Report for 2003WV16B: WRI54: Passive Treatment of Cl Contaminated Waters in NW West Virginia Using Passive Absorptive Technologies

- unclassified:
  - None.

Report Follows

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Introduction

In West Virginia there currently exists no state specific surface water quality limit for chloride. The limit currently on record for chloride, 230 mg/L, comes from federal water quality standards and are currently not heavily regulated within the state. However, the WV Division of Environmental Protection has recently been discussing monitoring chloride concentrations in discharge waters and enforcing existing chloride limits. Chloride concentrations have been detected > 1000 mg/L (over 5x the current standard) in several underground mine discharges in northern West Virginia, which will require many operators in this region to continually treat for chloride removal. Unfortunately, passive treatment technologies exist to address chloride removal from contaminated waters. The only alternative is for operators to construct and maintain expensive active treatment facilities to remove chloride. In addition, since chloride limits have not been enforced in the past, there has been little research on passive treatment of chloride contaminated waters. The result is that little is known about the potential for and effectiveness of passive chloride treatment systems.

The ultimate result of this project will be a better understanding of the absorptive potential of various materials, including acidified AMD sludge, on anionic species present in acid mine drainage (AMD). Of particular interest is chloride and its affinity for sorption sites. Also of interest if the interaction between Cl and other anionic species, particularly sulfate, that may inhibit Cl absorption and favor $SO4^{2-}$ absorption or visa versa. The results of this project can then be used to make recommendations for Cl removal in the field.

Synopsis of Accomplishments

Due to a delay in getting a subcontract in place between West Virginia University and West Virginia State College, the project was delayed in starting. It is anticipated that a no cost extension for up to one additional year will be necessary to allow additional time for project completion.

During the spring of 2004, however, the ICP has been calibrated to detect chloride, potassium, iron, aluminum and manganese at experimentally relevant levels and 26 other elements at background levels. Brines of various concentrations have been allowed to interact with iron, aluminum and manganese hydroxide sludge samples. Typical chloride reduction observed in these experiments was 60%. In experiments employing manganese, unacceptable enrichment of the aqueous phase with manganese was observed along with chloride reduction. Future experiments will focus on sludges of iron, aluminum, and mixed composition sludges obtained from abandoned mine lands. A variety of interaction protocols will be examined.

Publications

None yet.

Information transfer activities

None yet.

Student Worker Summary

None yet. However, anticipate having one M.S. graduate student begin work on this project in the fall of 2004.

NIWR-USGS Student Interns

None

Notable achievements and awards

None