



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: File

THRU: Pam Grubaugh-Littig, Permit Supervisor *pgl*

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

RE: Phase III Bond Release, Western States Minerals, J. B. King Mine, ACT/015/002-BR99, Folder # 2, Emery County, Utah

Summary:

Western States Minerals submitted an application Request for Phase II and III Bond Release at its J.B. King Reclaimed mine site. The initial application was received June 11, 1999. This memo reviews the initial application, 1999 Vegetation Monitoring Survey dated October 1, 1999, and a letter submitted by Western Sates Minerals Corporation (WSMC) dated October 14, 1999. This technical analysis reviews those issues associated with Phase III Bond Release. Phase II Bond release was recommended for the J.B. King mine site in my memo dated November 2, 1999. Reclamation was initially completed at the J.B. King Mine in 1985 and additional augmentive work was preformed on 16% of the disturbed areas surface in fall 1994. The minimum 10 year liability period has not been met. The site is **not** recommended for Phase III bond release.

TECHNICAL ANALYSIS:

VEGETATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

Standards for Success

Regulatory Requirements

The Standards for Success for Phase III Bond Release on areas previously disturbed by mining that were not reclaimed are that the Operator will demonstrate that the vegetation cover:

- ▶ is not less than 90 percent of the ground cover existing before redisturbance, (**R645-301-356.250**) (using a 90 percent statistical confidence interval and methods approved in the Division's "Vegetation Information Guidelines, Appendix A, (**R645-301-356.110**));
- ▶ is adequate to control erosion (**R645-301-356.250**);
- ▶ will achieve the approved postmining land use (**R645-301-356.100**).

Performance Standards (**R645-301-350**) included in the success standards are the vegetative cover will:

- ▶ be diverse, effective, and permanent;
- ▶ have the same seasonal characteristics of growth as the original vegetation;
- ▶ be capable of plant succession;
- ▶ be compatible with the plant and animal species of the area; and
- ▶ meet federal and Utah noxious plant laws.

R645-301-357 states that the vegetation parameters will equal or exceed the approved success standard during the growing seasons for the last two years of the responsibility period and in areas of less than 26 inches average annual precipitation, the period will be for not less than ten full years. The period of extended responsibility will begin after the last year of seeding, or other work, excluding husbandry practices approved by the Division.

Background

The J.B. King Mine was discontinuously mined from the 1930's to 1981. All disturbance occurred prior to 1977. The site was regraded and seeded in 1985. Repairs, mostly due to rill and gully formation, continued on the mine site for the next nine years. In 1994, the refuse pile and main ditches were redesigned and reworked. Biosolids and a rock mulch was amended into the refuse pile soil surface and extreme surface roughening used in attempts to minimize erosion and increase vegetation establishment.

At the time of application for Phase III bond release the site has been reclaimed for 14 years. Approximately 85 percent of the site has met the minimum 10 year extended responsibility period. The repair and seeding activities on the refuse pile and associated disturbance was documented as augmentive by the Division; beginning again the period of extended responsibility. (See memo to File from Susan White, dated June 16, 1999) The area reworked for drainage repair is not considered augmentive. The area of augmentive work is not eligible for bond release until 2004 or 19 years after initial seeding. No determination was made by the Division to separate the area requiring extended liability from the original area (**R645-**

301-820.330). The 10 year minimum responsibility period has not been met. The below table summarizes the grading and seeding activities at the mine site.

Area	Work Performed	Acreage	Percent of Disturbed Area
Entire Site	Graded, Seeded, 1984	32.8	100%
Upper Drainages	Redesigned and Reconstructed, Seeded, 1994	2.73	8.3%
Refuse Pile	Rock Mulch, Biosolids, Reseeded, 1994	3.51	10.7%
Biosolids Staging Area, Access to Refuse Pile	Reseeded, 1994	1.78	5.4%

Analysis of Operators Data

Vegetation sampling at the J.B. King mine site for Phase III bond release was conducted by Bamberg Associates in June 1998 and July 1999. The entire 32.8 acres was sampled, including areas of 1994 reseeded. The sampling included measurements for vegetation cover and shrub densities on the reclaimed site and the reference area. The results of vegetation cover sampling in 1998 and 1999 are summarized in the below table.

1998 Vegetation Study			1999 Vegetation Study		
	Reclaimed	Reference	Reclaimed	Reference	90 % of Reference
Mean % Cover	18.4	13.1	18.7	19.8	17.8
Confidence Interval	16.5 to 20.1	12.2 to 14.0	14.8 to 22.6	18.2 to 21.4	16.3 to 19.3
Median	17.0	13.0	11.0	19.0	17.1
Standard Deviation	6.7	2.4	17.9	4.3	3.8
Variance	44.7	5.7	320.4	18.1	14.6
Minimum Value	8.0	9.0	0.0	12.0	10.8
maximum value	32.0	18.0	75.0	26.0	23.4
n	40	20	60	20	60
N(min)	22	6	175	8	8

Cover

The vegetation cover on the reclaimed mine site (18%) in 1998 exceeds the reference area standard (13%). No statistical analysis is necessary since the cover exceeds the standard. Minimum samples size (N(min)) requirements were met during sampling in 1998. Because of some inconsistency in Division sampling and Operator sampling in 1998 (see memo dated August 5, 1999 from Susan White to Pam Grubaugh-Littig) the Operator was required to have the Division present when sampling in 1999.

The vegetation cover on the reclaimed mine site (18.7%) in 1999 exceeds 90 percent of the reference area standard (17.8%). The vegetation cover on the reclaimed mine site was not statistically different than the reference area vegetation cover. The Operator did not meet the minimum sample size requirement when sampling vegetation cover on the reclaimed mine site. The large sample variance and range of values on the reclaimed mine site explain the difficulty in meeting sampling requirements. As discussed in my memo dated August 5, 1999 the problems with this type of data is you don't know what the true value of the mean is. The true average (mean) cover of the site is somewhere between 14.8 and 22.6 percent vegetative

cover. Values below 16.3 percent (90% of the reference area, with 90% statistical confidence) cover will not meet the success standard therefore, the possibility exists that the Division will release bond when the bond should not be released. Statically this is known as a Type II Error.

Diversity

The bond release application only stated that the reclaimed area had greater diversity than the reference area. The application did not base this statement on data. The diversity standard in the permit (Section 784.13) is to establish 3 grass, 1 forb, and 3 shrub species with a relative cover value equaling or exceeding 1% at the time of bond release. Additionally, at least one of the grass species will be a warm season grass. I calculated relative cover from the Operator's data and the results are summarized below.

	Permit Diversity Standard (# Species with Relative Cover ≥ 1%)	1998 (# Species with Relative Cover ≥ 1%)	1999 (# Species with Relative Cover ≥ 1%)
Cool Season Grass	2	5	2
Warm Season Grass	1	1	1
Forb	1	0	0
Shrub	3	6	5

The permit diversity standard was met or exceeded for all categories except forbs. No non-weedy forbs were represented in either years sampling in amounts greater than a trace.

I looked at the total number of plant species encountered within quadrates during the Operator's sampling on the reclaimed area and on the reference area. The total number of species sampled in 1998 was 18 on the reclaimed area and 14 on the reference area. The total number of species sampled in 1999 on the reclaimed area was 20 and 14 on the reference area.

Total Number of Species Recorded in Sample Plots

1998 Reclaimed Area	18
1998 Reference Area	14
1999 Reclaimed Area	20
1999 Reference Area	14

Production

The bond release application states that the reclaimed mine site has greater plant productivity as compared to the reference area. No data was presented to validate this statement. The permit commits to meeting 90% of the reference area production. No production data was taken by the Operator on the reclaimed area or the reference area. The regulations do not require previously mined sites to meet a production standard.

Shrub Density

The permit standard for woody species density is 1000 stems (shrubs) per acre on 12 acres and 250 stems per acre on the remainder of the site or an overall density standard of 500 stems per acre. The regulations do not require previously mined sites to meet a shrub density standard but meeting this standard is a good demonstration of the suitability of the site for a postmining land use of wildlife. On the mine site, total shrub density was measured at 2,875 shrubs per acre in 1998 and 4,633 shrubs per acre in 1999.

Number of Shrubs Per Acre

<u>Permit Standard</u>	<u>1998 Reclaimed Area</u>	<u>1999 Reclaimed Area</u>
500	2875	4633

Postmining Land Use

The post mining land use for the site is wildlife habitat and livestock grazing. The bond release application states that the sites potential as animal habitat is good and the site contains more desirable vegetation for grazing than the surrounding countryside but has been protected from cattle grazing since 1989. No data or specific information was used to substantiate this statement.

I have inspected the reclaimed mine site numerous times since 1990. During this time I have observed significant wildlife use of the area. The following animals or evidence of animals use of the area includes; elk, deer, badger, coyotes, jack and cottontail rabbits, kangaroo mice, raptors, song birds, ducks, harvester ants, and lizards. The retained sediment pond has enhanced the site for wildlife use as noted by animal tracks surrounding the pond. Shrub density establishment averages 3700 shrubs per acre. Fourwing saltbush, the dominant shrub on site, is known to be a very palatable shrub to grazing animals.

Vegetation production information expressed in pounds of forage produced per acre is

generally used to demonstrate the suitability of an area for cattle grazing. No information concerning vegetation production on the reclaimed mine site is available. The retained sediment pond will be a good water source for cattle but unless proper fencing and pasture use is used in the postmining management plan there is great potential for overuse of the area surrounding the pond.

Site Inspection

The Phase II and III bond release inspection was conducted December 1, 1999. Cattle had trespassed within the disturbed area and a salt lick was placed adjacent to the sediment pond. Cattle trails were evident but vegetation appeared in a condition similar to the previous month's November inspection. My November, 1999 Inspection Report records grazing by rodents, rabbits and elk was evident on the entire site.

Generally, vegetation on site looks good. Areas of no desirable vegetation are still present. The areas reseeded in 1994 look very good with good vegetation establishment and diversity. Erosion is present and generally greater than off site, but not detrimental to the postmining landuse. Large gullies are mostly associated with areas that drain water from above the site.

The Division has approved removal of the north perimeter disturbed area ditch. The ditch has not been removed. The Division has required control of sediment until vegetation establishment (visual evaluation) after removal of sedimentation structures (includes ditches) on other mine sites, prior to approving Phase III bond release. Phase III bond release is not recommended until vegetation has established on the reclaimed north perimeter ditch.

Findings:

Information provided in the bond release application does not meet the minimum regulatory requirements for Phase III bond release.

RECOMMENDATION:

Do not approve Phase III bond release for the J.B. King Mine site.