Innovative Combined Amendment Approach Successfully Applied to Treat PHC Levels

Project Highlights

- Site previously treated with a series of RegenOx® and ORC Advanced® amendments significantly reduces plume concentrations. Remaining hot spot was then treated with turn-key injection application of PersulfOx® and ORC Advanced technologies bringing closure to facility
- Successful turn-key treatment of offsite hot spot completed within five days

Project Summary

An active gas station, identified by the State of Washington Department of Ecology as one of five LUST sites within one mile of Vancouver's three groundwater monitoring wells, had entered into the state's Voluntary Cleanup Program (VCP) in 2006 subsequent to shutdown of the onsite air-sparge/vapor extraction (AS/VE) system. This system had historically been employed at the site to supply oxygen for remedial purposes and address subsurface contamination that was first discovered beneath the dispenser islands in 1993. While prior applications of RegeneOx and ORC Advanced were effective in mitigating onsite contamination, PHC levels remained above MTCA criteria offsite hindering achievement of regulatory closure.

Antea® Group—the environmental consulting firm charged with remediation—partnered with REGENESIS® to implement a remedial strategy and technical design, which included the turn-key injection application of PersulfOx and ORC Advanced technologies to address petroleum hydrocarbons (PHCs) using an *in situ* chemical oxidation (ISCO) and enhanced aerobic remediation approach.

The hot spot injection application included one event of PersulfOx co-applied with ORC Advanced, using direct push technology (DPT) injection points throughout the 3200 sq. ft. treatment area through 40 DPT injection points.

Site Details

Site Type: Active Gas Station
Contaminant of Concern: PHCs **Soil Type:** Glacial Till and Sediment
Size: 3200 sq. t.
Remediation Approach: Combined Treatment with Direct Push Technology

REGEN Ox®

PERSULF Ox®

ORC® ADVANCED OXYGEN RELEASE COMPOUND

Technology Description

RegenOx- An injectable two-part advanced *in situ* chemical oxidation (ISCO) reagent that combines a solid sodium percarbonate-based alkaline oxidant (*Part A*) with a liquid mixture of sodium silicates, silica gel and ferrous sulfate (Part B), resulting in a powerful technology that treats and destroys a wide range of target contaminants including both petroleum hydrocarbons and chlorinated compounds.

PersulfOx- An advanced ISCO reagent and all-in-one product with a built-in patented catalyst destroys organic contaminants found in groundwater and soil through abiotic chemical oxidation reactions.

ORC Advanced- An engineered, oxygen-release compound designed specifically for enhanced, *in situ* aerobic bioremediation of petroleum hydrocarbons in groundwater and saturated soils. ORC Advanced produces a controlled release of molecular oxygen accelerating aerobic biodegradation processes up to 100 times faster than natural degradation rates.

Results

For the final application event, following five on-site working days, REGENESIS completed the hot spot application process during which 9,753 lbs. of PersulfOx and 2,240 lbs. of ORC Advanced were applied to the designated treatment area. First quarter sampling results post-application showed concentrations below MTCA criteria. Following three quarters of monitoring, remediation of this site will be complete.

About the Client

Antea Group is an international engineering and environmental consulting firm specializing in full-service solutions in the fields of environment, infrastructure, urban planning and water. With more than 3,000 employees in over 100 offices around the world, Antea Group serves clients ranging from global energy companies and manufacturers to national governments and local municipalities.