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State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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TO: [redacted]

THRU: Daron R. Haddock, Permit Supervisor DRH

FROM: Wayne H. Western, Senior Reclamation Specialist WHW

RE: Determination That the Willow Creek Mine Site Can Be Reclaimed to the Approximate Original Contours With Emphasis on the Cut Slopes on the Schoolhouse Canyon Road, Plateau Mining Corporation, Willow Creek Mine, [redacted]

SUMMARY:

On April 13, 2000, OSM and DOGM officials met with the permittee of the Willow Creek Mine on-site to discuss reclamation of highwalls and cut slopes. OSM had a general concern about how the site would be reclaimed to meet the approximate original contour requirements and a specific concern about the cut slopes along the access road to the School House Canyon refuse pile. The Division, in a memo dated October 25, 2000, responded to the OSM concerns. OSM reviewed the Division's memo and made comments listed in a memo dated November 16, 2000. The Division responded to those comments is in this memo.

RECLAMATION PLAN

APPROXIMATE ORIGINAL CONTOUR RESTORATION

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; R645-301-234, -301-270, -301-271, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536, -301-542, -301-731, -301-732, -301-733, -301-764.

Analysis:

Under R645-301-553.110 the permittee is required to achieve AOC except as other wise noted. Permittees may be granted a variance from the AOC requirements if all of the following requirements are satisfied:

(1) The Division grants, in writing, a variance from approximate original contour restoration requirements.

(2) The alternative postmining land use requirements are met.

(3) All applicable requirements of the Act and the Regulatory Program, other than the requirement to restore disturbed areas to their approximate original contour, are met.

(4) After consultation with the appropriate land use planning agencies, if any, the potential use is shown to constitute an equal or better economic or public use.

(5) The proposed use is designed and certified by a qualified registered professional engineer in conformance with professional standards established to assure the stability, drainage, and configuration necessary for the intended use of the site.

(6) After approval, where required, of the appropriate State environmental agencies, the watershed of the permit and adjacent areas is shown to be improved.

(7) The highwall is completely backfilled with spoil material, in a manner which results in a static factor of safety of at least 1.3, using standard geotechnical analysis.

(8) Only the amount of spoil as is necessary to achieve the postmining land use, ensure the stability of spoil retained on the bench, and meet the other requirements of the Act and regulations may be placed on the mine bench. All spoil not retained on the bench will be placed in accordance with all other applicable regulatory requirements.

(9) The surface landowner of the permit area has knowingly requested, in writing, that a variance be granted, so as to render the land after reclamation suitable for an industrial, commercial, residential, or public use (including recreational facilities.)

(10) Federal, State, and local government agencies with an interest in the proposed land use have an adequate period in which to review and comment on the proposed use.

While the rules state that AOC must be achieved the rules do not list specifically that specific requirements must be met in order for the Division to make a finding about AOC compliance. The definition for AOC in R645-100.200 is as follows:

Surface configuration achieved by backfilling and grading of the mined areas so that the reclaimed area, including any terracing or access roads, closely resembles the general surface configuration of the land prior to mining and blends into and complements the drainage pattern of the surrounding terrain with all highwalls, spoil piles, and coal refuse piles having a design approved under the R645 Rules and prepared for abandonment. Permanent water impoundments may be permitted where the Division has determined that they comply with the relevant regulations.

Findings are written in the technical analysis (TA) document. The TA document outline the requirements for AOC as (1) eliminate all highwalls, spoil piles, and depressions, (2) achieve a postmining slope that does not exceed either the angle of repose or such lesser slope as is necessary to achieve a minimum long term static safety factor of 1.3 and to prevent slides, (3) minimizes erosion and water pollution both on and off the site and (4) supports the approved postmining land uses. The Division revised the TA section for AOC. The findings in the revised TA are as follows:

Highwall Elimination

The term highwall was initially defined as a feature of surface coal mining operations. Under the regulations the definition also applies to underground coal mining operations. For underground coal mining operations highwall means the area for entry to underground coal mining activities. Portal face-up areas, dugways, shafts and boreholes for entry into underground coal mining activities are all considered highwalls.

The Utah coal rules have standards for reclaiming Pre-SMCRA highwalls, continuously used highwalls and Post-SMCRA highwalls. The highwalls (portal face up areas) at the Willow Creek mine site were developed Pre-SMCRA but never used for underground access. The highwalls at the Willow Creek Mine have a complex history.

The Castle Gate Mine No. 1 and the town of Castle Gate were developed in 1888. Castle Gate began a company town for the Pleasant Valley Coal Company. The town continued to grow as the mine expanded. The Castle Gate No. 2 mine opened in 1911 and the Castle Gate No. 3 Mine opened in 1922. The town grew and had a peak population of 1,300. Production remained high through the 1940's. The postwar demand for coal declined. By 1966 Castle Gate had a population of 350 and the final mine closed in 1972.

In the mid-1970's McCulloch Oil purchased the Castle Gate Mine and town site. The company moved the remaining residents and homes to the mouth of Spring Canyon and demolished any remaining structures not directly associated with coal production or processing operations. The final reclamation and closure plan was submitted by Blackhawk Coal Company and approved by the Division in 1990.

Part of the reclamation plan included an agreement between the Division and Blackhawk Coal Co. that allowed the AMR program to use part of the Willow Creek site for refuse disposal. In exchange for allowing AMR to use the site Willow Creek site the Division released Blackhawk Coal Co. from the reclamation responsibilities for the area used by AMR.

As part of the closure plan the Utah Abandoned Mine Reclamation (AMR) program conducted additional site reclamation work focusing on removal and placement of scattered coal fines and coal refuse materials in a secure disposal area well away from Willow Creek. The refuse material was placed in a face-up area developed but never used.

AMR eliminated the highwalls except for a few small highwall remnants. See cross section B-B' on Map 22 for more details.

On May 5, 1995, Plateau Mining Corporation submitted a permit application package for the Willow Creek Mine. DOGM approved it on April 23, 1996. On June 26, 1997, the Division granted a coal mining and reclamation permit for the Willow Creek Mine. During the permittee process, the Division evaluated the proposed disturbed area, including the reclaimed AMR, site to see if pre-SMCRA highwalls exited. The Division found that no highwalls existed within the proposed disturbed area. This finding can be verified by looking at the premining cross section B-B' on Map 22 that shows the no highwalls existed in portal area constructed for the Willow Creek Mine.

The operational plan called for the development of the portals and the associated highwalls in the location of the face-up area that AMR previously reclaimed.

The reclamation plan called for complete highwall elimination. The postmining topography on cross section B-B' on Map 22 shows that the highwall created in 1997 will be eliminated. The reclaimed slope will be concave with slopes ranging between 2:1 and 3:1.

Cross section B-B' on Map 22 shows that the pre-SMCRA highwall remnants that exist outside the disturbed area boundaries will not be reclaimed. The highwall remnants are 10 feet high and above them is a natural 30° slope.

In Section 5.4.1.3 of the MRP the permittee states the following:

> Due to previous mining and other disturbance of the area there is not sufficient available spoil to backfill all highwalls completely. Given that the Willow Creek development activities effectively constitute remining of the previously disturbed areas that included a preexisting highwall, under the applicable regulatory provisions dealing with remining of previously mined area (R645-301-553.500 through 524.) Since the requirements of the Rule R645-301-553.500 apply, a variance from the AOC restoration requirements is not necessary.

A lack of fill material is the reason sited by the permittee for not completely eliminating the highwalls. While that reason is valid, lack of fill is only one reason highwall remnants will not be completely reclaimed. The highwall remnants are outside the permit area and were not caused by the permittee. Placing more fill in the disturbed area will not eliminate the highwall remnants that are outside the disturbed area.

The term highwall has also been broadly interpreted to include cut slopes or cut features associated with highwalls, roads, pad facilities and other surface features related to underground coal mining. The permanent program rules have eliminated this broad interpretation of the term. The rules fail, however, to address what specialized grading techniques, if any, should be used to reclaim cut-slopes or roads and pads. Reclamation of the cut-slopes, roads and pads associated with the highwalls will not be discussed in this section.

Slope Stability

The slope stability studies are summarized in Exhibit 11 Section F page 6. The summary is as follows:

> Based upon our review of the TMI preliminary report and our visit to the site, we believe that the recommendations for cut slopes in rock presented in the TMI report (Section 5.3) should be used in final design. This recommendation is for some maximum slopes of 1 horizontal to 2 vertical, barring adverse jointing. Raveling of rock should be expected and precautions taken. We recommend that at least 20 feet be left between the toe of rock slopes and structures for berm construction and rock removal.
>
> Stability analyses of cut and fill slopes in the colluvial and alluvial materials have been made based upon observation of existing slopes in the soil in the vicinity of the site, the boring data, and results of laboratory tests. Stability analyses have been done using a computer model of Spencer's Method. Spencer's Method satisfies both force and moment equilibrium and is considered to be a satisfactory procedure for solving limiting equilibrium problems. The computer model used follows the procedure developed by Wright at the University of Texas for the U.S. Corps of Engineers.
>
> Based upon the results of stability analyses, the following general recommendations are made with respect to cut slopes in the natural colluvial or alluvial materials. Cut slopes of 1.5 horizontal to 1 vertical or flatter can be used for cuts less than 20 feet in height, if positive drainage is provided to prevent saturation of the slopes. For cuts in excess of 20 feet in height, cut slopes of 2 horizontal to 1 vertical or flatter should be used.

> Fill slopes constructed with on site granular soils or coal refuse and densified to at least 90% of ASTM D1557 should be designed with a maximum slope of 2 horizontal to 1 vertical. Surface water diversion channels should be constructed along the crest of all cut and fill slopes to prevent water from running over the face of the slope.

The general findings are similar to those of other mines in the area, such as the maximum reclaimed slope angles should be 2 horizontal to 1 vertical for long slopes and for cuts less than 20 feet in height the slope angle can be increased to 1.5 horizontal to 1 vertical.

The Division reviewed the information and found that the postmining slopes will meet the minimum safety factor requirements.

Reclaimed Drainage (Minimize Erosion)

The reclaimed drainages were not a major topic of discussion during the joint inspection. OSM did have concerns about how the restored drainage near the refuse pile access road would be restored. They cited R645-301-762 for the following requirements:

- All roads not to be retained for use under an approved postmining land use are reclaimed by restoring the natural drainage patterns.

- All cut and fill slopes are reshaped to be compatible with the postmining land use and to complement the drainage patterns of the surrounding area.

The Division reviewed the drainage plan and determined that the reclaimed drainages complement the natural drainages. The steep topography of the area dictates that the permittee restores the drainages to the approximate premining location. The drainage patterns for the premining and postmining contours are the same. In both cases water will flow into or on the surface until it reaches a stream channel. Water in the streams will flow into either the Price River or Willow Creek, which is a tributary to the Price River.

Postmining Land Use

The reclaimed highwalls will be suitable for low-intensity grazing and wildlife habitat. Grazing and wildlife activities can easily occur on slopes ranging between 2:1 to 3:1.

The Division's AOC Technical Directive was approved on July 1, 1997. The directive contains additional information on what standards should be used when making a finding about AOC compliance. The directive is not a rule but does contain the Division's policy on how to evaluate the AOC requirements.

The directive gave additional guidance to OSM's concern about how the reclaimed site will blend into the surrounding site. The directive begins by stating that under some

circumstances the replication of the original contours may only be possible at the expense of one or more reclamation performance standards. Therefore, the Division does not require a permittee to attain the original elevation or surface shape for reclamation. The main criterion for compliance with this guideline is "Does the postmining topography, excluding elevation, closely resemble the premining configuration?"

Most of the Willow Creek Mine site was disturbed by mining activities that began in 1888 and ended in 1972. The area partially reclaimed in the mid-1970's and final reclamation was completed in 1990. As mentioned above AMR used part of the site to dispose of coal and coal mine waste from AMR sites.

Map 18A shows the disturbed SMCRA surface disturbance. The areas of pre-SMCRA disturbance in the disturbed area boundaries are:

- Castle Gate Preparation Plant Area
- Schoolhouse Canyon Refuse Disposal Area
- Castle Gate Loadout Area
- Gravel Canyon Soil Stockpile Area
- Crandall Canyon Shaft Area

The areas of post-SMCRA disturbance in the disturbed area boundaries are:

- Willow Creek Mine Surface Facilities
- Barn Canyon Shaft Facility

The Willow Creek Mine surface facilities have been constructed while the Barn Canyon shaft facilities have been approved but not constructed.

The term post-SMCRA disturbance can be misleading at the Willow Creek Mine surface facilities. The new mine facilities were built in an area that have been previously disturbed by mining and other development activities. Those structures that were on the site before development of the Willow Creek Mine includes:

- A mine face-up area (highwall remnants)
- The old railroad grade
- Two rock tunnels
- An electrical substation and associated buildings
- Several power lines
- Rock gabion structures
- An office trailer

During the permit process the Division determined that the premining surface configuration for the Willow Creek Mine site is that of a reclaimed coal mine. Because of lack of suitable fill material and buried coal and coal mine waste the permittee will be unable to

restore the site to the pre-1888 condition. However, the reclamation plan calls for a smooth transition between the disturbed and undisturbed areas. The postmining surface configuration for the site is safe and stable.

During the permit process the Division evaluated how well the reclaimed site would blend into the surrounding topography by relying on the Division's staff judgement and on public comment. The Division's staff subjectively evaluated the postmining surface configuration and found that the site would blend into the surrounding topography. The public had an opportunity to review the mine plan and no objections were made.

Findings:

The Division found that the reclamation plan meets the minimum approximate original contour requirements because:

- All highwalls and highwall remnants that existed in the disturbed area before June 26, 1997, will be completely eliminated by backfilling. The permittee is not required by regulation to reclaim any highwalls or highwall remnants found outside the disturbed area.
- All slopes in the disturbed area will have static safety factors of 1.3 or 1.5 depending on the regulatory requirements.
- The area will be reclaimed to minimize erosion.
- The reclaimed area will be compatible with the postmining land use.
- The reclaimed areas blend into the surrounding topography.

BACKFILLING AND GRADING

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

Analysis:

The general backfilling and grading requirements are: (1) achieve AOC, (2) eliminate highwalls, spoil piles and depressions, (3) achieve a postmining slope that does not exceed either the angle of repose or such lesser slopes as is necessary to achieve a minimum long term static safety factor of 1.3 and to prevent slides, (4) minimize erosion and water pollution and (5) support the approved postmining land use.

The backfilling and grading requirements are similar to those for AOC. In this section will deal with those sections of the backfilling and grading requirements that are not part the AOC requirements. The AOC, highwalls, slope stability and erosion issues were addressed in

the Approximate Original Contour section of this TA. No spoil piles exist on the site or are scheduled to be constructed, nor are any depressions planned for the postmining surface. Therefore, those issues will not be addressed in detail.

A particular issue that OSM wanted the Division to make findings on is how structures such as cut-slopes, road cut-slopes, cut-slopes next to highwalls will be reclaimed. In order for a finding to be complete, it must contain a description of the operator's proposal, **a discussion of the pertinent Utah rule requirement**, and an analysis of whether the operator's proposal meets or exceeds the requirement.

OSM reviewed the Utah coal rules for road closure requirements and how those rules should be applied to cut slope reclamation. They believe that the two rules most applicable for reclaiming the refuse pile access road are R645-301-553 and R645-301-762. Neither of those regulations mentions the term cut-slopes.

The term cut slope does not appear in the reclamation section of the Utah coal rules, but is mentioned in R645-301-537.100. That regulation deals with slopes graded during the operational phase but are not required to be reclaimed. That situation does not exist at the Willow Creek Mine and therefore is not relevant.

Cut-slope reclamation is addressed in the Division AOC directive. The term highwall has also been broadly interpreted to include cut slopes or cut features associated with highwalls, roads, pad facilities and other surface features related to underground coal mining. The permanent program rules have eliminated this broad interpretation of the term. The rules fail, however, to address what specialized grading techniques, if any, should be used to reclaim cut-slopes or roads and pads. In some cases, leaving cut-slopes or conducting other specialized grading practices may yield a superior reclamation plan when all performance standards and requirements for AOC are considered

The Division cannot make findings about cut-slopes because there are no pertinent rules. However, the Division did discuss how and if cut-slopes would be reclaimed

The mountain slopes in and around the Willow Creek mine have cut-slopes that are at the natural angle of repose, which is approximately 35°. The safety factor for slopes at the angle of repose is slightly higher than 1.0 if the slope is in soil (higher safety factors are possible if the slope is in bedrock.) Since R645-301-553.100 requires that the reclaimed slope have a safety factor of 1.3, it is necessary that the reclaimed slopes be gentler than natural slopes. Therefore, the permittee cannot restore the areas on steep slopes to the premining conditions.

Because the reclaimed slopes must be gentler than the premining slopes, the permittee must either leave a cut slope or import more fill. Generally importing large amounts of fill to eliminate cut slopes is not prudent.

During the Division review of the backfilling and grading plans the Division found that Drawing 3.4-1, Pre-SMCRA Disturbance and Surface Facility Map, shows the cut slope for the

Schoolhouse refuse pile is outside the pre SMCRA disturbance area. **However, in the Golder Associates Report in Appendix 3.4A mention is made of a dozer trail in the location of the present haul road made before 1977.**

The description of the dozer trail includes cuts into the bedrock. While the exact extent of the dozer trail is unknown part of the cut slope is pre SMCRA. The Division contacted Vicki Miller who found other documents in the permittee's files that show a road existed to the Schoolhouse refuse pile existed before 1977. **The PRE-SCMRA maps incorrectly show the cut slope for the Schoolhouse refuse pile road to be outside the pre-SMCRA disturbed area.**

Whether or not the dozer cuts are pre-SMCRA or post-SMCRA does not affect the backfilling and grading plan. The permittee will be required to meet the backfilling and grading requirements for the disturbed site regardless of when the cut slopes were created.

Findings:

The Division found that the reclamation plan meets the minimum backfilling and grading contour requirements because:

- The reclaimed site will meet the approximate original contour requirements (see the AOC section of this TA for specifics.)
- All highwalls, spoil piles and depressions in the permit area will be eliminated with the exception of highwall remnants at the reclaimed AMR site. Note: the highwall remnants as outside the disturbed area and were not touched by the permittee.
- The reclaimed slopes will be reclaimed to either the angle of repose or such lesser slopes as is necessary to achieve a minimum long term static safety factor of 1.3 and to prevent slides.
- The reclaimed site will minimize erosion and water pollution.
- The reclaimed site will support the approved postmining land use.

RECOMMENDATIONS

The Division should update the Willow Creek TA to show that the reclamation plan meets the backfilling and grading requirements, which include the AOC requirements. The permittee should be required to update the predisturbed maps to show that the cut slopes for the Schoolhouse refuse pile road were made Pre-SMCRA.