In Situ Bioremediation Using ORC®
at an Active Service Station, Lake Geneva, Wisconsin

Site Name: Service Station (actual name confidential)

Site Location: Lake Geneva, Wisconsin

Contaminants: MTBE, BTEX

Media: Groundwater

Technology: *In Situ* Bioremediation using ORC®

Technology Scale: Full

Type of Cleanup: Not provided

Period of Operation: 280 days in duration (specific dates not provided)

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Site History [1,2]:

Groundwater at a service station, located in Lake Geneva, Wisconsin, was found to be contaminated with high levels of MTBE and BTEX. Concentrations as high as 800 ug/L for MTBE and 14,000 ug/L for BTEX were detected in the contaminant plume. The source of the contamination was a leaking underground storage tank. Source control activities included removal of the UST and excavation of contaminated soil.

The groundwater at the site generally flows to the east northeast at a velocity of 0.2 ft/day. Following the removal of the UST and contaminated soil, ORC® was injected into the groundwater to enhance aerobic biodegradation in the saturated zone.

Technology Description [1,2]:

A total of 17,000 pounds of ORC® slurry (magnesium peroxide compound) was injected into the backfill excavation using a Geoprobe® (direct push) and 37 injection points. Monitoring wells M-2 and M-3 were used to monitor levels of MTBE and BTEX in the groundwater.

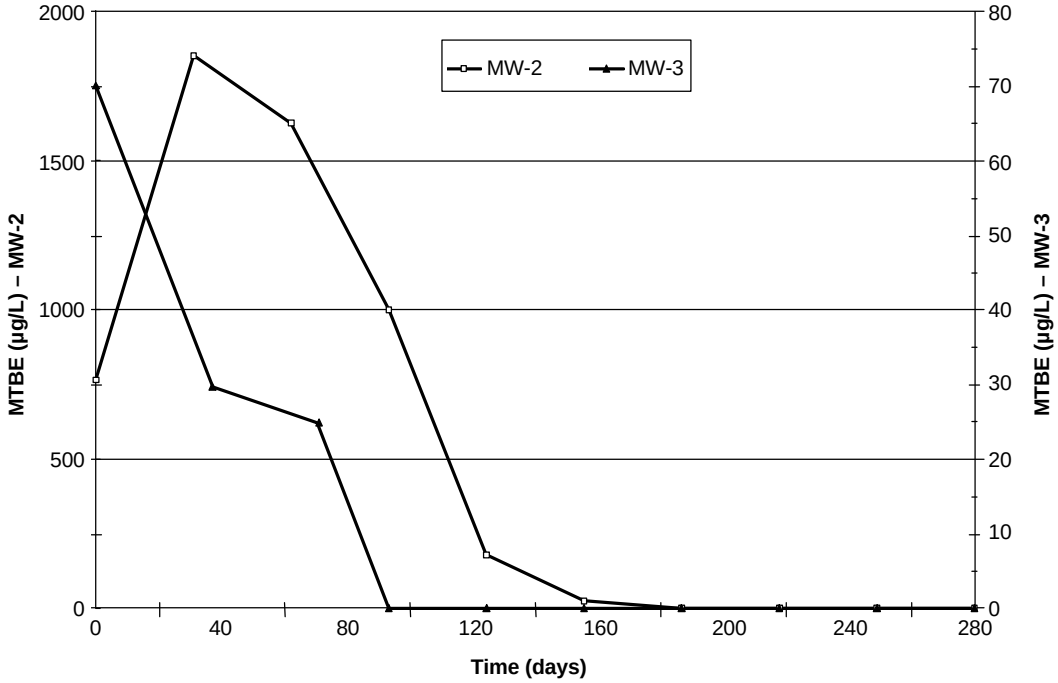
The wells were located downgradient of the former UST area - well M-2 located 13 ft downgradient and well M-3 located 7 ft downgradient.

Technology Performance [1,2]:

Groundwater samples were collected from wells M-2 and M-3 and analyzed for MTBE and BTEX starting at the time the ORC® slurry was injected (day 0) and periodically over the next 280 days. The MTBE results are presented in Figure 1.

As shown in Figure 1, after nine months of operation, concentrations of MTBE in wells M-2 and M-3 had been reduced to levels below 2 ppb, from initial concentrations of 800 ppb and 70 ppb, respectively. During the first month of operation, MTBE concentrations in well M-2 increased from about 800 ppb to 1,800 ppb, then showed a steady decline over the next eight months. MTBE concentrations in well M-3 declined rapidly during the first three months of operation and remained at low levels during the next five months of operation.

Figure 1. Concentrations of MTBE in MW-2 and MW-3 [1]



According to Regenesis, the site has been submitted to the state for closure.

Technology Cost:

No cost information for this application was provided.

Observations and Lessons Learned:

The application of ORC® slurry at the Lake Geneva former UST site reduced MTBE concentrations in groundwater from initial concentrations as high as 800 ppb to less than 2 ppb in nine months. MTBE groundwater concentrations dropped significantly within the first three months following injection, and remained at low levels throughout the next six months.

References:

1. Stephen Koenigsberg, Craig Sandefur, William Mahaffey, Marc Deshusses, and Nathalie Fortin. "Peroxygen Mediated Bioremediation of MTBE". In Situ Bioremediation of Petroleum Hydrocarbon and Other Organic Compounds. Battelle Press. Bruce C. Alleman and Andrea Leeson, editors. The Fifth International In Situ and On-Site Bioremediation Symposium, San Diego, California, April 19-22, 1999.

2. Regenesis Bioremediation Products. MTBE Pollution.com. "Slurry Injection MTBE Remediation in Wisconsin". 2000. <www.regenesis.com>