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January 6, 1988

TO: Memo to File

FROM: James Leatherwood, Reclamation Soil Specialist 

RE: Coal Waste Analysis, Date Reported: December 15, 1987; Received December 23, 1987, Summit Coal Company, Boyer Mine, ACT/043/008, Folder No. 2, Summit County, Utah

Abstract

The above-mentioned analysis (Commercial Testing and Engineering Company) of the Boyer Mine gob material has been reviewed. The December 15, 1987 analysis supports the previous waste analysis (Appendix 6D-MRP) indicating an acid- or toxic-forming material. The material is considered an acid- or toxic-forming material due to the high sulfur content and boron availability.

Recommendations

1. Continue with further analysis as required by the approved permit package.
2. Include non-sulfate determinations in all future gob analysis.

Discussion

The Acid-Base Potential methodology of analysis was unclear in the lab report. The report contained percent sulfur but not percent calcium carbonate. In accordance with the Division's Soil and Overburden Guidelines and Smith et. al. (1974) Mine Spoil Potentials for Soil and Water Quality, EPA-670/2-74-070, percent calcium carbonate and non-sulfate sulfur are required in calculating the Acid-Base Potential. Mr. Gary Zito of Barringer Laboratories in Golden, Colorado, was contacted by telephone (303-277-1687) January 5, 1988 concerning the procedure utilized. Mr. Zito stated that the

Acid-Base Potential determination was based on titration analysis. The titration analysis indicates the Acid-Base nature at the time of analysis. The Smith et. al. (1974) procedure models the potential acid production possible. The submitted lab report did report, however, that the titration was less than 1 ton CaCO_3 /1000 tons, indicating a potentially acidic nature. The analysis reported the percent sulfur at 1.44 and 0.92. This calculates to an Acid Production Potential of -45 and -28.95 tons CaCO_3 /1000 tons, respectively. One can infer the neutralization potential by the amount of Fizzability reported. The lab report indicated "no" for each sample. Thus the calculated Acid-Base Potential is -45 and -28.95 tons CaCO_3 /1000 tons. Previously reported Acid-Base Potential was calculated as -64.5 and -22.9 tons CaCO_3 /1000 tons material (Appendix 6D of the MRP). The Division considers any material less than -5 tons CaCO_3 /1000 tons as an acid- or toxic-forming material.

The acid production potential (APP) in these calculations is based on total sulfur. To determine a more accurate APP only non-sulfate sulfur should be used. The non-sulfate sulfur would include organic (residual) sulfur and pyritic sulfur. Specific tests for organic and pyritic sulfur should be determined in the future. It should also be noted that the type of pyritic sulfur affects the actual acid production. Usually small, non-crystalline, high surface area pyrite will oxidize and generate more acid than large, massive crystalline pyrite. X-ray diffraction may be necessary to evaluate the type of pyritic sulfur. The Division does not require this analysis at this time.

The submittal also indicates another toxicity problem. Boron is reported at 16 and 27 ppm for Summit Coal Gob #1 and #2, respectively. According to the Division Guideline for Management of Topsoil and Overburden for Coal Mining, any material greater than 5 ppm is considered toxic. Boron is specifically toxic to vegetation. This parameter should be closely evaluated with future data submittals as required by the approved MRP.

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