WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002AR13B

Title: Processes And Controls Affecting Water/Rock Interaction in Abandoned Underground Coal Mines, Including Feasibility and Risk Assessment of Using Mine Water for Public Drinking Water Sources

Project Type: Research

Focus Categories: Hydrogeochemistry, Water Quality, Water Supply

Keywords: Water Chemistry, Water Quality Modeling, Water Resources Development, Water Treatment, Surfact-Groundwater Relations, Health Effects, Heavy Metals

Start Date: 03/01/2002

End Date: 02/28/2003

Federal Funds: $25,102

Non-Federal Matching Funds: $50,205

Congressional District: Third

Principal Investigator:
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Abstract

This research addresses the feasibility of using flooded coal mines as safe, viable sources of drinking-water supplies, and incorporates an interdisciplinary approach to evaluate the effectiveness of this potential use. The study is process-oriented, and uses the case study for the city of Greenwood, Arkansas, an area representative of many coal-mining regions in the eastern and midcontinent of the U.S. The study utilizes hydrogeologic characterization of the mines and related aquifer/confining bed framework, continuous monitoring of surface- and ground-water sources, field reconnaissance and hydrologic boundary delineation, historic data compilation, surface- and ground-water quality characterization, development of integrated conceptual models of flow and geochemistry, and establishment of an on-line, interactive data base. Study tasks include ground-water quality determinations of major constituents, minor constituents, trace constituents, nutrients, microbial components, and the physical properties temperature, specific conductance, and pH at available wells, strip pits, and other sites deemed relevant to understanding the hydrogeology of this system. Sampling will be hydrologically based, meaning that low-flow, high flow, and anomalous hydrologic conditions such as major storms will trigger sample collection, rather than arbitrary quarterly or monthly sampling. The integrated conceptual model will be tested quantitatively using existing flow-modeling and equilibrium geochemical models.