

UCD CSN Technical Information #302B

Receiving and Inventorying of CSN Samples

*Chemical Speciation Network
Air Quality Research Center
University of California, Davis*

*September 28, 2017
Version 1.0*

Prepared By: MJ Navano Date: 10/16/17
Reviewed By: [Signature] Date: 10/16/2017
Approved By: Nicole Hye Date: 10/16/17

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1. PURPOSE AND APPLICABILITY

The subject of this standard operating procedure (SOP) is receiving and inventorying of samples collected in CSN network. The scope is to ensure good laboratory practice of receiving samples by checking condition and amounts with the chain-of-custody forms, and inventorying and preparing samples for XRF analysis.

2. SUMMARY OF THE METHOD

Samples collected for the CSN network are inventoried prior to analysis. This method describes the documentation and sample handling necessary to maintain sample integrity through the inventory and analysis process.

3. DEFINITIONS

- **Inventory:** The list includes the amount of samples received, condition, type of filter (sample, lab blank, field blank etc.) that shall be used to determine the samples to be XRF analyzed as well as analysis order.
- **Chain-of-custody (COC) form:** The form received with the samples including the list, amount, sample type etc.
- **Analysis Request ID:** Amec assigns a batch number to each shipment of filters, eg A0000001. Other names include, Batch ID, and ContractorBatchNumber.
- **Lab Analysis ID:** Amec assigns a barcode to each sample format F#####, eg F000002. Other names include Barcode ID, and ContractorFilterAnalysisId.
- **Teflon filter ID#:** Manufacturer serial number stamped on the outer membrane of a filter, eg T5656360.
- **SampleId (Id):** The number assigned to the electronic record in CSN database.
- **XRF Application:** The program contains the parameters for measuring a sample by XRF; specific to each instrument
- **XRF queue file:** A list of electronic records associated with a Batch of CSN samples to be analyzed by XRF. Each record includes the following information; Barcode ID, SampleId and XRF Application, eg F000002, 325, CSNv1.1_Nanna.
- **CSN Data Management Site:** User interface web application for the CSN database (*csn.crocker.ucdavis.edu*).
- **Operator:** Authorized personnel responsible for processing CSN samples; must be approved by the Lab Manager. The operator shall have access to Jungerman Hall rooms 116 and 120A where the XRF instruments and refrigerators are located.

4. HEALTH AND SAFETY WARNINGS

Not applicable.

5. CAUTIONS

Not applicable.

6. INTERFERENCES

Not applicable.

7. PERSONNEL QUALIFICATIONS, DUTIES, AND TRAINING

Only trained lab personnel designated by the Laboratory Manager may handle samples.

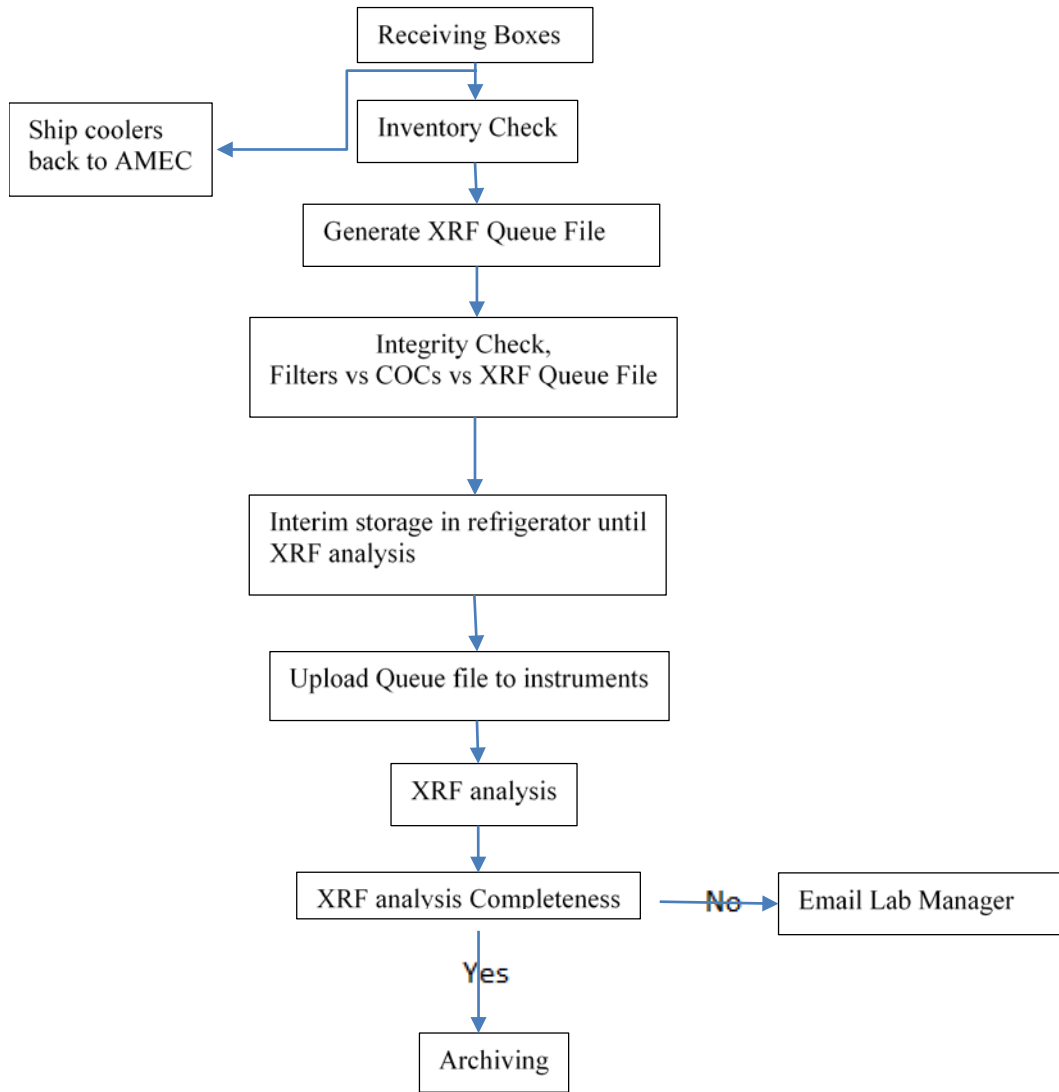
8. EQUIPMENT AND SUPPLIES

Not applicable.

9. PROCEDURAL STEPS

The flowchart of sample receiving and inventorying shown in Figure 1.

Figure 1. The flowchart of sample receiving to archiving.



9.1 Receiving of Samples

The CSN samples are shipped in coolers from Amec to UC Davis accompanied Chain-of-Custody (COC) forms (Figure 2). Upon receipt, the operator sign and date the COC. The COC includes the following information for each sample, Lab Analysis ID, intended use date, analysis type, Teflon filter ID#, set #, and status flag.

The operator unpacks the boxes in designated location (Jungerman Hall, room 120A) and inventories the filters.

Figure 2. Example of chain of custody form.

Analysis Request ID		Intended Sample Date	Sampling date
Batch ID		Set #	Set number
Barcode ID	Code/Filter Analysis ID	Filter Type	Analysis Requested
	Filter Analysis ID		Invalid?
	F000358	Teflon	XRF
	T6648813		
	F000361	Teflon	XRF
	T6648648		
	F000364	Teflon	XRF
	T6648814		
	F000367	Teflon	XRF
	T6648825		
	F000370	Teflon	XRF
	T6648649		
	F000373	Teflon	XRF
	T6648650		
	F000376	Teflon	XRF
	T6648815		
	F000379	Teflon	XRF
	T6648701		<input checked="" type="checkbox"/> Invalid sample
	F000382	Teflon	XRF
	T6648816		
	F000385	Teflon	XRF
	T6648817		
	F000388	Teflon	XRF
	T6648702		
	F000391	Teflon	XRF
	T6648523		<input checked="" type="checkbox"/>
	F000394	Teflon	XRF
	T6648703		

Teflon Filter ID

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9.2 Inventorying

The purpose of inventorying is to perform an integrity check to verify the number of samples on the COC and the queue file. A detailed inventory is done when loading samples to XRF instruments. The samples are organized and shipped by Amec, and shipments from Amec are assigned a batch number. Each batch contains multiple boxes of Petri trays. Each Petri box can hold two Petri trays, while each tray contains 50 Petri slides. The samples are organized in numerical order based on the COC. Amec labels the

boxes and each Petri Tray with the set numbers. The samples are identified by the Lab Analysis ID (eg F000002) on the bottom of the Petri slide.

Using the COC as a guide, check the 1st, 25th, 26th and 50th sample of each Petri tray. This ensures that samples in the Petri tray are in the same order as on the COC. Prior to analysis, each filter analysis ID (e.g., F000002) and the unique manufacturer number (e.g., T5656360) will be verified with the COC.

Use a red pen, to mark the COC with a small dash (-) after the 50th sample of each tray. Next to the dash write down the tray number format T# (eg.T1) with a red pen. In addition, write the batch number and tray number on every Petri tray format B#T# (eg B7T1). If less than 50 samples are received in a Petri tray or Ziploc bag, continue with the sample procedure by checking first and last filters in the tray or bag. Note the number of filters received and the number of filters records on the COC.

Integrity check information (Figure 3) and any discrepancies are reported to the Lab Manager via email. For instructions on performing queue file check, refer to Section 3.4, XRF Queue Generation.

Table 1. Integrity check table.

Filter Count	COC	XRF Queue file
# of samples received	# of samples listed	# of records in the file

To receive boxes, go to the CSN Data Management site (Figure 4), and update the following information for the batch; BoxReceivedDate, BoxSampleCount, BoxFirstSampleDate and BoxLastSampleDate. Refer to Section 3.3, CSN Data Management Site for instructions.

Figure 3. CSN Data Management Site.

The screenshot displays a web form titled "Receive Box for Batch A0000007". The form contains several input fields and a text area:

- BoxReceivedDate:** A date-time field with the value "04/27/2016 9:57 AM" and a calendar icon.
- BoxReceivedBy:** A text field with the value "marigaby".
- BoxSampleCount:** A text field with the value "975" and a dropdown arrow.
- BoxFirstSampleDate:** A date-time field with the value "02/03/2016 12:00 AM" and a calendar icon.
- BoxLastSampleDate:** A date-time field with the value "02/27/2016 12:00 AM" and a calendar icon.
- Comments:** A large, empty text area for entering notes.

At the bottom of the form, there are two buttons: a blue "Save" button with a checkmark icon and a "Back" button with a circular arrow icon.

9.3 CSN Data Management Site

CSN Data Management Site is the user interface to the electronic data associated with the CSN network for all the sample types (Quartz, Nylon, and Teflon). The electronic files are provided by Amec in a Microsoft Excel format. The electronic data is ingested into the CSN database by the UC Davis developers. The URL for the CSN Data Management Site (CSN webapp) is csn.crocker.ucdavis.edu; a valid UC Davis ID and password are required. For access to the CSN webapp check with developers and/or Crocker IT.

The CSN webapp has four main menus, Home, Analysis Data, Import and Admin. The lab group does not currently use Analysis Data, Import or Admin. The Home Menu has seven submenus:

1. The *Filters* submenu (Figure 5) is helpful when looking to select specific records for a given batch.

Figure 4. Filter results.

Filter Results

Filter Type: Teflon

Batch: All

Site: All

IntendedUseDate: Start: 03/09/2016, End: []

Filter Purpose: All

Invalid: Not Set

Null Code: All

Qualifier Code: All

Comments: []

SampleEventId: []

Set: []

ManufacturerNumber: []

Lot: []

Max Results: 100

[Filter] [Close]

2. The *Filter Details* submenu (Figure 6) is helpful when looking for detailed information for a given filter. Qualifier codes and comments are added in this view. It is possible to search records by Filter Barcode or Filter ID.

Figure 5. Filter details.

Filter BarcodeId: [] Go

Filter Details

Id: 6959

ContractorFilterAnalysisId: F007456

ContractorBatchNumber: A0000006

Sampler: 30-049-0004: Seiben Flats, MT (id: 133)

IntendedUseDate: 1/31/2016 12:00:00 AM

SampleStartDate: 1/31/2016 12:00:00 AM

SampleEndDate: 2/1/2016 12:00:00 AM

FilterPurpose: SA - Sample (id: 1)

AqsNullCodeId: [Edit AQS Null Code](#)

Invalid: False

QualifierCodes: [Edit Qualifier Codes](#)

Filter Type: Teflon

ChannelPosition: 5

SampleVolume: 9.67 m³

AvgFlow: 6.72 LPM

AvgFlowCv: 0.01

AvgAmbTemp: -3.50 °C

AvgBp: 658.00 mm Hg

AnalysisType: XRF

ContractorSampleEventId: Q0672016013101

ContractorSetNumber: 6q

ManufacturerNumber: T6645775

LotNumber: MTLCY2015

Comments: [Edit Comments](#)

[Edit](#) [Back to List](#)

- The *Batches* submenu (Figure 7) includes a list of all shipments received and the corresponding electronic records. Batch Details will give the details of the Batch including Receiving Box, and Generate XRF Queue.

Figure 6. Batch list.

Batches						
ContractorBatchNumber	BoxReceivedDate	BoxSampleCount	BoxFirstSampleDate	BoxLastSampleDate	BoxReceivedBy	Comments
<input type="checkbox"/> A0000001	12/16/2015 8:38:43 PM	346	11/20/2015 12:00:00 AM	12/21/2015 12:00:00 AM	marigaby	Initial import of data received
<input type="checkbox"/> A0000002	1/28/2016 9:51:00 AM	2409	11/20/2015 12:00:00 AM	12/14/2015 12:00:00 AM	marigaby	

- The *Lab Blanks* submenu (Figure 8) view and generate the electronic records for the laboratory blanks.

Figure 7. Lab Blanks.

Lab Blanks <input type="button" value="Add Lab Blank"/>													
Batch	Sampler	FilterPurpose	AqsNullCode	FilterType	Invalid	IntendedUseDate	SampleVolume	AnalysisType	ContractorFilterAnalysisId	ContractorSampleEventId	ContractorSetNumber	ManufacturerNumber	LotNumber
<input type="checkbox"/>	LB			Teflon	False			XRF	T6571454			T6571484	MTLCY2015

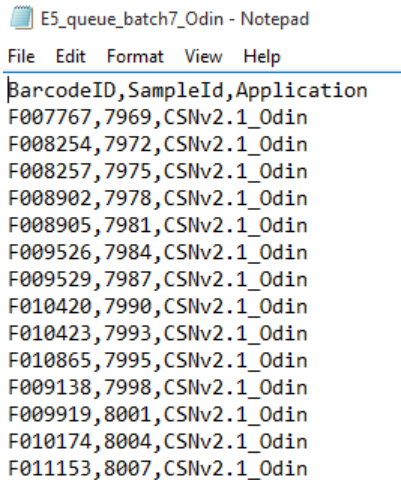
9.4 XRF Queue Generation

XRF queue files are generated with BarcodeId, SampleId, and Application information. The sample changer software uses the data within the queue file to link the Lab Analysis Barcode with the Sample identity and the application.

To generate the XRF queue file, access the CSN Data Management Site and select *Batches* from the top menu. Scroll to select *View Record Details* next to the batch number, and select *Generate XRF Queue*. Choose the application associated with the XRF instrument. If lab blanks are received with the current batch, leave selected, otherwise exclude the lab blanks. All samples are analyzed regardless of flag status, including the invalid samples, click *Go*.

Save the queue file to *U:\IMPROVE_Lab\XRF_Epsilon5\CSN\Queue files*. Change the file name to *E5_queue_batch#_instrument name* (Figure 4). Open the file and check the number of samples in the file. If samples are missing the Barcode ID then go to CSN webapp and review comments. Record the number of samples, and send an email with the integrity check information (Figure 3) to the Lab Manager.

Figure 8. XRF queue file.



```
E5_queue_batch7_Odin - Notepad
File Edit Format View Help
BarcodeID,SampleId,Application
F007767,7969,CSNv2.1_Odin
F008254,7972,CSNv2.1_Odin
F008257,7975,CSNv2.1_Odin
F008902,7978,CSNv2.1_Odin
F008905,7981,CSNv2.1_Odin
F009526,7984,CSNv2.1_Odin
F009529,7987,CSNv2.1_Odin
F010420,7990,CSNv2.1_Odin
F010423,7993,CSNv2.1_Odin
F010865,7995,CSNv2.1_Odin
F009138,7998,CSNv2.1_Odin
F009919,8001,CSNv2.1_Odin
F010174,8004,CSNv2.1_Odin
F011153,8007,CSNv2.1_Odin
```

Upload the queue file to the instrument in the following folder directory *C:\PANalytical\Epsilon5\Programs\Changer\Barcode Scripts* and save the file as *E5_queue*. Replace the current file in the folder. Follow the same procedure to generate the queue for another instrument.

PANalytical software will only recognize the queue file in txt format. The operator can generate the script file directly from the instruments computer. Use caution when saving the file to the instrument.

9.5 XRF Inventory

Samples are inventoried at the XRF upon loading by scanning directly into the sample changer software for the Epsilon 5 instruments. The operator will verify individual sample receipt by comparing Lab Analysis Barcode ID with the COC. Record the instrument name, tray and position number for the first and last samples in the XRF tray (Figure 9).

Figure 9. COC with XRF assigned Instrument Name, Tray and Position number.

CSN Laboratory Chain of Custody Form

Ship Date and Name: 4/26/2016 BARNARD
 Receive Date and Name: 04/27/2016 M6 NAWAB 0957
 Intended Sample Date: 2/3/2016
 Set #: 3

Analysis Request ID: A0000007
 Batch number: A0000007

Barcode/Filter Analysis ID	Filter Type	Analysis Requested	Invalid?
Filter Analysis ID: F007687	Teflon T6646344	XRF	Nanna (E) 1
Filter Analysis ID: F007690	Teflon T6646345	XRF	
Filter Analysis ID: F007693	Teflon T6645988	XRF	
Filter Analysis ID: F007696	Teflon T6646346	XRF	
Filter Analysis ID: F007699	Teflon T6646347	XRF	
Filter Analysis ID: F007702	Teflon T6646230	XRF	
Filter Analysis ID: F007705	Teflon T6646238	XRF	
Filter Analysis ID: F007708	Teflon T6646348	XRF	Nanna (E) 1
Filter Analysis ID: F007711	Teflon T6645989	XRF	Nanna (E) 1
Filter Analysis ID: F007714	Teflon T6646231	XRF	
Filter Analysis ID: F007717	Teflon T6646349	XRF	

Teflon Filter ID

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9.6 Laboratory Blanks

Amec will provide a box of 50 filters every time the Teflon lot changes. The Lab Manager will inform the operator when to prepare the lab blanks for analysis. Lab blanks have a manufacture code which is also used as the Teflon filter ID, format T5656360. Generate a barcode sticker for each filter using the Teflon filter ID. Prepare 32 laboratory blanks to be analyzed by XRF. Refer to *UCD CSN TI #302C: Sample Changes for 8-Position Trays* for further details.

9.7 Storage

CSN network samples are stored between 0 and 4 °C. Two refrigerators are available for CSN sample storage, located in Jungerman Hall rooms 120A and 116. Store samples ready for XRF analysis in 116. After analysis is completed, the samples are archived. Refer to *UCD CSN SOP #901: Archiving* for achieve instructions.

9.8 Cooler Return

The operator will prepare and ship the ice packs/coolers back to Amec, using the provided UPS return labels. If labels are not provided contact Amec for shipping account information.

9.9 XRF Analysis Completeness

When XRF analysis of a batch is completed, notify the Lab Manager. The Lab Manager will check completeness of the data comparing the XRF results files to the inventory list for each batch; the filter status of each sample is cleared of duplicates (only one valid result per sample). Any discrepancies will be resolved before the data is delivered.

To check Analysis completeness go to the website <http://169.237.146.119:3838/csnStatus/>. On the left hand side of the page select *Analysis Completeness*, then select the appropriate Year and Month. Review the list *Filters Not Yet Analyzed by XRF*. If any samples are on the list review the comments, verify samples were received. Notify the Laboratory Manager of any discrepancies.

10. QUALITY ASSURANCE AND QUALITY CONTROL

Not applicable.

11. REFERENCES

Not applicable.