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

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May 6, 1994

TO: File

FROM: Susan M. White, Senior Reclamation Biologist *SMW*

RE: Phase II Bond Release, Huntington Canyon No. 4 Mine,
Mountain Coal Company, ACT/015/004 Folder #2, Emery
County, Utah

The attached report are my findings for the vegetation portion of Phase II bond release for the Huntington Canyon No. 4 Mine. Both Mountain Coal's and my vegetation data support release of Phase II bond monies based on vegetation. Vegetation, hydrology and erosion are the basis for Phase II bond release. The on site inspection scheduled for May 18, 1994 must evaluate erosion.

Pending Phase II release the operator will remove the sediment pond. I suggest that a Division staff engineer review the bond release amount so as to retain sufficient money for the pond removal.

cc: Pam Grubaugh-Littig
Darron Haddock



Mountain Coal Company
Huntington Canyon No. 4 Mine
Phase II Bond Release Application

I. BACKGROUND

The Huntington Canyon No. 4 Mine is a reclaimed underground coal mine located in Mill Fork Canyon, a tributary of Huntington Canyon in Emery County, Utah. The No. 4 Mine is located on the same surface area used by the Leamaster Mine in the early 1940's. The Helco and Skeen Mines also operated in Mill Fork Canyon in the 1940's. All three mines were abandoned without clean-up or reclamation. The No. 4 Mine started production in early 1977 and was active off and on until October 1984.

The permit area is located on the eastern edge of the Wasatch Plateau and is characterized by steep, narrow canyons with sandstone cliffs. The mine site itself is in a Pinyon woodland interspersed with Salina wildrye and Sagebrush vegetation. The permit area covers 1,320 acres with the disturbance limited to 25 acres. The mine site is located on privately owned land within the boundaries of the Manti-LaSal National Forest. Coal was mined from both fee ownership and Federal Leases.

The mine site reclamation including portal seals, structure removal, coal waste removal, backfilling, grading and revegetation was completed in November 1985. Application for Phase I bond release was made in February 1986. The Division approved a 60 percent bond release in November 1986. An application for a Phase II bond release was received by the Division in August 1992 and was denied by the Division for issues relating to completeness.

II. REGULATORY REQUIREMENTS

R645-301-880.320 provides the regulatory requirement for Phase II of the bond release process. The requirement for vegetation is that successful revegetation be established. Guidance has been provided as to the definition of successful revegetation and establishment for the Kentucky program in 56 FR 15279, April 16, 1991. OSM holds that except for prime farmland, attainment of the success standard of R645-301-356 is a prerequisite only for final bond release. The State regulatory authorities are free to establish standards to determine when revegetation is successfully established for purposes of Phase II bond release. OSM states that these standards must be consistent with the conventional meaning of the terms "successful" and "established" and that revegetation must be adequate to control erosion and be in accordance with the approved reclamation plan.

Several states have interpreted the phrase "successful revegetation has been established" to mean that the vegetative ground cover as stated in the approved reclamation plan be within the statistical standards defined in R645-301-356.120. The Division at this time will also adopt this standard. The Division must also look at the remaining vegetation bond release standards (shrub density, diversity and production as listed in R645-301-350), and the potential of the site to meet these standards for Phase III bond release, however attainment of these standards are not required until Phase III release. Since the Huntington No. 4 Mine and the Gordon Creek No. 3 and 6 Mines are the first in the Coal Regulatory Program to apply for Phase II bond release, the adequacy of this definition may be subject to review and change.

III. VEGETATION SAMPLING

Mountain Coal Company notified the Division of its intent to conduct vegetation sampling on July 29 through 31, 1993 for Phase II bond release. The Division subsequently notified OSM and invited them to conduct their own sampling. Division vegetation sampling was completed on August 6 and 10, 1993.

Mountain Coal Company sampled for vegetative cover, woody species density, and annual biomass production. Vegetative cover and woody species density met the Division's requirement for sample adequacy while production measurements were only taken to provide guidance to Mountain Coal Company for final bond release. Table 1 provides a summary of Mountain Coal Company's data using means.

Table 1. Summary of Mountain Coal Company's Vegetation Data for the Huntington No. 4 Mine.

	Cover(%)	Density (#/ac)	Production (lbs./ac)
Lower Reclaimed	37.4	2625	550
Upper Reclaimed	41.4	2604	496
Reference Area	34.7	404	110

Mountain Coal Company summarizes the statistical differences in the data in Table 33 of the vegetation report for bond release. The report finds that the reclaimed area is either

significantly greater than or equal to the vegetation reference area for vegetative cover, woody plant density, and annual vegetation production.

The Division sampled only for vegetative cover on the reclaimed mine site and the reference area. Vegetation composition and diversity data were obtained from the cover data. The Division also found that the reclaimed area was either significantly greater than or equal to the vegetation reference area. The Division found 28 different species on the reclaimed site (7 grass, 10 forb and 11 tree and shrub species) while only eight species were identified in the reference area (2 grass, 1 forb and 5 tree and shrub species).

IV. ANALYSIS AND RECOMMENDATIONS

Statgraphics, Version 6 (1992) was used for all of the statistical analysis. The Division found no significant difference between the vegetation on the lower pad area and the reference area. The vegetation on the road and upper pad area was significantly greater than the vegetative cover in the reference area. A summary of the data is given in Table 2. Two statistical analyses were performed on the data: a t-test and a rank sum test. The t-test was used primarily due to convention. A probability plot correlation coefficient test showed that only the reference area data had a normal distribution, which violates one of the assumptions of the t-test. However, the results of the two tests were similar.

Table 2. Statistical Summary for Division Vegetation Cover Data on the Reclaimed Areas and Reference Area.

LOWER PAD AREAS	mean=32.2 median=33.5	std=13.8 IQR ₁ =18.5	n=80
REFERENCE AREA	mean=33.8 median=30.0	std=19.9 IQR=27.5	n=60
STATISTICAL ANALYSES (two sample analysis assume t distribution)	t=-.5488	p=.29	SL ₂ =NS
(Unpaired Wilcoxon Rank-Sum Test, no assumed distribution)	Z=.24	p=.40	SL=NS

IQR₁= Interquartile range

SL₂= Significance level

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UPPER ROAD AND PAD	Mean=43.6 Median=40.0	Std=17.2 IQR=18.0	n=38
REFERENCE AREA	Mean=33.8 Median=30.0	Std=19.9 IQR=27.5	n=60
STATISTICAL ANALYSES (two sample analysis assume t distribution)	t=2.489	p=.005	SL=S
(Unpaired Wilcoxon Rank-Sum Test, no assumed distribution)	Z=2.745	p=.003	SL=S

Data from the Division and Mountain Coal Company indicate the same statistical conclusion. The lower pad was not significantly different from the reference area and the upper road and pad had significantly greater vegetative cover than did the reference area. A summary of the means for Mountain Coal's data and the Division's data is given in Table 3.

Table 3. Average Total Living Cover for the Reclaimed Areas and Reference Area as Recorded by Mountain Coal Company and the Division.

	MT. COAL	DOGM
LOWER PAD AREAS Living Cover (%)	37.4	32.2
UPPER ROAD AND PAD Living Cover (%)	41.7	43.6
REFERENCE AREA Living Cover (%)	34.7	33.8

According to the Division's definition of successful revegetation establishment, Huntington No. 4 Mine has met the minimum qualifications for the vegetation cover portion of Phase II bond release. R645-301-356.120 states that the reclaimed area only has to meet 90 percent of the success standard. All of the above statistical conclusions were based on 100 percent of the standard. This fact should provide greater confidence when making the decision to release Phase II bond on this site.