

# UCD CSN Technical Information #302B

## Receiving and Inventorying of CSN Samples

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

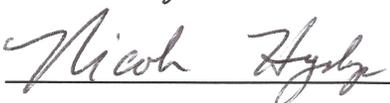
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## Table of Contents

1. PURPOSE AND APPLICABILITY .....	5
2. SUMMARY OF THE METHOD.....	5
3. DEFINITIONS .....	5
4. HEALTH AND SAFETY WARNINGS.....	6
5. CAUTIONS .....	6
6. INTERFERENCES .....	6
7. PERSONNEL QUALIFICATIONS, DUTIES, AND TRAINING.....	6
8. EQUIPMENT AND SUPPLIES .....	6
9. PROCEDURAL STEPS .....	6
9.1. Receiving of Samples.....	7
9.2. Inventorying .....	8
9.3. CSN Data Management Site .....	11
9.4. XRF Queue Generation.....	14
9.5. XRF Inventory.....	14
9.6. Laboratory Blanks .....	15
9.7. Carbon filters.....	15
9.8. Storage.....	15
9.9. Cooler Return .....	16
9.10. XRF Analysis Completeness .....	16
10. QUALITY ASSURANCE AND QUALITY CONTROL.....	16
11. REFERENCES .....	16

## List of Figures

Figure 1. The flowchart of sample receiving to archiving.....	7
Figure 2. Example of chain of custody form. ....	8
Figure 3. UC Davis Chain of Custody Form. ....	10
Figure 4. Integrity check table. ....	10
Figure 5. CSN Data Management Site.....	11
Figure 6. Filter results. ....	12
Figure 7. Filter details. ....	13
Figure 8. Batch list.....	13

Figure 9. Lab Blanks..... 13  
Figure 10. Batch details. .... 14  
Figure 11. COC with XRF assigned Instrument Name, Tray and Position number..... 15

## 1. PURPOSE AND APPLICABILITY

The subject of this technical instruction (TI) is receiving and inventorying of Teflon samples collected for the 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

The subject of this technical instruction (TI) is receiving and inventorying of Teflon samples collected for the 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.

## 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 analyzed by XRF 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:** WOOD PLC assigns a batch number to each shipment of filters, eg A0000001. Other names include Batch ID, and ContractorBatchNumber.

**Filter Analysis ID:** WOOD PLC assigns a barcode to each sample format F#####, e.g. F000002. Other names include Barcode ID, and ContractorFilterAnalysisId.

**Teflon filter ID#:** Manufacturer serial number stamped on the outer membrane of a filter, eg T5656360. Also known as manufacturer ID or manufacturer code.

**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, e.g. 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 receive prior approval from the Lab Manager. The operator shall have access to Jungerman Hall rooms 116 and 120A where the XRF instruments and refrigerators are located.

**Wood:** short for WOOD PLC, is the EPA subcontractor for sampling handling including deployment of filters, sample processing, and electronic record delivery and shipping samples to UC Davis.

**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 receive and inventory CSN samples.

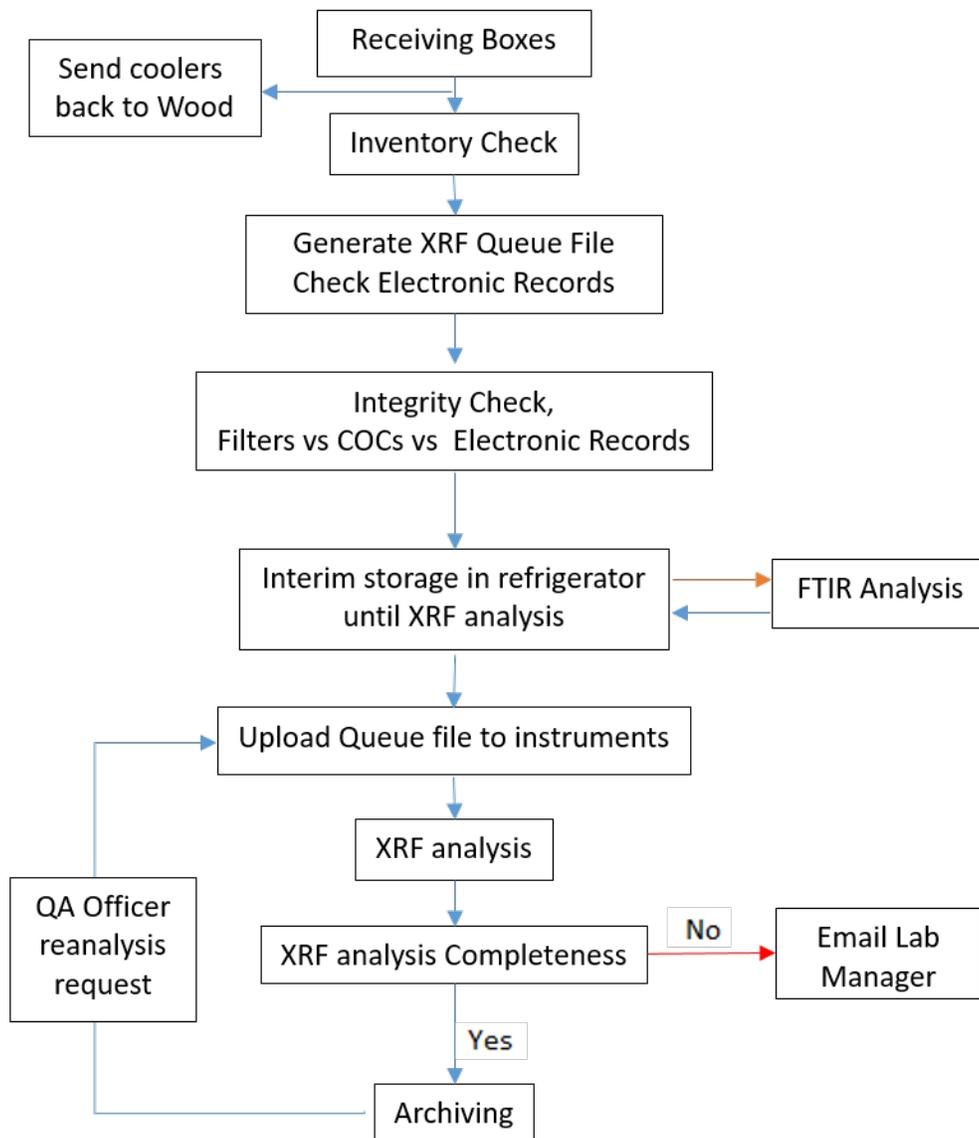
**8. EQUIPMENT AND SUPPLIES**

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 Wood to UC Davis with accompanied COC forms (Figure 2). Upon receipt, the operator will sign, and write down the date and time on 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 116) 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	Filter Analysis ID	Filter Type	Analysis Requested	Invalid?
	F000358	Teflon	XRF	<input type="checkbox"/>
	F000361	Teflon	XRF	<input type="checkbox"/>
	F000364	Teflon	XRF	<input type="checkbox"/>
	F000367	Teflon	XRF	<input type="checkbox"/>
	F000370	Teflon	XRF	<input type="checkbox"/>
	F000373	Teflon	XRF	<input type="checkbox"/>
	F000376	Teflon	XRF	<input type="checkbox"/>
	F000379	Teflon	XRF	<input checked="" type="checkbox"/> Invalid sample
	F000382	Teflon	XRF	<input type="checkbox"/>
	F000385	Teflon	XRF	<input type="checkbox"/>
	F000388	Teflon	XRF	<input type="checkbox"/>
	F000391	Teflon	XRF	<input checked="" type="checkbox"/>
	F000394	Teflon	XRF	<input type="checkbox"/>

Teflon Filter ID

Page 40 of 90

## 9.2. Inventorying

The purpose of inventorying is to perform an integrity check to verify the filter count is equal to the number of samples listed on the COCs and the number of electronic records. In addition, the operator verifies the BarcodeID, and manufacturer number prior to loading samples to the XRF instruments. After completing inventory, the operator sends

an email to the laboratory manager and QA officer with results of integrity check, including any discrepancies.

The samples are organized and shipped by Wood, where each shipment is 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. The boxes and each Petri tray are labeled with sampling date and set numbers. The samples are labelled with a unique barcode sticker, which is also the Filter Analysis ID (eg F000002) on the Petri slide.

Using the COC as a guide, check the 1<sup>st</sup>, 25<sup>th</sup>, 26<sup>th</sup> and 50<sup>th</sup> sample of each Petri tray. This ensures the 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 50<sup>th</sup> 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.

For samples received without COC documentation. In this situation, leave the sample in the tray. Draw an \* between the two records where the filter is located. On the bottom of the COC draw an \* and write include the Lab Analysis ID and, the Manufacturer number, and write the comment, "Sample missing from COC, refer to appendix for further sample information." Initial and date the comment. Open UCD COC, U:\IMPROVE\_Lab\XRF\_Epsilon5\CSN\Forms\UCD COC.xlsx and enter the requested information in the worksheet "Enter Data." The UC Davis Laboratory Chain of Custody Form will then be generated, see Figure 3. Print the form and place behind all the COCs for the specific batch.

Figure 3. UC Davis Chain of Custody Form.

**UC Davis Laboratory Chain of Custody Form**  
 Form to be used for samples received from Wood without a Chain of Custody Form

Received Name \_\_\_\_\_ Date/Time \_\_\_\_\_

Analysis Request ID \_\_\_\_\_



A0000036

Barcode/ Filter Analysis ID	Filter Type/ Manufacturer ID	Analysis Requested/ Intended Sample Date	Invalid? Set #
Filter Analysis ID  F080769	Teflon  220462458	XRF  10/4/2017	7Q

Report Integrity check information (Figure 4) and discrepancies to the Laboratory Manager and QA officer via email. The Filter Count is the number of samples received within a Batch. The COC refers to the number of samples included in the COC. The Electronic Records refers to the number of records in the database for the specific Batch. Note different terminology is used in the database. To view the number of electronic records login to CSN Data Management Site and view Batch Details. In Batch Details, locate Teflon Count. The Teflon Count is the number of electronic records for the Batch. Record the number of records in Figure 4.

Figure 4. Integrity check table.

Filter Count	COC	Electronic Records
# of samples received	# of samples listed	# of records in the file

To receive boxes, go to the CSN Data Management site (Figure 5), 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 5. CSN Data Management Site.

The screenshot shows 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 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 interphase to the electronic data associated with the CSN network for all the sample types (Quartz, Nylon, and Teflon). The electronic files are provided by Wood in a Microsoft Excel format. The electronic data is ingested into the CSN database by the UC Davis QA officer. The URL for the CSN Data Management Site (CSN webapp) is [csn.crocker.ucdavis.edu](http://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 6) is helpful when looking to select specific records for a given batch.

Figure 6. Filter results.

The screenshot shows a 'Filter Results' dialog box with the following fields and values:

- Filter Type: Teflon
- Batch: All
- Site: All
- IntendedUseDate: Start 03/09/2016, End (empty)
- Filter Purpose: All
- Invalid: Not Set
- Null Code: All
- Qualifier Code: All
- Comments: (empty text box)
- SampleEventId: (empty text box)
- Set: (empty text box)
- ManufacturerNumber: (empty text box)
- Lot: (empty text box)
- Max Results: 100

At the bottom of the dialog are two buttons: 'Filter' and 'Close'.

2. The *Filter Details* submenu (Figure 7) 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 7. Filter details.

Filter Barcode ID:  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](#)  
 FilterType 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 8) 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 8. Batch list.

Batches							
ContractorBatchNumber	BoxReceivedDate	BoxSampleCount	BoxFirstSampleDate	BoxLastSampleDate	BoxReceivedBy	Comments	
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	
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 9) view and generate the electronic records for the laboratory blanks.

Figure 9. Lab Blanks.

Lab Blanks <a href="#">Add Lab Blank</a>													
Batch	Sampler	FilterPurpose	AqsNullCode	FilterType	Invalid	IntendedUseDate	SampleVolume	AnalysisType	ContractorFilterAnalysisId	ContractorSampleEventId	ContractorSetNumber	ManufacturerNumber	LotNumber
	LD			Teflon	False			XRF	T6571454			T6571454	MTLCY2015

- The Batch details submenu (Figure 10) provides a view of the details for the batch including Teflon count, invalid count, list of samples without barcodes, Box received, and XRF queue file generation.

Figure 10. Batch details.

**Batch Details**

Receive Box   Generate XRF Queue   Back to List   Inventory information from COC and integrity check. Enter during Box Receiving

<b>ContractorBatchNumber</b>	A0000040
<b>BoxReceivedDate</b>	4/4/2018 9:45:00 AM
<b>BoxSampleCount</b>	1252
<b>First IntendedUseDate</b>	2/1/2018 12:00:00 AM
<b>Last IntendedUseDate</b>	2/28/2018 12:00:00 AM
<b>BoxReceivedBy</b>	marigaby

Comments:  
...

Imports (9)

Type	Date	Records Added / Updated
Filter	4/4/2018	3758 / 0
Flags	4/4/2018	533 / 0
NullCodes	4/4/2018	0 / 129
Filter	4/5/2018	0 / 2
Filter	4/12/2018	0 / 2
Mass	4/13/2018	13 / 0
Filter	4/13/2018	0 / 2
NullCodes	4/13/2018	0 / 1
Filter	4/16/2018	0 / 2

<b>First SampleStartDate</b>	2/1/2018 12:00:00 AM
<b>Last SampleStartDate</b>	2/28/2018 12:00:00 AM
<b>Filter Count</b>	3758 (Blanks: 430)
<b>Invalid Count</b>	126 (3 %)
<b>Teflon Count</b>	1252 (Blanks: 143)
<b>Invalid Teflon Count</b>	37 (2 %)

Data from electronic records

Sets (18)   IntendedUseDates (10)   Filters missing Barcodes (0)

#### 9.4. XRF Queue Generation

XRF queue files include the 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. The queue file includes all sample regardless of status and may include lab blanks. For additional information regarding generation and uploading queue file to Epsilon 5 instruments, refer to UCD CSN TI #302C: Sample Changes for 8-Position Trays.

#### 9.5. XRF Inventory

Samples are inventoried at 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 11).

Figure 11. 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 M63 NW 119 0957  
 Intended Sample Date: 2/3/2016  
 Set #: 3

Batch number: Analysis Request ID: A000007

Barcode/Filter Analysis ID	Filter Type	Analysis Requested	Invalid?
Barcode ID: F007697	Teflon T6646344	XRF	None (E)
Barcode ID: F007690	Teflon T6646345	XRF	
Barcode ID: F007693	Teflon T6645988	XRF	
Barcode ID: F007696	Teflon T6646346	XRF	
Barcode ID: F007699	Teflon T6646347	XRF	
Barcode ID: F007702	Teflon T6646230	XRF	
Barcode ID: F007705	Teflon T6646238	XRF	None (E)
Barcode ID: F007708	Teflon T6646348	XRF	
Barcode ID: F007711	Teflon T6645989	XRF	None (E)
Barcode ID: F007714	Teflon T6646231	XRF	
Barcode ID: F007717	Teflon T6646349	XRF	

Teflon Filter ID

Tray Number: T5  
 First sample: Instrument name, Tray, Position

Last sample: Instrument name, Tray, Position

Page 1 of 90

**9.6. Laboratory Blanks**

Wood 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 a subset (typically 16 laboratory blanks) to analyzed by XRF. Refer to *UCD CSN TI #302C: Sample Changes for 8-Position Trays* for further details.

**9.7. Carbon filters**

The Carbon filters are received from DRI and are in the same order as the COC. Follow the Inventorying procedures above to inventory the Carbon Batch. Notify supervisor of any issues. Sample can be stored as per section 3.7 below and archived as per UCD CSN SOP #901 Long-Term Archiving of Filters.

**9.8. Storage**

CSN network samples are stored between 0 and 4 °C. Two refrigerators are available for CSN sample storage, located in Jungerman Hall room 116. Archive samples for long-term storage after XRF analysis. Refer to *UCD CSN SOP #901: Long-Term Archiving of Filters*.

### **9.9. Cooler Return**

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

### **9.10. 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. Check XRF data and verify each samples has one valid XRF result. Any discrepancies will be resolved prior to data is delivery.

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 QUALTY CONTROL**

Not Applicable.

## **11. REFERENCES**

Not Applicable.