Chlorinated Solvent Impacts in Volatile F1 Petroleum Hydrocarbon Groundwater Data: Is it Significant and What Can be Done About It?

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The standard laboratory processing and reporting protocols for determining the volatile petroleum hydrocarbon content of groundwater samples are not designed to isolate just the volatiles arising from petroleum impacts. Other volatile compounds potentially found in groundwater can be co-extracted and contribute to the signal. Typically, other volatiles comprise an insignificant proportion of the total volatile fraction, even at regulatory guideline limits. However, in the case of co-mingled plumes of petroleum hydrocarbons and chlorinated solvents, this may not be true. There can be a measurable contribution of the chlorinated solvent signal in petroleum F1 fraction reported data. Because chlorinated solvents are regulated separately from petroleum hydrocarbons it is not reasonable to have chlorinated solvent impacts result in elevated F1 data.

Although it would seem that a simple solution would be to conduct both VOC and F1 analyses on samples and subtract the measured chlorinated solvent concentration from the F1 data, this approach isn’t actually workable, for the simple reason that the FID signal used to quantify F1 under reports chlorinated solvents, which would result in an under-correction for the F1 data. We investigated the magnitude of this issue and have developed an alternative solution.

In this presentation we will summarize our findings for the potential relevance of the chlorinated solvent contribution to an F1 data and describe the developed solution.

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Heather Lord joined Maxxam as Manager, Environmental Research & Development in October 2012. Managing Maxxam’s Environmental R&D team with a focus on increasing analytical sensitivity, reducing time and costs for field work and improving overall site characterization, she works closely with industry stakeholders to address new technical challenges. She is accountable for method development and for presenting and reporting on our research results. Heather has a wealth of experience in R&D planning, design and management; she has a successful track record in the execution of collaborative R&D projects.

Prior to joining Maxxam, Heather was a Research Associate in the Chemistry Department at the University of Waterloo. She managed all research activities carried out as part of the NSERC Industrial Research Chair for new analytical methods and technologies for sample preparation. Heather has co-authored a technology patent, edited two books on Sample Preparation, has delivered over 30 conference lectures in the past 10 years and has published over 50 papers in refereed scientific journals. She earned her PhD in Analytical Chemistry at the University of Waterloo.