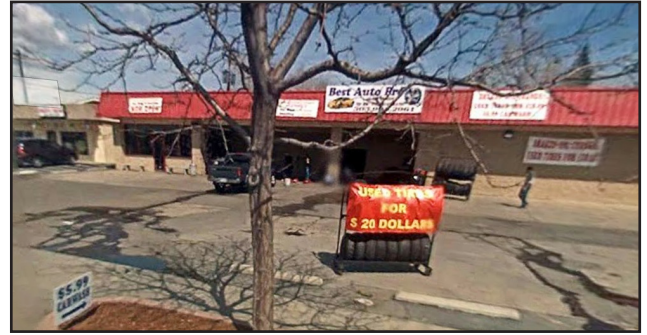


Site Closure Achieved at Colorado Service Station

Benzene Levels Reduced to Below 5 PPB in Clay Soils through Use of ORC® Advanced

Project Highlights

- Benzene concentrations remained on-site despite previous excavation efforts.
- Enhanced aerobic biodegradation using ORC Advanced produced a 99.8% reduction over 12 months
- Benzene reduced to below detection limits.
- “No Further Action” letter granted in October 2010.



Benzene concentrations persisted despite excavation efforts on-site.

Project Summary

Three underground storage tanks (USTs) were removed at a former tire store as part of corrective measures. Roughly 108 cubic yards of soils were excavated to reduce contamination levels. However, the excavation did not extend below the groundwater interface and residual sorbed contaminant mass remained, resulting in a lingering benzene plume. The client was interested in an in situ approach to reduce the remaining benzene contamination to below the Tier 1 risk based screening level of 5 ppb.

Site Type: Service Station

Contaminant of Concern: Petroleum Hydrocarbons

Concentration: Benzene – 460 ppb

Remediation Approach: Enhanced Aerobic Biodegradation

Soil Type: Clay, Sandy Clay

Technology Used: ORC Advanced

Remediation Approach

A direct-push injection of Oxygen Release Compound Advanced (ORC® Advanced) was chosen to reduce remaining soil and groundwater contamination at the location of the former excavation and well BW-1. Maximum TVPH and benzene concentrations in the prior two years were as high as 2.4 mg/L and 0.48 mg/L, respectively. Due to tighter soils, a 7-foot-on-center grid pattern with 15 injection points was implemented on-site. ORC Advanced was injected from approximately 6 to 13 feet below ground surface with about 1 foot of the injection interval extending above groundwater in the event of rising water levels. A total of 725 pounds of ORC Advanced was injected for this project.

Despite the relatively tight soils and high potential for contaminant back diffusion, the ORC Advanced treatment resulted in consistent downward trends of benzene contamination. A 96.3% reduction in benzene after only 3 months was observed. By month 12, a 99.8% reduction to below detection limits (<1 ppb) was achieved. The site was granted a no further action letter.

Technology Description

ORC Advanced® is a proprietary formulation of food-grade, calcium oxy-hydroxide that produces a controlled-release of molecular oxygen for periods of up to 12 months upon hydration.