

# RegenOx® and ORC Advanced® Application Reduces BTEX, MTBE, and TBA Concentrations to Below MCL

Integrated AS/SVE, ISCO, and Enhanced Bioremediation Strategy  
Achieves Site Closure at a Former Gasoline Service Station

## Project Highlights

- Targeting of the residual soil and groundwater contamination by a combined ISCO and enhanced aerobic biodegradation approach resulted in > 98% reduction in BTEX, MTBE, and TBA concentrations
- MCLs reached and Site Closure granted two years after treatment

## Project Summary

The site of a former gas station in Garden Grove, California was contaminated with BTEX, MTBE, and tertiary butyl alcohol (TBA) following the removal of eight underground storage tanks (USTs). Under the jurisdiction of the Orange County Health Care Agency and the Santa Ana Regional Water Quality Control Board, remediation of the site was undertaken with a goal of reducing the contamination to below maximum contaminant levels (MCLs).

Site remediation was first performed mechanically by an air sparging/soil vapor extraction (AS/SVE) system, which operated effectively for approximately three years, removing >25,000 lbs of total petroleum hydrocarbons (TPH). However, soil vapor rebound testing revealed that the mechanical system had reached asymptotic conditions and was no longer effective.

To accelerate the treatment of the remaining groundwater contaminants, additional remediation efforts by a combined *in situ* chemical oxidation (ISCO) and enhanced aerobic bioremediation approach were initiated. The ISCO treatment included a regimen of five separate direct-injection events of RegenOx® over a nine-month period to effect a bulk reduction in the total contamination. Enhanced aerobic bioremediation was then used to polish off the remaining dissolved phase contaminants via injection of ORC Advanced®.

## Technology Description

RegenOx is a percarbonate-based *in situ* chemical oxidation technology that rapidly destroys petroleum hydrocarbons and chlorinated contaminants through powerful chemical reactions. It directly oxidizes contaminants while a catalytic component generates oxidizing free radicals to destroy the target compounds.

ORC Advanced is a proprietary formulation of food-grade, calcium oxy-hydroxide that produces a controlled release of molecular oxygen to enhance aerobic biodegradation.

## Results

Following treatment with RegenOx and ORC Advanced, total groundwater contaminants were reduced by 98% for BTEX, 99% for MTBE, and to non-detect for TBA, thereby achieving the target MCLs. As a result of the integrated remedial strategy, the site was formally granted closure by the Orange County Health Care Agency. This combined remedies project illustrates the effectiveness of integrating multiple technologies to achieve site closure.



## Site Details

**Site Type:** Former gas station

**Contaminant of Concern:** BTEX, MTBE, TBA

**Concentration:** TPH: 545,706 µg/L  
BTEX: 58,837 µg/L  
MTBE: 433,133 µg/L  
TBA: 83,004 µg/L

**Remediation Approach:** ISCO, Enhanced aerobic biodegradation

**Technology Used:**

