INFLUENCE OF FLUE GAS DESULFURIZATION MATERIAL (FGD) ON WATER QUALITY IN AN ABANDONED DEEP MINE

Mikko O. Lamminen, James Wood, Harold W. Walker, and Yu-Ping Chin

Abstract. In this paper, a field study was carried out to examine the impact of flue gas desulfurization by-product (FGD) on water quality at an underground coal mine in central-eastern Ohio. Between October, 1997 and January, 1998, FGD was injected into the down-dip portions of the Roberts-Dawson mine in an attempt to seal major seeps exiting the mine and to coat exposed pyritic surfaces. Immediately following grout injection, significant increases in acidity, iron, aluminum, sulfur, and calcium were observed in groundwater wells located within the mine voids near where grouting was carried out. Following this initial increase in concentrations, levels of most constituents have decreased to near pre-grouting levels. At one site, located within a minespoil pile, major improvements in water quality were observed following grout injection. Geochemical modeling indicates that groundwater within the mine voids was saturated with ferrihydrite and a number of iron and aluminum sulfate solids both before and after grout injection. These same waters were also found to be saturated with respect to calcium sulfate and gypsum immediately following grout injection. Changes in water levels or re-routing of drainage flow may have resulted in the dissolution of iron and aluminum sulfate salts, and also possibly the dissolution of ferrihydrite. Dissolution of the FGD grout material may have contributed to increases in calcium and sulfate concentrations in the drainage waters.

Additional Key Words: Reclamation, Acid Mine Drainage, Coal Combustion Products

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[2]Mikko O. Lamminen, Graduate Student, Harold Walker, Assistant Professor, Department of Civil and Environmental Engineering and Geodetic Science, The Ohio State University, Columbus, OH 43210, James Wood, Graduate Student, Yu-Ping Chin, Associate Professor, Department of Geological Sciences, The Ohio State University, Columbus, OH 43210.