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-L-4.1**

Title: Maintenance and Temperature Verification of Refrigerated Units for Sample Storage

Source: The University of Arizona

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

Maintanence and Temperature Verification of Refrigerated Units for Sample Storage

1.0 Purpose and Applicability

The procedures described in this SOP are designed to assure suitable temperature maintenance by refrigerators and freezers used for sample storage for the EPA NHEXAS and EPA Border Projects, as well as future "Health in the Environment" investigations.

2.0 Definitions

2.1 SOP = Standard Operating Procedure

2.2 Unit = Refrigerator or freezer used in the EPA NHEXAS and EPA Border Projects, as well as future "Health in the Environment" investigations.

3.0 References

Not applicable

4.0 Discussion

Sample integrity relies on storage in a suitable location. Pesticide and VOC samples, water, food, blood and urine must be stored at specific temperatures prior to analysis. If not maintained at the appropriate temperature, the sample is compromised and should not be analyzed. If analyzed, results are invalid.

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, Project Field Coordinator will generate the appropriate paperwork, notify the appropriate vendor or company, and have the disfunctional item repaired.

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 Freezers
6.1.2 Laboratory max/min thermometer
6.1.3 Refrigerators
6.1.4 Refrigerator/Freezer log forms (see figures 1-3)
6.1.5 Sponge

6.2 Materials
6.2.1 Mild soap solution
6.2.2 Water

7.0 Procedure;

The following instructions apply to all refrigerator and freezer unites used for sample storage.

7.1 General Operation
7.1.1 Unit Cleaning.
A. Clean when dirty or every 6 months.
B. Transfer samples to another calibrated unit operating at the same temperature.
C. Turn off and unplug the dirty unit. Allow suitable time for defrosting.
D. Wash all surfaces with warm soapy water.
E. Rinse all surfaces with clear water.
F. Allow to air dry.

7.1.2 Operating the Unit
A. Follow all operation and safety guidelines recommended by the manufacturer.
B. Increase or decrease the temperature appropriately to achieve the desired temperature following the criteria listed on table 1 (page 5).
C. Allow temperature to stabilize 24 hours after the final setting before using unit.

7.1.3. Temperature Recording
'A. A max/min thermometer is kept permanently in each unit to record daily fluctuations.
B. Read the max/min thermometer in each unit to determine the maximum and minimum temperatures since the last reading was taken.

C. Record information on the "Freezer Log" or "Refrigerator Log" form (figure 1, figure 2) as appropriate.

7.2 Quality Control

7.2.1 Tolerance Limits

A. The tolerance limit for each unit will be designated as non conforming if it varies by ± 2 °C (± 3.6 °F). Then corrective action is required.

7.2.2 Detection Limits

A. Detection Limits: Thermometers should be sensitive to ± 2 °C.

7.2.3 Corrective Actions

A. Temperature variation in each of the units should be held to a minimum, although sample invalidation only occurs if the temperature raises above freezing. If above freezing conditions occur document the temperature, transfer all samples to a functioning unit (figure 3). Note the last date of valid temperature and the unit temperature at the time of the sample transfer to a conforming unit on each samples custody sheet under comments, and label the unit as not functioning.
B. Notify the Project Field Coordinator immediately for potential re-sampling.
C. Attempt to readjust and calibrate the unit in accordance with section 7.1.2A-C and 7.2.1A.
D. If calibration fails, clearly label the unit "DO NOT USE".
E. Call maintenance people for repair.
F. Once fixed, calibrate the unit (7.1.2A-C and 7.2.1A) and monitor for one week before returning samples.
G. If a replacement unit is obtained, clean and calibrate it (sections 7.1.2A-C and 7.2.1A).

8.0 Records

8.1 Data collected by this procedure.

8.1.1 Temperature Log

A. After the desired temperature is achieved (table 5) the maximum and minimum temperature are observed and recorded on the "Freezer Log" or "Refrigerator Log" regularly throughout the week for freezers (figure 1) and refrigerators (figure 2).

8.1.2 Unit Maintenance Log

A. Maintenance of the unit will occur if a problem is noted. The maintenance actions taken will be recorded on the "Maintenance Log" form (figure 3).

8.2 Location/Placement of Forms

8.2.1 Temperature Log

A. The "Freezer Log" and "Refrigerator Log" (figure 1, figure 2) are kept in the vicinity of the unit to record the temperature.

8.2.2 Maintenance Log

A. The "Maintenance Log" (figure 3) is kept with the Freezer and Refrigerator Logs.

Table 1: Required Sample Storage Temperatures

	Refrigerate	Freeze
Pesticides	4 °C	-20 °C
VOC's	4 °C	-20 °C
Water	4 °C	--------
Food	4 °C	--------
Blood	--------	-20 °C
Urine	--------	-20 °C

Figure 1: Freezer Log

FREEZER LOG

Date	Time	Tech	°C	Cabinet Temp	Max	Min	Set Point

Unit ID# _____

Figure 2: Refrigerator Log

REFRIGERATOR LOG

Date	Time	Tech	°C	Cabinet Temp	Max	Min	Set Point

Unit ID# _____

Figure 3: Maintenance Log

FREEZER AND REFRIGERATOR MAINTENANCE LOG

Unit ID#: Date:____/____/____ Problem Description	Tech Signature: Sample ID #'s In Unit
Maintanence Resolution:	