



Conestoga-Rovers & Associates Project Summary

KEY PROJECT ELEMENTS

- Design/Build
- Remedial Design
- CRA Innovative Technology Group
- Chemical Oxidation
- Brownfield Redevelopment

CRA was awarded the 2006 Environmental Excellence Award from Michigan Association of Environmental Professionals for our contributions to this project.

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ZM PROPERTIES SITE JACKSON, MICHIGAN



CLIENT: ZM PROPERTIES LLC
DURATION: DECEMBER 2005
COST: \$295,000

CRA was awarded a design/build project that involved completing interim response activities and remedial actions associated with soils impacted with chlorinated volatile organic compounds (VOCs) at an active industrial manufacturing facility in Michigan. The lateral and vertical extent of impacted soil was defined in a pre-design effort, followed by soil treatability studies completed by CRA's Innovative Technologies Group. Guided by the results of CRA's bench-scale testing, chemical oxidation was identified as the remedy. The chemical oxidation treatment activities utilized potassium permanganate (KMnO₄) to oxidize chlorinated VOCs identified in shallow soils (namely PCE and TCE) into carbon dioxide, manganese dioxide, potassium chloride, and hydrochloric acid.

During the design/build project, approximately 908 cubic yards (yd³) of impacted soils was treated with approximately 28,487 pounds of KMnO₄. The 908 yd³ of treated soil included approximately 710 yd³ of unsaturated soils and approximately 198 yd³ of moist to saturated soils. All soil treatment was completed in situ. To promote more efficient and thorough soil remediation, the KMnO₄ oxidant was applied directly to the VOC-impacted soil horizons targeted for treatment and homogenized within 2 or 3 foot lifts using a hydraulic mixing head (i.e., Lang Tool). Post-treatment VOC analytical results indicate that remedial efforts resulted in PCE and TCE concentration reductions that averaged 95%. After completing the treatment activities, PCE and TCE concentrations were below targeted risk-based health criteria established under Part 201 of Michigan's environmental regulations that were adopted by the client.

DNAPL assessments to identify potential free phase liquids and an ambient air-monitoring program to assess organic vapors around the treatment areas were also conducted. Results of the air monitoring program did not identify any issues or exceedances of any action level. No near misses, incidents, or accidents were recorded for the project. The project was completed at a substantial savings in both cost and time based on previous estimates provided by other parties.