

ASSESSMENT OF MICROBIAL ACTIVITY IN FIELD SITE SULFATE REDUCING BIOREACTORS¹

E. Buccambuso², L. Figueroa³, and D.Reisman⁴

Abstract: The purpose of this study is to evaluate the microbial activity in field site sulfate reducing bioreactors. Three separate systems were investigated, two of which are passive treatment systems located in 10-mile Creek Basin, Montana, which are designated Peerless Jenny King, Luttrell. The third system is the Leviathan bioreactor, which is an ethanol- fed, flow- through sulfate reducing reactor located near Markleeville, California. Batch cultures, or bioassays, were used to determine the effect of substrate addition, and microbial activity was assessed with the use of the measurement of overall microbial gas production , identification of the gas produced through GC analysis, and quantification of the organic acids produced as a result of microbial metabolism by HPLC. The microbial activity of the bioreactor samples was found vary with bioreactor design and spatial location.

¹Poster paper presented at the 7th International Conference on Acid Rock Drainage (ICARD), March 26-30, 2006, St. Louis MO. R.I. Barnhisel (ed.) Published by the American Society of Mining and Reclamation (ASMR), 3134 Montavesta Road, Lexington, KY 40502

²Emma Buccambuso, Department of Applied Chemistry and Geochemistry, Colorado School of Mines, Golden CO 80401 email ebuccamb@mines.edu, ³Linda Figueroa, Department of Environmental Science and Engineering, Colorado School of Mines, Golden CO 80401 email lfiguero@mines.edu ⁴David Reisman, Engineering Technical Support Center, USEPA, 26 W. Martin Luther King Blvd., Cincinnati, OH, 45268, email reisman.david@epa.gov

Bibliography

- Logan, M.V. 2003. Microbial activity and the rate- limiting step in degradation of cellulose-based organic material to support sulfate reduction in anaerobic columns treating synthetic mine drainage. Thesis project. Colorado School of Mines, Golden CO.
- Logan et al. 2005. Microbial community activities during establishment, performance, and decline of bench-scale passive treatment systems for mine drainage. *Water Research*. **39**, 4537-4551.