



## Project Highlights

- **ERDENHANCED™ PRS Pilot Study**  
>99.6% reduction in PCE concentrations in 7-months.
- **ERDENHANCED™ PRS PILOT STUDY**  
>95% reduction in TCE  
>81% reduction in cis-DCE
- **ERDENHANCED™ >93% reduction in PCE molar mass during evaluation period**
- **ERDENHANCED™ program sponsored by City of Hamilton and Ministry of Environment**
- **ERDENHANCED™ strategy proven cost-effective expedited source zone DNAPL bioavailability and biotransformation**
- **ERDENHANCED™ Reduced O&M and Long-Term Monitoring Costs and Indoor Air Quality Issues**



## Former Textile Manufacturing Facility DNAPL Source Zone Green ERD Remediation Cannon Knitting Mills, Hamilton, Ontario Canada

**BioStryke®** Remediation Products, LLC, provide innovative and cost-effective amendment formulations designed to biostimulate treatment zone conditions and enhance the in-situ destruction of Site contaminants. **BioStryke® ERDENHANCED™** leverages existing conditions facilitating passive-aggressive destruction of cVOC dissolved, sorbed, residual source mass eliminating above-ground, energy-consuming emissions-generating equipment. **ERDENHANCED™** is proven effective in terms of both cost and performance, allowing Site compliance with less environmental impact, working with Mother Nature, not against Her.

The site is a former textile mill in operation since the mid 1800's with prior site uses including manufacturing and foundry activities. Chlorinated volatile organic compounds (cVOC); specifically Tetrachloroethylene (PCE) was frequently used and stored on-site and unauthorized releases were frequent resulting in subsurface soil and groundwater issues. Site groundwater monitoring, sampling, analytical testing documents source area PCE, and daughter byproducts trichloroethylene (TCE) and cis-1,2-dichloroethylene (cis-DCE) above Ontario Ministry of Environment (MOE) Table 3 SCS standards.

- Tetrachloroethylene (PCE) concentrations decreased **>98%**
- Trichloroethylene (TCE) concentrations decreased **>95%**
- Dichloroethylene (cis-DCE)] decreased **>80%**

The Pilot Study was sponsored by the City of Hamilton and demonstrated **BioStryke® ERDENHANCED™** a cost-effective strategy for passive-aggressive source zone cVOC contaminant destruction. The Pilot Study also provides Owners/Generators, Practitioners, Regulators a low-cost low-risk process to evaluate amendment efficacy prior to full-scale remedial strategy commitment.

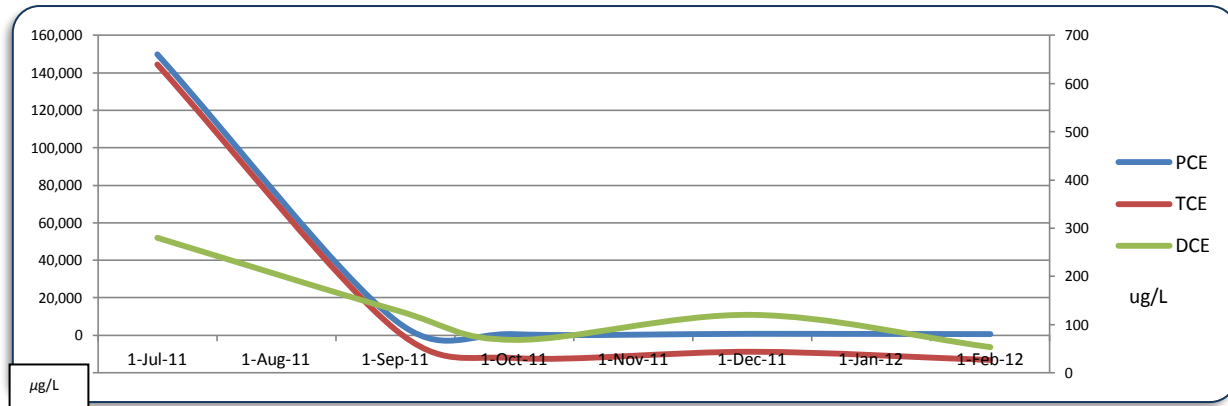
Pilot Study groundwater was amended using Passive Release Sock (PRS) deployment units filled with **ERDENHANCED™** and fit into existing 2-inch groundwater monitoring well. PRS units remain suspended within the screened interval, undisturbed, passive-aggressively amending a vertical column with an area-of-influence (AOI) of < 3-ft. Groundwater sample/analytical testing events are performed at the start, and at regular intervals throughout the evaluation, to include replacement of PRS units. PRS

**BioStryke®** amendments are suitable for any type of deployment such as Direct Push Technology (DPT), infiltrations gallery, and direct application due to enhanced solubility.

**BioStryke®** amendments are easy to handle, requiring less water, less pore space displacement, less site time, less overall remedial costs.

**BioStryke®** amendments maximize project margins while minimizing project impacts.

The **BioStryke**® Pilot Study clearly demonstrated the ability of **ERDENHANCED**™ to cost-effectively expedite the rate of *in-situ* cVOC biotransformation within phreatic zone source areas. BioStryke **ERDENHANCED**™ biostimulates the native microflora to scavenge competing terminal electron acceptors (TEAs) such as oxygen, nitrate, oxidized iron/manganese, and sulfate which can limit rates of cVOC dechlorination. BioStryke Remediation's proprietary, patent-pending formulation **ERDENHANCED**™ leverages the momentum generated by Mother Nature, enhancing the chemically reducing environment within the treatment zone, increasing rates of reductive dechlorination, expediting contaminant bioavailability and biotransformation, all with less environmental impact and lower site costs. The graph below summarizes the performance data (µg/L) collected during the herein described Pilot Study.



It is of great importance to note *prior* to full-scale deployment of **ERDENHANCED**™, within the AOI of the test well, concentration increases in daughter products were seldom observed indicating minimal levels of natural cVOC biotransformation. As a result of **ERDENHANCED**™ deployment post groundwater data documented a dramatic increase in contaminant destruction rates within the treatment zone during the evaluation period. The data also suggests little to no residual source mass is present within the treatment zone. Table One summarizes groundwater performance monitoring and analytical testing data obtained during the evaluation period. Please note no amendment has been deployed at the Site since December 19, 2011.

**Table One**

DATE	MW-9 cVOC Concentrations (µg/l)			
	PCE	TCE	cis-1,2 DCE	VC
July 21, 2011	150,000	640	280	<17
ERDenhanced Amendment Deployment				
Sept. 12, 2011	8,000	90	130	<17
Oct. 26, 2011	600	31	68	<34
Dec. 19, 2011	800	44	120	<34
Feb. 1, 2012	630	27	53	<17
<b>% Change</b>	<b>99.6%</b>	<b>95.8%</b>	<b>81.1%</b>	<b>ND</b>