



**Mixed Waste Soil Remediation,
Milwaukee, Wisconsin**
Client: WDNR/HSI Geotrans

SITUATION

In the 1950s and 60s, the property at 3033 West Walnut Street was being utilized as plating operation for Electro-coatings. Following shut down of operations, the soils within the area of the operation were found to be contaminated with Hexavalent Chrome and chlorinated VOCs (e.g., PCE, TCE, etc.). Results of a site characterization indicated approximately 14,400 tons of impacted soil to a depth of 40 feet. VOC contaminated soils were expected to be less than 7,700 ppm.

The Wisconsin Department of Natural Resources (WDNR) elected to remediate the site under a publicly funded approach. Two separate bid options were evaluated: 1) Treat metals in-place, Excavate and remove VOC soils as hazardous and incinerate; 2) Treat metals in-place and perform IN-SITU hot-air treatment on VOC soils to lower/ eliminate contamination levels to meet a non-hazardous classification for off-site disposal. In order to meet the State's treatment level, site soils had to be treated to less than 5 mg/l TCLP, Leachable Chrome, 14 ppm for PCE and 5 ppm for TCE. Bid option 2 was selected due to cost savings.

CBA'S TECHNOLOGY AND APPROACH

CBA's innovative technology was considered instrumental for IN-SITU hot-air soil treatment by the WDNR's prime contracting firm, HSI Geotrans. The primary objective was to utilize the IN-SITU soil treatment technology that could meet treatment objectives in accordance with the WDNR soil treatment criteria. CBA focused on treating the soils in shallow lifts that would be selectively removed following treatment.

RESULTS

At the request of the WDNR, CBA began IN-SITU soil treatment work on Lift No. 1 in late December. Post-treatment results indicated VOC levels of 15,000 ppm in one

of the grids. Based on treatment time, it was estimated that PCE soils within that grid were likely at or near 25,000 ppm prior to treatment. CBA completed IN-SITU soil treatment on chrome-contaminated soils in rapid fashion and continued to use hot-air treatment on VOC contaminated soils. While performing under adverse winter working conditions, heavy precipitation and the presence of marine clays, CBA was able to meet the treatment objectives for TCE and achieve 99% mass removal from the PCE soils (i.e., to about 100 ppm) with hot-air only. CBA and HSI collectively approached the WDNR and proposed the additional use of chemical amendments (i.e., chemical oxidation) in order to meet the optimal treatment objective of 14 ppm for the VOC contaminated soils.

Bench and pilot scale studies indicated that potassium permanganate could achieve the desired results. The CBA/HSI team proposed the use of KMnO₄ as a polishing step in the treatment train; this approach was still approximately \$2MM less than Option 1. CBA utilized the MITU-LVR to mix the KMnO₄ as a dry crystalline form with the VOC contaminated soils. The average KMnO₄ dose was 4% by wt., and results were generally achieved within 72 hours after initial application.

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