

PLUMESTOP AND HRC APPLIED AT FLORIDA RETAIL MALL TO ADDRESS CVOCs

CASE STUDY:

**Combined Remedy Effectively Reduces
Chlorinated Solvents to Achieve
Closure Status With Florida DEP**



REGENESIS®



Introduction

Florida Department of Environmental Protection Issues a Site Rehabilitation Completion Order (SRCO) Following Combined Remedy



Former Dry Cleaning Operations Lead to
CVOC Contaminated Groundwater

AECOM

AECOM, a Global Environmental
Consulting Firm, was engaged to develop
a solution for this site.



PlumeStop and HRC Provide Rapid and
Effective Remediation

A retail shopping center in St. Petersburg, Florida was the site of a chlorinated solvent spill as part of former dry cleaner operations. AECOM®, a global environmental consulting firm, was engaged to develop a solution for the site. The application called for an *in situ* groundwater treatment of low-concentration chlorinated volatile organic compounds (CVOCs). AECOM® enlisted REGENESIS® to design and implement an innovative sorption-enhanced reductive dechlorination (ERD) bioremediation approach for treating the CVOC contaminants. The CVOCs included the typical dry cleaner contaminant suite: tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-DCE), and vinyl chloride (VC).

In October 2017, REGENESIS Remediation Services (RRS) injected PlumeStop® Liquid Activated Carbon™ (PlumeStop) and Hydrogen Release Compound® (HRC), completing the sorption-ERD remedial application in a single day. The results of the effort led to the Florida Department of Environmental Protection (FDEP), Southwest District (SWD) issuing a Site Rehabilitation Completion Order (SRCO), releasing the property owner from further obligation to conduct remediation at the project site (i.e., site regulatory closure).





An Effective Solution to a Common Industry Problem

It is well established throughout the groundwater remediation industry that CVOCs are often notoriously difficult to treat and maintain below stringent cleanup levels. Many technologies can effectively reduce CVOCs to low concentrations (i.e., tens of parts per billion); however, once CVOCs attain a low-concentration, an asymptotic boundary condition occurs. In this asymptotic state, further energy input through either the continued operation of a mechanical remediation system, repeated ISCO injections, or implementation of many standard bioremediation approaches will not achieve further, sustained CVOC concentration reductions for a reasonable level of effort and cost. There are many sites where this condition prevails, prohibiting regulatory closure.



PlumeStop is an Effective and Proven Approach

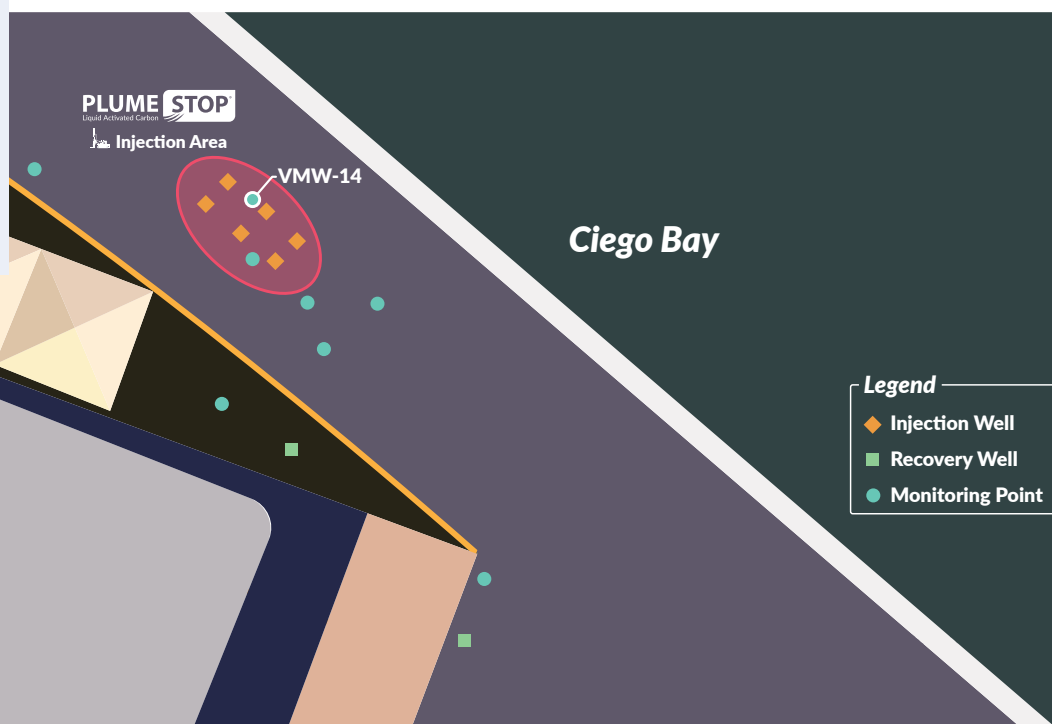
REGENESIS formulated PlumeStop with the asymptotic boundary problem in mind. Comprised of 1 to 2 micron-size activated carbon particles, with a surface treatment that allows for distribution through soil pore throats without clogging, PlumeStop deposits an enormous surface area of activated carbon onto soils in a treatment zone. The result is a near-immediate reduction of contaminants in groundwater, proven to be exceedingly effective at addressing the low residual CVOC concentrations that challenge other remediation approaches. The sequestered CVOCs are treated with amendments added to the PlumeStop treatment area to biologically or chemically degrade the contaminants at the carbon/groundwater interface, clearing further sorption space and eliminating the occurrence of rebound.

Background

PlumeStop Proposed as a Solution to Address a Common Industry Challenge

The site is located within a retail shopping plaza where a dry cleaner formerly operated at the northern end of the shopping center. In December 1998, dissolved chlorinated hydrocarbon impacts were detected in groundwater samples collected in the vicinity of the former dry cleaner, leading to the opening of an incident, investigations, and submittal of a Site Assessment Report to the FDEP-SWD. Stringent CVOC remediation cleanup goals, including an action level of 2.4 micrograms per liter VC, were applicable due to the site's proximity to surface water, specifically stemming from Ciego Bay and the Gulf of Mexico.

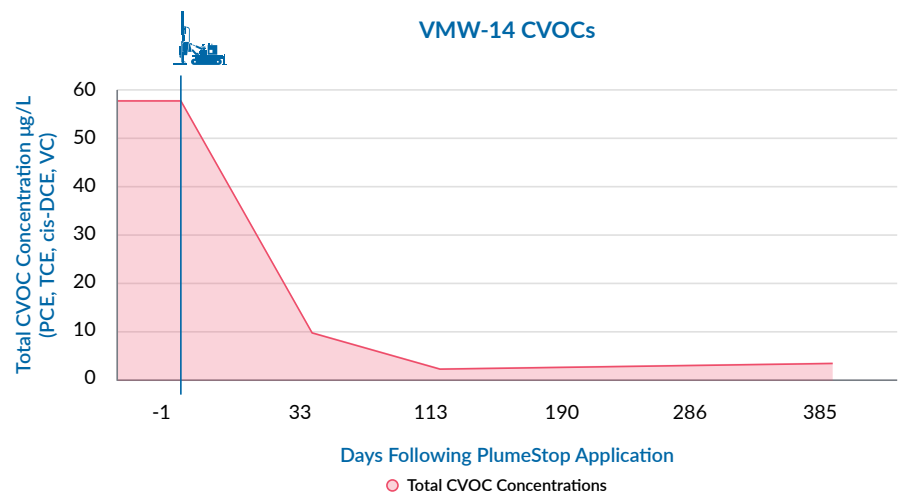
Remediation activities were originally initiated in 1999, which began with groundwater extraction and disposal, followed by the completion of *in situ* chemical oxidation (ISCO) pilot tests. In 2001, a Remedial Action Plan (RAP) was submitted to FDEP-SWP proposing natural attenuation monitoring (NAM). This approach was chosen due to groundwater data exhibiting limited effectiveness of the groundwater recovery and ISCO remediation strategies relative to their cost to implement. During the NAM period, the plume extent was reduced overall. However, beginning in 2014, CVOC concentrations had increased in one of the monitoring wells – VMW-14. At this time, REGENESIS had introduced a new, innovative liquid activated carbon amendment called PlumeStop to the market, providing a promising treatment option at the site. In response, an updated RAP was prepared in 2016, specifying PlumeStop and HRC to remediate this residual CVOC hotspot via sorption-ERD.



Application Results

Following PlumeStop Injection, the Stringent Cleanup Goals were Attained in One Month and Sustained Thereafter, Leading to Site Closure

REGENESIS Remediation Services applied the PlumeStop and HRC amendments on October 25, 2017, completing the injection in a single workday. The stringent performance objectives were met within one month post-application. The performance monitoring period demonstrated further reductions with no incidence of rebound for five consecutive quarterly sampling events, providing assurance that CVOC contaminants would not negatively impact the surface water bodies.



Additionally, as part of the monitoring effort, underground injection control variance parameters including pH, total dissolved solids and chloride were monitored for changes. These parameters were sustained below the secondary drinking water standards in the PlumeStop treatment zone. Based on these performance monitoring data, the FDEP-SWP did not require further site rehabilitation and issued the difficult-to-obtain SRCO.



About The Consultant

AECOM, Inc.



Whether it's improving your commute, keeping the lights on, providing access to clean water or transforming skylines, infrastructure powers possibilities to help people and communities thrive.

Across the globe, our clients in the public and private sectors count on us to take on the most complex challenges and pioneer innovative solutions that push the limits of what's possible – the world's longest cable-stayed bridge, record-breaking sports events, the largest greenfield port development mega project, life-sustaining disaster recovery programs, and the tallest tower in the Western Hemisphere.

On projects spanning transportation, buildings, water, governments, energy and the environment, we partner with our clients to build legacies for generations to come.

We are the world's premier infrastructure firm, delivering professional services throughout the project lifecycle.

We're planners, designers, engineers, consultants and construction managers driven by a common purpose to deliver a better world.

Technologies Used

PlumeStop and HRC



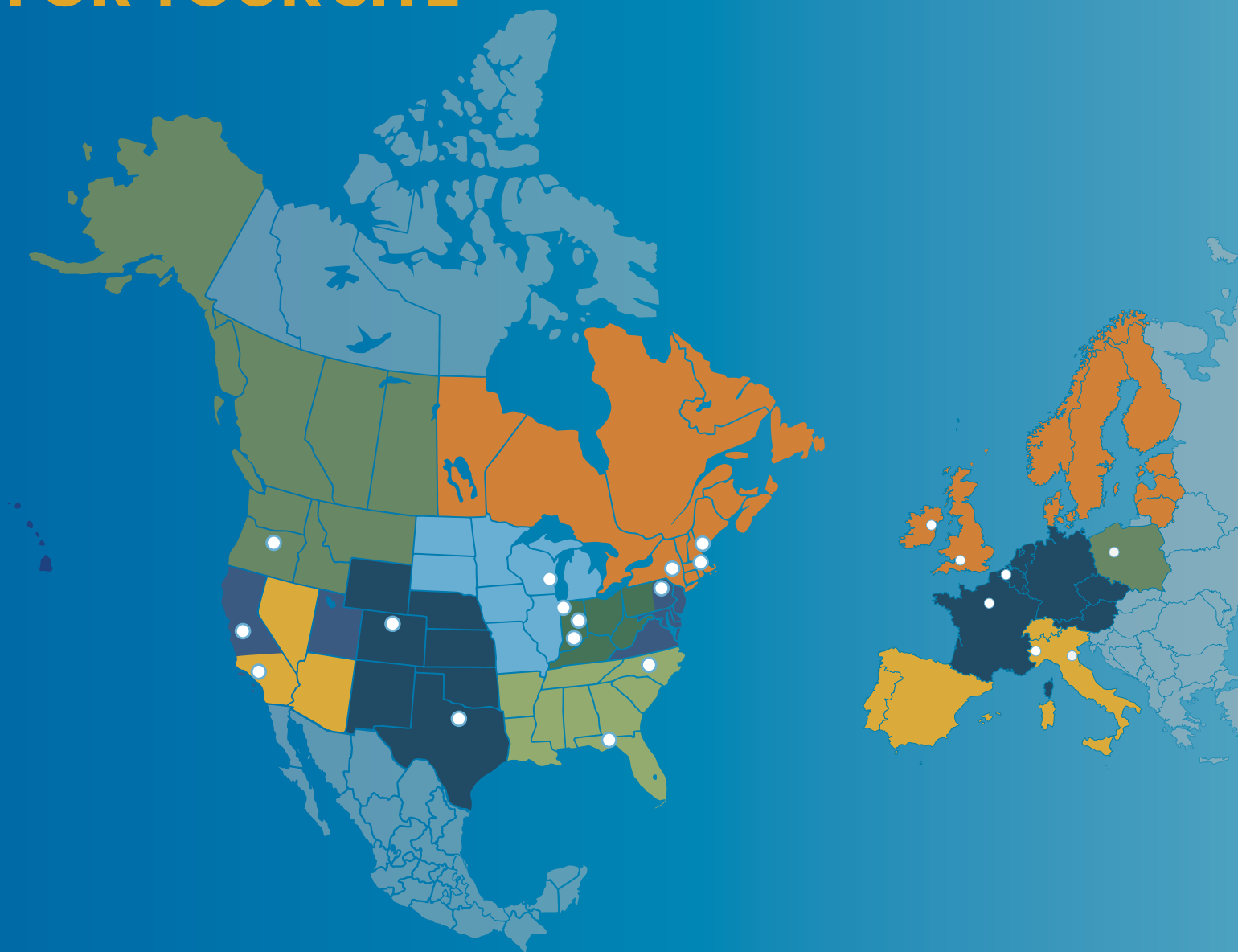
PlumeStop® Liquid Activated Carbon™ is a fast-acting groundwater remediation reagent which captures and biodegrades a range of contaminants, thus accelerating the successful treatment of impacted sites and leading to their permanent closure. As a science-based, *in situ* treatment technology, REGENESIS' PlumeStop rapidly removes contaminants from groundwater and stimulates their permanent degradation.



HRC® is an engineered, hydrogen release compound designed specifically for enhanced, *in situ* anaerobic bioremediation of chlorinated compounds in groundwater or highly saturated soils. Upon contact with groundwater, this viscous, poly-lactate ester material becomes hydrated and subject to microbial breakdown producing a controlled-release of hydrogen for periods of up to 18-24 months on a single application. HRC enables enhanced anaerobic biodegradation by adding hydrogen (an electron donor) to groundwater and/or soil to increase the number and vitality of indigenous microorganisms able to perform the naturally occurring process of enhanced reductive dechlorination.



WE'RE READY TO HELP YOU FIND THE RIGHT SOLUTION FOR YOUR SITE



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