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WBEA – Standard Operating Procedure			
SOP Title		Procedures for Operating Volatile Organic Compound Samplers using SUMMA Canisters	
SOP Number		WBEA SOP-INT-004	
Author		Gary Cross	
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Introduction and Background

WBEA currently collects samples using this method at 8 continuous monitoring stations in the network. These samples are to obtain data on a range of hydrocarbon species as well as a number of Sulphur containing compounds. This procedure outlines the steps required to complete automated sampling of Summa canisters for the analysis of the specific Volatile Organic Compounds (VOC) for the WBEA network. This is a 24-hour method of sampling and follows EPA Toxic Organics method TO-15. Commercially available programmable samplers are used in this method.

This SOP adheres to the requirements of the current Air Monitoring Directive (AMD) finalized by Alberta Environment in 1989. In some cases the limits and specifications exceed the requirements of the current AMD. It should be considered that the current and any future amendments or drafts of the AMD will be used as the benchmark for requirements and criteria for ambient air monitoring practices conducted in the WBEA network. Information used to write this procedure was also taken from sources identified in the reference section.

Principle of the Method

A programmable VOC ambient air sampler is used to collect a representative sample of ambient air over a 24 hour period for later laboratory analysis. Sampling is conducted on the National Air Pollution Surveillance (NAPS) schedule and at the predetermined locations. Samples are collected in stainless steel canisters with a polished interior coating of silico-glass. The coated stainless steel is an inert material which will not react with pollutants in the ambient sample. This is particularly important for the Sulphur species that are analyzed. Airflow to the canister is uniformly maintained over the 24 hour period in order to fill to a sufficient volume for laboratory analysis as well as to obtain a representative sample.

Measurement Range and Sensitivity

The VOC gaseous sampler used in this method is commercially available and is used to collect a representative ambient sample for analysis of chemical components that are in the ppb or sub-ppb concentration range; generally in the 0.01 to 20 parts per billion (ppb) ranges.


The detection limits obtained by the analytical method dictate the sensitivity of the method. See TO-15 for more details on the expected detection limits.

Equipment and Apparatus

The following are commercially available air samplers and canisters suitable for use in this method, and are currently in use in the AENV network:

- XonTech 910A canister sampler

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- Tisch model TE-123 Canister Sampler
- BIOS Definer 220 Primary Flow Standard

Interferences

A list of practices and compounds that can interfere with this method are itemized in EPA TO-15, however, most are applicable to the laboratory analysis and practices.

With respect to sample collections and canister handling, the following can interfere with the sample during collection:

- Always wear Nitrile gloves when deploying or collecting canister samples
- Minimize the time the canister is disconnected from the sampling system
- Always cap canisters or sample lines that are not connected
- Avoid storing or transporting the canisters near sources of hydrocarbons or Sulphur compounds

Precision and Accuracy

Precision of the method is outlined in EPA TO-15, and based on the analytical method and detection limits. From the sampling perspective, flow rate is a critical parameter used in the determination of the final reported concentration of VOCs. Flow calibrations are carried out on a routine schedule on all samplers.

Site Requirements


The samplers and canisters are typically installed inside a temperature controlled monitoring station and in an instrument rack. The sample air is drawn from the station manifold, which is typically all glass that pulls a stream of air from outside the station and made available to the analyzers in the station. The station is sited according to appendix A-2, Station Site Criteria section of the AMD.

Installation Requirements

The installation procedures are specified by the sampler manufacturer in the Operating Manual and should be read through prior to installing the sampler. General requirements listed below must also be followed:

- The sampler is typically installed in an ambient air monitoring shelter and should be rack mounted.
- Locate the sampler as close as possible to the sample intake manifold to keep the sample residence time to a minimum.
- Ensure the power to the station and the electrical system within is properly grounded to avoid power problems with the sampler
- Position the sampler for ease of reading the panel displays as sample settings need to be changed and read every sample period.

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Operating Parameters and Instrument Configuration

The WBEA network currently collects VOC canister samples for internal analysis and for EC analysis. Both methods follow EPA TO-15 with some small differences. Each configuration and procedure is outlined below.

WBEA VOC Sampling Program

The WBEA VOC sampling program collects sample at a flow rate of 5 sccm. The other difference from the Environment Canada sampling program is the list of compounds for analysis. The WBEA list contains a number of Sulphur compounds in addition to the list of Hydrocarbons.

Receiving

When proofed (prepared sample media from the lab) canisters arrive from the lab, they are to be recorded on the “incoming shipping” sheet located on the wall in the sample room. This is to keep track of incoming shipments: when they arrived, how many samples we received, and who received them. Once the shipment has been entered on the sheet, the sample canisters should be placed on the appropriate shelf in the sample room. New sample canisters should be taken from this shelf to the field for routine sample changes. The oldest canisters on the shelf should be used first.

Retrieval

Record canister pressure, sampler pressure, and total sampling time in the retrieval fields of the DocIT Chain of Custody.

Record final canister pressure on the tag attached to the canister.

Close the canister, disconnect the line from the sampler and connect the brass cap.

Deployment

Position a new canister, ensure the valve is in the “closed” position, then remove the brass cap and connect the Teflon line from the sampler.


Open the canister valve.

Record initial sampler pressure and initial canister pressure in the deployment fields of the DocIT system.

Record start and end date/time, sample location, and initial canister pressure on the tag attached to the canister.

Blanks

This program has no blank requirements at this time

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Shipping

Samples that have been collected and retrieved from the field should be placed on the shelf labelled "Sampled VOC Canisters". Once all the sampled canisters have been returned to the FOC from the field for one NAPS cycle, they need to be shipped to the laboratory.

Rush Samples

From time to time, samples are collected in canisters during specific events that need to be shipped and analyzed immediately. These rush samples are usually collected manually and outside of the NAPS schedule. Collection of these samples will be dictated on a case by case basis. Please follow the following notification and shipping process for rush samples:

If a manual sample is being collected, call AITF at the Trace Organics lab 780-632-8455 to inform them that there is a rush sample being collected, and provide any pertinent or known details at that time.

Complete the sample collection on site and fill out an ad hoc COC for the sample.

There should be either a single or double canister shipping cooler in the sample room to ship either a single or double sample canister to AITF.

Try to fill out all the shipping info and have the canister picked up that day by Purolator, or drop off the shipment at the Purolator office to ensure it gets shipped to AITF as soon as possible.

Call AITF again at the number listed above and notify them that the shipment is on its way and provide them the weigh bill number.

These samples are shipped to:

Alberta Innovates Tech Futures

75 Street & Hwy 16A

Vegreville, Alberta

T9C 1T4

Attn: Jessica Payne

Phone: 780-632-8459

Jessica.Payne@albertainnovates.ca


Also, TraceOrg@albertainnovates.ca

*Ship via Purolator ground service

Environment Canada VOC Sampling Program

The Environment Canada VOC sampling program collects sample at a flow rate of 10 sccm. The other difference from the WBEA sampling program is the list of compounds for analysis. The Environment Canada list contains only a list of Hydrocarbons.

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Receiving

When proofed canisters arrive from the laboratory in the blue or black shipping cases, they are to be recorded on the “incoming” sheet located on the wall in the sample room. This is to keep track of incoming shipments: when they arrived, how many samples we received, and who received them. Once the shipment has been entered on the sheet, the sample canisters should be placed on the appropriate shelf in the sample room. New sample canisters should be taken from this shelf to the field for routine sample changes.

Retrieval

Record sampler pressure and total sampling time on Environment Canada sample sheet.
Close the canister, unscrew the line from the sampler and screw on brass cap.

Deployment

Position a new canister, ensure the valve is in the “closed” position, then remove the brass cap and connect the Stainless Steel line from the sampler.
Open the canister valve.
Record initial sampler pressure, initial canister pressure, start and end date/time, sample location, and initial canister pressure on the tag attached to the canister.
Record start and end date/time, sample location, and initial sampler pressure on Environment Canada data sheet.


Blanks

This program has no blank requirements at this time

Shipping

Samples that have been collected and retrieved from the field have two sampled canisters in the shipping case, and therefore are shipped every two weeks, following two full NAPS cycles. Once these sampled canisters have been returned to the FOC, they need to be shipped to the laboratory. These samples are shipped to:

Environment Canada
335 River Road
Gloucester, Ontario
K1V 1C7
Attn: Patrick Thompson
Phone: 613-991-1998
*Ship via Purolator express air service

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Operational and Maintenance Requirements

The following maintenance requirements are completed to ensure proper operation of the sampling system. The tasks are to be completed, at a minimum, on the schedule outlined below, and following the manufacturer's instructions for each task.

Monthly Maintenance

- Check the maximum pump pressure.
- Perform sampler leak check.
- Complete flow audit and adjustment if required
 - The flow setting for the WBEA samplers is 5.0 sccm
 - The flow setting for the Environment Canada samplers is 10.0 sccm

Semi Annual Maintenance

- Check sample lines and replace as necessary

Data Collection and Management

Documentation of all the WBEA VOC samples is entered and archived in the WBEA Doc-It system. All sample information should be entered here during each sample deployment and collection. Copies of COCs are to be sent with the VOC canisters to the lab for analysis.

Sample information for the Environment Canada samples is also to be documented in the Doc-It system, but as well on the Environment Canada sample data sheets. Each sheet should be sent back with the canister for analysis. A copy of the EC sample sheet is made and filed in the FOC for future reference.

Reference Documents

- MODEL 910A AIR SAMPLER OPERATIONS AND MAINTENANCE MANUAL; Xontech Inc, 187 Tank Farm Road., Suite 140, San Luis Obispo CA, 2002.
- TISCH Model TE-123 Canister Sampler Operations Manual
- EPA Toxic Organics Method TO-15
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