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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Date Modified	Initials	Section/s Modified	Brief Description of Modifications
11/26/2018	MGN	all	Small editing changes; added pictures
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TABLE OF CONTENTS

LIST OF FIGURES

1. PURPOSE AND APPLICABILITY

The subject of this technical information (TI) document is receiving and inventorying of samples collected for the Chemical Speciation Network (CSN). The scope is to ensure good laboratory practice of receiving samples by checking condition and amounts with the chain-of-custody forms, as well as inventorying and preparing samples for X-ray Fluorescence (XRF) analysis.

2. SUMMARY OF THE METHOD

The operator will receive shipments of CSN samples and perform integrity checks. Descriptive information will be entered for each batch of samples into the appropriate database using web application tools. Sample analysis queues will be generated and reviewed prior to analyses. Once samples have been analyzed, they will be placed in cold storage.

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 room 116 where the XRF instruments and refrigerators are located.

Wood: short for WOOD PLC, is the Environmental Protection Agency (EPA) subcontractor for sampling handling including deployment of filters, sample processing,

and electronic record delivery and shipping samples to University of California, Davis (UCD).

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.
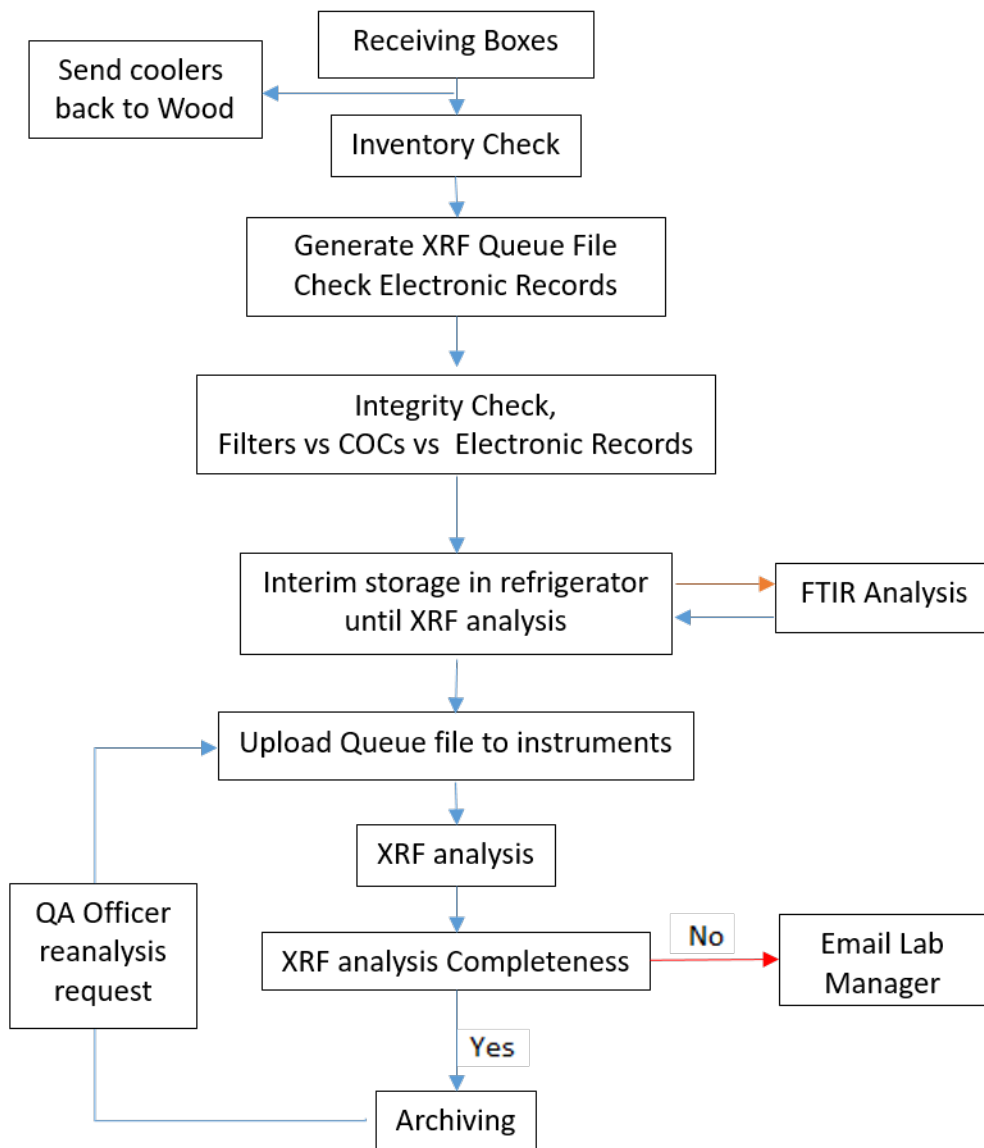
8.   EQUIPMENT AND SUPPLIES

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 a designated location (Jungerman Hall, room 116) and inventories the filters.

Figure 2. Example of chain of custody form.

9.2. Inventorying

The purpose of inventorying is to perform 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 into the XRF instruments. After completing inventory, the operator sends an email to the

laboratory manager and QA officer with results of this 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 labelled with the sampling date and set numbers. The samples are also labelled with a unique barcode sticker, which relates to the Filter Analysis ID (e.g., F000002) on the Petri slide.

Using the COC as a guide, check the 1st, 25th, 26th, and 50th 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 50th sample of each tray. Next to the dash, write down the tray number format T# (e.g.,T1) with a red pen. In addition, write the batch number and tray number on every Petri tray; format B#T# (e.g., B7T1). If less than 50 samples are received in a Petri tray or Ziploc bag, continue with the sample procedure by checking the first and last filters in the tray or bag. Note the number of filters received and the number of filter records on the COC.

For samples received without COC documentation, leave the sample in the tray. Draw an asterisk, "*", between the two records where the filter is located. On the bottom of the COC draw an asterisk and record the Lab Analysis ID, the Manufacturer number, and the comment "Sample missing from COC, refer to appendix for further sample information." Initial and date the comment. Open the UCD COC file, located at 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, shown in Figure 3. Print the form and place it behind all the COCs for the specific batch.

Figure 3. UC Davis Chain of Custody Form.

Report the integrity check information (Figure 4) and discrepancies to the Laboratory Manager and QA officer via email. The "Filter Count" field is the number of samples received within a Batch. The "COC" field refers to the number of samples included in the COC forms. The "Electronic Records" field refers to the number of records in the database for the specific Batch. Note that different terminology is used in the database. To view the number of electronic records, log into the CSN Data Management site web application and view Batch Details. In Batch Details, locate the 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.

9.3. CSN Data Management Site

CSN Data Management Site is the user interface to the electronic data associated with CSN for all 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 *https://csn.aqrc.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. Currently, the lab group only uses the Home menu. The Home menu has seven submenus:

1. The *Filters* submenu (Figure 6) is helpful when reviewing and selecting specific records for a given batch.

Figure 6. Filter results.

2. The *Filter Details* submenu (Figure 7) is helpful when searching 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.

3. The *Batches* submenu (Figure 8) includes a list of all shipments received and the corresponding electronic records. Batch Details provides the details of the Batch including Receiving Box and the "Generate XRF Queue" function.

Figure 8. Batch list.

4. The *Lab Blanks* submenu (Figure 9) can view and generate the electronic records for the laboratory blanks.

Figure 9. Lab Blanks.

5. 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.

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

9.5.   XRF Inventory

Samples are inventoried at XRF stations 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.

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 T#######. Generate a barcode sticker for each filter using the Teflon filter ID. Prepare a subset (typically16 laboratory blanks) to be 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 Wood and are in the same order as the COC. Follow the Inventorying procedures above to inventory the Carbon Batch. Notify the supervisor of any issues.

Samples can be stored as per section 9.8 and archived as per *UCD CSN SOP #901 Long-Term Archiving of Filters*.

9.8. Storage

CSN samples are stored between 0 and 4 ºC. 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 sample has a valid XRF result. Any discrepancies will be resolved prior to data delivery.

To check Analysis completeness, go to the website *http://analysis.crocker.ucdavis.edu: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 and verify the samples were received. Notify the Laboratory Manager of any discrepancies.

10. QUALITY ASSURANCE AND QUALTY CONTROL

Not Applicable.

11. REFERENCES

Not Applicable.