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-L-13.1**

Title: Food Sample Comparison with Diary and Shipment

Source: The University of Arizona

U.S. Environmental Protection Agency
Office of Research and Development
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Exposure & Dose Research Branch

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NHEXAS Arizona Project

Title: **FOOD SAMPLE COMPARISON WITH DIARY AND SHIPMENT**	
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Form TP-1

Food Sample Comparison with Diary & Shipment

1.0 Purpose and Applicability

This SOP describes the procedures to be followed in checking the food collections with the stated food consumed in the "24-Hour Food Diary". The sample is then packaged and shipped to the FDA for further analysis. This procedure applies to the checking of food samples and shipment for the EPA NHEXAS and EPA border projects of the University of Arizona/Battelle/Illinois Institute of Technology consortia, as well as future "Health in the Environment" investigations.

2.0 Definitions

2.1 Food Container = Commercially produced plastic tupperware containers given to the participants to store food in their refrigerator.

2.2 Liquid Container = Commercially produced plastic 3 1/2 and 1 liter containers given to the participants to store liquid food and beverages in their refrigerator.

2.3 24-Hour Food Diary = Diary filled out by the participant and field technician which details food and liquid items consumed during a 24 hour period. The food and liquid samples should reflect these same items.

3.0 References

Not applicable

4.0 Discussion

Assessment of food collected during food sampling, as a representation of the stated food consumed on the "24-Hour Food Diary" is crucial to assure a representative sample. Once the food is returned from the Field (UA-F-15.0) a check is to be made against the food diary. Those portions that are identified are weighed and a visual estimation of volume made. The samples are combined into a ziploc bag, frozen, and shipped for further analysis. Liquids consumed during this period are measured for volume then placed in a ziploc bag, frozen, and shipped with the food samples.

5.0 Responsibilities

5.1 The Project Director will be responsible for:

5.1.1 Final review and approval of this procedure.

5.2 The Project Lab Supervisor will be responsible for:

5.2.1 Insuring SOP procedures are followed by the Project Lab Staff.

5.2.2 Notifying the appropriate technicians with needed repairs. In cases when the item can not be fixed in-house, the Project Field Coordinator will generate the

appropriate paperwork, notify the appropriate vendor or company, and ship the dysfunctional item.

5.3 The Project Lab Staff will be responsible for:
- 5.3.1 Knowing and following the procedures described in this SOP.
- 5.3.2 Recording the information as directed in this SOP.
- 5.3.3 Notifying the Project Lab Supervisor with down equipment and repair supplies needed (where applicable).
- 5.3.4 Providing the Project Lab Supervisor with down equipment label and isolating the down equipment into the down equipment area.
- 5.3.5 Insuring proper labeling techniques of down equipment.
- 5.3.6 Repairing the item (where applicable) in a timely manner.

6.0 Equipment and Materials

6.1 Equipment
- 6.1.1 Beaker, 1000 ml
- 6.1.2 "Blue Ice" Blocks
- 6.1.3 Food Collection Containers
- 6.1.4 Laboratory Freezer (#10004)
- 6.1.5 Liquid Collection Containers
- 6.1.6 Metal Trays
- 6.1.7 Styrofoam Tray
- 6.1.8 Three-pound Coffee Can
- 6.1.9 Timer
- 6.1.10 Ziplock bags

6.2 Materials
- 6.2.1 Distilled deionized water

7.0 Procedure

7.1 Preparation

7.1.1. Work Area
- A. Wipe down the work area with paper towels and DDW.
- B. Take 4 "Blue Ice" blocks from the freezer, place them between two metal trays. The food containers will be set on top of the metal trays to maintain a cool environment.
- C. Turn on the Acculab V-1200 balance and follow calibration instructions (UA-L-1.1).
- D. Locate the liquid holding container (metal 3 lb coffee can).

E. Locate the food volume estimation template. To facilitate volume estimation, a ziploc bag was filled with known volumes of granulated sugar. The level attained when the bag was suspended was marked on the exterior for each volume (for example there is a 100 ml line and a 200 ml line, etc.). The bag will be used as a comparison with sample bags to estimate the food volume.

7.1.2 Samples

A. Receive from the Field Coordinator a xerox copy of the descriptive portion of the 24-Hour Food Diaries for the food portions to be checked against the food collected.
B. Fill out for each sample to be processed the date, sample ID#, HHID, family schism code, technician initials and code, along with the scale to be used on the "24-Hour Food Diary Check Form" (figure 1). Locate plastic ziploc bags to hold the solid and liquid samples. Locate a plastic ½ gallon wide mouth container to hold the liquid sample. Ensure that the Sample ID# is prominently displayed on each item.

7.2 Sample analysis

7.2.1 Food Samples

A. Copy the food items from the xerox of the 24-hour food diary onto the "24-hour Food Diary Check Form" (figure 1). If additional space is needed to record items use the "24-Hour Food Diary Check Supplement Form" (figure 2). Remove the sample food container from the refrigerator and place it upon the metal tray.
B. Check each food item with the stated diary entry. The container will have food items, either singularly or combined, in ziploc bags. Very wet food may be placed into one of the liquid food containers singularly or combined with other items. Mark the identifiable items as "Y" under "In Diary" on the "24-Hour Food Diary Check Form". Unidentifiable items are marked as "Y", "In Diary" but are noted as "not identified" on the back of the "24-Hour Food Diary Check Form" under comments. If an item occurs which is not in the "24-Hour Food Diary" record its presence on the "24-Hour Food Diary Check Form" and mark "N" under "In Diary".
C. Respondents often combine food items which do not subsequently separate. Note these items under comments on the back of the "24-Hour Food Diary Check Form" (figure 1).
D. Place the food container back in the refrigerator.
E. Repeat steps A through D for other containers from a given sample ID#.
F. Repeat steps A through E for each of the food samples.

7.2.2. Solid Food Weighing and Volume Estimation

A. Place on the Acculab V-1200 balance a styrofoam tray and tare the balance to 0.0.
B. Take the food container from the refrigerator and affix the sample ID labels to a plastic ziploc sample bag.
C. Place the ziploc sample bag on the Acculab V-1200 and tare the weight of the bag returning the balance to 0.0.
D. Take a bag containing a food item and estimate the volume by suspending the item and comparing the food with the lines on the food volume estimation template. Record the volume on the "24-Hour Food Diary Check" form (figure 1).
E. Weigh each identified food item. For food in ziploc bags grab the bottom of the bag and turn it inside out dumping the contents into the combined sample bag.
F. Samples in the liquid food containers are poured into the sample bag. Swirling helps to dislodge and homogenize the sample prior to its removal. Combined sample weights are listed on the "24-Hour Food Diary Check Form" and the "24-Hour Food Diary Check Supplement" (figure 1, 2) under "Combined". The identifiable elements of the combined sample are listed on the back of the "24-Hour Food Diary Check Form".
G. Press tare to return the balance to 0.0 before the next sample is placed in the bag and weighed.
H. Once filled, place the plastic ziploc sample bag into the freezer to solidify the contents prior to shipping.

7.2.3 Liquid Samples

A. Check the liquid sample to see that the color and composition approximates those liquids stated in the "24-Hour Food Diary".
B. Record any listed alcohol on the "24-Hour Food Diary Check Form" (figure 1).
C. Smell the sample for alcohol and note if present on the "24-Hour Food Diary Check Form" (figure 1).
D. Take a large ziploc plastic bag and affix the sample ID labels onto the exterior. Fit the sample bag into a three-pound coffee can rolling the top over the upper edge. Once measured, the liquid will be placed in the bag using the can as support.
E. Locate a clean (UA-L-5.1) 1000 ml beaker. Rinse with distilled water and drain. Measure the liquid and record the total sample volume on the "24-Hour Food Diary".
F. Carefully seal the top of the bag forcing as much air out as possible. Lift the bag out of the can and gently place it into a ½ gallon wide mouth plastic container.

Place the container into the freezer. The liquid will harden within 10 to 15 minutes.

7.3 Calculations
Not Applicable

7.4 Quality Control
7.4.1 Tolerance Limits
A. Samples
1. Each food container can be out of the refrigerator for a maximum of 5 minutes. At the time of sample removal from the refrigerator a timer is set. After each 5 minutes the sample must be returned to the refrigerator and brought to equilibrium at 4°C.
2. Each liquid container can be out of the refrigerator for a maximum of 5 minutes. At the time of sample removal from the refrigerator a timer is set. After each 5 minutes the sample must be returned to the refrigerator and brought to equilibrium at 4°C.

B. Blanks and Spiked Samples
1. Food blanks were prepared by grinding a wide range of raw and prepared food to simulate food samples from each participants home (See UA-F-15.1 for preparation procedure). The samples were frozen into convenient sized, ~750 ml, packets.
2. Half of the packets were spiked with known levels of pesticides and metals in the laboratory, the other half were not.
3. A randomly chosen "blank" food sample is sent with every 10 participant food samples as a quality assurance check.

7.4.2 Detection Limits
A. Detection limits for the Acculab V-1200 scale are listed in UA-L-1.1.

7.4.3 Corrective Actions
A. Food Samples
1. Food samples that are out of the refrigerator for 5 minutes must be replaced and brought to equilibrium, 4°C, before finishing the diary check and weighing procedure.

B. Liquid Samples
1. Liquid samples that are out of the refrigerator for 5 minutes must be replaced and brought to equilibrium, 4°C, before finishing the diary check and volume estimation procedure.

8.0 RECORDS

8.1 Data Collected by this Procedure

8.1.1 Food Diaries

A. For each sample ID# a "24-Hour Diary Check Form (figure 1, L-13.0-1.0) and possibly a "24-Hour Diary Check Supplement Form" (figure 2, L-13.0-2.0) is completed. The completed forms are transferred to the data coordinator for further processing.

8.2 Location/Placement of Forms

8.2.1 Completed forms are QC/QA checked and transferred to the data coordinator.

Figure 1: 24-Hour Food Diary Check Form

24-HOUR FOOD DIARY CHECK

Technicians Code:______ [ ][ ]
Init. Code

Start Date [ ][ ]/[ ][ ]/[ ][ ]

HHID:[ ][ ][ ][ ][ ][ ] F.S.[ ] Sample ID#:[ ][ ][ ][ ][ ][ ][ ] Status:[ ]

Weight (g)	Volume (ml)	Item Description	Code	In Diary Y N	QC
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0

Liquids Sample ID# [ ][ ][ ][ ][ ][ ][ ]
Total Volume [ ][ ][ ] ml

Alcohol; Smell (Y N) [ ] [ ] Diary (Y N) [ ] [ ]

Items on Diary but not collected

______________________ ______________________
______________________ ______________________

Items collected but not on Diary

______________________ ______________________
______________________ ______________________

QA/QC Signature ______________________ Date ______/______/______

Figure 2: 24-Hour Food Diary Check Supplement Form

24-HOUR FOOD DIARY CHECK SUPPLEMENT

Technicians Code:______ [ ][ ]   Start Date [ ][ ]/[ ][ ]/[ ][ ]
Init. Code

HHID:[ ][ ][ ][ ][ ][ ] F.S.[ ] Sample ID#:[ ][ ][ ][ ][ ][ ][ ] Status:[ ]

Weight (g)	Volume (ml)	Item Description	Code	In Diary Y N	QC
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0
[ ][ ][ ].[ ]	[ ][ ][ ][ ]		[ ][ ][ ]	0 0	0

Liquids Sample ID# [ ][ ][ ][ ][ ][ ][ ]   Y N   Y N
Total Volume [ ][ ][ ] ml   Alcohol; Smell [ ] [ ] Diary [ ] [ ]

Items on Diary but not collected

______________________________ ______________________________
______________________________ ______________________________
______________________________ ______________________________

Items collected but not on Diary

______________________________ ______________________________
______________________________ ______________________________
______________________________ ______________________________

QA/QC Signature _________________________ Date _____/_____/_____