

The Environmental Services Group is pleased to offer a series of **Maxxam TechTalks** as a value-added component of the services we offer to our customers. These technical presentations are typically one hour in length and can be offered in person at your location (or at Maxxam) or via webinar - whatever is most convenient for you and your staff. Please contact your account manager to schedule a Maxxam TechTalk on any of these topics:

1. Age Dating and Source Differentiation of Gasoline Plumes
2. Age Dating Techniques for Middle Distillate Fuels and Heavy Petroleum
3. Chromatography: Introduction and Interpretation
4. FLAG Sample Integrity Program
5. Legal Protocols: Building a Defensible Dataset
6. PAHs: Polycyclicaromatic Hydrocarbons
7. PAH Research: Evaluating Polyethylene Passive Samplers
8. PFCs: Practical Considerations for Soil & Water Sampling
9. QA/QC: Designing a Bullet-proof Field Quality Program
10. Soil Vapour Assessments: An Introduction

### **1. Age Dating and Source Differentiation of Gasoline Plumes**

During most routine environmental investigations, the only question asked of the laboratory is “how much is there?” However, for more complex sites involving multiple Potential Responsible Parties (PRPs) stakeholders are looking for scientific data to assign liability for contamination events. This TechTalk will provide an overview of some of the common tools used by forensics chemists to age date gasoline impacts in soil, groundwater and free phase. The following tools will be explored with specific application to real case studies:

- Stable carbon and hydrogen isotopes
- Gasoline additive analysis (alkyl lead, oxygenates, MMT, lead scavengers)
- PIANO analysis and fingerprinting
- BTEX ratios

Maxxam is the Canadian market leader in analytical services and solutions to the energy, environmental, food and DNA industries and a member of the Bureau Veritas Group of companies - a world leader in testing, inspection and certification services. We support critical decisions made by our customers through the application of rigorous science and the knowledge and expertise of our over 2500 employees.

For more information, please call  
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## 2. Age Dating Techniques for Middle Distillate Fuels and Heavy Petroleum Products

Insurance companies and their consultants are often working on sites where liability for contamination is limited to the most recent loss. When historical spills or other sources are suspected, age dating and fingerprinting techniques are often required.

This TechTalk will review the following tools used in middle distillate and heavy petroleum releases:

- Hydrocarbon fingerprinting by high resolution, gas chromatography
- Chromatogram interpretation for weathering and source identification
- Christensen Larsen model for age dating of diesel and heating oil
- Sterane, Hopane and other biomarker analysis by GC/MS
- Sulphur speciation analysis of diesel fuels and heating oil

## 3. Chromatography: Introduction and Interpretation

Environmental investigations can often benefit from the examination of chromatograms. Chromatography is the most common analytical technique for characterizing and quantifying petroleum contaminants in soil and water. However, environmental practitioners often only evaluate concentration and not the type of hydrocarbon impacts.

This TechTalk is intended to provide environmental professionals with a review of chromatography principles and detection techniques. Maxxam's recommended approach to interpretation of chromatograms can lead to a better understanding of the not just the concentration but also the properties and source of the contaminant(s). Several examples of chromatographic data for representative petroleum hydrocarbons will be examined.

## 4. FLAG Sample Integrity Program

The accuracy and reliability of analytical results produced in a laboratory are highly dependent on the quality of the samples being collected and the manner in which they are stored and transported to the lab. Maxxam has designed a Fundamental Laboratory Acceptance Guideline program ("FLAG") to document the condition of samples and to provide a framework for working with customers to improve the quality of sample submissions.

The FLAG TechTalk will cover:

- Container requirements and preservation
- Tips on how to maintain temperatures below 10°C post collection and during transport
- Completing a Chain of Custody - common errors and how to avoid them
- Field QA/QC samples - what to use given site-specific information
- Collection of VOCs using methanol kits and hermetic samplers

## 5. Legal Protocols: Building a Defensible Dataset

Maxxam's analytical results support projects ranging from routine environmental monitoring to high-profile legal cases. Legal cases often involve disputes over contamination liability with our results frequently being used as key pieces of evidence to settle cases both inside and outside the courtroom.

Though Maxxam has been involved in a number of legal cases where our analytical data has withstood legal challenge, Maxxam recently updated our legal protocols to further protect our customers and ensure customers are building a defensible dataset every step of the way.

Highlights of this TechTalk include:

- What does legal mean to you?
- Submission of laboratory data as evidence
- The burden of proof
- Legal cases where analytical data was challenged
- Maxxam's legal protocols - four levels of defensibility

## 6. PAHs: Polycyclicaromatic Hydrocarbons

PAHs are widespread and present in many products and situations at levels above regulatory criteria. We provide an overview of the chemistry of PAHs and their properties, sources and types (pyrogenic, petrogenic, biogenic). Given the pervasiveness of PAHs, we include a brief history of PAHs in various substances such as diesel, asphalt, and roofing material.

This TechTalk continues with a review of sampling considerations in air, groundwater and surface water. We also look at regulatory standards, the CCME additive cancer risk calculations (Index of Additive Cancer Risk), and quantitative guidelines. Finally, we review forensic analytical techniques used to determine source(s) and types of PAHs.

## 7. PAH Research: Evaluating Polyethylene Passive Samplers

The traditional sampling and analysis approach to determine PAH and PCB concentrations in groundwater can lead to a significant over-estimation of the dissolved concentration of these contaminants due to the influence of sediment. Maxxam has partnered with Dillon Consulting and is working with Ontario MOE to evaluate polyethylene passive samplers as a means to better estimate the concentration of dissolved PAHs and PCBs in groundwater on contaminated sites.

This TechTalk will review Maxxam's research results to date. It also outlines additional research requirements and anticipated next steps to obtain regulatory approval of this technology.

## 8. PFCs: Practical Considerations for Soil & Water Sampling

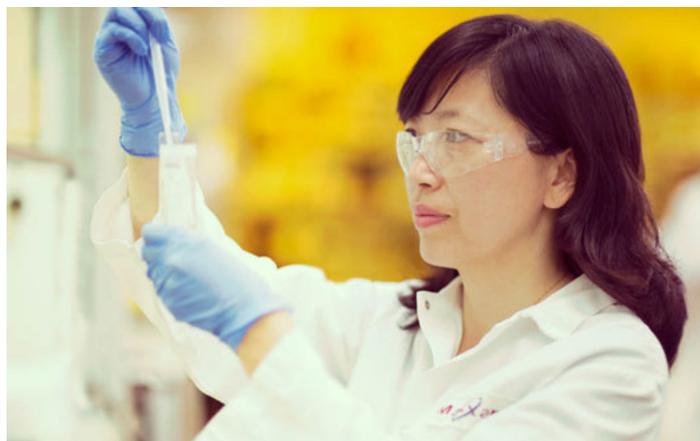
Perfluorinated Carbon Compounds (PFCs) such as perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) have received a substantial amount of attention, not only because they are recognized as ubiquitous environmental contaminants, but also because these compounds are persistent, bioaccumulate and have been identified as toxic (in some animal studies). Recently, the Canadian Federal Government has published provisional guidelines for PFOS and PFOA in drinking water of 0.7 ug/L and 0.3 ug/L respectively.

A sensitive and specific method has to be used in order to accurately quantify PFCs in environmental matrices which, in some cases, present unique analytical challenges because of the high affinity of these compounds for specific matrices. This TechTalk will review the use and distribution of these compounds in the environment, highlighting practical considerations for soil and water sampling, and demonstrating best practices to produce analytical results that are both reliable and representative.

## 9. QA/QC: Designing a Bullet-proof Field Quality Program

A well-designed Quality Assurance and Quality Control (QA/QC) program both in the laboratory and in the field are essential to ensure accuracy, precision and representativeness of the data produced. Maxxam has a strong and independent QA/QC team with a National Director of Quality who reports directly to the CEO.

This TechTalk will provide an overview of the Quality System used in Maxxam's laboratories including the different types of QA/QC samples and how to interpret the data. We also discuss field-level QA/QC elements and procedures (ie. equipment blanks, trip spikes, blind knowns) that will enable environmental practitioners to design a "bullet-proof" field quality program.



## 10. Soil Vapour Assessments: An Introduction

Accurately assessing soil vapour intrusion as part of a site investigation is complex and must take many factors into consideration. This TechTalk introduces participants to soil vapour sampling - including both passive and active techniques for ambient and indoor air measurements.

Topics include:

- Designing a conceptual site model
- Latest developments in soil probes and their deployment
- Leak check techniques

**To book a Maxxam TechTalk at your facility or ours, please contact your account manager or email: [enviro@maxxam.ca](mailto:enviro@maxxam.ca)**