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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 *SMW*

FROM: Susan M. White, Senior Reclamation Biologist

RE: Phase II Bond Release, Gordon Creek Nos. 3 and 6 Mines,
Mountain Coal Company, ACT/007/017 Folder #2, Emery
County, Utah

The attached report are my findings for the vegetation portion of Phase II bond release for the Gordon Creek Nos. 3 and 6 Mines. 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.

cc: Pam Grubaugh-Littig
Darron Haddock



Mountain Coal Company
Gordon Creek Nos. 3 and 6 Mine
Phase II Bond Release Application

I. BACKGROUND

The Gordon Creek Nos. 3 and 6 Mines are located in Coal Canyon approximately 13 miles northwest of Price, Utah. The No. 3 Mine opened in 1975 and the No. 6 Mine opened in late 1978. Both mines shared common facilities. Although the No. 6 mine did not begin production until 1978, the construction and disturbance for both mines was created late in 1969. The coal was mined by room and pillar method with continuous miners and transported by shuttle car, conveyors and then haul trucks to the preparation plant. The No. 6 Mine was temporarily closed in November 1980, and permanently closed in September 1983 along with the No. 3 Mine.

The permit area is located in the Gordon Creek area. Vegetation types in the mine area are oak shrubland and sagebrush-grass communities. The permit area encompasses 668 acres of which 28 acres is associated with the surface disturbance. All coal and surface area is privately owned, except for a coal lease from Carbon County of 320 acres and a 40 acre State lease.

The mine site reclamation including portal seals, structure removal, coal waste removal, backfilling, grading and revegetation was completed in November, 1986. The Office and the Division approved a 60 percent bond release in June 1987. 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 has been established. Guidance has been provided as to the definition of successful revegetation and establishment in 56 FR 15279, April 16, 1991, for the Kentucky program. OSM holds that except for prime farmland, attainment of the success standard of R645-301-356 is a prerequisite only for final bond release. And, thus, 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 within the conventional meanings of the terms "successful" and "established" and the revegetation must be adequate to control erosion and 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 compared to the success standard 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 standard (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 is 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 intent to conduct vegetation sampling for Phase II bond release on August 19 and 20, 1993. The Division subsequently notified the office and invited them to conduct their own sampling. Division vegetation sampling was completed on August 31, 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. The following table provides a summary of Mountain Coal Company's data as summarized by Mountain Coal Company.

	Cover(%) (mean)	Density (#/ac)	Production (lbs./ac)
Reclaimed	45.0	1455	1510
Reference Area	35.0	7972	452

Mountain Coal Company summarizes the statistical differences in the data in Table 41. of the vegetation report for bond release. The report finds that the reclaimed area has significantly greater cover and production than the reference

area. A predetermined standard of 1000 shrubs per acre was specified in the permit for shrub density. This standard was obviously met.

The Division sampled only for vegetative cover on the reclaimed mine site and the reference area. Vegetation composition and diversity data was obtained from the cover data. The Division found that the reclaimed area was equal to the vegetation reference area. The Division found 25 different species on the reclaimed site (8 grass, 10 forb and 7 shrub species) while only 13 species were identified in the reference area (1 grass, 7 forb and 5 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 reclaimed area and the reference area. A summary of this data is given below. 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 very similar.

RECLAIMED AREAS	mean=39.2	std=13.0	n=108
	median=38.0	IQR* =19.5	
REFERENCE AREA	mean=37.3	std =11.8	n=40
	median=36.5	IQR=16.5	
STATISTICAL ANALYSES (two sample analysis assume t distribution)	t=-.8286	p=.20	SL**=NS
(Unpaired Wilcoxon Rank-Sum Test, no assumed distribution)	Z=.8102	p=.20	SL=NS

* IQR = Interquartile range ** SL = Significance level

Both the Division and Mountain Coal Company's data indicate the same statistical conclusion. The vegetation cover of the reclaimed area is not significantly different from the vegetation cover of the reference area. A summary of the means for both sets of data is given below.

Phase II Bond Release
Gordon Creek Nos. 3 and 6 Mines
May 6, 1994
Page 4

	MT. COAL	DOGM
RECLAIMED AREA	45.0	39.2
Living Cover (%)	n=120	n=108
REFERENCE AREA	35.0	37.3
Living Cover (%)	n=30	n=40

According to the Division's definition of successful revegetation establishment, Gordon Creek No. 3 and 6 Mine have 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 more weight to the decision to release Phase II bond on this site.