



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)

November 8, 1999

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

THRU: Daron Haddock, Permit Supervisor *DH*

FROM: Sharon Falvey, Senior Reclamation Hydrologist *SFK*

RE: Phase II Bond Release, Received October 18, 1999, Western States Minerals, J.B. King Mine, ACT/015/002-99B-2, File #2, Emery County, Utah

SYNOPSIS

Western States Minerals Corporation (WSWC) submitted a request for Phase II and Phase III bond release. A memo from Pamela Grubaugh-Littig, dated July 6, 1999, indicates the Division will process the amendment for Phase II bond release. The request was determined to be incomplete with regard to Phase II bond release as was outlined in the J.B. King September 21, 1999 Technical Analyses (TA).

WSWC submitted information in response to the September 21, 1999 TA in a letter with some attached documents. The information was not presented as a complete package that would allow the public to easily access related information. Information was not submitted in a format where Phase II bond release was addressed separately from Phase III bond release.

The Division has attempted to make up for the inadequacies of the submittal by providing supporting information where it is available so WSWC can obtain bond release. Some information is proposed to be collected in the field following completion of this review: final findings can not be made on these items until the information is assessed. Where a findings determination can be made they are provided in this document.

ANALYSIS

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-880.320.

Analysis:
R645-301-880.320

Sedimentation Pond Retention

The following R645-301 regulations apply to permanent sedimentation ponds:

- 1) **733.220.** A permanent impoundment of water may be created, if authorized by the Division in the approved permit based upon the following demonstration:

Approval to retain the pond was previously granted. There were references to some of the regulatory requirements in the 1995 reclamation plan; however, all requirements were not clearly addressed and this resulted in deficiencies outlined in the September TA. The following portions summarize WSWC's response and is followed by the Divisions analyses:

733.221. The size and configuration of such impoundment will be adequate for its intended purposes;

Response:

The size and configuration was described as adequate for the intended purpose. The pond has 4H:1V slopes around the perimeter to allow for wildlife and livestock access. The capacity was stated to be sufficient to handle a large herd of cattle, but no numbers were provided describing what the animal water consumption requirements are, or how many cattle or wild life are expected to utilize the area at one time.

Analyses:

The Division considers the pond configuration adequate for the intended purpose: 4H:1V slopes provides access to livestock and wildlife. Since rainfall occurs infrequently and the pond has not been known to discharge, it can be determined that the pond holds the maximum available water following a precipitation event; therefore, the size is considered adequate for the use. Determining whether capacity is adequate for use, was based on information presented in inspection reports completed in 1991 through 1999.

- 2) **733.222.** The quality of impounded water will be suitable on a permanent basis for its intended use and, after reclamation, will meet applicable Utah and federal water quality standards, and discharges from the impoundment will meet applicable effluent limitations and will not degrade the quality of receiving water below applicable Utah and federal water quality standards;

Response:

The letter submitted by WSMC suggests the information submitted in the Memorandum, dated Sept. 10, 1992, demonstrates the long term water quality expected at the pond.

Analyses:

The information provided in the 1992 sample analyses assesses fill and refuse properties at the site using the Meteoric Water Mobility Procedure. The method uses a single pass column leach process, using de-ionized water over a 24 hour period. (Note: the procedure may not be suitable for obtaining extracts from finely divided soils such as clayey soil, sludge, and mill tailings). This does not characterize water quality data because water is not known to discharge from the pond and the site is located where evaporation rates are high resulting in a potential for increased TDS, Alkalinity, pH, salts, boron and selenium in the pond water. The Division cannot make a finding based on the information provided by the applicant and will visit the site to obtain a sample for determining regulatory compliance. The parameters and livestock water quality criteria that will be used for comparative reference are found in appendix A. The last inspection noting water in the pond was dated August 26, 1999. To obtain a worst case scenario the sample should be collected when water is low and there is a long period between precipitation events. A sample is expected to be collected on November 10, 1999 with the intent that the sample will represent a worst case scenario.

The sedimentation pond captures a majority of the sediment from the site and is not known to have discharged during the reclamation period; therefore, the requirement that discharges from the impoundment will meet applicable effluent limitations and will not degrade the quality of receiving water below applicable Utah and federal water quality standards is considered to be met.

- 3) **733.223.** The water level will be sufficiently stable and be capable of supporting the intended use;

Response:

The highest probability for capturing water is during late summer and early fall. The response memo talks about data that supports the observations, but no data is referenced or provided.

Analyses:

The Division reviewed inspection reports and quarterly impoundment inspections to summarize when water was observed in the pond from 1991 through 1999. The information is presented in table 1.

Based on the information presented in table 1, the Division considers the pond adequate for the intended purpose: the pond provides a source of water for livestock and wildlife. Water is available intermittently during the period where livestock and large ungulates graze the area (heavy use is from November through March). In a drought or low precipitation year the pond may be dry, and at other times during the winter months the water may be frozen. Since this region is arid and few water sources are observed in the immediate vicinity, this impoundment

will have periods where it fulfills the intended postmining land use.

- 4) **880.320.** The applicant needs to provide for sound future maintenance by the operator or the landowner with the Division.

A document was presented by fax to the Division on September 13, 1999. This letter did not make it clear that the land owner, School and Institutional Trust Lands Administration, would provide for sound future maintenance.

Response:

In the response letter, received by the Division on October 18, 1999, Western States Minerals Corp. indicated that Jim Cooper, SITLA was contacted and he will communicate directly with DOGM.

Analyses:

When adequate documentation is provided to the Division, this component of the regulatory requirements will be considered satisfied.

Diversions.

The following R645-301 regulations applies to diversions:

- 1) **R634-301-742.313. Removal of all Temporary Sediment Control Measures and Diversions.**

Response:

The response memo indicates the ditch will be regraded pocked and seeded.

Analyses:

Once the applicant achieves regrading this regulatory requirement can be considered complete. There is also a section of silt fence and a wheather monitoring station that must be removed.

Table 1. Pond Water Observations

Year	Water observations	Comment
1991	July 31 September 10 December 24	Some water noted- pond previously noted dry. First observation of water by this inspector. Estimated 2 feet of water in pond inspection.
1992	February 5 March 27 April 21 August 20 October 6 December 24	Water noted- pond dry in inspection report 1/22. Water noted 2 feet estimated depth. Water noted- some water; pond dry by 6/26. Water noted- pond dry in inspection report on 7/9/92. Water noted- 1 foot estimated depth in pond inspection. Water noted- 0.03 foot depth water noted in pond inspection.
1993		No water noted for year.
1994	August 3 October 15	Trace of water noted in pond inspection- noted dry in 6/9 and 9/22 inspection report. Water noted- pond dry in inspection report 11/15.
1995		No water noted for year.
1996	September 9 October 9 November 29 December 4	Water noted - pond full. Pond dry in inspection report 7/9. Water noted. Water noted - 2.5 feet in pond inspection. Water noted - pond 1/4 full in inspection report.
1997	January 30 February 13 March 18 September 25 October 29 November 12 December 29	Water noted - inspection report. Water noted - pond 1/4 to 1/3 full in inspection report. Water noted - near dry in 4/24 and dry 5/12 inspection report. Water noted - pond 1/2 full (water from undisturbed area entered pond). Water noted - inspection report. Water noted - inspection report. Water noted - ice in pond (97 pond inspections not found).
1998	January 15 March 13 September 23 October 21 December 22	Water noted - 3 inches frozen per pond inspection. Water noted - Ice and water 0.5 ft pond inspection. Pond dry in inspection 4/29. Pond full. Pond dry in previous inspection 8/20. Water noted - 1/2 full per inspection report. Water noted - frozen per inspection report.
1999	February 24 March 23 April 27 August 26 October 10	Water noted partially full thin ice. Water noted partially full - not frozen. Pond drying out. Pond dry 6/25. Water noted - Pond estimated to be 1/2 full. Pond dry 7/16. Pond 1/3 full according to pond inspection.

Water quality standards and effluent limitations.

The following R645-301 regulations applies to water quality standards and effluent limitations:

- **UCA 40-10-17(j)**

Lands to be released shall not contribute suspended solids or runoff outside the permit area in excess of the requirements set by UCA 40-10-17(j).

For which the applicable parts state:

(j) Minimize the disturbances to the prevailing hydrologic balance at the mine site and associated offsite areas and to the quality and quantity of water in surface and groundwater systems both during and after surface coal mining operations by:

(I) Avoiding acid or toxic mine drainage.

(ii)(A) Conducting surface coal mining operations so as to prevent to the extent possible using the best technology currently available, additional contributions of suspended solids to stream -flow or runoff outside the permit are, but in no event shall contributions be in excess of requirements set by applicable state or federal law:

Acid and Toxic Drainage

The July 1995 permit amendment provides analyses of substitute topsoil materials at the site. The amendment states that after mixing, through erosion processes, the site will not produce acid and toxic forming material. Discussions under **Topsoil and Subsoil** in this TA, and information in the recommendations section of the memo provided by Robert Davidson, Soils Scientist stated " The eroded sediments containing in part coal and refuse are shown not to be toxic or acid forming when diluted with other on-site sediments."

Additional Contributions of Suspended Solids

Reclamation at the J. B. King Mine was conducted in 1985-86 and this site is one of the first sites reclaimed in Utah under the SCMRA program. Regrading at the site was completed by placing the fill against the highwall with a convex land form. The deepest fill is located in areas where adjacent undisturbed lands with high runoff rates transport water through the site. Climatic changes impose periods of drought and high intensity short duration thunderstorms on this site. Unfortunately, this results in a landform and environment predisposed to erosion, especially along the drainages.

The erosion from this site is primarily retained on site. The sedimentation pond captures the sediment and is not known to have discharged during the reclamation period; therefore, the requirements to minimize additional contributions of suspended solids to stream-flow, or runoff, outside the permit area is met at this site. In addition, Rock mulch and biosolids were added to the refuse pile to decrease erosion in 1995. This activity has increased vegetation success and uses best technology currently available to reduce onsite erosion.

The applicant submitted and compared annual sediment volumes deposited in the pond with the sheet and rill erosion rates estimated using RUSLE. The sediment deposition in the pond doubled beyond the average annual estimated sediment deposition for 1997 and 1998. The increased sediment volume was attributed to high intensity storms.

An Erosion Monitoring Program was set up for the reclaimed J.B. King Mine in 1995 to monitor erosion for Bond release purposes. Information was collected on-site and off-site along erosion monitoring transects and precipitation was recorded with an on-site recording rain gauge. The response to precipitation events and recovery from erosive events at the reclaimed site was proposed to be used to determine whether the erosive rate at the site is acceptable for the post mining land use.

A photographic record was also obtained on the site for each transect. Data was collected twice for the first two years after installation. The applicant installed a recording rain gauge and collected data for two years. The rain gauge was provided to determine the rill and gully erosion rate changes influenced from the intensity and duration of precipitation events. The applicant has not provided any information summarizing their data.

R645-301-880.210

The Division will not make a determination whether pollution of surface and subsurface water is occurring or determine the probability of future occurrence until data is obtained and compared to state standards and standards for use.

FINDINGS

The application does not meet the minimum requirements in accordance with the R645 requirements for Phase II bond release; therefore the following needs to be provided in the bond release application:

- R645-301-733.** 1) Demonstrate that the quality of impounded water will be suitable on a permanent basis for its intended use and, after reclamation, will meet applicable Utah and Federal water quality standards.

Recommendations:

The following must be compelled before the bond is released; however, based on the commitments in the letter to the Division, the bond release can be approved for these issues.

- The north perimeter ditch routed to the sedimentation pond needs to be removed, regraded, roughened, and seeded before receiving bond release; however, based on their commitment, this section can be considered adequate to approve bond release.
- When the documentation for sound future maintenance at the site is determined, by the Division, to be adequate. Bond release can be approved.

Note: Phase III bond release will require the operator to :

- Provide a transfer for water rights at the well and sedimentation pond at the J.B. King site, or other documentation specific to this requirement in the bond release application.
- Continue to provide water quality analyses to demonstrate the water quality meets the criteria for the proposed use and other applicable water quality standards for the state.
- Show that all permanent structures meet design standards.

Appendix A: State Water Quality Criteria and Livestock Use Criteria

APPENDIX A

The following state requirements may be affected and are the water quality parameters will be analyzed with the exception of coliforms.

NUMERIC CRITERIA FOR CLASS 4 WATERS DOMESTIC, RECREATION, AND AGRICULTURAL USES

PARAMETER	CRITERIA
PHYSICAL	
pH (RANGE)	6.5-9.0
BACTERIOLOGICAL (30-DAY GEOMETRIC MEAN) (NO.)/100 ML (7)	
Max. Total Coliforms **	5000
Max. Fecal Coliforms**	200
METALS (DISSOLVED, MAXIMUM MG/L) (2)	
Arsenic	0.1
Cadmium	0.01
Chromium	0.10
Copper	0.20
Lead	0.1
Selenium	0.05
INORGANICS (MAXIMUM MG/L)	
Boron *	0.75
Total Dissolved Solids (4)	1200

FOOTNOTES:

* Although Boron is a state water quality standard the post mining land use of grazing and wildlife would not be impacted by increased levels in this parameter. (High nitrates interfere with the analyses and should be obtained in conjunction with Boron analyses if high nitrates are suspected to be present).

** Although this is a state standard for Class 4 waters it is primarily applicable to irrigation water used on crops for human consumption.

(2) The dissolved metals method involves filtration of the sample in the field, acidification of the sample in the field, no digestion process in the laboratory, and analysis by atomic absorption or inductively coupled plasma (ICP) spectrophotometry.

(4) Total dissolved solids (TDS) limits may be adjusted if such adjustment does not impair the designated beneficial use of the receiving water.

(7) Exceedences of bacteriological numeric criteria from nonhuman nonpoint.

APPENDIX A

The following information was collected at various internet sites to determine potential for Toxicity to Livestock. Because wildlife information will require a significant amount of searching the livestock levels will be used as cursory information to get a general idea of acceptable levels for the postmining land use. Further fact finding information will be conducted by the division in conjunction with development of the Bond Release directive. This information is provided as a basis to determine whether the water quality in the sedimentation pond is appropriate for the proposed use.

Obtaining the water quality data during low water will provide a good idea of the potential for a worst case scenario. The primary period of heavy use for livestock and large ungulates is from November to May.

Salinity levels for different classes of livestock are:

Low	Less than 1000 milligrams per liter (mg/l). Excellent for all classes of livestock. (Less than 1500 umhos/cm specific conductance- Montana State University).
Very Satisfactory	1000-2999 mg/l. All classes of livestock. Temporary, mild diarrhea in livestock may be noticed in animals not accustomed to this level of salinity. (1500-5000 umhos/cm specific conductance- Montana State University).
Satisfactory	3000-4999 mg/l. Satisfactory for livestock; Livestock not used to saline water may refuse it or have temporary diarrhea. 5000 - 8000 umhos/cm specific conductance. Montana State University.
Marginal	5000-6999 mg/l. Marginal for beef cattle, sheep, and horses; should not be used for pregnant or lactating animals. (8000- 11000 umhos/cm specific conductance).
Considerable Risk	7000-10,000 mg/l. Considerable risk for pregnant or lactating cows, horses, sheep, or immature animals of any class. Avoid use for all animals if possible; however, older animals may subsist on water of this quality under certain conditions.(11000-16000 umhos/cm specific conductance.

Elements and Compounds

Note: Maximum Contaminant Level (MCL), in mg/l, indicates the uppermost limit at which water should be considered safe to use. (This is probably considered to apply for a specified time period and may be considered the major water source but, this needs to be researched further).

Selenium	MCL 0.05 mg/l	Too much selenium can cause "blind staggers" or "bob-tailed disease," leading to loss of mane and tail in
----------	---------------	-----------------------------------------------------------------------------------------------------------

APPENDIX A

Fluoride	No MCL	horses, switch of cattle. Animals may recover if removed quickly from the contaminated source A limit of 2.0 mg/l is recommended. Fluoride interacts with copper in dietary minerals. Excessive levels can cause loss of tooth enamel, resulting in rapid, uneven wear. Secondary effects disturb metabolism, causing semi-starvation conditions.
Arsenic	MCL 0.02 mg/l.	Arsenic is stored by the body and can reach chronic toxicity levels, causing death.
Copper	MCL 0.5 mg/l.	In combination with phosphorus, copper plays a role in bone development. Ruminants are more susceptible to copper toxicity. Problems can occur when dietary molybdenum is either excessive or deficient.
Nitrate	No MCL	High nitrate levels may indicate high levels of biological pathogens (bacteria that can cause gastrointestinal disease). Recommended MCLs are 100 mg/l of nitrate-nitrogen plus nitrite-nitrogen, or 10 mg/l of nitrite-nitrogen alone. Excessive nitrate/nitrite intake can lead to problems in fetal development.
Cadmium	MCL 0.05 mg/l	Cadmium is considered very toxic. In young animals, increased dietary intake of cadmium can cause anemia. Reproductive problems related to cadmium have been observed in most livestock classes.
Boron	MCL 5.0 mg/l	Little scientific information on livestock boron intake is available. Slower growth rate is known to be one of the effects of too much boron in livestock water. Higher levels (150-300 ppm) can cause inflammation and edema in the legs of cattle, causing subsequent weight loss.
Chromium	MCL 1.0 mg/l	Carbohydrate metabolism in animals requires dietary chromium. Chromium toxicity from diet has been studied very little and is not considered a serious problem. Symptoms of elevated chromium intake varies among classes of animals, but primarily appear as skin and soft tissue problems.
Lead	MCL 0.1 mg/l	Pregnant goats will abort fetuses as a result of moderate levels of lead intake.
Mercury	MCL 0.01 mg/l	Mercury is not essential to animal nutrition and is not readily absorbed. Mercury can cause acute poisoning, much the same as arsenic. In cattle and sheep, dietary intake of 0.2 mg/kg mercury will cause un-coordination, unsteady gait, and eventual death.