PROJECT SUMMARY

Soil and groundwater samples were obtained from a former industrial site in the Northeast, USA where historical operations resulted in low level impacts by various constituents of interest (COIs) including monochlorobenzene (CB) and other CVOCs. Bench-scale treatability studies were conducted by an independent laboratory (ReSolution Partners, LLC - Madison, WI) using continuous-flow columns (**Figure**) to assess the potential of using ISCR technologies to remove site constituents. Two ISCR reagents were assessed: i) Provect-IR™ antimethanogenic ISCR reagent at (1% and 3% loading rate), and ii) EHC®, which is a conventional ISCR amendment, at 3% loading rate only. Parallel columns (ca. 22 cm long x 4 cm diameter) were run at room temperature alongside an un-amended control for 8 weeks under continuous flow conditions (*ca*. 0.34 L/day through 0.5 L soil for an estimated average seepage velocity of 42 cm/day (1.4 ft/day) within potential ranges between 33 and 150 cm/day, or 1.1 to >5 ft/day under aquifer conditions). At predefined intervals (Time 0, 2, 4, 6 and 8 weeks), samples of column influent and effluent were analyzed for COIs, Fe/Mn RCRA metals, DO/ORP and pH. Production of methane was not monitored.

CONCLUSIONS

In general, there were no differences in terms COI removal between amendments when applied at 3% loading rate. Here, both reagents reduced DO/ORP levels and maintained a pH within a range considered desirable for ERD/ISCR reactions. Although the COI levels were low, neither amendment resulted in a discernible increase in catabolic intermediates commonly associated with enhanced reductive dechlorination. There was some noted variability in samples, but both reagents liberated sufficient Fe to help facilitate secondary iron reactions. Neither amendment showed sustained release of heavy metals such as chromium or arsenic that could be viewed as secondary contaminants.

CONTACT US FOR A COMPLIMENTARY SITE EVALUATION

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ANALYTE	DAY ZERO COLUMN EFFLUENTS					2 WEEKS FLOW COLUMN EFFLUENTS					8 WEEKS FLOW COLUMN EFFLUENTS				
Parameter (Results in mg/L)	Control		Provect-IR		EHC	Control		Provect-IR		EHC	Control		Provect-IR		EHC
	Influent	Effluent	1%	3%	3%	Influent	Effluent	1%	3%	3%	Influent	Effluent	1%	3%	3%
Acetone	<0.50	<0.50	<0.50	1.8	<1.2	<0.25	0.067	0.45	<0.25	0.11	<0.050	<0.050	0.072	0.050	<0.050
Benzene	<0.010	<0.010	<0.010	<0.025	<0.025	<0.005	<0.001	<0.005	0.0088	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Monochlorobenzene	0.98	<0.010	0.28	0.21	0.22	0.74	0.036	0.10	0.034	0.077	0.57	0.11	0.090	0.086	0.050
Chloroethane	<0.050	<0.050	<0.050	<0.12	<0.12	<0.025	0.0063	<0.025	<0.025	<0.010	0.0088	0.0070	0.0074	0.0094	0.0073
1,1-Dichloroethane	0.014	<0.010	<0.010	<0.025	<0.025	0.014	0.0081	0.0086	0.0088	0.0046	0.0076	0.0047	0.0028	<0.001	0.0020
1,2-Dichloroethane	<0.010	<0.010	<0.010	<0.025	<0.025	<0.005	0.0021	<0.005	<0.005	<0.002	0.0016	0.0010	<0.001	<0.001	<0.001
cis-1,2-Dichloroethene	0.077	<0.010	0.014	<0.025	<0.025	0.071	0.027	0.033	0.025	0.012	<0.001	<0.001	<0.001	<0.001	<0.001
Di-isopropyl ether	0.020	0.013	0.014	<0.025	<0.025	0.019	0.018	0.018	0.021	0.018	0.021	0.020	0.019	0.019	0.020
Ethylbenzene	<0.010	<0.010	<0.010	<0.025	<0.025	<0.005	<0.001	<0.005	0.0083	0.0047	<0.001	<0.001	<0.001	<0.001	<0.001
2-Butone (MEK)	<0.10	0.20	0.27	1.6	0.27	<0.050	0.036	0.68	0.089	0.064	<0.010	<0.010	0.12	0.035	<0.010
Vinyl chloride	0.058	<0.010	0.014	<0.025	<0.025	0.040	0.023	0.021	0.023	0.0052	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	<0.030	<0.030	0.13	0.23	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Barium	0.044	0.15	0.59	0.43	0.86	0.10	0.19	0.19	0.12	1.54	0.10	0.14	0.11	0.088	0.10
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	<0.005	<0.005	<0.005	0.096	0.023	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Iron	0.26	0.60	215	293	61.8	0.23	0.35	6.88	30.5	640	0.086	2.15	4.46	14.9	22.1
Manganese	0.23	1.09	19.5	15.3	27.8	0.88	0.92	1.05	1.35	7.16	0.39	0.71	0.48	0.57	0.76
Lead	<0.030	<0.30	0.054	0.060	0.059	<0.030	<0.030	<0.030	<0.030	0.039	<0.030	<0.030	<0.030	<0.030	<0.030
Selenium	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Silver	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dissolved Oxygen	1.0	1.0	1.0	1.0	1.0	1.0	2.0	0.5	0.5	0.1	1.0	1.0	1.0	0.1	0.05
pH	7.14	6.73	5.83	5.54	6.18	7.51	7.3	6.85	6.46	6.22	7.33	7.23	7.02	6.92	6.93

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