

**PROJECT DESCRIPTION  
INNOVATIVE TIGHT SOIL  
PRE-TREATMENT ENHANCEMENT  
OF TRADITIONAL FENTON'S  
APPLICATION PROCESS  
FORMER GASOLINE STATION  
NEW CASTLE, INDIANA**



Targeted treatment site is a portion of an industrial property in New Castle, Indiana which had previously been used as a retail gasoline service station. The Site was impacted by historic petroleum spills from a leaking

underground storage tank. Contaminants of concern were volatile organic compounds, particularly BTEX and MTBE. Free product (LNAPL) was also found in one on-site monitoring well, MW-1. The primary source of on-site contamination (leaking UST and visually contaminated soil) had recently been removed. Permeability was low (0.03 feet per day) in native glacial till soils but high in the backfilled excavation areas. Depth to groundwater at the Site ranged from 8 to 15 feet below grade. A 4 foot smear zone was assumed because the aquifer was unconfined and fluctuates on a seasonal basis.

Based on the difficult to treat tight glacial till soil, MECX selected an innovative pre-treatment enhancement to be used in conjunction with its Traditional CleanOX<sup>®</sup> Process to treat the contaminants in the groundwater to Indiana Department of Environmental Management (IDEM) Risk Intergraded System Closure (RISC) industrial standards. The enhancement to the Traditional CleanOX<sup>®</sup> Process was an additional soil pre-treatment step designed to facilitate the delivery (fate and transport) of the desired chemical oxidant free radicals in low permeable soils. The additional pre-treatment step involved the injection of sodium persulfate solution through a customized direct push horizontal jetting tool into the saturated zone at two foot vertical intervals in a series of boreholes across the impacted area.

In December of 2003, MECX completed a one week application of the Traditional CleanOX<sup>®</sup> Process using eight stationary wells for the application of Fenton's Conditioning Reagents and Hydrogen Peroxide at the Site. The temperature of the exothermic, hydrogen peroxide induced, chemical oxidation process was continuously monitored and controlled to not only desorb the recalcitrant contaminants from the tight soil matrix but also to thermally activated the sodium persulfate which had been previously impregnated in the soil matrix.

MECX field personnel monitored the effects of the reagent application in adjacent monitoring wells to evaluate the performance of the technology at the Site. The target wells (MW-1 and MW-4) and other monitoring points in the vicinity of the application were monitored for water quality parameters including dissolved oxygen, pH, specific conductance, temperature, oxidation/reduction potential and static water level. The results of this very successful innovative approach to treat in-situ previously untreatable tight soils are presented on the next page.

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06-01-AOD-DD

**FORMER GASOLINE STATION  
NEW CASTLE, INDIANA  
(continued)**

<b>BTEX AND MTBE IN INJECTION WELLS VRP PHASE II SUBSURFACE INVESTIGATION NEW CASTLE, INDIANA</b>						
<b>BORING I.D.</b>	<b>SAMPLE DATE</b>	<b>BENZENE</b>	<b>TOLUENE</b>	<b>ETHYL- BENZENE</b>	<b>XYLENE</b>	<b>MTBE</b>
<b>RISC Default Closure Levels for Industrial Groundwater</b>		<b>99</b>	<b>20,000</b>	<b>10,000</b>	<b>180,000</b>	<b>720</b>
<b>RISC Default Closure Levels for Residential Groundwater</b>		<b>5</b>	<b>1,000</b>	<b>700</b>	<b>10,000</b>	<b>45</b>
AW-1	12/01/03	<5	<5	<b>5.8</b>	<b>20</b>	<5
	12/23/03	<b>26</b>	<b>19</b>	<5	<b>210</b>	<5
	02/20/04	<b>1.4</b>	<5	<5	<b>16</b>	<5
AW-2	12/01/03	<b>12</b>	<5	<b>6.4</b>	<b>17</b>	<5
	12/23/03	<5	<5	<5	<10	<5
	02/20/04	<1	<5	<5	<10	<4
AW-3	12/01/03	<b>5.4</b>	<b>16</b>	<b>66</b>	<b>76</b>	<5
	12/23/03	<5	<5	<5	<10	<5
	02/20/04	<1	<5	<5	<10	<4
AW-4	12/01/03	<5	<5	<5	<10	<5
	12/23/03	<5	<5	<5	<10	<5
AW-5	12/01/03	<5	<5	<5	<10	<5
	12/23/03	<5	<5	<5	<10	<5
AW-6	12/01/03	<b>67</b>	<b>290</b>	<b>33</b>	<b>220</b>	<5
	12/23/03	<b>12</b>	<b>40</b>	<5	<b>30</b>	<5
	02/20/04	<1	<5	<5	<10	<4
AW-7	12/01/03	<b>640</b>	<b>1,200</b>	<b>130</b>	<b>1,200</b>	<5
	12/23/03	<b>16</b>	<5	<5	<10	<5
	02/20/04	<b>5</b>	<5	<5	<10	<4
AW-8	12/01/03	<b>700</b>	<b>6</b>	<5	<b>16</b>	<5
	12/23/03	<b>220</b>	<b>42</b>	<b>81</b>	<b>100</b>	<5
	02/20/04	<b>40</b>	<5	<5	<b>15</b>	<4
<b>BOLD</b> indicates concentration exceeds the laboratory detection limit						
<b>BOLD/SHADED</b> indicates concentration exceeding RISC Default Closure Levels for Industrial Standards						
Samples were analyzed using USEPA SW-846 Method 8260						
Results reported in µg/L or parts per billion (ppb)						

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