

**STANDARD OPERATING PROCEDURE FOR THE
SAMPLE HANDLING AND ARCHIVING
LABORATORY (SHAL)**

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STANDARD OPERATING PROCEDURE FOR THE SAMPLE HANDLING AND ARCHIVING LABORATORY (SHAL)

1.0 Introduction

1.1 Scope and Application

The Sample Handling and Archiving Laboratory (SHAL) is responsible for the preparation of filter media to be sent to sampling sites in the PM2.5 Speciation Trends Network. Filters are prepared, packaged, and shipped from the SHAL to the field sites prior to scheduled sampling dates. Following the sampling event, the field site returns the filter media to the SHAL, where the filters are removed from their modules and sent to laboratories for analysis. Following analysis, the filters or filter extracts are archived in appropriate storage for a specified time by the individual laboratory. This Standard Operating Procedure (SOP) presents the methods used by personnel working in the SHAL) to accomplish these tasks.

2.0 Training of SHAL Personnel

2.1 Summary of Task

Prior to working in the SHAL all personnel must be trained. This procedure describes the training of all SHAL workers.

2.2 Procedure

1. The SHAL Supervisor will orient all new workers to the SHAL facility. This will include all safety and security information.
 2. The first step in training new workers is the presentation of a training video which highlights the various filter types and modules in the program and their handling and cleaning. All workers watch this video.
-

3. A new worker will be paired with an experienced worker who will instruct them in the various SHAL tasks. During this time the new worker will be required to review the current SHAL SOP.
4. As the new worker becomes familiar with a specific task and is able to complete the task unassisted he will be deemed competent in that task. This will be recorded on the SHAL Personnel Training Record (see Figure 1).
5. The SHAL Personnel Training Record will be kept in the Training File located in the Program Office.
6. Periodically workers will be trained in new tasks or retrained in common tasks. This extra training will be documented and a record placed in the worker's SHAL Personnel Training Record.

3.0 Batch Label Printing

3.1 Summary of Task

This procedure describes printing batches of identification labels, which are used in various parts of sampler processing and shipping.

3.2 Procedure

- 3.2.1 Review printed labels inventory to determine need to print more labels.
- 3.2.2 Print labels as needed using label printing program.
- 3.2.3 Review label stock inventory, reorder as needed.
- 3.2.4 Distribute labels to user(s), as needed.

4.0 Log-In Parts from Client

4.1 Summary of Task

This procedure describes receipt of incoming sampler accessory parts from clients.

SHAL Personnel Training Record

The SHAL worker listed below has completed instruction in the specific activities shown in the table. The listed activities are those tasks required in the SHAL as part of the PM 2.5 Speciation project.

Activity	Date Completed
1. RTI Safety and Occupational Health Orientation	
2. Review of Standard Operating Procedure for SHAL, Revision 4, Dated January 9, 2002.	
3. Review SHAL training video on filter handling and module processing.	
4. Hands-on instruction in filter handling and module loading/unloading.	
5. Hands on instruction in use of the PM2.5 Speciation database relating to SHAL data entry.	
6. Instruction in cooler packaging and unpecking	
7. Instruction in creating aliquots and transfer of aliquot- to analytical laboratories including Chain of Custody issues and documentation.	
8. Review CFS Archive security procedures.	

Acknowledgment of Initial Training

_____	_____	_____
Printed Name	Signature	Date
_____	_____	_____
James O'Rourke SHAL Supervisor	Signature	Date

Note: Additional training beyond the initial training will be acknowledged by initialing and dating additions to the above table.

Figure 1. SHAL Personnel Training Record. This figure shows training all SHAL personnel have received. A copy of this is kept in each person's training folder.

4.2 Procedure

- 4.2.1 Receive package with parts. Record shipping information in SHAL Incoming Package Notebook.
 - 4.2.2 Identify each part in shipment and assign inventory number to identifier part of module.
 - 4.2.3 Label a bin with a Bin Label. Enter bin location into database.
 - 4.2.4 Create Bin Folder and Bin Inventory Form. Label each with Folder Copy and Form Copy of Bin Label. The unique Bin number is now associated with the bin, the Bin Folder and the Bin Inventory form.
 - 4.2.5 Disassemble each module and verify that all parts are included. If not, note on Bin Inventory Form and notify SHAL supervisor.
 - 4.2.6 Label each module with an Inventory Label. Place the Form Copy of the Inventory Label on the Bin Inventory Form.
 - 4.2.7 Color code each module according to the current coding scheme for each sampler by affixing a colored dot to the module.
 - 4.2.8 Place a corresponding colored dot on the Bin Inventory Form next to the Module Inventory Label.
 - 4.2.9 Complete the Bin Inventory Form. Include client, sampler, and/or location information.
 - 4.2.10 Note any unusual items in comments at bottom of form.
 - 4.2.11 Enter inventory information into database from Bin Inventory Form.
 - 4.2.12 Place modules and other items into correct bin.
 - 4.2.13 Compare actual bin contents to list - make appropriate corrections.
 - 4.2.14 Put inventoried bin on shelf in bin storage area.
 - 4.2.15 Place Bin Inventory Form into the Bin Folder.
 - 4.2.16 File the Bin Folder in the file cabinet containing all of the Bin Folders in the SHAL.
-

5.0 Prepare Sampler Modules for Shipment

5.1 Summary of Task

This procedure describes the assembly of sampler modules prior to shipment. Details specific to individual sampling modules are covered in separate sections of this procedure.

5.2 Procedure

- 5.2.1 Schedule work for processing period.
 - 5.2.2 Generate Measurement Request Forms (see Figure 2).
 - 5.2.3 Identify storage bin(s) containing modules to be assembled.
 - 5.2.4 Remove bins from storage and place in SHAL work area.
 - 5.2.5 Assemble each module placing the correct filter/filters in each, as described on Measurement Request Form.
 - 5.2.6 Specific assembly instructions for each module type are covered in separate sections of this procedure.
 - 5.2.7 Record ID and batch number of pre-weighed Teflon filter for mass determination on Measurement Request Form.
 - 5.2.8 Record batch number(s) of other filters on module assembly form.
 - 5.2.9 Package assembled module in shipping bin.
 - 5.2.10 Complete Measurement Request Form.
 - 5.2.11 Generate Field Sampling Chain-of-Custody (FSCOC) form. Prepare a Chemical Speciation Trends Network Field Sampling Null Value and Validity Coding Form (see Figure 3) for this sampling event.
 - 5.2.12 Generate a return air bill.
 - 5.2.13 Sign/Date FSCOC Form transferring custody to receiving party.
 - 5.2.14 Place FSCOC in shipping container/bin. The FSCOC will be placed on top of the modules, clearly visible to the person receiving the shipment with the date of the sampling event prominently displayed on the top of the form.
-

Please AirB If Receipt Here

Measurement Request ID: R638157 **FIELD BLANK**
Ship Date: 8/14/2003 Sample Date: 8/19/2003 Location Name: Chester
Analyses: Mass - 100.5, Ozone - PM2.5 (H-A, H-A, H), Trace Metals: Ni, Pb - PM2.5, Fe, Mn - PM2.5
Trace and Elemental Sulfate - SO₄ - PM2.5

Sampling Request ID: Q63785P SET: 5 

Configuration: T556J NASS Mini-Trends Configuration Diagram: sheet.02
Configuration Module ID: 01940 
Module Name: S455 cassette (plus 2 filters) (R25A)

Bin: B15002
Serial Number: _____
Required Assembly Information
Teflon Module ID _____
Unique Filter ID _____
Gray Batch No. _____

Configuration Module ID: 01940 
Module Name: S455 cassette (plus 2 filters) (R25B)

Bin: B15002
Serial Number: _____
Required Assembly Information
Nylon Module ID _____
Denuder Yes _____ No _____
Ions Lab Batch No. _____

Configuration Module ID: 01940 
Module Name: S455 cassette (plus 2 filters) (R25C)

Bin: B15002
Serial Number: _____
Required Assembly Information
Quartz Module ID _____
QC Lab Batch No. _____

Assembled By: _____ Date: _____
C:\Me... August 08, 2003 Page 2 of 2

Figure 2. Measurement Request Form. This form has a ship date and a sample date at the top. This form is used to enter and track all information during assembly. The information is entered first on the form, and then in the database.

**Chemical Speciation Trends Network
 Field Sampling Null Value and Validity Coding Form**

a. White (return to lab)
 c. yellow (site retains)
 c. pink (lab)

Chain of Custody Sampling Request ID _____ Sampling Date _____

Date Received In SHAL _____

Instructions to Field Sampling Operator: For the sampling event identified by the Chain of Custody Sampling Request ID indicated above please circle all applicable flags in the tables below. If no flags apply to this sampling event, please check the box below the tables.

Table A. Null Value Codes
 * selection of any flag in this table will invalidate sample

FLAG	DESCRIPTION
AA	SAMPLE PRESSURE OUT OF LIMITS
AB	TECHNICIAN UNAVAILABLE
AC	CONSTRUCTION/REPAIRS IN AREA
AD	SHELTER STORM DAMAGE
AF	SCHEDULED BUT NOT COLLECTED
AG	SAMPLE TIME OUT OF LIMITS
AH	SAMPLE FLOW RATE OUT OF LIMITS
AI	INSUFFICIENT DATA (CAN'T CALCULATE)
AJ	FILTER DAMAGE
AK	FILTER LEAK
AL	VOIDED BY OPERATOR
AM	MISCELLANEOUS VOID
AN	MACHINE MALFUNCTION
AO	BAD WEATHER
AP	VANDAL SM
AQ	COLLECTION ERROR
AU	MONITORING WAIVED
AV	POWER FAILURE (POWER)
AW	WILDLIFE DAMAGE
BA	MAINTENANCE/ROUTINE REPAIRS
BB	UNABLE TO REACH SITE
BC	BUILDING/SITE REPAIR

Table B. Validity Flags
 * samples marked with any of these flags will be analyzed and reported with flags noted

FLAG	DESCRIPTION
A	HIGH WINDS
C	VOLCANIC ERUPTIONS
D	SANDBLASTING
E	FOREST FIRE
F	STRUCTURAL FIRE
H	CHEMICAL SPILLS & INDUST. ACCIDENTS
I	UNUSUAL TRAFFIC CONGESTION
J	CONSTRUCTION/DEMOLITION
K	AGRICULTURAL FILLING
L	HIGHWAY CONSTRUCTION
M	ROUTING OF TRAFFIC
N	SANDING/SALTING OF STREETS
O	INFREQUENT LARGE GATHERINGS
P	ROOFING OPERATIONS
Q	PRESCRIBED BURNING
R	CLEAN UP AFTER A MAJOR DISASTER
S	SEISMIC ACTIVITY
U	SAHARA DUST
W	FLOW RATE AVERAGE OUT OF SPEC.
X	FILTER TEMPERATURE DIFFERENCE OUT OF SPEC.
Y	ELAPSED SAMPLE TIME OUT OF SPEC.

No flags assigned to this sampling event.

Signature _____ Date _____

Figure 3. Chemical Speciation Trends Network Field Sampling Null Value and Validity Coding Form. This form is used by the site operator to assign any flags.

- 5.2.15 Enter the outgoing shipment information into the database.
- 5.2.16 Record the outgoing air bill number on the Measurement Request Form. Attach copies of the FSCOC, the Validity Coding Form, and the return air bill to the Measurement Request Form.
- 5.2.17 Package the bin/cooler with appropriate number of ice packs. Include all necessary paperwork in the bin. Place the bin into a cooler.
- 5.2.18 A shipping clerk will check the contents of the package using the SHAL Cooler Checklist (see Figure 4) to verify that the contents are correct. Any problems will be corrected before proceeding.
- 5.2.19 After the cooler has been checked and the inspection completed satisfactorily, the cooler will be taped securely and the outgoing shipping air bill attached.
- 5.2.20 The completed SHAL Cooler Checklist will be stapled to the copies of the Measurement Request Form, FSCOC, Validity Coding Form, and the return air bill. This paperwork will be filed in the SHAL.
- 5.2.21 Place the cooler in the designated area for outgoing shipments.

6.0 Receive Incoming Sampler Modules

6.1 Summary of Task

This procedure describes the receipt of incoming sampler modules. Disassembly and processing of pieces are not covered in this procedure, but are included as separate procedures.

6.2 Procedure

- 6.2.1 Receive packages from delivery service.
 - 6.2.2 Look for container number - identify and separate incoming samples from other items.
 - 6.2.3 Process sampler modules first.
-

SHAL COOLER CHECKLIST

- Compare outgoing airbill to return airbill. Both airbills show the same location.
- Tracking Sticker is removed from Outgoing airbill and attached to measurement request.
- Custody form, Flag Validation form, Operator instructions, and any extra information is included in shipment.
- Site indicated on Custody form agrees with airbill shipping address.
- Custody form is signed/dated in Section A, #1, "Laboratory Out".
- Modules in bin are correct type of module as indicated on Measurement Request.
- Correct number of modules are in bin.
 - URG - 2 Modules
 - MET ONE - 3 Modules
 - Andersen - 3 Modules
 - Texas R&P FRM - 6 Cassettes
 - Texas R&P FRM - 4 Cassettes
 - R&P - 3 Modules
- Bin number agrees with bin listed on Measurement Request.
- Correct number of freeze packs in cooler and bin.
- All Stickers are present on Cooler (Perishable and RTI Cooler label).
- All packaging materials are present.
- Information entered into "Log out Shipment" Form.

Measurement Request Number: _____

Inspected By: _____

Date: _____

Figure 4. SHAL Cooler Checklist. *This checklist is used to ensure that all packing materials and paperwork are included in the cooler. A second person (not the assembler) checks the cooler.*

- 6.2.4 Open shipping containers. Measure temperature of received filter modules using an infrared sensor or other appropriate thermometer or sensor. Record received temperature on Chemical Speciation Trends Network Level 0 Validation Form (see Figure 5).
- 6.2.5 Transfer containers to cold room area for storage.

7.0 Disassemble Incoming Sampler Modules and Associate with Sampling and Analysis Events

7.1 Summary of Task

This procedure describes the overall steps needed to disassemble incoming sampler modules. Details of disassembly for a specific module are not included in this procedure, but are contained in individual instruction sheets.

7.2 Procedure

- 7.2.1 Remove bins containing filter modules from the cold room. Place bins in SHAL module processing area.
 - 7.2.2 Remove module(s) from bin. Cross check the ID of the modules received with those listed on the FSCOC. Notify the SHAL supervisor of any discrepancies before proceeding.
 - 7.2.3 Place all of the module(s) from the bin on the table along with the FSCOC and Level 0 Validation form.
 - 7.2.4 Allow module(s) to thermally equilibrate before proceeding.
 - 7.2.5 Enter package contents and incoming air bill into SHAL database.
 - 7.2.6 Sign and date FSCOC indicating receipt of contents at SHAL. Enter the date received on the Field Sampling Null Value and Validity Coding Form.
 - 7.2.7 Determine sampling configuration from FSCOC and/or database.
 - 7.2.8 Compare individual modules to those specified on FSCOC.
-

- 7.2.9 Note any discrepancies between received module set and those on FSCOC.
- 7.2.10 Notify SHAL Supervisor of discrepancies. Resolve discrepancies before proceeding.
- 7.2.11 Document any discrepancies and corrective actions. Notify QA Officer if major problems are found.
- 7.2.12 Disassemble module, remove parts and filters. Place the filters into pre-labeled petri slides. The filters will now be called aliquots for internal tracking purposes.
- 7.2.13 Determine analysis list for sampling event from sampling event form or database.
- 7.2.14 Generate Aliquot Creation Form (see Figure 6) in database. Print the form. Handwrite the aliquot information on the Aliquot Creation Form.
- 7.2.15 Transfer information from the Aliquot Creation Form into the SHAL database.
- 7.2.16 Store aliquots in SHAL refrigerator or freezer as appropriate for filter type.
- 7.2.17 Determine correct bin for module storage.
- 7.2.18 Clean module parts and allow to dry. Reassemble modules. Place cleaned modules in Ziploc bags. Put bags with cleaned modules in correct bin(s) for storage.
- 7.2.19 Return bin(s) to bin storage area.
- 7.2.20 Staple the FSCOC, Chemical Speciation Trends Network Level 0 Validation Form, Chemical Speciation Trends Network Field Sampling Null Value and Validity Coding Form, Aliquot Creation Form and Return Air bill together.
- 7.2.21 Place the forms in the tray for transfer to data entry.

8.0 Flag events

8.1 Summary of Task

This procedure describes how any unusual events are identified and marked accordingly for reporting purposes in the SHAL.



Measurement Request: R426171
Location: Phoenix Supersite

Sampling Request: Q425901
Sample Date: 11/1/2002

I1566J SASS cassette (Teflon filter) (GREEN)

Teflon Filter

	<i>Analysis</i>	<i>Laboratory</i>	<i>Aliquot ID</i>
Metals	Trace elements	Chester Lab/Ne.	_____
GRAV	Mass - PM2.5	Gravimetric Analysis Lab	_____

I1567K SASS cassette (MgO denuder, nylon filter) (RED)

Nylon Filter

	<i>Analysis</i>	<i>Laboratory</i>	<i>Aliquot ID</i>
Cations	Cations - PM2.5 (NH4, Na, K)	Ion Analysis Lab	_____
NO3nvlo	Nitrate - PM2.5	Ion Analysis Lab	_____
SO4	Sulfate - PM2.5	Ion Analysis Lab	_____

I1568L SASS cassette (quartz filter) (ORANGE)

Quartz Filter

	<i>Analysis</i>	<i>Laboratory</i>	<i>Aliquot ID</i>
EXTND	Organic elemental and CO3 carbon Ext2 PM2.5	OC/EC Analysis Lab	_____

Aliquot Created By: _____

Creation Date: _____

Figure 6. Aliquot Creation Form. *This form, labeled Measurement Request R426171, has three sections. The first one starts with I1566J. This is the Aliquot Creation Form and is used in the SHAL laboratory, during the disassembly process to ensure that the filters are sent to the correct laboratories.*

8.2 Procedure

- 8.2.1 If any of the AIRS null value codes are assigned by the site operator the event will be invalidated for reporting purposes. The SHAL supervisor (or his designee) will be informed and he will decide if the filters will be sent to laboratories for analysis.
- 8.2.2 If marked "don't run" or otherwise voided by operator in the comments section of the FSCOC, make decision to analyze aliquots. Mark the Level 0 Validation Form appropriately.
- 8.2.3 Send aliquots to analytical laboratories or to the "Do Not Analyze" bin in the SHAL refrigerators as appropriate.
- 8.2.4 During disassembly - note any unusual issues on the Level 0 Validation form - Contact the SHAL supervisor for guidance.
- 8.2.5 Pass form to Form Evaluator
- 8.2.6 The Form Evaluator will review site operator and SHAL comments along with site operator marked flags. The Evaluator will determine which flags are appropriate and mark them for entry.

8.2.6.1 Treatment of Samples That Were Not Run as Scheduled

1. Samples that were scheduled as Routine, but were not run by the operator:
 - A. If there was not a blank on the scheduled date, always convert the sample to an Unsampled Blank. Note: Even if the site operator writes "Convert to a Trip Blank (or Field Blank)" Convert the sample to an Unsampled Blank.
 - B. If the sample did not run, but will be invalidated, (for example a machine malfunction or power failure), do not convert it to a blank. Add the indicated flags and mark it as invalid.
 - C. If there was a Field or Trip blank scheduled for the same date and you know that the operator ran the Blank instead of running the Routine,
-

convert the Blank to a Routine and the Routine to a Blank (simply swap the sample types).

D. If you do not know if a Trip or Field Blank was scheduled for the sample date, convert the sample to an Unsampled Blank. If necessary, the sample type will be converted to a Trip or Field Blank during data validation and reporting.

2. Samples that were scheduled as Blanks but were run as Routine samples by the operator:

A. If the event appears to be a valid Routine sample, then convert the sample type to Routine. (This means that the sampling time is between 23 and 25 hours, etc.)

B. If the sample was run, but obviously has to be invalidated, then don't bother to change the sample type; just invalidate it.

8.2.7 For a complete description of the flagging procedure see "Data Validation Process for the PM2.5 Chemical Speciation Network", June 30, 2000.

RTI/07565/12-01D.

8.2.9 Add billing flags, where appropriate and mark them on the data entry form.

8.2.10 A grouping of forms ready for data entry will now be entered into the database.

The group of forms will be created into a batch.

8.2.10.1 Setting Level 0 and Level 1 Validation

1. Form batch creation

A. While assigning flags for each batch of forms, make sure you check the "Flags Reviewed" box (see Figure 7).

2. Data Entry

A. While doing first data entry make sure the level 0 and level 1 boxes are checked and initialed.

Form Batch: Comment(s)

DATE_CREATED: Aliquots on Lab COC

Flags Reviewed by

Entry 1 by
Entry 1 date:

Entry 2 by
Entry 2 date:

Completed Completed date:

Archived by
Entry 2 date:

Form CO

<input type="text" value="Q35782E"/>
<input type="text" value="Q358258"/>
<input type="text" value="Q35943A"/>
<input type="text" value="Q35860B"/>
<input type="text" value="Q35895M"/>
<input type="text" value="Q36000F"/>
<input type="text" value="Q360792"/>
<input type="text" value="Q36114Q"/>
<input type="text" value="Q36326Y"/>
<input type="text" value="Q363779"/>
<input type="text" value="Q364807"/>
<input type="text" value="Q366278"/>
<input type="text" value="Q36653A"/>
<input type="text" value="Q36688L"/>
<input type="text" value="Q367237"/>
<input type="text" value="Q36828F"/>
<input type="text" value="Q36968Q"/>
<input type="text" value="Q37003M"/>
<input type="text" value="Q37038X"/>
<input type="text" value="Q370730"/>
<input type="text" value="Q37108U"/>
<input type="text" value="Q37142W"/>
<input type="text" value="Q372270"/>
<input type="text" value="Q372612"/>
<input type="text" value="Q373637"/>
<input type="text" value="Q374516"/>
<input type="text" value="Q37556E"/>
<input type="text" value="Q37591H"/>
<input type="text" value="Q37628B"/>
<input type="text" value="Q37661E"/>
<input type="text" value="Q37791N"/>
<input type="text" value="Q380596"/>

Figure 7. An example of the Data Entry Form Batch Creation Page which includes the Level 0 and Level 1 Validation acknowledgment.

- 8.2.11 Batches will be kept together during the data entry process and as each step of the data entry process is completed - the batch will be marked in the database accordingly (see Figure 8). All forms may be tracked during data entry using this batch process.
- 8.2.12 The Form Reviewer will then transfer a batch of forms to data entry to begin the entry of the information from the Custody Forms (see Figure 9) into the database. (For a detailed description of the data entry process refer to the Database Operation SOP).

9.0 Ship Aliquots to Laboratories

9.1 Summary of Task

This procedure describes aliquot shipment to laboratories (both inside and outside RTI).

9.2 Procedure

- 9.2.1 Remove a group of filters (by filter type) from the SHAL refrigerator.
- 9.2.2 Generate a Laboratory Chain of Custody (LCOC) form (see Figure 10) for the group of filters.
- 9.2.3 Enter the information for the group of filters in the Laboratory Aliquot Tracking Notebook. Also, mark in the database the date the filters were transferred from the SHAL to the laboratory.
- 9.2.4 If filters are transferred to an RTI laboratory (or a local subcontractor) obtain a signature of the receiving laboratory on the LCOC Form. Retain one copy of the LCOC Form in the SHAL in the designated area.
- 9.2.5 For filters transferred to a subcontractor at a distance from RTI, sign and date the LCOC Form and keep one copy in the SHAL for RTI's records.
-

Forms Listed in Order Added to Batch

Batch: **E10240V**



Form Batch Create	12/13/2002	Flags Reviewed	<input checked="" type="checkbox"/>
Entry 1	DATE		
Entry 2	DATE	Complete	<input type="checkbox"/>
COC Form ID	Location	Sampling Date	
Q454331	UTC	11/28/2002	
Q44710N	LPH	11/28/2002	
Q43413M	Army Reserve Center	11/28/2002	
Q45688M	Southwick Community Center	11/28/2002	
Q45075J	Halliburton	11/28/2002	
Q45042Q	Harrisburg	11/28/2002	
Q44889P	Decatur	11/28/2002	
Q429774	Lindor	11/28/2002	
Q44974I	Florence	11/28/2002	
Q44540N	Springfield Pumping Station	11/28/2002	
Q45110L	Hendersonville	11/28/2002	
Q42832J	Children's Park	11/28/2002	
Q44770B	Bates House (USC)	11/28/2002	
Q45395G	Tallahassee Community College	11/28/2002	
Q45336Z	Hattie Avenue	11/28/2002	
Q43002A	Simi Valley	11/28/2002	
Q450931	Hazelwood	11/28/2002	
Q417958	MN - Rochester	11/28/2002	
Q44940J	Linwood	11/28/2002	
Q43852S	Rome	11/28/2002	
Q42798F	Bismarck Residential	11/28/2002	
Q448044	Burcombe County Board of Education	11/28/2002	
Q437161	Athens	11/28/2002	
Q45144V	Kingsport	11/28/2002	
Q42833B	East Charleston	11/28/2002	
Q42951S	North Los Angeles	11/28/2002	

Figure 8. Form Batch Chain of Custody. *Forms Listed in Order added to Batch. This is the form used to track the Chain of Custody form. All forms are scanned into a batch before the data entry process.*

 Q425901	PM 2.5 STN CUSTODY AND FIELD DATA FORM	a. White (return to lab) b. Yellow (site retains) c. Pink (lab)						
A. CUSTODY RECORD (Name, Date) _____ Bin ID: R1035Y								
1. Laboratory, Out: _____		3. Site Out: _____						
2. Site, In: _____		4. Lab, In: _____						
B. SITE AND SAMPLER INFORMATION								
1. Site AIRS Code: <u>040139997</u>		5. Site Name: <u>Phoenix Supersite</u>						
2. Sampler SN: _____		6. Intended date of use: <u>Friday, November 01, 2002</u>						
3. Sampler Type: <u>SASS</u>		7. Date of Sampler set-up: _____						
4. Sampler PO: <u>7</u>		8. Operator's name: _____						
C. SAMPLER CHANNEL COMPONENTS								
Channel No.	Component ID No.	Component Description						
1	Kept at Site	SASS cyclone						
1	I1566J	SASS cassette (Teflon filter) (GREEN)						
2	Kept at Site	SASS cyclone						
2	I1567K	SASS cassette (MgO denuder, nylon filter) (RED)						
3	Kept at Site	SASS cyclone						
3	I1568L	SASS cassette (quartz filter) (ORANGE)						
D. START, END, AND RETRIEVAL TIMES								
Channel No.	Start date	Start time	End date	End time	Retrieval date	Retrieval time		
1								
2								
3								
E. SAMPLER CHANNEL INFORMATION (Post-Sampling)								
Channel No.	Run Time	Run Time Flag	Sample Volume (m3)	Avg flow (L/min)	Avg flow CV (L/min)	Avg. ambient T (°C)	Max. ambient T (°C)	Min. ambient T (°C)
1								
2								
3								
Channel No.	ΔT Flag	Avg. Filter T (°C)	Max. Filter T (°C)	Min. Filter T (°C)	Avg. BP (mm Hg)	Max. BP (mm Hg)	Min. BP (mm Hg)	
1								
2								
3								
F. Comments _____ _____ _____								

Figure 9. PM2.5 STN Custody and Field Data Form.

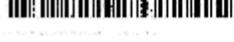
Bar Code		Identification Number	Filter Type	Analysis Requested
 H141831		Page 1 of 3		
RTI PM 2.5 Laboratory Chain of Custody Form (LCOC)				
Research Triangle Institute Gravimetric Analysis Lab				
Delivery Order: 0009		RTI Task: 7565		
		A185200Y	Teflon Filter B 11332200	GRAV
		A1852097	Teflon Filter B 11332200	GRAV
		A189041H	Teflon Filter B 11332200	GRAV
		A1977860	Teflon Filter B 11332200	GRAV
		A194827S	Teflon Filter B 11332200	GRAV
		A2075921	Teflon Filter B 11332200	GRAV
		A209504N	Teflon Filter B 11332200	GRAV
		A209521N	Teflon Filter B 11332200	GRAV
		A210556M	Teflon Filter B 11332200	GRAV
Delivery Order: 0010		RTI Task: 7565		
		A184762N	Teflon Filter B 11332200	GRAV
		A184774R	Teflon Filter B 11332200	GRAV
		A105197K	Teflon Filter B 11332200	GRAV
		A189028K	Teflon Filter B 11332200	GRAV
		A183031F	Teflon Filter B 11332200	GRAV
		A184824P	Teflon Filter B 11332200	GRAV
		A199425W	Teflon Filter B 11332200	GRAV
Custody Record (Name, Date)				
1. RTI SHAL, Out		Laboratory, In		
2. Laboratory, Out		RTI SHAL, In		
Comments				

Figure 10. RTI PM 2.5 Laboratory Chain of Custody Form (LCOC). This form is used to track filters as they move through the laboratories. The SHAL laboratory keeps a copy of the form and the laboratory keeps the other two copies.

10.0 Sending Filters to an Offsite Subcontractor Laboratory for Analysis

10.1 Summary of Task

This procedure describes the process of packaging and shipping filters to an offsite laboratory for analysis.

10.2 Procedure

- 10.2.1 Determine the subcontractor to receive a particular type of filter.
- 10.2.2 Retrieve a batch of filters from the refrigerator or freezer to be shipped.
- 10.2.3 In the SHAL database, generate a LCOC form. Sign and date the LCOC form. Mark the date that the batch is being shipped from the SHAL.
- 10.2.4 Package the samples in an appropriate container. Use a carrier appropriate to the type of filters being shipped. Complete the carriers waybill - charging to the correct task.
- 10.2.5 Retain copies of the LCOC form, the waybill, and the cover letter.
- 10.2.6 Ship the samples via the carrier to the laboratory.

11.0 Receiving Filters From an Offsite Laboratory

11.1 Summary of Task

This procedure details the receipt of filters from an offsite laboratory.

11.2 Procedure

- 11.2.1 Verify that the package received is intended for the RTI SHAL. Remove the carrier waybill and retain for record keeping, or note the waybill number if the waybill cannot be removed from the packaging.
 - 11.2.2 Inspect the package for damage. Note any damages. Open the package, removing any packing materials and freezepakcs. Store the freezepakcs in the freezer for future use.
-

- 11.2.3 Compare the filters to the custody form or packing list if included. Note any discrepancies. Sign and date the custody form or packing list acknowledging receipt of the package contents.
- 11.2.4 Store all filters appropriately. If filters are to be sent to another laboratory, follow the procedures for sending filters to RTI laboratories or offsite laboratories.

12.0 Receive Aliquots from Laboratory and Archive

12.1 Summary of Task

This procedure describes the return of aliquots from the analysis laboratories and their subsequent archiving.

12.2 Procedure

- 12.2.1 Log in shipment information in SHAL Aliquot Tracking Logbook.
 - 12.2.2 Compare aliquots received to listing on LCOC.
 - 12.2.3 Note any discrepancies. Resolve discrepancies with SHAL Supervisor.
 - 12.2.4 Sign LCOC for aliquots received.
 - 12.2.5 Log in previously generated aliquots.
 - 12.2.6 Enter new (lab generated) aliquots into database.
 - 12.2.7 Prepare storage box and form. Assign storage ID to box.
 - 12.2.8 Link aliquots to storage box in database. Place aliquots in storage box. Place storage box in Archive.
 - 12.2.9 Print out copy of Archive Box List which shows the aliquots contained in the Archive Box.
 - 12.2.10 Enter storage box location in database.
 - 12.2.11 File LCOC and airbill (if the shipment was received via delivery service) along with Archive Box List in SHAL.
-

13.0 Removal of Aliquots from Archive for Disposal

13.1 Summary of Task

This procedure describes the task of disposing of archived sample filters.

13.2 Procedure

- 13.2.1 Receive approval from RTI Task Leader for disposal of samples.
- 13.2.2 Prepare list of Storage Boxes to be removed from Archive for disposal.
- 13.2.3 Retrieve listed Storage Boxes from Archive for disposal.
- 13.2.4 Dispose of sample aliquots.
- 13.2.5 Enter sample identification of samples which have been disposed into database.

14.0 Return Unused Parts to Owner

14.1 Summary of Task

This procedure describes the steps needed to return unused sampler parts to their owner.

14.2 Procedure

- 14.2.1 Identify part(s) to be returned
 - 14.2.2 Prepare shipping paperwork including air bill.
 - 14.2.3 Associate container(s) with shipment.
 - 14.2.4 Associate part(s) with container(s) in database. Carefully package each part in the appropriate container.
 - 14.2.5 Verify actual contents of bins with printed list - make appropriate corrections.
 - 14.2.6 Ship package - add shipment date and airbill number to database.
 - 14.2.7 Update Inventory in database to show which parts have been returned to owner.
-

15.0 Filter Types and Handling

15.1 Summary of Task

This procedure describes in general terms the handling of filters in the SHAL.

15.2 Procedure

- 15.2.1 All filters are 47mm and white in color. Before assembling modules with clean filters, examine filters for tears, holes, etc. If any are damaged, record and discard. Wear gloves when handling filters and modules. Use forceps to pick up the filters.
 - 15.2.2 At least five different types of filters may be handled in the SHAL: Teflon, Nylasorb, Quartz, Polycarbonate, and XAD impregnated.
 - 15.2.3 Filters will be pretreated in the laboratories prior to being received in the SHAL.
 - 15.2.4 Teflon and polycarbonate filters are equilibrated at a constant temperature and humidity and preweighed.
 - 15.2.5 Quartz filters are pre-fired at high temperature to remove any carbon.
 - 15.2.6 Nylasorb filters may be washed to remove ions. XAD impregnated filters are treated with XAD.
 - 15.2.7 Post treatment of filters will be done in the SHAL and the analytical laboratories.
 - 15.2.8 Teflon and polycarbonate filters are posttreated by equilibrating in a temperature and humidity controlled room and reweighing the filter.
 - 15.2.9 Quartz filters are kept frozen prior to analysis.
 - 15.2.10 Nylasorb filters are kept refrigerated before analyzing.
 - 15.2.11 XAD filters are refrigerated before analyzing.
 - 15.2.12 Orientation and appearance of filter types: Teflon filters have an outer ring and an inner delicate Teflon membrane. The filter top will curve down. Teflon filters have a unique identifying number stamped on the outer ring.
-

- 15.2.13 Nylasorb filters are thin curved filters with no outer ring. Both sides appear the same. Place these filters in the holders such that the curved downside of the filter collects the particulate matter.
- 15.2.14 Quartz and XAD filters are thicker than Teflon filters with no outer ring. The top has a bumpy texture. Bottom has a grid pattern.
- 15.2.15 Polycarbonate filters are very thin with no outer ring. The top is shiny in appearance, bottom is dull.
- 15.2.16 Handling of Filter types (always use forceps and gloves): Teflon - pick up by the ring, inner Teflon tears easily. Quartz, XAD, and Nylasorb - use forceps under edge. Polycarbonate - use forceps under edge and handle in a static free environment.

16.0 Module Cleaning and Drying

16.1 Summary of Task

This procedure describes the cleaning of the disassembled modules.

16.2 Procedure

- 16.2.1 Once the module is disassembled, wipe down all parts using DI water wipes. Do not use soaps or other cleaners. Discard and replace the wipe with a fresh one as needed. Clean each module separately to keep parts from individual modules together.
- 16.2.2 Spread out the parts on a clean table surface. Allow all parts to air dry.

17.0 MET ONE (SASS) Module Disassembly/Assembly

17.1 Summary of Task

This procedure describes the handling of MET ONE modules in the SHAL.

17.2 Procedure

- 17.2.1 Place the white module holder on the work area in front of you. Take the yellow end caps off the MET ONE module and turn it so that the screw on the top is facing towards you.
 - 17.2.2 Place the MET ONE module into the holder by placing the two long screws at the bottom of the module into the two holes on the module holder. Take the MET ONE wrench and unscrew all three screws only half way. Then remove them completely.
 - 17.2.3 While keeping the screws and washers in the module, lift up and remove the metal covering of the MET ONE. Place it to the side. Then remove/open each piece placing the pieces in order on the table from first to last. Leave the base piece in the holder.
 - 17.2.4 Remove filters and place in petri dishes.
 - 17.2.5 Clean all of the module parts and allow to air dry completely.
 - 17.2.6 Clean and dry the module and each individual piece. (See cleaning instructions.)
 - 17.2.7 Place the closed bottom white filter ring back in the base, empty. Place the metal divider piece on top of it.
 - 17.2.8 Open the next ring and place the appropriate filter on top of the screen, using tweezers. Securely close the ring and place it on the spacer.
 - 17.2.9 All Teflon filters in the MET ONE modules will be placed into blue plastic cassettes - NOT the white Delrin plastic cassettes.
 - 17.2.10 Place the empty metal ring or the denuder on top of the white ring with filter, then the top metal piece on top of that. Finally, place the metal covering over the pieces lining it up in the same direction it was taken off.
 - 17.2.11 Tighten all the screws half way down then all the way down securely. This is done to make sure the module is closed evenly to prevent leaks during sampling. Place the module in a plastic Ziplock bag.
-

18.0 Andersen (RAAS 2.5-400) Module Disassembly/Assembly

18.1 Summary of Task

This procedure describes handling of the Andersen modules in the SHAL.

18.2 Procedure

- 18.2.1 Remove the Andersen modules from the bin. Place them on a clean work area for disassembly.
- 18.2.2 Unscrew the threaded center piece of the module. Take out the filter cassette from the center of the module. Remove the filter from the cassette. Place the filters into petri slides.
- 18.2.3 Clean each part of the Andersen filter module, including the white Teflon end caps. (See cleaning instructions.) Allow all pieces to air dry completely.
- 18.2.4 Place the appropriate filter on top of the screen in the bottom piece of each white ring. Close the cassette and reassemble the module.
- 18.2.5 Make sure the filter is oriented properly according to the direction of airflow through the module.
- 18.2.6 Place all modules into Ziplock bags and return them to the bin.

19.0 URG (400 and 450) Module Disassembly/Assembly

19.1 Summary of Task

This procedure describes the handling of URG modules in the SHAL.

19.2 Procedure

- 19.2.1 URG 400 - Turn the module so that the metal quick connect end is down and the male screw on top is up. Screw off the white Delrin screw sleeve and place it aside. Remove the filter housing inlet and place it aside.
-

- 19.2.2 Remove the filters from the first and second filter holders using forceps. Place the filters into pre-labeled petri slides.
- 19.2.3 Clean all of the module parts and allow them to air dry completely. (See the cleaning instructions.)
- 19.2.4 Holding the module with the metal quick connect end down, place a screen in the bottom holder and place the appropriate filter on top of it.
- 19.2.5 Push on the first holder and ring, placing the appropriate filter on top of the screen.
- 19.2.6 Now push on the top with the male end. Make sure that both of the filters are flat on the screen and all three layers are securely pressed together. Screw on the sleeve and place in a plastic Ziplock bag.
- 19.2.7 URG 450 - Hold the module so that the metal quick connect end is down. Unscrew the Delrin screw sleeve, remove it and place it aside.
- 19.2.8 Pull off the top male end layer and remove the filter using forceps. Place the filter in a pre-labeled petri slide.
- 19.2.9 Remove the screen from the module.
- 19.2.10 Clean all of the module parts and allow to air dry completely. (See cleaning instructions.)
- 19.2.11 Place the screen in the filter holder with the appropriate filter flat on top. Push the male end down on top of the filter. Make sure all layers are pressed together securely.
- 19.2.12 Finally screw on the Delrin screw sleeve and place the module in a plastic Ziplock bag for storage.

20.0 R & P ChemComb Model 3500 Speciation Sampling Cartridge Disassembly/Assembly

20.1 Summary of Task

This procedure details the handling of R&P type modules in the SHAL.

20.2 Procedure

- 20.2.1 Place the sampling module in a plastic work tray in front of you. Inspect retaining clips and external condition of module.
 - 20.2.2 Place filter pack end of module in jig.
 - 20.2.3 Loosen filter pack retaining clips and remove cylinder and inlet assembly. Place cylinder on its side in work tray.
 - 20.2.4 Inspect filter for damage, wrinkles, etc. Note any problems on the Level 0 Validation Form. Remove filter with tweezers. Place filter in petri slide holder.
 - 20.2.5 Clean parts of the filter pack. Clean the rim of the cylinder which touched the filter. Allow all to air dry, then re-install parts in filter pack.
 - 20.2.6 Loosen inlet retaining clips and remove inlet from cylinder. Set cylinder aside. Be careful! The cylinder may contain glass spacers and denuders.
 - 20.2.7 Remove impactor plate from inlet. Set it aside, impactor side up. Clean inlet interior and allow to air dry.
 - 20.2.8 Refurbish impactor plate with vacuum grease. Re-install impactor in inlet; be sure impactor surface faces the inlet jet.
 - 20.2.9 Carefully remove any glassware and spacers from interior of cartridge for cleaning or re-use. Clean interior of empty cartridge.
 - 20.2.10 Attach the inlet/impactor assembly to the cartridge. Secure by closing retaining clips. Load denuder components in cartridge as required for setup.
 - 20.2.11 Place the filter pack into the jig. Install proper filter in the top-most filter holder.
NOTE: Components of module vary with type of filter. See detailed instructions.
 - 20.2.12 Insert the cylinder/inlet assembly into the filter pack assembly. Secure by closing retaining clips.
 - 20.2.13 Remove the assembled module from the jig. Close both ends with plastic caps. Place the labeled module in a plastic bag and store until ready for shipment.
-

21.0 R&P FRM Module Disassembly/Assembly

21.1 Summary of Task

This procedure describes the handling of the R&P FRM modules in the SHAL.

21.2 Procedure

- 21.2.1 Remove the blue R&P FRM filter modules from the transport magazine cylinder.
Place the modules on a clean work area for disassembly.
 - 21.2.2 Separate the blue cassette rings and open the filter cassette. Remove the filter.
Place the filter into a petri slide.
 - 21.2.3 Clean the blue poly cassette rings and the support screens. Allow all parts to air dry completely. (See cleaning instructions.)
 - 21.2.4 Place the appropriate filter on top of the screen in the bottom ring of the module.
Close the module by replacing the top ring and pressing down into the bottom ring.
 - 21.2.5 Place the filter modules back into the transport magazine.
 - 21.2.6 Place the magazine in a clean Ziplock bag for storage prior to shipping back to the field sampling site.
-