



## Project Highlights

### ERDENHANCED™

#### COST-EFFECTIVE cVOC REMEDIATION

- **ERDENHANCED™** biostimulates existing treatment zone biogeochemistry to enhance native dehalorespiring bacteria
- **ERDENHANCED™** enhances and nourishes native microbial populations
- **ERDENHANCED™** expedites the scavenging of alternative electron acceptors to attain methanogenic conditions faster, and keeping them longer
- **ERDENHANCED™** is *sustainable* maintaining enhanced reductive dechlorination for >10-years after a single deployment event
- **ERDENHANCED™** expedites solubilization of residual source mass increasing smear zone contaminant bioavailability
- **ERDENHANCED™** defends against rebound to uphold the realization of long-term site compliance cost-effectively and with minimal impact



## TerraStryke® ERDENHANCED™ cVOC REMEDIATION STRATEGY EVALUATION

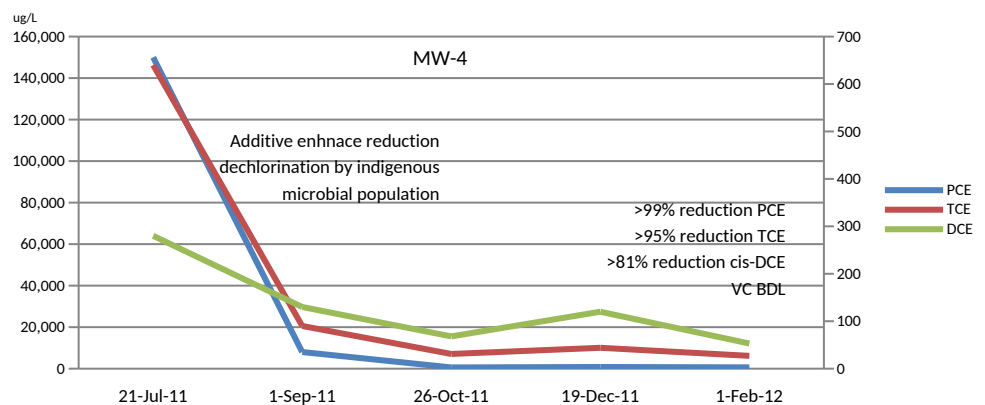
### Simple Additive Delivery Approach using PRS Units

#### Former Textile Manufacturing Facility, Hamilton, Ontario Canada

**Background:** Former textile mill, continuous operations from early 1800's through 1960's. Past use of the solvent Tetrachloroethylene (PCE) adversely impacted Site groundwater. 'Daughter' cVOCs Trichloroethylene (TCE) and cis-1,2-Dichloroethylene (cis-1,2-DCE), documented above Ontario Ministry of Environment (MOE) Table 3 SCS standards.

**Baseline:** Source zone [PCE] in groundwater 120,000 micrograms per kilogram ( $\mu\text{g}/\text{Kg}$ ); 'daughter' cVOC [TCE]  $\approx 150,000 \mu\text{g}/\text{L}$ , [cis-DCE]  $> 60,000 \mu\text{g}/\text{L}$ .

**Results:** **ERDENHANCED™** In 6-months amended groundwater realized **>99% reduction** in PCE; **>95% reduction** in TCE; and, **>81% reduction** in cis-1,2-DCE, with no rebound and/or detectable concentrations of vinyl chloride (VC).



Concentrations in above graph reported in micrograms per Liter ( $\mu\text{g}/\text{L}$ ); PCE, TCE on left axis, cis-1,2-DCE on right.

The table below summarizes the plotted results above from source test well MW-9a.

DATE	MW-9 cVOC Concentrations ( $\mu\text{g}/\text{L}$ )			
	PCE	TCE	cis-1,2 DCE	Total [cVOC]
July 21, 2011 (Baseline)	150,000	640	280	150,920
ERDenhanced Amendment Deployment				
Sept. 12, 2011	8,000	90	130	8,220
Oct. 26, 2011	600	31	68	699
Dec. 19, 2011	800	44	120	964
Feb. 1, 2012	630	27	53	710
% Change	99.6%	95.8%	81.1%	99.5%

**What happened?!?** Proper nutritive support allowed microbes to stop swimming, become sessile and, collectively established biofilm to harmoniously work their tails off!!!

**Summary:** **TerraStryke® ERDENHANCED™** enhanced indigenous microbial populations to realize **>99% reduction** in total cVOCs.

Results demonstrates superior performance with less impacts, less overall costs.

Biostimulation is **the** ideal remediation strategy because TerraStryke biostimulation additives organically and sustainably leverage Nature's 4.5-billion year strategy to attain complete contaminant destruction and Site development goals organically.



**Methods:** Evaluation performed using additive filled Passive Release Sock (PRS) deployment units. PRS units are suspended, left undisturbed, within screened interval of test well(s) to passively amend a treatment zone  $\approx 3\text{-}5\text{ft}$  (AOI). This evaluation included five (5) PRS replacement events over a 7-month period. Baseline and performance groundwater monitoring, sampling, and analytical testing completed during each event. Additive efficacy determined by comparing performance data to baseline conditions providing a low-cost, low-risk proof-of-concept process under actual Site biogeochemical. Our strategies do not employ 'trap-and-linger' adsorbing materials; rather, our biostimulation additives support indigenous microbial populations' ability to collectively seek and destroy contaminants to realize Site compliance, at less cost. Be it a pilot 'proof-of-concept' study, treatability, or full-scale application of **ERDENHANCED™** consistently provides:

- Three (3) Order-of-Magnitude reductions in cVOC constituents.
- Complete biotransformation of parent PCE/TCE to Ethene.
- Decade if not decades of extended effect-residency times after one deployment event!
- No 'cis-stall', No Vinyl chloride buildup, No above-ground support equipment.

**What does this mean to you?** Expedited site compliance without site encumbrances to redevelopment, including, equipment, field activities, and costs. **TerraStryke®** biostimulation additives are proven to cost-effectively maximize the performance of your remediation dollar.

