

DEVELOPMENT AND EVALUATION OF SEQUENTIAL EXTRACTION PROCEDURES FOR IRON-RICH PRECIPITATES ASSOCIATED WITH COAL MINE DRAINAGE¹

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Abstract: Numerous sequential extraction procedures are currently used for the analysis of contaminated soils. However, no such methods exist for the analysis of precipitates associated with coal mine drainage (CMD). Most CMD precipitates consist primarily iron oxides, hydroxides and oxyhydroxides (e.g. goethite, ferrihydrite). Precipitates collected from various Appalachian bituminous coal mine discharges are dominantly goethite; some exhibit elevated levels of metals such as aluminum, arsenic, manganese, zinc, nickel and cobalt. These associations could be related to the depositional environment and chemical properties of the coal and the overburden from which the discharge originates. Subsurface cation exchange and sorption processes can influence the trace elements that accumulate in the precipitates. In order to determine how trace elements are sorbed or bound to the iron hydroxide precipitates, sequential extraction procedures were developed and carried out on precipitates collected from bituminous coal mine discharges (including Pittsburgh, Freeport, Kittanning, Clarion and Brookville coals). The results of the sequential extraction procedures will be presented.

Additional Key Words: goethite, AMD, heavy metals, bituminous, geochemistry

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