

National Human Exposure Assessment Survey (NHEXAS)

Arizona Study

Quality Systems and Implementation Plan for Human Exposure Assessment

The University of Arizona
Tucson, Arizona 85721

Cooperative Agreement CR 821560

Standard Operating Procedure

SOP-UA-F-10.1

Title: Field Use of the Modified Air Sentinel

Source: The University of Arizona

U.S. Environmental Protection Agency
Office of Research and Development
Human Exposure & Atmospheric Sciences Division
Human Exposure Research Branch

Notice: The U.S. Environmental Protection Agency (EPA), through its Office of Research and Development (ORD), partially funded and collaborated in the research described here. This protocol is part of the Quality Systems Implementation Plan (QSIP) that was reviewed by the EPA and approved for use in this demonstration/scoping study. Mention of trade names or commercial products does not constitute endorsement or recommendation by EPA for use.

Field Use of the Modified Air Sentinel

1.0 PURPOSE AND APPLICABILITY

The purpose of this SOP is to describe the in-field use of the modified Air Sentinel. Samples collected with this Hi-Vol instrument will be analyzed for atmospheric concentrations of target metals. This procedure must be followed to insure consistent data retrieval of air and dust analyte samples for the NHEXAS Arizona project of the University of Arizona/ Battelle/ Illinois Institute of Technology Consortium.

2.0 DEFINITIONS

- 2.1 BUCKET = A plastic container with a buckle top. One bucket is assigned to each household to be visited. Household identification and stage numbers are listed on the outside of the container. The bucket contains all paperwork to be completed by field staff or household respondents. It serves as the primary vehicle for securing and transporting forms, data and samples to and from the field.
- 2.2 CHAIN OF CUSTODY RECORD (Fig.1)= A vital data tracking and quality assurance form which is inside every filter packet's small Ziploc bag with an already generated Sample Identification Number and an HHID number assigned to it by the Materials Technician.
- 2.3 DATA COORDINATOR = The employee of the research project who supervises data batching, entry and verification.
- 2.4 FIELD COORDINATOR = The employee of the research project who supervises field data collection and operations. The Field Coordinator collates individual data into HH packets, and upon completion of all visits, sampling and QA checks, forwards the packet to the Data Coordinator.
- 2.5 FIELD KIT = A sampling tool-box containing appropriate collection and storage utensils. For Sentinel sampling, the kit contains extra filter packets, an indelible ink labeling pen, tape measure, calculator, disposable polyethylene gloves, common flat-head screwdriver, psychrometer, three charged D cell batteries and extra copies of the Sentinel Sampling Field Sheet (Fig.2).
- 2.6 FIELD STAFF = The Field Coordinator, the Team Leader and the Team Members.
- 2.7 FILTER = This is a 4" by 4" teflon filter with a fiberglass backing/support. The Teflon filter readily peels away from the backing for XRF analysis.

- 2.8 **FILTER PACKET** = A polyethylene Ziploc Freezer Bag of at least .4 mm thickness containing the sentinel filter. The Chain of Custody Record is housed in a smaller Ziploc bag inside the freezer bag containing the filter.
- 2.9 **HRP OFFICE** = The Health Related Professions building, currently located at 1435 North Fremont Avenue; Tucson, AZ 85719. This is an annex of the Respiratory Sciences Center and the primary site of the operations for NHEXAS Arizona.
- 2.10 **HOUSEHOLD(HH)** = The residence occupied by study respondent(s).
- 2.11 **HOUSEHOLD IDENTIFICATION NUMBER(HHID)** = A unique number and character combination which is assigned to each respondent household for identification purposes. This number must be recorded on all data (forms, samples, questionnaires and correspondence) related to the household.
- 2.12 **LAB SUPERVISOR** = The employee of the research project who supervises laboratory analyses.
- 2.13 **MATERIALS TECHNICIAN (Materials Tech)** = The employee of the research project who is responsible for assembling and assigning field forms, questionnaires and equipment for field use. The Materials Tech assigns a unique sample ID number to each sentinel filter as it is received from the manufacturer and logged-in to the Tracking System.
- 2.14 **N/A** = Not Applicable.
- 2.15 **NHEXAS Arizona** = Acronym for National Human EXposure Assessment Survey, a research project conducted in Arizona by the University of Arizona/Battelle/Illinois Institute of Technology consortium.
- 2.16 **PACKET** = A sturdy, envelope-like container that can be fully closed and is large enough to hold the physical data forms generated from sampling and surveying a study household.
- 2.17 **QUALITY ASSURANCE (QA)**= All those planned and systematic actions necessary for ensuring the accuracy, validity, integrity, preservation and utility of collected data.
- 2.18 **QUALITY CONTROL (QC)** = Those quality assurance actions providing a means to control and measure the characteristics of a datum, processor the adherence to established parameters.
- 2.19 **RESPONDENT** = A person in the study population of NHEXAS Arizona. Each household is assigned a HHID. All respondents are assigned an Individual Respondent Number (IRN). Each respondent can be uniquely identified by a HHID and IRN.

- 2.20 **SAMPLE** = The dust deposit left on the filter after sampling is complete. **Sample** may also refer to the filter before it is exposed, while **sampler** refers to the modified Sentinel Hi-Vol Sampler.
- 2.21 **SAMPLE IDENTIFICATION NUMBER** = A numeric code that uniquely identifies every sample. It is generated by the NHEXAS tracking system by the Materials Technician as the filter is logged-in.
- 2.22 **TEAM LEADER** = The member of the field team who is primarily responsible for respondent contact, data collection, field form and questionnaire completion, and site QC checks of all data.
- 2.23 **TEAM MEMBER** = Member of a field team responsible for assisting the Team Leader in the collection of data and quality control checks in the field.
- 2.24 **TRACKING SYSTEM** = A database system containing information about the custody, transfer and storage of hard copy data, electronic data, field samples, and field sample aliquots.
- 2.25 **VISIT** = A scheduled appointment with participating respondents at their place of residence (HH) for the collection of samples, questionnaires and other data.

3.0 REFERENCES

- 3.1 Lebowitz, M.D. 1993. Study Design (Revision of 31 Dec. 1993). EPA NHEXAS Cooperative Agreement.
- 3.2 Swanson, M.C. Agarwal, M.K., and C.E. Reed. 1985. An immunochemical approach to indoor antigen quantification with a new volumetric air sampler: Studies with mite, roach, cat, mouse, and guinea pig antigens. J. Allergy Clinical Immunol. 76:724-729.

4.0 DISCUSSION

This SOP outlines the procedure for operating the Sentinel Air Sampler in the Field. This sampler will obtain a 24 hour composite sample on a teflon / glass fiber filter in the yard of participating respondents. While the sampler is very durable, the teflon filter is quite fragile, and prone to shearing or ripping. Great care must be used in installing and removing the filter.

The Sentinel will be set-up in approximately 28% (125 Homes) of the households sampled in the NHEXAS Stage Two sampling. A schematic of the timing of sentinel sampling relative to other sample collection is shown in Figure 3. Sentinel filters may be stored and

transported at room temperature. The filter will be analyzed for metal content only.

5.0 RESPONSIBILITIES

5.1 The Field Coordinator is responsible for:

- (a) knowing the procedures described in this SOP and insuring that they are followed by the Field Staff,
- (b) supervising the set-up and collection of Sentinel Air samples in one out of every ten houses as a field audit for QA,
- (c) coordinating with the Materials Technician to insure that Sentinel Filters have been logged in to the Tracking System and assigned to each HH as appropriate,
- (d) accepting custody of the filter packets from the Team Leader and annotating the receipt in the Chain of Custody Record that accompanies the sentinel filter,
- (e) properly storing the filter packets at room temperature after receipt, and forwarding the filter to the Lab Supervisor for analysis.
- (f) QA checking of the Sentinel Sampling Field Sheet within 24 hours of collection.

5.2 The Team Leader is responsible for:

- (a) knowing the procedures described in this SOP and ensuring that they are followed by the Team Members,
- (b) arranging sampling dates and times with the HH,
- (c) obtaining the Filter Packets from the Materials Technician,
- (d) collaborating with the Team Member(s) to select the appropriate sampling site at each HH,
- (e) insuring the integrity and custody of the dust sample and field forms collected,
- (f) quality control checks in the field,
- (g) properly storing the Filter Packets at room temperature to and from the Field sites in the HH Bucket,
- (h) forwarding individual QC checked field forms to the Field Coordinator for QA check within 24 hours of collection;

5.3 All Team Member(s) are responsible for:

- (a) knowing and following the procedures described in this SOP,
- (b) receiving the Filter Packets from the Team Leader,
- (c) collaborating with the Team Leader to select the appropriate sampling site at each HH,
- (d) collecting the Sentinel air sample according to this SOP,
- (e) completing the Sentinel Sampling Sheet (Figure 2) and the Chain of Custody Record (Figure 1),
- (f) quality control (QC) checks in the field.

5.4 The Materials Technician is responsible for:

- (a) the proper assignment of Sentinel filters to HH selected to undergo Sentinel sampling as identified by the Field Coordinator,
- (b) to stock the HH Bucket with appropriate field sampling forms,
- (c) include Field Blanks with Filter assignment as appropriate.

6.0 MATERIALS AND REAGENTS

6.1 Materials

Air Sentinel sampler, filter, filter pack, disposable non-sterile, non-powered latex gloves, common screwdriver, psychrometer, three charged "D" cell batteries, a 50 foot outdoor extension cord, electrical outlet ground tester, weather resistant tape, pocket calculator.

6.2 Reagents - N/A

7.0 PROCEDURE

7.1 Preparation

Filters are stored and transported at room temperature. Once a filter has been assigned a unique sample-ID number, it is forwarded to the Lab Supervisor who pre-weighs the filter and returns it to the Materials Tech for field assignment (See UA-L-9.0).

7.1.1 Field Site Selection Criteria

- (a) The Sentinel Hi-Vol air sampler will be placed outdoors on the North side of the HH, ten feet +/- 3 feet from the midpoint of the wall. Placement is intended to protect the sampler from direct sunlight. If the North side of the HH faces a street or places the sentinel at risk of theft or vandalism, place the sampler in a more secure part of the HH property. Indicate the location on the Field Sheet (Fig. 2)
- (b) The Sentinel sampler makes a considerable amount of noise and should be kept away from sleeping quarters where possible.
- (c) The sampler requires an outside outlet for electric power which is fully grounded. Check the outlet to be used with a ground tester. If the outlet fails to be adequately grounded, try another outlet /location in the home.
- (d) Do not locate the sampler under trees, near pools of standing water, near animal cages or under tables, near a roadside, or a sandbox, etc.
- (e) Indicate whether site selection criteria were met at setup on the Field Data Sheet.

7.1.2 Reagents - N/A

7.1.3 Standards and Blanks

The Materials Technician prepares one field blank and one lab blank out of every batch of twenty filters. Filters are chosen randomly from the Filter batches and labeled as blanks. The blanks are placed into Ziploc freezer bags using polyethylene gloves and the bags are labeled accordingly. The "Field Blank" or "Lab Blank" status code is entered into the Tracking System for this particular sample using the sample ID as the unique identifying characteristic. The blanks are then stored in the pre-field Sentinel Storage Bin to await random HH assignment with the other Sentinel filters.

7.1.4 Samplers

- (a) The samplers were factory calibrated (2.5 l/sec) and shipped assembled, with the exception of the inlet cover assembly. The plastic timer cover is fastened to the existing aluminum support protruding through top of the sampler. The original 24 hour timer has been replaced with a 7 day timer with 2 hour increments.
- (b) Samplers are cleaned externally and checked for operation before assignment to the Field by the Materials Technician.

7.2 Field Procedures

7.2.1 Blanks Deployed

Samplers marked as Field Blanks are randomly assigned to households by the Materials Technician. Filters are transported to the field and placed next to the Sentinel during set-up. The blank is not removed from the filter packet. The blank remains attached to the outside of the sentinel in the filter packet for the duration of the sampling period. The blank is returned to the HRP Office unexposed and analyzed with the other filters.

7.2.2 Samples

A. SAMPLE SET-UP

- (a) Place the sampler according to the field site selection criteria of 7.1.1.
- (b) Test the electrical outlet with the ground tester. Verify that the outlet is not controlled by a wall-switch. Inform the respondents that the sampler needs to be powered for the next 24 to 30 hours. Using the extension cord, connect the sentinel to the power source and turn the sentinel 'on'.
- (c) Operate the psychrometer to obtain wet and dry bulb temperatures and calculate

the Relative Humidity after the temperatures have stabilized. Record the data on the Sentinel Sampling Sheet.

- (d) Set the clock timer on the side of the unit to the current approximate day and time (as indicated by the white arrow) by rotating the dial clockwise.
- (e) Check that the sampler is off and remove the lid assembly.
- (f) Set the black tabs on the clock timer so that the sampler will begin sampling within the next two hours and stop sampling twenty four hours later. Since every pin represents a two hour time period, twelve pins should be depressed.
- (g) Place the protector covering the clock timer. Note: The sample is collected on the teflon portion of the filter.
- (h) Don latex gloves. Remove filter from Ziploc bag.
- (i) Place sentinel filter over the sampler inlet with the teflon or glossy side facing toward you as you look down at the sampler.
- (j) Double check that the filter covers the entire inlet / orifice.
- (k) Carefully cup your hand and press on the filter so it conforms to the shape of the orifice.
- (l) Carefully place the lid assembly over the filter and slowly lower the cover to seal the filter over the inlet. Be sure that the aluminum support and support screw are aligned before lowering the lid.
- (m) **Do Not** rotate the lid assembly as you lower it on the filter as it will rip the filter and void the sample.
- (n) Screw the lid down onto the aluminum support using the screwdriver.
- (o) Check the elapsed time (T1) counter and record the hours on the Sentinel Sampling Field Sheet (Figure 2).
- (p) Using a field flow-meter, obtain a flow rate check from the port on the neck of the Sentinel Sampler (with the filter in place) after the sampler has been allowed to run and equilibrate for two to five minutes.
- (q) Record the flow rate on the Sentinel Sampling Sheet. The value should be approximately 24 Lpm. Any reading between 20-30 Lpm is acceptable. If outside this range, do not use sampler.
- (s) Notify the Team Leader of sample set-up completion.

B. SAMPLER TAKE DOWN

- (a) Obtain wet bulb, dry bulb and RH and record on Sentinel Sampling Sheet.
- (b) Using a field flow-meter, obtain a rate check from the port on the neck of the Sentinel Sampler (with the filter in place) after the sampler has been allowed to run and equilibrate for five minutes. If the sampler is still running when you arrive for pick-up, you do not have to wait for the two to five minutes in 7.2.2 (o).
- (c) Record the flow rate on the Sentinel Sampling Sheet. The value should be between 20-30 Lpm. Turn sampler off.
- (d) Don latex gloves, remove the lid assembly remove the filter and fold it in quarters. Place the folded filter into the filter packet.

- (e) Label the Filter Packet with HHID, date, time and Tech Id.
- (f) Record hours from the elapsed time counter on the sampler.
- (g) Record the date, and HHID on the Filter Packet and store in the HH Bucket.
- (h) Determine the total sample time by subtracting the hours from the elapsed time counter on set-up, from the hours recorded on tear-down.
- (i) Custody of the sample is transferred from the Team Leader to the Field Coordinator or Materials Tech, and then to the Lab Supervisor for appropriate analysis.

7.3 Calculations

The hours recorded for the elapsed time on set-up are subtracted from the hours recorded for the elapsed time on teardown yielding the total number of hours that the sampler functioned. The T1 timer records time to one decimal place. The total number of hours elapsed is recorded on the Sentinel Sampling Data Sheet (Figure 2). Total time sampled should be approximately 24.0 hours ± 2 hours.

7.4 Quality Control

7.4.1 Tolerance limits

Tolerance on flow rates on set-up and teardown is a range from 20-30 Lpm. This broad range is due to the fact that the Sentinel cannot be calibrated and is a volumetric sampler whose flow varies with temperature and pressure. Sampler site location is flexible within the bounds of safety and security and in accordance with site selection criteria. Elapsed sample time may show variation due to the two hour increment in clock function and external factors related to sampler reliance on an external power source. Elapsed time variability should not exceed ± 2 hours out of 24 hours.

7.4.2 Detection Limits

Sentinel elapsed sampling time is limited to tenths of an hour. Flow rate determination is limited to the minor divisions on each flow meter, but will not exceed .0625 L/sec.

7.4.3 Corrective Actions

- (a) A duplicate sample will be gathered in ten percent of HH sampled by running two Sentinel samplers side by side. Field and lab blank sampling will be accomplished in 10% of all samples collected.
- (b) In the HH sampling site the Team Leader supervises all work and form completion. Team Members work collectively and check each other's work for accuracy, precision and compliance with SOP procedure and policy.

- (c) The "comments" section on the Sentinel Sampling data sheet must be completed, as necessary, to indicate sampling variation or concerns of the Field Staff.
- (d) The Field Coordinator supervises 1 out of 10 sampling procedures to insure the proper collection, transportation and storage.
- (e) Apparent mis-labeling problems detected in the field may be corrected by the Team Members when appropriate and in accordance with SOP #UA-C-2.0.
- (f) Sentinel flow rate cannot be calibrated in the field. Flow meter checks are for concentration calculations only. If the flow is greater than 30 Lpm, or less than 20 Lpm, flag the Sentinel as malfunctioning in accordance with UA-G-2.0.

8.0 RECORDS

8.1 Chain of Custody Record.

- 8.1.1 This Record (Fig. 1) will serve as the primary record of sample custody. The Team Leader and the collector are responsible for the thorough completion of this form. Enter data in the appropriate fields on the form.
- 8.1.2 The completed original Chain of Custody Record will remain with the data sample except when the filters are left at a HH while sampling is taking place. The Chain of Custody Record will be stored with the appropriate field sampling sheet in the HH Bucket until the filter is collected from the field at which time the custody record will be reunited with the sample by the Team Leader.

8.2 Sentinel Sampling Sheet.

- 8.2.1 This data sheet (Fig. 2) will serve as the primary record of field sampling and activities. The Team Member operating the Sentinel Sampler is responsible for the thorough completion of this form.
- 8.2.2 The completed original sampling data sheet will be securely archived with the HH packet upon completion of post field QA checks to be accomplished by the Team Leader and Field QA coordinator.

8.3 Sample - Record HHID, FS, SAMPID and DATE on sample container.

8.4 Field Notes and Trouble Shooting Guide (Figure 4).

Figure 1. Chain of Custody Record

Chain of Custody Record NHEXAS Arizona Project (CR-821560) Respiratory Sciences 1435 N. Fremont Ave Tucson, AZ 85719 (520) 626 - 4226				
Sample Type: _____ page ____ of ____				
Generated by: _____ / _____ <div style="display: flex; justify-content: space-around; font-size: small;"> print name signature </div>				
Date Generated	Time	Sample ID	# of Containers	Remarks
__/__/__	__:__:__			
History of Sample Handling and Custody				
Relinquished or Received	Signature	Date <small>mo / day / yr</small>	Time	Action
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	
[Rel] or [Rec]		__/__/__	__:__:__	

Figure 2. Sentinel Sampling Sheet (page 1 of 2).

SENTINEL SAMPLING

Form Type: <div style="border: 1px solid black; padding: 2px; display: inline-block;">107</div> FORM UA-F-10.0-1.0	Study: <input type="radio"/> 1. NHEXAS <input type="radio"/> 2. Border <input type="radio"/> 3. _____ <input type="radio"/> 4. _____ <input type="radio"/> 5. _____	Stage # <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> Collapsed? Y <input type="radio"/> N <input type="radio"/> 8 <input type="radio"/> O <input type="radio"/> O <input type="radio"/> O <input type="radio"/>	Team Leader: <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div> Tech ID <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div> Init. _____	HHID <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div> F.S. <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> Visit <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> Sampling Date <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> / <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> / <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> MO DAY YR	Set up QC: [] Take down QC: []
---	--	--	--	--	-------------------------------------

1. Site Selection Criteria Met: ☐ Yes ☐ No ☐ N/A (def.)
 If no, how and why: _____

2. Sentinel ID#: Set up QC: []
 Take down QC: []

3. Sample ID#:

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ITEM	SET-UP	TEARDOWN	Set up QC:	Take down QC:
Date	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> / <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> / <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> MO DAY YR	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> / <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> / <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> MO DAY YR	[]	[]
Time	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> : <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div>	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> : <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div>	[]	[]
Temp.	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> °C °F	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> °C °F	[]	[]
RH %	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> %	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> %	[]	[]
PSY/HYG ID#	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div>	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div>	[]	[]
Flowmeter ID#	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div>	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div>	[]	[]
Flowmeter Cal. Date	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> / <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> / <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> MO DAY YR	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> / <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> / <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> MO DAY YR	[]	[]
Flowmeter Accuracy	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> %	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> %	[]	[]
Flow Rate	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> LPM	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> LPM	[]	[]
T1 Timer	Start <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div>	Stop <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div>	[]	[]
Tech. ID:	Init. <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div>	Init. <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div>	Init. <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div>	Init. <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div>

4. Sample Time = T1 Teardown _____ -- T1 Setup _____ = hour(s)

Data Use Only:	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H	I	J
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Figure 2. Sentinel Sampling Sheet (page 2 of 2).

PAGE 2
Sentinel Sampling

5. Blank filter used? QC: ☒ []

☐ Yes Blank Filter ID #:

☐ No or N/A []

☐ N/A (def.)

REPLICATE SAMPLER

6. Replicate filter used? Set up QC: []
Take down QC: []

☐ Yes a. Replicate Sentinel ID#:

☐ No b. Replicate Sample ID#: 1 2 or N/A []

☐ N/A (def.)

ITEM	SET-UP	TEARDOWN	Set up QC:	Take down QC:
Time	 : 	 : 	[]	[]
Flow Rate	 : LPM	 : LPM	[]	[]
T1 Timer	 : 	 : 	[]	[]
Tech ID	Init. 	Init. 		

7. Replicate Sample Time

T1 Teardown _____ -- T1 Setup _____ = hour(s)

Comments: _____

Comment Codes

Gen. Comment:
 Real Sample:
 Blank Sample:
 Rep. Sample:

Office Use Only QC: ☒ []

Form Status:	<input type="radio"/> 1. Cmp <input type="radio"/> 2. N Cmp <input type="radio"/> 3. P Cmp <input type="radio"/> 4. Re-col <input type="radio"/> 5. Ref <input type="radio"/> 7. Dest <input type="radio"/> 8. N/A <input type="radio"/> 9. Miss	Tech. ID 	MO 	DAY 	YR 	Tech. ID 	MO 	DAY 	YR 	
	QC: _____					DE: _____				
	Init. 					Init. 				
	QA: _____					DP Batch: 	QXV: F S E N 1			

Chain of custody initiated (sig.): _____

Consigned to packet on: [] ____/____/____ Box UA G4-2.0

Pagelink QC: _____
 Init: _____

Data Use Only:	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H	I	J
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Figure 3. Relative Timing of Sample Collection by Stage (page 1 of 2)

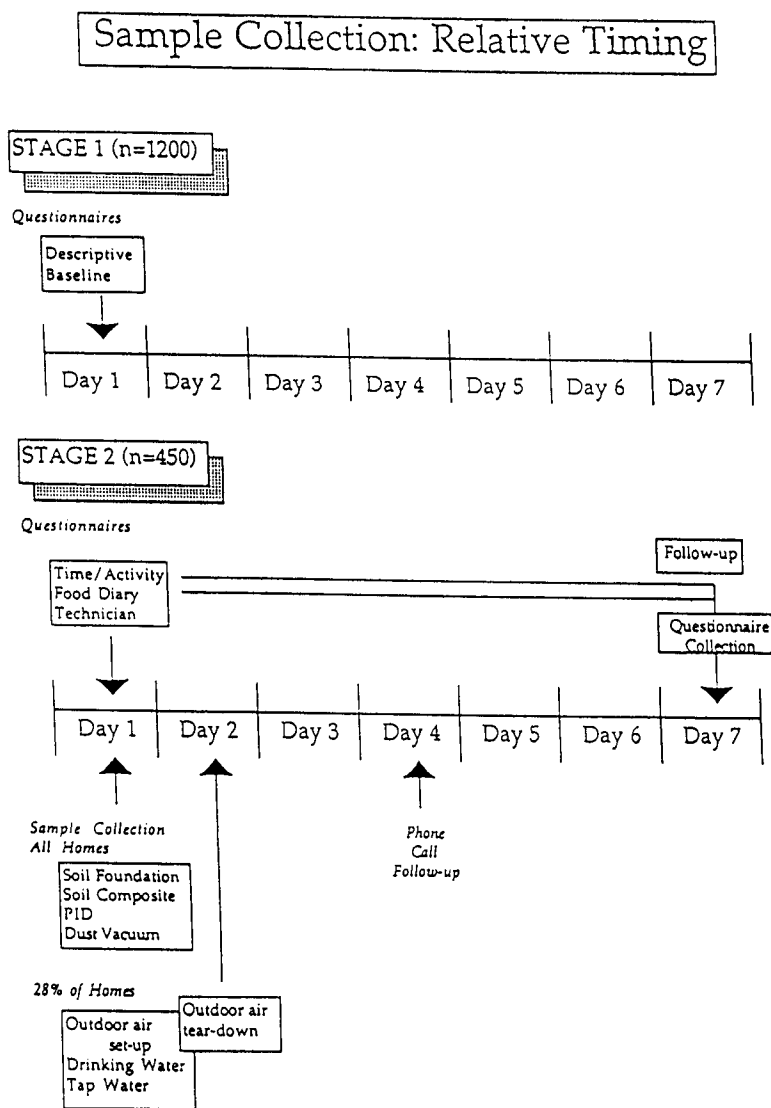


Figure 3. Relative Timing of Sample Collection by Stage (page 2 of 2)

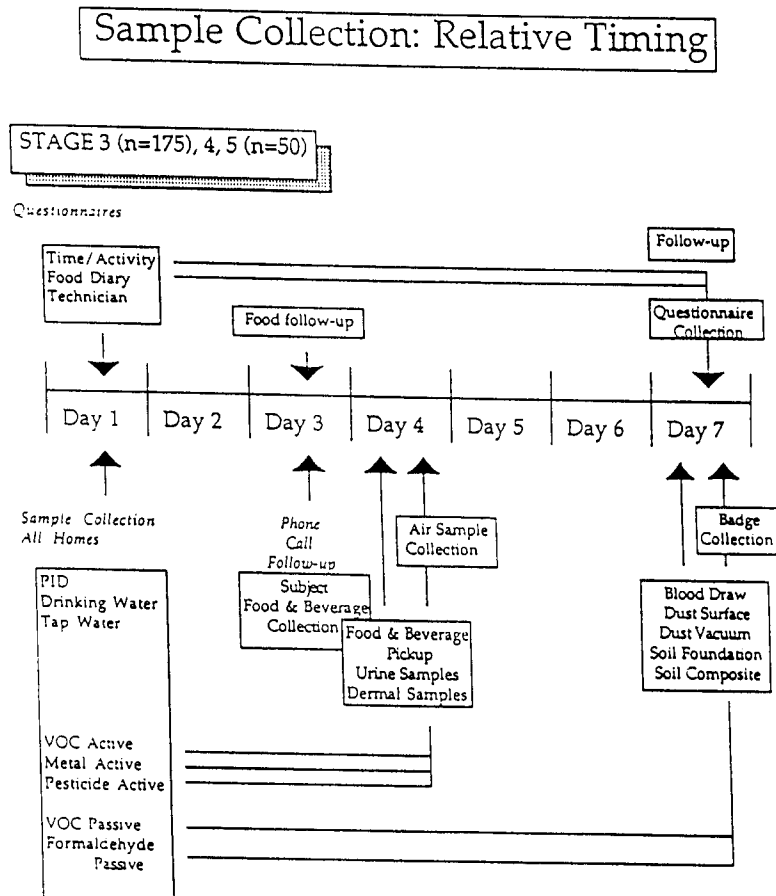


Figure 4. Field Notes and Trouble Shooting Guide, plus Sentinel Schematic

- (1) Always place filter Teflon side "up" in the filter holder.
- (2) Record flow from calibration stem with filter in line and after the sentinel has been operating for two to five minutes.
- (3) Verify that all other pins in the 7 day timer are "out" after you have programmed the sentinel for the sampling period. That is be sure that the 7 day timer is programmed to operate the pump for a 24 hour period on a single day.

