Region 4
U.S. Environmental Protection Agency
Science and Ecosystem Support Division
Athens, Georgia

OPERATING PROCEDURE

Title: **Trace Contaminant Sampling using an Infiltrex® 300 High Volume Sampler**

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Revision History

This table shows changes to this controlled document over time. The most recent version is presented in the top row of the table. Previous versions of the document are maintained by the SESD Document Control Coordinator.

History	Effective Date
SESDPROC-502-R2, *Trace Contaminant Sampling using an Infiltrex® 300 High Volume Sampler*, replaces SESDPROC-502-R1. **Revision History** Replaced Field Quality Manager with Document Control Coordinator. **Section 1.3** Replaced Field Quality Manager with Document Control Coordinator. **Section 3.3** Added the discussion of using second filter configuration with stainless steel strainer and 110 um screen. Deleted "440 um and 140 um filters from item 1 of procedures to be used when collecting a sample using the Infiltrex 300.	
SESDPROC-502-R1, *Trace Contaminant Sampling using an Infiltrex® 300 High Volume Sampler*, replaces SESDPROC-502-R0. **General** Corrected any typographical, grammatical, and/or editorial errors. **Title Page** Added Field Quality Manager to Laura Ackerman's title. **Revision History** Changed R1 to R0 in the procedure's title. **Table of Contents** Reformated, and changed title of Section 1.4 to References.	November 1, 2007

Section 1.3 Updated information to reflect that procedure is located on the H: drive of the LAN. In addition, text has been revised in this section. **Section 1.4** List revised: Citations of SESD procedure, IATA, and CFR added, and other changes made to be consistent. **Section 1.5.1** Title of Safety, Health, and Environmental Management Program Procedures and Policy Manual corrected, and citation added. **Section 1.5.2, 4th bullet** Added references to the CFR and IATA's Dangerous Goods Regulations. **Section 2.4** Added SESD procedure. **Section 3.1** Deleted equipment not used in the field, and added one piece of equipment. **Section 3.3, Number 2** Revised second sentence.	
SESDPROC-502-R0, Trace Contaminant Sampling using an Infiltrex® 300 High Volume Sampler, Original Issue	February 05, 2007

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1 General Information

1.1 Purpose

The purpose of this procedure is to document procedures, methods and considerations to be used when collecting surface water samples using an Infiltrex® 300 high volume sampler.

1.2 Scope/Application

This document describes both general and specific methods to be used by field personnel when collecting and handling surface water samples collected using an Infiltrex® 300 high volume sampler. If conditions in the field require any variations from this procedure, the change and circumstances will be thoroughly documented in the field log book.

1.3 Documentation/Verification

This procedure was prepared by persons deemed technically competent by Science and Ecosystem Support Division (SESD) management, based on their knowledge, skills and abilities. The procedure has been tested in practice and reviewed in print by a subject matter expert. A master copy of this procedure is kept in a central file by the Document Control Coordinator, along with documentation of the review conducted prior to its issuance.

1.4 References

Axys Environmental Systems. 2002. Infiltrex 300 Trace Organic Sampling System User's Manual. Sidney, British Columbia, Canada.

International Air Transport Authority (IATA). Dangerous Goods Regulations, Most Recent Version.

SESD Operating Procedure for Logbooks, SESDPROC-010, Most Recent Version.

SESD Operating Procedure for Field Sampling Quality Control, SESDPROC-011, Most Recent Version.

SESD Operating Procedure for Equipment Inventory and Management, SESDPROC-108, Most Recent Version.

SESD Operating Procedure for Packing, Marking, Labeling and Shipping of Environmental and Waste Samples, SESDPROC-209, Most Recent Version.

Title 49 Code of Federal Regulations, Pts. 171 to 179, Most Recent Version.

USEPA. 2007. Safety, Health and Environmental Management Program Procedures and Policy Manual. Science and Ecosystem Support Division, Region 4, Athens, Georgia.

1.5 General Precautions

1.5.1 Safety

Proper safety precautions must be observed when collecting surface water samples. Refer to the SESD Safety, Health and Environmental Management Program Procedures and Policy Manual (USEPA 2007) and any pertinent site-specific Health and Safety Plans (HASP) for guidelines on safety precautions. These guidelines, however, should only be used to complement the judgment of an experienced professional. When using this procedure, minimize exposure to potential health hazards through the use of protective clothing, eye wear and gloves. Address chemicals that pose specific toxicity or safety concerns and follow any other relevant requirements, as appropriate.

1.5.2 Procedural Precautions

The following precautions should be considered when collecting surface water samples:

- Special care must be taken not to contaminate samples. This includes storing samples in a secure location to preclude conditions which could alter the properties of the sample. Samples shall be custody sealed during long-term storage or shipment.
- Collected samples are in the custody of the sampler or sample custodian until the samples are relinquished to another party.
- If samples are transported by the sampler, they will remain under his/her custody or be secured until they are relinquished.
- Shipped samples shall conform to all U.S. Department of Transportation (DOT) rules of shipment found in Title 49 of the Code of Federal Regulations (49 CFR parts 171 to 179), and/or International Air Transportation Association (IATA) hazardous materials shipping requirements found in the current edition of IATA's Dangerous Goods Regulations.
- Documentation of field sampling is done in a bound logbook.
- Chain-of-custody documents shall be filled out and remain with the samples until custody is relinquished.
- All shipping documents, such as air bills, bills of lading, etc., shall be retained by the project leader and stored in a secure place.

2 Sampling Considerations

2.1 General

The Infiltrex® 300 trace organic sampler is designed to collect particulate and dissolved fractions of organic constituents *in situ* by passing a high volume of water through a glass fiber filter and a stainless steel column packed with XAD™ resin. Analysis of the filter provides chemical concentrations for the particulate fraction, and analysis of the resin provides chemical concentrations for the dissolved fraction. The sampler utilizes a low flow rate (~2.2 liters/minute) which provides the maximum amount of contact time between the sample water and the column resin. The total volume of sample passing through the unit varies based upon the analysis required. However, volumes typically are between 750 and 1000 liters. At a flow rate of 2.2 liters/minute, it takes approximately six to eight hours to collect a sample. If feasible, a flow rate of 1.2 liters/minute is recommended.

2.2 Sample Handling and Preservation Requirements

Prior to use, the stainless steel columns must be cleaned and packed with the appropriate extraction material (e.g., XAD™ resin). The glass fiber filters must also be cleaned. The cleaning procedures and packing of the columns are performed by the analytical laboratory. Clean latex gloves should be worn at all times when handling the columns and filters.

Following sample collection, the columns should be placed in the protective packing provided by the laboratory and placed in a cooler with frozen ice packs rather than wet ice. The filters should be placed in a glass jar and stored in a cooler with ice packs. The glass jars should be cleaned by the laboratory prior to placing the filters in the jars.

2.3 Quality Control

With the exception of the stainless steel columns, all equipment associated with the Infiltrex® 300 sampler should be cleaned according to the procedures provided in Section 4 of this procedure prior to its use in the field. Due to the extremely low analytical reporting limits provided by the high volume sampling technique, equipment should not be decontaminated while in the field and reused between sample stations.

A certification of cleanliness is available from the analytical laboratory for the stainless steel columns, the XAD™ resin and the glass fiber filters.

2.4 Records

Information generated or obtained by SESD personnel will be organized and accounted for in accordance with SESD records management procedures. Field notes, recorded in a bound field logbook (in accordance with SESD Operating Procedure SESDPROC-010, Logbooks), will be generated, as well as chain-of-custody documentation.

3 Sampling Methodology

3.1 General

The sampling technique and equipment described in the following section of this procedure are designed to minimize effects on the chemical and physical integrity of the sample. If the procedures in this section are followed, a representative sample of the water column should be obtained.

3.2 Equipment

Following is a list of equipment recommended when collecting a sample using the Infiltrex® 300 water sampler:

- Infiltrex® tool kit
- Teflon® intake line
- 3500 watt generator
- 100' foot extension cord
- Glass fiber filters
- XAD™ resin column (2 per station)
- Latex gloves
- Plastic bags
- Sample containers
- Aluminum foil
- Coolers
- Analyte-free water
- Safety glasses
- Hearing protection
- Stainless steel tongs
- Stainless steel forceps
- 5-gallon bucket (3)
- Stop watch
- Teflon® squeeze bottle (2)
- Plastic roll
- Frozen ice packs.

3.3 Sampling Procedure

SESD has utilized two different filter configurations. The first consists of one 440 micrometer (µm) and one 140 µm stainless steel thimble filter in series and the second consists of a 7 1/2 inch long stainless steel strainer, typically used with and ISCO automated sampler, that is covered with 110 µm stainless steel screen. The screen is secured to the strainer using stainless steel hose clamps. The type of filters used on the intake line and their configuration depends on the characteristics of the media to be sampled. The anticipated amount of suspended solids in the water column will dictate the most appropriate configuration. After the sample passes through the intake line filter, it flows through the pump and then to a 1 µm glass fiber filter. There are two glass fiber filter housings configured in parallel. The sample is passed through one filter or the other. One filter can be replaced while the other is used for sampling without disrupting the sample collection process. The sample flows from the glass fiber filter to two XAD™ resin columns in series. The sample passes from the resin columns to the flow meter and is then discharged from the unit. The glass fiber filters are analyzed to determine the concentration of chemicals in the particulate phase. It is possible to retain the particulates from intake line filter(s) and analyze them with the glass fiber filters. The XAD™ resin columns are extracted and the extract is analyzed to determine the concentration of contaminants in the dissolved phase. The particulate and dissolved phases may be analyzed separately or combined into one sample.

The intake line is placed at ½ the depth of the water column in waters less than 14 feet deep and at 7 feet below the surface for waters greater than 14 feet deep. For swiftly flowing water, it may be necessary to attach the intake line to a weighted line to insure the intake remains stationary.

The following procedures should be followed when collecting a sample using the Infiltrex® 300:

1. Install the intake line filter(s).

2. Place the intake line into the sample source. Turn the unit on and prime the pump, (if necessary), with a squeeze bottle containing analyte-free water. Allow approximately 20 liters of sample water to pass through the unit before sample collection begins.

3. Remove the glass fiber filter housings. Empty all water from the filter housings. Insert the 1 µm glass fiber filters and re-attach housings to unit.

4. Connect two XAD™ resin columns in series to the sampling unit. Uncap one connection at a time and connect to sampler before uncapping additional connections in order to reduce potential for airborne contamination. The caps from the columns should be stored in a contaminant-free container such as a 2-ounce glass jar and

identified so that the same caps are used on each column after sampling is complete.

5. Record the totalizer reading. Check the control unit settings.

6. Begin sampling. Record the volume pumped and the flow rate every 30 minutes. The flow rate should be maintained as close to the targeted rate as possible. Occasional adjustments to the pump speed may be necessary to maintain the desired flow rate. If frequent adjustments to the pump speed are required, clean or replace the 440 µm and 140 µm filters, and check and/or change the glass fiber filter.

7. After the required volume has been sampled, record stop time and the total volume filtered. Turn main switch off.

4 Decontamination Procedures

4.1 Laboratory Decontamination of Stainless Steel and Teflon® Parts

1. Clean with liquinox and water.
2. Rinse with analyte-free water.
3. Rinse with laboratory-grade methanol.
4. Rinse with laboratory-grade hexane/acetone (1:1) mixture.
5. Allow to air dry.
6. Once dry, wrap in aluminum foil.

4.2 Laboratory Decontamination of Teflon® Tubing

1. Clean with liquinox and water.
2. Rinse with analyte-free water.
3. Force laboratory-grade methanol through tubing using laboratory-grade nitrogen gas.
4. Force laboratory-grade hexane/methanol mixture (1:1) through tubing using laboratory-grade nitrogen gas.
5. Purge remaining liquid from tubing with laboratory-grade nitrogen gas until dry.
6. Coil tubing and wrap in aluminum foil.