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# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

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November 10, 1992

TO: Pamela Grubaugh-Littig, Permit Supervisor

FROM: Henry Sauer, Senior Reclamation Soils Specialist *pgl for HS*

RE: NOV N91-35-6-1, N91-35-7-1, N91-32-6-1 Abatement Proposal Response, Western States Minerals Corporation, J.B. King Mine, ACT/015/002, Folder #2, Emery County, Utah

## SYNOPSIS

The forthcoming review of the NOV abatement proposal is a rebuttal to the findings made by Western States Minerals (WSM) and their consultants. The findings made by WSM regarding the acid and/or toxic and alkalinity producing potential of the refuse material located on site are based on questionable refuse sampling procedures and analytical laboratory methods. Many assumptions and predictions made by WSM are not substantiated by physical evidence and/or verifiable data.

Therefore, it is the finding of this writer that the refuse material located in the refuse pile at the J.B. King Mine is acid and toxic forming and may adversely effect surface water quality and be detrimental to plant growth and meeting the postmining land use. As such, the permittee must fulfill the applicable requirements of the R645-301 Rules.

## ANALYSIS

The permittee contends that the soils surrounding the refuse pile have a net neutralization potential which is adequate to buffer the formation of acid created by the refuse.

The Division does not question the acid-buffering capacity of the soils derived from sandstone and shale. However, the permittee's summation of the neutralization potential of the soil and the acid potential of the refuse is incorrect. This procedure assumes thorough mixing of the soils and the refuse material, uniform rates of weathering and dissolution of the pyrites and carbonates, and water contact throughout the backfill.

The refuse material deposited by headcutting will most likely result in outwash fan depositional features. Episodes of erosion off the refuse pile may deposit refuse in thick layers where the buffering capacity of the soil will not be realized. Therefore soil solution hydrogen ion activity which the plant roots encounter on the newly exposed refuse will be acidic (see discussion below). The common perception held by many is that acid formation in an otherwise alkaline environment is beneficial to plant growth. While this may be valid, native vegetation and seeded plant species are adapted to alkaline soil conditions and may not respond favorably to a decrease in the soil solution pH. ✓

The meteoric water leaching procedure is not a valid laboratory methodology for determining the acid and/or toxic forming potential of the coal refuse material. The lixiviant acidifies the material in a column utilizing nitric acid. This procedure may exclude by adsorption and precipitation the most plant available forms of selenium, boron, molybdenum and arsenic. The meteoric method does not incorporate the effects of wetting and drying upon the refuse material or change in the redox potential encountered upon exposure of the refuse material. The time of continuous recirculation of supernatant does not describe the number of pore volumes to which the refuse was exposed. This will vary greatly in accordance with the texture and compaction of the material in the column. ✓

In addition, the sampling sites chosen by WSM to characterize the refuse were located on refuse which has been exposed to oxidized condition for the entire reclamation period and does not describe the soil solution pH of potentially exposed (i.e., material exposed by gully erosion) or covered refuse.

The Division independently sampled the refuse material at the J.B. King Mine. All samples were immediately placed in a zip-lock plastic bag, sealed and labeled. The samples were placed in a cooler until they were mailed to Inter-Mountain Laboratories, Inc. in Sheridan, Wyoming. The samples were analyzed according to the Division's Guidelines for the Management of Topsoil and Overburden, Table 6. Refuse samples were collected on the test plots at the

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following locations: 120 cm soil cover - 1/2 fertilizer treatment; 30 cm soil cover - no fertilizer treatment; 0 cm soil cover - 1/2 fertilizer treatment at 0-30 cm and 30-48 cm. The refuse sample results (see attachment) indicate a net acid potential and acidic pHs within the refuse overlaid by soil. In addition, the hot water soluble selenium concentration of the 30 cm soil cover treatment is unacceptable when compared to the Division Guidelines, Table 2.

Given the information provided, the information found within the permit and the findings of Leatherwood and Kunzler 1990, this writer must categorize the refuse material at the J.B. King Mine as acid and toxic forming as defined in the R645-301 Coal Mining and Reclamation Rules.

#### RECOMMENDATION

The WSM's NOV abatement proposal is not acceptable and must be revised.

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Attachment  
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