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***IN-situ* Mitigation of Iron in a Net-alkaline Environment**

Project No. WV-238

Funding: \$100,000 US DOI/OSMRE
\$ Cost-Share
\$ Total Value

Project Duration: 9/30/2006 – 6/30/2008

Recipient: West Virginia University

Principal Investigator: Richard Herd, Program Coordinator
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Project Description: This study investigates the hydrodynamics of flow in the T&T / Ruthbelle mine complex, in Preston County West Virginia. This complex consists of three mines: T&T #2, T&T #3, and Ruthbelle. On April 25 1994 a blowout at the T&T #2 pit mouth resulted in environmental impacts to Muddy Creek and the Cheat River. A subsequent Consent Decree led to a hydrologic study of the mine complex and the injection of 80,845 tons of limestone sand as an *in situ* treatment.

The study also evaluates the efficacy of *in situ* use of hydrogen peroxide as an oxidizing agent. This requires that the flow to be treated be concentrated in one or just a few mine entries. Two holes were drilled into the mine. The upstream hole was for hydrogen peroxide injection and the downstream hole was for sampling of the mine water.

Field measurements of pH, oxidation reduction potential (ORP), and dissolved oxygen (DO) all responded to the addition of hydrogen peroxide. Field titration of the raw mine water using pH, DO and ORP were conducted to establish the ferrous oxidation end point. This injection rate was varied periodically and the effect of these different rates were measured at the sampling well. Water samples were also taken and measured for total, dissolved and ferrous iron.

Project Significance: This project allowed costs and flows to be determined as well as application rates for hydrogen peroxide. It allowed for more accurate estimations of application rates and the appropriate allowances for sludge storage and limestone sand injection.