

Mine Plan

Type of Mining Activities

Mining will consist of small, open pit surface activities associated with the removal of bentonite.

Life of Mining Activities

The life of the mining operation including reclamation activities is expected to last approximately ten years. Approximately 72,900 tons of bentonite will be removed from an estimated 8.1 acres. Approximately 10.4 additional acres will be disturbed by related mine disturbances such as access roads, topsoil stockpiles, equipment parking areas and overburden stockpile areas.

Mining on the amendment area will begin within one year of the approval of the amendment application. The locations of proposed mining activities are illustrated on Mine Plan Map No. 1.

Heavy Equipment

Mining and reclamation will be conducted using the following equipment:

Caterpillar 627F Push-Pull Scrapers
Caterpillar D8R Dozers
Caterpillar 966 Front-End Loaders
Caterpillar 14H Motor Graders
John Deere 8220 Tractor
Chisel Plows - Grain Drills

Type of Bentonite Mined

The bentonite mined on this amendment area consists of a bentonite bed within the Mowry Shale. The bed averages 36 inches in thickness.

Existing Mining Activities

No existing mining activities are located within the proposed amendment area. Existing bentonite mining activities are located in the immediate vicinity of the proposed amendment area. These activities are illustrated on the mine plan and progression map included in this document. Bentonite mining activities have been conducted in the vicinity since the 1970's. There are no underground mines on or adjacent to the proposed amendment area. No mining activities for other minerals are located in the immediate vicinity.

Impacts to Groundwater

Due to the shallow mining depths, no groundwater is expected to be encountered. No ground water has been encountered during the course of exploration drilling activities on the amendment area. Additionally, no seeps or springs have been identified on the areas of proposed pits and other surface disturbances. Therefore, it is expected that impacts on groundwater resources will not occur in conjunction with mining activities on the amendment area.

Impacts to Surface Waters

Impacts to watersheds and surface water hydrology on the amendment area are expected to be minimal. Surface runoff will be directed around and away from mining activities in order to prevent unnecessary erosion and sedimentation. Final contouring will be done in order to return the affected lands to the approximate original contour. No springs, seeps, or perennial streams will be affected by the proposed mining activities.

Proposed access roads have been developed to minimize the impact on the ephemeral drainages. For situations where roads will cross ephemeral drainages, either low-water crossings will be constructed or culverts will be installed. The minimum culvert size allowed will be eighteen (18) inches in diameter.

Buildings, Processing Plants or other Facilities

No buildings, processing plants or other facilities will be constructed in conjunction with mining activities on this amendment area. The bentonite produced from this area will be transported to Black Hills Bentonite's existing processing facilities located in Worland, Wyoming.

Access and Haul Roads

Access to the amendment area will be via Black Hills Bentonite's existing mine haul road that intersects with Highway 16, approximately six miles west of Ten Sleep, Wyoming. This road is on the north side of Highway 16 and is illustrated on the mine plan map included with this amendment application

The construction of new roads within the amendment area will be limited to secondary access roads as illustrated on the mine plan map. These roads will have a top width of twenty feet and a total width of fifty feet to allow for ditches along the roadside. Ditches will be approximately twelve (12) to eighteen (18) inches in depth to allow for drainage. Water turnouts will be constructed along the side ditches in order to disperse runoff and to minimize erosion. Special efforts will be made to prevent water from running down roadways and ditches into drainages at crossings.

Topsoil will be salvaged from the access roads and adjacent ditches to a maximum depth of eighteen (18) inches. Topsoil removed from the access roads will be stockpiled. All access roads will be reclaimed upon the completion of mining activities. Cross-sections for the construction of access roads are presented in Figure MP-1.

As stated previously, either low water crossings will be constructed or properly sized culverts will be installed, as needed, during the construction of the access roads. Typical construction details associated with the low-water crossing are illustrated in Figure MP-2. Construction details associated with culvert installations are illustrated in Figure MP-3.

The following criteria will be utilized in calculating peak storm water discharges for culvert sizing determinations:

Culvert Sizing for Ephemeral Drainages

Four culverts and one low water crossing will be placed in ephemeral drainages and swales in conjunction with the construction of access roads associated with the mining activities. The locations of these culverts are illustrated on Map No. MP-1. The depth of cover over the culverts will be a minimum of twice the diameter of the culvert. The sizes of the culverts are presented in the following table:

CULVERT SIZING INFORMATION

<u>Culvert/LWC Location</u>	<u>Drainage Area Above Culvert</u>	<u>Peak Discharge In C.F.S.</u>	<u>Culvert Installed Size</u>	<u>Slope (ft/ft)</u>
#1	5 Acres	<10	18"	.03
#2	5 Acres	<10	18"	.03
#3	1654 Acres	90	42"	.03
#4	992 Acres	65	36"	.03
#5	2791 Acres	>100	Low Water Crossing	

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 SCS Curve Number Method using 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: 10 Year, 24 Hour, 1.4 inches based on Wyoming Isopluvials
- Moderate Slopes
- Curve Number: 79

Culvert sizes are based on culvert sizing charts provided by Mr. John Hunzicker, Geotech Industrial Supply, Casper, Wyoming.

Power Transmission Lines, Communication Lines and Pipelines

No power lines or communication lines will be constructed in conjunction with the development of mining activities on the amendment area. No power lines or communication lines will be affected by the proposed mining activities.

Sedimentation and Treatment Ponds

No sedimentation or treatment ponds will be constructed in conjunction with the mining activities on this amendment area.

Mill and Tailings Disposal Sites

No mill or tailings disposal sites will be constructed or created in conjunction with the development of mining operations on this amendment area.

Drainage Diversions

No permanent drainage diversions are proposed for the amendment area. Surface flow may be diverted on the up-slope side of pits and other affected area 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 side of pits 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, these sites will be seeded with a temporary seed such as barley or winter wheat to provide soil stabilization. Straw bales or water bars may also be used to stabilize erosion.

Solid Waste Disposal

Wastes and trash which will be generated as a result of mining activities will be collected in trash containers and hauled to a municipal landfill for disposal. Trash and other solid waste will not be allowed to accumulate at the site. Used oil from heavy equipment will also be collected and properly disposed of or recycled.

Railroads and Conveyor Systems

No railroad lines or conveyor systems will be constructed in conjunction with the mining activities associated with this amendment area.

Overburden and Bentonite Stockpiles

Out-of-pit overburden and bentonite stockpiles will be constructed in conjunction with the mining activities conducted on this amendment area. Out-of-pit overburden stockpiles are normally only constructed in conjunction with the overburden removed from the first pit mined in an adjoining series of connected pits (multiple cut sequence).

Bentonite stockpiles will be developed in order to field dry the bentonite exposed in each pit. These bentonite stockpiles are usually placed on either the overburden stockpile or the backfilled portion of previously mined pits in order to reduce impacts to the land.

Access Control

Due to the remoteness of the 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, will be addressed on a site specific basis using fencing or other methods determined to be appropriate for the conditions. The mined lands will be completely reclaimed following the completion of mining, which will eliminate potential hazards such as highwalls and open pits.

Mining Methods

Bentonite mining on the amendment area will consist of a series of pits arranged in multiple cut sequences. Topsoil will be removed from all affected areas utilizing scrapers and dozers. Topsoil will be placed in stockpiles for future use in the reclamation of the mined or disturbed lands. In some instances the topsoil may be spread directly onto backfilled areas instead of being placed in stockpiles.

Following the removal of topsoil, the exposed overburden will be ripped using dozers. The overburden will then be removed from the pit using scrapers. Overburden from the first pit in a multiple cut series of pits will be placed in an out-of-pit overburden stockpile. Overburden from each subsequent pit will be directly backfilled into the adjacent open pit.

Once all the overburden is removed and the bentonite is exposed, the bentonite is field dried in the pit and on out-of-pit bentonite stockpiles which will be constructed on the backfilled pit areas and the out-of-pit overburden stockpile.

Topsoil Removal and Handling

Topsoil will be salvaged prior to overburden removal or construction activities. Topsoil will be salvaged from the following areas: 1) overburden stockpile areas; 2) pits areas; 3) roads; 4) equipment parking areas, and any other area where it is deemed necessary to remove topsoil in order to protect this resource. Topsoil will be removed in accordance with the recommended topsoil salvage depths presented in Appendix D-7, Soils. In the event that overburden material is encountered that appears suitable as a topsoil substitute, this material may also be salvaged and stockpiled at the discretion of the operator.

The removal of topsoil will be accomplished using 627G push-pull scrapers. In some instances where the topography may be too steep for the safe operation of scrapers, topsoil will be removed and stockpiled using D8R dozers. Typically, salvaged topsoil will be placed in stockpiles. If graded and contoured areas exist, the topsoil may be applied directly (live-spread) instead of being stockpiled.

Topsoil will also be removed from the edges of all pits in order to create a topsoil “buffer area” 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 operation of heavy equipment and complete salvage of topsoil along the edges of advancing multiple cut pit sequences.

All topsoil stockpiles will be conspicuously identified with signs. Topsoil stockpiles which will remain in place for more than one year will be seeded with the approved permanent seed mixture. Seeding of stockpiles will be conducted in the spring or fall, whichever season follows the placement of the stockpile.

Topsoil salvage depths on proposed disturbance areas range from zero (0) to sixty (60) inches.

Overburden Handling

Overburden removed from the pit areas will be either stockpiled or directly backfilled into previously mined pits in the advancing pit series. Overburden removed from the first pit in a multiple cut pit series will be placed immediately adjacent to the pit to form an out-of-pit overburden/bentonite stockpile. A portion of this material may be returned to the pit areas to complete backfilling, or in some specific instances, all or a portion of the overburden will remain as a permanent reclamation feature.

The top 12 to 24 inches of overburden will be removed with scrapers and stockpiled on or adjacent to the remainder of the overburden, on the overburden stockpile areas illustrated on the mine plan map. This material will be identified and signed as “Segregated Overburden.” Segregated overburden will be spread 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 poorest quality overburden.

If an out-of-pit overburden stockpile is left as a reclamation feature, it will be graded and contoured to blend with the existing topography and all slopes will be reduced to 4(H):1(V) or less. Overburden stockpiles which will remain as a permanent reclamation feature will have a maximum height of ten (10) feet and will also be oriented in the same direction as nearby topographic features. Salvaged “Segregated Overburden” will also be placed on out-of-pit stockpile areas after grading and prior to the application of topsoil.

Overburden will be backfilled in order to restore mined and affected areas to their approximate original contour (AOC). Once the overburden is backfilled, it will be graded and contoured to achieve AOC. Final slopes will be no steeper than 4(H):1(V) and all reclaimed areas will drain in order to prevent ponding of water. Topsoil will be reapplied to the approximate original depth.

Waste bentonite, commonly referred to as "cleanings," which remain on the overburden stockpile areas after the stockpiled bentonite has been removed, will 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.

Bentonite Handling and "Field-Drying"

The "field-drying" of bentonite is a process which utilizes the radiant heat of the sun to reduce the natural moisture content of the mined bentonite. This "field-drying" procedure reduces the amount of fuels consumed in both the hauling of the material to the processing plant, and in the drying of the bentonite as it is being processed.

During the summer months, the exposed bentonite is plowed using farm tractors and chisel plows. As a plowed layer of bentonite becomes dried by the sun and wind, this dried layer is removed with scrapers and placed in a stockpile. The plowing process in the pit is then repeated until the entire seam of exposed bentonite is eventually dried, removed from the pit, and stockpiled.

"Field-dried" bentonite is loaded from the stockpiles into twenty-five (25) and thirty-five (35) ton belly-dump trucks, and hauled to the BHB processing plant for processing.

Jurisdictional Wetlands

As reported in Appendix D10 - Wetlands, no jurisdictional or non-jurisdictional wetlands were identified within the amendment area.

Approximately 0.89 acres of ephemeral stream Other Waters of the U.S. were identified on the amendment area. Although defined channels were present, the ephemeral streams within the study area were 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.

Wildlife Protection and Monitoring

The nature of mining on the proposed amendment area will consist of small, widely scattered pits. This will minimize the impact to all wildlife species. Big game species were not abundant

on the study area but were commonly observed. Most of the actual sites to be mined are sparsely to well vegetated and provide habitat for big game.

Raptor nests are present within one mile of the amendment area. Future mining will be conducted in order to minimize impacts to any nests that are currently present and any nests that may become established during the breeding season of February through July. MBHFI species were not common on the study area but will be protected wherever they are found.

The bald eagle, formerly a T & E species, may seasonally use the study area. This species is a migrant and winter resident so mining may only minimally affect this bird.

Black Hills Bentonite personnel will continue to conduct observations for any activity of wildlife species of major concern. Proper mitigation or avoidance will be conducted for these species through the required coordination with the appropriate management agencies.

No threatened and endangered species (T & E) are known to frequent or exist on the study area. No prairie dog towns were present on or within one mile of this amendment area and suitable habitat for the Ute ladies'-tresses orchid is not present.

In the event that a threatened or endangered species is observed on or immediately adjacent to the amendment area, the U.S. Fish and Wildlife Service - Endangered Species Office located in Cheyenne, Wyoming will be contacted and the observations will be reported.

In the event that a raptor nest is established on or immediately adjacent to the amendment area and it becomes necessary to "take" or remove a raptor nest, the U.S. Fish and Wildlife Service will be contacted as soon as a "take" situation is anticipated. Sufficient lead time will be allowed for developing and implementing a mitigation plan, and to avoid disrupting the mining operation.

Protection of Cultural and Paleontological Resources

During the cultural resources inventories conducted on the project area, two cultural features (Features #1 and #5) within one previously described site (48WA1205) were identified as contributing features to eligible site 48WA1205. At the recommendation of Mr. Mike Bies, BLM archaeologist, these sites have been fenced and will be marked on the ground as "No Disturbance" areas. Mine activities have been designed in order to avoid the features. Additionally, one site (48WA1283) was described during the cultural resources survey conducted in April 2009 by ARC, Inc. as "unevaluated" pending further testing. This site will be fenced and marked as a "No Disturbance Area." Mining activities have been designed in order to avoid disturbance of this site.

Any cultural or resources (historic or prehistoric site or object or fossil) discovered by the holder, or any person working on his behalf, on private, State or Federal lands shall be immediately reported to the authorized officer. The operator shall suspend all operations in the immediate

area of such discovery until written authorization to proceed is issued by the authorized officer. An evaluation of the discovery will be made by the authorized officer to determine appropriate actions to prevent the loss of significant cultural or scientific materials. The holder will be responsible for the cost of evaluation and any decision as to proper mitigation measures shall be made by the authorized officer after consulting with the operator.