



WATER RESOURCES RESEARCH GRANT PROPOSAL

Influence of Mine Reclamation Amendments on Metal Mobility and Water Pollution Potential

Focus Categories:WQL, ST, G&G

Keywords: Metals, Oxyanions, Colloid Assisted Transport, Sorption, Humic Acids, Chelation, Organic Matter

Project Duration: June, 1998 - September, 2000

Federal Funds Requested: \$35,590

Non-Federal Matching Funds: \$71,180

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Congressional District: 41st, Montana

Statement of Critical Regional or State Water Problem

There are over eight thousand abandoned mines in Montana alone and thousands more across the North Central Region. Wastes from abandoned sulfide mineral mines have the potential to release significant levels of acidity, heavy metals, and toxic oxyanions (As) to groundwater thereby reducing the quality of ground water resources in this region. Both abandoned and active mines are currently being reclaimed using various surface amendments that enhance the revegetation potential of these sites, but may also increase the loss of metals and oxyanions to subsurface water resources. The wide spread nature of abandoned mines in the West and Midwest creates an insidious, long-term "non-point source" degradation of water resources throughout this region. As more of these inactive mines are reclaimed, it will become increasingly critical that researchers describe the potential effect that organic mine reclamation amendments have on rates of metal transport to ground water via chelate or colloid assisted transport.

Statement of Results or Benefits

Our research is aimed at providing the much needed information on how organic mine reclamation amendments influence metal mobility and ground water pollution potential. A thorough experimental research program will be designed to investigate the mechanisms by which organic compounds associated with organic mine reclamation amendments sorb or chelate metals and in turn influence the vertical mobility of these contaminants. We will establish both laboratory and field experiments that specifically address the influence of various commonly used organic mine reclamation amendments on metal and oxyanion mobility with particular emphasis on chelate or colloid assisted

transport of metals. The results will provide insight into whether certain amendments actually increase metal or oxyanion mobility and thus groundwater pollution potential.

This research will:

- Assist in our understanding of the effect of various organic amendments on metal and oxyanion mobility in mine reclamation efforts.
- Provide operational guidelines for the use of organic amendments in acid mine reclamation.
- Enhance the potential for successful mine reclamation and minimize the potential for metal loss to groundwater.

Serve as a source of base line information for the development of models that predict metal loss to groundwater with and without surface organic amendments.