

OTTER CREEK MINE

EXHIBIT 313C: BACKFILLING AND GRADING

1.0 Introduction

This exhibit addresses the requirements of ARM 17.24.313(1)(d) with respect to stabilization, compacting, and grading of the proposed permit area. The performance standards of ARM 17.24.501, 502, 503, 504, 505, 515, 519 and 520 are also addressed as appropriate.

2.0 Overburden Handling Sequence

Backfilling and grading procedures are dictated by the mining sequence and overburden stripping procedures, which are outlined as follows:

- The initial mid-pit box cut will be 1200 feet wide and will be excavated using mobile equipment.
- Spoil from the initial 3000-foot block will be placed into temporary storage as shown on Map 8 – Mine Plan.
- After coal is mined from the initial block, spoil will be back-hauled and placed in the pit against the low-wall for four purposes:
 - Sealing of the low-wall to minimize inflow from the Otter Creek alluvium;
 - Construction of the main haul road on the spoils as the pit advances;
 - Minimization of spoil volume hauled to temporary storage; and
 - Because of the coal volume removed, the 1200-foot width will allow a minimum 200-foot inside slot to accommodate spoil from the initial dragline cut.
- Once overburden removal from the mid-pit box cut is complete, the box cut will be advanced northward, with a width of 450 feet. Spoil will backhauled and placed along the low wall to construct the main haul road, leaving a 200-foot slot for spoil form the initial dragline cut. Excess spoil will be placed in the temporary spoil storage area. After the north box cut coal has been removed, the dragline will begin operations at the north end working southward, dumping into the empty box cut.

- Once the north box cut is complete, the 800-foot-wide south box cut will be excavated working southward using mobile equipment and the spoil backhauled within the pit.
- As the pit advances, pre-strip spoil will be placed over dragline spoil to construct the post-mining topography (PMT).
- Stored spoil will be used for final pit closure.
- Sufficient stored spoil will be retained in the box cut area to reclaim sediment ponds.

2.1 Placement of Overburden and Partings

The quality of overburden materials is discussed in Baseline Report 304H – Overburden Analysis. Overburden quality is such that mixing through shovel and dragline handling, spoil testing, and supplemental fill prior to soil placement where required is the most appropriate strategy for mitigation of strata exceeding suspect levels for analytical parameters, primarily salinity and sodium adsorption ratio (SAR), where they occur. Special handling of specific overburden strata, interburden or partings is not indicated by overburden quality and is not planned.

In general, partings and interburden, where they occur, will be removed by mobile equipment and placed at the pit floor or between the dragline spoil peaks in an adjacent area of the pit. Overburden, or that material from the top of the Knobloch coal seam to the surface, or a height 150 feet above the coal where overburden exceeds 150 feet, will be excavated by the dragline and dumped into the adjacent empty pit. Pre-strip material will be used to cover the parting or interburden material that is placed between the spoil peaks. The PMT will be constructed by placement of pre-strip material, or that interval from 150 feet above the coal to the surface, and spoil hauled from storage. Plate 1 includes four cross-sections illustrating placement of box cut, dragline and pre-strip soils in the backfill to achieve the PMT. Interburden volume is incorporated into the dragline spoil.

2.2 Contemporaneous Reclamation

Plate 2 shows the projected sequence of spoil regrading. Along ramp roads, delayed reclamation by one to three years will be required as ramps are raised to PMT elevation behind the advancing pit. In advance of final pit closure, delay of reclamation estimated at three years will be required

to allow stockpiling of pre-strip spoil for final closure. Another delayed reclamation zone is the dragline walk road between the north and south pit segments after about year 13 until completion of the mine plan. Finally, ramps and the box cut, which includes sediment ponds and the main haul road, will be reclaimed last.

ARM 17.24.501(c) specifies that grading must be kept current with mining operations with a limitation of four spoil ridges behind the active pit, and completion of backfilling and grading within two years after coal removal. This timing is reflected in Plate 2 with the exceptions noted above.

2.3 Final Pit Closure

Final pit closure will occur in deep overburden adjacent to hilly areas in the eastern part of Tract 2. The PMT will be constructed by minimal borrowing from the highwall side to create bluff extensions, leaving a slope ranging from 5:1 to 1:1 as appropriate to blend with the natural topography. Spoil from storage will then be hauled in as necessary to achieve the final PMT. To prepare for final pit closure, delayed reclamation will be required for temporary storage of pre-strip spoil for at least three years prior to final closure. Specific plans will be proposed for approval at that time.

Highwall borrow disturbance where it occurs will maintain a buffer zone of at least 100 feet from the permit line where the adjacent property to the east is owned by the Custer National Forest.

Prior to mining, the mining area includes some 361 acres of slopes exceeding 3:1, and 133 acres of slopes exceeding 2h:1v; please refer to Baseline Report 304C – Geologic, Scenic and Topographic Features. This is more than sufficient to offset steep slopes and bluff extensions built into final pit closure.

2.4 Bulking (“Swell”) Factors

Since stripping operations have not yet been conducted at the mine, swell factors used in the mass balance determination and generation of the PMT were primarily derived by a third party experienced in swell factor determinations for other similar regional surface mining operations. Individual swell factors were applied to material moved by the dragline and truck shovel

operations. Dragline material was estimated to swell 17 % while truck shovel overburden was assumed to swell 12%. Derivation of swell factors is described in detail in Appendix A – Overburden Swell Factors and Projection of the Post-Mining Topography for Otter Creek Mine, prepared by CDG Engineers of Sheridan, Wyoming.

2.5 Post-Mining Topography

The post-mining topography is generated in four basic steps; Step 1 is calculation of the pit shell volume: This is the total volume of material present pre-mining from the pit floor to the surface. It is comprised of in-place volumes of overburden and coal. In-situ volumes of overburden were calculated by year and based on the projected mine plan sequence using Mincom software. Overburden volumes were categorized by shovel and dragline cubic yards (bcy); these were further identified as box cut, pre-strip and interburden for shovel bcy and cast and dragline for dragline bcy. Total prime bcy was calculated for each stripping category. Prime volumes were totaled for the mine plan. Annual coal tons uncovered was also calculated; coal density used in calculations was 1.08 tons/bcy. The sum of overburden and coal volumes in bcy is the pit shell volume.

Step 2 is calculation of material available for construction of the PMT considering the volume of coal removed and expansion or “swell” of overburden materials excavated. To calculate this volume, prime volumes of shovel and dragline overburden are swelled by 12 and 17 percent respectively, and the unmined 10 percent of the coal volume is added. (Waste coal volume is not adjusted for swell.)

Step 3 utilizes material volumes and placement generated by Mincom to project the general post-mining drainage pattern and elevations. This generalized PMT is checked and adjusted if necessary to be consistent with material availability, the general configuration of drainage ways and drainage divides in the pre-mining topography, and approximate original contour (AOC) performance standards.

Step 4 involves fine tuning of the PMT by adding tributaries to resemble pre-mining drainage density and topographic detail with attention to land forms associated with pre-mining

configuration and land uses. This process is iterative and requires frequent calculation of mathematical cuts and fills to maintain the material balance.

The PMT is presented on Map 12, and Table 1 summarizes the pit shell volume and spoil volumes adjusted for swell to demonstrate that the PMT can be achieved. Year-by-year volumetrics are presented in Appendix B.

The original volume within the pit shell totaled 1,269,620,000 bank cubic yards (bcy) which represents the in-situ volume of coal, overburden and parting associated with the proposed mine plan. The volume of spoil material available, including swell, is calculated to be 1,161,338,000 loose cubic yards (lcy), or 91 percent of the pre-mining volume, indicating a consequent lowering of the post-mining surface relative to the original surface by an average of 22 feet over the mine plan area of 3046 acres. The modeled volume between the PMT surface and the pit shell totals 1,159,800,000 lcy, or within 0.1 percent of the available spoil volume, demonstrating that the PMT can be achieved using the volume of material available.

3.0 ARM 17.24.501 General Backfilling and Grading Requirements

(1) Backfilling and grading of the disturbed area will be completed prior to removal of necessary reclamation equipment from the area of operation.

(2) Overburden and parting materials which are not conducive to revegetation techniques, establishment, and growth will not be left on the top nor within eight feet of the top of graded spoils nor at the surface of any other affected areas. Mixing of overburden strata by shovel and dragline handling is expected to mitigate potential spoil quality problems with respect to electrical conductivity (EC), saturation, SAR and localized elevated nitrate such that special spoil handling measures are not required to approximate pre-mining subsoil conditions. Analysis of overburden materials (Baseline Report 303H) indicates that overburden is alkaline with no potential for acid formation. Replaced spoils are expected to exhibit moderately saline and/or sodic characteristics in some areas similar to pre-mining conditions. Soil redistribution will mitigate adverse effects of spoil salinity and SAR on revegetation.

(3)(a) Backfilled material will be placed to minimize erosion and sedimentation of undisturbed and reclaimed areas both on and offsite, water pollution, adverse effects on ground water, other

offsite effects, and to support the approved post-mining land use. Sediment ponds will prevent offsite transport of sediment; onsite undisturbed and reclaimed areas will be protected using undesignated sediment traps. The post-mining topography (Map 12) is designed to support the post-mining livestock grazing land use.

(b) Acid, acid forming, toxic or toxic-forming overburden materials have not been identified, and selective placement and compaction is not planned. If such materials are encountered, backfilled materials will be selectively placed and compacted wherever necessary to prevent leaching of acid, acid-forming, toxic, or toxic-forming materials into surface or subsurface waters and wherever necessary to ensure the stability of the backfilled materials. The method and design specifications for placing and compacting such materials will be submitted to the Montana Department of Environmental Quality (MDEQ) for approval.

(4) All final grading on the area of land affected will be to the approximate original contour of the land in accordance with 82-4-232(1), MCA.

(a) Otter Creek Coal, LLC (OCC) will transport, backfill, and compact to ensure compliance with (3)(b) and ARM 17.24.505, and grade all spoil material as necessary to achieve the approximate original contour. Highwalls will be reduced or backfilled in compliance with ARM 17.24.515(1), or approved highwall reduction alternatives in compliance with ARM 17.24.515(2).

(b) Cut-and-fill terraces are not planned; if utilized they will be used only in those situations expressly identified in and in compliance with ARM 17.24.502.

(c) The post-mining graded slopes will approximate the pre-mining natural slopes in the area, recognizing any limitations imposed by hydrologic balance, revegetation and land use performance standards..

(d) Depressions will be eliminated, except as provided in ARM 17.24.503(1).

(5) The disturbed area will be blended with surrounding and undisturbed ground to provide a smooth transition in topography.

(6) Backfilling and grading will be kept current with mining operations. Although it is an area strip mining operation, Otter Creek Mine utilizes pre-stripping with mobile equipment prior to

dragline stripping over much of its area. Pre-strip material must be placed over dragline spoils to achieve the post-mining topography.

(a) In most cases, there will not be more than four consecutive spoil ridges present in any location as pre-strip material is placed. Exceptions will occur when it is necessary to reclaim in a block to achieve the PMT, as in pit closure areas. A variance request with justification for any such exception will be submitted to MDEQ for approval.

(b) Backfilling and grading will in normal operation be completed within one thousand feet of the active pit, which is equivalent to two years of operation at the anticipated production rate of 20 million tons per year. At lower production rates, or if it is necessary to reclaim in a block, the time lag between coal removal and final grading may exceed two years. A variance request with justification for any exception to this two-year backfilling standard will be submitted to MDEQ for approval.

(c) Backfilling and grading of other excavations will be kept current as departmental directives dictate for each set of field circumstances.

(d) All backfilling and grading will achieve the approved post-mining topography.

(7) OCC will notify MDEQ writing, upon detection of grading problems that would result in topography not consistent with the approved postmine topography.

4.0 17.24.502 Cut and Fill Terraces

Cut and fill terraces are not planned. If proposed at a later date, the requirements of this subsection will be followed.

5.0 17.24.503 Small Depressions

(1) Small depressions will be utilized in the reclaimed surface to enhance vegetative diversity, as wildlife enhancement features, and as a sediment control best management practice. Please refer to Exhibit 312A - Fish and Wildlife Plan.

6.0 17.24.504 Permanent Impoundments

(1) Permanent impoundments are addressed in Exhibit 315A – Ponds and Embankments. Any permanent impoundment(s) proposed will meet the requirements of this subsection.

7.0 17.24.505 Burial and Treatment of Exposed Mineral Seams and Waste Materials

- (1) All exposed coal seams remaining after mining will be covered with a minimum of 4 feet of non-toxic and non-combustible material.
- (2) Acid, acid-forming, toxic, toxic-forming, combustible, or other undesirable waste materials will not be generated by the mining process; fly ash disposal is not planned. Management of waste materials is addressed in Exhibit 308D – Waste Handling and Disposal.
- (3) Wastes will not be used in the construction of embankments for impoundments.
- (4) Wastes will not be disposed of in a waste disposal structure that is located on the surface of the ground.
- (5) Impoundment of waste is not planned; no wastes requiring impoundment will be generated.
- (6) There will be no coal waste impoundments.
- (7) If any examination or inspection discloses that a potential hazard exists at a waste disposal site, MDEQ will be informed promptly of the finding and of the emergency procedures formulated for public protection and remedial action. If adequate procedures cannot be formulated or implemented, MDEQ will be notified immediately.
- (8) Waste disposal in underground mine workings is not planned; there are no underground mine workings in the mine area.

8.0 17.24.515 Highwall Reduction

- (1) Highwalls will be eliminated and the reduced highwall slope will be no greater than whatever slope is necessary to achieve a minimum long-term static safety factor of 1.3, or a lesser slope prescribed by MDEQ whenever necessary to achieve post-mining slope stability. Highwall reduction will be commenced at or beyond the top of the highwall and sloped to the graded spoil bank.
- (2) Highwall reduction alternatives will be utilized in some areas to replace bluff features that existed before mining where:

- (a) post-mining bluffs are compatible with the proposed post-mining land use;
- (b) post-mining bluffs are stable, achieving a minimum long-term static safety factor of 1.3;
- (c) similar geometry and function exists between pre- and post-mining bluffs;
- (d) the horizontal linear extent of post-mining bluffs does not exceed that of the premining condition; and
- (e) highwalls will be backfilled to the extent that the uppermost mineable coal seam is buried in accordance with ARM 17.24.505(1).

9.0 17.24.519 Monitoring for Settlement

- (1) Monitoring of settlement on regarded areas will be conducted if required by MDEQ as authorized by this subsection.

10.0 17.24.520 Thick Overburden and Disposal of Excess Spoil

Disposal of excess spoil is not planned; all spoil generated will be utilized to construct the PMT.