Importance of Low Level Ethene

Reporting limits for ethene are critical to identifying and demonstrating complete natural biodegradation of chlorinated ethenes. In fact, reporting limits for ethene that are 200 times lower can be crucial.

The table below shows data collected from the analysis of samples at a minimally contaminated site. Even though there had never been an active treatment, the contaminants have transformed and the daughter products have dissipated.

Well ID	Event	cDCE (ug/L)	Fe(II) (mg/L)	Ethene (ug/L)	DO (mg/L)
GWC-3	1	7.2	13	0.057	1.9
GWC-1	1	23	<1	<0.025	2.1
GWB-5	1	<1	<1	<0.025	5.9
GWB-2	1	100	<1	<0.025	3.0
GWC-3	2	8.3	3.6	0.055	3.4
GWC-1	2	33	<1	0.025	3.4
GWB-5	2	<1	<1	<0.025	5.6
GWB-2	2	100	<1	<0.025	5.7

The ferrous iron (Fe II) clearly indicates that there are at least mildly reducing conditions in well GWC-3. This well is the only well that has observable ethene, indicating complete reductive dechlorination in that well, even though vinyl chloride concentrations were <1 ug/L. This observation is not sufficient to conclude that MNA is a sufficient remedy, but it certainly would change the site manager's assessment of the competency of the local bacteria to carry out complete reductive dechlorination. That observation would have been completely missed without sensitive ethene analysis.

Pace Energy Services provides methane, ethane and ethene detection limits up to 200 times lower than our competition!

The reason for very low ethene levels is probably because much of the ethene produced is rapidly oxidized. The table also shows the dissolved oxygen concentrations. It is clear that the chances of observing ethene increase as the dissolved oxygen concentration decreases.

Dissolved Gas Detection Limits

Hydrogen	**0.088 nM**
Methane (FID)	**0.037 ug/L**
Ethane and Ethene	**0.004 ug/L**
Carbon Dioxide	**0.27 mg/L**
Oxygen	**0.097 mg/L**
Nitrogen	**0.203 mg/L**

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