

Research Operating Procedure 10
for
Placement of PFT Emitter and Collection Tubes
in DEARS

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Date: 10/11/2005

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List of Revisions

CAT number	Revision Number	Changes	Date
081	0	Original	7/2004
082	1	New format and numbering for Season 2	1/2005
082	2	Changes in wording for field, office, shipping blanks	2/2005
082	3	Additions to handling procedures	2/2005
082	3	Editing changes, clarification of details	4/2005
082	4	Enhancing the CATS numbers; change in shipping frequency	10/2005

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1.0 Scope and Application

The placement of PFT emitter tubes will help to determine how well the air inside a residence is mixed. The goal of placing sources is to provide sufficient PFT concentration for good measurements and uniform house concentration.

2.0 Summary of Method

PFT emitter tubes (sources) are placed throughout a residence and left overnight to equilibrate. PFT collector tubes (CATS) are placed on the sampling platform to collect the source emission for each day of the sampling week.

3.0 Materials and Supplies

- PFT emitter tubes
- PFT collector tubes (CATS)
- Analyslides
- Scotch tape
- Measuring tape
- Residence survey form
- Pen or pencil

4.0 Personnel Qualifications

- All personnel should be familiar with general field measurement techniques. Those who service the sampler in the field must be very conscientious and attentive to details in order to report complete, high quality data.
- All personnel should read the ROP carefully
- All staff working on this project will have successfully completed a 2-day training course covering all samplers used in the study.

5.0 Sampler Description

The PFT emitter tubes are approximately 1 inch long and 1/4 inch in diameter. They have a metal outer casing and are brightly colored. Each tube is taped to either the top or the bottom of an Analyslide prior to deployment. This will provide a stable surface for the tube to be placed in the residence. Without the slide, the tube may roll off the surface it's placed on and could potentially be lost. The gas inside the tube is a perfluorocarbon tracer. This perfluorinated cyclic hydrocarbon compound is completely harmless and will not degrade into harmful by-products.

The PFT collector tubes are approximately 2 inches long and 1/4 inch in diameter. These tubes are made of glass and have a rubber stopper on either end of the tube. One of the

stoppers is removed when the collector is deployed. The glass tube is filled with 2 layers of activated carbon separated by glass fiber plugs.

6.0 Sampler Operation

On day 0 of the sampling week, the day before sampling starts, the interior of the residence will be measured using a measuring tape and mapped out on the Residence Survey Form. These measurements will be used to calculate the volume of air in the home. The number of sources and their locations should be recorded for each house for accounting purposes.

1. The PFT emitter tubes are placed throughout the residence on Day 0. Usually 4 to 5 tubes are deployed in a 2000 ft² residence. Unless the rooms are unusually large (greater than 2000 cubic feet) one source per room will be sufficient to provide a usable concentration in that room. For very large rooms, more than one source may be used to provide a concentration comparable to those found in other rooms of the house. There should be sources in all rooms of comparable volume, for example, bedrooms, living room, kitchen. Rooms that are well connected (no doorways, such as a living room/dining room) may be considered a single room.
2. Criteria for emitter placement should include:
 - The source should be located near an outside wall in the room in which it is placed.
 - The source should be located 0.5 – 1.5 m above the floor.
 - The sources are temperature sensitive and should not be placed in sunshine, or near sources of heat or cold. *Avoid placing emitters 1) on top of refrigerators, 2) on fireplace mantles, 3) on window sills, 4) above heat vents, 5) above stove, 6) bathrooms, 7) near space heater, 8) etc.*
 - PFT emitters are deployed when equipment is set-up, but should not be located near the CAT sampler (collector tube) deployment location.

PFT collector tubes should be deployed in a central location, near an inside wall, and not in a position where it is subject to air not representative of the interior air (HVAC vents, windows, flowing air streams, PFT sources.) Clipping the PFT collector tube to the indoor cart usually is sufficient. Make sure the PFT collector tube is at least 1 inch from other samplers and the inlet is not obstructed.

If emitters cannot be deployed until the first or later days of sampling, do not deploy a collector tube on the same day. The sample will be wasted, as it is rarely possible to obtain meaningful results.

7.0 Sample Handling, Shipping, and Storage

PFT emitter tubes should be stored in a sealed container when not deployed at a residence. The PFT emitter tubes should not be in the same building as the PFT collector tubes to avoid contamination. This may be unavoidable when transporting the equipment

and samples from the field site to the field lab. In this instance, the PFT emitter tubes should be sealed in a tightly sealed glass jar and placed at the opposite end of the vehicle from the PFT collector tubes. Normal procedure is to keep PFT emitters in the engine compartment of the vehicle, and the PFT collectors in the cabin of the vehicle. Open the windows in the back of the vehicle to increase the air circulation when PFT sources and collectors are in the vehicle simultaneously. *The PFT sources should never be stored in the vehicle for more than a couple of hours.*

Upon return from sampling, the PFT collector tubes are removed from the glass container, checked into the sampling notebook, and then stored in the cardboard cutout form at room temperature. The date should be indicated on the cardboard to show the sampling status for the tubes.

Hint: some of the CATS numbers are difficult to read. Try rubbing the number with a soft lead pencil (No. 2 or softer) to enhance the number. The graphite will not interfere with the analysis.

During DEARS, the collector tubes will be sent to Brookhaven for analysis twice each season, after each four weeks of sampling and at the end of sampling.

The sources that are not deployed in the field should not be kept in the field office, but rather in a motel room in a sealed glass jar. Sources will be mailed directly to the motel and collectors will be shipped to the field office separately.