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-2.1**

Title: Weighing Room Operation and Maintenance

Source: The University of Arizona

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Title: **WEIGHT ROOM OPERATION AND MAINTENANCE**

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Form TP-1

Weighing Room Operation and Maintenance

1.0 Purpose and Applicability

The purpose of this SOP is to identify the steps in the upkeep of the weighing room for the EPA NHEXAS and 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 Dehumidifier = Appliance which removes moisture from the air

2.2 DDW = Deionized distilled water

2.3 Hydrothermograph = A device which continuously monitors the temperature and humidity and records these measurements to paper.

2.4 Hydrothermograph paper = A paper wheel which is placed in the hydrothermograph and records the temperature and humidity readings of the device.

2.5 Psychrometer = Device which contains a "dry bulb" thermometer and "wet bulb" thermometer for determining the relative humidity.

2.6 Psychrometer Sliderule = Plastic sliderule on which the current "dry bulb" temperature and the "wet bulb" temperature taken from the psychrometer are compared to obtain the current relative humidity.

2.7 SOP = Standard Operating Procedure

2.8 Weighing Room = The weigh room is a controlled environment for the proper operation of the balance and for consistent filter weighing.

3.0 References

Not applicable

4.0 Discussion

This procedure outlines the responsibilities for the care and upkeep of the environment within the weigh room which will provide accurate and reproducible weighing.

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 Coordinator 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 ship the disfunctional 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 matter.

6.0 Equipment and Materials

6.1 Equipment

6.1.1 Balance

6.1.2 Dehumidifier

6.1.3 Humidifier

6.1.4 Hydrothermograph

6.1.5 Hydrothermograph graph paper

6.1.6 Psychrometer

6.1.7 Psychrometer sliderule

6.2 Materials

6.2.1 Distilled Deionized Water

7.0 Procedure

7.1. Weigh Room Maintanence

7.1.1 Temperature and Humidity Settings

A. Maintain the temperature of the weigh room between 70 and 80 degrees Fahrenheit by making small adjustments to the thermostat on the air conditioner/heater.

B. Maintain the relative humidity is between 40% and 60%, by the simultaneous operation of a humidifier and dehumidifier. The dehumidifier drains into the sink and requires no maintenance other than small adjustments at times of high humidity. Check the humidifier DDW reservoirs each morning for an adequate supply of water. Add water when needed.

C. Monitor the temperature (°F) and relative humidity (%) are monitored by a hydrothermograph. A paper chart (figure 1) that fits onto the front of the instrument records weekly measurements.

D. Check the temperature and relative humidity weakly using a psychrometer. This is done during the change of the hydrothermograph graph paper. The results are recorded on the back of the Hydrothermograph graph paper (figure 1) which is

kept on file.

E. Opening and closing of the weigh room door is discouraged to reduce variation in the temperature and relative humidity.

7.1.2 Changing of Hydrothermograph

A. Change the hydrothermograph once a weak.

B. Check the accuracy of the hydrothermograph using a psychrometer. The psychrometer determines wet and dry bulb temperatures and from this the relative humidity is calculated. The procedure follows;

1. Slide the panel open on the side of the psychrometer and retrieve a bottle with DDW.
2. Wet the cotton soxlet on the thermometers using the bottle of DDW. This will give the wet bulb reading.
3. Turn on the fan motor on.
4. Allow the fan to run until each thermometer has stabilized and obtain a reading from each, the wet bulb and the other dry bulb.
5. Calculate the relative humidity using the sliderule (figure 2) and the wet and dry bulb temperature readings.
6. These readings are written on the back of the chart paper during the changing procedure (see 7.2.4).

C. To change the Hydrothermograph chart, open the door and swing the pens back away from the current chart, loosen the hold-down knob, and remove the old record (figure 1).

D. Record the following information from the psychrometer on the back of the old chart paper under "OUT":

1. Date
2. Time
3. Dry Bulb Temperature (°F)
4. Wet Bulb Temperature (°F)
5. Relative Humidity (%)
6. Technician Initials.

E. Record the same set of information on the new chart paper under the label "IN":

F. Carefully install the new chart paper on the hydrothermograph by aligning the chart pens with the correct time and date. Tighten down the hold-down knob securing the new graph.

G. Using the key, carefully wind the clock on the hydrothermograph. The graph will rotate, thus the clock should only be wound to bring the time and date back to its original position. This insures that the clock will not be over-wound!

H. Mark the start point of the chart with a vertical line by carefully rubbing each pen up and down on the chart.

I. Carefully adjust the pens to reflect the temperature and relative humidity

determined from the psychrometer by adjusting their respective screw located on the sides of the hydrothermograph.

J. File the completed chart paper in the Lab Supervisor's office.

7.1.3 Weigh Room Cleaning

A. Clean the weigh room when needed (approximately every two weeks). This includes:
   1. Mopping the floors
   2. Emptying the trash
   3. Wiping down the shelving and tables.

7.2 Calculations

Not applicable

7.3 Quality Control

7.3.1 Tolerance Limits

A. Every attempt is made to maintain the weigh room at all times within the specified tolerance limits of a temperature between 70 to 80 °F and a relative humidity between 40 and 60%

B. The weigh room must fall within the temperature and humidity constraints (7.1.1 and 7.1.2) for 48 hours before any weighing procedure is implemented for the samples to be valid.

7.3.2 Detection Limits

Not applicable

7.3.3 Corrective Actions

A. Adjust the air conditioner/heater, humidifier, and dehumidifier to meet the criteria. Failure of these pieces of equipment to respond to adjustment will result in labeling the item as "down equipment" and repairs or replacement will occur.

8.0 Records

8.1 Data Collected by this Procedure

8.1.1 Completed Hydrothermograph charts are filed in the Lab Supervisor's Office.

8.2 Location/Placement of Forms

8.2.1 New hydrothermograph chart paper is located in the desk drawer on which the hydrothermograph sits.

Figure 1; Hydrothermograph Graph paper (example of data recorded on the back during the initial installation and change out of the graph after 7 days)

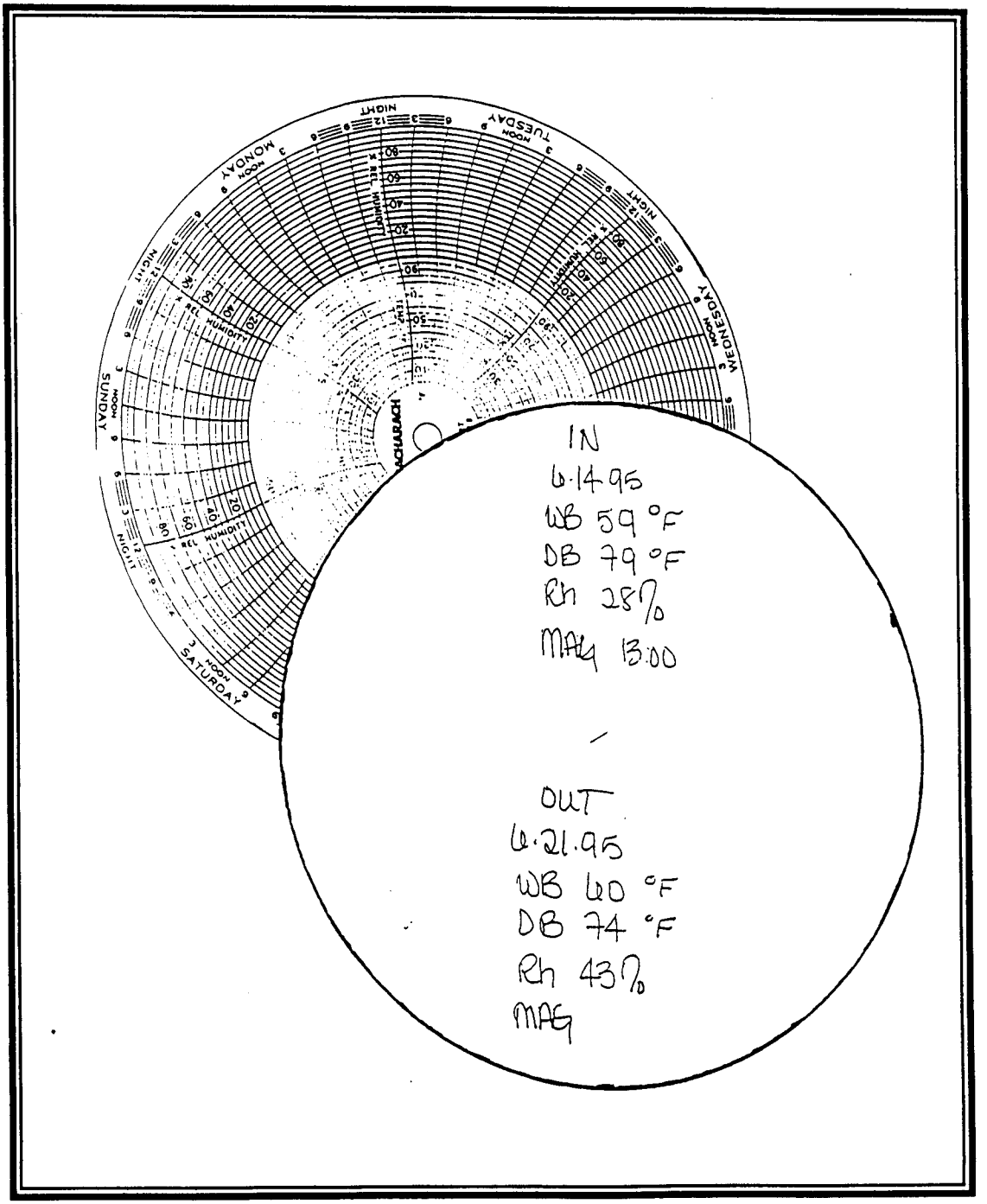

Figure 2; Psychrometer Sliderule (photocopy)