

The Arizona Border Study

*An Extension of the
Arizona National Human Exposure Assessment Survey (NHEXAS) Study
Sponsored by the Environmental Health Workgroup of the Border XXI Program*

Quality Systems and Implementation Plan for Human Exposure Assessment

The University of Arizona
Tucson, Arizona 85721

Cooperative Agreement CR 824719

Standard Operating Procedure

SOP-UA-F-8.1

Title: Collection of Surface Wipe Samples for Pesticides or Metals
Analysis

Source: The University of Arizona

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

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11

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Form TP-1

Collection of Surface Wipe Samples for Pesticides or Metals Analysis

1.0 PURPOSE AND APPLICABILITY

This standard operating procedure (SOP) describes the procedures for collecting surface wipe samples inside a home for analysis of either metals or pesticides. This procedure covers the preparation of the surface wipe material and field activities. This protocol must be followed to insure consistent data retrieval for the NHEXAS Arizona project, AZ Border project (BORDER AZ), and other Health and Environment projects.

2.0 DEFINITIONS

- 2.1 AZ Border = The US border region is defined as 100 km north of the border. In this study, we define the border as 40 km north of the border. The Arizona Border Study or "Border AZ" is an alias for "Total Human Exposure in Arizona: A Comparison of the Border Communities and the State" conducted in Arizona by the University of Arizona / Battelle / Illinois Institute of Technology Consortium.
- 2.2 BUCKET = A plastic container with a buckle top or tight-fitting lid. One bucket is assigned to each household to be sampled. Household identification and stage numbers are listed on the outside of the container. The bucket contains all paperwork and questionnaires 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 through the course of the study.
- 2.3 CHAIN OF CUSTODY RECORD (Fig.1) = A vital data tracking and quality assurance form which accompanies every sample packet in a Ziploc bag.
- 2.4 DATA COORDINATOR = The employee of the research project who supervises data batching, entry and verification.
- 2.5 FIELD COORDINATOR = The employee of the research project who supervises field data collection and operations. The Field Coordinator collates HH specific data into HH packets, and upon completion of all visits, sampling and QA checks, forwards the packet to the Data Coordinator.
- 2.6 FIELD KIT = A sampling tool-box containing appropriate collection and storage utensils. For surface wipe collection the kit contains extra polyethylene Ziploc bags (quart and sandwich sizes), a tape measure, white lab tape, non-sterile, non-powdered latex gloves, psychrometer or hygrometer, three charged D cell batteries and extra copies of the Surface Wipe Sampling Sheet (Fig. 2).

- 2.7 **FIELD STAFF** = The Field Coordinator, the Team Leader and the Team Members.
- 2.8 **HRP OFFICE** = The **Health Related Professions** building, currently located at 1435 North Fremont Avenue; Tucson, AZ 85719. This is an annex of the Arizona Prevention Center and the primary site of the operations for the NHEXAS Arizona project, AZ Border project, and other Health and Environment projects.
- 2.9 **HOUSEHOLD(HH)** = The residence occupied by study respondent(s).
- 2.10 **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.
- 2.11 **LAB SUPERVISOR** = The employee of the research project who supervises laboratory analyses.
- 2.12 **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 the sill wipes unique sample ID numbers upon receipt from Battelle.
- 2.13 **MUFFLED GLASSWARE** = A heat cleaning procedure for glassware to remove residual organic contamination. Glassware is heated in a "muffle" furnace to 400°C for 4 hrs.
- 2.14 **N/A** = Not Applicable.
- 2.15 **NHEXAS Arizona**= Acronym for National **H**uman **EX**posure 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 all 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, process or the adherence to established parameters.

- 2.19 **RESPONDENT** = A person in the study population of NHEXAS Arizona project, AZ Border project (BORDER AZ), and other Health and Environment projects. Each household is assigned a HHID number. All the family respondents are assigned an Individual Respondent Number (IRN). Each respondent can be uniquely identified by a HHID and IRN combination.
- 2.20 **SAMPLE** = The dust deposit left on the wipe after sampling is complete.
- 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 at the HRP Office when the sample material is logged into the Tracking System.
- 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 aliquot.
- 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 "Guidelines for Testing, Abatement, Clean Up, and Disposal of Lead-Based Paint in Housing," National Institute of Building Sciences. (no date)
- 3.3 "Protocol for Wipe Sampling of Settled Dust," - Prepared by Battelle Memorial Institute for the HUD Renovation and Remodeling Study. (no date)
- 3.4 Simulation of Track-In of Lawn-Applied Herbicide Acids from Turf to Home: Comparison of Dislodgeable Turf Residues with Carpet Dust and Carpet Surface Residues. Final Report submitted by Battelle for U.S. EPA Contract No. 68-D0-0007 WA 28, September 1993.

4.0 DISCUSSION

- 4.1 This procedure describes the collection of dust from the surface area of two window sills in the home for collection of dust-bound-metal surface residues. The procedure may be repeated a second time in the home to collect a sample of dust-bound pesticide surface residues. The relative timing of surface dust (sill wipe) sampling to other samples is shown in Fig. 3, the Relative Timing of Sample Collection by stage.
- 4.2 The SOF-WICK gauze wipe material that is used to wipe the sills is moistened just prior to use with distilled deionized water.
- 4.3 Sill wipes and solution may be stored at room temperature for up to six months after the date of preparation before they must be returned to Battelle. Sill wipes must be returned to Battelle within six weeks of sample collection. After collection in the field, pesticide wipes must be stored at -20°C and the shipped for analysis on blue ice.

5.0 RESPONSIBILITIES

5.1 Battelle personnel are responsible for:

- (a) purchasing wipe material,
- (b) cleanup of unexposed wipes before shipment for field use,
- (c) shipping wipe materials in pre-packaged units to the HRP Office for use in Household sampling,
- (d) Aliquoting of the moistening solution and aliquoting into individual vials for field use,
- (e) shipping vials to HRP Office,
- (f) assuring that blank levels for each batch of wipes meet acceptability requirements prior to shipping to the HRP Office,
- (g) documenting blank levels in a NHEXAS (or other study) laboratory notebook.

5.2 The Materials Technician is responsible for:

- (a) receipt of wipes and vials shipped by Battelle personnel,
- (b) logging the material into the Tracking System and generating a unique sample ID for each wipe packet in accordance with SOP UA-G-5.X,
- (c) storing the wipes and moistening solution at room temperature in the Surface Wipe Sampling Pre-Field Storage Bin before assignment to the HH,
- (d) randomly selecting 10% of each batch of wipes and moistening vials to serve as UA Field Blanks,
- (e) assigning blanks and samplers to the field and documenting the assignment in the Tracking System,
- (f) shipping the exposed wipes and blanks on blue ice with the appropriate custody

documentation to Battelle for analysis.

5.2 The Field Coordinator is responsible for;

- (a) supervision of Field Staff
- (b) performing a 10% QA audit of surface wipe collection in the field.
- (c) 100% QA check of all Surface Wipe Sampling Sheets after their submission by the Team Leader

5.3 The Team Leader is responsible for:

- (a) sample site selection,
- (b) custody of all samples until they are transferred to the Field Coordinator /or Materials Technician after sample collection.

5.4 The Team member is responsible for:

- (a) Sample collection according to the procedures outlined in this SOP,
- (b) Documenting the collection on the field sheet and the Chain of Custody Record.

6.0 MATERIALS AND REAGENTS

6.1 Materials

- (a) Johnson & Johnson SOF-WICK dressing sponges (4 in x 4 in -6 ply).
- (b) 2.0 mL disposable polyethylene transfer pipettes.
- (c) Polyethylene Zip-lock bags (4"x4" and quart sizes).
- (d) Disposable non-sterile, non-powdered latex gloves
- (e) Heating Mantle
- (f) Variac
- (g) Soxhlet extractor (large size, e.g. Kontes 585000-0023; including extractor body, condenser, 300 mL round-bottom flask).
- (h) Glass vials (muffled) (2 mL) with Teflon lined screw caps (un-muffled).
- (i) Polyethylene (2 mL) vials
- (j) Stainless steel scissors
- (k) Boiling Chips (Hengar crystals).
- (l) Stainless steel tongs
- (m) Teflon Tweezers
- (n) Disposable polyethylene pipettes; short length (5 3/4") (muffled and stored in polyethylene zip-lock bag)
- (o) psychrometer, RH slide rule, and 3 AA batteries
- (p) One 30 cm plastic ruler

6.2 Reagents

- a) Distilled deionized water (Di water).
- b) Methylene Chloride (High purity).

7.0 PROCEDURE

7.1 Preparation

7.1.1 Field Site Selection Criteria

- (a) Sills are the sole surface sampled for target metals and pesticides. Multiple sill locations within a given household are acceptable if any given sill is not large enough to allow the minimum area required for both metals and pesticide sampling on that given sill. Sills must have a minimum width of 2.5 cm to be sampled.
- (b) The sill wipe for each target pollutant (metals & pesticides) is a composite sample. One sill wipe for metals is taken in the main room, and the second sill wipe is taken in the main bedroom and composited with the first metals sample. If there is enough unsampled area left on the sill, the pesticide sample may be taken on a non-overlapping portion of the same sill. This process is repeated in the main bedroom (sill space allowing) and the two pesticide sill wipes are composited. If the metals and pesticide samples cannot be taken side-by-side on the same sill, another sill (preferably within the same room) may be used.

Note: Always collect metals if there is not enough sill surface area to sample both metals and pesticides. Metals samples are always given priority over pesticides.

- (c) The sill wipe for metals consists of two swabs (one from the main room and one from the main bedroom). The area that each swab was wiped over must be recorded on the field data collection sheet. Each of the two swabs will be wiped over a pre-measured area which has a long axis of 30 cm, and a short axis of the width of the sill.
- (d) For both metals and pesticide samples to be taken on non-overlapping portions of the same sill, the sill must have a surface longer than 60 linear cm. A thin film blot (UA-F-21.X) may be taken at the midpoint between the metals and pesticides sample areas if the sill surface is longer than 70 linear cm.
- (e) In all cases, site selection criteria should be followed. Exceptions to these criteria must be documented on the field sampling sheet (Fig. 2).

7.1.2 Reagents

ACCOMPLISHED AT BATTELLE:

- (a) Aliquot the distilled water by 2 mL volumes using a disposable polyethylene transfer pipette into individual, pre-cleaned, labeled vials. For metals samples, put the moistening solution in polyethylene vials and for the pesticides samples, put the moistening solution in glass vials.
- (b) Store all solutions at room temperature until used. Discard unused solutions after 6 months and re-prepare

7.1.3 Standards and Blanks

Selected Field blanks are assigned to the Field by the Materials Tech and returned unexposed for analysis with other exposed samples.

7.1.4 Samples

ACCOMPLISHED AT BATTELLE:

- (a) For pre-extraction of SOF-Wick Dressing Sponges (hereafter referred to as wipes). Open each SOF-Wick wipe along the first fold and then cut into 2 pieces along that fold line using scissors.
- (b) Load 16 wipes into a Soxhlet extractor. Add 200 mL of methylene chloride to the 300 mL round bottom flask together with a few boiling chips. Connect the condenser. Add the heating mantle and Variac. Prepare in triplicate for one batch of 48 wipes (either pesticide or metals).
- (c) Continue with Soxhlet extraction as described in BCO SOP-L-2.X. Extract wipes overnight (14-16 hr).
- (d) At the end of extraction, drain residual methylene chloride from the extractor body and remove wipes to a clean dry mat of Kim-Wipes in a laboratory hood using methylene chloride-rinsed tongs. Cover the wipes with a single layer of Kim-Wipes.
- (e) Allow wipes to dry for approximately 10 min.
- (f) Using solvent rinsed tweezers, place two dry wipes into a small (4"x 4") Zip-lock bag. Place 24 sample bags into a larger Zip-lock bag.
- (g) Label the bag with the batch number. Enter in the NHEXAS pesticides (or metals) materials prep notebook the batch number, the lot number of wipes used, the date of extraction, the lot number of acetone used.
- (h) Store the pre-cleaned wipes at room temperature until shipment to UA. Ship to UA at room temperature.

7.2.1 Standard/Blanks Deployed

To prepare a field blank sample: composite two sill wipes in the field by folding wipes twice and place in their Ziploc bag and mark as a field blank. Store and ship as per instructions for actual samples.

Field blanks are transported to and from the field with active samples, but are returned unexposed.

7.2.2 Field Wipe Procedure

Field wipes and solution (Distilled water) are stored and carried to the field at room temperature. After collection, the pesticide samples are returned on blue-ice and stored at -20°C, while the metals samples are returned and stored at either room temperature, or at -20°C.

- (a) The Team Member locates the wipe surface on two sills in the home according to site selection criteria and puts on a pair of disposable latex gloves (non-powdered).
- (b) The Team Member uses the plastic ruler to establish a 30 cm long wipe area for the first wipe surface. **DO NOT PLACE THE RULER ON THE SILL.**
- (c) Tape is placed next to the sill, but not on the area to be wiped. When pesticide samples are to be collected, step (b) is repeated on the same sill (if possible) and a second 30 cm long area is demarcated for surface sampling (with tape).
- (d) The Field Team Member moves to the bedroom of the primary respondent and repeats steps (b) and (c) above (7.2.2). At no time will the gloved hands, the ruler or the tape, touch the area to be wiped.
- (e) The Team Member removes a SOF-Wick wipe from the Zip-lock bag and places it on the area that it will be used to wipe. The Team Member then removes one of the unused vials of moistening solution and draws up 2 mL of that solution into a polyethylene pipette. The Team Member applies the 2 mL of solution dropwise over the entire surface of the wipe.
- (f) Holding the wipe, the Team Member grasps one edge of the wipe between thumb and forefinger while allowing the remainder of the wipe to rest against the palm of the hand.
- (g) Place the wipe flat on the surface to be wiped. Using an open flat hand with fingers together, wipe the marked surface in an overlapping "S" pattern, from side to side, until the entire surface is covered.
- (h) Fold the wipe so that the collected dust is in the inside, and repeat step (g).
- (i) At the completion of wiping, fold the wipe one more time and place the folded wipe into the original Zip-lock bag. Seal the Zip-lock bag and mark the outside of the bag with the sample type, HHID, date and Team Member initials. Record all pertinent data on the field data sheet (Fig. 2).
- (j) Move swiftly but carefully to the next sample site and re-accomplish steps (e)

through (i) for the same type of surface wipe that you had just collected (i.e. either metals or pesticides). The second wipe collected is placed in the same Ziploc bag and both are shipped as a composite sample. The two wipes stored in the Ziploc bag will be analyzed for the same target material.

- (k) Now repeat steps (e) through (j) for the other target category wipe (either metals or pesticides).
- (l) Record the sample ID numbers, sampling location, area wiped, date, etc. on the Field Sampling Sheet (Fig 2.).
- (m) Place the dust samples into a larger bag, and store blue-ice in a cooler until the Field Team returns to the lab. Once at the lab, store at -20°C, and ship to Battelle on blue ice. Metals wipes may be stored at room temperature or -20°C.
- (n) A thin film blot of an unsampled portion of the window sill may be sampled (See UA-F-21.X).
 - 1. Half the thin film application should be blotted in the Main Room, and the other half in the second room sampled.
 - 2. These halves should have the samples from each room overlapping in the middle of the blot for accurate XRF analysis. (See UA-F-21.X).
 - 3. Staple the laminated material to the non-stick backing and label with ID numbers, sample location, date, and time.
 - 4. Transport to the Field Office at room temperature.
- (o) Remove the tape strips from the surfaces and discard with latex gloves in the local trash. Return empty DIDW vials to the Field Office.

7.3 Calculations

None.

7.4 Quality Control

- 7.4.1 To achieve the necessary levels of QA/QC for samples, the following set of analyses are planned for each batch (either pesticides only, or metals only) of 48 wipes that are prepared:

40 wipes	sill wipes in 20 homes (pesticides only or metals only)
2 wipes	1 pre-shipment analysis for materials suitability
2 wipes	1 field duplicate
2 wipes	1 field spike
2 wipes	1 field blank

This batch will be collected for either pesticides or metals sill wipes. For each sample type, there are 5% field duplicates (1 for every 20 homes), and 20% overall QA (4 samples for every 20 homes).

7.4.2 To collect the field duplicate samples, identify a home with at least two windows in each of the two rooms to be sampled (or windows that are at least 4 ft in length in each room). If smaller windows are used, then collect the duplicate pesticide wipes from the same window sill (rather than pesticide and metal wipes from the same window sill). If a single large window is used, then that window sill will be wiped in four areas, duplicates for pesticides and duplicates for metals.

7.4.3 For the pesticide field spike sample, prepare a wipe as if for an actual sill wipe sample, and spike with 50 microliters of the Pesticide Field Spike solution (0.25 µg/analyte) instead of the wetting solution (see SOP BCO-L-2.X) using a 50 µL syringe. Spike the wipe by dragging the syringe lightly over the center area of the wipe as the solution is expelled. After spiking, fold the wipe and place it in the zip-lock bag. The second wipe is moistened and placed in the zip-lock bag without any spike. Spikes do not contact wipe surface.

7.4.4 For the metals field spike sample, prepare a wipe as if for an actual sill wipe sample, but spike with 50 µL of the Metals Field Spike solution using an adjustable micropipette with disposable plastic tip. Spike the wipe as described above in 7.4.4 and place in the Ziploc bag. The second wipe is moistened and placed in the Ziploc bag without any spike. Spike solution will be provided by Battelle.

7.4.5 Laboratory blanks will not be analyzed concurrently with sample sets unless a problem is found with the field blanks. At such time, laboratory method blanks, lab blanks, trip blanks (a trip blank is a pair of wipes that is shipped to UA and back to Battelle without exposure), and field blanks will be analyzed to pinpoint and correct the source of contamination.

7.4.6 Tolerance Limits

Field tolerance limits are centered on the use of multiple sill surfaces within the same home to model composite pollutant values. Multiple sill use is acceptable when there would be insufficient surface area to sample for both metals and pesticides. Measurements will be made +/- .5 cm when determining area.

7.4.7 Detection Limits

Field measurements are limited by the minor units and accuracy of the ruler used.

7.4.8 Corrective Actions

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.X.

8.0 RECORDS

8.1 Chain of Custody Record.

8.1.1 The Chain of Custody Record (Fig.1) will serve as the primary record of sample custody after collection in the field. The Team Leader and the collector are responsible for the thorough completion of this form. The Chain of Custody Record is created as the sample is logged into the Tracking System by the Materials Tech.

8.1.2 The completed original Chain of Custody Record will remain with the sample at all times.

8.2 Surface Wipe Sampling Sheet

8.2.1 A record of the sampling location, date, and any problems encountered during the sampling will be noted on the Surface Wipe Sampling Sheet (Fig. 2).

8.3 A record of the blank levels of pesticides and metals in each batch of cleaned wipes will be maintained in a NHEXAS (or any other study) laboratory notebook set aside for materials preparation information. These notebooks will record the batch number, the date of extraction, the lot number for the wipes, and the lot number of the methylene chloride used for extraction. These notebooks (one for metals and one for pesticides) will be retained in the respective extraction laboratories until the conclusion of the study, and will serve as a continuing file on the expected performance of the cleanup step. At the conclusion of the study these notebooks will be transferred from the labs, to the Principal Investigator's Office at Battelle.

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

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Figure 2. Surface Sampling Data Sheet (page 1 of 2)

SURFACE SAMPLING																			
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4	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div>	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div>	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> cm X <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> cm	Met. <input type="radio"/> Pest. <input type="radio"/> N/A <input type="radio"/>	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div>	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> °C <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> °F	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> %		[]										
1. Sample START time: _____				3. Thin film sample taken as composite from: _____				4. Outdoor Special Thin Film ID #: <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block; vertical-align: middle;"></div>											
2. Sample STOP time: _____ QC [<input checked="" type="checkbox"/>]				Locations: <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div>				QC [<input checked="" type="checkbox"/>]											
Office Use Only																			
Form Status: <input type="radio"/> 1. Comp <input type="radio"/> 2. N Comp <input type="radio"/> 3. P Comp <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 QC: <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> / <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> / <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> Init. <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div>				Tech. ID MO DAY YR DE: <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> / <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> / <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> Init. <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div>				DP Batch: <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> QXV: <div style="border: 1px solid black; padding: 2px; display: inline-block;">FSUR1</div>									
Chain of custody initiated (sig.): _____																			
Consigned to packet on: [] / [] / [] Box UA G4-2.0																			
Data Use Only: <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle;"></div> </div>																			

Figure 2. Surface Sampling Data Sheet (page 2 of 2)

Metals Blank ID#: 8 1 or N/A []		Met. Blk. Com. 		Pesticides Spike ID#: 8 3 or N/A []		Pest. Spike Com. 	
Pesticides Blank ID#: 8 3 or N/A []		Pest. Blk. Com. 		25 microliter Volume []		Comments: _____ _____	

PAGE 2
Surface
Sampling

ITEMS	WIPE 1	WIPE 2	WIPE 3	WIPE 4	QC	
1. Window Faces <i>Shade ONE bubble.</i>	<input type="radio"/> North <input type="radio"/> East <input type="radio"/> N <input type="radio"/> South <input type="radio"/> West <input type="radio"/> M	<input type="radio"/> North <input type="radio"/> East <input type="radio"/> N <input type="radio"/> South <input type="radio"/> West <input type="radio"/> M	<input type="radio"/> North <input type="radio"/> East <input type="radio"/> N <input type="radio"/> South <input type="radio"/> West <input type="radio"/> M	<input type="radio"/> North <input type="radio"/> East <input type="radio"/> N <input type="radio"/> South <input type="radio"/> West <input type="radio"/> M	[]	
2. Window Features <i>Shade ALL THAT APPLY.</i>	<input type="radio"/> Window opens <input type="radio"/> N <input type="radio"/> Metal latches <input type="radio"/> M <input type="radio"/> Sill is painted <input type="radio"/> Loose paint chips	<input type="radio"/> Window opens <input type="radio"/> N <input type="radio"/> Metal latches <input type="radio"/> M <input type="radio"/> Sill is painted <input type="radio"/> Loose paint chips	<input type="radio"/> Window opens <input type="radio"/> N <input type="radio"/> Metal latches <input type="radio"/> M <input type="radio"/> Sill is painted <input type="radio"/> Loose paint chips	<input type="radio"/> Window opens <input type="radio"/> N <input type="radio"/> Metal latches <input type="radio"/> M <input type="radio"/> Sill is painted <input type="radio"/> Loose paint chips	[]	
3. Surface Area Sampled is: <i>Shade ALL THAT APPLY.</i>	<input type="radio"/> Metal <input type="radio"/> N <input type="radio"/> Wooden <input type="radio"/> M <input type="radio"/> Cement <input type="radio"/> Other: 	<input type="radio"/> Metal <input type="radio"/> N <input type="radio"/> Wooden <input type="radio"/> M <input type="radio"/> Cement <input type="radio"/> Other: 	<input type="radio"/> Metal <input type="radio"/> N <input type="radio"/> Wooden <input type="radio"/> M <input type="radio"/> Cement <input type="radio"/> Other: 	<input type="radio"/> Metal <input type="radio"/> N <input type="radio"/> Wooden <input type="radio"/> M <input type="radio"/> Cement <input type="radio"/> Other: 	[]	
4. Type of Blinds <i>Shade ALL THAT APPLY.</i>	<input type="radio"/> Cloth <input type="radio"/> N <input type="radio"/> Venetian <input type="radio"/> M <input type="radio"/> Other: 	<input type="radio"/> Cloth <input type="radio"/> N <input type="radio"/> Venetian <input type="radio"/> M <input type="radio"/> Other: 	<input type="radio"/> Cloth <input type="radio"/> N <input type="radio"/> Venetian <input type="radio"/> M <input type="radio"/> Other: 	<input type="radio"/> Cloth <input type="radio"/> N <input type="radio"/> Venetian <input type="radio"/> M <input type="radio"/> Other: 	[]	
5. Items moved to collect sample <i>Shade ONE bubble.</i>	<input type="radio"/> Yes <input type="radio"/> N <input type="radio"/> No <input type="radio"/> M	<input type="radio"/> Yes <input type="radio"/> N <input type="radio"/> No <input type="radio"/> M	<input type="radio"/> Yes <input type="radio"/> N <input type="radio"/> No <input type="radio"/> M	<input type="radio"/> Yes <input type="radio"/> N <input type="radio"/> No <input type="radio"/> M	[]	
6. Thin Film on Outer Sill <i>Shade ONE bubble.</i>	<input type="radio"/> Yes <input type="radio"/> N <input type="radio"/> No <input type="radio"/> M	<input type="radio"/> Yes <input type="radio"/> N <input type="radio"/> No <input type="radio"/> M	<input type="radio"/> Yes <input type="radio"/> N <input type="radio"/> No <input type="radio"/> M	<input type="radio"/> Yes <input type="radio"/> N <input type="radio"/> No <input type="radio"/> M	[]	
7. Indoor Height from Floor	 ' "	 ' "	 ' "	 ' "	[]	
8. Date Surface Last Cleaned	MO / DAY / YR 	MO / DAY / YR 	MO / DAY / YR 	MO / DAY / YR 	[]	
COMMENTS	Wipe 1 Com 	Wipe 2 Com 	Wipe 3 Com 	Wipe 4 Com 	[]	
9. Outdoor sill surface is: <i>Shade ALL THAT APPLY.</i>	<input type="radio"/> Metal <input type="radio"/> Other: <input type="radio"/> Wooden <input type="radio"/> N <input type="radio"/> Cement <input type="radio"/> M <input type="radio"/> Painted	<input type="radio"/> Metal <input type="radio"/> Other: <input type="radio"/> Wooden <input type="radio"/> N <input type="radio"/> Cement <input type="radio"/> M <input type="radio"/> Painted	<input type="radio"/> Metal <input type="radio"/> Other: <input type="radio"/> Wooden <input type="radio"/> N <input type="radio"/> Cement <input type="radio"/> M <input type="radio"/> Painted	<input type="radio"/> Metal <input type="radio"/> Other: <input type="radio"/> Wooden <input type="radio"/> N <input type="radio"/> Cement <input type="radio"/> M <input type="radio"/> Painted	<input type="radio"/> Metal <input type="radio"/> Other: <input type="radio"/> Wooden <input type="radio"/> N <input type="radio"/> Cement <input type="radio"/> M <input type="radio"/> Painted	[]
10. Outdoor area around the sill has: <i>Shade ALL THAT APPLY.</i>	<input type="radio"/> Soil <input type="radio"/> Vegetation <input type="radio"/> Cement <input type="radio"/> Asphalt	<input type="radio"/> Soil <input type="radio"/> Vegetation <input type="radio"/> Cement <input type="radio"/> Asphalt	<input type="radio"/> Soil <input type="radio"/> Vegetation <input type="radio"/> Cement <input type="radio"/> Asphalt	<input type="radio"/> Soil <input type="radio"/> Vegetation <input type="radio"/> Cement <input type="radio"/> Asphalt	<input type="radio"/> Soil <input type="radio"/> Vegetation <input type="radio"/> Cement <input type="radio"/> Asphalt	[]

PageLink QC: Data Use Only:

QC Tech ID Tech ID

Figure 3. The Relative Timing of Sample Collection by Stage. (page 1 of 3)

Sample Collection: Relative Timing

Stage 1 (n=300)

Questionnaires:

Descriptive

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
-------	-------	-------	-------	-------	-------	-------

Stage 2 (n=125)

Questionnaires:

Descriptive Update
Baseline
Diet Diary *
Time / Activity *
Technician
Supplement

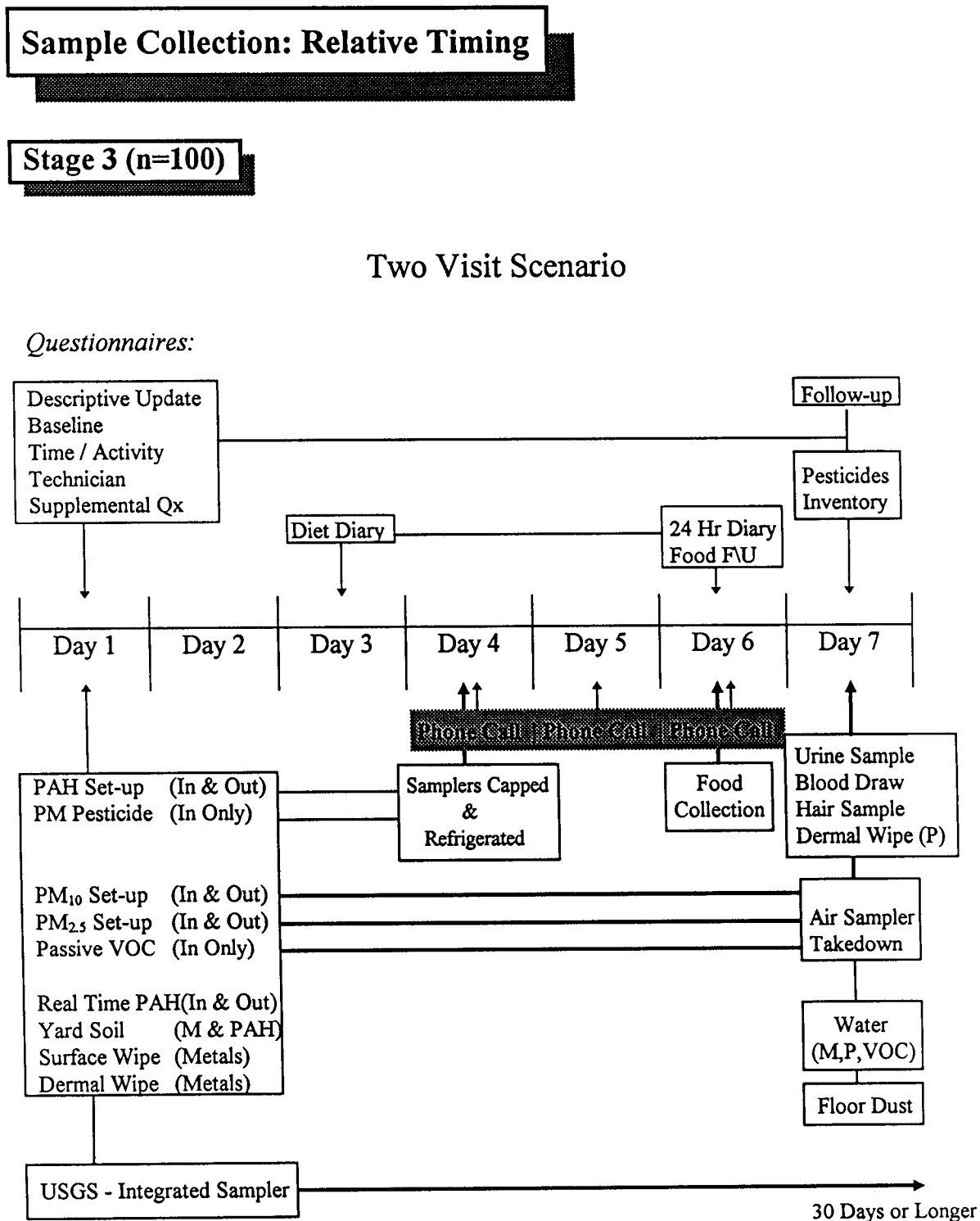
* One day recall

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
-------	-------	-------	-------	-------	-------	-------

Sample Collection:

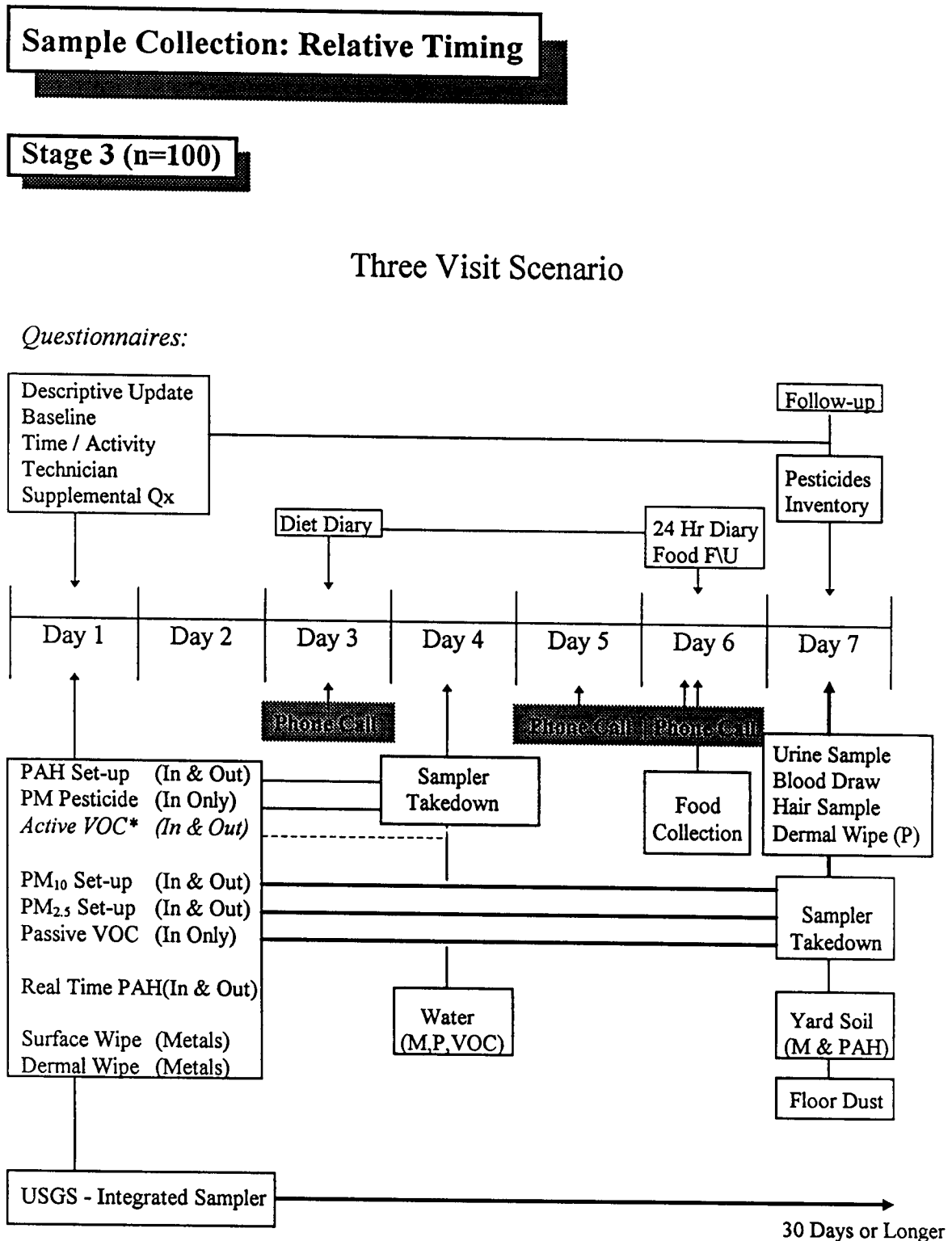
Yard Soil
Floor Dust

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



* Active VOC is collected in a subset of 25 homes only

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

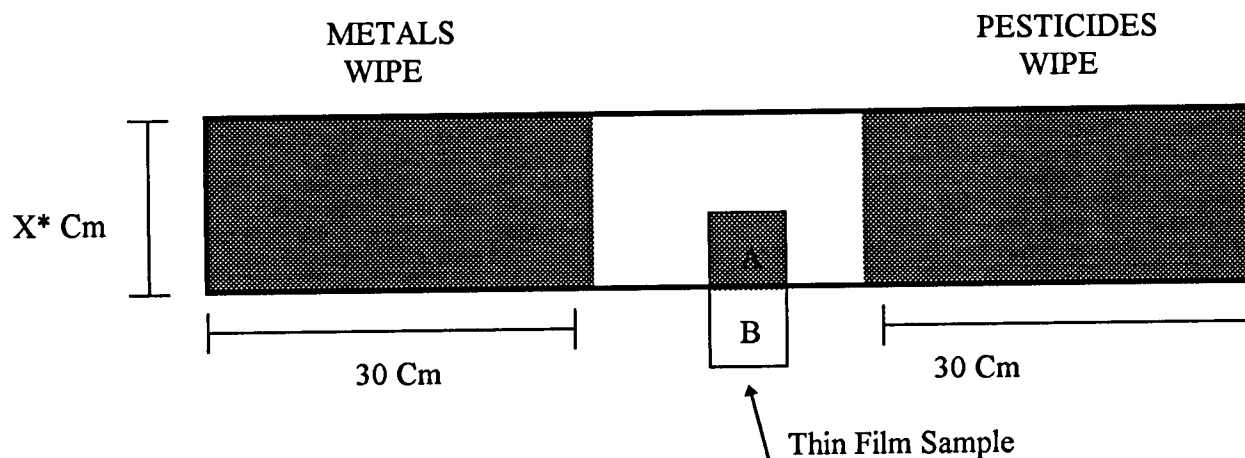


* Active VOC is collected in a subset of 25 homes only

Figure 4. Field Notes and Trouble Shooting Guide.

- (a) Record whether or not items had to be moved from the sill to collect the sample on the field sheet.
- (b) Record whether or not the window was open during sampling on the Field Data sheet.
- (c) If there are no interior window sills suitable for sampling, collect metals and / or pesticide samples on a piece/pieces of interior furniture (TV / table / lamp) in both rooms (main and primary respondent's bedroom) and record the area and type of surface sampled on the field sheet.
- (d) A schematic of a typical sample collection scenario follows:

Windowsill in Main Room: Width of sill (X^* Cm) must be greater than 2.5 Cm.



Windowsill in Main Bedroom: Width of sill (X^* Cm) must be greater than 2.5 Cm.

