Commission Report

for

SUSDEV21 Baseline Survey: Toxic Air Monitoring

Prepared by

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1. Standard Operating Procedure for Ambient Volatile Organic Canister Sampler

1.1 PRINCIPLE OF OPERATION

The Andersen Instruments Inc. Series 97-300, Ambient Volatile Organic Canister Sampler (AVOCS) is an ambient whole air toxics sampler utilizing passivated stainless steel canisters for collection of volatile organics. Analysis is performed on the captured sample at a later date under laboratory conditions as described in US Environmental Protection Agency Compendium Method TO-14 'Determination of Volatile Organic Compounds (VOCs) In Ambient Air Using Summa Passivated Canister Sampling and Gas Chromatographic Analysis'. The sampler is designed to collect ambient air samples at a constant sample rate for selected sampling times into various sizes of passivated stainless steel canisters. These canisters are typically evacuated under laboratory conditions, and filled to a pressurized condition during sampling for subsequent analysis. The AVOCS sampler incorporates a mechanical or electronic mass flow control device which can be set for precision sample rates over short periods of time or up to a 24 hour low-flow sample. The sampler is designed to be a flexible environmental field tool for ambient air monitoring. Portable, durable, and reliable are features which make the AVOCS a sampling system which is useful in research, air toxics monitoring, and identification and quantitative analysis of hazardous air pollutants.

1.2 SAMPLING EQUIPMENT

The AVOCS system utilizes several main components to collect a representative sample of the ambient air. The manifold assembly pulls ambient air through a sampling wand. The pump pulls a sample from the manifold tube though a particulate filter. The output of the pump feeds the input of a flow control device, which maintains a constant sample flow. The sample can be stored for later analysis in a lab.

Sampling Wand – The sampling wand allows the unit to pull ambient sample gas into the manifold tube from a point 24 inches above the unit.

Manifold Tube – Ambient air is pulled through the manifold tube by a fan. As large amounts of ambient air pass the sample point, a small sample is extracted. This process increases the accuracy of the collected sample by providing a more representative sample of ambient air. A stainless steel screen at the inlet prevents the entry of large debris and insects.

Inlet Filter – Sample gas passes through the 2 μm particulate filter placed between the manifold tube and the rest of the sample path to remove particulates that could damage system components.

Valves – The system uses electro-mechanical solenoid valves to control the path of sample through the system. A solenoid valve is placed in line between the pump and the flow controller so that the incoming sample path can be shut off during the leak checking of the system. A second valve is used at the end of the flow path to allow the system to purge sample air prior to sampling. Depending upon system configuration, either one or two output valves are used to select the output path for sampling. These valves are referred to as 'Sample 1 Solenoid' and 'Sample 2 Solenoid'.

Pump – A stainless steel pump with a Viton diaphragm is used to extract a representative sample from the manifold tube and push it through the sample path and into the sampling can. The pump power is controlled so that minimum power is used to provide the necessary upstream pressure for the flow controller. This allows the unit to conserve power and lengthen sample time when a battery is used to provide power.

Pressure Sensor – A stainless steel pressure transducer enables the unit to measure the pressure of the sample in the canister. A similar pressure transducer labeled 'Pressure Transducer 1' is used in previous revisions and options.

Flow Controller – A flow controller is used to maintain a constant flow rate through the sample path. Systems can be configured to use either mechanical or electronic mass flow controllers. The flow rate for mechanical flow controllers is set by adjusting an easily accessible knob inside the enclosure. When an electronic flow controller is installed the flow rate can be set using the microprocessor.

Microprocessor – The AVOCS system utilizes a microprocessor to monitor and control the various components in the system. The microprocessor also provides an interface by which the user can monitor and program the system for operation.

Keypad/Display – The keypad and display allow the user to easily program and monitor the operation of the system. The keypad/display is designed for outdoor use.

Heater and Cooling Fan – The heater and cooling fan provide the system with the ability to keep the internal components at a desired temperature during operation. The heater also provides the system with the capability of running a clean cycle, which can aid the user in removing post sample contaminants.

Instrument Enclosure – The AVOCS system is enclosed in a weather resistant, insulated cabinet suitable for outdoor service.

Electrical Power – The AVOCS system can be powered from 110 VAC or 220 VAC with a frequency between 47 and 63 Hz, or from a DC source of 12 volts. The fuses for the AC power are contained in the power entry module, and the fuses for

DC operation are inside the unit in the cable harness. The power entry module is set at the factory for 110 volts. It must be changed if 220 volt operation is desired.

Sample Canister -- a passivated leak-free stainless steel sample containment vessel of desired internal volume with a bellows valve attached at the inlet.

Stainless Steel Vacuum/Pressure Gauge -- capable of measuring vacuum (0-30 in Hg) and pressure (0-30 pounds per square inch gauge). Gauge should be leak-free and shown to be non-biasing.

Chromatographic-Grade Stainless Steel Tubing and 316 Grade Stainless Steel Fittings -- used for system interconnections (all tubing in contact with the sample prior to analysis should be chromatographic grade stainless steel and all fittings should be 316 grade stainless steel).

1.3 CLEANING AND CERTIFICATION PROCEDURE

1.3.1 Cleaning Sampling System Components

Sampler components are disassembled and cleaned before the sampler is assembled. Nonmetallic parts are rinsed with methanol followed by HPLC grade deionized water and dried in a vacuum oven at 50°C. Stainless steel parts and fittings are cleaned by placing them in a beaker of methanol in a ultrasonic bath for 15 min. This procedure is repeated with hexane as the solvent. The parts are then rinsed with HPLC grade water and dried in a vacuum oven at 100°C for 12 to 24 hours. After the sampler is assembled, the entire system is purged with humid zero air for 24 hours.

1.3.2 Humid Zero Air Certification

The cleanliness of the sampling system is determined by testing the sampler with humid zero air, as follows. The sampler (without a canister) is connected to the GC/MSD analytical system through the gas inlet system. The humid zero air is connected to the sampler inlet and the air stream passes through the sampling system and through the cryogenic trap. After the air sample (~250 ml) is preconcentrated on the trap, the trap is heated and the VOC are thermally desorbed onto the head of capillary column and analyzed. The analytical system should not detect more than 0.2 ppbv of targeted VOC in order for the sampling system to pass humid zero air certification test.

1.3.3 Sampler System Certification with Humid Calibration Gas Standards

For this test, a sample dilution system (containing two mass flow controllers of 0 - 50 ml and 1 - 5 L range, respectively, and a mixing chamber) is used and the test is performed as follows:

1.3.3.1 The sample dilution system is certified clean (less then 0.2 ppbv of targeted VOC) by sampling humid zero air through this system into the GC/MSD analytical system.

1.3.3.2 The calibration gas cylinder, containing selected VOC standards at nominal concentration of ~ 10 ppmv is attached to the dilution system and mixed with humid zero air to obtain ppbv level of standards. This mixture is sampled into an evacuated, certified canister first (to provide reference concentration of the generated VOC), and then is passed through the sampling system to be certified and collected into another clean, evacuated canister attached to the sampler.

1.3.3.3 The reference canister is analyzed by the GC/MSD system in order to verify the concentration of generated VOC standards.

1.3.3.4 At the end of the sampling period (typically the same sampling period which will be used for anticipated sampling) the sampling system canister is analyzed and compared to the reference canister to determined if the concentration of the targeted VOC was increased or decreased by the sampling system.

1.3.3.5 A recovery between 90% and 110% is considered acceptable. If the recovery does not fall into this range, a sampler should be cleaned and recertified.

1.4 SAMPLING PROCEDURE

1.4.1 General Discussion

The sample is collected in a canister using a pump and flow control device. A flow control device is used to maintain a constant sample flow rate into the canister over a specific sampling period. The flow rate used is a function of the final desired sample pressure and the specified sampling period and assumes that the canisters start at a pressure of 5 mm Hg absolute. The flow rate can be calculated by:

$$F = \frac{P \times V}{T \times 60}$$

where F = flow rate (mL/min)
P = final canister pressure, atmospheres absolute
V = volume of the canister (mL)
T = sample period (hours)
60 = minutes in an hour

For example, if a 6-L canister is to be filled to 2 atmospheres absolute pressure in three hours, the flow rate can be calculated by:

$$F = \frac{2 \times 6000}{3 \times 60} = 67.7 \text{ mL/min}$$

For automatic operation, the timer is programmed to activate and deactivate the sample collection system at specified times, consistent with the beginning and end of a sample collection period.

1.4.2 Detailed Procedures

The following provides specific details for operating a typical multi-event sampling system.

1.4.2.1 Setting the flow rate – The user should remember that the set point of the flow controller will change as the viscosity of the air changes with temperature. In order to decrease this effect and aid in preventing internal condensation, the minimum unit temperature should be set to the maximum temperature the unit is expected to reach during the sampling period. The unit should be allowed to reach this temperature before setting the flow rate. To set the flow rate of the mechanical flow controller, do the following:

1.4.2.1.1 Program an event to last long enough to make adjustments of the flow rate.
1.4.2.1.2 Attach a flow measuring device to the output valve that was selected in the event.
1.4.2.1.3 Rotate the knob on the mechanical flow controller until the flow rate desired is obtained.
1.4.2.1.4 The flow rate of the mechanical flow controller has now been set.

1.4.2.2 Programming an event – After setting the flow rate:

1.4.2.2.1 Set Event Start Date
1.4.2.2.2 Set Event Start Time
1.4.2.2.3 Set Event Duration
1.4.2.2.4 Set Canister Port
1.4.2.2.5 Adjust Flow Controller

1.4.2.3 Disconnect the calibrated mass flow meter or rotameter and attach a clean canister(s) to the sampling system.

1.4.2.4 Open the canister bellows valve(s).

1.4.2.5 Record the initial vacuum in the canister(s), as indicated by the sampling system vacuum gauge, onto the canister sampling field data sheet.

1.4.2.6 Record the time of day and elapsed time indicator reading onto the canister sampling field data sheet.

1.4.2.7 Set the electronic timer to begin and stop sampling at the appropriate times.

NOTE: The sampler will purge the sampler line for one minute after being turned on and will sample for an additional one minute after it is turned off.

1.4.2.8 After sample collection, record the final sample pressure on the sampling field data sheet. Final sample pressure should be close to the desired calculated final pressure. Time of day and elapsed time indicator readings should also be recorded.

1.4.2.9 Close the canister bellows valve(s). Disconnect and remove the canister(s) from the sampling system.

1.4.2.10 Attach an identification tag to the canister. Canister serial number, sample number, location, and data should be recorded on the tag.

1.4.3 Sampling Shutdown

When the sampler is to be shut down, the pump and power must be shut off. The operator must install the caps on the sampler inlet, outlet, and exhaust ports to keep the system clean.

1.4.4 Canister Storage/Shipment

The canister samples do not require any special condition for storage - they are usually stored at room temperature. The canisters are shipped back to the Air Laboratory.

2. Standard Operating Procedure for Polyurethane Foam (PUF) Sampler

2.1 DESCRIPTION OF SAMPLING APPARATUS

2.1.1 General Description

The PUF sampler, from Andersen Instruments, Inc. is used for collecting particulate and semi-volatile gaseous polyaromatic hydrocarbons and other organic compounds simultaneously. The Model GPS-1 features the latest in technological advances for accurately measuring airborne particulates and vapours. PUF sampler is equipped with a bypass blower motor arranged with an independent cooling fan. This feature permits the motor to operate at low sampling flow rates for extended periods without motor failure from overheating. A dual chambered aluminum sampling module contains both filtering systems. The upper chamber supports the airborne particulate filter media in circular filter holder. The lower chamber encapsulates a glass cartridge which contains the Polyurethane Foam for vapor entrapment. A side variety of Sorbents can be used in a manner that permits their continual use. Polyurethane foam or wet/dry granular solid media can be used individually or in combination. The dual chambered sampling module is designed for easy access to both upper and lower media. The threaded lower canister is removed with the cartridge intact for immediate exchange. Filter support screens and module components are equipped with gaskets providing leak proof seal during the sampling process. Air flow rates are infinitely variable up to 280 liters per minute. The voltage variator adjustment screw alters the blower motor speed to achieve the desired flow rate. Air flow rate is measured through the flow venturi utilizing a 0-100" Magnehelic Gage. Periodic calibration is necessary to maintain on-site sampling accuracy. A Seven Day Mechanical Timer is included as standard equipment and permits weekly scheduling with individual settings for each day and 14 trippers to turn the sampler on and off. Any day or days may be omitted and day and night periods are distinctly marked. Other timers and programmers are available optionally to suit any sampling requirement.

2.1.2 Sampling Manifold Assembly

The sampling manifold assembly consists of the inlet manifold, diffuser chambers, PUF sampling head, and a magnehelic gauge. The sampling module is commercially available and consists of a glass sampling cartridge and an air-tight metal cartridge filter holder. The adsorbent (PUF) is retained in the glass sampling cartridge. The entire assembly is housed inside the Anodized aluminum box and shelter.

2.1.3 Sampler Control Unit

The sampler control unit consists of a Blower motor assembly (GPS1-11), a dual sampling module (GSP1-1), Flow selector (GSP1-6), Seven day mechanical timer (GSP1-7), Magnehelic gauge (GSP1-8), flow venturi, and a 220 V power cord.

2.3 CALIBRATION OF SAMPLING SYSTEM

Each sampler is to be calibrated: 1) when new; 2) after major repairs or maintenance; 3) whenever any audit point deviates from the calibration curve by more than 7%; or 4) when a different sample collection medium, other than that which the sampler was originally calibrated to, will be used for sampling.

2.3.1 Calibration of the PUF Sampler is performed without a foam slug or filter paper in the sampling module. However, the empty glass cartridge must remain in the module to insure a good seal through the module.
2.3.2 Install the G40 Calibrator on top of the 4" filter holder.
2.3.3 Connect an 8" water manometer to the Calibrator.
2.3.4 Open the ball valve fully.
2.3.5 Turn the system on by tripping the manual switch on the timer. Allow a few minutes for warm-up.
2.3.6 Adjust the voltage control screw to obtain a reading of 70 inches on the Magnehelic Gage.
2.3.7 With 70 inches on the dial gage as your first calibration point, record it and the manometer reading on the data.
2.3.8 Close the ball valve slightly to readjust the dial gage down to 60 inches. Record the figure and manometer reading on the data sheet.
2.3.9 Using the above procedure, adjust the ball valve for readings at 50, 40, and 30 inches and record on the data sheet.
2.3.10 Using these two sets of readings, plot a curve on the data sheet. This curve will be used for determining the actual flow rate in the field.
2.3.11 Re-adjust the voltage control fully clockwise to maximum setting. Open ball valve fully.

2.4 SAMPLE COLLECTION

2.4.1 After the sampling system has been assembled and flow checked as described in Section 3.0, it can be used to collect air samples.

2.4.2 The sampler should be located in an unobstructed area, at least 2 m from any obstacle to air flow. The exhaust hose should be stretched out in the downwind direction to prevent recycling of air into the sample head.

2.4.3 Detach the lower chamber of the sampling module. While wearing disposable, clean lint-free nylon or powder-free surgical gloves, remove a clean glass cartridge/sorbent from its container and unwrap its aluminum foil covering. The foil should be replaced after the sample has been collected.

2.4.4 Insert the cartridge into the lower chamber and tightly reattach it to the module.

2.4.5 Using clean Teflon®- tipped forceps, carefully place a clean fiber filter atop the filter holder and secure it in place by clamping the filter holder ring over the filter using the three screw clamps. Insure that all module connections are tightly assembled. [Note: Failure to do so could result in air flow leaks which could affect sample representativeness]. Ideally, sample module loading and unloading should be conducted in a controlled environment or at least a centralized sample processing area so that the sample handling variables can be minimized.

2.4.6 Ambient temperature, barometric pressure, elapsed time meter setting, sampler serial number, filter number, and adsorbent sample number are recorded on the Field Data Sheet at the beginning and end of the sampling period.

2.4.7 At the end of the desired sampling period, the power is turned off automatically. Carefully remove the sampling heads containing the filter and adsorbent cartridge to a clean area.

2.4.8 While wearing disposable lint-free nylon or surgical gloves, remove the sorbent cartridge from the lower module chamber and lay it on the retained aluminum foil in which the sample was originally wrapped.

2.4.9 Carefully remove the glass fiber filter from the upper chamber using clean Teflon®-tipped forceps.

2.4.10 Fold the filter in half twice (sample side inward) and place it in the glass cartridge atop sorbent.

2.4.11 Wrap the combined samples in aluminum foil and place them in their original glass sample container. A sample label should be completed and affixed to the sample container. Chain-of-custody should be maintained for all samples.

2.4.12 The glass containers should be stored in ice and protected from light to prevent possible photo-decomposition of collected analytes. If the time span between sample collection and laboratory analysis is to exceed 24 hours, the sample must be kept refrigerated.

2.4.13 One field filter/adsorbent blank with every second sample will be returned to the laboratory with each group of samples. A field blank is treated exactly as a sample except that no air is drawn through the filter/adsorbent cartridge assembly.

2.4.14 Samples are stored at 0°C in an ice chest until they are received at the analytical laboratory, after which they are refrigerated at 4 °C.

2.5 SAMPLE SHIPMENT AND HANDLING

2.5.1 The samples (filter and adsorbent pairs) are shipped to the laboratory in a glass container in an ice chest.

2.5.2 The samples are logged in the laboratory logbook according to sample location, filter and adsorbent cartridge number identification and total air volume sampled (uncorrected).

2.5.3 If the time span between sample registration and analysis is greater than 24 hours, then the samples must be kept refrigerated. Minimize exposure of samples to fluorescent light. All samples should be extracted within one week after sampling.

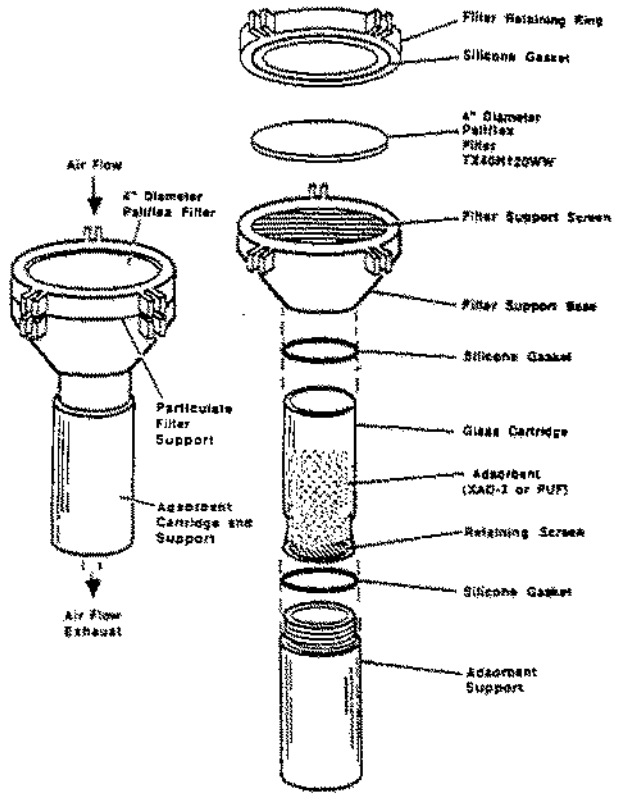

Figure 2.1. PUF Sampling Head.

3. Standard Operating Procedure for Carbonyl Sampler

3.1 INTRODUCTION

Aldehydes and ketones belong to a class of compounds called carbonyl compounds. The most common carbonyls in air include formaldehyde, acetaldehyde, and acetone. Carbonyls in air are collected by drawing air through a cartridge impregnated with acidified 2,4-dinitrophenylhydrazine (DNPH), which is very reactive toward carbonyls. The resulting products (hydrazones) in the cartridge are measured in the laboratory using high performance liquid chromatography to determine the levels of the carbonyl compounds originally present in air. Using DRI's standard carbonyl sampler with one channel, cartridges can be exposed on a predetermined schedule.

Since the reagent is extremely reactive, a cartridge left open will continue to absorb carbonyl compounds from the air until all the reagents are completely consumed. Thus the cartridges are plugged at both ends and placed inside glass screw-capped vials. They are further placed into a tin can for protection during shipment and storage. An open vial, containing DNPH-impregnated material, is placed inside each can to absorb any carbonyls that may intrude into the can to keep the can atmosphere clean. Cartridges are best stored inside a refrigerator.

Cartridges installed in the sampler are protected by a check valve upstream, and a solenoid valve downstream. They are only exposed to the air stream during the period of sampling. When the exposed cartridges are removed, they should be immediately plugged, put into the vials, and stored in a can designated for exposed cartridges. The exposed cartridges should be stored inside a refrigerator and returned to the laboratory in a cooler.

3.2 SAMPLING

The sampler consists of check valves, solenoid valves and pump. Timers are located in the unit. These samplers are designed to be used indoors or out. A temperature-controlled environment is recommended. Follow the appropriate instructions below for the type of sampler to be installed.

3.2.1 DRI Sampler

The DRI single-event sampling system configuration includes the following primary components.

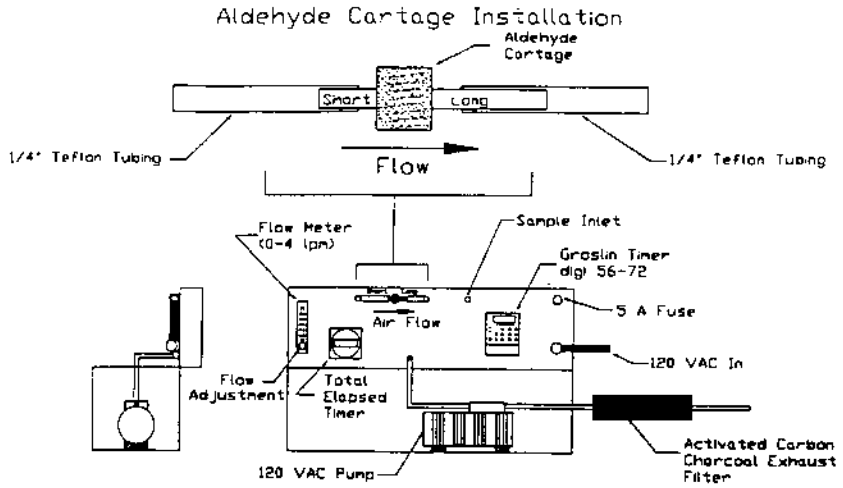

Figure 3.1. DRI Aldehyde Sampling System Configuration

Sample Pump -- a 120 V.A.C. vacuum pump, capable of drawing air through the cartridges at up to 5 liters per minute. The pump must be free of leaks and determined to be nonbiasing.

Sample Inlet Line -- chromatographic-grade stainless steel tubing used to connect the sampler to the sample probe and manifold assembly.

Sample Cartridge -- a DNPH-impregnated cartridge, prepared as per DRI SOP 2-401.1.

Adjustable Micrometering Valve Solenoid and Manifold -- The flow can be adjusted by the needle valve on the front panel.

Electronic Timer -- to allow unattended operation (activation and deactivation) of the solenoid in the collection system. The timer is a 120 V.A.C. Grasslin 56-72 seven-day, fifty-six event programmable controller. Instructions are written for each project's special use and placed in the operations book, along with the user's handbook for this timer.

Chromatographic-Grade Stainless Steel Tubing and 316 Grade Stainless Steel Fittings -- used for system interconnections (all tubing in contact with the sample prior to analysis should be chromatographic grade stainless steel and all fittings should be 316 grade stainless steel).

Total Time Indicator -- for measuring the duration of the sampling episode. This timer is attached to the vacuum switch and will not count if flow stops for any reason. This is a confirmation of flow in the system.

Vacuum Switch -- The vacuum switch monitors the flow in the system. If flow is interrupted for any reason the total timer will stop, indicating that a problem occurred.

3.2.1 Installation

In the sampler, find the following items:

- Teflon sampling line, ¼-inch O.D. tubing, 20-ft,
- Vacuum pump line, ¼-inch tubing, 6-ft,
- Power cord for the main unit,
- A filter holder preloaded with charcoal,
- A copy of this SOP, and
- Instructions on how to program and operate the timer.

3.2.1.1 Locate the sampler in the shelter where the stainless steel sampling line can lead to the outside. Strap the line to a pole or similar object to raise the inlet of the line several feet above the roof of the structure.

3.2.1.2 Install the charcoal filter holder in the pump outlet. Remove the plastic plugs and caps from the sampler fittings. Place the plugs and caps into the Zip-loc bag for safe keeping in the pump box. You will need these items when you pack the sampler at the end of the program.

3.2.1.3 Loosen the Teflon nut and insert the sampling line fully into the inlet fitting. Finger-tighten the fitting. If the line does not slip from the fitting by a tug on the line, the connection is good. Otherwise, loosen the cap nut slightly, push the line back in, and tighten the fitting until the line is snug. All Teflon and plastic fittings are to be connected in such manner.

3.2.1.4 The timers now should display the current time and day of the week. If there is no display on both timers, either there is no power reaching the unit (a dead AC outlet, bad power cord, or loose connection), or a blown fuse. Unplug the unit before attempting to check the fuse.

3.2.1.5 Uncouple the line leading from the manifold solenoid valve (black line) from the short blue tubing stub (the blue stub is installed in place of a sample collection cartridge). Control is accomplished by the timer and Guardian Roto-Stepper switch. Instructions for the single-channel manifold are written individually for each project. Instructions are placed in an operation book inside each sampler box. In the event of sampling, the cartridge will replace the blue tubing stub. The stub keeps dust from entering the system and contaminating the sample.

3.3 SAMPLE COLLECTION

3.3.1 Disconnect the clear fitting from the blue tubing stub. Leave the stub in the tray for later use. Connect the long end of a cartridge to the clear fitting of the black line (vacuum or solenoid valve side). The short end of the cartridge should be connected to the luer fitting of the Teflon line (inlet or check valve side). Do not lose the plug or vial for the cartridge. Place the plug into the vial and leave them on the tray.

3.3.2 Verify the correct sample flow rate using a calibrated mass flow meter or rotameter. Attach the flow meter to the end of the cartridge so that flow is being measured through
the cartridge. This will correct for any restriction by the cartridge. Step through all cartridges setting flows on each individually.

3.3.3 Disconnect the calibrated mass flow meter or rotameter and attach the check valve/sample inlet line to the cartridge.

3.3.4 Record the time of day and elapsed time indicator reading onto the sampling field data sheet.

3.3.5 Set the electronic timer to begin and stop sampling at the appropriate times.

3.3.6 After sample collection, record the time of day and elapsed time indicator readings. Record any problems in sample collection. Fill in the sampling log sheet. Do not skip any lines. The information to be recorded includes:

- Site
- Date the cartridges are installed,
- Sampling date (presumably the day following installation),
- Sampler number,
- Cartridge numbers in each channel,
- Starting flow rates, and
- Initial reading of the elapsed time indicator.

Also record any remarks that you may have, such as power, outages, etc.

3.3.7 When sampling is finished the next day, record the elapsed time indicator reading and the cartridge collection date. The flow rate is checked for each individual cartridge as described above. If the flow rates at the beginning and end of the sampling period differ by more than 15%, the sample should be marked as suspect. Remove the cartridge and plug the ends tightly. Put it into the vial and screw on the cap. Put a label with the site name on the outside of the vial. This

will help you to distinguish an exposed cartridge from a new one at a glance. A new cartridge does not have a label on the vial.

3.3.8 If sampling continues the following day, install a fresh cartridge and continue sampling as described previously. After using the sampler, unplug the power cord from the AC outlet.

3.3.9 Put the exposed cartridges into a tin can designated for exposed cartridges. Keep the can in a refrigerator. Samples can be stored under refrigeration and returned to the laboratory on a batch basis, preferably after one or two intensives.

3.3.10 Return the can of cartridges, using next-day air in a cooler chilled with blue ice, to the DRI laboratory.

Sampling Schedule

TAP Project - Sampling Schedule		
Date	Day of Week	Samples
APRIL		
16/4/99	Friday	VOC
		PAH
		Carbonyl
		Carbonyl Tandem
22/4/99	Thursday	VOC
		VOC Collated, PAH
28/4/99	Wednesday	VOC
		PAH
		Carbonyl
		Carbonyl Tandem
		Carbonyl Collated
		Carbonyl Blank
		VOC Blank
MAY		
4/5/99	Tuesday	VOC
10/5/99	Monday	VOC
		Carbonyl
		Carbonyl Tandem
16/5/99	Sunday	VOC
		PAH
		PAH Blank
22/5/99	Saturday	VOC, PAH
		Carbonyl
		Carbonyl Tandem
		Carbonyl Collated
		Carbonyl Blank
		VOC Blank
28/5/99	Friday	VOC
		PAH
JUNE		
3/6/99	Thursday	VOC
		Carbonyl
		Carbonyl Tandem
9/6/99	Wednesday	VOC
15/6/99	Tuesday	VOC
		PAH
		Carbonyl
		Carbonyl Tandem
		Carbonyl Collated
		Carbonyl Blank
		VOC Blank

21/6/99	Monday	VOC
27/6/99	Sunday	VOC
		PAH
		Carbonyl
		Carbonyl Tandem
JULY		
3/7/99	Saturday	VOC
9/7/99	Friday	VOC
		Carbonyl
		Carbonyl Collated
		Carbonyl Blank
		VOC Blank
15/7/99	Thursday	VOC
16/7/99	Friday	PAH
		PAH Blank
21/7/99	Wednesday	VOC
		Carbonyl
		VOC Collated
27/7/99	Tuesday	VOC
		PAH
AUGUST		
2/8/99	Monday	VOC
		Carbonyl
		Carbonyl Collated
		Carbonyl Blank
		VOC Blank
8/8/99	Sunday	VOC
14/8/99	Saturday	VOC
		Carbonyl
16/8/99	Monday	PAH
20/8/99	Friday	VOC
26/8/99	Thursday	VOC
		Carbonyl
SEPTEMBER		
1/9/99	Wednesday	VOC
7/9/99	Tuesday	VOC
		Carbonyl
13/9/99	Monday	VOC
16/9/99	Thursday	PAH
		PAH Blank
19/9/99	Sunday	VOC
		Carbonyl
		Carbonyl Collated
		Carbonyl Blank
		VOC Blank
25/9/99	Saturday	VOC
OCTOBER		

1/10/99	Fricay	VOC
		Carbonyl
7/10/99	Thursday	VOC
13/10/99	Wednesday	VOC
		Carbonyl
		Carbonyl Collated
		Carbonyl Blank
		VOC Blank
16/10/99	Saturday	PAH
19/10/99	(Tuesday)	VOC
		VOC Collated
25/10/99	Monday	VOC
		Carbonyl
31/10/99	Sunday	VOC
NOVEMBER		
6/11/99	Saturday	VOC
		Carbonyl
		Carbonyl Collated
		Carbonyl Blank
		VOC Blank
12/11/99	Friday	VOC
16/11/99	Tuesday	PAH
		PAH Blank
18/11/99	Thursday	VOC
		Carbonyl
24/11/99	Wednesday	VOC
30/11/99	Tuesday	VOC
		Carbonyl
DECEMBER		
6/12/99	Monday	VOC
12/12/99	Sunday	VOC
		Carbonyl
16/12/99	Thursday	PAH
18/12/99	Saturday	VOC
24/12/99	(Friday)	VOC
		Carbonyl
		Carbonyl Collated
		Carbonyl Blank
		VOC Blank
30/12/99	Tuesday	VOC
JANUARY		
5/1/00	Wednesday	VOC
		Carbonyl
11/1/00	Tuesday	VOC
16/1/00	Sunday	PAH
		PAH Blank
17/1/00	Monday	VOC

		Carbonyl
		Carbonyl Collated
		Carbonyl Blank
		VOC Blank
23/1/00	Sunday	VOC
		VOC Collated
29/1/00	Saturday	VOC
		Carbonyl
FEBRUARY		
4/2/00	Friday	VOC
10/2/00	Thursday	VOC
		Carbonyl
		Carbonyl Collated
		Carbonyl Blank
		VOC Blank
16/2/00	Wednesday	VOC
		PAH
22/2/00	Tuesday	VOC
		Carbonyl
28/2/00	Monday	VOC
MARCH		
5/3/00	Sunday	VOC
		Carbonyl
		Carbonyl Collated
		Carbonyl Blank
		VOC Blank
11/3/00	Saturday	VOC
16/3/00	Thursday	PAH
		PAH Blank
17/3/00	Friday	VOC
		Carbonyl
23/3/00	Thursday	VOC
29/3/00	Wednesday	VOC
		Carbonyl
APRIL		
4/4/00	Tuesday	VOC
10/4/00	Monday	VOC
		Carbonyl
		END
Underlined Public Holiday		
() Public holiday before/after sampling date		