

Groundwater Assessment Framework to Evaluate Relative Impacts of Surface Impoundment Closure Options

Andrew B. Bittner,¹ Ari S. Lewis,¹ Kurt Herman,¹ Eric M. Dubé,¹ Chris M. Long,¹ Bruce R. Hensel,² and Kenneth J. Ladwig²;

¹ Gradient, 20 University Road, Cambridge, MA 02138, ² Electric Power Research Institute, 3420 Hillview Avenue, Palo Alto, CA 94304

KEYWORDS: surface impoundments, coal combustion residuals, closure, groundwater

ABSTRACT

Recent regulatory activities at both the federal and state level as well as several high profile coal ash releases have led to increased scrutiny of how surface impoundments (SIs) containing coal combustion residuals (CCR) should be managed. In particular, there has been increased public and regulatory pressure to close unlined SIs due to concerns regarding impacts to groundwater quality from the leaching of CCR. We have developed a framework that details a scientifically defensible approach by which the relative impacts to groundwater associated with different SI closure methods can be assessed. The framework compares relative groundwater impacts under two general scenarios: in-place closure and excavation and redisposal.

This framework outlines a process for evaluating potential groundwater impacts of CCR leachate constituents, originating from an unlined diked or excavated SI, on a downgradient point of interest. For each closure scenario, the framework provides a set of recommended modeling approaches to simulate the potential migration of CCR constituents in leachate through the vadose zone and the saturated zone as well as the tools to evaluate the potential impacts to groundwater, including risk assessment approaches when the point of interest is a community drinking water supply. The recommended approaches vary in complexity and should be selected by the user based on the availability of site-specific data as well as how the assessment will be used for decision making.

Submitted for consideration in the 2015 World of Coal Ash Conference, May 5-7, 2015.