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Norman H. Bangerter
Governor
Dee C. Hansen
Executive Director
Dianne R. Nielson, Ph.D.
Division Director

State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340

September 10, 1992

Mr. Dan Guy, Manager
Mountain Coal Company
P.O. Box 1378
Price, Utah 84501

Dear Mr. Guy:

Re: Highwall Reclamation, Mountain Coal Company, Gordon Creek #2, #7, and #8 Mines, ACT/007/016, Folder #3, Carbon County, Utah

The highwall reclamation plan submitted August 20, 1992, is approved, see enclosed analysis. Information contained in the August 20, 1992 submittal must be included in the final reclamation plan, which must be submitted to the Division no later than December 18, 1992.

If you have any questions, please call me.

Sincerely,

Pamela Grubaugh-Littig
Permit Supervisor

pgl
Enclosure
cc: Lowell P. Braxton

an equal opportunity employer

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September 10, 1992

TO: Pamela Grubaugh-Littig, Permit Supervisor

FROM: Jess Kelley, Reclamation Engineer JK

RE: Highwall Reclamation, Mountain Coal Company, Gordon Creek #2, #7 and #8 Mines, ACT/007/016, Folder #2, Carbon County, Utah

SYNOPSIS

In an August 17, 1992 letter to the operator, the Division agreed to a seven-point plan for the reclamation of this site. On August 20, 1992, the operator submitted, for Division approval, a plan for reclaiming the highwalls in the three separate mine areas, highwall reclamation being point one of the seven-point plan. This memorandum constitutes an analysis and approval of this submittal.

ANALYSIS

In point one of the seven-point plan, the operator agrees to three things:

1. The operator will completely eliminate the highwall at the No. 8 Mine.

2. The operator will eliminate as much of the No. 7 Mine highwall as possible. Since this area has historically been unstable, the operator will design the highwall backfill to have a static safety factor of no less than 1.5.

3. The operator will completely eliminate the No. 2 Mine highwall unless a) it is demonstrated that there is not enough reasonably available spoil or, b) it is demonstrated that complete elimination of the highwall would cause the static safety factor of the resultant fill to fall below 1.3.

The operator hired the consulting firm of J.F.T. Agapito & Associates, Inc. of Grand Junction, Colorado, to characterize the available fill material and define the limiting slope heights and slope angles. Agapito's report is found in Appendix 12 of the mine plan.

For both the No. 7 and the No. 2 areas, Agapito determined representative values of 3 physical properties of the available fill material: cohesion (c), internal friction angle (ϕ), and dry density (γ). Agapito then applied these values to the circular slope failure criteria of Hoek & Bray (Rock Slope Engineering, 1981, p. 238.) in order to define a range of possible slope configurations which would attain the required static safety factor. The fill material was assumed, for the purposes of this analysis, to be completely saturated (the worst case).

The properties of the material in the No. 7 Mine area were determined to be as follows:

$c = 504$ psf
$\phi = 21°$
$\gamma = 120$ pcf

Application of these values to the Hoek & Bray circular slope failure criteria yielded the following possible slope configurations with a static safety factor of 1.5:

Slope Angle (degrees)	Maximum Height (ft)
15	78
20	45
25	36
30	29
35	25

The operator will backfill the No. 7 Mine highwall to a height of approximately 45 feet with a slope angle of approximately 20°, as shown in Map 3-7 and in the cross sections of Figure 3-8. This will result in retention of about 40 feet of the cliff face above the backfilled area. Given the properties of the fill material, the amount of available material, and the space between the highwall and the stream channel on the opposite side of the canyon, this is the only possible slope configuration. A lesser slope would be less than the original slope and would reclaim more of the highwall, but would obstruct the stream channel and require more material than is available.

The properties of the material in the No. 2 Mine area were determined to be as follows:

$c = 828$ psf
$\phi = 23.8°$
$\gamma = 107$ pcf

Application of these values to the Hoek & Bray circular slope failure criteria yielded the following possible slope configurations with a static safety factor of 1.3:

Slope Angle (degrees)	Maximum Height (ft)
15	230
20	115
25	82
30	66
35	55

The operator will backfill the No. 2 highwall to a height of approximately 115 feet with a slope angle of approximately 20°, as shown in Map 3-7 and in the cross sections of Figure 3-8. This will result in retention of approximately 15 feet of the cliff face above the backfilled area. The height of the cliff face will approach 25 feet in the mouths of the two tributary canyons in this area because of the lack of space between the highwall and the restored channels.

Just as in the case of the No. 7 highwall, the 20° slope angle is the optimum slope angle for the No. 2 Mine area. Again, a lesser slope would reclaim more of the highwall, but would require more material than is available and would obstruct the restored channels in the narrow canyons.

RECOMMENDATIONS

It is recommended that the highwall reclamation submittal be approved as fulfilling the requirements of both the R645 rules and the August 17, 1992 Division letter to the operator. The submittal should be included in the final reclamation plan, which the operator has agreed to submit to the Division no later than December 18, 1992.

jbe
cc: Scott W. Anderson, ARCO
Dan Guy, Mountain Coal
Lowell Braxton, DOGM
AGAPI.MEM