



### 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 reducing conditions faster, and maintain 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

#### PRS Evaluation Results include:

- ✓ **99.6%** REDUCTION [PCE]
- ✓ **95.8%** REDUCTION [TCE]
- ✓ **81.1%** REDUCTION [cis-DCE]
- ✓ **99.5%** REDUCTION [cVOC total]
- ✓ [VC] **ND** throughout study

## TerraStryke® ERDENHANCED™ cVOC REMEDIATION STRATEGY EVALUATION

### PRS Deployment Units: Simple Additive Delivery Approach

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

TerraStryke® Remediation Products, LLC (TerraStryke®) develop and distribute biostimulation additives proven to enhance native dehalorespiring populations to cost-effectively realize the destruction of chlorinated volatile organic compounds (cVOC).

#### ERDENHANCED™:

Consistently achieves 3-orders of magnitude reductions in cVOC concentrations.

Realizes extended effect-residency times >7-years after one deployment event!

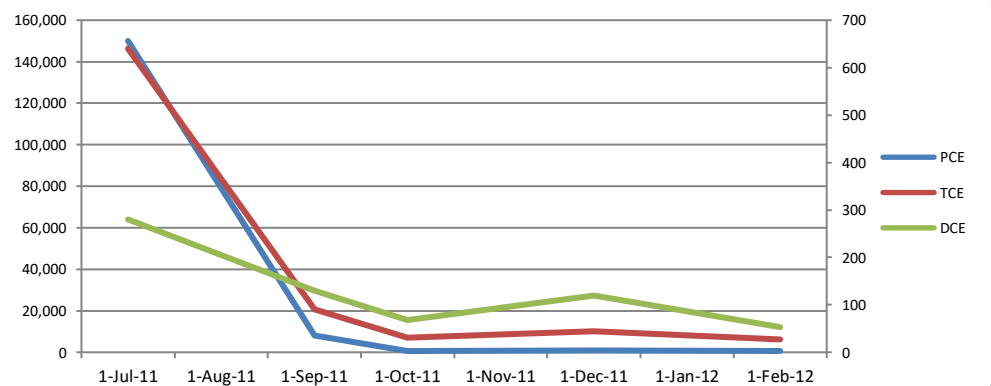
NO 'cis-stall', NO Vinyl chloride buildup, and NO above-ground support equipment.

ERDENHANCED™ is a patented additive which sustainably leverages site biogeochemical conditions, enhancing *complete* cVOC destruction for 7-10 years after a single amending event *and* eliminating rebound by expediting residual source mass non-aqueous phase liquid (NAPL) solubilization.

**Background:** Former textile mill with continuous operations from early 1800's through 1960's. Past use of the solvent Tetrachloroethylene (PCE) adversely impacted Site groundwater with PCE. Trichloroethylene (TCE) and cis-1,2-Dichloroethylene (cis-DCE) were also documented in 2010 above Ontario Ministry of Environment (MOE) Table 3 SCS standards.

**Baseline:** PCE 43,000 µg/Kg (micrograms per kilogram) in saturated soils proximate to MW-9 and the source zone contaminants. TCE and cis-DCE 1.4 µg/Kg and 0.5 µg/Kg, respectively. PCE in groundwater at MW-9 120,000 µg/Liter with TCE and cis-DCE 700 µg/Kg, and 560 µg/Kg, respectively.

**Results:** ERDENHANCED™ amended groundwater realized **>98% REDUCTION** in PCE; **>95% REDUCTION** in TCE; and **>80% REDUCTION** in cis-DCE with no rebound and no detectable concentrations of Vinyl chloride (VC). The graph below shows data from MW-9 generated over the 7-month evaluation period.



Concentrations in above graph reported in micrograms per Liter (µg/L); PCE, TCE on left axis, cis-DCE on right.

# “Make Something Good Happen Today”

**Summary:** TerraStryke® ERDENHANCED™ realized >99% reductions in total [cVOCs] in amended groundwater sampled from the limited MW-9 treatment zone. These results again demonstrate that the additive is a sustainable, cost-effective strategy for the *in-situ* remediation of cVOC contaminants. Table One summarizes data generated during the 7-month evaluation.

TABLE ONE

DATE	MW-9 cVOC Concentrations (µg/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%

**Methods:** The evaluation was performed using additive filled Passive Release Sock (PRS) deployment units. The PRS units are suspended within the screened interval of the test well(s) to passively amend a limited treatment zone of ≈3-5ft area of influence (AOI). This evaluation included five (5) PRS replacement events over a 7-month period with baseline and performance groundwater monitoring, sampling, and analytical testing completed during each event. Additive efficacy was determined by comparing performance data results to baseline. PRS evaluations are a low-cost, low-risk evaluation process completed under actual biogeochemical conditions.

PRS based Pilot evaluations typically require 6-9 months and involve 4-6 replacement events to realize completion. Each represents a low-cost/low-risk treatability study that can be used to demonstrate to stakeholders additive efficacy, prior to committing to a long-term remediation strategy.

TerraStryke® will provide the necessary amount of additive filled PRS units **at no cost** other than shipping; assuming, agreements are made prior to initiation that all data shall be shared, all data is available for publication and/or presentation, and if the agreed upon performance milestones are achieved the full-scale remediation of Site contaminants shall be pursued based on estimated quantities established on site data provided to TerraStryke® prior to the implementation of the pilot evaluation.



Please refer to our Pilot Study Guidance Document for a complete description of evaluation procedures and monitoring and testing metrics.

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Please visit [www.terrastryke.com](http://www.terrastryke.com) for additional information