

Coal Fly Ash Trace Element Mobility in Soil Stabilization

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ABSTRACT

A multifaceted effort was funded by EPRI and the U.S. Department of Energy (DOE) to determine the performance of coal combustion fly ash in soil stabilization. The effort included the use of coal fly ashes for varying types of soil stabilization projects, including road, parking lot, and building subgrade sites and a simulated rainfall event, the results of which were used to compare/contrast fly ash and lime soil stabilization.

A key component was an evaluation of the potential for the release of inorganic constituents into the environment from coal fly ash-stabilized soil, performed by the Energy & Environmental Research Center. Other components of the study included engineering performance evaluation, runoff evaluation, and biotoxicity studies. Ash from five sources was used for 12 sites. Application rates were 12 or 14 parts fly ash or 5 parts lime added to 100 parts soil.

Each component of the soil stabilization was evaluated for trace element leachability and bulk composition. Composites of core samples from various locations at each site were subjected to two laboratory leaching methods and long-term leaching. Leaching results indicate that soil stabilization with fly ash is an environmentally sound option with cost and engineering advantages. Boron was found in laboratory leachates at levels above those allowed for long-term irrigation. Chromium was found at above the maximum contaminant level (MCL) in three of the leachates at one site. This may have been an anomaly, since other sites with similar treatments leached chromium at lower levels. All other leachates had trace element concentrations well below problematic concentrations.