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United States Department of the Interior

OFFICE OF SURFACE MINING
Reclamation and Enforcement
1999 Broadway, Suite 3320
Denver, Colorado 80202-5733

May 15, 1995

Mr. James W. Carter, Director
Utah Division of Oil, Gas,
and Mining
3 Triad Center, Suite 350
355 West North Temple
Salt Lake City, Utah 84180-1230

RECEIVED
MAY 16 1995
DIV. OF OIL, GAS & MINING

Dear Mr. Carter:

The Western Regional Coordinating Center (WRCC) has reviewed the draft reclamation proposal submitted by Arco Coal Company for the Mountain Coal #2, #7 and #8 Mines.

After a technical review, the WRCC has determined that a modification of this plan is needed in order to meet the requirements of SMCRA at these three sites.

Attached are our technical findings that support revised slopes at the #2 and #7 portals, which will meet the requirements of SMCRA and completely cover the highwalls at both locations. Gene Hay of our technical staff is available to discuss our findings. Please call him at 303-672-5560.

Please inform Arco that a submittal of a revised plan that incorporates the revised slopes developed by WRCC is required. Upon approval of that submittal by the Utah Division of Oil, Gas, and Mining and WRCC staff, the Deputy Director will then make his decision pursuant to 30 CFR 842.11(b).

If you have any questions concerning this submittal, please contact Mike Rosenthal at 303-672-5557.

Sincerely,

Charles Sandberg

Charles E. Sandberg, P.E.
Acting Assistant Director

Attachment

cc: Ed Kay
Tom Ehmett

GORDON CREEK INVESTIGATION

CONCLUSION:

The stability analysis shows that if the fill is saturated to a depth of one third, the fill will have a static safety factor of 1.3 and eliminate the highwalls of both Portals No. 2 and No. 7.. The fill material must be compacted as it is placed, this will reduce the infiltration rate and reduce the chance of the fill becoming saturated.

By using the average end area method on cross sections 1 through 3 it is estimated that completely backfilling the No. 7 Portal highwall could require as much as an additional 62,460 compacted cubic yards. If the highwall is covered at the angles analyzed in the stability analysis, only an additional 37,530 compacted cubic yards would be needed. Since the company did not remove any of the original spoil material from the permit area, the swell of the material should produce enough compacted material to meet these additional volumes.

If a 20 to 22 degree slope (cross sections 22+00 and 24+00) is used, the amount of spoil needed to eliminate the highwall will increase the fill volume for Portal No. 2 by about 64 percent (from 75,378 to 123,620 cubic yards). The company may be able to reduce the volume of fill for Portal No. 2 by doing additional slope stability modelling and determine the maximum stable slope.

The company may need to put in cross slope diversions to reduce the slope length and keep the velocity of runoff below the erosional velocity of the soil. If the fill material can be placed in lifts the diversions can be built into the fill. This would be the most erosionally stable. The cross slope diversions should either empty into the restored stream channel or into a riprapped down drain.

GORDON CREEK PORTAL No. 2

SITE VISIT:

On the way down from the No. 7 Portal, Mr Dan Guy and myself stopped at the bridge again in the middle of the portal area and at the lower end of the portal area. An existing talus slope was measured where the highwall ends next to sediment pond No. 2. The slope measured 66 percent. This would be the natural angle of repose for the weathered shale material from the highwall in the No. 2 Portal area.

There appeared to be extensive spoil in the original stream channel under and down stream from sediment pond 7A. the exact amount may be difficult to estimate.

STABILITY:

The permit contains direct shear test results performed on the fill material from the No. 2 Portal area. This material has a higher cohesion (828 psf) and a higher internal angle of friction (23.8 degrees) than the material at Portal No. 7 (504 psf and 21 degrees). With the higher material strength values, a minimum static safety factor greater than 1.3 was obtained. The fill slope angle used in the analysis was 30 degrees. This shows it will be possible to eliminate the No. 2 Portal highwall.

Because the 30 degree fill slope is steep, a second stability analysis was completed using the material strength values from the No. 7 Portal. A minimum static safety factor of 1.21 was obtained. The fill slope was then reduced to 27 degrees and the stability analysis was performed again using the No. 7 Portal material strengths. The lowest static safety factor found was 1.31. Therefore, If there is enough solid bench width, the material can be stacked high enough to eliminate the No. 2 Portal highwall.

FILL VOLUME ESTIMATE:

The volume calculations for cross sections 20+00 through 26+00 show a volume of 75,378 cubic yards of fill material needed. The slopes proposed by OSM will increase the volume by approximately 64 percent or 48,242 cubic yards. This will increase the total volume for Portal No. 2 to 123,620 cubic yards. The additional volume should be located in the original drainage channel below pond 7A.

EROSION:

The fill slope lengths at the No. 2 Portal will exceed 100 feet. This will cause gully erosion. The fill slope length must be broken up with cross slope diversions. The distance between diversions should be analyzed.

Where the cross slope diversions cannot empty into a natural channel, flow should be directed into down drains. The down drains will need to be designed to handle the high water velocities generated by the steep slopes.

GORDON CREEK PORTAL No.7

SITE VISIT:

The portal sites are between elevations 7000 and 8000 ft. Because of the recent weather some of the snow had melted and we (Dan Guy and myself) were able to drive to Portal 7. There was still approximately 12 to 18 inches of snow on portals 7 and 8. Mr. Guy made the statement that all spoil from portals 7 and 8 is still on site. The company proposes to use all available spoil to backfill the highwall. There appears to be enough spoil to accomplish the task. There is an area that has had an active slide. Mr Guy was not sure if the slide occurred prior to or during the development of the road to portal 7 and the development of portal 7. This shows some indication of instability in the preexisting stream channel. The company has stabilized the toe of the slide. While doing so the slide became active again.

Spoil was stockpiled when portals 7 and 8 were constructed. The topsoil for portal 7 is stockpiled at the No. 2 portal and the topsoil for portal 8 is stockpiled on top of the spoil from portal 7. The No. 2 Portal area was disturbed pre-SMCRA. But, there is a large amount of spoil in the natural drainage channel. Several of the sediment ponds are built on fill that may have come from the portal face-up. If not needed to reclaim the No. 2 portal, it could be used to backfill the No. 7 portal. There should be adequate spoil to backfill all exposed rock out crops produced to facilitate coal removal. That includes the rock outcrops above the MSHA benches.

STABILITY ANALYSIS:

The company completed a stability analysis of the backfill slopes to determine how high the material could be stacked and therefore how much of the highwall can be backfill and still meet the 1.3 static safety factor. As part of the analysis, the company assumed the fill material would be completely saturated. This assumption is an overly conservative design standard and dramatically reduces the stability of the fill, thereby reducing the amount of highwall that can be eliminated. The No. 7 portal has the highest highwalls associated with the narrowest solid bench. As part of this investigation, numerous stability analysis were completed by OSM on fill slopes projected to cover all exposed highwalls and have the fill material placed on the solid bench. The average snow fall for the area is not known, so the analysis was completed assuming three levels

of saturation. The model was run using the MSHA bench elevation as the limit of saturation. The stability of the fill material had a calculated static safety factors of 1.2. The model was then run assuming the bottom one third of the fill would be saturated (a reasonable design standard). Under this assumption the fill exceeded the 1.3 static safety factor requirement for fills placed on a solid bench. Due to the amount of time moisture remains in the area, it is a more realistic design standard to assume that only the bottom one third of the fill material will be saturated.

There is a fault along one side of the No. 7 portal and did produce water when the portal was first opened. The source for the seep is probably surface water and not deep seated because the mine was dry and only encounter a small amount of water associated with faults.

Presently there is an inactive slide along the road to Portal No. 7. The company stabilized the slide shortly after it occurred.

FILL VOLUME ESTIMATE:

By increasing the angle of the fill and covering the highwall, additional fill material will be needed. Using the average end area method, cross sections 1 through 3 estimate a volume of 37,530 compacted cubic yards to complete the companies proposal. To complete the OSM proposal will require at a minimum, 53,790 compacted cubic yards. If a combination of the OSM proposal and the companies is used, a volume of 62,460 compacted cubic yards will be needed. At the most, the combination will require the company to move an additional 24,930 compacted cubic yards. It is not possible to determine where the operator would obtain the extra material. There are no premining topographic maps accurate enough to estimate volumes. The company has not hauled any material off the permit area so the material should be available.

EROSION CONTROL:

Depending on the amount of clay in the stored topsoil the erosional slope length may need to be shortened. This can be accomplished by building the diversions into the fill if the fill is placed in horizontal lifts. The built in diversions would be more stable than having diversion berms (Cross slope diversions) cut into the fill after construction.

Where the cross slope drains can not empty into the restored channel, they should empty into constructed down drains. The design of the down drains need to take into

consideration both the amount of water and the steepness of the down drain. The steepness of the down drains will require the rock rip rap to be sized and placed properly. There are several methods which can be used to estimate the maximum slope length between cross slope diversions.