

Project No. WRI-83

Project Title: Evaluation of the Environmental Hazard of Selenium in Coal-Associated Rocks of the Southern West Virginia Coal Basin

Principal Investigator: Ronald Smart

Recipient: West Virginia University

Funding:

USGS	31,892
Cost-Share	63,880
Total Project Value	95,772

Project Status: Active

Abstract

In a typical mountain top removal/valley fill (MTR/VF) coal mining operation the overburden and interburden material associated with the coal is placed into adjacent valleys containing streams. A recent study undertaken by the U.S. EPA characterized and compared the conditions in 1) streams that were not mined, 2) streams in mined areas with valley fills, and 3) streams in mined areas without valley fills in the Appalachian coal fields of southern WV. There were 213 stream samples analyzed for selenium in that study which resulted in 66 violations of the 5 ppb water quality criterion to protect aquatic life. The study to be undertaken in this proposal will develop a rapid ultrasonic water-extraction procedure to determine which portion of the coal-associated rocks contains the most selenium as well as which rock material is the most easily extracted. In addition to the total selenium extracted, its oxidation state (selenite and selenate) will also be determined since the bioaccumulation and toxicity of selenium are related to the oxidation state. The stratigraphic distribution of selenium within a 900 foot core sample will be determined. Lithigraphic/mineralogic affinities with whole-rock selenium, selenium mobilization, and selenium speciation will also be established.