

**RECLAMATION PLAN**  
**for**  
**PERMIT TO MINE NO. 268C - UPDATE AREA NO. 6**

**1.0 POST MINING LAND USES**

Lands affected by bentonite mining activities on the permit update area will be reclaimed to restore the area to pre-mining land conditions conducive for use by domestic livestock and wildlife species.

**2.0 CONTOURING PLAN FOR AFFECTED LANDS**

**2.1 Surface Configuration and Post-Mining Land Uses**

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). Restoring the pre-mining topography to AOC will ensure that the reclaimed lands are compatible with the post-mining land use.

**2.2 Blending Affected Lands with Adjacent Topography**

Post mining slopes will 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 will 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 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 to create the final surface configuration. At times, overburden may be placed in the pit and against the high wall 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. A schematic diagram of this backfill scenario is illustrated in Figure MP-3 of the Mine Plan.

**2.3 Control of Erosion and Sedimentation**

During the reclamation phase, run-off from lands undergoing reclamation activities will be minimized and controlled to reduce or eliminate sediment-loading onto undisturbed lands. This can be achieved by diverting storm water flows generated by significant rainfall events or rapid snow melt away from and around disturbed areas associated with the reclamation activities.

Diversion ditches may be constructed to divert water away from reclamation areas. Given the small size of the affected watersheds in the permit area, diversion ditches may be constructed using the blade on a Caterpillar 140 motor grader or a Caterpillar D8R/D8T dozer. The diversion ditch will be cut to create a ditch which is triangular and a minimum of 1.5 feet deep with 2:1 side slope. Soil derived from the ditch cut will be "thrown" to the down slope side of the ditches, in essence creating a berm that will provide additional protection of the reclamation area. If 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. As a part of reclamation, all interceptor ditches will be graded out and contoured to blend into the surrounding topography, topsoiled and seeded.

#### **2.4 Re-Establishment of Drainages**

No perennial or intermittent streams will 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 will be affected by mining activities. These channels will be re-established during the reclamation phase. Reconstruction of the drainages will 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.

#### **2.5 Acceptable Slope Conditions**

Post mining slopes will 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 will approximate the pre-mining slopes in terms of magnitude, aspect, and shape.

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

### **3.0 SURFACE PREPARATION FOR TOPSOIL REPLACEMENT**

Backfilled overburden will be graded and smoothed prior to applying topsoil to facilitate a uniform application of topsoil. Areas where backfilled overburden is compacted due to repeated traffic by scrapers or other equipment will be ripped using the rear scarifier on a Caterpillar 140 motor grader, or with a D8T/D8R dozer equipped with three ripper shanks.

## **4.0 TOPSOIL REPLACEMENT AND HANDLING**

### **4.1 Methods of Topsoil Replacement**

Topsoil will be applied primarily with Caterpillar 627G push-pull scrapers. In areas which are too steep to safely operate scrapers, Caterpillar D8R/D8T dozers may be used to spread topsoil. Topsoil will be re-applied to approximately the original depth which existed on each area prior to removal.

### **4.2 Schedule for Topsoil Replacement**

Topsoil will be applied to the affected areas as soon as possible, although the replacement schedule for topsoil application is dependent upon the mining and backfilling schedule. If areas are available for the direct application of topsoil, topsoil will be applied during the topsoil removal phase during the development of a new pit. Topsoil application from stockpiles is generally conducted during the late summer or early fall, immediately prior to the seeding phase.

### **4.3 Special Soil Reconstruction Procedures and Special Treatments**

No special soil reconstruction techniques or procedures will be required or used on the permit update area. Additionally, no special treatment of topsoil will be conducted.

### **4.4 Depth of Topsoil Replaced on Affected Lands**

Topsoil will be re-applied to approximately the original depth which was removed. In certain circumstances, such as the occurrence of isolated pockets of topsoil on bentonite outcrop areas, the topsoil will be applied to those areas where it will be most beneficial in terms of reclamation success. BHB will use its discretion in determining which areas are best suited for topsoil application in these special situations.

### **4.5 Soil Amendments**

No soil amendments will be used on the permit update area.

## **5.0 REVEGETATION PRACTICES**

### **5.1 Topsoil Decompaction and Tillage**

To reduce the compaction of the topsoil created by passing over it with loaded Caterpillar 627G push-pull scrapers during the topsoil application process, proper tillage of the topsoil is a necessity. Due to the clay content in many of the soil types of the permit update area, rubber-tired scrapers can exacerbate soil compaction. This generally results in soil conditions that are detrimental to seedling establishment unless topsoil tillage is conducted.

BHB will utilize a John Deere 7800 or 8000 series four-wheel drive tractor in conjunction with various tillage implements to de-compact 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 Rome 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 Rome disk. The depth of tillage is carefully controlled and monitored to prevent mixing of the topsoil with the underlying materials. Tillage will be conducted along the topographic contours whenever possible.

## **5.2 Cover Crops and/or Mulch**

If 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 will be seeded with a sterile annual small grain hybrid such as triticale, as soon as possible, to protect the topsoil from erosion. The triticale cover crop will be drill seeded using a John Deere 7800 or 8000 series four-wheel drive tractor pulling a Great Plains NT1006 no-till grain drill with a seven-inch row spacing. The seed will be planted approximately one-half inch in depth, at a rate of 20 to 30 pounds per acre. After the cover crop has been established, the permanent seed mixture will be directly drill seeded into the standing stubble and biomass. No mulch such as straw or native hay will be applied in conjunction with the reclamation activities conducted on the permit area.

## **5.3 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 Great Plains NT1006 no-till grain drill with a seven-inch row spacing. The seed will be planted approximately one-quarter to one-half inch in depth. The Great Plains NT1006 no-till grain drill is equipped with adjustable press-wheels located behind the disk-openers, which allows for careful control of the depth of planting. Seeding will 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 may be broadcast seeded using a Herd mechanical broadcast seeder mounted on the three-point hitch of the John Deere 7800 or 8000 series tractor. The sagebrush seed may be applied immediately prior to seeding with the Great Plains NT1006 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 may be attempted.

Species contained in the permanent seed mixture listed in Table RP-1 application 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

#### **5.4 Temporary Seed Mixtures**

No temporary seed mixtures will be used on the permit update area.

#### **5.5 Woody Species Transplants**

Transplanting of woody species (trees) on the permit area will not be conducted. No woody species exist on the pre-mining landscape of the permit update area.

#### **5.6 Post-Mining Husbandry Practices**

No post-mining husbandry practices will be conducted in the permit update area.

#### **5.7 Protection of Seeded Areas**

At the discretion of BHB and based on the grazing intensity occurring on the reclaimed areas, newly seeded areas may require fencing to protect these areas from grazing by livestock. If fencing is required to protect seeded areas on the permit update area, prior to construction, BHB will consult with the grazing lessee and the Wyoming Game & Fish Department to determine the locations and best types of fences to be constructed.

#### **5.8 Control of Noxious Weeds**

In accordance with WDEQ/LQD Rules & Regulations, Chapter III, Section 2(d) (ix), in those areas where there were no or very few noxious weeds prior to being affected by mining, BHB will control and minimize the introduction of noxious weeds into the revegetated areas for a period of at least five years after the initial seeding.

## **6.0 RECLAMATION SUCCESS CRITERIA AND METHODS FOR DETERMINING SUCCESSFUL RECLAMATION**

### **6.1 Reclamation Success Criteria**

Reclamation will be determined successful, considered complete, and be eligible for full bond release under the following conditions specified by WDEQ/LQD Rules & Regulations, Chapter 3, Section 2, which states,

*"The Administrator shall not release the entire bond of any operator until such time as revegetation is completed, if revegetation is the method of reclamation as specified in the operator's approved reclamation plan. Revegetation shall be deemed to be complete when: (1) the vegetation species of the reclaimed land are self-renewing under natural conditions prevailing at the site; (2) the total vegetation cover of perennial species (excluding noxious weed species) and any species in the approved seed mix is at least equal to the total vegetation cover of perennial species (excluding noxious weed species) on the area before mining; (3) the species diversity and composition are suitable for the approved post-mining land use; and (4) the requirements in (1), (2) and (3) are achieved during one growing season, no earlier than the fifth full growing season on the reclaimed lands. The Administrator shall specify quantitative methods and procedures for determining whether equal total vegetation cover has been established and procedures for evaluating post-mining species diversity and composition."*

Lands affected by mining and associated activities within the permit update area which have been classified as bentonite outcrop or shale outcrop will be reclaimed in such a manner that these lands will exhibit similar pre-mining characteristics. Similar pre-mining characteristics shall include similar surface stability, approximate original contours, and an appearance like the pre-mining conditions.

Due to the absence of suitable plant growth material on lands classified as bentonite outcrop and shale outcrop, the establishment of vegetation will not be feasible. Therefore, these lands will be reclaimed by backfilling, grading, and contouring to produce a surface configuration which will be like the pre-mining conditions.

### **6.2 Extended Reference Area or Comparison Areas**

BHB will use extended reference areas (ERA) or comparison areas (CA), as described by WDEQ/LQD Guideline No. 2, March 1986 for the purpose of evaluating post-mining reclamation success of affected lands on the permit update area. The selection and verification of the representative nature of the ERA or CA will be determined by evaluation of the vegetation mapping, pre-mining vegetation data, soils data, topographic and land use information. The location of the ERA or CA will be mutually selected on-site by LQD and BHB personnel.

### **6.3 Methods for Demonstrating and Evaluating Reclamation Success**

Reclamation success will be evaluated by collecting quantitative data from the ERA or CA and reclaimed area and directly comparing, by standard statistical procedure, the resulting data from each site. Data will be collected from an adequate sample size from each area. Adequate sample size will be determined using the information presented in WDEQ/LQD Guideline No. 2, Section IV - Estimating Adequate Sample Size, March 1986.

Each sampling site will be randomly located in each area. Sampling for aerial cover will be done using point intercept sampling techniques which will include percent total cover and percent absolute vegetation cover. Total herbaceous production data will not be collected from the reclaimed area, or the ERA or CA. Production will be qualitatively judged based on visual comparison and field reconnaissance of the reclaimed lands and the ERA or CA. The vegetative cover data collected from the reclaimed area and the ERA or CA will also be used to qualitatively judge total herbaceous production.

Based on the reference area concept, there will be no re-use of pre-mining vegetation data in the evaluation of reclamation success where ERA or CA have been or will be used. Quantitative vegetation data (percent cover) gathered from the appropriate ERA or CA and reclaimed area will be directly compared using statistical procedures mutually agreed upon by the WDEQ/LQD and BHB.

Species composition and species diversity present on the reclaimed areas will be qualitatively judged based on the relationship between the species present and the post-mining land use. Species establishment from qualitative and quantitative aspects will be based on the permanent seed mixture. The establishment of these species will be determined through documentation in the quantitative data collected and through qualitative observations using percent cover estimates and qualitative abundance estimates.

The post-mining evaluation process for the determination of full bond release shall also include the construction of a species list and an evaluation of surface stability. The development of a species list for the reclaimed area will provide quantitative data on the total number (diversity) and kinds (composition) of species established from seeding, and the total number and kinds of species established through natural succession. The species list will be compiled by conducting a thorough field reconnaissance of each reclamation unit and recording all plant species observed. This species list and the cover data will provide the basis for demonstrating the quantity and quality of plant species established on the reclaimed lands. This information will be provided for LQD review when bond release is requested. The development of a detailed species list will provide information on the ability of the reclaimed lands to support the post-mining land use and should also provide data on the capability of the vegetation to renew itself. Surface stability (erosion) of the reclamation units will be assessed by field reconnaissance by LQD and BHB personnel present on site.

BHB personnel will make the preliminary decision on the timing of any full bond release request, based in part upon comparison of annual observations of reclamation success and progress. In general, BHB anticipates that 2-3 years of accumulated reclamation may be combined in a single

bond release request. In each request package, BHB will also provide a written statement that the reclamation is satisfactory to the surface owner.

## **7.0 FINAL HYDROLOGIC RESTORATION**

No perennial or intermittent streams will 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 may be affected by mining activities. These channels will be re-established during the reclamation phase. Reconstruction of the drainages will 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.

All pits will be backfilled, with no depression and allowing for thorough drainage. Post-mining slopes will 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 permit area. As mining progresses, all secondary access roads and culverts that are no longer needed will be removed and the areas will be graded to achieve pre-mining contours.

## **8.0 ISOLATION AND CONTROL OF ACID-FORMING, DELETERIOUS MATERIALS, OR NON-EXEMPT RCRA MATERIALS**

Replacement of overburden during backfilling open pits will 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. 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 permit update area. Please refer to the overburden section of this document for a complete and detailed assessment of the overburden suitability and rock characterizations. BHB has utilized the data presented in the overburden section of this document to develop overburden handling and overburden replacement plans.

Waste bentonite, which remains on the bentonite stockpile areas after the stockpiled bentonite has been removed for processing, 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.

No materials or wastes considered non-exempt under the Resources Conservation and Recovery Act (RCRA) will be generated by or during the extraction of the bentonite. Therefore, plans for the isolation and control of non-exempt RCRA waste and materials are not provided.

## **9.0 DECOMMISSIONING, STABILIZATION AND REMOVAL OF BUILDINGS, STRUCTURES AND SUPPORT FACILITIES**

No buildings, processing plants, structures, fueling stations, or other facilities will be constructed in conjunction with mining activities on the permit update area. The bentonite produced from the permit area will be transported to existing bentonite processing plants located in Casper, Wyoming for processing, sale, and shipment to customers.

## **10.0 EXPLORATION DRILL HOLE PLUGGING**

Exploration drilling consists of shallow auger drilling (< 50 feet) using a four-inch diameter auger drill mounted on a Ford F550 heavy duty four-wheel drive truck. Drill holes will be reclaimed by shoveling the auger cuttings back into the drill hole, completely filling the hole. The drill hole location will be marked with a two-inch by four-inch wooden stake placed in the hole. The area around the drill stake will be hand-seeded with certified weed-free native grass seed (Western wheatgrass) and lightly raked to cover the seed with soil. Each drill hole will be reclaimed immediately and concurrently with the drilling program. No drill holes will remain open and/or un-plugged.

The drill hole plugging and sealing techniques described above meet all the plugging and sealing requirements of the WDEQ/LQD and the BLM.

## **11.0 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 will periodically monitor and evaluate the reclaimed areas for signs of erosion, off-site sedimentation, seeding failures and noxious weeds. Additionally, these sites will be monitored to ensure that they are not subject to overgrazing. If fences have been constructed to restrict grazing on the reclaimed areas, fences will be periodically examined 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 will implement corrective actions to correct the problem at the first available opportunity.

## **12.0 RECLAMATION SCHEDULE**

Mining on the permit update area will be conducted in a multiple-cut, direct-backfill sequence. As the excavation of each pit progresses through the sequence, overburden removed from each advancing pit is directly placed (direct-backfill) in the previous open pit. Mining in this sequence allows for reclamation to begin concurrently with each new pit being developed in the advancing sequence. Section 3.8 and Section 6.3 of the Mine Plan provide additional information on the mining and reclamation sequence and schedule.

Reclamation of disturbed areas will begin as soon as possible, and all attempts will be made to ensure that reclamation occurs concurrently with the mining activities.

### **13.0 RECLAMATION COST ESTIMATES AND BONDING**

#### **13.1 Reclamation Cost Estimates & Production Rates**

BHB utilizes WDEQ/LQD Guideline 12A (12/2/2024) costs for overburden and topsoil replacement, as well as for final grading on the update area, Scarification of compacted surfaces, and for seeding. These costs and production rates are presented below:

##### Cost of Overburden & Topsoil Replacement Using Caterpillar 637G Push-Pull Scrapers

\$0.550 per BCY assuming 500-foot distance, 0% grade, 4% rolling resistance.

##### Cost of Final Grading Using a Caterpillar 140 Grader

\$49.942 per acre

##### Cost of Scarification of a Compacted Surface

\$43.796 per acre

##### Cost of Seeding

Seed @ \$400.00/Acre + Application Cost @ \$150.00/Acre = \$550.00/Acre

##### Contingency Fee

25.0% per Guideline 12A

#### **13.3 Reclamation Bond**

The total reclamation liability for Permit to Mine No. 268C is recalculated and updated on an annual basis. Bonding for the first year's proposed mining activities on the update area is included in Table RP-2 of this reclamation plan.