

# EXCAVATION WITH REGENOX SUCCESSFULLY TREATS LARGE PHC PLUME

## CASE STUDY:

Successful Remediation Makes Way  
For Urban Medical Center





## C&S COMPANIES®

After previous consultants attempted remediation without success, C&S created a remediation strategy that successfully reduced the plume.



The combined remedy approach of excavation and ISCO exceeded the remediation goals.



The NYSDEC Brownfield Cleanup Program provided tax credits which made remediation and redevelopment possible.

## Overview

# Acre-Sized Petroleum Plume Successfully Treated With Excavation and RegenOx

A former gas station site in Buffalo, New York required remediation due to leaking underground storage tanks. As part of the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program, C&S Consulting designed a complex remediation program to ensure a quick and affordable solution. Petroleum contamination extended from 10 to 40 feet below grade. The site was excavated to 26 feet below ground surface to remove residual contamination and to enable equipment staging and material handling areas to support the deeper excavation area. Together with REGENESIS®, C&S designed an *in situ* remediation strategy to target the residual contaminant plume. RegenOx® *in situ* chemical oxidant was chosen because of its ability to target petroleum hydrocarbons and its non-corrosive properties.

## Background

# Uniquely Challenging Site Conditions



Successful remediation enabled the construction of a 350,000 sq. ft. \$110 million facility at the Buffalo Niagara Medical Campus.



RegenOx was chosen due to its non-corrosive properties and its ability to successfully remediate the petroleum contaminant plume.

The former gas station site had leaking underground storage tanks for over 20 years. This resulted in a contaminant plume larger than an acre. Previous remediation attempts were unsuccessful at reducing the size of the large plume. The site is located in an area of Buffalo, New York that has recently been revitalized and redeveloped into a prominent medical corridor. As a way to encourage private-sector cleanup and redevelopment of brownfields across New York State, the Brownfield Cleanup Program offers tax credits to offset the costs of remediation. This Brownfield site qualified for the program, making the remediation possible. The remediation of this site was a crucial component in the redevelopment of the former gas station into the Conventus Center For Collaborative Medicine.





## Timeline

# Remediation Efforts Using Excavation and RegenOx Accelerated Redevelopment



- **January 2013**

Soil remediation process begins



- **October 2013**

Soil remediation efforts are completed



- **December 2015**

RegenOx applied as part of groundwater treatment



- **June 2016**

Conventus has surpassed the original goal of Gold, and has been LEED Certified at the Platinum level. Only 3% of Core & Shell LEED registered projects worldwide, achieve Platinum Level certification

## Treatment

# RegenOx Was Applied to the Remaining Contamination to Reduce the Size of the Plume

## Treatment Process



RegenOx was applied to the remaining contamination to reduce the size of the plume.

**1,600** Pounds of RegenOx

The acre-sized contaminant plume was first treated through excavation and then with the *in situ* chemical oxidant RegenOx. The site was excavated to 26 feet below ground surface to remove a large portion of the contaminated soil and to install 2 floors of underground parking for the future site redevelopment. Saturated running sands destabilized the deep excavation and required development of an innovative method of deep excavation in “cells” to control the excavation integrity. As a result, 30 percent of the below grade soil conditions were stabilized with flowable fill to allow construction of the parking garage and building. This technique was one of the most important factors in the project’s success, helping exceed the remediation goals and generating additional tax credits.

The underground parking walls are sheeted with steel shoring which limited the options for remediation. RegenOx was applied to the remaining contamination to reduce the size of the plume. Additional barriers including a VI barrier, an SVI system, and ventilation in the underground parking structure are in place to ensure that patrons are not at risk from any of the contaminant plume.





## Technology Used

### RegenOx



RegenOx® *in situ* chemical oxidation (ISCO) directly oxidizes contaminants while its catalytic component generates highly oxidizing free radicals that rapidly destroy target contaminants, including petroleum hydrocarbons and chlorinated compounds. RegenOx is an injectable, two-part 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 contaminant destroying technology. The chemical oxidation reactions can continue to propagate in the presence of RegenOx for periods of up to 30 days on a single injection.





## Results

# Site Successfully Redeveloped to Make Way for Major Medical Center

C&S completed the remedial investigation, design, and oversight for the remediation of the former gas station site. As a result of the excavation and *in situ* application of RegenOx, the site was successfully redeveloped into the Conventus Center For Collaborative Medicine, a 350,000-square-foot, \$110 million facility at the Buffalo Niagara Medical Campus. The project received a Platinum Engineering Excellence Award from ACEC–New York.



### About the ACEC Awards:

*An ACEC New York hallmark for over 50 years, the Engineering Excellence Awards – the Academy Awards® of the consulting engineering industry—are held annually in the spring to honor member firms for design achievements of superior skill and ingenuity.*

*Each year, over 60 firms submit projects that are judged on a rigorous set of criteria, which includes complexity, innovation and value to society. In addition to celebrating among peers, the EEA helps to publicize the many significant contributions consulting engineers make to the built environment throughout the world.*







## The Consultant

### About C&S:



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C&S' versatile group of experts work as an integrated team, identifying and implementing well-rounded, comprehensive, and resilient solutions. Working together, C&S plans, designs, constructs, and maintains the built and natural environment. The C&S staff of nearly 500 has the expertise to handle almost any challenge.

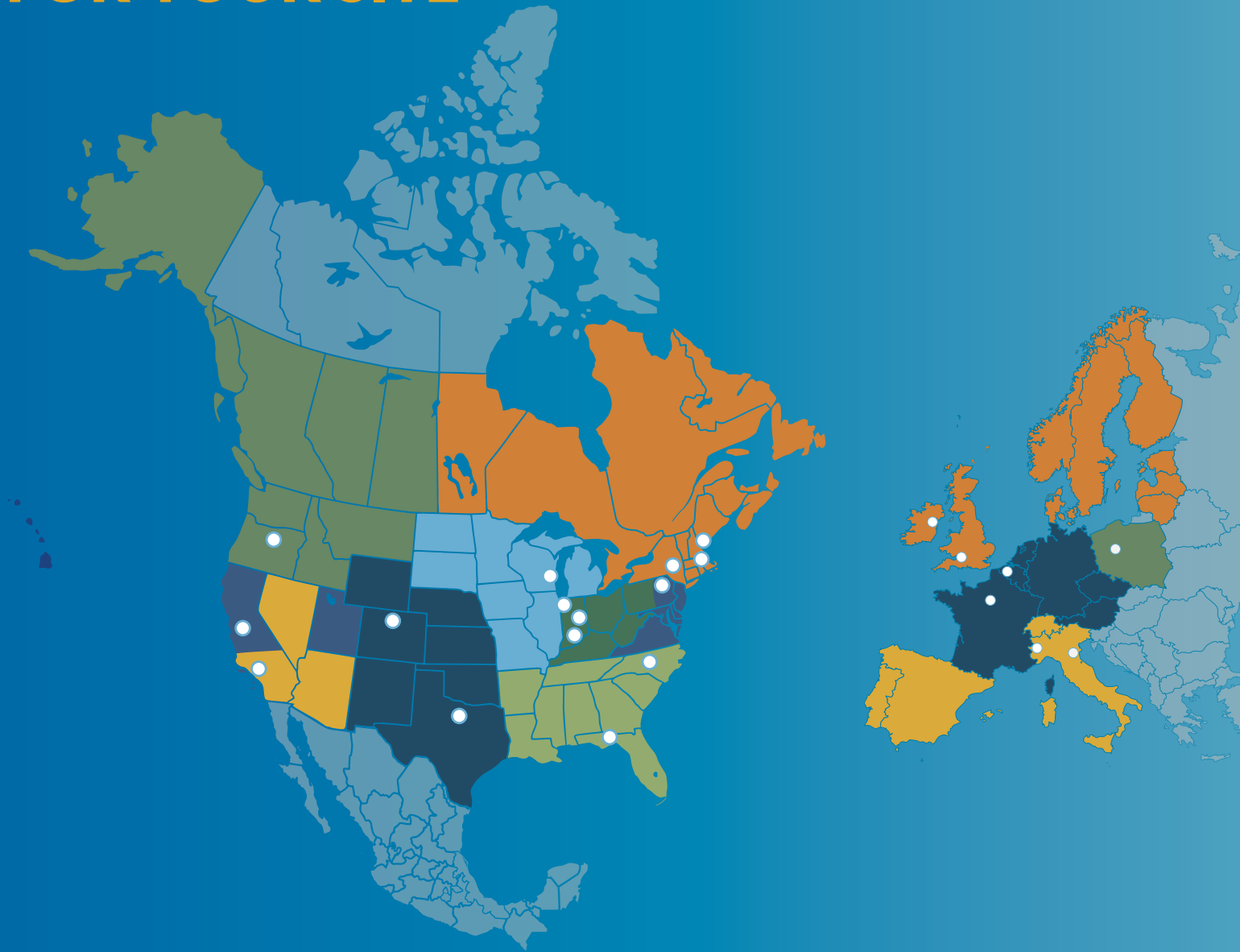
The team manages an incredible range of project types and specialties, drawing on significant in-house resources. The C&S team collaborates and combines its collective knowledge to deliver the best solutions to each client. Coordinating projects from inception through construction provides a continuity of service that clients rely on. C&S works with local, state, and federal government; the private sector; industry; developers; and the military throughout the United States and the world with a deep bench of services.



### About The Project Manager

Cody Martin is a Project Environmental Scientist with C&S Engineers, Inc., a leading environmental services company and valued REGENESIS client. Cody received his Bachelor of Science in Anthropology and a Master's of Science in Geographic Information Systems (GIS) from the University of Buffalo. In his current position with C&S Engineers, Martin's responsibilities focus primarily on Brownfield Cleanup Program (BCP) sites, a state program regulated by the New York State Department of Environmental Conservation (NYSDEC). In his role, Martin designs the remedial investigation and remedial action plans as well as documents and oversees cleanup activities.

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



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