modeled using the TR-55 (NRCS,2013) small watershed model to estimate potential changes in runoff from the proposed mined area. The inputs into the model were 523.9 acres, Ten Sleep Wyoming climate data, Type C (closest overall average) hydrologic runoff soils, 4 percent average slope, clay loam soils, Utah 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 were a change in peak runoff for all combined drainages within the disturbed area from 32 cfs to 37 cfs following modeled storm events, change in total runoff from 35 acre feet to 43 acre feet, due to the impervious change around compacted areas and roads,

decrease in runoff depths from 1.9 to 1.6 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.

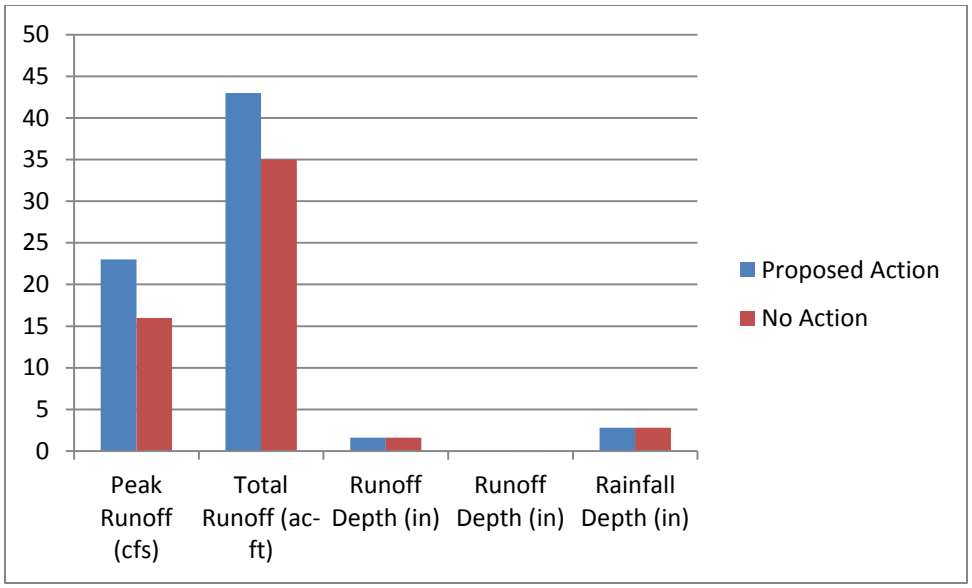
The estimate erosion rate using the WEPP ROAD model (Elliot,2014) from the 20.8 acres of roads outside of the proposed disturbance area output for this model was an average 3.2 tons of sediment annually.

Ground Water

The potential to impact ground water within the proposed mining area is low due to the water table levels of the Mowry and Frontier 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. 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.

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 (523.9 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 and naturally occurring high levels of TDS in runoff flows. 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.



Cumulative Effects

The following cumulative effects have been outlined in the table below. There would be an additional 523.9 acres in the watershed of disturbance. This would be in addition to historically and currently mined areas in the Little Cottonwood, Nowood River- Bobcat Gulch, and Nowood River-Joe Emge Creek sub-watersheds. The duration of the impacts for the foreseeable future would be for the length of the mining activity.

Cumulative Effects Table impacts to Watersheds							
Alternativ	Cumulative Impact Assessment Area (CIAA)/Geographic Scope	CIAA/Temporal Scope	Past-Present Actions	Future Actions	Direct-Indirect Effects		
Action	Various Subwatersheds located within the Nowood River-Joe Emge Creek Creek watersheds (HUC # 100800080506)	10-50+ years (or length of active mining operation)	Previous mining operations have been occuring 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 522 acres of disturbance throughout the duration of the mining activites. The removal would occur in stages and have indirect effects of increased annual runoff from disturbed areas (estimated at rate of 3.2 tons sediment/yr and a .3 inch reduction in runoff depthannual average). Alterations to topography and natural ephemeral channels would occur as a result.	Output Summary	
						Peak Runoff (cfs)	16
						Total Runoff (ac-ft)	35
						Runoff Depth (in)	1.9
						Runoff Depth (in)	0.04
						Rainfall Depth (in)	2.8
No Action	Various Subwatersheds located within the Nowood River-Joe Emge Creek Creek watershed (HUC # 100800080506)	10-50+ years (or length of active mining operation)	Prevoius 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	There would not be an additional estimated 522 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 Nowood River-Joe Emge Creek Creek watersheds.	Output Summary	
						Peak Runoff (cfs)	23
						Total Runoff (ac-ft)	43
						Runoff Depth (in)	1.6
						Runoff Depth (in)	0.05
						Rainfall Depth (in)	2.8

Tribes, Individuals, Organizations, or Agencies Consulted:

List of Persons, Agencies and Organizations Consulted

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Holly Elliott	P&EC	Socio-econoomic, Prime/Unique Farmlands, Air Quality and NEPA compliance

References Cited

Wyo-Ben, Inc. 2013-2015. Ten Claims Mine Plan of Operations

Bayard D. Rea, James A. Barlow Jr. "Upper Cretaceous and Tertiary Rocks, Northern Part of Bighorn Basin, Wyoming and Montana." *Geology and Mineral Resources of the Bighorn Basin; 27th Annual Field Conference Guidebook*, 1975, Pages 63-71. Print

Bureau of Land Management Wyoming Reclamation Policy

BLM, 1988. Record of Decision and Approved Resource Management Plan for the Washakie Resource Area; Worland Field Office, Wyoming.

BLM, 2009. Summary of the Analysis of the Management Situation for the Bighorn Basin Resource Management Plan Revision project; Cody and Worland Field Offices, Wyoming, pp. 2-1 – 2-9.

Elliot, William J.; Hall, David E. 2014. Disturbed WEPP Model 2.0. Ver. 2013.07.01. Moscow, ID: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Online at <httproforest.moscowfsl.wsu.edu/fswepp>

Franklyn B. Van Houten, "Frontier Formation, Bighorn Basin, Wyoming." *Symposium on Early Cretaceous Rocks of Wyoming and Adjacent Areas; 17th Annual Field Conference Guidebook*, 1962, Pages 221-231 Print

W. R. Keefer, T. M. Finn, R. C. Johnson, C. W. Keighin, "Regional Stratigraphy and Correlation of Cretaceous and Paleocene Rocks, Bighorn Basin, Wyoming and Montana." *Cretaceous and Lower Tertiary Rocks of the Bighorn Basin, Wyoming and Montana; 49th Annual Field Conference Guidebook*, 1998 ; Pages 1-30 Print

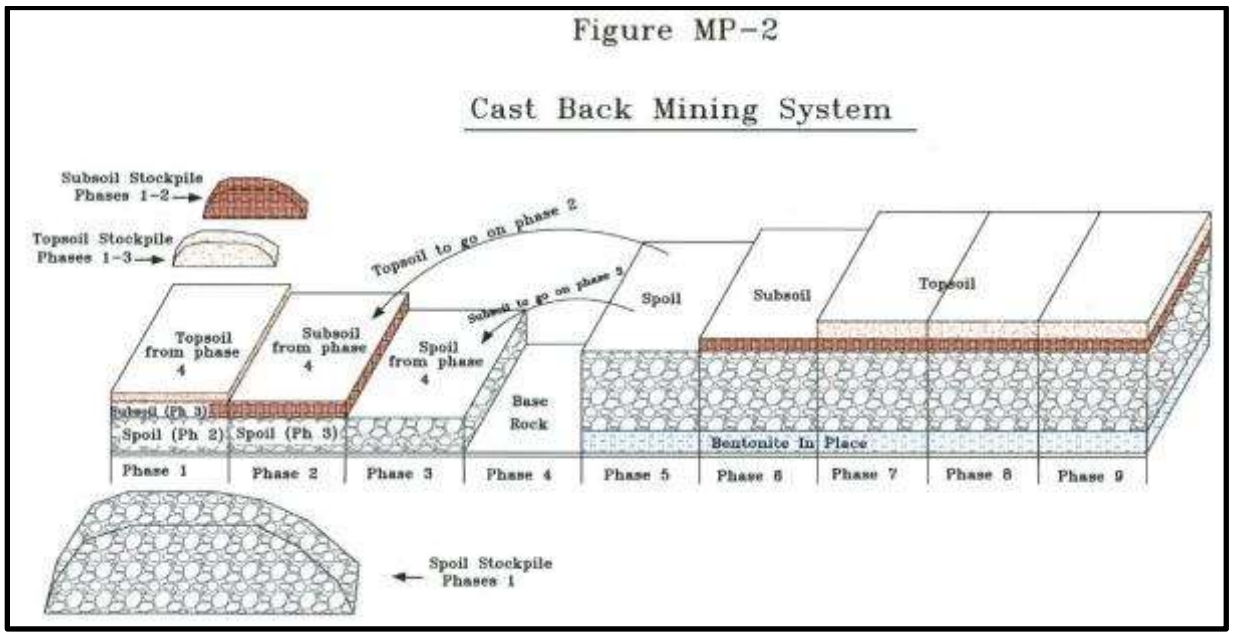
NRCS, 2013. National Resource Conservation Service. TR-55 Small Watershed Hydrology Model. Found at the following linkNRCS-TR55 Small Watershed Model or on the web at http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/?cid=stelprdb1042901

U.S. Department of Agriculture, Natural Resources Conservation Service. 2008. Ecological Site Description System. Site ID: R032XY122WY (Loamy), R032XY150WY (Sandy), and R032XY144WY (Saline Upland). Available on the web at: http://esis.sc.egov.usda.gov/Welcome/pgReportLocation.aspx?type=ESD

Appendix

Castback Mining Technique

Pit sequences would be excavated using standard castback mining techniques and procedures. Castback mining is a technique that is beneficial both environmentally and economically on many levels. Figure MP-2 shows a model of the castback system as described:



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

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

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

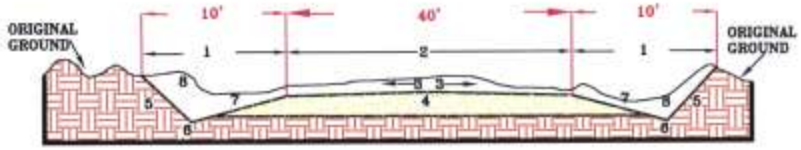
4. After the removal of bentonite from Phase 3, topsoil from Phase 4 is then cast onto contoured and previously subsoiled Phase 1; the subsoil is then cast onto Phase 2; and the remaining overburden from phase 4 is cast into Phase 3.

5. This process repeats itself until the end of the pit sequence. At this time, since there is not overburden available from another phase of mining, material to fill the last hole is acquired by reducing the highwall's steep grade, also known as a highwall reduction, Figure MP-3. The castback/ highwall reduction process provides ecological and economic pragmatism by promoting live topsoil distribution, as well as eliminating the need for long-distance transport of the original overburden from phase 1. In many cases this distance can exceed a mile. The cost, energy, and equipment necessary for that effort are well above accepted norms.

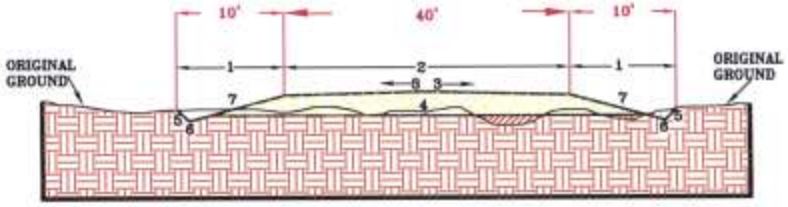
FIGURE MP-4.

TYPICAL HAULAGEWAY SECTIONS

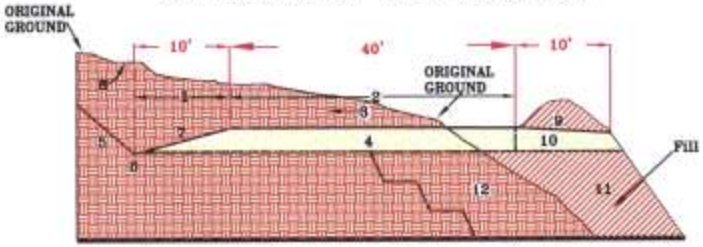
TYPICAL CUT SECTION



TYPICAL FILL SECTION



TYPICAL SIDE HILL SECTION



1 Ditch & Slope of Road Distance

2 Road surface width Typical 40ft. Wide

3 Crown from center 0.25' or super to drain

4 Road Base

5 Side slope 2:1,1:1, ½:1, ¼:1

6 V or flat Bottom Ditch

7 Slope 4:1

8 Cut Area

9 Berm in place. Height = one half the height of the tire of the largest piece of equipment.

10 Road surface under berm compacted.

11 FILL

12 Stair step for compaction