



COAL ASH RESIDUE LANDFILL TREATABILITY STUDIES

The Problem

Coal ash residue (CCR) landfills may generate acidic and/or anaerobic conditions which allow metals such as arsenic, cobalt, lithium, molybdenum, selenium, and others to leach from the CCR and accumulate in the groundwater to above regulatory limits.

Terra Systems Experience

Terra Systems has conducted multiple batch and column treatability studies to date for CCR landfills with groundwater or groundwater and soil for several consultants to evaluate:

- buffers including sodium bicarbonate, potassium bicarbonate, calcium oxide, and sodium hydroxide
- iron containing compounds including iron oxide, ferrous sulfide, zero valent iron, ferric chloride, and commercial products containing ferrous sulfide or ferrous sulfate, and magnesium oxide/hydroxide,
- oxygenation

Terra Systems Results

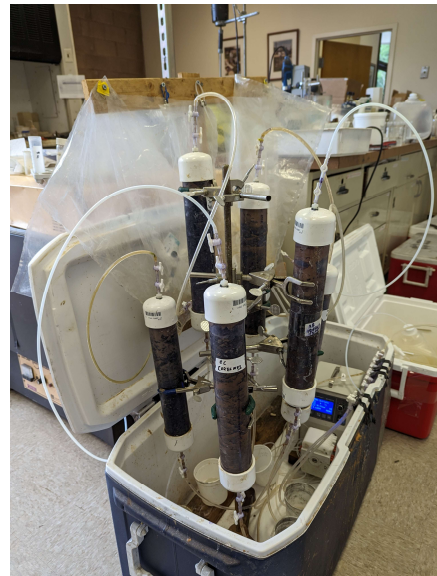
Several loadings of each reagent were tested. Batch studies showed that no single treatment to date was effective in reducing all metals in the various groundwaters to below the regulatory limits. Buffering, iron-containing reagents, and oxygenation were successful in reducing arsenic, cobalt, lithium, and molybdenum to below regulatory limits in some groundwaters and soils.

Column studies have also been conducted to evaluate sodium bicarbonate and the ferrous sulfate, ferric sulfate, and magnesium oxide/hydroxide combinations for arsenic and cobalt treatment in a flow-through system reflective of aquifers. Aeration was sufficient to reduce arsenic. Sodium bicarbonate and buffered iron salts combinations reduced cobalt to below the regulatory limits for over 12 pore volumes and 8 weeks. The columns were not run long enough for the reagents to be exhausted.

Photos of LTS in Progress



Batch Studies



Column Studies

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