Using Data Loggers to Record Temperature

1. SCOPE AND APPLICATION

1.1. This procedure is based on the ERTCO® RTDtemp 101 data logger instructions. Data loggers are used to provide continuous monitoring of temperatures for quality assurance in the bioassay laboratory.

2. SUMMARY OF METHOD

2.1. The Data Logger program is opened. Data loggers are removed from monitoring stations, attached to the PC, and data are downloaded. Data logger is returned to station. A hard copy (graph) of the data is generated and filed. Data are transcribed to appropriate bench sheets.

2.2. Interferences: Potential problems collecting and downloading data include, but are not limited to, full memory, restarting device prior to extracting data, dead battery, and other devices using the selected COM port on the PC.

2.3. Use of this SOP constitutes acknowledgement that the "read me" file and the data logger booklet have been read and understood and that the user is familiar with general PC usage.

3. EQUIPMENT AND SUPPLIES

3.1. Barnstead® software, installed on PC located in the Culture Lab, Room B246. (Backup software CD is in office A215N, first desk, center drawer.)

3.2. Data logger cable (attached to PC)

3.3. Fisher® data loggers with attached probe (ERTCO® RTDtemp101; Fisher® # 13990-272)

3.4. Black pen

3.5. Blank sheet of paper or appropriate logbook

4. DATA COLLECTION METHOD

NOTE: Data should be collected every 7 days, generally Tuesday to Tuesday. The coverage can be adjusted to accommodate laboratory needs.

4.1. Open Barnstead® software on Culture Room PC using either the shortcut on the desktop, or by going through the network: \\fldep1\dear\Labs\Lab5\Biology\Bench Common\ToxCommon\Data Logger-Tox Lab\Tox Lab Temperature Charts.

4.1.1. The Barnstead program must be opened and ready before any data loggers (DL) are removed from temperature recording positions. This is to ensure that no data are recorded while DL is away from temperature recording site.

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4.2. Retrieve a single data logger (no more than one DL at a time) from its assigned recording site and take it to the PC.

4.2.1. The DL and the DL probe are connected by wires. Do not use the data logger to lift the probe. Also, do not break or stress the small diameter wires connecting the probe to the data logger.

4.2.2. The Tox group has seven data loggers. They are currently located at:

a) Sediment water bath
b) Culture room (B246) by the toxicity table
c) Incubators #1, #3, #4, #5 and #6

4.3. Connect the DL to the data logger cable already connected to the PC.

4.4. Stop the data logger from recording by one of the following methods:

4.4.1. In the tool bar, locate and select the "Stop Device" icon

4.4.2. From the menu bar, select **Device/Stop Device**

4.4.3. Press [Ctrl]+[X]

4.5. Immediately retrieve the data from the data logger by one of the following methods:

4.5.1. Click on the yellow arrow icon, located in the approximate center of the program tool bar

4.5.2. From the menu bar, select **Device/Read Device**

4.5.3. Press [Ctrl]+[R]. Within a few seconds, a graph will appear on the monitor screen.

4.6. Title the graph. At the top of the graph screen, there are four tabs. Select the "Graph" tab (second from the left), if it is not already selected. Highlight the generic graph title of "Untitled" by moving the cursor over it and double-clicking. Type in the data logger name (i.e. the site where the data logger is used) and the dates the logger was run. Press [Enter].

Example of title: Culture Room 1.1.13-1.8.13

NOTE: Printing is optional. Graphs can be viewed on the PC having the Barnstead software.

4.7. Prior to printing, open **Start/Printers** and ensure that printer **EAR-Labs-PRN9** is selected. Print the graph. Use one of the following options:

4.7.1. Select the printer icon on the tool bar

4.7.2. From the menu bar, select **File/Print Graph**

4.7.3. Press [Ctrl]+[P]

4.8. Retrieve the printed graph from the printer. The printer is located in the Wet Lab, next to the storage/glassware corridor.

4.9. Save the graph.

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4.9.1. On the menu bar, select **File/Save As** and name the graph the same as the title created in step 4.6. Under **Save As Type**, select "All Data Files."

4.9.2. Click on the folder corresponding to the appropriate year and save in folder according to the location where the data logger is stored. (Ex. \\Fldep1\dear\Labs\Lab5\Biology\Bench Common\ToxCommon\Data Logger-Tox Lab\Tox Lab Temperature Charts\2015\Incubator #1)

4.9.3. Press [OK] on the bottom of the save file screen.

4.10. Use the pen and paper to record the minimum and maximum temperatures from the graph.

4.10.1. Right click on the graph and select **Graph Scale** then **Set Time Scale**. Enter the test start date and time and then the end date and time. Click **OK**.

4.10.2. Find the minimum and maximum points by sliding the cursor along the graph line.

4.11. Restart the data logger by one of the following methods:

4.11.1. Locate and select the "Start Device" icon on the tool bar.

4.11.2. Select **Device/Start Device** on the menu bar

4.11.3. Press [Ctrl]+[A]

4.12. When the window opens, select "Delay Start" from the file menu. Set the time for 3-5 minutes after the current time. This allows sufficient time for the data logger to be returned to the recording site without recording ambient data.

4.13. Once the time has been set, press [Enter] and wait for the PC to restart the data logger. A prompt will appear when the data logger is ready. Disconnect the data logger from the PC and return it to its designated recording site.

4.14. Repeat Steps 4.2.-4.13 for each data logger. After the last data logger has been returned to its recording site, continue to step 4.15.

4.15. Extract from graph and record the temperature range onto the appropriate bioassay bench sheets, making certain that the range covers the bioassay test period. Round to the nearest 0.1 ˚C.

4.16. File the charts in the temperature chart folder located in the filing cabinet in room A216N.

5. DATA ARCHIVAL

5.1. Use a black, waterproof pen for all bench sheets, graphs, and logbooks.

5.2. Use the Barnstead® software to convert the Data Logger data into graphs. Save Data Logger graphs in \\fldep1\dear\Labs\Lab5\Biology\Bench Common\ToxCommon\Data Logger-Tox Lab\Tox Lab Temperature Charts.

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5.3. Graphs with temperature data are filed in the temperature chart folder located in the filing cabinet in room A216N.

5.4. To correct raw data entries, place a single line through the incorrect or illegible entry. Write the corrected entry near the error, date and initial the correction. Do not overwrite entries.

5.4.1. The corrected entry is written as near its appropriate space as possible or else in the comment box on the appropriate bench sheet.

5.4.2. If the correction requires an explanation, write a comment and reference the error. Initial and date the explanation.

5.4.3. Use sequential alphabetical annotation to identify errors and corresponding comments (use A for first error and use A for corresponding explanatory comment; use B for second error, etc.).

6. QUALITY CONTROL

6.1. The Data Loggers are calibrated annually with the Toxlab's or the chemistry section's NIST-certified electronic thermometer. Data Logger calibration data are located in the *Thermometer Repipettor Pipette QC Biology Section Tox Lab Calibration* Logbook.

6.2. Refer to Laboratory Quality Manual for corrective action and handling out-of-control temperature data.

7. REFERENCES

7.1. ERTCO® RTDtemp101 Data Logger Instruction Manual.

7.2. Laboratory Quality Manual http://www.dep.state.fl.us/labs/library/lab_sops.htm

APPENDIX OF CHANGES

01/04/2008 Added Scope and Application, Summary of Method and Appendix of Changes.

08/12/2013 Reformatted SOP.

02/09/2015 Formatted for 508 compliance.

07/28/2015 Updated link. Arranged steps to remove duplication.

07/13/2016 Updated link.

09/14/2017 Updated links.

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