Field Pilot Achieves Rapid Treatment of Dissolved Nickel, Zinc and Copper in Groundwater at Foundry Site

J. Andrew Irwin, PE, LSP (airwin@irwinengineers.com)
(IRWIN Engineers, Inc., 33 West Central Street, Natick, MA 01760,
Phone: 508-653-8007, Fax: 508-653-8194)

This paper reports on investigations with an *in-situ* chemical program of reductive precipitation of dissolved nickel, zinc and copper to stabilize the metals within the soil matrix. Testing has successfully demonstrated with bench-scale testing and field pilot trials applying Regenesis® products along with additional chemical additives so that Massachusetts groundwater standards are achieved within a one year timeframe.

Foundries have historically managed casting sands on-site as fill material with volumes typically measured in tens of thousands of cubic yards. Casting of specialty alloys may have introduced heavy metals to the casting sands and natural leaching resulted in dissolved concentrations that require remedial actions and pump and treat systems end up running indefinitely as material continues to leach.

Short-term bench-scale testing over 45 to 60 days was conducted to test chemical treatment performance with various doses of reagents. The bench-scale testing process is discussed and how the results were used to develop a modified chemical treatment mixture that proved to be even more effective in reducing dissolved metals than the Regenesis® MRC treatment alone.

A field pilot program in separate areas of the Site compared application of Regenesis® MRC and HRC products each with additional additives. Observed distribution of reagents within the site soils with a program involving screening field chemistry is also discussed. Both treatments were effective in the field pilot application for rapidly reducing metals concentrations to the remediation goals. Within 7 months from a single injection a field pilot program achieved reduction of dissolved nickel from concentrations of 3 to 6 mg/L to less than 0.2 mg/L and reduction of dissolved zinc from 2 to 3 mg/L to less than 0.9 mg/L.

Besides avoiding the monitoring costs for a long term pump and treat program the savings in energy with the treatment are also considerable.