

Effects of Acid Mine Drainage on CCP Grout: A Bench-Scale Weathering Experiment

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ABSTRACT

Measuring 10 cm thick and 20 cm by 48 cm on a side, four blocks composed of 100 percent stabilized Coal Combustion Product (CCP) grout were created to document the effects of acid mine discharge (AMD) flowing over cured CCP grout. Maryland Environmental Restoration Group created blocks from varying mix ratios of R. Paul Smith pulverized fly ash and Warrior Run fluidized bed combustion ash as part of ongoing Maryland Power Plant Research Program (PPRP) research to demonstrate the beneficial use of CCPs.

Started in June 2005, the experiment documents the physical and chemical degradation of CCP grout that could occur if placed as cover on abandoned underground mine pavement and exposed to AMD. To simulate abandoned mine conditions and determine environmental impacts, blocks of varying composition were placed in flowing water ranging from pH 7 to pH 3.0. Western Maryland Resource Conservation & Development collected samples of the circulating water monthly, (now quarterly), analyzing for trace metals and selected contaminants of concern. Due to the inherent buffering capabilities of the CCP grout when exposed to AMD, water samples are analyzed daily for pH and must be adjusted weekly to the specified pH level through the addition of a 5% sulfuric acid solution.

To date, the monitoring has shown an increase in standard water quality parameters (i.e., calcium, potassium, sulfate, TDS), expected from CCP grout weathering under acidic conditions. No water quality constituents show increased concentration trends that would indicate increasing weathering and/or chemical dissolution of the blocks over time.

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