UCD CSN Standard Operating Procedure #904

Receiving and Inventorying of CSN Samples

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

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DOCUMENT HISTORY

Revision	Release Date	Initials	Section/s Modified	Brief Description of Modifications
1.0	10/31/2022	LMK	All	New document.

TABLE OF CONTENTS

LIST OF FIGURES

1. PURPOSE AND APPLICABILITY

This standard operating procedure describes the process for 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 analysis.

This document gives an outline of how samples are received and an overview of the CSN data management site. A detailed explanation of each of these steps is required and is provided in the Technical Information (TI) documents that are referenced within this SOP.

2. SUMMARY OF THE METHOD

Shipments of CSN samples are received at the UC Davis Air Quality Research Center and integrity checks are performed. Information for each batch of samples is entered into the appropriate database using web application tools. Sample analysis files will be generated and reviewed prior to analyses. Samples are stored in cold storage, unless undergoing analysis.

3. DEFINITIONS

- **Inventory:** The list includes the number of samples received, type of filter (sample, lab blank, field blank etc.) as well as analysis order.
- **Chain-of-custody (COC) form:** The form received with the samples including the itemized list, amount, sample type, ship date and name, as well as a field for receive date and name.
- **Analysis Request ID:** WOOD PLC assigns a batch number to each shipment of filters, e.g. 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, eg220812072. 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.aqrc.ucdavis.edu*).

- **Laboratory Technician:** Authorized personnel responsible for processing of CSN samples; must receive prior approval from the Lab Manager. The lab tech shall have access to where the Carbon Lab, XRF Lab 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

9.1. Inbound Sample Shipment and Receiving

CSN samples are shipped in coolers from Wood to UC Davis with accompanied COC forms (Figure 2) per filter type. Teflon and quartz filters are typically shipped in separate coolers. Upon receipt, the laboratory technician will sign, and write down the date and time on the hardcopy of the COC. The COC includes the following information for each sample: Filter type, Filter Analysis ID, intended sample date, analysis requested, Teflon filter ID# (for Teflon filters only), set #, and status flag.

The laboratory technician unpacks the boxes in the lab and inventories the filters. Filter inventory is conducted separately for each filter type. Shipments are received in the CSN web app following the completion of the inventory process, refer to UCD CSN Technical Instruction ### Receiving and Inventorying of CSN Teflon Samples and UCD CSN Technical Instruction ### Receiving and Inventorying of CSN Quartz Samples.

Figure 1. Example of chain of custody form for Teflon filters.

9.2. Shipment Inventory and Integrity Check

The purpose of inventorying is to verify if the physical filter count is equal to the number of samples listed on the COCs and the number of electronic records received from Wood. After completing inventory, the laboratory technician 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 are numbered and each Petri tray is labeled with the sampling date and set numbers. The samples are also labeled with a unique barcode sticker, which is also the Filter Analysis ID (e.g., F000002) on the Petri slide.

The COC is used to 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, filter information for each sample is verified with either the COC or an inventory list. Notations are made on the COC indicating the tray number, first sample in a tray and the 25th sample in a tray. Barcode labels are generated and placed on each tray with the batch and tray numbers.

For samples received without COC documentation, the sample is left in the tray and position it was found. Notations are added to the COC with the filter information and a supplemental UC Davis COC is generated using the batch and sample information. This manually generated COC is printed and placed with the rest of the COC for the batch. An email is also sent to the QA officer regarding the sample without COC documentation.

Report the integrity check information and discrepancies for both filter types to the Laboratory Manager and QA officer via email. The integrity check includes, the physical number of samples received, the number of samples listed on the COC and the number of electronic records. The number of electronic records is listed on the Batch Details page of the CSN web app. Following the integrity checks the batch of filters is received through the CSN web app Batch details screen. For step by step procedure on performing physical inventory and integrity checks refer to, UCD CSN Technical Instruction ### Receiving and Inventorying of CSN Teflon Samples and UCD CSN Technical Instruction ### Receiving and Inventorying of CSN Quartz Samples.

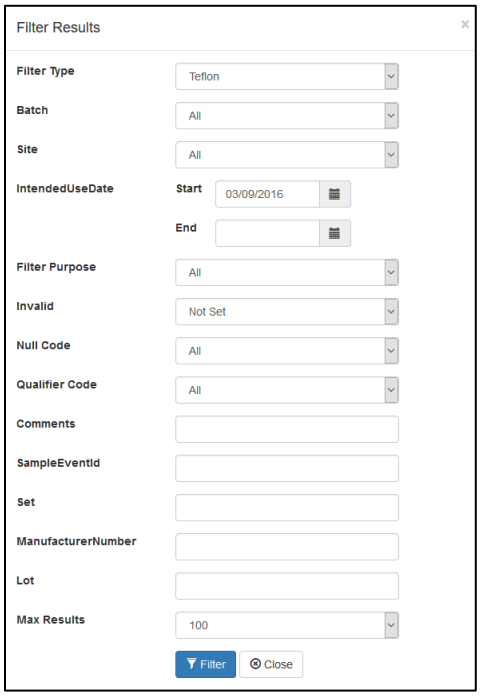
9.3. CSN Data Management Site

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 PDF. The electronic data is ingested into the CSN database by the UC Davis QA officer. The URL for the CSN Data Management Site (CSN web app) is *https://csn.aqrc.ucdavis.edu/*. A valid UC Davis ID and password are required. For access to the CSN web app, check with developers and/or AQRC IT.

The CSN web app has four main menus: Home, Analyses, Import and Admin. The Home menu has seven submenus:

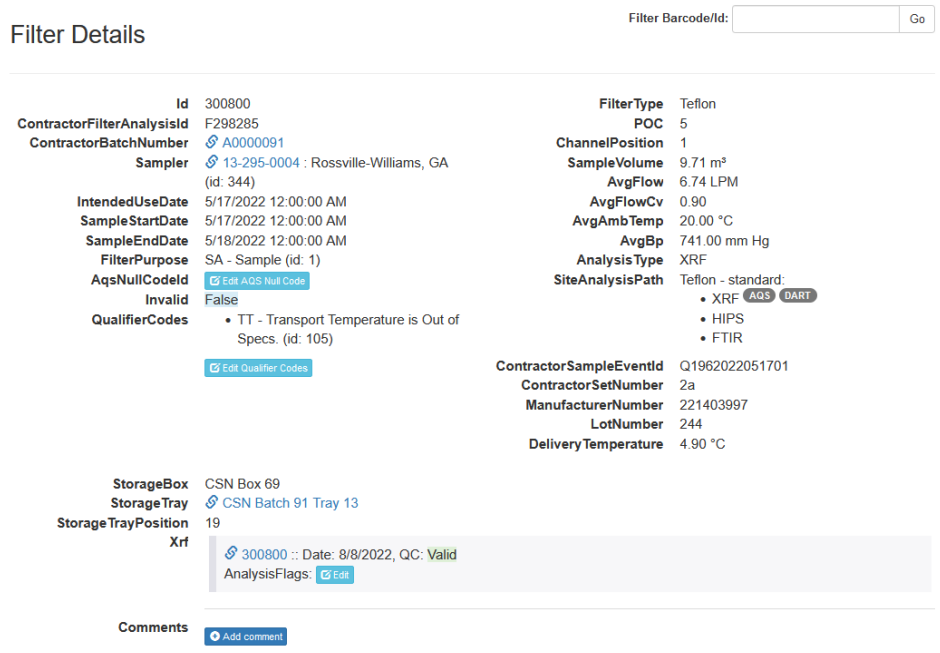
1. The *Filters* submenu (Figure 2) is helpful when reviewing and selecting specific records for a given batch. This screen allows searching for filters by Filter Barcode or Filter ID.

Figure 2. Filter results.



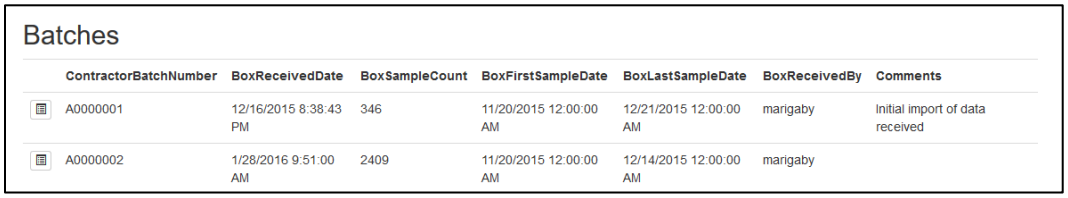
2. The *Filter Details* screen (Figure 3) is accessed via the Filters submenu and is helpful when searching for detailed information for a given filter. Qualifier codes and comments are added in this view. This screen also shows the different analyses conducted for each filter. It is possible to search records by Filter Barcode or Filter ID.

Figure 3. Filter details.



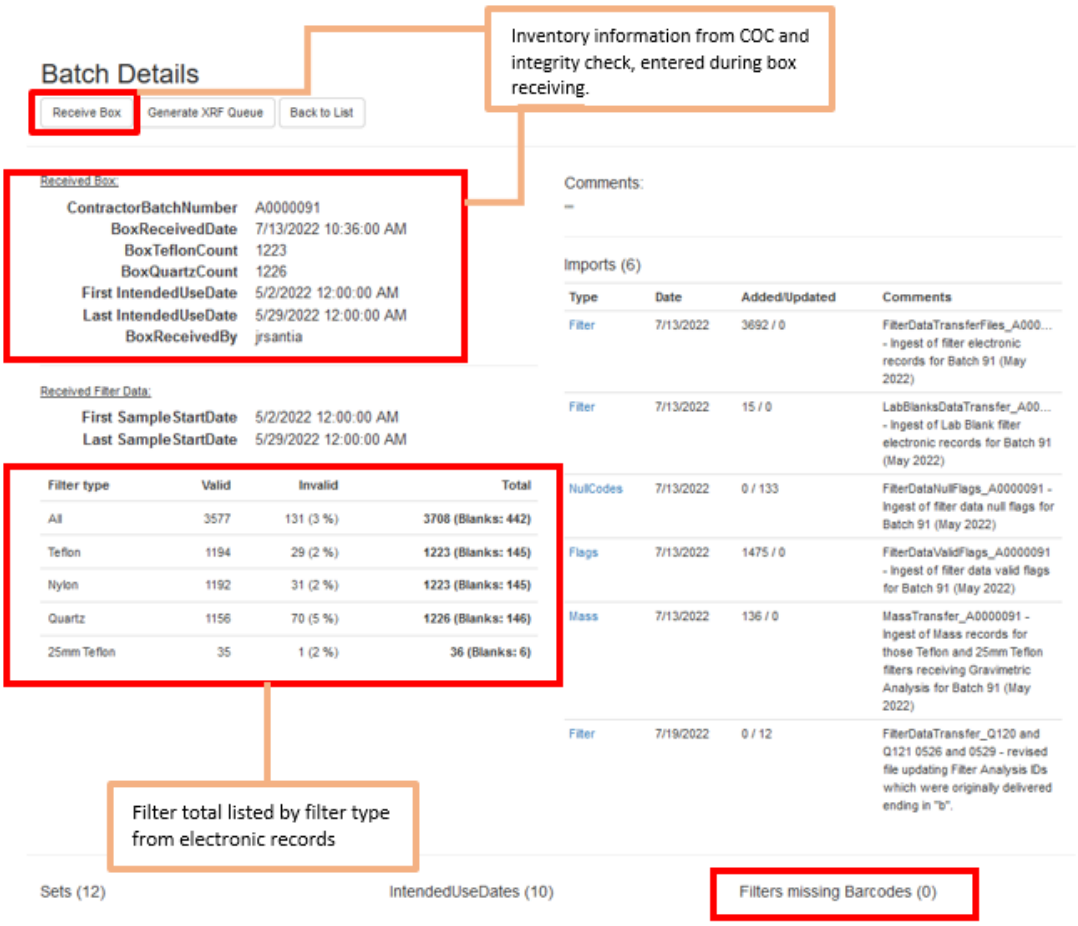
3. The *Batches* submenu (Figure 4) includes a list of all shipments received and the corresponding electronic records.

Figure 4. Batch list.



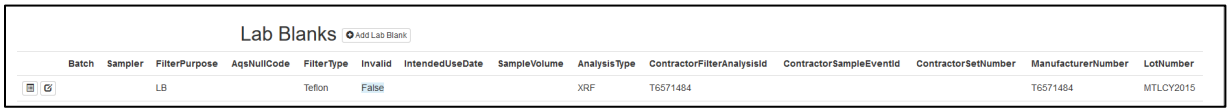
4. The Batch Details screen (Figure 5) is accessed via the Batches submenu and provides a view of the details for the batch including Teflon count, Quartz count, Nylon count, invalid count, list of samples without barcodes, Box received, and XRF queue file generation. Filter shipments are received through the Batch Details Screen.

Figure 5. Batch details.



5. The *Lab Blanks* submenu (Figure 6) can view and generate the electronic records for the laboratory blanks.

Figure 6. Lab Blanks.



6. The Sites submenu has a list of all CSN sites.
7. The Inventory submenu is used for generating electronic trays for batches of Teflon filters and FTIR text files. Filters are also archived from this screen, *UCD CSN SOP #901 Long-Term Archiving of Filters.*
8. The Archive submenu is a list of archived samples and lists the physical location the samples are stored.
9. The Special Studies submenu has a list of current special studies being conducted.

9.4. Generate Inventory Trays

Electronic trays must be generated via the CSN web app upon receiving a shipment of filters. The physical copy of the COC will be utilized to generate trays. Electronic trays are built separately for each filter type. Refer to UCD CSN Technical Instruction ### Receiving and Inventorying of CSN Teflon Samples and UCD CSN Technical Instruction ### Receiving and Inventorying of CSN Quartz Samples. For more information on generating inventory trays.

9.5. Delivering Teflon Filters to FTIR

Teflon filters are delivered to FTIR following inventory (before XRF analysis). Prior to delivery to FTIR electronic inventory trays are created to generate the necessary text files. Refer to UCD CSN Technical Instruction ### Receiving and Inventorying of CSN Teflon Samples # for step-by-step procedure on generating Teflon inventory trays.

9.6. Generate Analysis Specific Files

Analysis files are generated prior to analysis of Teflon and quartz filters. Files generated are unique to each lab and filter type. All samples received in a batch are included in the analysis files regardless of filter status, files may also include lab blanks.

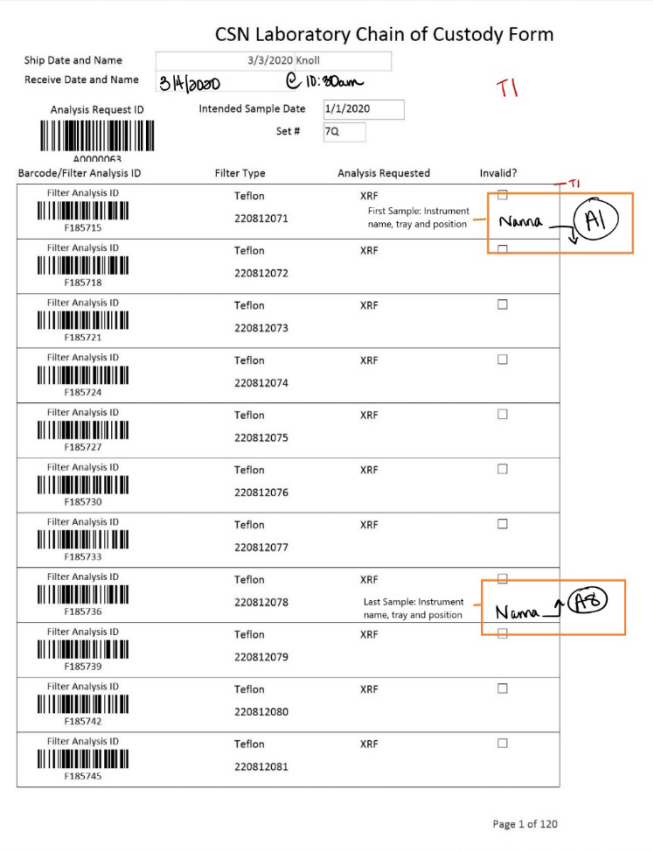
XRF analysis utilizes queue files which include the BarcodeId, SampleId, and Application information. The XRF sample changer software uses the data within the queue file to link the Filter Analysis Barcode with the Sample identity and the application. For additional information regarding generation and uploading queue files to the Epsilon 5 instruments, refer to UCD CSN Technical Instruction #302B Receiving and Inventorying of CSN Teflon Samples and *UCD CSN TI #302C: Sample Changes for 8-Position Trays*.

Carbon analysis utilizes a generated inventory list referred to as a Tray List for analyzing routine samples. Tray Lists are generated per batch and samples are listed in the same order as the COC. Tray Lists are generated thru the CSN web app following creation of electronic trays. Refer to UCD CSN Technical Instruction #402A Receiving and Inventorying of CSN Quartz Samples for more details on generating carbon inventory lists.

9.7. Sample Verification

Sample information is verified at XRF and Carbon prior to analyzing each sample. Filters are scanned directly into the instrument software in the XRF and Carbon labs. The laboratory technician verifies each sample by comparing the Barcode ID with either the printed COC or printed inventory lists (printed inventory lists are generated based on sample order of the COC). Notations are made on either the COC or printed inventory lists at the time the samples are loaded. Refer to figure 7 for notations made during XRF loading, the technician records the instrument name, tray and position the samples were loaded to.

Figure 7. COC with XRF assigned Instrument Name, Tray and Position number.



9.8. Laboratory Blanks

Wood provides 5 lab blanks with every CSN batch, these filters are analyzed with the routine samples for each batch. Lab blanks have a Barcode ID and for Teflon filters a manufacturer number and this information is listed on the COC.

9.9. Storage

CSN samples are stored below 4 °C. Refrigerators are available for CSN sample storage in the laboratory. Archive samples for long-term storage after analysis. Refer to *UCD CSN SOP #901: Long-Term Archiving of Filters.*

9.10. Cooler Return

The laboratory technician 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.

9.11. Analysis Completeness

When analysis of a batch is completed verify completeness by comparing the number of results generated to the Teflon or quartz count received. Verify each sample has a valid

analysis result per filter type, also check for duplicates. Investigate any filters missing a valid analysis as well as any duplicate results. If there are any discrepancies that cannot be resolved notify the Lab manager. Any outstanding filter comments and pre-analysis flags (quartz filters only) should also be applied during the completeness process. Once all completeness checks are done an email is sent to the laboratory manager and QA officer. Refer to UCD CSN Technical Instruction ### Receiving and Inventorying of CSN Teflon Samples and UCD CSN Technical Instruction ### Receiving and Inventorying of CSN Quartz Samples, for step by step analysis completeness procedure.

10. QUALITY ASSURANCE AND QUALITY CONTROL

Not applicable.

11. REFERENCES

Not applicable.