Nickel

EnviroBlend® has extensive knowledge of the fate and transport of heavy metal contamination, as well as remedial action experience. Our scientists have spent years developing cost-effective chemistries for rendering lead, cadmium, arsenic, hexavalent chromium, zinc and other heavy metal contaminants non-hazardous. This research has resulted in a number of patented products that have been widely applied for heavy metal remediation sites across the country.

Industrial Waste Disposal NPL Site – South Carolina

A site surrounded by extensive residential development required stabilization of more than 57,000 cubic yards of soil impacted by arsenic, cadmium, chromium, lead, mercury, and nickel. Advanced geostatistics and XRF analysis were used to focus the site excavation and treat and handle only affected soil. Our client constructively reused treated soil, sludge, and waste. The treated soil was used as internal berms within the on-site landfill. Results included a significant reduction in the treatment of additional material by attributing the existing chromium to background sources. The project was performed for a final cost of $7 million versus the preliminary cost estimate of $12 to $25 million, based on data from the US Environmental Protection Agency (USEPA).

Powerplant Industrial Wash Water - Florida

In Florida, laboratory treatability studies were conducted to evaluate the nickel-stabilizing capacity of various soil amendments for the purpose of enhancing the attenuation of dissolved nickel from industrial wash water derived from operations at a power plant fired with Number 6 fuel oil. The wash water, containing an average nickel concentration of 10 mg/L, percolated through the base of a holding pond into groundwater. The ambient attenuation capacity of native soil was inadequate to attenuate the nickel concentration to less than the state groundwater protection standard of 0.1 mg/L. Studies were conducted to evaluate approaches to improve the attenuation capacity of the native soil with regard to nickel binding with the intent to modify the percolation pond to allow its operation for wash water disposal while also complying with groundwater quality requirements.

A series of tests were performed to identify and select appropriate metal-binding reagents, evaluate the nickel binding capacity of the selected reagents, and test various mixtures of native soil and the reagent for removing nickel from wash water to below the groundwater standard. Tests were performed in flow-through columns to measure percolation rates and nickel removal under gravity-driven flow with relatively short contact times to simulate *in-situ* infiltration through the percolation pond.

Results indicated that a relatively small concentration (4% by weight) of EnviroBlend CS mixed to a depth of 12 inches into the native soil effectively attenuated nickel from the wash water and would continue to be effective for at least 30 wash cycles (up to at least 133 mg/kg of nickel loading) or approximately five years of normal operation. Synthetic Precipitation Leaching Procedure (SPLP) analyses performed on the amended soil samples exposed to the equivalent of 30 wash cycles of soluble nickel indicated the attenuated (bound) nickel did not leach from the soil at detectable concentrations.

The state regulatory agency approved the addition of the amendment to the soil in the bottom of the pond for the removal of nickel from the facility's industrial wash water. The amendment was spread in the bottom of the pond during renovation and mixed to a depth of 12 inches. Following the placement of the amendment, wash water was discharged to the pond with no apparent effect on the percolation rate of the pond. The performance of the modified pond bottom with regard to nickel removal is being evaluated through shallow groundwater monitoring. This approach provided an initial cost savings of approximately $250,000 over other water treatment alternatives and was operated with no ongoing O&M costs.