

Evaluation of Water Quality Conditions Associated with the Use of Coal Combustion Products for Highway Embankments

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ABSTRACT

The Maryland Power Plant Research Program (PPRP) has evaluated the potential environmental effects of using coal combustion products (CCPs) to construct a highway embankment for the Route 213/301 overpass near Centerville, Maryland. In 1993 and 1994, BGE and Delmarva Power (now Conectiv) provided approximately 60,000 tons of Class F fly ash to create the two overpass embankments for the overpass. This study was conducted as part of PPRP's long-term program to promote the beneficial use of CCPs generated at Maryland's power plants as a means to offset environmental impacts associated with construction of landfills.

The study purpose is to evaluate the potential for leachate to form within the CCP embankment and to determine the potential for the leachate to reach and degrade ground water quality. Two multi-level monitoring clusters, each consisting of three lysimeters and one monitoring well, were installed into and beneath the CCP fill within the embankments. In addition, a multi-level cluster of soil moisture probes was installed at one monitoring location. The soil moisture probes were used to indicate whether sufficient moisture was available to extract pore water samples from the lysimeters. Two rounds of pore water and ground water samples were collected from the six lysimeters and two monitoring wells and were analyzed for dissolved trace elements and major ions. Chemical data were evaluated using concentration versus vertical distance plots to illustrate the concentration gradient of leachate constituents. Moisture content data were analyzed to show where leachate is forming in the CCP fill and to illustrate the movement of water vertically through the CCP.