

MICROBIOLOGY OF SULFATE-REDUCING PASSIVE TREATMENT SYSTEMS¹

Amy Pruden², Luciana P. Pereyra³, Sage R. Hiibel³
Kenneth F. Reardon⁴, Linda Figueroa⁵, and David Reisman⁶

There is significant need for fundamental knowledge of the microbiology of sulfate-reducing passive treatment systems, such as wetlands and compost-based biozones. Our recent work has shown that though sulfate-reducing bacteria perform the ultimate function of sulfide production and metal precipitation, they typically represent only 1% of the total microbial community active in compost-based biozones. Sulfate-reducers rely on the activity of anaerobic cellulose-degraders and fermenters to break down the compost into simple organic compounds that they are capable of utilizing. Our work has focused on the development and application of biomolecular tools that directly target DNA. Polymerase chain reaction (PCR), cloning, and quantitative real-time PCR provide a means to profile and quantify key groups of microorganisms in the environment. This poster describes the application of these tools at two field sites: Peerless Jenny King and Luttrell, near Helena, MT. The overall focus is on insights gained for improving current design criteria with respect to the microbiology.

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

²Amy Pruden, Department of Civil Engineering, Colorado State University (CSU), Ft. Collins, CO 80523 email apruden@engr.colostate.edu ³Luciana P. Pereyra, ³Sage R. Hiibel, Department of Chemical and Biological Engineering, CSU, ⁴Kenneth F. Reardon, Professor of Chemical Engineering, Department of Chemical Engineering, CSU, email reardon@engr.colostate.edu, ⁵Linda Figueroa, Department of Environmental Science and Engineering, Colorado School of Mines, Golden CO 80401 email lfiguero@mines.edu ⁶David, Reisman, Engineering Technical Support Center, USEPA, 26 W. Martin Luther King Blvd., Cincinnati, OH, 45268, email: reisman.david@epa.gov .