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

Michael O. Leavitt
Governor
Kathleen Clarke
Executive Director
Lowell P. Braxton
Division Director

1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

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TO: Internal File

THRU: Priscilla Burton, Sr. Reclamation Specialist/Soils, Team Lead

FROM: Peter Hess, Sr. Reclamation Specialist/Engineering PHH

RE: Exhibit 20, Crandall Canyon, Plateau Mining Corporation, Willow Creek Mine, C/007/038-SR01A-1

SUMMARY:

Exhibit 20, Crandall Canyon is a proposed revision to the reclamation plan for this area associated with the Willow Creek Mine. The Crandall Canyon surface facilities/disturbed area consists of an access road, two ventilation shafts which penetrate the D, A, and sub-3" coal seams relative to the Castle Gate #5 and #3 Mines, a large capacity hoist/man cage, a return airshaft emergency escape capsule/hoist, a substation, two sediment ponds, and several smaller buildings. The propane tanks (which previously existed here) were moved to the Willow Creek Mine site when that main Mine surface facilities area was constructed.

This technical memo will address the revision of the reclamation plan to retain the access road from U.S. highway 6 to the surface facilities located 1.04 miles up-canyon. Retention of the road is contingent upon the approval of a change in the approved postmining land use, which is currently listed as undeveloped land.

TECHNICAL ANALYSIS:

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

Analysis:

The aforementioned coal rules require a Permittee to close or permanently reclaim all affected areas impacted by coal mining and reclamation operations upon cessation of mining. The Permittee must have a Division approved reclamation plan in place in order to conduct the reclamation activities for all of those areas. R645-301-541.300 states that for the purposes of UNDERGROUND COAL MINING AND RECLAMATION ACTIVITIES, all surface equipment, structures, or other facilities not required for continued underground mining activities and monitoring, unless approved by the Division as suitable for the postmining land use or environmental monitoring will be removed and the affected lands reclaimed. Hence, R645-301-541.300 must be addressed by this application in order to obtain the Division approval necessary to retain the access road as part of the approved postmining land use.

Findings:

The information provided is adequate for the General Reclamation Information required by the Regulations.

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:

As part of the Division's review of Exhibit 20, Crandall Canyon, it was determined that a necessity existed relative to the capability of achieving approximate original contour requirements while leaving roads P-1 and A-1 in place.

There are no highwalls in the Canyon; the mineable reserves in the D seam, the A seam, and the sub-3" coal seams are accessed by the two Crandall Canyon airshafts which average 1,425 feet in depth.

All requirements in the Canyon relative to the restoration of approximate original contour will deal with cut banks relative to road construction. Section 3.7-5(3)(4) of Exhibit 20, Approximate Original Contour Compliance, and beginning on page 3.7-41 through 43 addresses AOC. As allowed under existing UDOGM Approximate Original Contour Regulations, limited portions of cut slopes will remain where they mimic or blend with existing topography and where fully reclaiming the cut slopes would result in slopes with a static factor of safety less than 1.3. Page 3.7-42 states, "The cut slopes identified along the road will remain, except in the facilities area where cut slopes are anticipated to be reclaimed."

There are two post reclamation cut slopes discussed in Appendix 3.7U, which are adjacent to the primary road designated as AP-1". PRCS-3 is located NE of sediment pond 014, (its up-canyon end lies 740 feet down-canyon of the #2 airshaft). PRCS-3 is approximately 750 feet long with a maximum height of thirty feet.

Post reclamation cut slope #4 (PRCS-4) begins 900 feet up-canyon of the US-6 gate and extends 850 feet; the maximum height of the cut slope is approximately thirty-five feet.

Both of the cut slopes are located along portions of primary road P-1 which will have no reclamation activities performed upon them, i.e., they will remain as they exist today assuming that the change in the approved postmining land use is successful and that the approval to retain primary road P-1 as approved access is inherent with that approval.

The reclamation of the access road within the surface facilities area will affect 750 feet of pre-reclamation cut slopes (three areas) which are not mentioned in Appendix 3.7U.

The first area is a 110-foot length of PRCS located adjacent to where the reclamation of the road begins 200 feet up-canyon of the #2 airshaft. This portion of cut slope lays half way between cross sections A-A' and B-B'. Examination of Exhibit 3.7-7D reveals that, although there are no pre land development surface contours shown, the final reclamation contour which is depicted shows an aesthetically pleasing slope. This, plus the fact that a static safety factor of 1.3 is achievable are felt to be adequate justification to meet the requirements of approximate original contour.

Area 2 is the 525-foot pre-reclamation cut slope that is intersected on the lower end by cross section C-C' and on the upper end by D-D'. As depicted by these cross sections, the final contour of the reclamation work will not achieve strict approximate original contour because 3.7-7D does not depict the pre-development surface contours of the area. The northern toe of the reclaimed area (C-C') intersects a nearly vertical slope that rises fifteen feet to the head of the cut slope. The northern edge of the reclamation work as depicted on cross section D-D' intersects a sixty degree slope. The attempt to return this cross section to AOC would probably encounter two problems. The first would be the stability of the area due to the amount of fill necessary to return the area to AOC; the second would be where to obtain that fill. It is therefore felt that although the requirements of AOC are not necessarily achievable, the aesthetic appearance of the reclaimed area plus the increased assurance of a more stable area due to the lower slope angle compensate for the lack of strict enforcement of AOC requirements.

Area 3 is about sixty feet up-canyon of cross section E-E' on the north side of the reclamation area. The operational phase slope of this area lies forty degrees from horizontal. The slope of the fill in the reclaimed area will be graded to approach the existing slope on a ten-degree angle. Once again, the benefits of an increased assurance of stability, plus the aesthetically pleasing appearance of the reclaimed slope are felt to offset the benefits realized by the strict adherence to approximate original contour requirements.

Findings:

The Division has approved the post-mining land use as "recreational"; the retention of the primary road P-1 for access is inherent within that approval. Therefore, no reclamation activities will occur along the primary access road from the US-6 gate to 220 feet up-canyon of the #2 air shaft and no attempt will be made to reclaim this portion of the road or return the area from which the road was developed to approximate original contour. The requirements of R645-301-553.110 cannot be achieved in conjunction with the retention of the primary access road.

Relative to the achievement of approximate original contour requirements within the surface facilities reclamation area, it is felt that the achievement of it is secondary to the achievement of ensured stability and aesthetic visual value in the pre-reclamation cut slope areas. The requirements of R645-301-553.110 are felt to have been adequately addressed.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Final surface configuration maps

Exhibits 3.7-7A, 7B, 7C, and 7D of Exhibit 20, Crandall Canyon have been submitted to attempt to meet the requirements of the R645 coal rules relative to map requirements in proposed reclamation areas. The aforementioned maps address specific concerns relative to the retention of the access road P-1 and R-1 within the reclaimed facilities area.

The operational stage of the Crandall Canyon surface facilities area that existed under Plateau Mining Corporation management was that of storage for mining related apparatus. The operational stage Crandall Canyon access road consists of a primary road designated as P-1 (7,150 feet from the US 6 gate to approximately 200 feet past the main intake (or #1) airshaft). From that point, the road was designated as ancillary (and designated as A-1). This ancillary portion was 5,065 feet or 0.96 miles in length, and was partially reclaimed (ripped and seeded) by AMAX Coal Company in 1990 or 1991.

The reclamation phase of the Crandall Canyon access road proposes the following:

1) The primary road P-1 will remain as it currently exists, up to a point approximately 200 feet up-canyon of the #2 (or return) airshaft.

   Twelve culverts will remain in place to route collected drainage under the road toward Crandall Creek. These culverts include CCC-14 through CCC-21, CCC-24 and 27, and CCD-22 and 23.

2) A portion of the in place primary road P-1 will be reclaimed, starting at a point approximately 200 feet up-canyon of the #2 air (return) shaft. The reclaimed road will be designated as R-1, and will be reclaimed for approximately 2,480 feet. Thus, as depicted on Exhibit 3.7-7B, approximately 1,000 feet of P-1, and 1,550 feet of A-1 will be reclaimed and re-designated as R-1.

   Two culverts CCRC-1 and CCRC-2 will route drainage under the reclaimed road R-1 toward Crandall Creek.

3) As depicted on Exhibit 3.7-7A, all of the ancillary roads originally designated as A-1 (starting 175 feet west of the propane tank foundations) and terminating at the western end of the Canyon was reclaimed. Exhibit 3.7-7A depicts this road as a portion of reclamation road R-1. The total length of R-1 is approximately 4,950 feet. The current conditions in the area are that the Permittee has re-established the road for the convenience of the adjacent landowner.

   Four culverts are associated with the ancillary road A-1, starting at the propane tank foundations and terminating at the end of the disturbed area, (CCC 1-4). These were not reclaimed and remain as part of the drainage system for the area.

   The portion of P-1 which is to be reclaimed (and re-designated as a portion of R-1) incorporates two plan view sections B-B', and C-C' as depicted on Exhibit 3.7-7B.

   Each cross section, as shown on Exhibit 3.7-7D will be discussed separately.

Cross Section B-B'

On cross section B-B', the center of the reclaimed road will be shifted approximately eighteen feet ESE toward the canyon center. The original elevation of the road surface here will remain almost unchanged, being lowered an average of one foot in the center, and sloped away from the center of the drainage, such that runoff will report into ditch CCRD-9. The major changes noted in Section B-B' are the following:

1) The operational channel on the WNW side of the road will be completely backfilled.
2) The drainage will be relocated 175 feet to the ESE.
3) The surface elevation of the area will be lowered approximately 7.5 feet.

Cross Section C-C'

Cross section C-C' is located 150 feet down-canyon of the #1 or intake ventilation airshaft. As depicted on Exhibit 3.7-7D, the elevation of P-1 at this location will remain virtually unchanged, but will be sloped to the outside to collection ditch CCRD-9. This section is similar to B-B' in that the major changes noted are the backfilling of the P-1 drainage channel on the north side of the road and the moving of the center of the drainage 133 feet toward the south.

To obtain the material to fill the old drainage, the overall elevation of the surface will be lowered about six feet over a 110 foot width. Some fill will be disposed of in the toe of the southern embankment of C-C'. Both cross-sections C-C' and D-D' will intersect a pre-reclamation cut slope (which is depicted as 525 feet in length) as shown on Exhibit 3.7-7B.

However, based on examination of the cross-sections C-C' and D-D' of Exhibit 3.7-7D, the final contour of the reclamation work will not achieve approximate original contour because 3.7-7D does not depict the pre-development surface contours of the area. The northern toe of the reclaimed area intersects a nearly vertical slope that rises fifteen feet to the toe of the original slope.

Ancillary road A-1, (reclaimed as a portion of R-1)

The 1,666 feet of ancillary road A-1, which starts 200 feet up-canyon of the #1 or intake airshaft at the facility (and will be re-designated as a portion of R-1) which will be reclaimed incorporates three cross sections, as shown on the plan view depicted on Exhibit 3.7-7B. Cross sections D-D', E-E', and F-F' will be discussed individually.

Cross Section D-D'

Cross section D-D' is located 350 feet up-canyon of the #1 intake airshaft (transects the downstream crest of pond 015's dam). The center of the road R-1 is shifted almost due south twenty feet, but its surface elevation will be raised nine feet. As noted above, cross-section D-D' intersects a pre-reclamation cut slope located along the northern edge of the disturbed area. Examination of Exhibit 3.7-7D indicates that the final contour of the reclaimed area intersects the toe of a sixty-degree slope. This contour will be more stable than trying to achieve an AOC configuration, and is felt to be more acceptable for the Division's purposes. The impounding embankment of pond 015 will be lowered twelve feet (at the relocated center of the channel) to provide fill in this area. The only other significant change in this area is that the channel will be relocated 75 feet to the north or center of the Canyon. The surface elevation of the relocated/ reclamation channel bottom will be raised about eleven feet. The operational channel will be backfilled to a fifteen-degree slope, starting at the crest of the south bank of the reclamation channel.

It needs to be noted here that although the reclaimed road R-1 will be built on nine feet of fill material, the fill will be compacted in a troughed area that has been in place for at least twenty years and is considered stable.

Cross Section E-E'

Cross Section E-E' is located 480 feet up-canyon of D-D'. The center of the reclaimed road R-1 has been moved about ten feet to the SWS, although its surface elevation has been raised about six and a half feet. Slopes above and below R-1 at this section are depicted to be graded to a maximum ten-degree slope. This is adequate for stability.

Other changes indicated by cross section E-E' are that the operational drainage located on the SWS side of Crandall Canyon will be moved 97 feet to the NE, placing it in the center of the Canyon. The operational channel will be backfilled, and the slopes will be graded to a final angle varying from nine to fifteen degrees from horizontal.

Cross Section F-F'

Cross Section F-F' is located 1300 feet up-canyon of the #1 (or intake) airshaft. The center of reclamation road R-1 will be moved about 17 feet to the SW (of the operational road A-1 center). R-1 will be raised approximately three and a half feet from the operational elevation. Only a minor amount of fill will be needed in this area (on the inside berm) ensuring a stable road surface. The fill slope above the road will be graded to a maximum of sixteen degrees above horizontal, and the placement will be in a trough that has been stable for many years. The cut below the road will be graded to a maximum of fifteen degrees from horizontal. Both angles are low enough to ensure adequate stability of the reclamation road when constructed of competent material kept free of saturation.

Other pertinent features of cross-section F-F' are as follows:

1) The center of the operational drainage will be moved 100 feet to the NE. The reclaimed drainage will be one foot lower at the center of the channel than the operational drainage.
2) The operational channel will be backfilled; in general the overall surface elevation in the area will be lowered approximately eight feet.

Cross Section G-G'

Cross Section G-G' is 500 feet up-canyon of F-F' and lies within the portion of the ancillary road A-1 which was ripped and re-seeded (reclaimed) in 1990 or 1991 by AMAX Coal Company. Exhibit 3.7-7D shows the center of reclamation road R-1 as identical to the center of the operational or ancillary road A-1. The outslope of the road here will be reshaped to a ten degree down dip. This section has been in place for twenty years. There are no concerns relative to the stability of the road here. G-G' also intersects a pre-reclamation cut slope, as indicated by Exhibit 3.7-7B. This cut slope will remain unchanged, as indicated on Exhibit 3.7-7D. The area has been reclaimed. The submitted plan and cross section drawings for the proposed changes were made "to depict a travelable road through the area to accommodate Mr. Martineau. The road is to be reestablished, except through the immediate leach field area." as explained via the Permittee's deficiency response dated September 12, 2001. No determination relative to approximate original contour can be made because, although the area has been reclaimed, a cross section representing the contour of this final reclamation has not been provided. This can be justified, as according to Mr. Johnny Pappas, none of the previous Division approvals for this area contained pre-land development surface contour cross sections" (neither in the 1996 approval, nor any previous approvals). Only operational and reclamation cross-sections were presented and approved in the 1996 submittal.

The only significant changes relative to this cross section are:

1) The center of the reclaimed drainage will be 25 feet NNW of the operational drainage.
2) The operational drainage will be backfilled; the reclamation channel bottom will be about 2.5 feet higher in surface elevation than was the operational channel bottom.
3) The cut that will be made on the north side of the operational channel appears to be at least twice the amount of material necessary to reclaim the operational channel.

Exhibit 3.7-7D contains a typical road cross section for reclamation road R-1. Same shows a twelve to fifteen foot roadway width having a one to three percent slope toward the ditch located along the inside berm. This ditch has a four-foot top width and a one-foot depth with 2:1 side slopes.

Exhibit 3.7-7D is P.E. certified by Mr. Layne D. Jensen, Utah registered professional engineer.

Findings:

The requirements of R645-301-542.310 have been adequately addressed.

BONDING AND INSURANCE REQUIREMENTS

Regulatory Reference: 30 CFR Sec. 800; R645-301-800, et seq.

Analysis:

Determination of bond amount

The Permittee currently has a reclamation bond in the amount of $11,949,205 to cover the reclamation of the disturbed areas incorporated within the Willow Creek Mine's 14,670 permitted acres. Of this amount, $1,841,245 (See Table 3.1-2 and Appendix 3-2 relative to Crandall Canyon in the currently approved Willow Creek MRP) has been dedicated to the reclamation of the Crandall Canyon area. Since this amount has been reviewed and approved by the UDNR/OGM via previous submittals, that amount is considered adequate to reclaim the area. Additional justification that this amount is adequate can be assumed if the considerations below are evaluated:

1) The ancillary road designated as A-1 in the leach field area has already been reclaimed.

2) The primary road designated as P-1 (starts at Permittee's gate at U.S. 6 and extends to the lower end of the surface facilities area) in Crandall Canyon and its associated post-reclamation cut slopes will remain as they currently exist if the change in the approved post-mining land use is approved by the UDNR/OGM. The amount of dirt moving necessary to reclaim the Crandall Canyon area will be much less than what the approved bond amount of $1,841,245 was calculated for to reclaim.

Thus, the bond amount, as currently approved, will be used to reclaim much less than what was anticipated when that $1.85 million amount was determined and approved.

Findings:

The bond amount determination of $1,841,245 (as currently approved in the Willow Creek mining and reclamation plan) is adequate to reclaim the Crandall Canyon area.

RECOMMENDATIONS:

C/007/038-SR01A-1 meets the minimum regulatory requirements of the R645 coal rules. It is recommended that the submittal be approved.

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