Standard Operating Procedure for Sample Handling and Archiving Laboratory (SHAL)

Environmental and Industrial Sciences Division
RTI International*
Research Triangle Park, North Carolina

Prepared by: Jim O'Rourke Date: 2/18/09

Reviewed by: James B Flanagan Date: 2/18/2009

Approved by: W.T. Zutknecht Date: 2/19/09

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* RTI International is a trade name of Research Triangle Institute.

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Standard Operating Procedure for 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 Chemical Speciation Network. Filters are prepared, packaged, and shipped from the SHAL to the field sites prior to the 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

All personnel must be trained prior to working in the SHAL. 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 explanation of all safety and security information.
2. The first step in training new workers is the presentation of a training video that highlights the various filter types and modules in the program and their handling and cleaning. All new workers must 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.

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 8, Dated July 11, 2005..	
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 unpacking.	
7. Instruction in creating aliquots and transfer of aliquots to analytical laboratories including Chain-of-Custody issues and documentation.	

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.*

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.

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 Forms.

Place AirBill Receipt Here

Measurement Request ID: *R159059N*

Ship Date: 2/19/2008 ***Sample Date:*** 2/24/2008 ***Location Name:*** San Jose - Jackson Street

Analyses Organic and elemental carbon Ext3 PM2.5, Nitrate - PM2.5, Mass - PM2.5, Trace elements, Sulfate - PM2.5, Cations - PM2.5 (NH4, Na, K)

Sampling Request ID: Q152998M **SET:** 6

Configuration: F556J **SASS Mini-Trends Configuration** **Diagram:** sheet 02

Configuration Module ID: *G2042*

Module Name: *SASS cassette (Teflon filter) (GREEN)*

Bin: **B10585**
Shelf 2 Section B
I14133, I14144, I14155

Required Assembly Information

Teflon Module ID _____

Unique Filter ID _____

Grav Batch No. _____

Configuration Module ID: *G2064*

Module Name: *SASS cassette (MgO denuder, nylon filter) (RED)*

Bin: **B10585**
Shelf 2 Section B
I14133, I14144, I14155

Required Assembly Information

Nylon Module ID _____

Denuder **Yes** ____ **No** ____

Ions Lab Batch No. _____

Configuration Module ID: *G2086*

Module Name: *SASS cassette (quartz filter) (ORANGE)*

Bin: **B10585**
Shelf 2 Section B
I14133, I14144, I14155

Required Assembly Information

Quartz Module ID _____

OC Lab Batch No. _____

Assembled By: _____ ***Date:*** _____

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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.*

5.2.8 Record batch number(s) of other filters on module assembly form.

5.2.9 Package assembled module in shipping box. The shipping box is an insulated container designed to keep contents cold when packed with frozen blue ice.

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.

Chemical Speciation Network
Field Sampling Null Value and Validity Coding Form

c. 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	VANDALISM
AQ	COLLECTION ERROR
AU	MONITORING WAIVED
AV	POWER FAILURE (POWR)
AW	WILDLIFE DAMAGE
BA	MAINTENANCE/ROUTINE REPAIRS
BB	UNABLE TO REACH SITE
BE	BUILDING/SITE REPAIR

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

FLAG	DESCRIPTION
IA	African Dust
IB	Asian Dust
IC	Chem. Spills and Industrial Accidents
ID	Cleanup After a Major Disaster
IE	Demolition
IF	Fire - Canadian
IG	Fire - Mexico/Central America
IH	Fireworks
II	High Pollen Count
IJ	High Winds
IK	Infrequent Large Gatherings
IL	Other
IM	Prescribed Fire
IN	Seismic Activity
IO	Stratospheric Ozone Intrusion
IP	Structural Fire
IQ	Terrorist Act
IR	Unique Traffic Disruption
IS	Volcanic Eruptions
IT	Wildfire-U. S.
IU	Wildland Fire Use Fire-U. S.
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 Network Field Sampling Null Value and Validity Coding Form. *This form is used by the site operator to assign any flags.*

5.2.12 Generate a return air bill.

5.2.13 Each month, RTI will include one or more Field Audit forms with a shipment to each sampling location. This form will be completed by the site operator when he does his monthly audit of the sampler. The form will then be returned to RTI for data entry and inclusion in the monthly data reports.

5.2.14 Complete the validity coding form for this sampling event. Sign/date the FSCOC Form, transferring custody to receiving party.

5.2.15 Place the FSCOC, validity coding form and the monthly Field Audit Form (if scheduled) in the shipping box. 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.

5.2.16 Enter the outgoing shipment information into the database.

5.2.17 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.

5.2.18 Package the shipping box with the appropriate number of ice packs. Include all necessary paperwork.

5.2.19 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.

5.2.20 After the box has been checked and the inspection completed satisfactorily, the cooler will be taped securely, and the outgoing shipping air bill attached.

5.2.21 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.

5.2.22 Place the box in the designated area for outgoing shipments.

SHAL COOLER CHECKLIST

- ❑ **Sampling date, Site name and "Q" number(s) on Custody form match with those on the Measurement request(s).**
- ❑ **Site indicated on Custody form agrees with airbill shipping address.**
- ❑ Compare outgoing airbill to return airbill. Both airbills show the same "Q" number.
- ❑ Tracking sticker is removed from outgoing airbill and attached to measurement request.
- ❑ Custody form(s), Flag validation form(s), Operator instructions, and any extra information is included in shipment.
- ❑ Custody form(s) is/are signed/dated in Section A, #1 "Laboratory Out".
- ❑ Modules in bin are correct type of module as indicated on Custody form(s).
- ❑ Correct number of modules are in bin. Memory card in included if needed.
  - URG- 2 modules
  - MetOne- 3 modules
  - Andersen- 3 modules
  - R&P- 3 modules
  - MetOne+IMPROVE- 3 MetOne + 1 IMPROVE + Memory Card
  - MetOne+IMPROVE – 2 MetOne + 1 IMPROVE + Memory Card
- ❑ Bin number agrees with bin listed on Measurement Request(s).
- ❑ Correct number of freeze packs in cooler.
- ❑ All packing materials are present.
- ❑ All modules and icepacks are placed in ziplock bags.
- ❑ Every Ziplock bag is in good condition

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.*

6.0 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.

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 containers of filter modules from the cold room. Place in SHAL module processing area.

7.2.2 Remove module(s) from box. Crosscheck 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 box on the table along with the FSCOC forms and Level 0 Validation forms.

7.2.4 Allow module(s) to thermally equilibrate before proceeding.

7.2.5 Enter package contents and incoming air bill into SHAL database.

Chain of Custody Sampling Request ID: Q _____ Cooler Number: C _____

Chemical Speciation Network
Level 0 Validation - SHAL

Date Received in SHAL: **Wednesday, May 14, 2008**

OBSERVATION	STATUS	FLAG ASSIGNED	COMPONENT ID's FLAGGED
1. Cooler received intact with all ice packs and bin components?	Y / N / NA		
2. Contents received at ≈ 4 degrees C? Time Temp. Measured: _____	Y / N / NA		
3. All modules present and intact?	Y / N / NA		
4. Custody and Field Data Form received in cooler? A. All required data properly filled in? B. Signed and dated by field operator?	Y / N / NA Y / N / NA Y / N / NA		
5. Module numbers agree with numbers on Custody and Field Data Form?	Y / N / NA		
6. Modules appear undamaged?	Y / N / NA		
7. Module end caps in place, threaded properly (if applicable)?	Y / N / NA		
8. Visible filters inspected and appear undamaged?	Y / N / NA		
9. All filters unloaded and assembled into batches for laboratory analysis?	Y / N / NA		
10. Filter aliquot numbers entered onto Laboratory Chain of Custody forms?	Y / N / NA		

_____ Aliquot flags entered
_____ Aliquot flags reviewed
_____ First data entry complete
_____ Second data entry complete

Comments: _____

_____ Signature

_____ Date Completed

Figure 5. Chemical Speciation Network Level 0 Validation Form. *This form is used by the SHAL to note the temperature when the cooler arrives. It is also used to note any flags or unusual conditions.*

7.2.6 Sign and date FSCOC forms to indicate receipt of contents at the SHAL. Enter the date received on the Field Sampling Null Value and Validity Coding forms.

7.2.7 Determine sampling configuration from FSCOC form and/or database.

7.2.8 Compare individual modules to those specified on FSCOCs.

7.2.9 Note any discrepancies between received module set and those on FSCOC forms.

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 modules, 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 forms (see Figure 6) in database. Print the form. Handwrite the aliquot information on the Aliquot Creation forms.

7.2.15 Transfer information from the Aliquot Creation forms 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 forms, Chemical Speciation Network Level 0 Validation Form, Chemical Speciation Network Field Sampling Null Value and Validity Coding Forms, Aliquot Creation forms, and Return Air bill together. If the site has returned the monthly Field Audit Form in the package, include this form with the others.

7.2.21 Place the forms in the tray for transfer to data entry.

Measurement Request: R159059N **Sampling Request:** Q152998M
Location: San Jose - Jackson Street **Sample Date:** 2/24/2008

I14133 **SASS cassette (Teflon filter) (GREEN)**

13076283 ***Teflon Filter***

	Analysis	*Laboratory*	*Aliquot ID*
GRAV	Mass - PM2.5	Gravimetric Analysis Lab	_____
Metals	Trace elements	Chester LabNet	_____

I14144 **SASS cassette (MgO denuder, nylon filter) (RED)**

Nylon Filter

	Analysis	*Laboratory*	*Aliquot ID*
NO3nylon	Nitrate - PM2.5	Ion Analysis Lab	_____
SO4	Sulfate - PM2.5	Ion Analysis Lab	_____
Cations	Cations - PM2.5 (NH4, Na, K)	Ion Analysis Lab	_____

I14155 **SASS cassette (quartz filter) (ORANGE)**

Quartz Filter

	Analysis	*Laboratory*	*Aliquot ID*
3EXT/OC EC	Organic and elemental carbon Ext3 PM2.5	OC/EC Analysis Lab	_____

Aliquot Created By: _____ ***Creation Date:*** _____

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

8.0 Flag Events

8.1 Summary of Task

This procedure describes how any unusual events are identified and marked accordingly for reporting purposes

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 data 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 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.

   B. 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).

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 must be invalidated, do not change the sample type; invalidate it by assigning the appropriate flags.

8.2.7 For a complete description of the flagging procedure see *Standard Operating Procedure for Assigning Data Validation Flags for the Chemical Speciation Network*, May 14, 2008.

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

8.2.9 A group of forms ready for data entry will now be assigned to a Batch.

8.2.9.1. Setting Level 0 and Level 1 Validation

1. Form batch creation

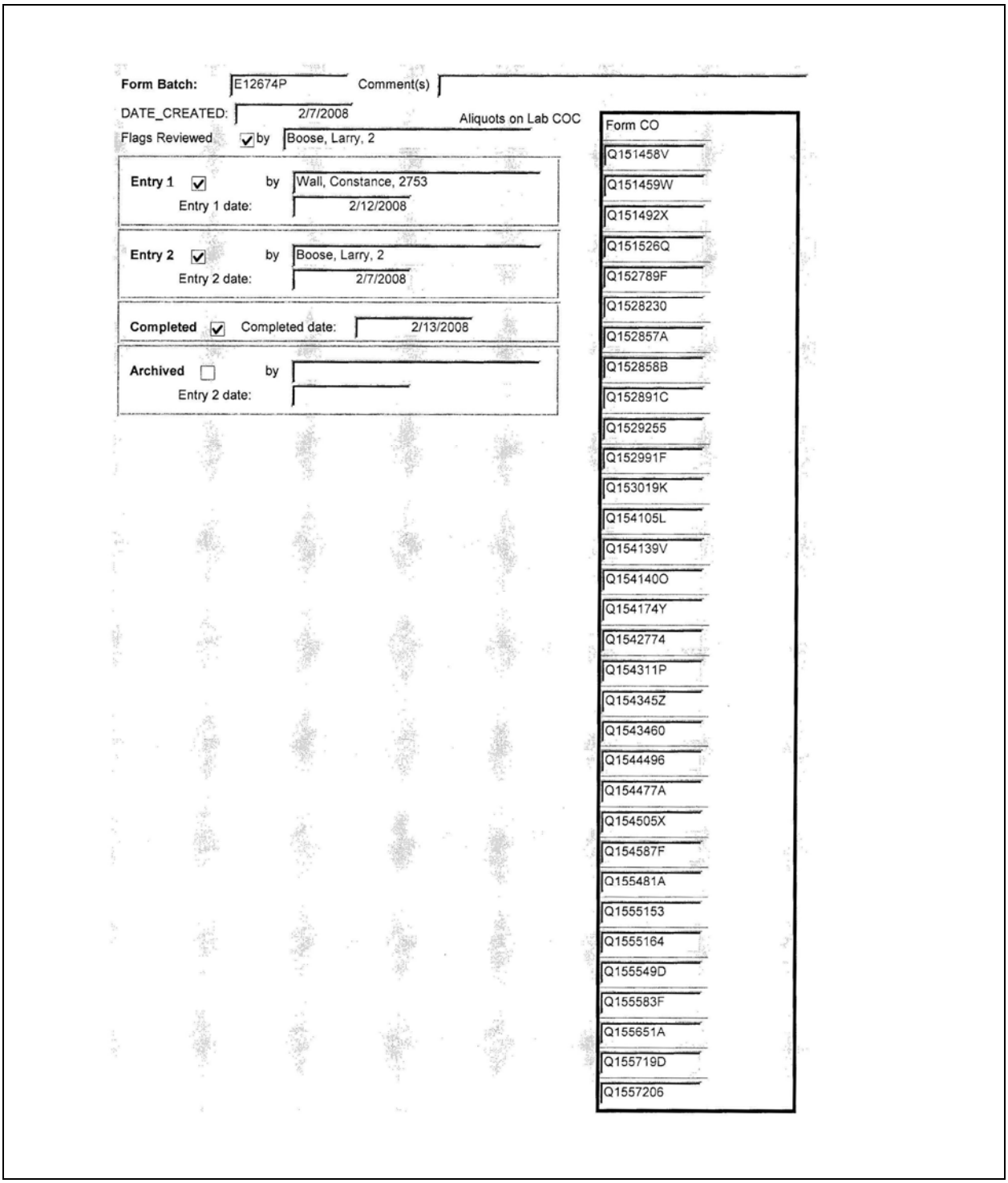
A. While assigning flags for each batch of forms, make sure you check the "Flags Reviewed" box (see Figure 7).

2. Data Entry

A. While doing first data entry, review the level 0 and level 1 boxes. Verify they are checked and initialed.

8.2.10 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.

8.2.11 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).



Form Batch: E12674P Comment(s)

DATE_CREATED: 2/7/2008

Flags Reviewed ☑ by Boose, Larry, 2

Entry 1 ☑ by Wall, Constance, 2753
Entry 1 date: 2/12/2008

Entry 2 ☑ by Boose, Larry, 2
Entry 2 date: 2/7/2008

Completed ☑ Completed date: 2/13/2008

Archived ☐ by
Entry 2 date:

Aliquots on Lab COC

Form CO
Q151458V
Q151459W
Q151492X
Q151526Q
Q152789F
Q1528230
Q152857A
Q152858B
Q152891C
Q1529255
Q152991F
Q153019K
Q154105L
Q154139V
Q154140O
Q154174Y
Q1542774
Q154311P
Q154345Z
Q1543460
Q1544496
Q154477A
Q154505X
Q154587F
Q155481A
Q1555153
Q1555164
Q155549D
Q155583F
Q155651A
Q155719D
Q1557206

Figure 7. An Example of the Data Entry Form Batch Creation Page. *This includes the Level 0 and Level 1 Validation acknowledgement.*

Forms Listed in Order Added to Batch

Batch: E12674P

E12674P

Form Batch Created 2/7/2008 **Flags Reviewed** ☑

Entry 1 ☑ **DATE** 2/12/2008

Entry 2 ☑ **DATE** 2/7/2008 **Complete** ☑

COC Form ID	Location	Sampling Date
Q155549D	Burlington	1/31/2008
Q155787P	Roxbury (Boston)	1/31/2008
Q153019K	Simi Valley	1/31/2008
Q156027W	Henrico Co.	1/31/2008
Q154139V	Chamizal	1/31/2008
Q155971N	Elizabeth Lab	1/31/2008
Q155821A	Sydney	1/31/2008
Q1544496	JFK Center	1/31/2008
Q154105L	Capitol	1/31/2008
Q154587F	Urban League	1/31/2008
Q155583F	CPW	1/31/2008
Q155481A	Alabama (TN)	1/31/2008
Q152789F	Fairbanks State Bldg	1/31/2008
Q152891C	Phoenix Supersite	1/31/2008
Q154505X	Woolworth St	1/31/2008
Q152991F	San Jose - Jackson Street	1/31/2008
Q152857A	Fresno - First Street	1/31/2008
Q155999Z	Gulfport	1/31/2008
Q1529255	Reno	1/31/2008
Q1560550	Lawrenceville	1/31/2008
Q154311P	Jefferson Elementary (10th and Vine)	1/31/2008
Q1542774	Arnold - R&P	1/31/2008
Q1555153	Albany Co HD	1/31/2008
Q151526Q	Mayville Hubbard Township site	1/31/2008
Q155915F	Chicopee	1/31/2008
Q151492X	G.T. Craig	1/31/2008

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

Q84261F

PM 2.5 CSN CUSTODY AND FIELD DATA FORM

c. White (return to lab)
c. Yellow (site retains)
c. Pink (lab)

A. CUSTODY RECORD (Name, Date) **Bin ID:** B1649M **Set:** 3

1. Laboratory, Out _____ 3. Site, Out _____
2. Site, In _____ 4. Lab, In _____

B. SITE AND SAMPLER INFORMATION

1. Site AIRS Code 123456789 5. Site Name Test Site
2. Sampler S/N 6. Intended date of use **Thursday, July 29, 2004**
3. Sampler Type SASS 7. Date of Sampler set-up _____
4. Sampler POC 5 8. Operator's name _____

C. SAMPLER CHANNEL COMPONENTS

Channel No.	Component ID No.	Component Description
1	Kept at Site	SASS cyclone
1	I3319E	SASS cassette (Teflon filter) (GREEN)
2	Kept at Site	SASS cyclone
2	I33207	SASS cassette (MgO denuder, nylon filter) (RED)
3	Kept at Site	SASS cyclone
3	I33218	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 (%)	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. $PM_{2.5}$ CSN Custody and Field Data Form.

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 subcontactor), 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 subcontactor at a distance from RTI, sign and date the LCOC Form and keep one copy in the SHAL for RTI's records.

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.

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RTI PM 2.5 Laboratory Chain of Custody Form (LCOC)

Research Triangle Institute Gravimetric Analysis Lab

Bar Code	Identification Number	Filter Type	Analysis Requested
Delivery Order: 0023		**RTI Task:** 08858	
	A556105D	Teflon Filter B 13071379	GRAV
	A556234L	Teflon Filter B 13071288	GRAV
	A564539W	Teflon Filter B 13071551	GRAV
	A573171L	Teflon Filter B 13071471	GRAV
	A573877C	Teflon Filter B 13070558	GRAV
	A573895E	Teflon Filter B 13071664	GRAV
Delivery Order: 0024		**RTI Task:** 08858	
	A556164O	Teflon Filter B 13071697	GRAV
	A556229O	Teflon Filter B 13071299	GRAV
	A562482O	Teflon Filter B 13071631	GRAV
	A564525Q	Teflon Filter B 13070832	GRAV
	A564534R	Teflon Filter B 13071722	GRAV
	A568734D	Teflon Filter B 13070536	GRAV
	A568737G	Teflon Filter B 13071528	GRAV
	A573174O	Teflon Filter B 13070194	GRAV
	A573260L	Teflon Filter B 13070296	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 analytical laboratories. The SHAL keeps a copy of the form and the receiving laboratory keeps the other two copies.*

10.2.4 Package the samples in an appropriate container. Use a carrier appropriate to the type of filters being shipped. Complete the carrier's 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 and removing any packing materials and freezepacks. Store the freezepacks 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 Return Unused Parts to Owner

12.1 Summary of Task

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

12.2 Procedure

12.2.1 Identify part(s) to be returned.

12.2.2 Prepare shipping paperwork, including air bill.

12.2.3 Associate container(s) with shipment.

12.2.4 Associate part(s) with container(s) in database. Carefully package each part in the appropriate container.

12.2.5 Verify actual contents of bins with printed list; make appropriate corrections.

12.2.6 Ship package, and add shipment date and airbill number to database.

12.2.7 Update Inventory in database to show which parts have been returned to owner.

13.0 Filter Types and Handling

13.1 Summary of Task

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

13.2 Procedure

13.2.1 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 when handling the filters.

13.2.2 At least five different types of filters may be handled in the SHAL: Teflon, Nylasorb, Quartz, Polycarbonate, and XAD-impregnated.

13.2.3 Filters will be pretreated in the laboratories prior to being received in the SHAL.

13.2.4 Teflon and polycarbonate filters are equilibrated at a constant temperature and humidity and preweighed.

13.2.5 Quartz filters are prefired at high temperature to remove any carbon.

13.2.6 Nylasorb filters may be washed to remove ions. XAD-impregnated filters are treated with XAD.

13.2.7 Post treatment of filters will be done in the SHAL and the analytical laboratories.

13.2.8 Teflon and polycarbonate filters are post-treated by equilibrating in a temperature- and humidity-controlled room and reweighing the filter.

13.2.9 Quartz filters are kept frozen prior to analysis.

13.2.10 Nylasorb filters are kept refrigerated before analyzing.

13.2.11 XAD filters are refrigerated before analyzing.

13.2.12 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.

13.2.13 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.

13.2.14 Quartz and XAD filters are thicker than Teflon filters with no outer ring. The top has a bumpy texture, and the bottom has a grid pattern.

13.2.15 Polycarbonate filters are very thin with no outer ring. The top is shiny in appearance, and the bottom is dull.

13.2.16 Handling of Filter types (always use forceps and gloves): Teflon – pick up by the ring because the inner Teflon tears easily. Quartz, XAD, and Nylasorb – use forceps under edge. Polycarbonate – use forceps under edge and handle in a static-free environment.

14.0 Module Cleaning and Drying

14.1 Summary of Task

This procedure describes the cleaning of the disassembled modules.

14.2 Procedure

14.2.1 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.

14.2.2 Spread out the parts on a clean table surface. Allow all parts to air dry.

15.0 MET ONE (SASS) Module Disassembly/Assembly

15.1 Summary of Task

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

15.2 Procedure

15.2.1 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.

15.2.2 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.

15.2.3 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.

15.2.4 Remove filters and place in petri dishes.

15.2.5 Clean all of the module parts and allow to air dry completely.

15.2.6 Clean and dry the module and each individual piece. (See cleaning instructions.)

15.2.7 Place the closed bottom white filter ring back in the base, empty. Place the metal divider piece on top of it.

15.2.8 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.

15.2.9 All Teflon filters in the MET ONE modules will be placed into blue plastic cassettes - NOT the white Delrin plastic cassettes.

15.2.10 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.

15.2.11 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.

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

16.1 Summary of Task

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

16.2 Procedure

16.2.1 Remove the Andersen modules from the bin. Place them on a clean work area for disassembly.

16.2.2 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.

16.2.3 Clean each part of the Andersen filter module, including the white Teflon end caps. (See cleaning instructions.) Allow all pieces to air dry completely.

16.2.4 Place the appropriate filter on top of the screen in the bottom piece of each white ring. Close the cassette and reassemble the module.

16.2.5 Make sure the filter is oriented properly according to the direction of airflow through the module.

16.2.6 Place all modules into Ziplock bags and return them to the bin.

17.0 URG (400 and 450) Module Disassembly/Assembly

17.1 Summary of Task

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

17.2 Procedure

17.2.1 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.

17.2.2 Remove the filters from the first and second filter holders using forceps. Place the filters into pre-labeled petri slides.

17.2.3 Clean all of the module parts and allow them to air dry completely. (See the cleaning instructions.)

17.2.4 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.

17.2.5 Push on the first holder and ring, placing the appropriate filter on top of the screen.

17.2.6 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.

17.2.7 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.

17.2.8 Pull off the top male end layer and remove the filter using forceps. Place the filter in a pre-labeled petri slide.

17.2.9 Remove the screen from the module.

17.2.10 Clean all of the module parts and allow to air dry completely. (See cleaning instructions.)

17.2.11 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.

17.2.12 Finally screw on the Delrin screw sleeve and place the module in a plastic Ziplock bag for storage.

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

18.1 Summary of Task

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

18.2 Procedure

18.2.1 Place the sampling module on the work table in front of you. Inspect retaining clips and external condition of module.

18.2.2 Place filter pack end of module in jig.

18.2.3 Loosen filter pack retaining clips and remove cylinder and inlet assembly. Place cylinder on its side on the work table.

18.2.4 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.

18.2.5 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.

18.2.6 Loosen inlet retaining clips and remove inlet from cylinder. Set cylinder aside. Be careful! The cylinder may contain glass spacers and denuders.

18.2.7 Remove impactor plate from inlet. Set it aside, impactor side up. Clean inlet interior and allow to air dry.

18.2.8 Refurbish impactor plate with vacuum grease. Re-install impactor in inlet; be sure impactor surface faces the inlet jet. Change to a new pair of gloves when impactor has been re-installed.

18.2.9 Carefully remove any glassware and spacers from interior of cartridge for cleaning or re-use. Clean interior of empty cartridge.

18.2.10 Attach the inlet/impactor assembly to the cartridge. Secure by closing retaining clips. Load denuder components in cartridge as required for setup.

18.2.11 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.

18.2.12 Insert the cylinder/inlet assembly into the filter pack assembly. Secure by closing retaining clips.

18.2.13 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.

19.0 R&P FRM Module Disassembly/Assembly

19.1 Summary of Task

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

19.2 Procedure

19.2.1 Remove the blue R&P FRM filter modules from the transport magazine cylinder. Place the modules on a clean work area for disassembly.

19.2.2 Separate the blue cassette rings and open the filter cassette. Remove the filter. Place the filter into a petri slide.

19.2.3 Clean the blue poly cassette rings and the support screens. Allow all parts to air dry completely. (See cleaning instructions.)

19.2.4 Place the appropriate filter on top of the screen in the bottom ring of the cassette. Close the cassette by replacing the top ring and pressing down into the bottom ring.

19.2.5 Place the filter modules back into the transport magazine.

19.2.6 Place the magazine in a clean Ziplock bag for storage prior to shipping back to the field sampling site.

20.0 URG 3000N Cartridge Disassembly/Assembly

20.1 Summary of Tasks

This procedure describes the handling of the URG 3000N modules in the SHAL.

20.2 Procedure

20.2.1 Place the URG 3000N on a clean work surface for disassembly.

20.2.2 Remove the red caps and open the filter cassette. Remove the filter using the cassette tool. Place the filter in a petri slide.

20.2.3 Clean the filter cassette and support screen. Allow all parts to air dry completely. (See cleaning instruction.) While the parts are drying, download the compact flash memory card data to the $PM_{2.5}$ Speciation database.

20.2.4 Place the appropriate filter on the bottom ring of the cassette. Close the cassette using the cassette tool.

20.2.5 Place the filter cassette and compact flash card in a clean Ziplock bag for storage prior to shipping back to the field sampling site.

21.0 PM Coarse Filter Handling

21.1 Summary of Task

This procedure describes the handling of the coarse filter modules in the SHAL.

21.2 Procedure

21.2.1 Place the coarse filter module on a clean surface for disassembly.

21.2.2 Disassemble the coarse filter module following the manufacturers specifications.

21.2.3 Remove the sampled filters and place in petrislides.

21.2.4 Clean all of the module parts and allow to air dry completely.

21.2.5 Install new clean filters into the module in preparation for the next sampling event.

21.2.6 Place the filter module into a clean Ziplock bag for storage prior to shipping back to the field sampling site as described in Section 5.0

22.0 Denuders for Collection of Acidic, Basic, and Organic Gases

22.1 Summary of Task

This procedure describes the handling of denuders in the SHAL.

22.2 Procedure

22.2.1 Freshly prepared denuders for the collection of acidic and basic gases and organic vapors will be supplied to the SHAL by the Denuder Refurbishment Laboratory.

22.2.2 As directed by EPA, denuders will be installed in modules for the purposes of removing acidic, basic or organic gases from the air being sampled. Some denuders will only be employed to "scrub" gases from the sampled air. Other denuders will be used to collect the target gases for subsequent extraction followed by analysis to determine the concentration of the gases in the sampled air.

22.2.3 The use of appropriate denuders will be scheduled in the PM2.5 database. Based on this schedule, the SHAL will load the correct denuder type into sampling modules for subsequent shipment to the field sampling locations. The denuder will be identified by the unique inventory number of the filter module in which it is installed.

22.2.4 Denuders may be installed into modules containing filters, or they may be installed in modules that contain only a denuder or a series of denuders.

22.2.5 Upon their return to the SHAL from the field sampling location, the denuders will be removed from the modules.

22.2.6 For those denuders that are only used to "scrub" gases out of the airstream and will not be subsequently extracted, they may be reinstalled in the module for the next sampling event if it is determined that the denuder has remaining capacity to "scrub" out the target gas from the airstream.

22.2.7 The denuders that will be extracted will be assigned a unique laboratory identification number and returned to the denuder laboratory from the SHAL for extraction and subsequent analysis.