

Standard Operation Procedures for URG-3000N PM2.5 Speciation

In Use By

**Polk County Air Quality
Ambient Air Monitoring Personnel**

For Calendar Year 2014

Created: January 28, 2009

**Section: 30
Revision 1**

PREPARED BY



Polk County Air Quality Air Pollution Monitoring Specialist

3/14/14
Date

SIGNATURES/APPROVALS

Brent Blanchard

Polk County Air Quality Assurance Officer

3/14/2014
Date

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

**POLK COUNTY AIR QUALITY DIVISION STANDARD OPERATING PROCEDURE MANUAL
FOR THE URG-3000N (PM 2.5 SPECIATION) MONITORING**

Table of Contents	Page #
30.1 Purpose.....	3
30.2 Scope.....	3
30.3 References.....	3
30.4 Health and Safety Warning/Precautions.....	3
30.5 Sampler Setup.....	4
30.5.1 Inspecting New Equipment.....	4
30.5.2 Setup of New Equipment.....	4
30.5.2.1 In-Laboratory Assembly.....	4
30.5.2.1.1 Upright Supports and Rain Shield Assembly.....	4
30.5.2.1.2 Pump Installation in Lower Stand.....	5
30.5.2.2 Field Assembly.....	6
30.5.2.3 Exterior Connection of Cables.....	7
30.5.2.4 Completing the Installation.....	7
30.5.3 Sampler Programming.....	8
30.5.3.1 Date and Time Correction.....	8
30.5.3.2 Site Configuration Information.....	9
30.6 Equipment, Maintenance and Trouble Isolation.....	10
30.6.1 The Monitoring Station.....	10
30.6.2 Preventative Maintenance.....	10
30.6.2.1 Every Site Visit.....	10
30.6.2.2 Monthly.....	10
30.6.2.3 Quarterly.....	10
30.6.3 Trouble Isolation.....	11
30.7 Calibrations-Temperature, Pressure and Flow.....	11
30.7.1 Temperature Calibration.....	11
30.7.2 Barometric Pressure Calibration.....	12
30.7.3 Leak Check/Flow Calibration.....	13
30.8 Procedures.....	15
30.8.1 Field Blank Filters.....	17
30.8.2 Trip Blank Filters.....	17
30.9 Sampler QA/QC Procedures.....	18
30.9.1 Date and Time Checks.....	18
30.9.2 Monthly Leak Checks.....	18
30.9.3 Monthly Temperature Verification.....	18
30.9.4 Quarterly Temperature Audit.....	19
30.9.5 Monthly Pressure Verification.....	19
30.9.6 Quarterly Pressure Audit.....	19
30.9.7 Monthly Flow Verification.....	19
30.9.8 Quarterly Flow Audit.....	20
FIGURES	
Figure 30-1: Fully Assembled URG-3000N.....	5
Figure 30-2: Wiring Diagrams for URG-3000N.....	8
Figure 30-3: LCD Display Screen.....	8
Figure 30-4: Packaging of SuperSASS Speciation Modules with URG-3000N Filter Cartridge.....	17
Figure 30-5: URG-3000N Filter Cartridge with CSFDF Sheet and Memory Card.....	17
APPENDIX	8

30.0 STANDARD OPERATING PROCEDURE FOR SPECIATION SAMPLING USING THE URG-3000N SPECIATION SAMPLER

30.1 Purpose

To establish a standard operating procedure (SOP) for Polk County Ambient Air Quality personnel to ensure proper collection of PM 2.5 speciation samples when operating the URG-3000N Speciation Sampler.

30.2 Scope

This section describes the routine field operations for the URG-3000N PM2.5 Speciation Sampler. This SOP is to be used as an outline and is not intended to replace the equipment manufacturer's manual or procedures. Routine operations are defined as those performed on a monthly, or more frequent, basis.

30.3 References

- 30.3.1 Sequential Particulate Speciation System Operation Manual URG-3000N. URG Inc. October 1, 2008, Revision 5.6.**
- 30.3.2 Quality Assurance Guidance Document, PM2.5 Speciation Trends Network Field Sampling, USEPA, June 2000.**
- 30.3.3 Quality Assurance Guidance Document, Final, Quality Assurance Project Plan: PM2.5 Speciation Trends Network Field Sampling, December 2000.**
- 30.3.4 Research Triangle Institute, Draft Data Validation Process for the PM2.5 Chemical Speciation Network, RTI/07565/12-01F, July 5, 2000.**
- 30.3.5 40 Code of Federal Regulations (CFR) Part 58, Appendix A, Quality Assurance Requirements for State and Local Air Monitoring Stations (SLAMS).**

30.4 Health and Safety Warning/Precautions

To avoid electrical hazards, all sampler installation procedures should be conducted with the sampler disconnected from the AC power source.

Observe proper lifting procedures when unpacking and moving sampler components.

Read, understand, and follow all safety precautions for the sampler outlined in the sampler's operations manual.

Once sampler installation is complete, secure the sampler to the field sampling platform to ensure that it does not tip over during high wind speed events.

The sampler weighs 135 pounds when completely installed. If a move is necessary, disassemble and remove the sample and controller modules and rain shield assembly from the lower stand (pump enclosure) so they can be moved separately.

Care must be taken when operating or calibrating the units in inclement weather. Safety is paramount. If planning to dismantle and reconstruct the sampler for any reason, ensure that all electrical connections, both cords and sockets, are color-coded with tape prior to disconnecting.

30.5 Sampler Setup

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

Specifications for siting a SuperSASS will mirror the Federal EPA PM2.5 criteria listed in the Code of Federal Regulations (40 CFR 58, Appendix A).

30.5.1 Inspecting New Equipment

Upon receipt of the URG-3000N, visually inspect it to ensure that all components are accounted for. Inspect the instrument for external physical damage due to shipping, such as scratched or dented panel surfaces and broken knobs or connectors.

Open the instrument cover and remove all interior foam packing and save (in case future shipments of the instrumentation are needed). Make note of how the foam packing was installed.

Inspect the interior of the instrument for damage, such as broken components or loose circuit boards. Make sure that all of the circuit boards are completely secured. (Loose boards could short out the motherboard). If no damage is evident, the monitor is ready for installation, calibration and operation. If any damage due to shipping is observed contact the manufacturer for instructions on how to proceed.

Notify URG immediately if any equipment is missing or damaged. Repack it in the same way it was delivered.

30.5.2 Setup of New Equipment

Figure 30-1 shows the major components of the assembly for the URG-3000N Sampler.

30.5.2.1 In-Laboratory Assembly

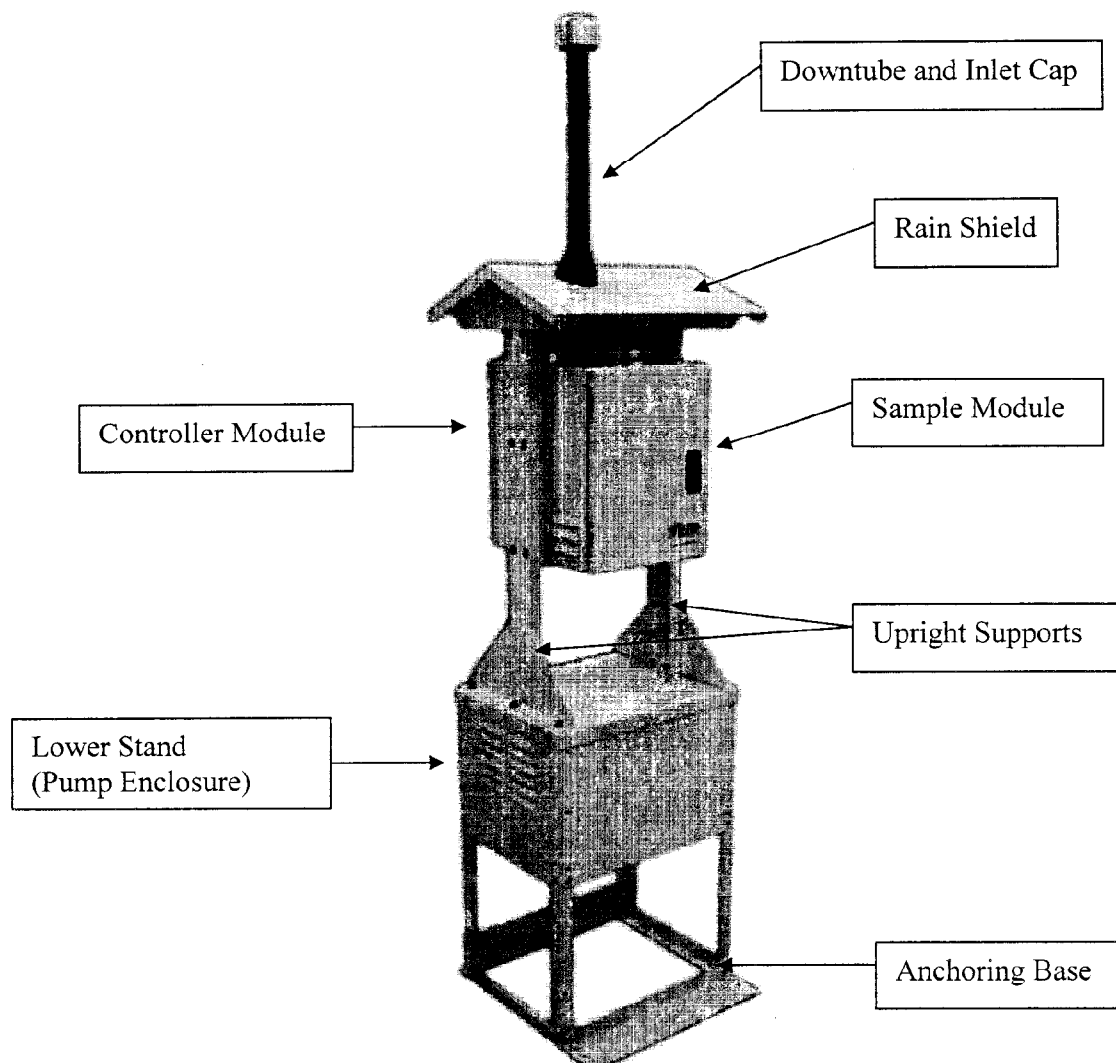
30.5.2.1.1 Upright Supports and Rain Shield Assembly

Install one roof support to the roof with six (6) screw studs nuts with integrated lock washers and tighten. Install both H-body base supports with twelve (12) screw studs washers and nuts. Turn the H-body on its side, using a thin screwdriver, slide one washer on the screwdriver. Align the screwdriver with the stud and let the washer slide down onto the stud. Turn the H-body over far enough that the washer does not slide off and the screw studs. nut in a nut-driver will stay in the driver. Tighten the nut. Repeat the washer/nut installation until all twelve (12) studs have been secured.

Install the second roof support on the H-body. Install the roof assembly. Line up all the studs with the holes and press fit everything together. Install and tighten all connectors. The roof connector nuts require an 11/32" open end wrench to access the studs at the peak.

Place the completed upright support assembly on the top surface of the lower stand (pump enclosure). Align the six (6) screw studs on the lower stand with the opening on the upright support assembly and fasten with lock washers and carriage nuts.

Figure 30-1: Fully Assembled URG-3000N



The mounting feet are installed in the wrong direction to allow for easier shipping. Remove the support feet and install them correctly before operating the URG-3000N. Remove the two (2) screw studs that hold the feet onto the base and re-install them with the larger flat surface facing down onto the ground. There are four (4) holes in the part of the feet that face the ground. The two (2) larger holes are to allow the stand to be bolted to a sampling platform.

30.5.2.1.2 Pump Installation in Lower Stand

Connect the Tygon exhaust tubing to the brass L-shaped fitting and screw into the pump. Unscrew the six (6) screws in the side panel of the lower stand and place the pump in the pump enclosure. Screw the four (4) rubber feet into the bottom of the pump. Align the four (4) rubber feet from the pump with the four

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

(4) openings in the lower stand to secure the pump to the lower stand. Attach four (4) lock washers and four (4) nuts and tighten. Align the exhaust tubing through the opening in the bottom pump enclosure. Connect a vacuum hose with “Colder” fittings from the pump to the Mass Flow Controller (MFC). Connect electrical line from pump to gray power box in the pump enclosure.

After powering up the sampler and determining it is operational, re-assemble the side panel to the pump enclosure using the six screws and washers.

30.5.2.2 Field Assembly

Bulk parts to the site for field assembly include:

- Upright support and rain shield
- Lower stand (pump enclosure)
- Controller module
- Sample module
- Downtube and inlet cap.

Place pump enclosure on the base (ground, deck, concrete, etc.). Place the completed upright support assembly on the top surface of the lower stand (pump enclosure). Align the six (6) screw studs on the lower stand with the opening on the upright support assembly and fasten with lock washers and carriage nuts. Locate on the upright support the side for the Sample Module and Controller Module. The sample module is the side with the downtube opening in the rain shield. Unscrew the set screw on the Sample Module support of the upright support. Align and place the rubber feet on the base of the Sample Module with the opening in the lower module support. The Sample Module is placed on the side marked “Sampler” and has the opening protruding through the roof rain shield. Direct the handle at the top of the Sample Module through the opening behind the set screw. Tighten the set screw to secure the top of the Sample Module.

Repeat Steps to setup the Controller Module.

Open the door of the Sample Module. Take rubber roof flashing boot and slide 1/3 down the 36”downtube. Loosen the nut at the top of the Sample Module for inserting the downtube. Insert the downtube through opening in the roof rain shield and Sample Module until it reaches the inlet tee inside the Sample Module. With a turning motion, insert the downtube into the inlet tee until it seats.

Note: Be careful not to tear the silicon-coated Teflon O-ring at the base of the inlet tee.

Tighten the large lock-nut that secures the downtube into the T-fitting inside the Sample Module box. The lock-nut is located on the top of the Sample Module box. Slide the rubber roof flashing boot on top of the roof boot mounted in the rain shield. Attach the inlet cap at the top of the downtube.

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

Locate the keypad and memory card. Open the door to the Controller Module and locate the keypad holder and memory card slot. Drop the cable through the cord storage area and pull the data jack through the slot in the bottom left of the Controller Module. Plug the data jack into the designated jack on the controller. Insert a compatible Compact Flash memory card into the slot.

30.5.2.3 Exterior Connection of Cables

Review wiring connections for the pump relay cable, vacuum line, controller cable, and temperature probe in shown in Figure 30-2.

Connect the pump relay cable from the side of the lower stand to the Controller Module. Align the prongs on the pump relay cable plug with the receiver end of the Controller Module. Turn plug until locked into place. Connect the *single end* of the 20" 12-pin data cable (without the MFC connector) to the Controller Module. Connect the other 12-pin data cable to Sample Module. Connect the breakout cable on that end to the Mass Flow Controller, which is the central port on the side of the lower stand (pump enclosure) Connect the 30" Air line with "Colder" fittings to the Sample Module and the side of the lower stand (pump enclosure). Open the door of the Sample Module and mount the ambient temperature probe at the base of the inlet tee. Drop the cable out of the bottom of the Sample Module and secure the plastic disc in the hole. Plug the connector into the base of the Controller Module. Connect the 72" 115VAC power cable from the Controller Module to a grounded receptacle. Connect the pump power cable to a ground receptacle. The LCD display screen on the controller keypad should illuminate and display, in sequence, the four screens displayed in Figure 30-3.

30.5.2.4 Completing the Installation

Level the sampler by adjusting the URG-3000N Sampler so that the top surface of each module is horizontal as indicated by a bubble level. Final leveling of the unit is done only after the major installation tasks described above have been completed. Inspect the sampler to be sure that the inlet is not out of alignment due to an improperly mounted downtube. The downtube should be perpendicular to the Sample Module. Make any necessary adjustments to the downtube mounting. The sampler's horizontal angle can be adjusted by placing thin shims of wood under the anchoring base. Be sure to observe safety precautions. It may require two people to safely place the shims. Verify that the sampler remains secure after the shims are put into place. Secure the anchoring base to the platform with screws and washers.

Figure 30-2: Wiring Diagrams for URG-3000N

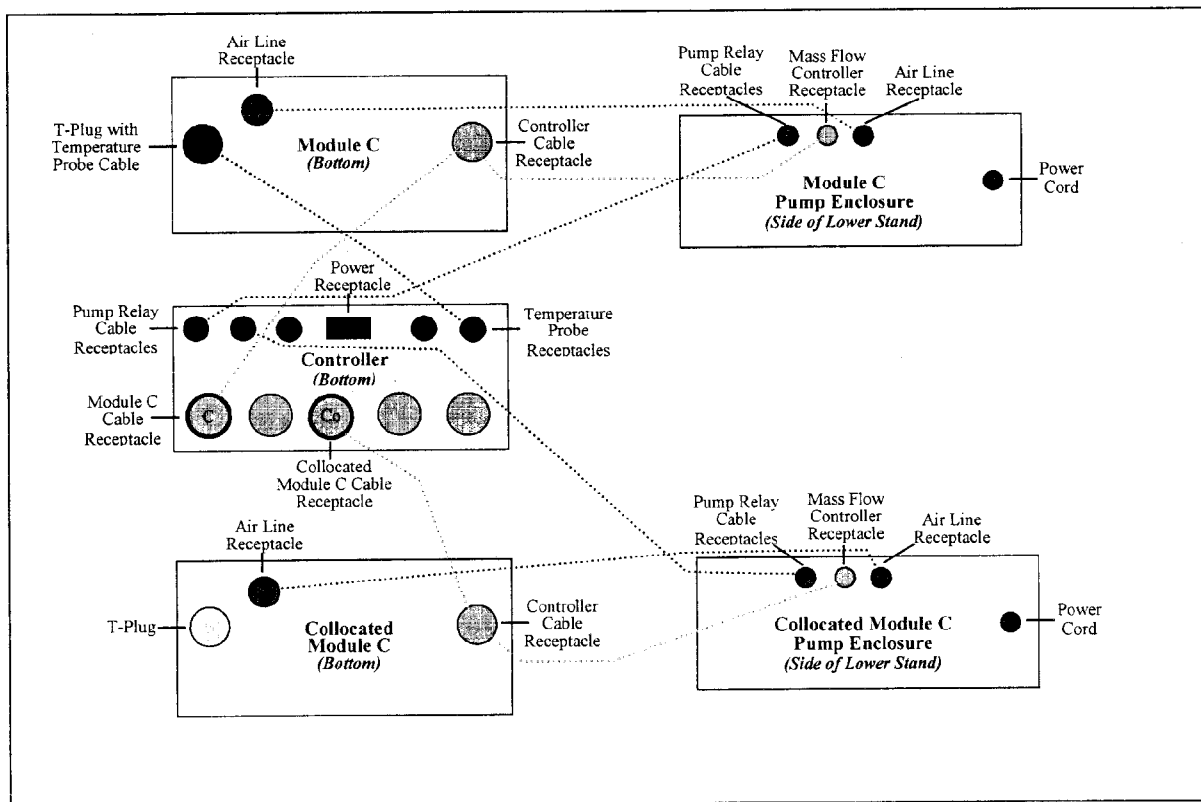
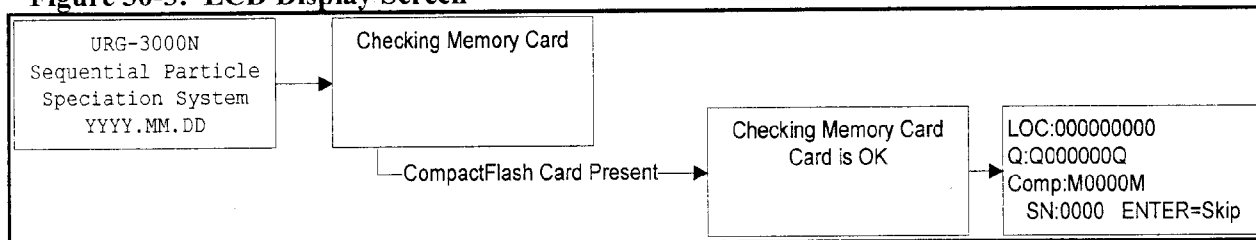


Figure 30-3: LCD Display Screen



30.5.3 Sampler Programming

30.5.3.1 Date and Time Correction

Open the Controller Module door and check the date and time. All samplers at a site should be synchronized to within 1 minute of a time standard. If the date and time are not within requirements, use the following procedure to set or adjust the URG-3000N sampler's date and time.

The screen shown below is the AUTO MODE screen. Press the **ENTER** key to proceed to the Authentication screen.

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

12/20/06 09:26pm WED
Next samp: COMPLETED
Sampler is OFF

Authorized use only
Please enter code:
-

Enter in **1123** to proceed to Choose Operator screen.

Choose Operator
Primary: 1-ABC
Backups: 2-XXX 3-YYY
F4=Edit

Choose **1**, **2**, or **3** from the Choose Operator screen to proceed to the Main Menu screen.

F1=Change Filter
F2=Set Date & Time
F3=Alt. Sample Day
F4=More ENTER=Auto

Press the **F2** key to advance to the next screen to set date and time. The screen below shows the menu for changing the date and time. Press the **F3** and **F4** keys to move the cursor to select the month, day, year, hour or minute. Press the **F1** or **F2** keys to adjust values. The day of the week changes based on the month, day, and year. If an invalid date is entered, a screen will appear and prompt you to re-enter the proper date.

MM/DD/YY HH:MMam DAY
F1&F2=Adjust values
F3&F4=Move cursor
ENTER=Save changes

Press the **ENTER** key to save changes. The sampler software will return the operator to the Main Menu screen. Press the **ENTER** key to return to the AUTO MODE screen.

30.5.3.2 Site Configuration Information

From the AUTO MODE, Press the following sequence in order to get to the Site Configuration screen:

ENTER - 1123 - 1 - F3 - F4 - F4 - F4 -F1

At the Location Code screen, use the keypad to enter the AQS Number assigned to the site. Press the **ENTER** key to proceed to the Controller Module Serial Number screen. Use the keypad and enter the last four digits of the Controller Module's serial number (located on the inside of the Controller Module door).

The URG-3000N Default settings are:

The Number of Modules	1
Select Schedule	1 in 3
Sampling Interval	15 minutes

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

Sample Time/Hour	60 minutes
Filter Configuration	1=Normal

Installation of the URG-3000N sampler is complete. Proceed with ambient temperature, barometric pressure, and flow rate calibration prior to beginning sampling. Perform a leak check on the sampler prior to conducting flow rate calibration.

30.6 Equipment, Maintenance and Trouble Isolation

There are several routine duties that must be performed each time an air monitoring station is inspected. These duties include equipment inspection, performing calibrations, assisting during audits, documentation, and making necessary adjustments or repairs to the instruments.

30.6.1 The Monitoring Station

It is the operator's responsibility to maintain the monitoring station. Routine maintenance includes keeping site clean and being observant of potential problems. Examples of potential problems include:

- Accumulation of dirt and debris
- Infestation by rodents or insects
- Overgrowth of vegetation around the site

30.6.2 Preventative Maintenance

As part on the normal maintenance and operation, the various components of the system should be inspected for wear, damage, and changes in previous operation. Most inspections rely on visual checks during normal operation of the system. These should be performed each time anything is done to the system. Some minor but critical maintenance procedures are as follows:

30.6.2.1 Every Site Visit

- Check O-rings on each filter cassette for wear, damage, and proper seat
- Clean off any moisture (rain or snow) around the outside of the Sampler and Controller Modules
- Check for moisture inside Sample Module

30.6.2.2 Monthly

- Examine O-rings and apply light coat of vacuum grease if required
- Clean the interior of the Sample and Controller Modules with Kimwipe tissues or paper towel to remove bugs, dirt, or water deposits
- Clean sampler inlet surfaces

30.6.2.3 Quarterly

- Inspect O-rings and apply light coat of vacuum grease if required
- Clean the interior of the Sample and Controller Modules with Kimwipe tissues or paper towel to remove bugs, dirt, or water deposits

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

- Check all Tygon tubing and vacuum lines, replace if necessary
- Clean sampler inlet surfaces
- Inspect electrical line connections
- Clean sampler inlet tube by pushing a slightly moistened paper towel with a wooden dowel through the inlet tube. Allow to dry before using inlet tube.
- Rotate the quartz filter cassettes on the “AUDIT” cartridge provided by the manufacturer for conducting verification and calibration checks. The laboratory support contractor will periodically call for the AUDIT cartridge and send back a replacement cartridge with clean new filters in the cassettes. Cassettes that have been loaded with clean filters should be rotated to the Number “1” position once a quarter or as needed. Report and return to the laboratory support contractor any AUDIT cartridges on which all the filters become damaged or contaminated prematurely.

30.6.3 Trouble Isolation

The URG-3000N sampler is a new sampler for the CSN. As the sampler is used, issues may develop that require troubleshooting steps. This SOP will be revised to include these problems and discuss the troubleshooting steps needed to solve the problem. When an issue develops, review Section 9.0 Sampler Service and Maintenance, and if you are still not able to solve the problem, refer to the Operations Manual or contact URG at their website (www.urgcorp.com) or by phone at (919) 942-2753.

30.7 Calibrations-Temperature, Pressure and Flow

30.7.1 Temperature Calibration

Carefully remove the ambient temperature probe from the base on the inlet tee. From the Calibration Menu screen, press the **F1** key for the temperature Calibration. Place the reference temperature standard probe ½ inch from the sampler’s temperature probe and allow both temperature probes to equilibrate. Press the **SPACE** key to begin the ambient temperature calibration. The screen below will appear.

Raw Offset C	F
1457 0	20.0 68.0
F1:+/-	F2:C/F
Ref. Temp (C):?	

After the two probes equilibrate, enter the reference standard temperature value in degrees Celsius. The agreement should be within ± 2 °C. Press the **F1** key to toggle between positive and negative values whereas pressing the **F2** key to toggle between Celsius and Fahrenheit. (Example: for 25.2 °C; enter **252**. The decimal place is fixed for a tenth degree.) The next screen shows the sampler’s calibrated temperature in degrees Celsius.

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

```
Calibration Temp:
20.0 degrees C
Raw=1457 Offset= 0
YES=Save NO=Cancel
```

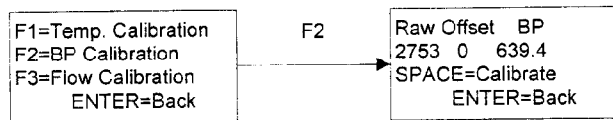
Press the **YES** key to save to the Compact Flash memory card (see below). After a brief pause, the Calibration Menu will return.

```
Calibration Temp:
20.0 degrees C
Raw=1457 Offset= 0
SAVED
```

Remove the temperature reference standard and securely place the sampler's temperature probe back in the bottom of the inlet tee. Replace the black plastic disc. Record the sampler and reference standard temperature values in degrees Celsius in the field logbook and Calibration Report Form, Form 1, Appendix A.

30.7.2 Barometric Pressure Calibration

At the Calibration Menu, press the **F2** key to proceed to the barometric pressure calibration screen.



Press the **SPACE** key to begin the barometric pressure calibration. The screen below will appear.

```
Raw Offset BP
2753 0 639.4

Ref. BP(mmHg):?
```

Enter the barometric pressure (in mmHg) of an equilibrated NIST-traceable reference standard using the keypad. The agreement should be within ± 10 mmHg.

Note: for 754 mmHg, enter 7540, the display screen will show 754.0 mmHg. The decimal place is fixed for a tenth degree. If you entered 754, the display screen will show 75.4 mmHg which is incorrect.

After entering the reference standard's barometric pressure, the next screen shows the sampler's calibrated barometric pressure.

```
Calibration BP:
639.4 mmHg
Raw=2753 Offset 0
YES=Save No=Cancel
```

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

Press the **YES** key to save to the Compact Flash memory card. After a brief pause, the Calibration Menu will return.

Calibration BP: 639.4 mmHg Raw=2753 Offset 0 SAVED

This concludes the Barometric Pressure Calibration. Press the **ENTER** key twice to return to AUTO MODE. Record the sampler and reference standard pressure values in mmHG in the field logbook and Calibration Report Form.

30.7.3 Leak Check/Flow Calibration

Open the Sample Module door and carefully remove the sample filter cartridge.

Note: When handling the filter cartridge: (1) Do not touch filter cassettes, (2) Place red caps on the bottom of the four cassette inlets, and (3) Places the filter cartridge in a plastics storage bag.

Remove your Calibration Filter Cartridge from storage bag, remove red caps, place cartridge on cassette manifold, and lower solenoid manifold. Follow screen commands from AUTO MODE screen to the Leak Check screen of the Calibration Menu. The sequence from the AUTO MODE screen is: Press the **ENTER** key, type **1123**, type **1**, press the **F4** key for more, press the **F3** key for Calibration Menu, and press the **F1** key for Leak Check.

Remove the inlet cap and attach the reducer and flow audit adapter to the top of the downtube. Leave flow audit adapter in the open position. Follow the screen commands. Disconnect the vacuum line and install the inline pump shutoff valve. Leave valve in the open position. The pump will begin. When prompted by the screen command, close valve on the flow audit adapter on downtube by rotating the valve handle 90°. Pressure in sampler will begin. When prompted, close valve to the inline pump shutoff valve by rotating the valve handle 90°.

Press the **ENTER** key and the Leak Check will begin. Sampler will countdown from 35 seconds. After 35 seconds, the screen will show the result in mmHg. The acceptance criterion is a vacuum drop of less than 225 mmHg in 35 seconds. **Slowly** release the vacuum by opening the valve on the flow audit adapter. Disconnect the inline pump shutoff valve and reconnect the vacuum line. Press the **ENTER** key to return to the Calibration Menu screen.

Connect tubing from the reference standard to the flow audit adapter on the downtube. From the Calibration Menu screen, press the **ENTER** key to go to the Main Menu. Press the **F1** key and then press the **F3** key for the Flow Calibration Test. The sampler program will ask if a valid Leak Check has been performed. Press the **ENTER** key and then press the **YES** key to continue with the Flow Calibration Test. The Flow Calibration is a 3-Point calibration of a 22.00 LPM set point. The calibration includes the following test flows:

- Minimum Flow: 19.80 LPM
- Set Flow: 22.00 LPM

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

- Maximum Flow: 24.20 LPM

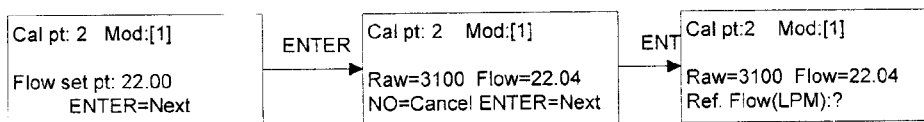
Press the **ENTER** key twice to proceed to the first calibration point (19.80 LPM). The sampler will run for 5 minutes. At the end of the 5 minute warm up period, the screen below will appear showing the sampler's flow rate and vacuum at that time.

```
Cal pt: 1 Mod:[1]
Gain=6.000 Off=0.00
Raw=2800 Flow=19.77
NO=Cancel ENTER=Next
```

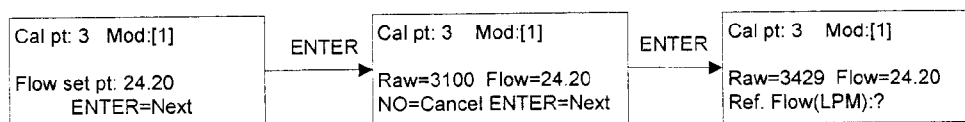
Press the **ENTER** key to continue to the next screen. In the screen below, the operator is prompted to enter the reference standard's flow rate in LPM. After the reference standard stabilizes, use the keypad to enter the reference standard's flow rate value. The decimal place is fixed at two decimal places. For example, for a flow rate of 21.75 LPM, enter **2175**. The agreement should be within +/-10%.

```
Cal pt: 1 Mod:[1]
Gain=6.000 Off=0.00
Raw=2800 Flow=19.77
Ref. Flow(LPM):?
```

After entering the reference standard's flow rate for Calibration Point 1, the screen below appears showing the second calibration point of 22.00 LPM. Press the **ENTER** key. The MFC begins sampling at the second calibration point and displays the flow rate. After the reference standard stabilizes, use the keypad to enter the reference standard's flow rate value.



After entering the reference standard's flow rate for Calibration Point 2, the screen below appears showing the third calibration point of 24.20 LPM.

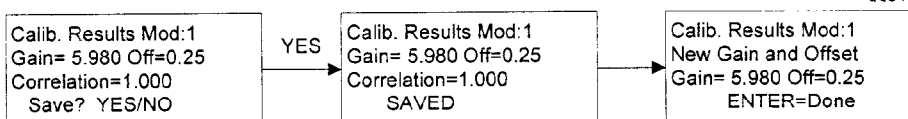


After entering the reference standard's flow rate for Calibration Point 3, the screen below appears showing the new Gain, Offset, and Correlation Coefficient. Report the results of the calibration in your field logbook. Press the **YES** key to save the flow rate calibration to Compact Flash memory card and to the on-board ROM. Press the **ENTER** key to return to the Calibration Menu screen.

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

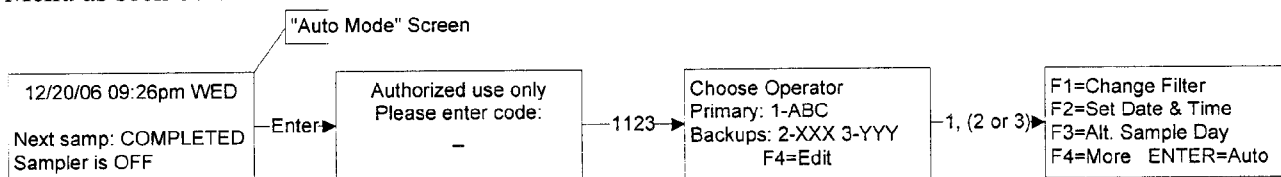
Revision 1



This concludes the Flow Calibration. Press the **ENTER** key twice to return to AUTO MODE. Record the sampler and reference standard pressure values in LPM on the Calibration Report Form and the field logbook.

30.8 Procedures

From the AUTO MODE screen, press the **ENTER** key and type **1123**. Type **1** to get to the Main Menu as seen below.



Select the **F1** key for Filter Change and then select **Yes**. The pump will power on and perform a 5 minute warm-up. Select **ENTER** to store the warm-up values on the memory card.

Note: If the vacuum pump contains some residual vacuum from the previous sample run, it may prevent the pump from starting. If this occurs, disconnect the black line from the lower stand and then plug it back in. This will release the residual vacuum and allow the pump to start again.

The sampler will start displaying the values from the previous 24-hour sample (Exposed Filter) in the following order:

- Elapsed Time
- Sample Volume
- Flow Average and CV
- Temperature - Average, Maximum, and Minimum
- Barometric Pressure- Average, Maximum, and Minimum

These values are to be recorded on the PM_{2.5} Custody and Field Data Form (CAFDF) Form 2, Appendix A. Select **F4** More to proceed through these values.

WARNING: You can NOT go back to a previous screen during this procedure. Record ALL of the required values on the form before proceeding to the next screen.

Press **ENTER**. The screen will prompt the operator to remove the old memory card and install the new memory card. The sampler will reset and check the new memory card.

Note: Make sure the card is oriented correctly. Trying to force the card into the slot incorrectly will damage the pins inside the slot.

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

Remove the Exposed Filter Cassette Cartridge, place the red protective plugs on the cassette, and place the cartridge in a plastic storage bag.

Note: It is essential that the red protection caps are installed onto the Exposed Filter Cassette Cartridge before shipping it back to RTI for analysis.

Remove the red protection plugs from your New Filter Cassette Cartridge and place the cartridge on the cassette manifold. Store the red protective plugs and storage bag in a secure place until time to retrieve the sample. Press **ENTER** to continue. Enter the "Q" number that is found on the top of your new CAFDF. If the "Q" number has a letter in it, you can enter it with the keypad by pressing the **F1** key several times. It will scroll through numbers 0-9 and then it will scroll through letters A-Z. **F2** can be pressed to go back to previous numbers or letters. Press **ENTER** to proceed.

Enter the Comp ID number that is found on the New Filter Cassette Cartridge. Press **ENTER** to proceed.

WARNING: There is also a Comp ID number on the new memory card. DO NOT enter the memory card ID by accident.

The pump will perform a 10 second warm-up. Select **ENTER** to store the warm-up values on the memory card.

The sampler will now display the current date and time on the AUTO MODE Screen, as well as the next scheduled sampling date. It will also indicate that the sampler is OFF. Confirm that the next scheduled sampling date is correct.

Protect the sample from direct sunlight and extreme heat during transport from the site to the field office. Store them in a secure, air-conditioned area until just before packaging them in the cooler. The filter cartridge, paperwork, and memory card must be properly packaged in a shipping container, ready for pickup by Fed-Ex ideally within 48 hours after the sampling period ends. The support laboratory will provide specific directions for packaging and shipment and days for shipment. If shipping within 48 hours is not possible, store at 4°C until packaged is shipped. Do not ship on Fridays unless prior arrangements are made with the DOPO and laboratory.

The URG-3000N sampler will be assigned to locations that use the Met One SuperSASS sampler. The Met One SuperSASS use modules to collect samples. The URG-3000N filter cartridges will be packaged and shipped with the Met One sample modules from the same sampling date, Figure 30-4. After packing the Met One sampler modules, place the 9" x 12" sealable plastic shipping bag containing the URG-3000N filter cartridge, completed CAFDF, and small anti-static plastic bag containing the memory card on top of the modules, Figure 30-5. Place the insulated lid on, cover with plastic, and seal the shipping container. Place the appropriate Fed-Ex shipping label and ship the support laboratory. The EPA contractor responsible for Polk County's speciation sample handling is: Research Triangle Institute (RTI), 1000 Parliament Court, Suite 100, Room 152, Durham, NC 27703. In case of problems, contact Jim O'Rourke at 919-541-8996.

Figure 30-4: Packaging of SuperSASS Speciation Modules with URG-3000N Filter Cartridge

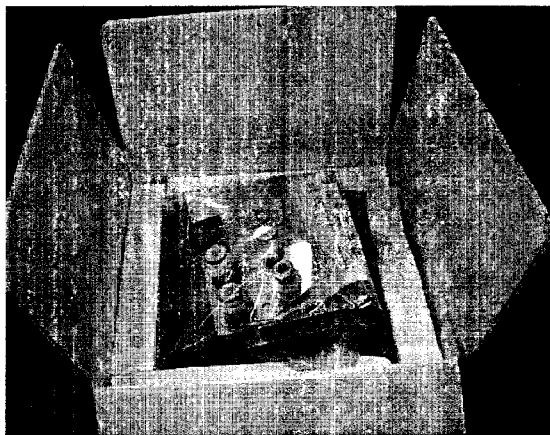
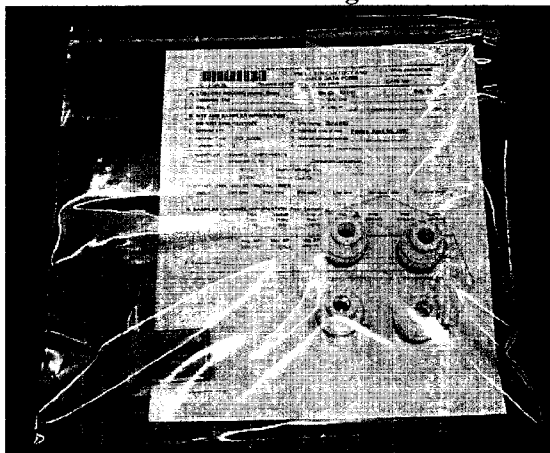


Figure 30-5: URG-3000N Filter Cartridge with CAFDF Sheet and Memory Card



30.8.1 Field Blank Filters

The procedure for sampling the field blanks has not been determined. When an approved procedure has been accepted, steps will be added to the SOP. The current plan is to place a “BLANK” filter in the Number 4 position on the filter cartridge. As a natural consequence of the procedure, the filter will remain in the Sampler for the 24-hour routine sampling, plus recovery time.

30.8.2 Trip Blank Filters

The frequency of Trip blanks will be recommended by the PM_{2.5} Chemical Speciation Network Quality Assurance Project Plan. Trip blanks are used to measure possible contamination to filters during transportation to and from sampling locations. They provide a frame of reference in case field blanks exhibit mass gain higher than the tolerance levels. Trip blanks should remain inside their protective bags and never be exposed to sampling procedures. Trip blanks account for have been historically issued at a rate of approximately 5% of all routine filters issued by the contractor laboratory support. The historical values have been quite low so the frequency may be reduced further as soon as a new record can be established with the URG-3000N. Trip Blanks are designated by the weighing laboratory and issued at random.

However, trip blanks should be used in conjunction with field blanks.

30.9 Sampler QA/QC Procedures

Certain quality control checks must be conducted at the time of sampler startup and at monthly or quarterly intervals thereafter. Carry out these checks before making any adjustments to the sampler. Record information about the site, the sampler, and the results of scheduled or special (unscheduled) quality control checks on the PM_{2.5} STN QA/QC Report Form. This report form originates at the field site. The site operator should keep the original on file and send a copy to the State or local agency QA Manager. Do not send the QA/QC Report Form to the support laboratory. Any actions taken to service or calibrate the speciation sampler after the check must be recorded in brief on the form and in detail in the field operator's notebook.

30.9.1 Date and Time Checks

Conduct these checks monthly or whenever daylight savings time changes occur. Compare the date and time displayed on the sampler to a NIST traceable time such as a cell phone or GPS system. Record information on the Monthly Verification Form, Form 3 Appendix A.

30.9.2 Monthly Leak Check

Performed upon startup, then monthly. Open the Sample Module door and carefully remove the sample filter cartridge.

Remove the Verification Filter Cartridge from storage bag, remove red caps, place cartridge on cassette manifold, and lower solenoid manifold. Follow screen commands from AUTO MODE screen to the Leak Check screen of the Audit Menu. The sequence from the AUTO MODE screen is: Press the **ENTER** key, type **1123**, type **1**, press the **F4** key for more, press the **F3** key for Calibration Menu, and press the **F1** key for Leak Check.

Remove the inlet cap and attach the reducer and flow audit adapter to the top of the downtube. Leave flow audit adapter in the open position. (Follow the screen commands). Disconnect the vacuum line and install the inline pump shutoff valve. Leave valve in the open position. The pump will begin. When prompted by the screen command, close valve on the flow audit adapter on downtube by rotating the valve handle 90°. Pressure in sampler will begin. When prompted, close valve to the inline pump shutoff valve by rotating the valve handle 90°.

Press the **ENTER** key and the Leak Check will begin. Sampler will countdown from 35 seconds. After 35 seconds, the screen will show the result in mmHg. The acceptance criterion is a vacuum drop of less than 225 mmHg in 35 seconds. **Slowly** release the vacuum by opening the valve on the flow audit adapter. Disconnect the inline pump shutoff valve and reconnect the vacuum line. Press the **ENTER** key to return to the Audit Menu screen.

30.9.3 Monthly Temperature Verification

Performed upon startup and then monthly. Carefully remove the ambient temperature probe from the base on the inlet tee. From the Audit Menu screen, press the **F3** key. Place the reference temperature standard probe ½ inch from the sampler's temperature probe and allow both temperature probes to equilibrate.

Enter the reference standard temperature on the sampler's display screen. The sampler will

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

display the sampler and reference temperature values in Celsius and Fahrenheit. The sampler will determine the difference. Record the air sampler and reference standard temperature (°C) on the Monthly Verification Form.

Return the temperature probe to the base of the inlet tee. Confirm the probe is securely in place. Press the **ENTER** key twice to return to the Audit Menu screen.

If the sampler and standard temperature readings differ by more than + 2°C, trouble-shoot the system and recheck. If still out of tolerance, conduct a calibration or replace the faulty sensor. Consult the manufacturer and the operator's manual for procedures.

30.9.4 Quarterly Temperature Audit

Performed a temperature audit each calendar quarter. Follow the same steps as in Section 30.9.3, but use a temperature transfer standard that is independent of the one used for the monthly checks. Should a temperature sensor not maintain its calibration after the monthly or quarterly checks, maintenance and/or replacement of the faulty parts must occur. Record the air sampler and audit temperature standard on the Quarterly Audit Form, Form 4, Appendix A.

30.9.5 Monthly Pressure Verification

From the Audit Menu screen, press the **F4** key. Enter the barometric pressure of the reference standard on the sampler's display screen. The sampler will determine the difference. Record the air sampler and reference standard barometric pressure (mmHg) on the Monthly Verification Form. Compare the measured difference to the calculated value on the display screen.

Press the **ENTER** key twice to return to the Audit Menu screen. Press the **ENTER** key two more times to return to the AUTO MODE screen. Remove the Verification filter cartridge, cap the filter cassettes, and return to storage bag. Replace any routine filter cartridge to its original position.

If the sampler and standard pressure readings differ by more than 10 mmHg, trouble-shoot the system and recheck. If still out of tolerance, conduct a calibration or replace the faulty sensor. Consult the manufacturer and the operator's manual for procedures.

30.9.6 Quarterly Pressure Audit

Perform a pressure audit each calendar quarter. Follow the same steps as in Section 30.9.5, but use a pressure standard that is independent of the one used for the monthly checks. Should the pressure sensor system not maintain its calibration after the monthly or quarterly checks, maintenance and/or replacement of the pressure sensor system must occur. Record the air sampler and audit barometric pressure (mmHg) standard on the Quarterly Audit Form.

30.9.7 Monthly Flow Verification

Connect tubing from the reference standard to the flow audit adapter left on the downtube from the leak check in Section 30.9.2. From the Audit Menu screen, press the **F2** key for the Flow Rate Test. The sampler program will ask if a valid Leak Check has been performed. Press the **ENTER** key twice to continue with the Flow Rate Test. The sampler will run for 5 minutes.

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

The sampler program will show the sampler flow rate and request for the reference flow rate value to be entered.

The next screen will show the sampler's flow rate, the reference standard's flow rate, and the measured difference in LPM. Record sampler's flow rate and reference standard's flow rate on the Monthly Verification Form. Compare the measured difference to the calculated value on the display screen.

Remove the flow audit adapter and reducer and place in storage bag. Replace the inlet cap. Press the **ENTER** key twice to return to the Audit Menu screen.

If the sampler and standard flow readings differ by more than 10%, trouble-shoot the system and recheck. If still out of tolerance, conduct a calibration or replace the faulty sensor. Consult the manufacturer and the operator's manual for procedures.

30.9.8 Quarterly Flow Audit

Performed a flow audit each calendar quarter. Follow the same steps as in Section 30.9.7, but use a flow rate audit standard that is independent of the one used for the monthly checks. Should the flowrate mechanism not maintain its calibration after the monthly or quarterly checks, maintenance and/or replacement of the flow controller system must occur. Consult the manufacturer or the operator's manual for procedures for maintenance, adjustment, and calibration of sample flow rates. Record sampler's flow rate and audit standard's flow rate on the Quarterly Audit Form.

Note: If a problem is recognized while performing any maintenance, diagnostic, external, or internal checks which has or could affect data a corrective action form is to be filled out describing the problem identified and the action taken to correct the problem. All information should be recorded on a Corrective Action Form, Form 5, Appendix A.

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

Appendix A – Critical Forms and Field Sheets

Form 1	Annual Calibration Form
Form 2	Custody and Field Data Form
Form 3	Monthly Verification Form
Form 4	Quarterly Audit Form
Form 5	Corrective Action Form

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

Form 1 - Annual Calibration Form


URG 3000N ANNUAL CALIBRATION FORM						
A. SITE AND SAMPLER INFORMATION						
Site Name:				Date:		
Site Location:				Time:		
Technician's Name:				Sampler ID:		
Observer's Name:				Sampler Model: URG-3000N		
B. DATE AND TIME CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Sample display date/time	Transfer standard date/time	Date/time agree \pm 5 min?				
C. LEAK CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Channel number	Manufacturer's specification met? (less than 225 mm Hg)	Action taken and recheck results				
1						
D. TEMPERATURE CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Sensor location	Sampler display ($^{\circ}$ C)	Transfer standard ($^{\circ}$ C)	Agreement \pm 2 $^{\circ}$ C?	Action taken and recheck results		
Filter						
E. PRESSURE CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Sensor location	Sampler display (mm Hg)	Transfer standard (mm Hg)	Agreement \pm 10 mm Hg?	Action taken and recheck results		
Ambient						
F. FLOW RATE CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Channel number	Sampler display (L/min)	Transfer standard (L/min)	Design flow rate (L/min)	Agreement \pm 10 %? Samp./Std.	Agreement \pm 10 %? Samp./Design	Action taken and recheck results
1			22.0			
			22.0			
			22.0			
			22.0			
			22.0			
G. COMMENTS:						

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

Form2 - Custody and Field Data Form (CAFDF)

 Q135885G		PM 2.5 CSN CUSTODY AND FIELD DATA FORM TRAINING DB FOR TRAINING USE ONLY		a. White (return to lab) b. Yellow (site retains) c. Pink (lab)				
A. CUSTODY RECORD (Name, Date)			Bin ID: B23102	Set: 6a				
1. Laboratory, Out _____		3. Site, Out _____						
2. Site, In _____		4. Lab. In _____						
B. SITE AND SAMPLER INFORMATION								
1. Site AIRS Code <u>460110004</u>		5. Site Name: <u>Bountiful</u>						
2. Sampler S/N _____		6. Intended date of use: <u>Friday, April 06, 2007</u>						
3. Sampler Type: <u>URG 3000N</u>		7. Date of Sampler set-up _____						
4. Sampler POC: <u>5</u>		8. Operator's name _____						
C. SAMPLER CHANNEL COMPONENTS								
Position	Component ID No.	Component Description						
1	I80180	Quartz Cartridge ID						
1	I3019P	Memory Card ID						
D. START, END, AND RETRIEVAL TIMES								
Position	Start date	Start time	End date	End time	Retrieval date	Retrieval time		
1								
E. SAMPLER CHANNEL INFORMATION (Post-Sampling)								
Position	Run Time	Run Time, Flag	Sample Volume (m3)	Avg. flow (L/min)	Avg. flow CV (%)	Avg. ambient T (°C)	Max. ambient T (°C)	Min. ambient T (°C)
1								
Position	Avg. BP (mm Hg)	Max. BP (mm Hg)	Min. BP (mm Hg)					
1								
F. Comments _____ _____ _____								

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

Form 3 - Monthly Verification Form

URG 3000N MONTHLY VERIFICATION FORM						
A. SITE AND SAMPLER INFORMATION						
Site Name:			Date:			
Site Location:			Time:			
Technician's Name:			Sampler ID:			
Observer's Name:			Sampler Model: URG-3000N			
B. DATE AND TIME CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Sample display date/time	Transfer standard date/time	Date/time agree \pm 5 min?				
C. LEAK CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Channel number	Manufacturer's specification met? (less than 225 mm Hg)	Action taken and recheck results				
1						
D. TEMPERATURE CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Sensor location	Sampler display ($^{\circ}$ C)	Transfer standard ($^{\circ}$ C)	Agreement \pm 2 $^{\circ}$ C?	Action taken and recheck results		
Filter						
E. PRESSURE CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Sensor location	Sampler display (mm Hg)	Transfer standard (mm Hg)	Agreement \pm 10 mm Hg?	Action taken and recheck results		
Ambient						
F. FLOW RATE CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Channel number	Sampler display (L/min)	Transfer standard (L/min)	Design flow rate (L/min)	Agreement \pm 10 %? Samp./Std.	Agreement \pm 10 %? Samp./Design	Action taken and recheck results
1			22.0			
			22.0			
			22.0			
			22.0			
			22.0			
G. COMMENTS:						

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

Form 4 - Quarterly Audit Form

URG 3000N QUARTERLY AUDIT FORM						
A. SITE AND SAMPLER INFORMATION						
Site Name:			Date:			
Site Location:			Time:			
Technician's Name:			Sampler ID:			
Observer's Name:			Sampler Model: URG-3000N			
B. DATE AND TIME CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Sample display date/time	Transfer standard date/time	Date/time agree \pm 5 min?				
C. LEAK CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Channel number	Manufacturer's specification met? (less than 225 mm Hg)	Action taken and recheck results				
1						
D. TEMPERATURE CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Sensor location	Sampler display ($^{\circ}$ C)	Transfer standard ($^{\circ}$ C)	Agreement \pm 2 $^{\circ}$ C?	Action taken and recheck results		
Filter						
E. PRESSURE CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Sensor location	Sampler display (mm Hg)	Transfer standard (mm Hg)	Agreement \pm 10 mm Hg?	Action taken and recheck results		
Ambient						
F. FLOW RATE CHECKS						
Transfer Standard Name _____		Transfer Standard ID Number _____				
Channel number	Sampler display (L/min)	Transfer standard (L/min)	Design flow rate (L/min)	Agreement \pm 10 %? Samp./Std.	Agreement \pm 10 %? Samp./Design	Action taken and recheck results
1			22.0			
			22.0			
			22.0			
			22.0			
			22.0			
G. COMMENTS:						

Section 30: PM2.5 URG-3000N Speciation Sampler

Created Date: January 28, 2009

Revision 1

Form 5 - Polk County Corrective Action Form

To: _____ Polk County Air Quality _____
(position)

From: _____

Copies of completed form to: AQ Supervisor, File

Urgency: Emergency (immediate action needed) Urgent (24 Hr.)
 Routine (7 days) Next scheduled visit Information only

Problem Identification:

Site: _____
System: _____
Date: _____

Description of Problem: _____

Recommended Action: _____

Signature of Initiator: _____ Date: _____

Problem Resolution:

Date of Corrective Action: _____

Summary of Corrective Action: _____

Result of Corrective Action: _____

Signature of resolver: _____ Date: _____

Signature of QA Officer: _____ Date: _____