ENVIRONMENTAL ASSESSMENT

WYW-165316 – McClellan Gulch Bentonite Mine Plan of Operations

BLM

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

JUNE 2014

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-R010-2014-0032-EA

Table of Contents

1 INTRODUCTION AND NEED FOR THE PROPOSED ACTION 5
1.1 Background Information....5
1.2 Purpose and Need for the Proposed Action....6
1.3 Decision to be Made....6
1.4 Conformance 6
1.5 Relationship to Statutes, Regulations, Plans or Other Environmental Analyses....6
1.6 Scoping, Public Involvement and Issues....7
1.6.1 Scoping 7
1.6.2 Public Participation....7
1.6.3 Issues Identified....7
2 PROPOSED ACTION AND ALTERNATIVES....8
2.1 Alternatives Considered 8
2.2 No Action 8
2.3 Proposed Action 8
2.3.1 Mine Claim locations 8
2.3.2 Proposed feature locations and disturbance 8
2.3.3 Mine Life 9
2.3.4 Equipment Used for Mining & Reclamation....9
2.4 Design Features of the Proposed Action Alternative 9
2.4.1 Access 9
2.4.2 Mining Methods 10
2.4.3 Quality Assurance 14
2.4.4 Interim Management Plan.... 14
2.4.5 Solid Waste/Human Waste Disposal 15
2.4.6 Spill Contingency and Countermeasure Plan 15
2.4.7 Public Nuisance and Safety.... 15
2.4.8 Surface water/Groundwater/Riparian 17
2.4.9 Revegetation Practices and Seed Mixtures 17
2.4.10 Weed Management Plan.... 19
2.4.11 Post Closure Management 20
2.5 Alternatives Considered but not Analyzed in Detail 20
3 AFFECTED ENVIRONMENT and ENVIRONMENTAL EFFECTS 21
3.1 Introduction.... 21

3.1.1 General Setting and Geographic Scope of the project area 21
3.1.2 Resources Not Analyzed 21
3.2 Resources Carried Forward for Analysis 21
3.2.1 Geology & Mineral Resources 21
3.2.2 Cultural Resources, Traditional Cultural Properties, Native American Religious Concerns 23
3.2.3 Paleontology 24
3.2.4 Soils 25
3.2.5 Water Resources (Water Quality and Ground Water, Floodplains, Wetlands and Riparian Zones) 26
3.2.6 Native Vegetation 30
3.2.7 Invasive, Non-native, and Noxious Weeds 32
3.2.8 Rangelands/Grazing Administration 33
3.2.9 Fish/Wildlife (Including Threatened, Endangered, Candidate and BLM Sensitive Species) 33
3.3 Mitigation 33
3.3.1 Land Use/Access 33
3.3.2 Cultural Resources, Paleontology 34
4 TRIBES, INDIVIDUALS, ORGANIZATIONS, or AGENCIES CONSULTED 35
5 LIST OF PREPARERS 35
List of Reviewers 35
6 References Cited 36
Appendix A 37

***Project Title**:* **McClellan Gulch Plan of Operations**
NEPA Number: DOI-BLM-WY-R010-2014-0032-EA

***Type of Project**: Bentonite Mining Plan of Operations*

General Location of Proposed Action:
T. 47 N, R. 89 W, Sec. 25

***Name and Location of Preparing Office**:*
Worland Field Office
101 S. 23rd St.
Worland, WY 82401

***Lease/Serial/Case File Number**: WYW-165316*

***Applicant Name:** Black Hills Bentonite, LLC*

1 INTRODUCTION AND NEED FOR THE PROPOSED ACTION

1.1 Background Information

This Environmental Assessment (EA) has been prepared to analyze and disclose the environmental consequences of the McClellan Gulch Mine Plan of Operations (Plan) under Permit 281C as proposed by Black Hills Bentonite (BHB). The EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or alternatives to the proposed action.

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 Law of 1872 (as amended), give the applicant, BHB, the right of access to extract the minerals claimed and to use the surface of the claim area in as careful and prudent a manner as may be necessary to facilitate this extraction. Approval of this Plan of Operations through the signing of a Decision Record (DR) by the BLM, under the terms of §43 CFR 3809, and the Cooperative Agreement between the 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 McClellan Gulch project area is located approximately 1 mile southwest of the Town of Ten Sleep. Established roads in the area include US HWY 16 that travels from Worland to Ten Sleep and the old highway to the north of 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 18.9 acres, and includes mine development areas, stockpiles, and permitted and bonded haul roads.

No existing surface or underground mining activities are located within the proposed plan area. Bentonite mining activities have been conducted on a continuous basis within the DEQ Permit Area since

1975. No mining activities for other minerals are located on the permit area or in the immediate vicinity of the permit area.

1.2 Purpose and Need for the Proposed Action

The purpose of this federal action is to respond to BHB's proposed Plan. BHB is proposing to mine bentonite, which is a locatable mineral on BLM administered public lands.

The BLM is required to respond to BHB'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).

1.3 Decision to be Made

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

If it is decided to approve the Plans, 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.

1.4 Conformance

The Proposed Action and associated alternatives conform to the Record of Decision (ROD) and Approved Resource Management Plan (RMP) for the Washakie Resource Area dated September 1988. The decisions in the Washakie RMP provide "All public lands not formally withdrawn or segregated from mineral entry would be open for the exploration and development of locatable minerals. If necessary, areas of special interest or high sensitivity would be formally withdrawn from mineral entry, In other situations, the regulations listed in 43 CFR 3809 and agreements made with the State of Wyoming pursuant to those regulations would be applied to reduce unnecessary and undue degradation of resources as a result of mining." (Washakie RMP ROD, pg. 12)

1.5 Relationship to Statutes, Regulations, Plans or Other Environmental Analyses

This environmental assessment was prepared in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA) and other statutes relevant to the proposal. Authority for the Proposed Action and alternatives is contained in the Federal Land Policy and Management Act of 1976, as amended (FLPMA) and the regulations in 43 CFR 3809.

The BLM is responsible for managing mineral rights and access on federal lands as authorized by the General Mining Law of 1872, as amended. Under the law, persons are entitled to reasonable access to explore for and develop mineral deposits on public domain lands that have not been withdrawn from mineral entry.

In order to use public lands managed by the BLM for locatable mineral exploration and development, BHB 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 regulations at 43 CFR 3809.2 apply to all operations authorized by the mining laws on public lands where the mineral interest is reserved to the United States, including Stock Raising Homestead lands as provided in §43 CFR 3809.31(d) and (e). When public lands are sold or exchanged under 43 U.S.C. 682(b) (Small Tracts Act), 43 U.S.C. 869 (Recreation and Public Purposes Act), 43 U.S.C. 1713 (sales) or 43 U.S.C. 1716 (exchanges), minerals reserved to the United States continue to be removed from the operation of the mining laws unless a subsequent land-use planning decision expressly restores the land to mineral entry, and BLM publishes a notice to inform the public. This subpart does not apply to private land except as provided in paragraphs (a) and (c) of this section.

1.6 Scoping, Public Involvement and Issues

1.6.1 Scoping

Internal scoping was conducted in the BLM WFO beginning in April 2014, and concluding in June 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.

1.6.2 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.

1.6.3 Issues Identified

- How would the proposed action affect geologic & mineral resources in the area?
- How would the proposed surface disturbance affect cultural resources eligible or unevaluated for the National Register of Historic Places (NRHP)?
- Would atmospheric impacts from the proposed mining operations affect cultural resources eligible or unevaluated for the NRHP?
- How would the proposed surface disturbance affect significant paleontological localities?
- Would the proposed action with mitigation features be able to restore native vegetation on the mine site?
- Would the proposed mining and subsequent reclamation increase the distribution and cover of cheatgrass?
- How would the soil resources be impacted as a result of 18.9 acres of disturbance associated with mining?
- How would the proposed action impact the runoff conditions below proposed mining areas in the Nowood River-Joe Emge Creek subwatershed ?
- What would be the change in water quality, in particular amount of total dissolved solids (TDS) of runoff from the proposed mined areas?

2 PROPOSED ACTION AND ALTERNATIVES

2.1 Alternatives Considered

This EA considers two alternatives, a "No Action" alternative, and the "Proposed Action" which includes proposed stipulations and mitigation/monitoring measures provided by BHB, supplemented by BLM because of this analysis.

2.2 No Action

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.

2.3 Proposed Action

The McClellan Gulch Mine Plan of Operations proposes an open pit bentonite mine of no more than 18.9 acres of disturbance (16.6 acres on federal land and 2.3 on adjacent private land) that would consist of pits, out of pit stockpiles, and haul roads. The pit sequences would be excavated in phases utilizing standard multiple-cut direct-backfill mining techniques and procedures. A pit sequence may take up to four years to complete, with the overall project taking up to seven years to conclude.

The mining activity proposed with this submission consists of two pit sequences in the Mowry and Double beds to begin in 2014, or as soon as this Plan is approved. The following table includes a listing of projected legal descriptions and disturbance acreages for each proposed pit sequence.

2.3.1 Mine Claim locations

Claim Name	Serial Number	Legal Description	Section Township Range	Acres
KC #423A	WMC252912	NE¼NW¼SE¼	Section 25, T.47N. R.89W.	10.0
KC #424A	WMC252913	W½NE¼SE¼	Section 25, T.47N. R.89W.	20.0
KC #425A	WMC252914	E½NE¼SE¼	Section 25, T.47N. R.89W.	20.0

2.3.2 Proposed feature locations and disturbance

PROPOSED FEATURE	TOWNSHIP	RANGE	SECTION	PROPOSED DISTURBANCE AREA
MDA #25-2 Pits	T47N	R89W	25	6.5
MDA #25-3 Pits	T47N	R89W	25	9.2
ACCESS ROAD G - G'	T47N	R89W	25	0.5
TOPSOIL STOCKPILE #1	T47N	R89W	25	0.7
OVERBURDEN STOCKPILE #1	T47N	R89W	25	2.0
TOTAL				18.9

2.3.3 Mine Life

The life of the mining operation is expected to last seven (7) years. Mining is anticipated to last four (4) years, while reclamation activities may last another two to three years once the mining and removal of the bentonite is completed. Mining would commence upon approval from the WDEQ/LQD and the BLM-WFO. Table MP-1 in Appendix A lists the proposed mining features which would be developed, including the projected development date and the location of the proposed mining feature. Proposed mining features are located on lands administered by both the BLM and the state of Wyoming.

2.3.4 Equipment Used for Mining & Reclamation

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

- Caterpillar 627G Push-Pull Scrapers
- Caterpillar D8R & D8T Dozers with three-shank rippers
- 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 7800 Series Tractors
- John Deere 8000 Series Tractors
- John Deere Chisel Plows
- John Deere V-Rippers
- John Deere Disks
- Wishek Heavy Duty Disks
- Laird/United States Forest Service (USFS) Design Rangeland Drill

2.4 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:

2.4.1 Access

2.4.1.1 Haul Roads:

Access to the project area from Worland, Wyoming is via U.S. Highway 16, between Worland and Ten Sleep, Wyoming. The project area lies south of Highway 16. The access point which leads to the project area is approximately 24 miles east of Worland, at the Black Hills Bentonite access road to the South Ten Sleep mining operation.

A new haul road segment G-G' would be the primary haul road for the access to the McClellan Gulch mine development area. New roads would be constructed as a crowned and ditched road with a top width of twenty-five (25) feet and a total width of fifty (50) feet. The road would connect to BHB's existing permitted haul road network which in turn connects with US HWY 16.

Typical cross sections for the construction of access roads are presented in the mine plan, these typical road construction cross sections have been taken from an early version of the BLM publication referred to as "The Gold Book - Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development".

In some instances, access to certain mining areas would be across proposed pit areas or through open pits or backfilled pits. Roads would be reclaimed once mining concludes in an area. No newly-developed haul road spurs would remain after mining is completed, unless desired by the landowners or the land managers in the case of state or federally managed property.

2.4.1.2 Culverts:

No culverts are proposed for this project area. However, if it is determined at a later date that culverts are needed, the following criteria would be utilized in calculating peak storm water discharges for culvert sizing determinations. This method was provided by WDEQ/LQD District III as the recommended procedure for determining the volume and rate of runoff in small (<2,000 acre) watersheds. This method has also been approved for calculating peak storm water discharges in small watersheds by WDEQ/LQD Districts I, II and III.

Peak discharge information for proper culvert sizing is based on information presented in the U.S.D.A./Soil Conservation Service Publication SCS-TP-149, “A Method for Estimating Volume and Rate of Runoff in Small Watersheds,” January 1968.

Peak discharge rates are based on the following criteria:

Type II Storm Distribution
Land Use: Pasture or Range, No Mechanical treatment
Hydrologic Condition: Fair
Hydrologic Soils Group: C (from SCS Handbook NEH-4)
Rainfall Event: 5 Year, 24 Hour, 1.2 inches based on Wyoming Isopluvials
Moderate Slopes
Curve Number: 79

The depth of cover over the culverts would be no less than twelve (12) inches or a minimum of one-half the diameter of the culvert, whichever is greater. The culvert length would be dependent on the geometry of the drainage channel and the culvert diameter. In all cases the culvert length would never be less than forty (40) feet.

2.4.1.3 Access Control:

Due to the remoteness of the project area and limited size of this mining operation, no access control features are planned. Any potential hazards to humans, livestock, or wildlife which may develop would be addressed on a site specific basis using fencing or other methods determined to be appropriate for the conditions. The mined lands would be completely reclaimed following the completion of mining, which would eliminate potential hazards such as highwalls and open pits.

2.4.2 Mining Methods

Bentonite mining on the project area would consist of mining a series of small pits arranged in a multiple-cut, direct backfill or "cut and fill" sequence. Topsoil, where present, would be removed from all affected areas utilizing Caterpillar 627G push-pull scrapers and Caterpillar D8R/D8T dozers. Topsoil would be placed in stockpiles for future use in the reclamation of the mined or disturbed lands. Topsoil stockpiles are generally located in close proximity to the mining feature where the topsoil was removed. Whenever

possible or feasible, the topsoil may be spread directly onto previously backfilled areas, instead of being placed in stockpiles.

Following the removal of topsoil, the exposed overburden would be ripped using Caterpillar D8R/D8T dozers equipped with one to three ripper shanks. The overburden would then be removed from the pit using Caterpillar 627G push-pull scrapers. Overburden from the first pit in a multiple-cut series of pits would be placed in an out-of-pit overburden stockpile. Overburden from each subsequent pit would be directly backfilled into the previous open pit using Caterpillar 627G scrapers and/or Caterpillar D8R/D8T dozers. Cross sections illustrating the development and reclamation of a typical multiple-cut, direct-backfill mining sequence are provided in Appendix A, Figure MP-3.

Following the removal of the overburden from the pit, the exposed bentonite seam would be sun-dried or "field-dried" in the pit during the summer and early fall seasons. Field-dried bentonite stockpiles which are constructed on the mine site serve as feedstock for the bentonite processing plants located in Worland, Wyoming.

2.4.2.1 Topsoil Removal and Handling:

The removal of topsoil would typically be accomplished using Caterpillar 627G push-pull scrapers. In some instances where the topography may be too steep for the safe operation of scrapers, topsoil would be removed and stockpiled using Caterpillar D8R/D8T dozers.

Ideally, topsoil salvage is conducted in the summer or fall season in order to avoid salvaging topsoil when it could be saturated by spring rains or snowmelt, or frozen during the winter months. Every attempt would be made to salvage topsoil with scrapers, as control of the depth of topsoil removal is greatly improved with the use of scrapers versus dozers. Typically, salvaged topsoil would be placed in stockpiles. If graded and contoured areas exist, the topsoil may be applied directly (haulback) instead of being stockpiled.

Topsoil would also be removed from the edges of all pits in order to create a topsoil “buffer area” ranging in width from ten to approximately thirty feet wide. This buffer is necessary in order to protect the topsoil resources from the possibility of sloughing of high-walls or low-walls on the edges of pits. These buffer areas also facilitate the safe and complete salvage of topsoil along the edges of advancing multiple-cut pit sequences. A wider topsoil buffer, approximately thirty feet in width, is typically developed along a pit highwall where the mining would advance. This wider topsoil buffer provides additional protection of the topsoil resources in the event that a highwall should fail. It also creates a greater margin of safety for heavy equipment operators when removing topsoil in conjunction with the development of the next pit to be mined in a multiple-cut pit sequence.

All topsoil stockpiles would be conspicuously identified with signs reading TOPSOIL. BHB utilizes highly visible, flat, flexible fiberglass posts for topsoil signs. These sign posts are typically red in color with black on white lettering. The flexible fiberglass posts are resistant to livestock rubbing on the post and knocking down the topsoil sign posts.

BHB's topsoil stockpile conservation plan requires that all topsoil stockpiles which would remain in place for more than one (1) year be seeded with the approved permanent seed mixture listed in the Reclamation Plan. Seeding of stockpiles would be conducted in the spring or fall, whichever season follows the placement of the stockpile, utilizing a grain drill. Topsoil stockpiles would be constructed in such a manner that the shape of the stockpile would resemble a "dome", which would facilitate the seeding of the entire topsoil stockpile using a tractor and grain drill. Temporary seeding of topsoil

stockpiles using an annual sterile small grain such as triticale may also be conducted. The use of a small grain as a "cover crop" would provide for the rapid establishment of temporary vegetation to help hold the soil in place. This would protect the topsoil stockpiles from unnecessary or undue degradation due to wind or water erosion. Seeding of the topsoil stockpiles not only reduces the potential for erosion, it also significantly reduces the establishment of weeds, annual grasses and noxious weeds on the stockpiles.

Topsoil stockpiles would be located and constructed so that they would not block drainages or be impacted by potential storm water runoff from ephemeral drainages. At the discretion of BHB, berms may be constructed around the base of topsoil stockpiles if it is determined that the topsoil stockpile is not adequately protected from erosion due to the poor establishment of vegetation.

2.4.2.2 Mine Pit Excavation, Backfilling and Contouring:

Overburden thickness in the pit sequence ranges from one (1) to twenty-five (25) feet. Overburden removal and backfilling would occur almost exclusively during the winter and spring months, as the scrapers are used exclusively during the summer and fall for bentonite field-drying activities, reclamation activities, and topsoil removal.

Overburden would be excavated from the mine pit areas utilizing Caterpillar 627G push-pull scrapers and Caterpillar D8R/D8T dozers equipped with one to three ripper shanks. The majority of the overburden would be excavated and backfilled utilizing the Caterpillar 627G push-pull scrapers. The Caterpillar D8R/ D8T dozers would be utilized primarily to rip the overburden and to assist the scrapers.

Overburden removed from the first pit in a multiple-cut pit series would be placed immediately adjacent to the first pit to form an out-of-pit overburden stockpile. Overburden removed from each subsequent pit in the series would be directly backfilled into the previously mined open pit, allowing for reclamation to occur concurrently with mining activities. No materials would be pushed or dumped over any steep escarpments during the mining process. The location of the proposed pit sequences and overburden stockpiles and surroundings are illustrated on the Mine Plan Map in Appendix A.

Replacement of overburden during the course of backfilling open pits would be designed to create the most conducive reclamation substrate for revegetation as possible. Most often the most suitable overburden in terms of plant growth and desirable root zone material is found directly beneath the topsoil/subsoil strata, as demonstrated by the overburden sampling and laboratory analysis data presented in the Overburden section of this Plan.

In areas of thin topsoil (<12 inches), the top twelve to eighteen inches of overburden would be removed with scrapers and stockpiled. This material would be identified and signed as “Segregated Overburden.” Segregated overburden would be placed on top of the backfilled overburden prior to the application of topsoil, in order to create an improved plant root zone as well as a buffer between the topsoil and the overburden.

Overburden suitability and rock characterizations, including the analytical protocols and criteria necessary to identify potential acidic and/or reactive conditions, or the generation of deleterious leachate were evaluated for the project area. Please refer to the Overburden section of this Plan, for a complete and detailed assessment of the overburden suitability and rock characterizations. BHB would utilize the data presented in the Overburden section of the Plan, to develop overburden handling and overburden replacement plans.

Generally, no special handling of overburden during pit excavation and backfilling is warranted, as a considerable amount of mixing of overburden occurs during the loading and unloading of the overburden using scrapers. This mixing effect should contribute to a blending of overburden materials, thus improving overall quality of the few zones or intervals of overburden exhibiting unsuitable pH or SAR values.

Waste bentonite, which remains on the bentonite stockpile areas after the stockpiled bentonite has been removed for processing, would be disposed of by placing this material at the base of a highwall prior to backfilling. This is done to prevent this highly bentonitic material from being placed directly on the surface prior to the application of topsoil.

After the bentonite is removed from a pit, and as the mining sequence progresses, the open pit is backfilled and contoured to blend in with the surrounding topography and to restore the area to the approximate original contour (AOC). Post mining slopes would be graded to 4H:1V or flatter, with a straight slope profile, unless the pre-mine slopes were steeper. In those cases, post-mining slopes would approximate the pre-mining slopes in terms of magnitude, aspect and shape. Generally, there is enough "swell" in the volume of overburden being replaced to compensate for the overall volume of the bentonite which was removed from the pit.

In general, most pits are completely backfilled and rough graded in order to establish AOC and the required slope angles utilizing Caterpillar 627G push-pull scrapers. In certain circumstances, both the Caterpillar 627G push-pull scrapers and the Caterpillar D8R/D8T dozers are utilized to backfill, grade and contour a pit in order to create the final surface configuration. At times, overburden may be placed in the pit and against the highwall utilizing the scrapers, to a point where the pit is not completely backfilled. This would create a partially backfilled pit with a section of the highwall remaining above the backfilled overburden. Caterpillar D8R/D8T dozers would then be used to push overburden from above and behind the remaining highwall, into the pit area, thus completing the backfilling of the pit.

Any ephemeral drainages which may have existed pre-mining would also be reestablished in the process of rough grading and contouring. In general, the majority of this rough grading and contouring is done with Caterpillar 627G scrapers and Caterpillar D8R/D8T dozers. Final grading would be accomplished using a Caterpillar 140 motor grader. The haulback of topsoil would be conducted whenever possible in the mining process described above.

Out-of-pit overburden stockpiles or portions of these stockpiles which may remain as a final reclamation feature would be graded and contoured to blend with the existing topography. All slopes would be reduced to 4H:1V or less. Overburden stockpiles which would remain as a permanent reclamation feature would have a maximum height of ten feet and would be oriented in the same direction as nearby topographic features and would approximate the pre-mining topography in terms of magnitude, aspect and shape.

2.4.2.3 Bentonite Removal:

Following the removal of the overburden from the pit, the exposed bentonite seam would be sun-dried or "field-dried" in the pit during the summer and early fall seasons. This drying process is conducted in order to reduce the amount of greenhouse gases produced by the combustion of fossil fuels. The drying process, utilizing the solar energy of the sun and warm air currents, reduces the natural moisture content of the bentonite by approximately ten to fifteen percent. This in turn reduces the amount of diesel fuel which is consumed when the bentonite is transported to Worland, Wyoming for processing. Additionally,

reductions in greenhouse gases are achieved when the field-dried bentonite undergoes further drying in the processing plant, as the consumption of coal and/or natural gas is significantly reduced.

The effect of sun-drying the bentonite is further enhanced by tilling the exposed bentonite using John Deere 7800 and 8000 series tractors pulling an assortment of conventional agrarian tillage implements such as v-rippers, chisel plows and disks. Following several days of shallow tillage to a depth of approximately ten inches, the sun-dried layer of bentonite is removed from the exposed bentonite seam using Caterpillar 627G scrapers and transported to a bentonite stockpile area where a field-dried bentonite stockpile is constructed. Depending on climatic conditions, the size of a pit, and the thickness of the bentonite seam, the field-drying process typically lasts for two to three months.

The field-dried bentonite stockpiles which are constructed on the mine site serve as feedstock for the bentonite processing plant located in Worland, Wyoming. The bentonite from these stockpiles is loaded into over-the-road belly-dump trucks using either Caterpillar 966 front-end loaders or Volvo L120/L150 front-end loaders for transport to Worland, Wyoming for processing and sale. The over-the-road belly-dump trucks have a capacity of approximately twenty-five tons. If the over-the-road belly-dump trucks are equipped with a "pup" trailer, the hauling of the trucks capacity may reach approximately thirty-five (35) tons.

2.4.2.4 Compaction of Backfilled Material:

Past experience in conducting bentonite mining and reclamation activities over the last forty years has demonstrated that compaction created by passing over backfilled overburden materials with rubber-tired Caterpillar 627G push-pull scrapers is sufficient to provide stability of backfilled material and to prevent subsidence. Quality Assurance the mine site would be inspected by BHB personnel at regular intervals. The mine foreman, as well as the mine development manager and environmental personnel, visit the site on a frequent basis. During periods of mining and hauling activities, heavy equipment operators and maintenance personnel visit the mine site on a daily basis. The mine development manager coordinates mining activities with the mine foreman, who is on the mine site on a daily basis when mining and reclamation activities are in progress, to ensure that proper operations and procedures are followed according to the plan and schedule. BHB mine site personnel such as heavy equipment operators and mine equipment maintenance personnel have been trained and educated by the mine development manager and the mine foreman to recognize potential problems, such as erosion problem areas or other unnecessary degradation of the resources. These personnel have been instructed to immediately report any potential problems or signs of undue degradation to the mine development manager, the mine site foreman or the environmental staff so that corrective actions can be implemented as soon as possible.

2.4.3 Interim Management Plan

BHB's heavy equipment fleet is highly mobile and moves among the various mine development areas within the permit area in order to meet the demands of customers for a wide variety of bentonite clay qualities. This results in periods of inactivity on all of BHB's mining operations at various times of the year. Periods of inactivity may also result due to inclement weather, particularly during and immediately following significant rainfall events. Periods of inactivity due to inclement weather rarely last more than a few days. Temporary closure and temporary inactivity is considered to be a period of time lasting more than twelve consecutive months when no mining, hauling or reclamation activities occur.

Prior to moving mining equipment from an active mine site, a thorough inspection would be conducted to ensure that all berms and ditches constructed to divert runoff around the active mine area are in place and functional. Containment basins would also be inspected to ensure functionality. Berms would be constructed along pit highwalls, as well as at the entrance to any open pit areas. These procedures would

be implemented in order to prevent unnecessary and undue degradation of the environment, as well as ensuring the safety of the public. The area would be periodically inspected and monitored, generally on a weekly basis, by BHB's mine and environmental personnel. In the event that the mining operation experiences a temporary closure, the BLM/WFO would be notified.

2.4.4 Solid Waste/Human Waste Disposal

Waste and trash which may be generated because of mining activities would be collected in custom made trash containers which are completely enclosed utilizing expanded metal, which prevent trash and waste from blowing in the wind. Trash and waste generated by the mining operations would be stored on staging areas outside the project area and periodically transported to a municipal landfill for proper disposal. Large amounts of trash and other solid waste are not allowed to accumulate at the mine site. Used lubricating oil and filters from heavy equipment would also be collected and properly disposed of, or recycled. No hazardous materials would be used, consumed, stored, generated or disposed of on the project area.

Self-contained human waste collection receptacles (HWCR's also known as porta-potties) would be located on or adjacent to the amendment area for use by BHB employees, contractors and visitors. The HWCR's are serviced and maintained in an appropriate manner in order to provide a safe and healthy work area for mine site personnel. Use of HWCR's would also serve to reduce or eliminate un-necessary and undue impacts to the local environment.

2.4.5 Spill Contingency and Countermeasure Plan

No staging areas, equipment maintenance and parking areas or equipment fueling areas would be developed or located on the project area. Therefore, there would be no storage of diesel fuel or lubricants on the amendment area.

If a fuel spill were to occur on the project area as a result of a mechanical failure, damage to a piece of heavy equipment, storage tank or a fuel delivery truck, mine personnel are instructed to make sure the site is safe, stop additional leakage or spillage, ensure the containment of any spilled fuels or oils, and immediately contact the company's environmental compliance officer and/or mine manager.

Containment of a diesel fuel spill or a lubricating oil spill would most likely be contained utilizing the native earthen materials present at the site. Depending upon the size of the spill and the volume of contaminated earthen materials, the contaminated material would be removed with shovels or with the appropriate size of earth moving equipment. Disposal of the contaminated earthen material would be coordinated by BHB environmental personnel at an approved land farm in accordance with state and federal regulations.

In the event that the volume of a spill is greater than twenty-five gallons, BHB would report the spill to the Wyoming Department of Environmental Quality-Water Quality Division (WDEQ/WQD) and the BLM within twenty-four hours of the spill and a written report would be submitted to the WDEQ/WQD within seven days of the spill.

2.4.6 Public Nuisance and Safety

2.4.6.1 Procedures to Avoid Public Nuisance and Endangerment:

Due to the relatively small size of the proposed mining operation associated with the McClellan Gulch Plan, BHB does not expect that proposed mining activities would result in a public nuisance or endangerment to public safety, human or animal life, or property. BHB has been conducting ongoing bentonite mining operations on Permit to Mine No. 281C since 1975, and has no knowledge of any

instances where it's mining activities have resulted in a public nuisance or an endangerment to the public, human life, or property. This is primarily due to the rural setting and the remoteness of the site, coupled with the small size and scope of the mining operation. The closest incorporated community or subdivision to the project area is the town of Ten Sleep, Wyoming, located approximately one mile northeast of the project area.

The development of additional mining activities on the project area would not change the number of workers on the operation, nor would the size of the mining operation increase significantly. The numbers of vehicles entering and exiting the mine site, as well as the amount of machinery operating on the site would not change.

Access to the active mining areas can be restricted due to private land ownership in the area. The main access roads can be posted as "No Trespassing" where private property is located along the access roads. Additionally, if necessary, locked gates and other barriers could be constructed at key points on private lands to restrict the public from entering the mining operations. Where deemed necessary by BHB, fences may be constructed above highwalls in order to protect wildlife or livestock from the dangers of a fall. No conflicts with grazing are expected to result in conjunction with the development of mining activities.

2.4.6.2 Hours of Operation, Access Routes and Traffic:

Mining and reclamation activities would be conducted Monday through Friday from 7:00 A.M. until 5:00 P.M. Overburden removal would usually occur from November through June on the project area. Once the overburden is removed and the bentonite is exposed, the heavy equipment fleet would conduct bentonite field-drying activities on the project area. This "field-drying" fleet of equipment generally consisting of two to four Caterpillar 627G push-pull scrapers; a Caterpillar D8R dozer; a Caterpillar 140 motor grader and a John Deere 8000 series tractor with various tillage implements. Field-drying would be conducted for approximately three months, from June through early September.

Following the completion of bentonite field-drying activities around the early part of September, reclamation activities generally begin, lasting approximately two months. During the reclamation phase, areas where the overburden has been previously backfilled would undergo final grading and contouring, ripping or scarification (if required), topsoil application, topsoil tillage, and seeding.

Estimating the potential number of over-the-road, belly-dump trucks which would be transporting field-dried bentonite from the project area on a daily basis is somewhat problematic. Customer demand for various grades and quantities of bentonite varies greatly over the course of a year. At any one time, BHB may be hauling various grades of bentonite from at least a dozen different bentonite stockpiles located on Permit to Mine No. 281C permit area.

BHB estimates that approximately 20,000 tons of bentonite would be hauled from the project area on an annual basis using over-the-road, belly-dump trucks with a capacity of thirty-five tons. This would result in a total 571 trucks entering and leaving the mine site annually. It is estimated, based on a hauling schedule of six days per week, that approximately two truckloads per day would be required in order to transport 20,000 tons per year from the project area to the processing plant. The over-the-road, belly-dump trucks typically operate during the daylight hours.

Access to the project area from Worland, Wyoming is via U.S. Highway 16, between Worland and Ten Sleep, Wyoming. The project area lies south of Highway 16. The access point which leads to the project area is approximately 24 miles east of Worland, at the Black Hills Bentonite access road to the South Ten Sleep mining operation.

2.4.7 Surface water/Groundwater/Riparian

No perennial or intermittent streams would be disturbed by the mining activities. Only ephemeral channels which infrequently carry water in direct response to a significant rainfall event or the rapid melting of a significant accumulation of snow would be affected by mining activities. These channels would be re-established during the reclamation phase of the mining operations. Reconstruction of the drainages would be accomplished using Caterpillar 627G push-pull scrapers and/or Caterpillar 140 motor graders to construct flat-bottomed swales that meander as much as possible and are at least as long as the native channels.

Storm water flows generated by significant rainfall events or rapid snow melt away from and around disturbed areas associated with the bentonite mining activities would be diverted. Diversion ditches may be constructed using the blade on a Caterpillar 140 motor grader or a Caterpillar D8R/D8T dozer. The diversion ditch would be cut to create a ditch which is triangular in shape and a minimum of 1.5 feet deep with 2:1 side slopes. Soil derived from the ditch cut would be "thrown" to the down slope side of the ditches, in essence creating a berm that would provide additional protection of the mine area.

If diversion ditches remain in place where down-cutting of the diversion ditch or sedimentation may become an issue, a Caterpillar 627G scraper may be used to construct the ditch to ensure there is adequate available capacity. The scraper constructed ditch would have a bottom width of approximately ten feet with approximately 1:1 side slopes. In the event that down-cutting or erosion should develop in the interceptor ditches or diversions, straw bales, straw logs, rock check dams or other erosion control features may be installed to control down-cutting of the ditch or channel bottom. After mining is completed and as a part of reclamation, all interceptor ditches would be graded out and contoured to blend into the surrounding topography, topsoiled and seeded.

Overburden and topsoil stockpiles would be located and constructed so that they would not block drainages. Topsoil would be removed from the base of all overburden stockpiles in order to protect the topsoil resources from "sloughing" which may occur on the side slopes of the overburden stockpiles. This topsoil removal area, which is commonly referred to as a "topsoil buffer", surrounding the base of the overburden stockpiles also forms a basin which would collect and retain sediments originating from the overburden stockpiles as a result of storm water runoff.

All pits would be backfilled, with no depression and allowing for through-drainage. Post-mining slopes would approximate the pre-mining topography in terms of magnitude, aspect and slope. No impoundments are included as final reclamation features in the reclamation plan for the project area. As mining progresses, all secondary access roads and culverts that are no longer needed would be removed and the areas would be graded to achieve pre-mining contours.

2.4.8 Revegetation Practices and Seed Mixtures

2.4.8.1 Topsoil Decompaction and Tillage:

BHB would utilize a John Deere 7800 or 8000 series four-wheel drive tractor in conjunction with various tillage implements in order to decompact the topsoil and create a suitable seedbed prior to planting the cover crop and/or the permanent seed mixture. Depending on the degree of compaction and the physical characteristics of the soil, BHB may utilize a John Deere V-ripper in the initial phase of tillage, followed by disking with a heavy-duty Wishek disk. In other instances where the soil compaction is not so great, initial tillage may be conducted with a John Deere chisel plow, followed by disking with a heavy-duty Wishek disk. The depth of tillage is carefully controlled and monitored to prevent mixing of the topsoil with the underlying materials. Tillage would be conducted along the topographic contours whenever possible.

2.4.8.2 Cover Crops and/or Mulch:

In the event a fall seeding with the permanent seed mixture is not possible due to inclement weather, saturated or frozen soils, or other special circumstances, the area would be seeded with a sterile annual small grain hybrid such as triticale, as soon as possible, in order to protect the topsoil from erosion. The triticale cover crop would be drill seeded using a John Deere 7800 or 8000 series four-wheel drive tractor pulling a Laird/United States Forest Service (USFS) Design Rangeland Drill with twelve-inch row spacing. The seed would be planted approximately one-half inch in depth, at a rate of fifty pounds per acre. After the cover crop has been established, the permanent seed mixture would be directly drill seeded into the standing stubble and biomass. No mulch such as straw or native hay would be applied in conjunction with the reclamation activities conducted within the area of the Proposed Action.

2.4.8.3 Permanent Seed Mixture:

Due to the predominance of cool season species in the permanent seed mixture, planting generally takes place during the months of October, November and December. Seeding is conducted using a John Deere 7800 or 8000 series four-wheel drive tractor pulling a Laird/United States Forest Service (USFS) Design Rangeland Drill with twelve-inch row spacing. The seed would be planted approximately one-quarter to one-half inch in depth. Seeding would be conducted along the topographic contours of the reclaimed area, or perpendicular to the prevailing winds whenever possible.

Due to the difficulties in feeding certain seeds, such as sagebrush seed, through a conventional grain drill, broadcast seeding may be conducted as well as drill seeding. Sagebrush would be broadcast seeded using a Herd mechanical broadcast seeder mounted on the three-point hitch of the John Deere 7800 or 8000 series tractor. Sagebrush seed may be applied immediately prior to seeding with the Laird/United States Forest Service (USFS) Design Rangeland Drill, or the sagebrush seed may be applied on top of snow after the area has been drill seeded. If an area cannot be drill seeded due to steep topography or other special circumstances, hand broadcasting of seed would be attempted.

Species contained in the permanent seed mixture listed in Table RP-1 have been selected based on the following criteria:

- Adaptability to existing soil conditions
- Forage potential and palatability to livestock
- Forage, cover and habitat potential for wildlife
- Pre-mining presence as documented by the vegetation inventory
- Reclamation success proven by previous revegetation efforts
- Contribution to species and structural diversity
- Ability to remain self-sustaining
- Commercial availability

Whenever possible or economically feasible, locally sourced and/or collected seed would be used in the seed mixture. No temporary seed mixtures would be used. No woody species exist on the pre-mining landscape in the project area, therefore, transplanting of woody species (trees) in the area post-mining would not be conducted.

Seed Species	Rate-lb PLS/acre
Bluebunch wheatgrass, Secar CT (*Pseudoroegneria spicata*)	3.0
Indian ricegrass, Rimrock CT (*Achnatherum hymenoides*)	3.0
Basin wildrye (*Leymus cinereus*)	1.0
Bottlebrush squirreltail (*Elymus elymoides*)	3.0

Gardner saltbush (*Atriplex gardneri*)	2.0
Fourwing saltbush (*Atriplex canescens*)	2.0
Wyoming big sagebrush (*Artemisia tridentata wyomingensis*)	1.0
Rubber rabbitbrush (*Ericameria nauseosa*)	0.5
Western yarrow (*Achillea millefolium occidentalis*)	0.5
Scarlet globemallow (*Sphaeralcea coccinea*)	0.5
American vetch (*Vicia americana*)	2.0
	18.5 lb/acre

2.4.9 Weed Management Plan

During the mining phase of the operations, BHB would monitor for and control all noxious weeds which may develop on disturbed areas. On BLM managed lands, a Pesticide Use Permit (PUP) would be obtained from the Authorized Officer prior to using herbicides to control weeds during the mining phase of the operations.

BHB environmental staff is trained to identify weeds and would conduct ongoing monitoring of weeds. BHB would be responsible for managing all noxious and undesirable invading plant species in the reclaimed areas, including cheat grass, halogeton, and thistle, until revegetation activities would be determined to be successful and the bond would be released for a given area.

The following is a list of Wyoming State Listed Noxious Weeds that would need to be controlled should they begin to grow within the area of the Proposed Action during or after mining and/or reclamation. Cheatgrass would also need to be controlled in the proposed project area that would be disturbed under this Plan, should it begin to grow in mined or reclaimed areas.

1) Field bindweed (Convolvulus arvensis L.) 2) Canada thistle (Cirsium arvense L.) 3) Leafy spurge (Euphorbia esula L.) 4) Perennial sowthistle (Sonchus arvensis L.) 5) Quackgrass (Agropyron repens (L.) Beauv.) 6) Hoary cress (Cardaria draba & pubescens) 7) Perennial pepperweed (Lepidium latifolium L.) 8) Ox-eye daisy (Chrysanthemum leucanthemum L.) 9) Skeletonleaf bursage (Franseria discolor Nutt.) 10) Russian knapweed (Centaurea repens L.) 11) Yellow toadflax (Linaria vulgaris L.) 12) Dalmation toadflax (Linaria dalmatica (L.) Mill.) 13) Scotch thistle (Onopordum acanthium L.)	14) Musk thistle (Carduus nutans L.) 15) Common burdock (Arctium minus (Hill) Bernh.) 16) Plumeless thistle (Carduus acanthoides L.) 17) Dyers woad (Isatis tinctoria L.) 18) Houndstongue (Cynoglossum officinale L.) 19) Spotted knapweed (Centaurea maculosa Lam.) 20) Diffuse knapweed (Centaurea diffusa Lam.) 21) Purple loosestrife (Lythrum salicaria L.) 22) Saltcedar (Tamarix spp.) 23) Common St. Johnswort (Hypericum perforatum) 24) Common Tansy (Tanacetum vulgare) 25) Russian olive (Elaeagnus angustifolia L.)

BHB would implement the following management plan to address noxious weed control on all of its activities conducted on federal lands managed by the BLM:

- Noxious weeds identified on the Wyoming State List of Noxious Weeds would be the subject of this weed management plan.
- All BHB mine activity areas and access routes would be inventoried for infestations of noxious weeds. BHB personnel would conduct on-going monitoring of noxious weed presence at all of the mine activity areas and their access routes. BHB would take action, in cooperation with the Washakie County Weed and Pest department to remove noxious weed species when they are located. Any areas found to contain noxious weeds during on-going monitoring would be reported to the weed coordinator at the BLM-WFO.

- If noxious or invasive weeds are present, the BLM and/or the Washakie Weed and Pest department would be consulted for control and eradication methods. A Pesticide Use Proposal (PUP) would be written, and approval from the BLM-WFO authorized officer for the use of herbicides would be obtained prior to the use of herbicides on BLM administered lands.
- All off-road access would be limited to only necessary routes in order to minimize impacted areas and to reduce the spread of weeds.
- Access would be restricted through infested areas until removal of noxious weeds is accomplished.
- BHB would train mining personnel 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 mining activities or road construction or maintenance at the first available window of opportunity. This may mean waiting until the fall planting season to help ensure the success of vegetation establishment. In the event that a fall seeding with the permanent seed mixture is not possible due to inclement weather, saturated or frozen soils, or other special circumstances, the area would be seeded with a sterile annual small grain hybrid such as triticale, as soon as possible.
- All seed obtained from commercial sources would be laboratory tested for the presence of noxious weed seed.
- All hay or straw used for check-dam construction would be certified weed-free.
- No mulch would be utilized on the mine site.

2.4.10 Post Closure Management

BHB defines post-closure as the phase of the project immediately following the completion of reclamation activities, up to the time reclamation success is demonstrated and final bond release is approved by the LQD. During this period, BHB would periodically monitor and evaluate the reclaimed areas for signs of erosion, off-site sedimentation, seeding failures and noxious weeds. Additionally, these sites would be monitored to ensure that they are not subject to overgrazing. If fences have been constructed to restrict grazing on the reclaimed areas, fences would be periodically examined in order to ensure their structural integrity. If the quality and integrity of the reclamation appears to be jeopardized by erosion, seeding failures, noxious weeds, etc., BHB would implement corrective actions to correct the problem at the first available opportunity.

2.5 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 BHB, 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.

3 AFFECTED ENVIRONMENT and ENVIRONMENTAL EFFECTS

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

3.1 Introduction

3.1.1 General Setting and Geographic Scope of the project area

The area of the Proposed Action is situated south 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 three (3) unpatented mining claims on federal lands proposed to be disturbed by mining and related activities, totaling approximately 50 acres. The Mine Plan Map in Appendix A illustrates the specific locations of proposed new mining features under this project under BLM serial case file WYW-165316. **The total amount of land proposed for new mining and related disturbance is 18.9 acres, 16.6 acres of which is located within unpatented mining claims on federal land with the remaining 2.3 acres on adjacent private patented lands.**

3.1.2 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, Land Use/Access, Fuels, Air Quality, Socioeconomics, Wastes, & Public Safety.

3.2 Resources Carried Forward for Analysis

3.2.1 Geology & Mineral Resources

3.2.1.1 Issue(s) Identified

How would the proposed action affect geologic & mineral resources in the area?

3.2.1.2 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 – Black Hills Bentonite 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**. 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 BHB plan of operation under analysis proposes to mine the Mowry and Double bentonite beds within the Mowry Shale.

Lithologic Description of the Mowry Shale:
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 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.

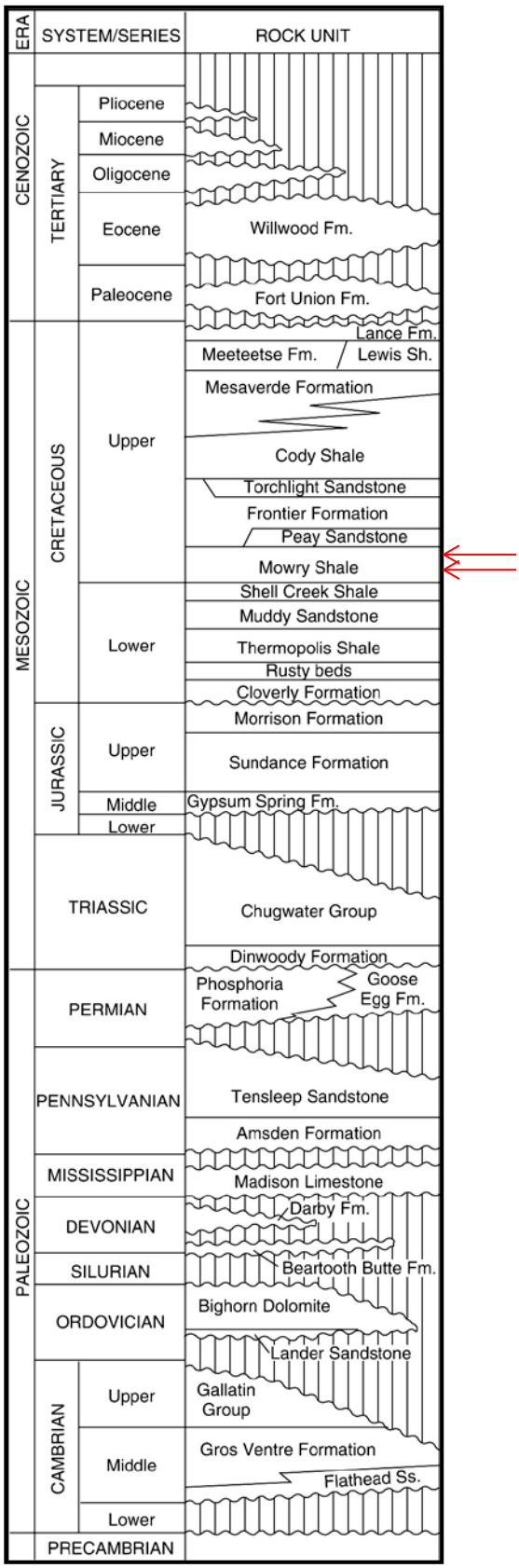


Figure 1 – Stratigraphic column for the proposed mining area

3.2.1.3 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 commercial quantities of bentonite, estimated at approximately 74,000 bank cubic

yards based on an average bentonite bed thickness of 2.6 to 4.8 feet, would be removed from two beds in the Mowry Shale. Mining would disrupt the natural stratigraphic order of beds within open pit areas, and disturb overburden, as well as top and subsoil profiles, as described in the Mine Plan.

No solid or fluid mineral resources other than the intended bentonite beds were identified in the formations affected by the proposed action. Due to the relatively shallow depth of the proposed mining activity, less than 50 feet, there would be no impact upon oil or gas deposits.

3.2.1.4 Cumulative Effects

The cumulative effects on geologic resources associated with the proposed action are that over time, this project combined with previous and future projects in surrounding areas, is the extraction and permanent removal of a solid mineral resource (bentonite) from the area. Bentonite production in Wyoming totaled more than 4 million tons per year since 2010. There is no established threshold of significance regarding removal of minerals although the resource management planning decisions permit such activities. Surface mining of bentonite is practiced on the surrounding lands as well as in many other parts of the Bighorn Basin where beds of bentonite are exposed at the surface.

3.2.2 Cultural Resources, Traditional Cultural Properties, Native American Religious Concerns

3.2.2.1 Issue(s) Identified

How would the proposed surface disturbance affect cultural resources eligible or unevaluated for the National Register of Historic Places (NRHP)?

Would atmospheric impacts from the proposed mining operations affect cultural resources eligible or unevaluated for the NRHP?

3.2.2.2 Affected Environment

The area of potential effect (APE) is defined by the Wyoming State Protocol Agreement between the BLM and the State Historic Preservation Office (SHPO) 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 by the BLM to include the physical footprint of the proposed surface disturbance (direct) and the foreground of the proposed surface disturbance (indirect).

A class III cultural resources inventory was conducted for the direct APE (BLM cultural project #010-2012-097), approximately 18.9 acres. A total of 97 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. One cultural resource site and two isolated resources were identified; all prehistoric. The site was evaluated as not eligible for the NRHP.

3.2.2.3 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 one cultural resource site. The site, not eligible for the NRHP, is within the direct APE and will be impacted by the proposed action. No historic properties were identified within the project's APE. Surface disturbance resulting from the proposed action, approximately 18.9 acres, will have no effect on known 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.

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. Consultation occurred with State Historic Preservation Office (SHPO) under the State Protocol.

3.2.2.4 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 known historic properties, there can be no cumulative effects

3.2.3 Paleontology

3.2.3.1 Issue(s) Identified

How would the proposed surface disturbance affect significant paleontological localities?

3.2.3.2 Affected Environment

The project area is located within the Mowry Shale (Kmt) and Frontier Formation (Kf) . 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).

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 18.9 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. Unknown fossil localities may be affected once disturbances are implemented as proposed. To mitigate affects to unknown surface significant paleontology localities standard paleontology stipulations apply and are included in the conditions of approval.

3.2.3.3 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.

3.2.4 Soils

3.2.4.1 Issue(s) Identified

How would the soil resources be impacted as a result of 18.9 acres of disturbance associated with mining?

3.2.4.2 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 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 of the soils have a considerable amount of exchangeable sodium, and with the salts they are classified as saline-sodic soils.

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) to shallow (less than 20 inches). Some soils are limited by elevated sodium levels and have a relatively high sodium absorption ratio (SAR). The soils in each map unit are classified below for the McClellan Gulch Plan Area.

Table D7-3. Soil Map Unit Acreage for the McClellan Gulch Plan of Operation Area and Adjacent Patented Land

Soil Map Unit	Topsoil Salvage Depth	Total POO Acres	POO Disturbance Acres	Adjacent Patented Land Disturbance Acres	Total Disturbance Acres	Estimated Topsoil Salvage Volume Cubic Yards
33A	10"	2.9	2.7	0.0	2.7	3,630
35A		2.0	0.0	0.0	0.0	0
57	20"	9.7	6.7	0.6	7.3	19,629
59	10"	7.4	3.9	0.7	4.6	6,184
61A	10"	28.0	2.6	1.0	3.6	4,840
Total		**50.0**	**15.9**	**2.3**	**18.2**	**34,283**

The map unit descriptions have been submitted as part of the plan of operations and taken in part from the Washakie County Soil Survey, which was later amended from a class 2 order soil survey. For further details and descriptions of each soil unit, refer to the submitted plan of operations.

3.2.4.3 Direct and Indirect Effects

No Action

Under the No Action Alternative, the development of the proposed Action would not occur. No resulting effects on soil resources would be expected to occur beyond the current situation. There would be no disturbance or removal of topsoil, sub-soil, or bentonite layers associated with mining activities. The rates of erosion from the 18.9 acres would remain at the current levels.

Proposed Action

The impact to the soil resources would be from the disturbance of the top soil, sub-soil, and overburden layers on the 18.9 acres that would be disturbed according to the soil salvage and mining methods as outlined in the document. There would be a permanent removal of approximately 74,000 bank cubic yards of bentonite material that would be mined.

The duration of the impact would be from initial disturbance until successful reclamation occurs on the site for up to 10 or more years following the completion of mining activities. Although every attempt to salvage topsoil would be taken, there would be mixing of soil horizons as a result of the salvage process. As a result of soil and subsoil horizons mixing during the topsoil salvage and stockpiling or live-spreading processes there would also be changes to salinity and pH as well as dilution of the organic matter in the approximately 34,000 cubic yards of soil which would be salvaged. These changes to soil characteristics and nutrients may impact the ability of the soil to support a native vegetative community during reclamation.

Minor wind erosion and loss of sediment from stock piles would occur until a seed crop stabilizes the stock piles.

The amount of erosion or potential sediment leaving the site via water erosion was modeled using the NRCS TR-55 runoff model and is further outlined below in the hydrology sections of the document. This was completed to quantify the amount of sediment that would leave the site as a result of the proposed action. Design features to minimize erosion and topsoil loss have been incorporated into the plan of operations and would likely reduce the modeled amounts. The estimated erosion rate was 0.04 tons of sediment annually.

3.2.4.4 Cumulative Effects

The soil cumulative effects analysis has been combined with the Water Resources Section 3.2.5.

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

3.2.5.1 Issue(s) Identified

How would the proposed action impact the runoff conditions below proposed mining areas in the Nowood River-Joe Emge Creek subwatershed?

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

3.2.5.2 Affected Environment

Watershed/Surface Water

The proposed action is located within the Nowood River-Joe Emge Creek sub-watershed (USGS # 100800080305). The sub-watershed is located within a 10-14" precipitation zone. The watershed is a semi-arid intermittent watershed that is a tributary to Nowood Creek 2 miles to the northeast of the proposed mining area. Current disturbances to the watershed are from haul roads, culverts installed along access roads, open pit areas, and stockpiles in the vicinity of the mining area.

The Nowood River is the closest permanent perennial water source and is located approximately 3 miles east of the project area. McClelland Gulch, an intermittent/ephemeral drainage, meanders adjacent to the project area. Highly erosive bedrock outcrops with high rates of natural erosion in upland areas are present in the mining area of the sub-watershed. There are several smaller ephemeral drainages that reveal incised channels with narrow terraces that are classified as Rosgen F and G type channels (Rosgen, 1996). Drainage is to the northeast via a series of ephemeral drainages into the Nowood River. Although defined channels were present, the ephemeral streams within the study area are classified as non-jurisdictional since they do not flow continuously for three consecutive months out of the year and do not appear to have a significant nexus to traditionally navigable waters. There were no identified floodplains or jurisdictional wetlands that were encountered within the project 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 reservoir water quality monitoring in the watershed by the BLM in 2003 and 2004. 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.

3.2.5.3 Direct and Indirect Effects

No Action

Under the No Action Alternative, the development of the proposed action would not occur. The additional roads, pits, stockpiles in the sub-watershed would not occur. The current infiltration rates and runoff conditions in mining area of the Nowood River- Joe Emge Creek sub-watershed would remain unchanged. The native channel conditions and runoff conditions from the area would remain unchanged.

Proposed Action

Watershed/Surface Water

The hydrology of the drainages would be altered temporarily by the re-routing of water around the overburden storage area. This would change the nature of the flow patterns surrounding the pits and downstream of the pits. Rill and gully formation will likely occur on exposed areas with no vegetative cover and on slopes greater the 5 percent. These rills and gullies that fall outside of the contained pit area are likely to transmit new sediment that would be introduced into the watershed if the area received a precipitation even greater than 2 year, 6 or the 100 year 6 hour maximum precipitation events. The 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 proposed mined area of 18 acres was modeled using the NRCS TR-55 runoff model to estimate potential changes in runoff from the proposed mined area. The inputs into the model were 18 acres, Thermopolis Wyoming climate data, Type C hydrologic runoff soils, 4 percent average slope, clay loam soils, Pinon Juniper rangeland conditions, Curve Number of 63 for current conditions and 81 for the post treatment number.

Table 1- Pre-Disturbance

Data Summary for SCS Curve Number Model TR-55 Windows

Input Summary		**Output Summary**	
Average Slope (%)	5	Peak Runoff (cfs)	**13**
Hydrologic Soils Group	C	Total Runoff (ac-ft)	**1.1**
Hydrologic Response Units (HRU)	1	Runoff Depth (in)	**0.7**
Arid and Semi-Arid Rangeland- Sagebrush (Good) CN= 51	18	Runoff (in)	**0.04**
		Rainfall depth	**2.8**
Composite SCS Curve Number	N/A		
Total Area (acres)	**18**		
Storm Duration (hr)	24		
Precipiation (in)	2.31		
Recurrance Interval (yr)	25		
Storm Distribution Type	SCS Type B		
TP-40	Washakie Co		

Table 2- Post Disturbance

Data Summary for SCS Curve Number Model TR-55 Windows

Input Summary		**Output Summary**	
Average Slope (%)	5	Peak Runoff (cfs)	**26**
Hydrologic Soils Group	C	Total Runoff (ac-ft)	**2.2**
Hydrologic Response Units (HRU)	1	Runoff Depth (in)	**1.4**
Arid and Semi-Arid Rangeland- Pinon Juniper (Poor) CN= 85	18	Runoff (in)	**0.04**
		Rainfall depth	**2.8**

The results were a change in peak runoff from 13 cfs to 26 cfs following modeled storm events, change in total runoff from 1.1 acre feet to 2.2 acre feet, due to the impervious change around compacted areas and roads, decrease in runoff depths from 2.8 to 1.4 inches. The estimate erosion rate was 0.04 tons of sediment annually.

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 (18 acres) compared to the sub-watershed size (40,000 acres), along with ephemeral channels, would make impacts negligible and difficult to quantify. The specific impacts from the proposed action are too small in scale and difficult to model due to the ephemeral flow regime of the sub-watershed. However, overall general best management practices in the mine plan and SWPP are in place to reduce potential impacts to water quality. 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.

3.2.5.4 Cumulative Effects

The following cumulative effects have been outlined in the table below. There would be an additional 18 acres in the watershed of disturbance. This would be in addition to historically and currently mined areas in the McClellan Gulch and Nowood River-Joe Emge Creek sub-watershed. The duration of the impacts for the foreseeable future would be for the length of the mining activity.

Cumulative Effects Table impacts to Watershed							
Alternative	Cumulative Impact Assessment Area (CIAA)/Geographic Scope	CIAA Temporal Scope	Past & Present Actions	Future Actions	Direct-Indirect Effects	NRCS TR-55 Output Summary	
Action	Various Subwatersheds located within the Nowood River-Joe Emge Creek watershed (HUC # 100800080506)	10-50+ years (or length of active mining operation, until vegetation cover is established)	Mining operations have been conducted in the area for the past 40 years, and are presently ongoing, on adjacent private and state lands, as well as previously permitted federal lands resulting in alterations to topography and runoff. Approval would result in disturbing 18.9 additional acres as a result of surface mining.	Continued amendments to plans of operations to add additional acres for mining operations in the watershed. Alteration of the topography of the watershed around mined areas would continue to occur.	There would be an additional 16.6 acres of disturbance to federal lands throughout the duration of the mining activities. The removal would occur in stages and have indirect effects of increased annual runoff from disturbed areas (estimated at rate of 0.04 tons sediment/yr and 0.04 inches annual average). Alterations to topography and natural ephemeral channels would occur as a result.	Peak Runoff (cfs)	26
						Total Runoff (ac-ft)	2.2
						Runoff Depth (in)	1.4
						Runoff (in)	0.04
						Rainfall Depth	2.8
No Action	Various Subwatersheds located within the Nowood River-Joe Emge Creek watershed (HUC #	10-50+ years (or length of active mining operation)	Mining operations have been conducted in the area for the past 40 years, and are presently ongoing,	The amendments would not be allowed. The mining operations would occur in other non-federal	There would not be an additional 16.6 federal acres of surface disturbing activity associated with the mining operations. There	Peak Runoff (cfs)	13
						Total Runoff (ac-ft)	1.1
						Runoff Depth (in)	0.7
						Runoff (in)	0.04

	100800080506)		on adjacent private and state lands, as well as previously permitted federal lands resulting in alterations to topography and runoff. The disturbance of 18.9 additional acres would not occur.	administered areas of the watershed. There would be no future alteration of topography or change in runoff from mined areas in the watershed.	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 watershed.	Rainfall Depth	2.8

3.2.6 Native Vegetation

3.2.6.1 Issue(s) Identified

Would the proposed action with mitigation features be able to restore native vegetation on the mine site?

3.2.6.2 Affected Environment Native Vegetation

The dominant species recorded on site and within the 3 mining claims pertinent to this action includes Big sagebrush (*Artemisia tridentata*), Bluebunch wheatgrass (*Agropyron spicatum*), Sandberg bluegrass (*Poa secunda*) and Needleandthread (*Stipa comata*), Prairie junegrass (*Koeleria macrantha*), Gardner saltbush (*Atriplex gardneri*), Broom snakeweed (*Gutierrezia sarothrae*) and Rubber rabbitbrush (*Chrysothamnus nauseosus*). A complete survey of vegetation was completed and provided as part of the plan of operations--titled Appendix D8.

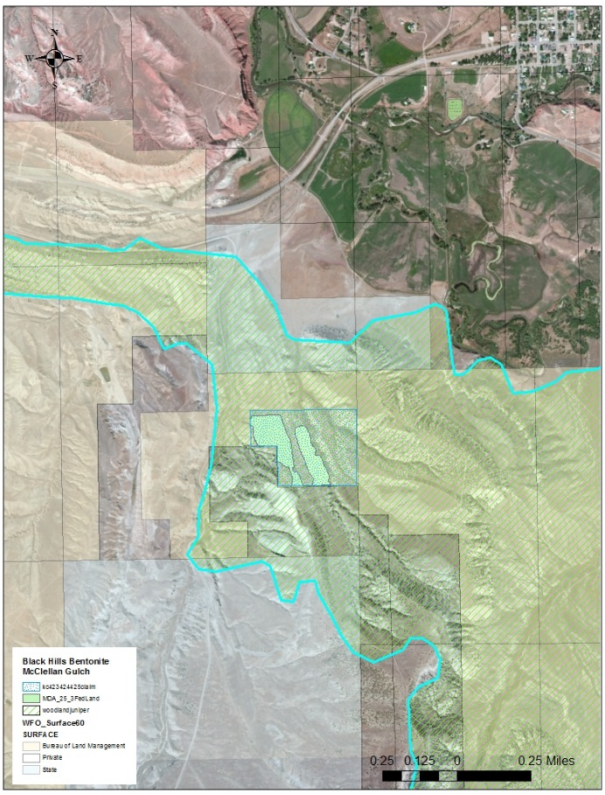
3.2.6.3 Direct and Indirect Effects

No Action

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

Proposed Action

This alternative would incrementally mine and reclaim approximately 17 acres of public lands over a seven (7) year period. This would result in the incremental and total removal of vegetation on site and would also result in an incremental and concurrent reclamation of vegetation on site as designed in the mine plan. The seventeen acres would occur on 3 mining claims comprised of fifty acres within a Juniper-Woodland/Wyoming Big Sage community type. This would amount to 34% of the mining claims total acreage (17 acres/50 acres). The proposed action, when compared to the no action alternative results in 17 acres of vegetation being removed thus yielding a need and obligation to reclaim those acres as approved in the plan of operation for the proposed action.



3.2.6.4 Cumulative Effects

Geographic scope 3 mine claims comprised of 50 acres

Claim Name	Serial Number	Legal Description	Section Township Range	Acres
KC #423A	WMC252912	NE¼NW¼SE¼	Section 25, T.47N., R.89W.	10.0
KC #424A	WMC252913	W½NE¼SE¼	Section 25, T.47N., R.89W.	20.0
KC #425A	WMC252914	E½NE¼SE¼	Section 25, T.47N., R.89W.	20.0

Resource	Past Actions	Present Actions	Proposed Action	Future Actions	Cumulative Effect
Vegetation	Wildlife and domestic Grazing utilizing < or = 50% of annual growth	Wildlife and domestic Grazing utilizing < or = 50% of annual growth	Incremental removal of vegetation on 17 acres	The incremental Reclamation of 17 acres And/or Wildlife and domestic grazing after reclamation. There are no	NONE--Until reclamation is complete there would be no cumulative effect as without the vegetative establishment the area would

				proposals to mine the balance of the 3 claims.	not support livestock or wildlife needs.

3.2.7 Invasive, Non-native, and Noxious Weeds

3.2.7.1 Issue(s) Identified

Would the proposed mining and subsequent reclamation increase the distribution and cover of cheatgrass?

3.2.7.2 Affected Environment

Currently federal lands in the plan area are in an undisturbed state, although cheatgrass (*Bromus tectorum*) and other invasive plants such as Japanese brome, and halogeton (*Bromus japonicas and Halogeton glomeratus*) are present; native plant species are dominant in the McClellan Gulch Plan area. Cheatgrass is most common in Shrubland areas, with total coverage mapped at up to 15.1% for Shrubland, 3.5 acres of the proposed disturbance, 3.7% for Rocky Shrub Barrens/Outcrops at 13.5 acres of disturbance, and 1.3% for Juniper Outcrop which makes up 1.9 acres of the disturbance.

3.2.7.3 Direct and Indirect Effects

No Action

Under the No Action Alternative no new surface disturbance would take place, leaving the established soil and plant communities intact. Cheatgrass would remain present at or near the current proportion (1.3 – 15.1% cover) but would only be able to expand and increase as bare soil becomes available due to fire and other natural ecological succession processes. Native habitat would remain functioning and wildfire risk would not be affected by an increased presence of cheatgrass.

Proposed Action

Invasive and non-native plant species cover in the area would most likely increase on the 18.9 disturbed acres (16.6 BLM acres) under the proposed action. Due to cheatgrass' relatively long seed viability and early germination, cheatgrass tends to outcompete native species in freshly disturbed areas. If the reclamation process is unable to establish a self-sustaining native vegetation community in a reasonable time period, annual, invasive and non-native weed species could be more likely to spread throughout the disturbed areas.

If cheatgrass (Bromus tectorum) becomes established on reclaimed disturbed areas, it could form a monoculture, outcompeting native species, reducing species diversity, decreasing sagebrush establishment, and creating a volatile fuel source for fires. Cheatgrass cover begins to influence fire risk at 12% cover (46% risk) and at 45% cover fire risk increases to 100% (Link et. Al. 2006).

Mitigation

BHB has committed to treating for noxious and invasive weeds in their weed management plan as part of the proposed operation (see Weed Management Plan section 2.4.6). Under their proposed weed plan BHB would be responsible for managing all noxious and undesirable invading plant species in the reclaimed areas, including cheat grass, halogeton, and thistle, until revegetation activities would be determined to be successful and the bond would be released for a given area.

3.2.7.4 Cumulative Effects

The cumulative effects analysis area (CEAA) for invasive plants is defined by historic and proposed bentonite mining immediately surrounding the project in the South Tensleep area, south of US Highway 16. The total acreage is approximately 1200 acres. Within the CIAA currently disturbed areas total approximately 79 acres, and planned mine areas total 120 acres. The total disturbance for the proposed mine plan is 18.9 acres of Federal, State, and private lands; the BLM-managed area affected by the proposed action would be 16.6 acres. The approval of the proposed mine plan would result in 209 acres disturbed and either invaded by, or at risk from invasion by, invasive plant species such as cheatgrass, halogeton, and other weeds. Due to past actions including mining, grazing, and succession the cheatgrass cover of the area has increased from 1-6% mapped in 1988 to the present 1-15%. If the disturbed acres are not successfully reclaimed the result would be a significant increase in invasive plant cover over time, which could lead to both an increase in wildfire risk as well as risk to native plant communities, wildlife habitat and livestock forage.

3.2.8 Rangelands/Grazing Administration

3.2.8.1 Issue(s) Identified

No issues identified for analysis.

Rationale: The action would not change the management of the authorization to graze public lands. The action occurs on loamy (~7.6 acres) and shale range sites (approximately 9 acres). Shale range sites are not typically utilized by livestock as feed is scarce and slopes are steep. Loamy range sites are utilized by livestock and in this case there are ~7.6 acres of temporary disturbance which, in terms of livestock management, may displace less than 1 animal unit month (AUM). A change in annual AUMs can vary more than this year to year as a direct result of precipitation therefore this would not be considered unusual or result in a change to grazing.

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

3.2.9.1 Issue(s) Identified

No issues identified for analysis.

Rationale: The proposed project is in an area that already has disturbance associated with historic and current mineral development activity. No measureable additional effects on migratory birds, threatened, endangered, or BLM sensitive species, or wildlife resources in general are anticipated as a result of the project as described.

Although the proposed project area is partially within an area designated as big game crucial winter habitat for elk and mule deer by the Wyoming Department of Game and Fish, no measureable impact to those species is anticipated in association with the proposed project and no seasonal stipulation is recommended.

3.3 Mitigation

3.3.1 Land Use/Access

The operator would 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 would use extra safety precautions when working near or around pipelines, power lines, power poles, underground cables, or other utility installations. The operator would 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.

3.3.2 Cultural Resources, Paleontology

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

(i) Operators shall not knowingly disturb, alter, injure, or destroy any scientifically important paleontological remains or any historical or archaeological site, structure, building or object on Federal lands.

(ii) Operators shall immediately bring to the attention of the authorized officer any cultural and/or paleontological resources that might be altered or destroyed on Federal lands by his/her operations, and shall leave such discovery intact until told to proceed by the authorized officer. The authorized officer shall evaluate the discoveries brought to his/her attention, take action to protect or remove the resource, and allow operations to proceed within 10 working days after notification to the authorized officer of such discovery.

(iii) The Federal Government shall have the responsibility and bear the cost of investigations and salvage of cultural and paleontology values discovered after a plan of operations has been approved, or where a plan is not involved.

4 TRIBES, INDIVIDUALS, ORGANIZATIONS, or AGENCIES CONSULTED

Person Consulted	Agency/Tribe/Organization
Mary Hopkins, SHPO	*State Historic Preservation Office*
Sarah Naylor	*WDEQ-LQD, Lander District Office*

5 LIST OF PREPARERS

The following Worland Field Office personnel reviewed or have been contacted with regard to this EA.

List of Reviewers

Resource	Name	Title
Cultural Resources	Marit Bovee	Archaeologist
Fish/Wildlife (including T&E)	Ted Igleheart	Wildlife Biologist
Recreation/VRM/Travel Management/Special Designations	Brian Smith	Recreation/Visual Specialist
Rangeland/Vegetation	John Elliott	Range Management Specialist
T&E Plants	Karen Hepp	Range Management Specialist (T&E/Sensitive Plants)
Engineering	Monica Goepferd	Civil Engineer
Soils/Haz. Mat.	Jared Dalebout	Hydrologist
Invasive Species	Alex Jensen	Geologist
Water Resources	Jared Dalebout	Hydrologist
Paleontology	Marit Bovee	Archaeologist
Geology & Minerals	Alex Jensen Darci Stafford Frank Sanders	Geologist Natural Resource Specialist Petroleum Engineer
Land Use/Access	Rita Allen	Realty Specialist
Fuels	Eve Warren	NRS
Forests	Jim Gates	Forester
Public Health and Safety	Holly Elliott	Planning & Environmental Coordinator
Socioeconomics	Holly Elliott	Planning & Environmental Coordinator
Air Quality	Holly Elliott	Planning & Environmental Coordinator
NEPA Review	Holly Elliott	Planning & Environmental Coordinator

6 References Cited

Black Hills Bentonite – South Tensleep Mining Area – McClellan Gulch Plan of Operations for the KC423A, KC424A & KC425A Placer Mining Claims– Permit application binder and CDROM

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.

Adcock, T.W., 2011. Annual Report of the State Inspector of Mines of Wyoming office of Mine Inspector. p.125

Soil Survey Staff. 1999. Keys to Soil Taxonomy, Eighth Edition. Pocahontas Press, Inc. Blacksburg, Virginia.

United States Department of Agriculture (USDA). 1981/1993. Soil Survey Manual, Chapter 4, Examination and Description of Soils in the Field. Manuscript (430-V-SSM, May 1981).

Wyoming Department of Environmental Quality. November, 1984. Guideline No. 1, Topsoil and Overburden.

Link, S.O. 2006. Bromus tectorum cover mapping and fire risk. International Journal of Wild¬land Fire 15: 113-119.

Anderson Consulting Engineers, 2009. Nowood River Storage/Watershed Study. Wyoming Water Development Commission Report pp 3.100.

Rosgen, D., 1996. Applied River Morphology, Wildland Hydrology, Pagosa Springs, Colorado

Appendix A

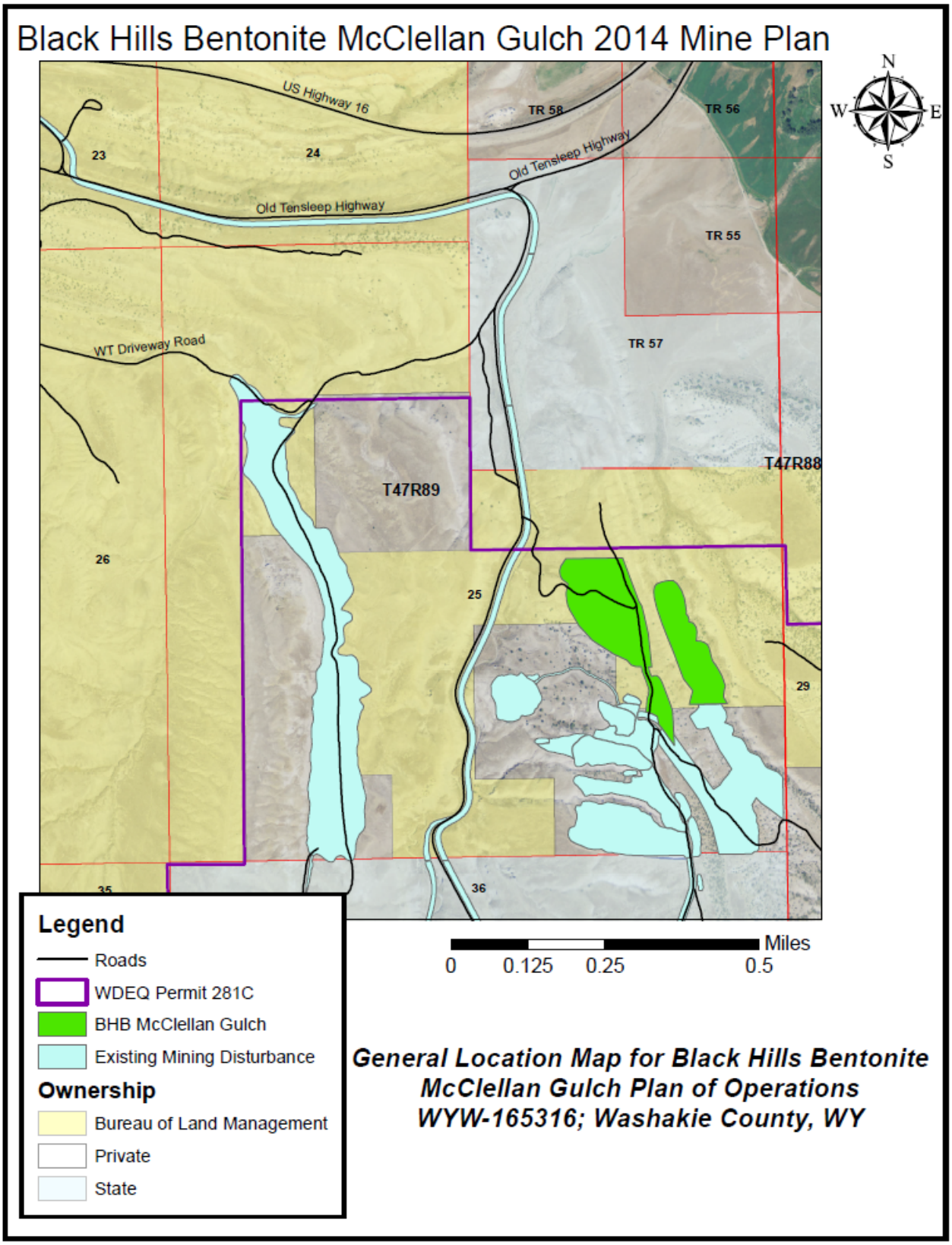

Black Hills Bentonite McClellan Gulch 2014 Mine Plan
US Highway 16
TR 58
TR 56
23
24
Old Tensleep Highway
Old Tensleep Highway
TR 55
WT Driveway Road
TR 57
T47R88
T47R89
26
25
29
36
35
N
W
E
S
Legend
Roads
WDEQ Permit 281C
BHB McClellan Gulch
Existing Mining Disturbance
Ownership
Bureau of Land Management
Private
State
Miles
0
0.125
0.25
0.5
General Location Map for Black Hills Bentonite
McClellan Gulch Plan of Operations
WYW-165316; Washakie County, WY

Table MP-1

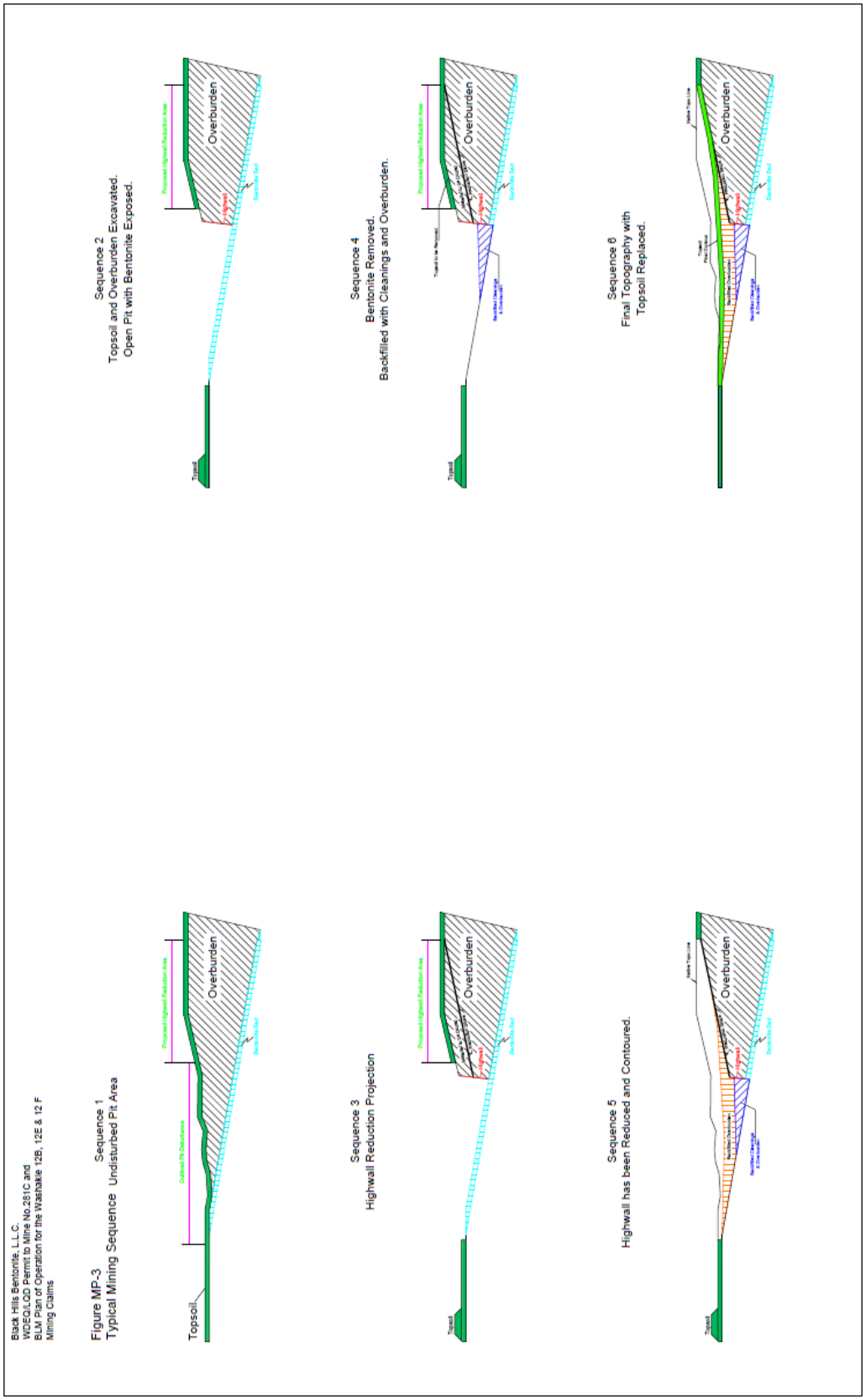
Table MP-1 - Revised March 2014
Volumetric Calculations
Black Hills Bentonite, L.L.C.
BLM - McClellan Gulch Plan of Operation
South Ten Sleep Area

Mine Development Area Section Township Range	Disturbance	Acres	Year of Development or Construction	Topsoil Volume (Calculated) (Ave. Depth)	Segregated Overburden Volume (1.25 ft.)	Average Overburden Depth	Pit Area	Estimated Overburden Volume	Overburden Swell Volume (45% Factor)	Average Bentonite Thickness	Calculated Bentonite Volume	Total Pit Depth	Overburden Replacement Volume (Box Cut)
				(BCY)	(BCY)	(Feet)	(Acres)	(BCY)	(LCY)	(Feet)	(BCY)	(Feet)	(BCY)
MDA #25-2													
Sec 25, T47N R89W	Pit 1	1.6	2014	4,301	3,226	15.0	1.6	38,712	17,420	2.8	7,226	17.8	45,938
	Pit 2	1.6	2015	3,764	3,226	15.0	1.6	38,712	17,420	2.8	7,226	17.8	45,938
	Pit 3	1.6	2016	3,629	3,226	15.0	1.6	38,712	17,420	2.8	7,226	17.8	45,938
	Pit 4	1.7	2017	4,436	3,428	15.0	1.7	41,132	18,509	2.8	7,678	17.8	48,809
MDA #25-3													
Sec 25, T47N R89W	Access Road Segment G - G'	0.5	2014	672									
	Topsoil Stockpile Area #1	0.7	2014										
	Overburden Stockpile Area #1	2.0	2014	2,957									
	Pit 1	1.6	2014	2,420	3,226	5.4	1.6	13,936	6,271	2.7	6,968	8.1	20,904
	Pit 2	1.6	2014	2,285	3,226	4.3	1.6	11,097	4,994	2.8	7,226	7.1	18,324
	Pit 3	1.6	2015	2,420	3,226	4.0	1.6	10,323	4,645	2.6	6,710	6.6	17,033
	Pit 4	1.6	2015	2,957	3,226	4.8	1.6	12,388	5,575	2.7	6,968	7.5	19,356
	Pit 5	1.6	2016	2,823	3,226	6.8	1.6	17,549	7,897	2.8	7,226	9.6	24,776
	Pit 6	1.2	2014	1,513	2,420	20.1	1.2	38,906	17,508	4.8	9,291	24.9	48,196
TOTAL		**18.9**		**34,276**	**31,655**		**15.7**	**261,467**	**117,660**		**73,746**		**335,214**

These volumes include the out of Plan of Operation acreage on adjacent patented Land

ABBREVIATIONS:
BCY = Bank Cubic Yards
LCY = Loose Cubic Yards

Figure MP-3


Black Hills Bentonite, L.L.C.
WDEQ/LQD Permit to Mine No.281C and
BLM Plan of Operation for the Waehakie 12B, 12E & 12 F
Mining Claims
Figure MP-3
Typical Mining Sequence
Sequence 1
Undisturbed Pit Area
Topsoil
Sequence 2
Topsoil and Overburden Excavated.
Open Pit with Bentonite Exposed.
Overburden
Sequence 3
Highwall Reduction Projection
Sequence 4
Bentonite Removed.
Backfilled with Cleanings and Overburden.
Sequence 5
Highwall has been Reduced and Contoured.
Sequence 6
Final Topography with
Topsoil Replaced.