

Backfill Hydrologic Characteristics in a Tennessee Area Surface Coal Mine

by

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The hydrologic characteristics of backfill in a Tennessee area surface coal mine provide useful information concerning the aqueous environment in a recovering water table within a reclaimed surface coal mine. Chemical analyses of water samples from observation wells emplaced in a reclaimed surface coal mine provide a measure to evaluate the overall effectiveness of post-mining reclamation activities. Graphs of chemical parameters including Total and Dissolved Fe, Total and Dissolved Mn, Alkalinity, Sulfate and Specific Conductance reveal that reclamation efforts can be effective in reducing adverse chemical impacts. Trends for Total and Dissolved Fe in water from several observation wells indicate that following an initial increase in Fe concentrations, there was a general decreasing trend to levels below the standard for concentrations permitted for discharge in natural streams. Graphs of chemical parameters also reveal that many traditional rules of aquatic chemistry are not always followed during water table recovery in a reclaimed surface mine. This is most evident in the case of metal concentrations. Increases or decreases in metal concentrations have no apparent correlation with pH levels. Metal concentrations fluctuate as pH remains relatively constant. Total alkalinity levels also fluctuate as pH remains relatively constant. Graphing water quality over time provides valuable information on observation well water quality which can be useful in regards to maintaining enforced water quality standards and as a tool in understanding the chemistry within a surface mine hydrologic regime.