# Enhanced Reductive Dechlorination using a Multi-Aquifer Injection Well Transect to Replace a Pump & Treat System at a TCE-Impacted Site

***Eduardo Abdo*** (Eduardo.Abdo@erm.com), Isaac Pelz (Isaac.Pelz@erm.com), and Arun Chemburkar (Arun.Chemburkar@erm.com) (ERM, Walnut Creek, CA, USA)

# Introduction

At numerous legacy cleanup sites, groundwater extraction and treatment (GWET) systems are the selected remedial approach for impacted groundwater. However, these systems are often ineffective and non-sustainable. They also present a challenge for implementing concurrent application of in situ bioremediation approaches because injected substrates have potential to foul treatment system components.

This presentation summarizes two field pilot studies of enhanced reductive dechlorination (ERD) remediation in conjunction with the required ongoing GWET system. It shares findings and lessons learned to help environmental cleanup practitioners transition away from GWET cleanup approaches to more rapid, effective, and sustainable in situ technologies.

# Discussion/ Results / Evaluation:

The goal is to implement ERD to replace the GWET system, while maintaining continuous operations for hydraulic control and managing risk of offsite migration of trichloroethene (TCE) and other compounds.

In 2023, ERM installed a transect of 14 injection wells (screened between 70 and 100 feet below ground surface), intersecting the plume perpendicularly to groundwater flow. A subsequent first ERD event was performed (184,000 gallons of reagent at an average of 8.4 gallons per minute); and 2 months after, high concentrations of total organic carbon (TOC) were observed at a GWET system well, proving successful reagent distribution, but requiring extraction well shutdown. Results showed TCE concentrations declining significantly with the plume shrinking 73 percent and limited increases of degradation byproducts (cis-1,2-dichloroethene and vinyl chloride).

In 2025, ERM implemented a second ERD event (134,000 gallons of reagent at an average of 7.6 gallons per minute), opting to deliver a less mobile substrate from select wells, which resulted in no TOC spikes in extraction wells during a 4-month performance monitoring period.

# Conclusions/ Implications

* Monthly TOC sampling was essential for monitoring initial reagent migration towards GWET system wells to avoid system fouling and maintaining extraction rates
* Integrating GWET system proved a successful tool to favor reagent distribution
* Injection well and transect design favored multiple injection events and broad distribution through the plume extents
* Different carbon substrate products served distinct purposes, achieving with:
	+ ELS™: Long distance migration, fast carbon delivery; and
	+ AquiFix™: Mid distance migration, slow carbon release for continuing GWET system operation