

BIOREMEDIATION of TPH

with IXP^{ER}® Calcium Peroxide

CONCLUSIONS

This remediation has been conducted after removing of leaking underground storage tanks from a former gasoline service station in Bethalto, Illinois, and limited source area excavation and off-site disposal of petroleum-contaminated soils.

Dissolved petroleum constituents in excess of state regulatory standards were still observed in the groundwater. It was estimated that the remaining contamination would take more than ten years to adequately attenuate.

Enhanced aerobic bioremediation was selected as a reasonably priced relatively non-invasive means of further reducing the levels of remaining contamination.

Injection of mainly IXP^{ER}® 75C Calcium Peroxide successfully promoted reduction of concentrations for other petroleum constituents including ethylbenzene, xylenes and naphthalene.

Solvay
Chemicals



Description

Contamination

In January, 2003, CSD Environmental Services, Inc. removed 5 leaking underground storage tanks (USTs) from a former gasoline service station in Bethalto, Illinois, and conducted limited source area excavation and off-site disposal of petroleum-contaminated soils.

The exact nature and quantity of the actual release is unknown, but is suspected to be a combination of multiple leaks, spills and overfills. Dissolved petroleum constituents in excess of state regulatory standards were still observed in the groundwater beneath the site and adjacent properties more than 10 months after UST removal.

It was estimated that the remaining contamination would take more than ten years to adequately attenuate. Due to the observed contaminant concentrations and the proximity to potable water supply lines, sanitary sewer and other manmade pathways contributing to migration of petroleum and vapours, the site was classified by the state regulatory agency as high priority.

Hydrogeology

At the site, there is a 7.5 meter thick aquifer made of sand and gravel with varying amounts of fines.

The groundwater level fluctuates between 2.5 and 6 meter bgs. In general, it flows eastward towards the nearby river, although seasonal variations are observed in relation with the flow volume in the river.

Remedial Strategy

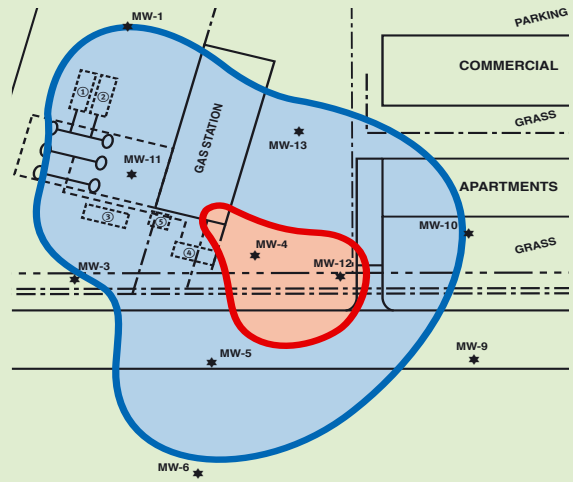
Enhanced aerobic bioremediation was selected as a reasonably priced relatively non-invasive means of further reducing the levels of remaining contamination.

Approximately 1.400 kg of magnesium peroxide and 1.700 kg. IXPER® 75C Calcium Peroxide were injected in separate wells on October 2004 at various parts of the site.

Due to its high performance, IXPER® 75C Calcium Peroxide was exclusively used for a follow up application. On March 2005, 1.000 kg of IXPER® 75C Calcium Peroxide were injected at 36 locations.



The global results of the remediation are shown on the graphs below :

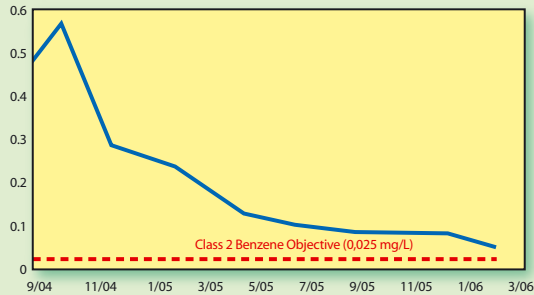


Before Injection October 2004 ■

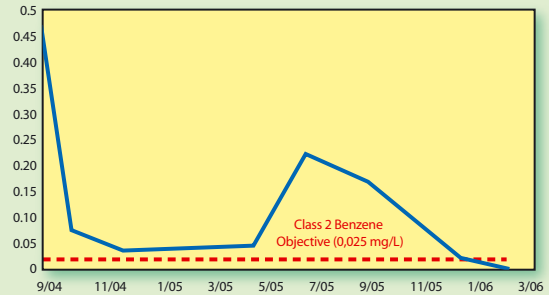
After Injection October 2005 ■

The following graphs of benzene concentrations in some monitoring wells prior to injection through 17 months of monitoring illustrate the rapid degradation of benzene resulting from the introduction of IXPER® 75C Calcium Peroxide to promote enhanced aerobic bioremediation.

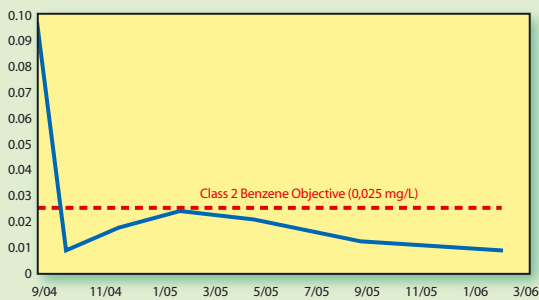
MW-4-Benzene Concentration (mg/L)



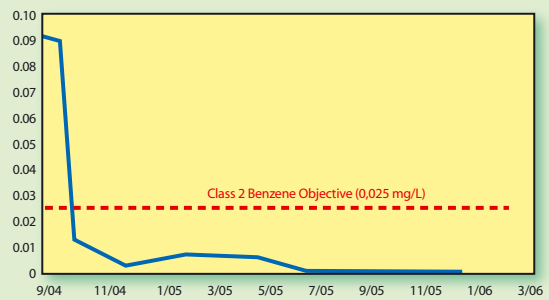
MW-12-Benzene Concentration (mg/L)



MW-11-Benzene Concentration (mg/L)

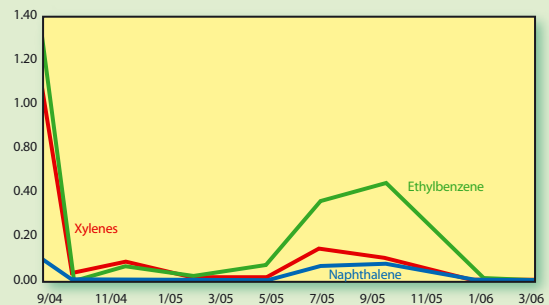


MW-13-Benzene Concentration (mg/L)



Injection of IXPER® 75C Calcium Peroxide successfully promoted reduction of concentrations for other petroleum constituents including ethyl-benzene, xylenes and naphthalene.

MW-12-Ethylbenzene, Xylenes and Naphthalene (mg/L)



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