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***Rapid Site Closure Achieved within One Year Using EHC-O™***

LUST Site, Kenosha, WI  
Lead Consultant – STS Consultants, Ltd., Milwaukee WI

***Summary***

Site groundwater was impacted by petroleum volatile organic carbons (PVOCs) as a result of leaking underground storage tanks (LUSTs). The LUSTs were removed in the early 1970s, and in October 2004, STS Consultants, Ltd. treated the groundwater plume using an alternate oxygen-release compound. However, in Spring 2005, PVOCs were still detected at significant levels. To facilitate site closure, a second round of oxygen release compound injections was conducted in August 2005. But this time **EHC-O** was used as the source of slow-release oxygen due to its ability to supply oxygen plus inorganic nutrients and buffering capacity in a more cost effective manner (US\$4.50/lb; US\$9.90/kg for EHC-O). The primary PVOC concentrations were reduced by 99% within 1 month, and all compounds were below the State of Wisconsin's Groundwater Enforcement Standards (ES). A second sampling event, four months after the injections, showed additional reductions in PVOC levels and a "No further action" letter was issued on June 5, 2006 following only two sampling events.

***The Challenge***

Site groundwater was impacted with PVOCs up to levels of 2,300 ppb and the chemical oxygen demand measured between 36 and 90 ppm. The groundwater table was approximately 5 ft (1.5 m) bgs, and the impacts extended down to approximately 15 ft (4.6 m) bgs. The lithology consisted of silty clay with occasional trace gravel at the targeted treatment depth. The redox potential measured 21 mV and the pH was 6.65. The goal was to treat the PVOCs down to their respective groundwater quality standards within a timely manner in order to facilitate Site development.

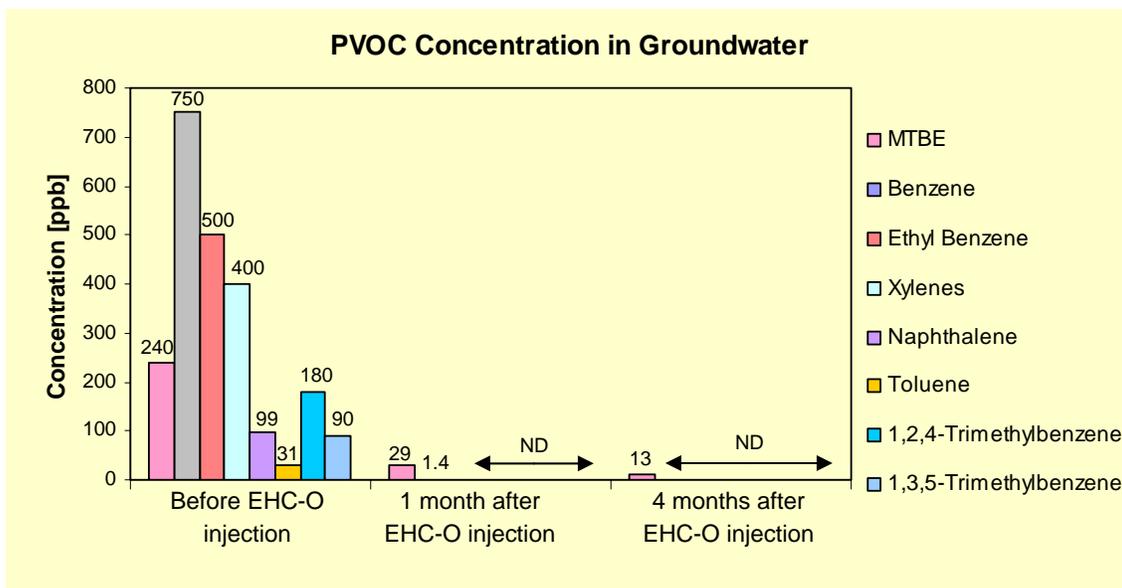
***The Solution***

In August 2005, a total of 450 lbs (205 kg) of EHC-O were introduced into 9 injection points at the hot spot area from 5 to 15 ft (1.5 to 4.6 m) bgs. The EHC-O powder was mixed with water on site into slurry (20% solids) using a handheld drill with mixing attachment and injected using direct push technology (Geoprobe grout system GS-1000 series). The injection points were spaced about 6 ft (1.8 m) apart to cover an area of approximately 20 ft x 20 ft (6 m x 6 m).



### The Result

**Figure 1** shows the concentration of PVOCs in groundwater before and after the EHC-O injection. Four weeks following the injection, six out of eight constituents of concern had decreased below the laboratory analytical detection limits. The concentration of the remaining PVOCs had also decreased significantly; the benzene concentration decreased by >99% (from 750 to 1.4 ppb) and the MTBE concentration decreased 88% (from 240 to 29 ppb). A second sampling event conducted 4 months following the injections confirmed the decreasing trend; benzene had decreased below the laboratory analytical detection limit and MTBE had decreased to 13 ppb. The total PVOC concentration decreased about 99% (from 2,290 to 13 ppb).



**Figure 1:** Concentrations of PVOC in groundwater before and after EHC-O injection.

### The Timeline and Cost

- ❖ The EHC-O injection was completed in one day. Four weeks following the EHC-O additions the concentration of total PVOC decreased about 99%, and the concentrations of all constituents were below the State of Wisconsin’s groundwater ES.
- ❖ The site was recommended for no further action within 4 months of switching to EHC-O technology and a “No further action” letter was issued on June 5, 2006 following only two sampling events (Appendix A). No further investigation or remedial action is necessary at the site.
- ❖ At US\$4.50/lb (US\$9.90/kg), the EHC-O product cost was US\$0.50/ft<sup>3</sup> (US\$18/m<sup>3</sup>).



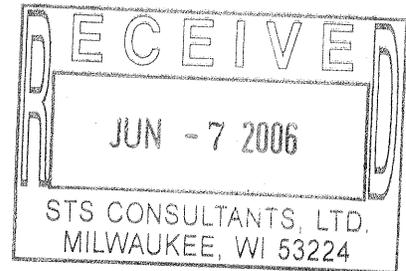
**For more information, contact us by phone at 888.295.8661 or by email at [info@adventus.us](mailto:info@adventus.us).**



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Jim Doyle, Governor  
Mary P. Burke, Secretary

June 5, 2006

Mr. Michael Zuckerman  
Builders Bank of Chicago  
1660 North La Salle Drive  
Chicago, IL 60614



RE: **Conditional Case Closure**

**Commerce # 53171-9999-71** DNR BRRTS # 03-30-113520  
May Property, 1771 30th Street, Somers

Dear Mr. Zuckerman:

The Wisconsin Department of Commerce (Commerce) has reviewed the request for case closure prepared by your consultant, STS Consultants, Ltd., for the site referenced above. It is understood that residual soil contamination remains on site. Commerce has determined that this site does not pose a significant threat to the environment and human health. No further investigation or remedial action is necessary.

**The following condition must be satisfied to obtain final closure:**

- Groundwater monitoring wells MW-2R, MW-4 and MW-5 must be properly abandoned and the appropriate documentation forwarded to me at the letterhead address.

This letter serves as your written notice of "no further action." Timely filing of your final PECFA claim (if applicable) is encouraged. If your claim is not received within 120 days of the date of this letter, interest costs incurred after 60 days of the date of this letter will not be eligible for PECFA reimbursement.

Thank you for your efforts to protect Wisconsin's environment. If you have any questions, please contact me in writing at the letterhead address or by telephone at (414) 220-5361.

Sincerely,

Monica L. Weis  
Senior Hydrogeologist  
Site Review Section

cc: Mr. Mark Mejac, STS Consultants, Ltd.