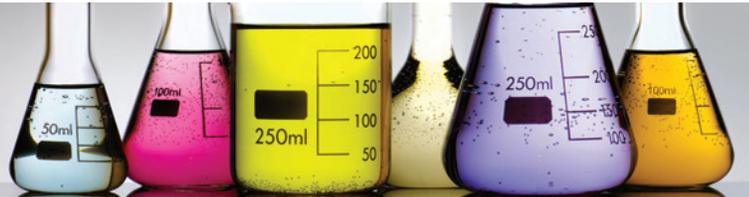




TESTMARK Laboratories Ltd.
Committed to Quality and Service



elements

Ontario's Revised Brownfield Regulation: SNAPSHOT AT THE HALF-YEAR MARK



With 6 months under its belt, Ontario's amended Record of Site Condition (O. Reg. 153) to the July 2011 Standards appears to have made a relatively smooth transition from policy to practice. From an analytical laboratory perspective, we continue to field some common questions from our environmental consulting clients. Here are some of our "Top Ten" Q&A (in no particular order):

in this issue

Ontario's Revised
Brownfield Regulation:
**SNAPSHOT AT THE
HALF-YEAR MARK**

Compound of Interest:
FORMALDEHYDE

1 CAN THE LAB FILTER OUR GROUNDWATER FOR METALS ANALYSIS?

Yes, the requirement to field-filter groundwater samples with a 0.45 μ m filter immediately prior to adding HNO₃ preservative or filling a container precharged with HNO₃ is noted in the amended Analytical Protocols for this regulation. However, the protocol also permits the client to submit unpreserved and unfiltered samples to be filtered and preserved at the laboratory provided that analysis not commence for at least 16 hours after preservation. This deviation will be noted on your Certificate of Analysis.

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2 ARE THE METHANOL-PRECHARGED VIALS MANDATORY FOR SOIL SAMPLING OF VOLATILES UNDER THIS REGULATION?

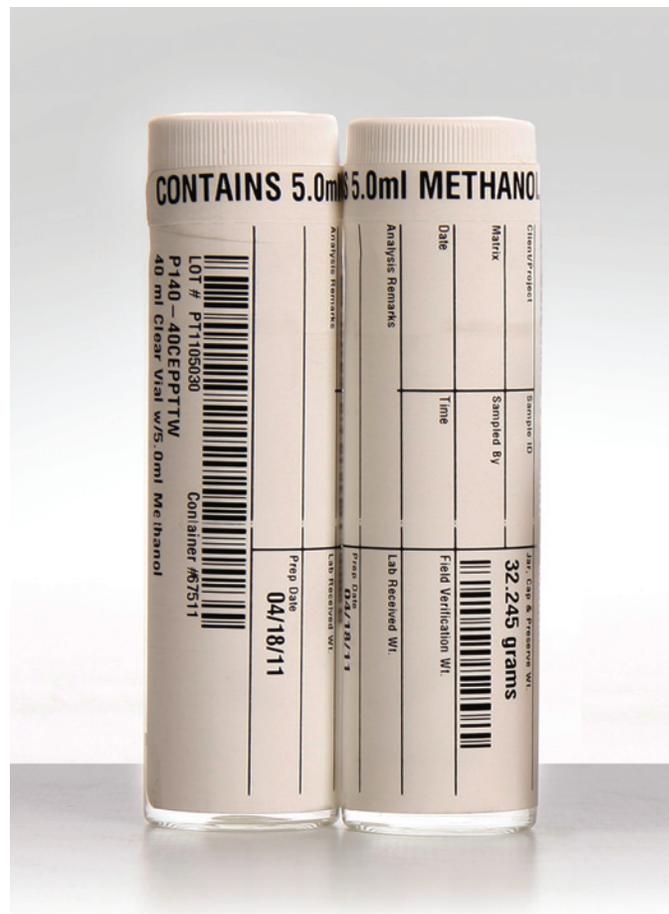
No, they are not mandatory however Testmark has adopted them as Best Practice as they significantly reduce the risk of vapour loss and they extend the hold time from 48 hours from time of sampling to 14 days. Testmark's soil sampling kits are included in the cost of the test.

3 CAN WE REQUEST ANALYSIS FOR ONE METAL ONLY FOR A RSC APPLICATION?

No, the directive from the Ministry of the Environment is that a client cannot 'cherry-pick' analytes from a group of tests. Therefore, it is not allowable to report only one metal for a scan, the lab must report all metals in that scan. Similarly, the lab is not allowed to report one VOC or one OCP etc.. The method groups are clearly defined in the *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*.

4 HOW STRINGENT ARE THE REQUIREMENTS FOR SAMPLES TO ARRIVE AT THE LAB <10°C?

Every effort should be made to ensure that samples arrive at the lab <10°C, particularly for samples requiring organic analyses. If samples arrive at the lab on the day of sampling they may not have had time to achieve a temperature of <10°C. In these cases the lab is looking for evidence that an effort was made on the part of the client to ensure the cooling process has begun (frozen ice packs present, free ice, etc.). Incoming temperature is noted at our Sample Reception and a qualifying comment is included on the Certificate of Analysis in cases where it was found to equal or exceed 10°C.



5 DO WE HAVE TO SUBMIT A SECOND BOTTLE FOR THE ANALYSIS OF BENZO[A]PYRENE IN WATER?

The option to submit a second bottle (1L amber) for the analysis of benzo[a]pyrene rests with the QP and is only applicable in cases where there is particulate present in the water. It addresses the fact that PAHs commonly adsorb to sediment, therefore if a QP notes that their groundwater has particulate in it, they can elect to submit a second bottle of sample to the lab with instructions to filter the second bottle and analyze it for benzo[a]pyrene only. Both sets of data will appear in the final report.



6 THE NEW PROTOCOLS CALL FOR PRESERVATION OF HEXAVALENT CHROMIUM WITH AMMONIUM SULFATE FOR WATER SAMPLES, CAN WE STILL USE BOTTLES PRECHARGED WITH SODIUM HYDROXIDE INSTEAD?

You can still use sodium hydroxide, but be aware that the hold time is reduced to 24 hours from the time of sampling. For that reason, Testmark has adopted the use of ammonium sulfate buffer as a preservative for this analyte to allow the client a more reasonable hold time of 28 days. As well, keep in mind that the water sample must be field filtered prior to preserving.

7 WHY DO WE NEED TO SUBMIT A SOIL JAR WHEN WE USE THE METHANOL PRECHARGED VIALS FOR SOIL SAMPLING OF VOLATILES?

The 60mL glass amber container included with your Volatile Soil Sampling kit is there so the lab can perform the necessary moisture analysis on your samples to be able to correct the result for moisture. It is an important part of the test.

8 WHEN DO WE NEED TO REQUEST A FIELD/TRAVEL BLANK FOR VOLATILE SOIL ANALYSIS?

The decision to incorporate any Field/Travel QC measures rests with you - the QP. Under the revised Analytical Protocols for this Regulation, one Field/Travel blank is required for volatile soil analysis per sample batch for any submissions for a Record of Site Condition. This QC sample will be billed as a sample.

9 WHY DOES THE LAB CHARGE SEPARATELY FOR 1,4-DIOXANE ANALYSIS WHEN WE ARE ALREADY SUBMITTING SAMPLES FOR VOC ANALYSIS?

Although our lab performs the analysis of 1,4-Dioxane as a VOC (by GC/MS) method, the instrument configuration for this method is completely different than those required for our standard VOC scan. It is an entirely separate analysis involving isotope dilution and for this reason it is separately billed.

10 WHY DO WE ALWAYS GET OUR FRACTION ORGANIC CARBON (FOC) RESULTS REPORTED IN TRIPLICATE?

The amended protocols require that all FOC analyses are conducted and reported in triplicate. This means that the lab physically takes three subsamples of each soil sample and runs the test in triplicate. It is a prescriptive QC measure built into the Regulation.





Compound of Interest: **FORMALDEHYDE**



Formaldehyde is an organic compound that is likely quite familiar to professionals working in the field of occupational health and safety as well as those working in environmental investigations. It has been identified as a known carcinogen by the U.S. National Toxicology Program. In 2006 Ontario enacted a new short-term exposure limit of 1 ppm, and a maximum exposure limit (ceiling) of 1.5 ppm through the Occupational Health & Safety Act. Ontario's Provincial Water Quality Objectives currently has an interim water quality criterion for this compound set at 0.8 ppb.

FORMS OF FORMALDEHYDE:

At room temperature, formaldehyde exists as a strong-smelling, colourless gas and is readily converted into a variety of derivatives. It is also soluble in water where it dissolves to form methanediol or methylene glycol. Water that is saturated with formaldehyde is often referred to as a 100% formalin solution.

SOURCES AND SINKS:

Formaldehyde is a naturally occurring substance and is considered the simplest of the aldehyde group of compounds. It consists of carbon, oxygen and hydrogen (CH_2O). The largest source of this compound is a by-product from combustion processes and the cycling of methane in the environment. Incineration, forest fires, photochemical oxidation, refineries and the burning of fossil fuels are primary sources.

When released in water, this compound is readily biodegradable and will degrade to extremely low levels in a matter of a few days. It is favoured by bacteria and is not expected to adsorb to soil or sediment. To date there is no evidence of bioaccumulation. In air, this compound is also very unstable and is typically removed by direct photolysis and oxidation. It has an estimated half-life in air of anywhere from 1.6 – 19 hours, with faster degradation occurring in the presence of more direct sunlight.



INDUSTRIAL APPLICATIONS:

Formaldehyde is commonly used in the textile industry as a resin to make fabrics crease-resistant. It is also used as a permanent adhesive in the plywood, flakeboard and carpet industry and its wet-strength properties are valued in the making of facial tissue, napkins and other paper products. As a foam, formaldehyde is used to make insulation and cast-mould products. In an aqueous form, formaldehyde is used as a disinfectant and as a tissue fixative and embalming agent. Many cosmetic products contain derivatives of formaldehyde to prevent the growth of bacteria in the product.

ANALYTICAL CHALLENGES:

From an analytical chemistry perspective, the greatest challenge with the analysis of formaldehyde comes from the fact that it degrades so readily. Therefore, adherence to tight hold time requirements is a must if the data is to be of any value. For water, the standard hold time is 3 days to extract (from the time of sampling) and up to an additional 3 days to analyze. Water samples should be collected in 250mL amber glass containers and stored in a cool (4-8°C) and dark place. Since light precipitates the breakdown of formaldehyde, it is imperative that the sample containers be kept away from direct sunlight.

Standard analytical methods for the detection of formaldehyde typically involve analysis either by High-Performance Liquid Chromatography (HPLC) or by Gas Chromatography (GC). In HPLC analysis, formaldehyde is solvent-extracted followed by derivatization with 2,4-dinitrophenylhydrazine (DNPH), then analyzed by HPLC/UV.

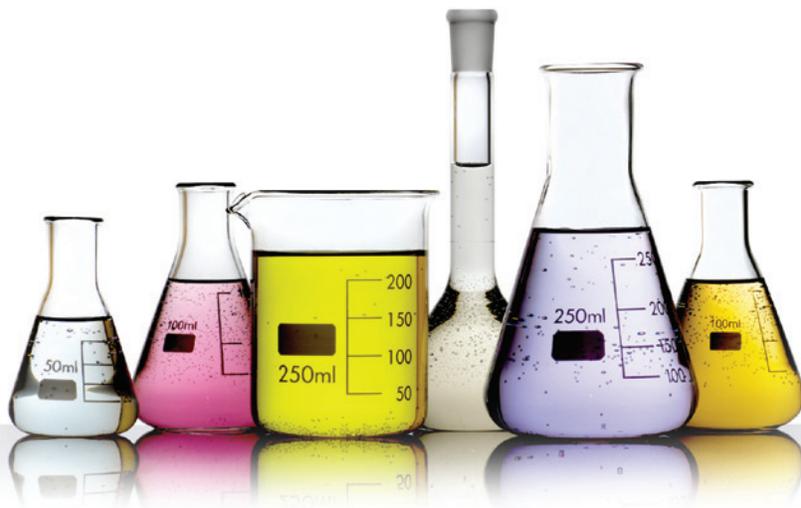
COMPARATIVE STUDY OF HPLC VS. GC METHOD CONDUCTED BY TESTMARK:

After conducting a series of trials, a study conducted by Testmark Laboratories concluded that the GC/ECD (Electron Capture Detector) was a preferred method for the analysis of this compound in environmental samples. As a result, last year Testmark switched our accreditation for the analysis of formaldehyde away from HPLC to GC/ECD as it is a more selective method for this compound.

SOME OF OUR KEY FINDINGS INCLUDE:

- Overall, analysis by GC/ECD yielded much greater sensitivity over analysis by HPLC/UV (approximately 3 orders of magnitude more sensitive)
- HPLC/UV method was fraught with interpretive challenges as it tended to be nonspecific and was subject to interferences.
- Analysis time was significantly shorter per sample with GC/ECD as compared with HPLC/UV





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