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UCD CSN Technical Information #904B

Receiving and Inventorying of CSN Teflon Samples

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

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Version 1.2

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DOCUMENT HISTORY

Revision	Release Date	Initials	Section/s Modified	Brief Description of Modifications
1.0	10/31/2022	LMK	All	Document created. Previously based on TI 302B. Updated images and wording. Added procedural steps for physical inventory and editing electronic trays. Added information on processing lab blanks, performing integrity checks and generating XRF queue files. Added procedural steps for batch completeness.
1.1	06/30/2023	LMK	3, 9	Removed references to Wood, added RTI as sample handling lab. Removed section referencing preparing Teflon filters for delivery to FTIR. Added steps for printing tray lists. Updated example of Chain of Custody form. Added definitions for Batch ID and Batch number. Updated flowchart. Added recording shipment temperature and use of receiving log.
1.2	09/09/2025	SRS	2, 3, 7, 9, 12	Clarified duties and appropriate lab personnel, updated file locations, moved legacy Panalytical E5-specific steps to newly created Appendix: Section 12.

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1. PURPOSE AND APPLICABILITY

The purpose of this technical information (TI) document is receiving and inventorying of Teflon samples collected for the Chemical Speciation Network (CSN).

2. SUMMARY OF THE METHOD

A Laboratory Technician in AQRC will receive shipments of CSN samples and perform integrity checks. Information will be entered for each batch of samples into the CSN Data Management Site (CSN web app). Samples are stored in cold storage, unless undergoing analysis. Following analysis of each batch a completeness check is performed.

3. DEFINITIONS

- **Analysis Request ID:** Research Triangle Institute assigns a batch ID to each shipment of filters.
- **Batch ID:** Alphanumeric identifier assigned by RTI to each shipment of filters.
- **Batch Number:** Numeric identifier assigned by AQRC to each Batch ID.
- **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.
- **CSN Data Management Site:** User interface web application for the CSN database (*csn.aqrc.ucdavis.edu*).
- **Filter Analysis ID**: Research Triangle Institute assigns a barcode to each sample, also referred to as the Barcode ID.
- **Inventory:** The list includes the number of samples received, type of filter (sample, lab blank, field blank etc.) as well as analysis order.
- **Research Triangle Institute (RTI)**: Subcontractor for sample handling including deployment of filters, sample processing, and electronic record delivery and shipping samples to University of California, Davis (UCD).
- **SampleId (Id):** The number assigned to the electronic record in CSN database.
- **Teflon filter ID#:** Manufacturer serial number stamped on the outer membrane of a filter, eg220812072. Also known as manufacturer ID or manufacturer code.
- **XRF Application:** The program contains the parameters for measuring a sample by XRF; specific to each instrument.

4. HEALTH AND SAFETY WARNINGS

Not applicable.

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5. CAUTIONS

Not applicable.

6. INTERFERENCES

Not applicable.

7. PERSONNEL QUALIFICATIONS, DUTIES, AND TRAINING

Only trained lab personnel designated by the Laboratory Manager or Supervisor may receive and inventory CSN samples, as well as access instrumentation and storage.

8. EQUIPMENT AND SUPPLIES

Not applicable.

9. PROCEDURAL STEPS

The flowchart of sample receiving and inventorying is depicted below in Figure 1.

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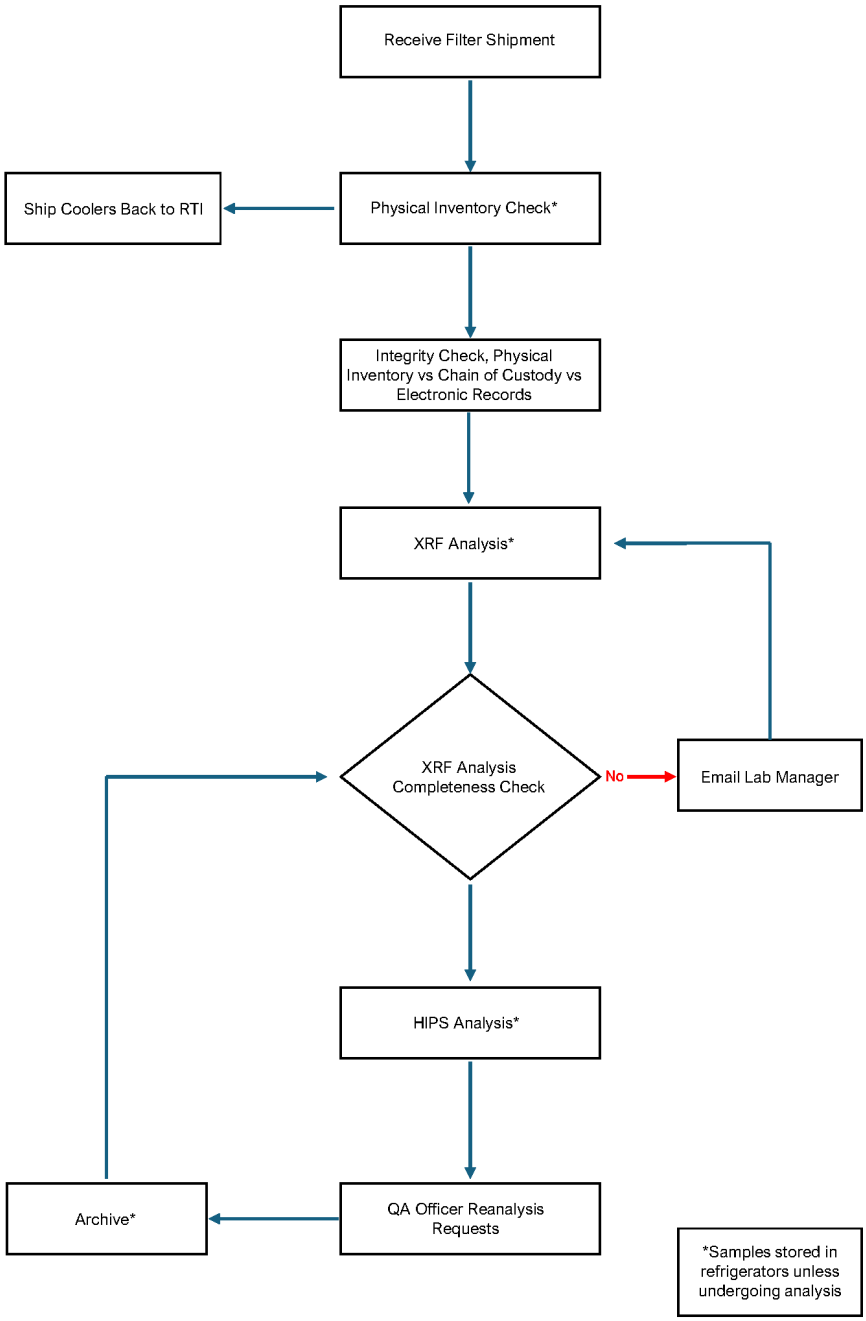
Figure 1. Flowchart of sample receiving to archiving.



9.1 Receiving of Inbound Sample Shipment

CSN samples are shipped in coolers from RTI to UC Davis with accompanied COC forms (Figure 2). Upon receipt, authorized lab personnel will sign, then write down the date and time on the COC. The COC includes the following information for each sample: Filter Analysis ID (Barcode ID), manufacturer number, and analysis requested.

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Figure 2. Example of chain of custody form.

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RTI PM 2.5 Laboratory Chain of Custody Form (LCOC)

UC Davis XRF Analysis Lab

Bar Code	Identification Number	Filter Type	Analysis Requested
Delivery Order: 001			
	A10157656 11923890	Teflon Filter	XRF
	A1016350R 12254830	Teflon Filter	XRF
	A1018153W 11787136	Teflon Filter	XRF

Total Aliquot Count: 3

9.2 Receiving the Samples

CSN samples are received using the CSN Data Management Site (CSN web app). The shipment can be received using the receiving date and time. The receiving page can be edited once all the physical and electronic checks are completed to add additional information.Navigate to the CSN web app, https://csn.aqrc.ucdavis.edu/ and login.

1. Click on the “Batches” tab from the submenu.
2. Click on the “View record details” Icon for the batch being received, opening the Batch Details screen, figure 3.

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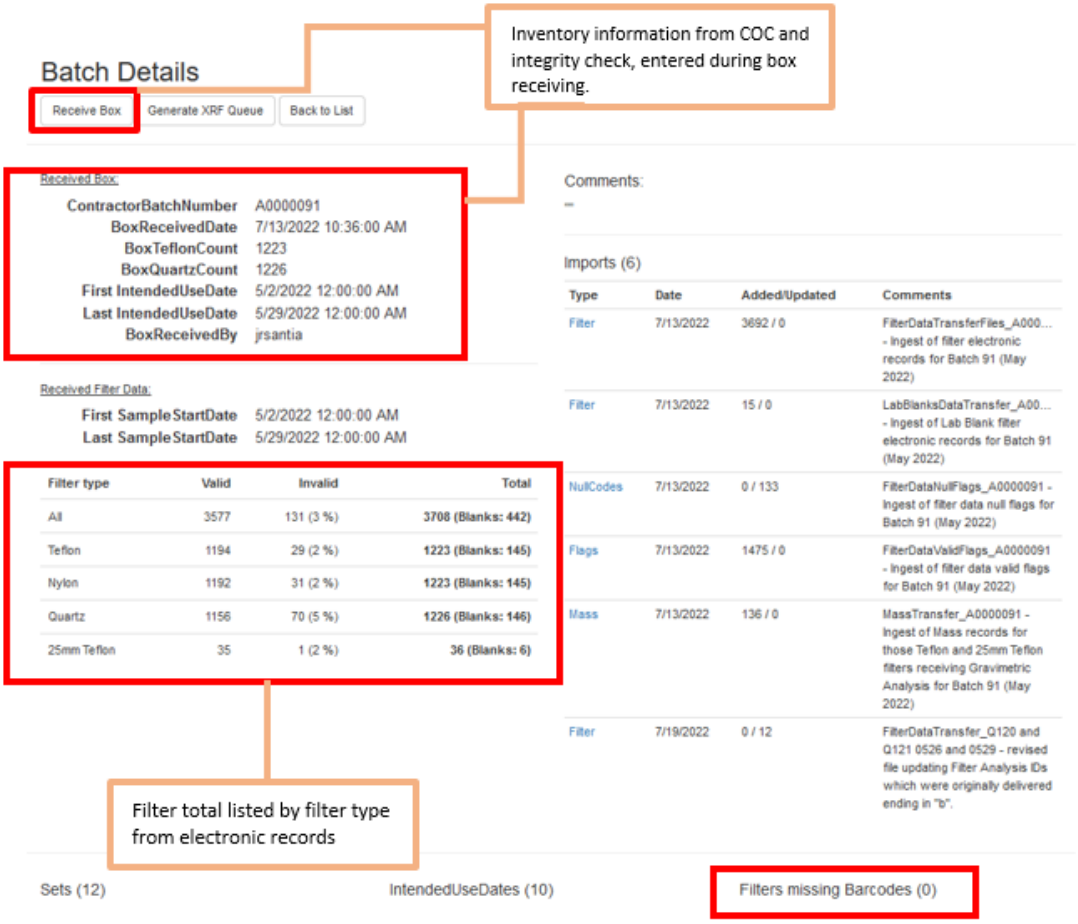
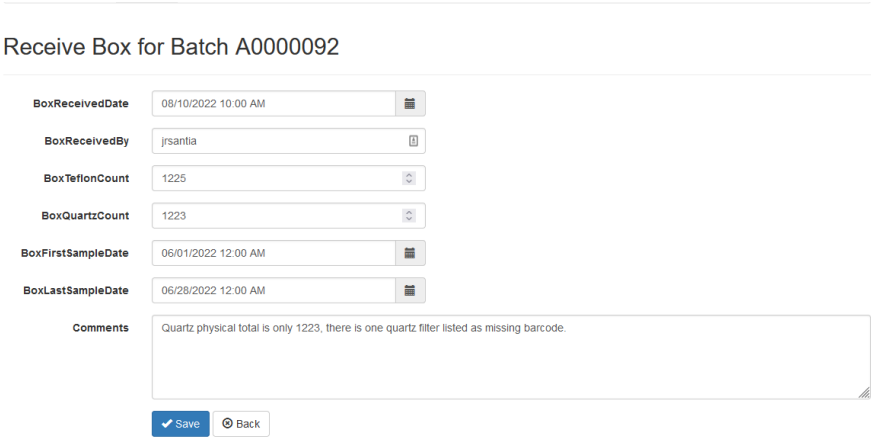
Figure 3. Batch Details Screen.



3. Click on Receive Box, figure 4.

Figure 4. Receive Box.



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4. The BoxReceivedDate will auto-populate; the time listed will need to be manually adjusted to the time recorded on the physical COC.
5. The BoxReceivedBy will auto-populate with your username.
6. For Teflon filters fill in the BoxTeflonCount field (Quartz count can be updated separately). If you do not have the BoxTeflonCount total, click **save**. Steps 7 and 8 can be completed once physical and electronic checks are complete.
7. The BoxFirstSampleDate and BoxLastSampleDate will need to be filled in on the batch details screen; this information is on the physical COC.
8. Add any additional comments needed in the comments box and click **save**.

9.3 Inventorying

The purpose of inventorying is to verify if the physical filter count, COC count, and electronic records agree. During the inventory process a subset of samples are verified with information on the hardcopy of the COC. In addition to these checks, the BarcodeID and manufacturer number for each sample is verified by laboratory staff when loading samples into the XRF instruments. Following the completion of inventory, a summary including any discrepancies is emailed to the laboratory manager and QA officer.

Prior to the shipment arriving, barcode labels need to be generated for the Petri trays and a receiving log needs to be printed. The barcode labels are in the following format Batch# Tray#, Batch# is the Batch number and Tray# is the tray number (Figure 5 is one possible version of CSN Teflon Tray Labels). The file for generating barcode labels is located here: U:\IMPROVE_Lab\CSN\Inventory\Teflon. Update the batch number listed in the file, refresh the barcodes and print. The receiving log can be printed from here, "U:\IMPROVE_Lab\CSN\Inventory\Teflon\Teflon_Receiving_Log.xlsx".

Figure 5. CSN Teflon Tray label.

The receiving log is used for recording information about the shipment. Any issues concerning the delivery of the shipment, the coolers, the sample condition, or temperature probes are recorded on this form. All requested fields should be filled in. If information for a requested field is not available, leave a comment stating why. The information from the receiving log is then used to aid in the electronic receipt of the shipment. Finally, the completed forms are archived in a binder. The receiving log can be printed from here, "U:\IMPROVE_Lab\CSN\Inventory\Teflon\Teflon_Receiving_Log.xlsx" (Figure 6 is one possible version of the Teflon Receiving Log).

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Figure 6. Teflon Receiving Log.

CSN Batch: _____

Receiving Date:	Number of Samples:
Receiving Time:	Number of Lab Blanks:
Initials:	

Cooler	Current Temp	Max Temp	Probe #	Notes pertaining to temperature probes:
Teflon 1-4				
Teflon 5-8				
Teflon 9-12				
Teflon 13				

Notes pertaining to physical inventory:

Shipment received in CSN Webapp by:
COC count:
Electronic count:
Do Physical/COC/Electronic counts agree? If counts do not agree list actions taken.
Information from form input into electronic file by:

Samples are organized in Petri trays by sampling month and each sampling month is assigned a Batch ID by RTI. Petri trays are prepared for shipping by placing them in sealed plastic bags and into cardboard boxes. Each box can hold two Petri trays and each Petri tray holds 50 Petri slides. Each Petri slide has a unique barcode sticker, which is also the Filter Analysis ID. Samples are placed in the Petri trays in the same order as the COC. The boxes of prepared filters are packed in coolers with ice packs and temperature probes and shipped overnight.

Coolers will arrive with either quartz or Teflon filters inside; occasionally a cooler will contain both filter types. Inside each cooler the boxes will contain a label indicating quartz or Teflon filters.Each cooler will arrive with a temperature probe showing the current temperature and the maximum temperature of the shipment while in transit. The

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current and maximum temperatures are recorded for each temperature probe on the Teflon Receiving Log. If the temperature probe has an identification number listed, record this information on the receiving log as well. If a probe does not have an identification number write NA for not applicable on the receiving log.

Notations are made on the physical COC during the inventory process using black and red pens. The tray number is written in red at the top of each page in the following format, T# (e.g., T1). If a page contains samples for two trays, write both tray numbers in the following format, T#/T# (e.g., T1/T2). Use a red pen to mark the COC with a small dash (-) before the first sample of each tray to designate the start of the tray. The tray number is also written in red pen next to this mark. Use a black pen to mark the COC with a small dash (-) after the 25th sample of each tray. If less than 50 samples are received in a Petri tray or plastic bag, continue with the same procedure by checking the first and last filters in the tray or bag.

1. Start by locating the cooler containing boxes labeled as Teflon. Open the cooler, locate the temperature probe and record the current and maximum temperatures listed and the temperature identification number. Also note if there is anything unusual about the contents of the cooler, melted icepacks, damp boxes, damaged plastic bags, etc. Remove the sealed plastic bag containing the COC, if the COC is not in this cooler check all the coolers until it is located.
2. Write the date, time and your name on the COC. This information is used when the shipment is received in the CSN web app.
3. Use a red pen to mark the top right corner of the first page of the COC with a T1; this indicates tray 1. A small red dash is also placed to the right side of the first filter listed on the COC and T1 is written here as well. This helps indicate where the tray starts on the COC.
4. Find the box marked 1 and remove the two Petri trays from inside. The Petri trays may not contain tray numbers to start.
5. Use the COC to check the Barcode ID and manufacturer number of the filter in position 1 of the two trays. After locating the Barcode ID and manufacturer number of the first filter listed on the COC, place the filter back into position. Find the printed label with Batch # Tray 1 on it and place it on the Petri tray. The label is placed on the tray with the filter barcodes facing away from you, this is to allow position 1 of the tray to be in the top left corner.
6. After verifying the filter in position 1 is correct, verify the filter in position 25 is correct. The COC does not list position numbers for the samples; each sample on the COC is counted starting with position 1 until 25 is reached. Remove the filter in position 25 from the Petri tray and verify the Barcode ID and manufacturer number match the COC. Use a black pen and place a small dash on the right side of the COC between positions 25 and 26.
7. Next verify the Barcode ID and manufacturer number for the filter in position 26.

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8. Count from position 26 on the COC to position 50. Verify the Barcode ID and manufacturer for position 50 on the COC match the filter in position 50 of the tray.
9. Set this tray aside and repeat steps 3-8 for the next tray.
10. Once both trays in a box have been checked, place the two trays back inside the plastic bag and seal the bag.
11. Place the sealed bag of filters in the designated refrigerator.
12. Repeat steps 3-11 for all remaining filters.
13. Count the number of Teflon filters physically received and write this information down.

Remember to keep the COC in order and to only open one box of filters at a time. If a discrepancy is found when verifying positions 1, 25, 26 or 50 start by recounting the COC. If the discrepancy is not resolved by recounting, then each filter in the tray is verified with the COC. If filters are found out of order per the COC, detailed notes are made on the receiving log and will be reported with the integrity check. Filters are left in the order received until the laboratory manager and QA officer have been notified of the discrepancy. The QA officer will communicate with the lab on how to proceed. Typically, filters are moved to the physical location matching the COC and filter comments are added to the CSN web app detailing the discrepancy.

For samples received without COC documentation, leave the sample in the tray and position it was found. Draw an asterisk (*) on the COC between the two records where the filter is located. On the bottom of the COC, draw an asterisk and write the Barcode ID 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\CSN\COC_Teflon and enter the requested information in the worksheet UCD COC. 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. Save a copy of the form in the COC Teflon folder with the Batch number as the name of the file. An email is sent to the QA officer with filter information, and they will add the filter to the database. The filter cannot be added to an electronic tray until it has been added to the database.

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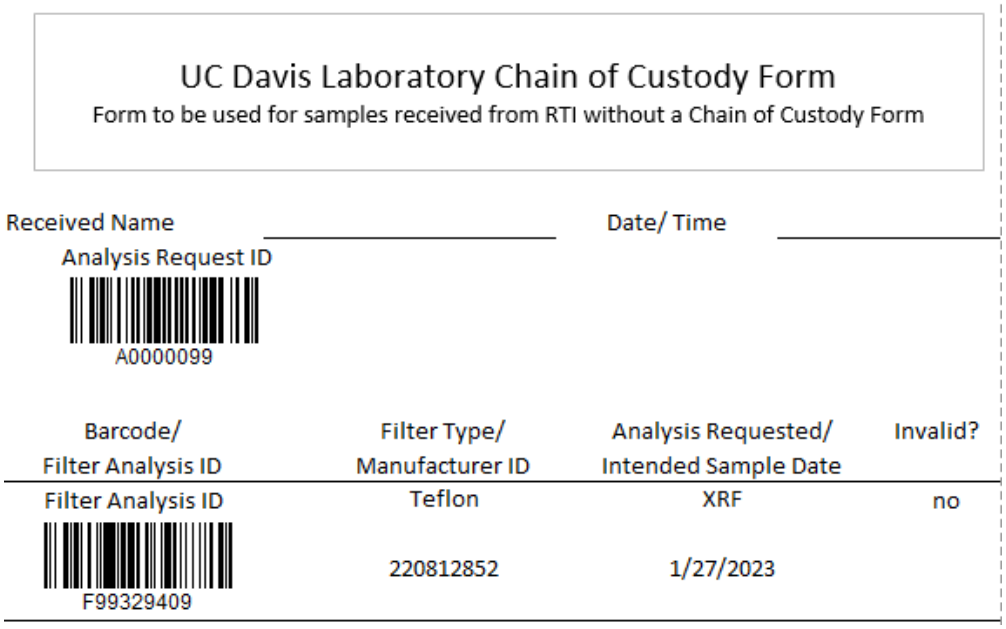
Figure 7. UC Davis Chain of Custody Form.



UC Davis Laboratory Chain of Custody Form

Form to be used for samples received from RTI without a Chain of Custody Form

Received Name _____ Date/ Time _____

Analysis Request ID

A0000099

Barcode/ Filter Analysis ID	Filter Type/ Manufacturer ID	Analysis Requested/ Intended Sample Date	Invalid?
Filter Analysis ID	Teflon	XRF	no
F99329409	220812852	1/27/2023	

9.4 Generate Teflon Inventory Trays

Electronic trays must be generated via the CSN web app upon receiving a shipment of filters. An excel file matching the sample order of the COC and a hardcopy of the COC will be utilized to generate trays. The excel file is saved on the U-drive in the following folder based on sampling year and month, U:\IMPROVE_Lab\CSN\Inventory. This file is provided by the CSN sample handling lab.

1. Open the excel file for the sampling year and month being received. This file matches the filter order on the COC and is formatted to copy and paste in the CSN webapp. A macro can be ran to help separate the file into worksheets grouping the filters together in counts of 50. The macro is located here, "U:\IMPROVE_Lab\CSN\Inventory\Ordered_COC_MM_YYYY_trays_Teflon-TEMPLATE.xlsm"
2. Login to the CSN web app at https://csn.aqrc.ucdavis.edu/ and select “Inventory”.
3. The inventory tab will default to Teflon and displays a list of “Filter Inventory Boxes”. The most recent box will be at the top of the list. Check the number of trays in the “Storage Trays” column. If there are less than 20, trays will be added to this box.

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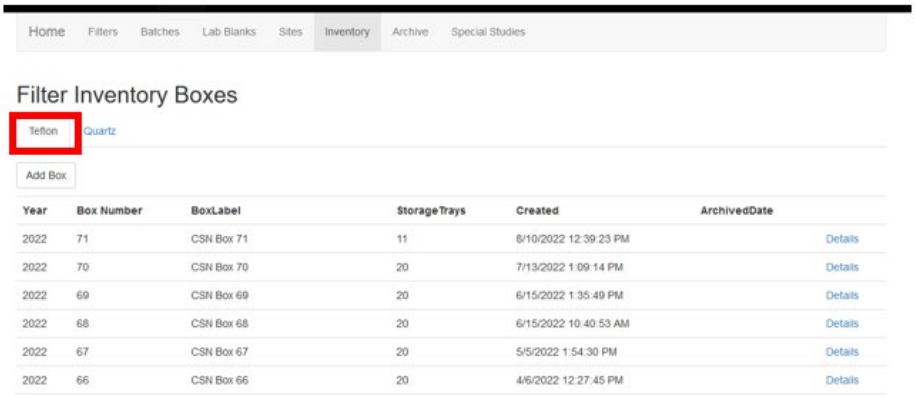
Figure 8. Teflon Inventory Boxes.



4. Click on “Details” for the box to add a new tray.
5. Click on “Add Empty Tray” at the bottom of the list. Fill in the tray label field using the batch number and tray number, click create. Refer to trays previously created as an example. a
6. Navigate to the bottom of the empty tray screen and click “Bulk add filters”.
7. Copy the first fifty filters listed in the excel file opened in step 1. Paste the list of fifty filters into the “Filter barcode/ids” box in the webapp. Then click add filters. This will populate the first fifty filters listed on the COC. Pay careful attention to the fifty filters copied each time to ensure they are done in the exact order listed.
8. Using the hardcopy of the COC verify the first and last filters match the information on the screen.
9. Repeat steps 5-8 until all filters on the COC have been assigned to a tray. Remember to copy the next 50 filters from the excel file with each tray created.

Once an inventory box contains 20 trays, a new box needs to be generated. From the Teflon Filter Inventory box screen, click on the “Add Box” option near the top of the screen. The Box number and Box Label fields need to be filled in. The box numbers are in numerical order, if the previous box is 54 then the new box is 55. Type in the box label is in the following format, CSN Box ## and click create.

Electronic trays can be edited if there is a discrepancy. This is done from the Inventory tab in the CSN web app; pay careful attention when selecting the filter type. Lab blanks and filters without barcodes may be randomly inserted in the electronic trays. These will need to be removed from the electronic trays and added to the appropriate tray and position. If the filter order of an electronic tray does not match the COC, then the following steps are taken to edit the tray.

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1. Start by verifying the filter listed in position 1 of the electronic tray matches the COC.
2. Continue verifying the electronic tray positions with the COC until the discrepancy is found. For this example, the filter in position 10 will be removed.

Figure 9. Electronic tray details screen.

Filters

Position	FilterId	BarcodeId	Intended Use Date	Set	Batch	Type	Purpose	Null Code	Manufacturer #				
1	292433	F278447	3/3/2022	5Q	A0000089	Teflon	SA		221402802	Up	Down	Insert Above	Remove
2	292910	F278467	3/3/2022	5Q	A0000089	Teflon	SA		221402811	Up	Down	Insert Above	Remove
3	289440	F281871	3/3/2022	5Q	A0000089	Teflon	SA		221092128	Up	Down	Insert Above	Remove
4	289473	F281877	3/3/2022	5Q	A0000089	Teflon	SA	AF	221092130	Up	Down	Insert Above	Remove
5	289524	F281883	3/3/2022	5Q	A0000089	Teflon	SA		221092132	Up	Down	Insert Above	Remove
6	289557	F281889	3/3/2022	5Q	A0000089	Teflon	SA		221092134	Up	Down	Insert Above	Remove
7	289619	F281897	3/3/2022	5Q	A0000089	Teflon	SA		221092136	Up	Down	Insert Above	Remove
8	289652	F281903	3/3/2022	5Q	A0000089	Teflon	SA		221400052	Up	Down	Insert Above	Remove
9	289685	F281907	3/3/2022	5Q	A0000089	Teflon	SA		221092138	Up	Down	Insert Above	Remove
10	289742	F281913	3/3/2022	5Q	A0000089	Teflon	SA		221092140	Up	Down	Insert Above	Remove
11	289775	F281919	3/3/2022	5Q	A0000089	Teflon	SA		221092142	Up	Down	Insert Above	Remove

3. Click the remove button for the filter listed in position 10, here is how the tray will look:

Figure 10. Electronic tray details screen with deleted row.

Filters

Position	FilterId	BarcodeId	Intended Use Date	Set	Batch	Type	Purpose	Null Code	Manufacturer #				
1	292433	F278447	3/3/2022	5Q	A0000089	Teflon	SA		221402802	Up	Down	Insert Above	Remove
2	292910	F278467	3/3/2022	5Q	A0000089	Teflon	SA		221402811	Up	Down	Insert Above	Remove
3	289440	F281871	3/3/2022	5Q	A0000089	Teflon	SA		221092128	Up	Down	Insert Above	Remove
4	289473	F281877	3/3/2022	5Q	A0000089	Teflon	SA	AF	221092130	Up	Down	Insert Above	Remove
5	289524	F281883	3/3/2022	5Q	A0000089	Teflon	SA		221092132	Up	Down	Insert Above	Remove
6	289557	F281889	3/3/2022	5Q	A0000089	Teflon	SA		221092134	Up	Down	Insert Above	Remove
7	289619	F281897	3/3/2022	5Q	A0000089	Teflon	SA		221092136	Up	Down	Insert Above	Remove
8	289652	F281903	3/3/2022	5Q	A0000089	Teflon	SA		221400052	Up	Down	Insert Above	Remove
9	289685	F281907	3/3/2022	5Q	A0000089	Teflon	SA		221092138	Up	Down	Insert Above	Remove
10												Add filter	
11	289775	F281919	3/3/2022	5Q	A0000089	Teflon	SA		221092142	Up	Down	Insert Above	Remove
12	289832	F281925	3/3/2022	5Q	A0000089	Teflon	SA		221092144	Up	Down	Insert Above	Remove

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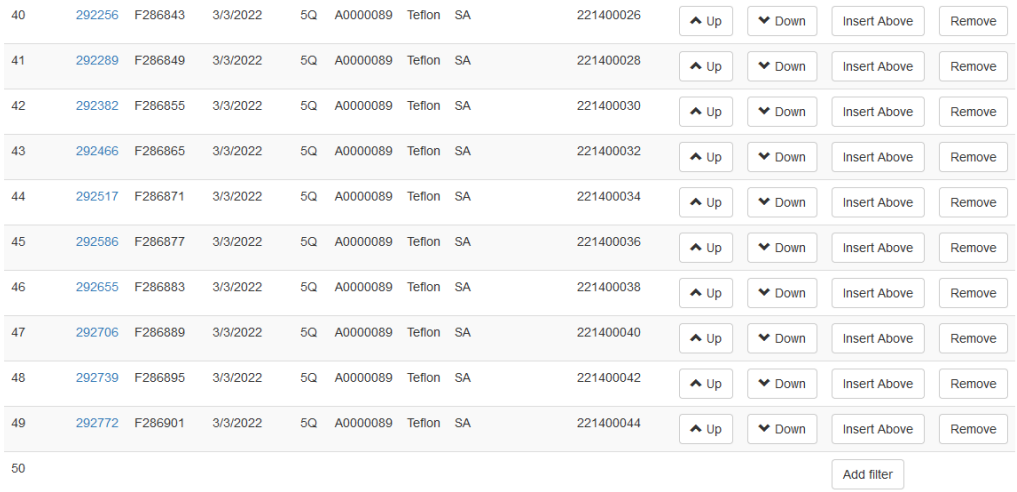
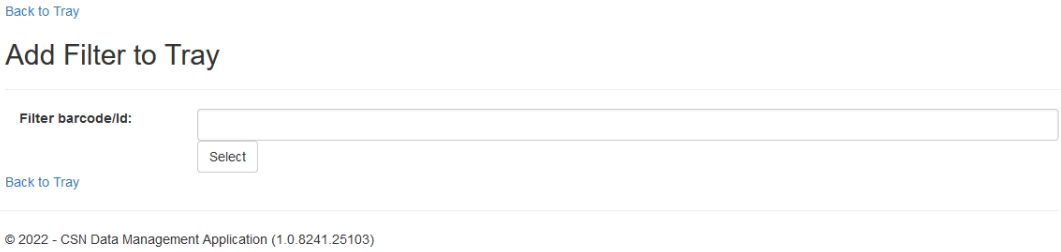
4. The "Add Filter" button can be used to insert a different filter in position 10. Only use this option if a different filter needs to be added to this tray. Otherwise, the up and down buttons are utilized to shift the inventory within the electronic tray. If the filters are shifted up in the tray this will leave a blank position at the end of the tray as seen below.

Figure 11. Electronic tray details screen with deleted row shifted to position 50.



5. Position 50 is blank in this tray and the Add filter button can be used to add the correct filter. Click "Add filter" to go to the add filter screen.

Figure 12. Add filter to tray.



6. Type in the Barcode ID and hit select. Position 50 will now be filled in with the Barcode ID that was just typed in.
7. If lab blanks appear in the wrong electronic tray, they need to be removed by using the remove button. The filter purpose for lab blanks is listed on the electronic trays as LB. This is used to identify and remove blanks from the wrong location in a tray.
8. After removing lab blanks, add them to the final electronic tray for the batch. Lab blanks are added after all routine samples have been assigned a tray and position. Use the add filter button to add them.

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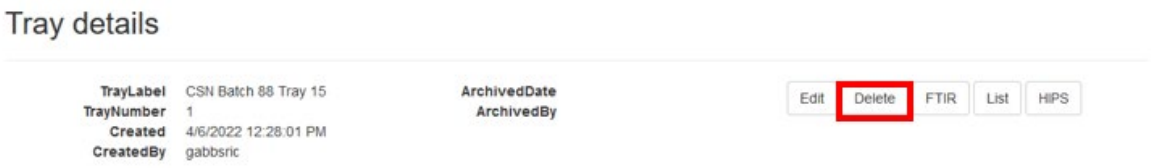
9. If a filter without barcode is listed in a tray, use the remove filter button. Any filters without barcode do not need to be added to a tray, these are filters the lab did not physically receive.

An electronic tray can be completely deleted and restarted if necessary. This is done from the Inventory tab in the CSN web app. Pay careful attention when selecting the filter type. Entire trays usually only need to be deleted because more than 20 trays were added to an inventory box.

1. From the Inventory tab, click Teflon.
2. Click details for the necessary box.
3. Click details for the tray that needs to be deleted.
4. Click the delete button to remove the entire tray.

Figure 13. Trays details screen.



5. Once the tray has been deleted, the web app will automatically redirect to the Box details page. The tray is ready to be regenerated if needed.

9.5 Filter Tray Lists

Filter tray lists are saved and printed for each tray of CSN samples. These lists are meant to be a quick reference for filter Barcode IDs and are not meant to be used as a replacement for the COC.

1. Navigate to U:\IMPROVE_Lab\CSN\Inventory, click on the folder for the sampling year and month. Within this folder create a subfolder and title it “Inventory Tray Lists”.
2. Log in to the CSN web app at https://csn.aqrc.ucdavis.edu and select “Inventory”.
3. The inventory tab will default to Teflon. Otherwise, click “Teflon”.
4. Select the box containing trays that need printed inventory lists by clicking on “Details”, in most cases this will be the box most recently created.
5. From the tray list, find the first tray of the batch based on the tray label. Format CSN Batch # Tray # (e.g., Batch 63 Tray 1) and click details.
6. This opens a detailed filter inventory list, click list and save the file in the Inventory Tray Lists subfolder created in step 1. The file will auto save as a .txt with the following name, TrayList_CSN_Batch_YYYY_MM_Tray_#.

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7. Repeat step 6 for all trays within a given CSN batch.
8. Open the .txt files and print each document.
9. Fold and place the sheets inside the zippered plastic bags for each tray.
10. Trays are now ready for XRF analysis.

9.6 Laboratory Blanks

RTI provides 5 lab blanks with every CSN batch. These filters are typically placed in the last Teflon tray of the shipment. Lab blanks are handled in the same manner as samples during the inventory process.

9.7 Shipment Integrity Check

Report integrity-check information (Table 1), temperature probes (Table 2), and discrepancies to the Laboratory Manager and QA officer via email after recording the following information in the Inventory Excel file.

The “Physical Count” field in Table 1 is the number of samples received within a Batch and can be pulled from the completed “Teflon Receiving Log” shown in Figure 6. The “COC” field refers to the number of samples included in the COC forms. This is accomplished by counting each sample on the COC. The “Electronic Records” field refers to the number of records in the database for the specific Batch. To view the number of electronic records, log into the CSN Data Management Site and go to Batches. Select the corresponding batch number from the list and click the “view record details” icon. On the Batch Details page locate filter type and check the total listed for Teflon, this is the number of electronic records per filter type for the batch.

The Batch Details page is also used to check for filters without barcodes. Scroll down to the “Filters missing barcodes” list and check for any listed Teflon filters. This number will be subtracted from the total listed for Teflon filters.

This information from the integrity checks must be entered in the Excel file, U:\IMPROVE_Lab\CSN\Inventory.

1. Go to the U:\IMPROVE_Lab\CSN\Inventory folder and open the inventory receiving template, "U:\IMPROVE_Lab\CSN\Inventory\Inventory receiving template.xlsx"
2. Click “Save As” and rename the template with as Batch ##.
3. The template has designated fields for Teflon and quartz filters, as well as the temperature probes from each cooler. Fill out the requested information for Teflon filters and temperature probes, save and close the file.

After information is entered in the inventory file for both filter types, send an email to the QA officer and Lab manager with the table for filter types and temperature probes from the inventory file is included (see Table 1 and Table 2).

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Table 1. Example of Teflon integrity check; not official.

Teflon – CSN Batch ##			
	COC	**Physical Count**	**Electronic Records**
47 mm filters	1220	1220	NA
25 mm filters	NA	NA	NA
Lab Blanks	5	5	5

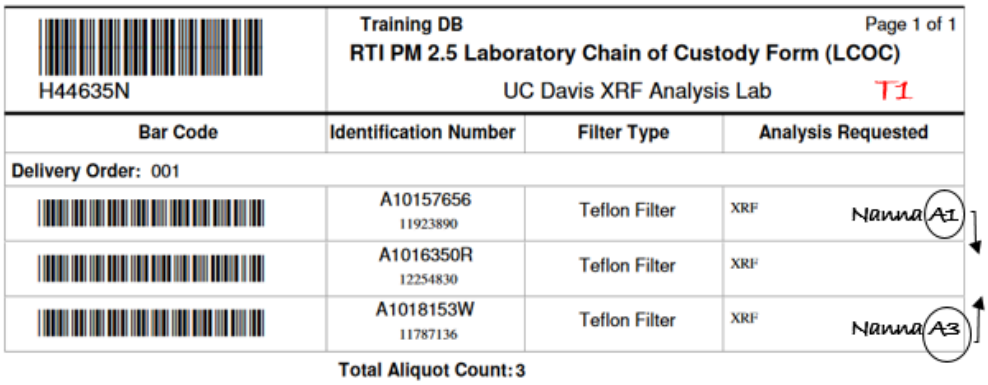
Table 2. Example of Teflon temperature probes; not official.

Cooler	Current Temp °C	Max Temp °C	Probe #
Teflon 1-4			
Teflon 5-8			
Teflon 9-12			

9.8 XRF Analysis Inventory Verification

Sample information is verified at XRF stations upon loading by scanning directly into the sample changer software for the Epsilon 5 instruments. The laboratory technician will verify individual sample receipt by comparing the Barcode ID and manufacturer number with the COC. Record the instrument name, tray, and position number for the first and last samples in the XRF tray (Figure 14 depicts a COC example).

Figure 14. COC with XRF assigned Instrument Name, Tray and Position number.



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RTI PM 2.5 Laboratory Chain of Custody Form (LCOC)

H44635N

UC Davis XRF Analysis Lab T1

Bar Code	Identification Number	Filter Type	Analysis Requested	
Delivery Order: 001				
	A10157656 11923890	Teflon Filter	XRF	Nanna A1
	A1016350R 12254830	Teflon Filter	XRF	
	A1018153W 11787136	Teflon Filter	XRF	Nanna A3

Total Aliquot Count: 3

9.9 Storage

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

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9.10 Cooler Return

The laboratory technician will prepare and ship the ice packs, temperature probes, and coolers back to RTI using the provided UPS return labels. If labels are not provided, contact RTI.

9.11 XRF Analysis Completeness

Batch completeness is performed when XRF analysis of a batch is completed. This includes verifying all filters have a valid analysis and duplicates are reconciled.

9.11.1 Verify All Filters Have Been Analyzed

1. Go to the CSN status page, https://shiny.aqrc.ucdavis.edu/csnStatus/.
2. From the menu on the left side, select “Analysis Completeness”.
3. From the year dropdown menu, select the year for the batch being completed.
4. From the month dropdown menu, select the month for the batch being completed. The page will update automatically.
5. Go to the “Filters Not Analyzed by XRF” section. This is listed at the top of the page.
6. If there are “0 out 0 entries” listed, this indicates all Teflon filters from this batch were analyzed.
7. If there are any Teflon filters listed here, copy the Barcodes IDs and use the CSN web app to look up the filter information. If a filter has an assigned tray and tray position listed in the CSN web app, go physically locate the filter. If the filter is found in the correct tray and tray position, and the barcode label is turned toward the right side, this is an indication the filter may not have been analyzed at XRF. If the barcode label is turned toward the left, this is an indication the filter may have been analyzed at XRF.
8. Locate the hardcopy of the COC and find the filter in question. Does the filter have an instrument name, tray, and position number noted? If not, this is an indication the filter was not analyzed at XRF. If there is an instrument name and loading location noted, go to this instrument and check the results folder.
9. When reviewing an XRF instruments results folder, look for the filter listed before and after the filter with a missing analysis per the COC. If the missing analysis filter is not listed between the results for these two filters, the filter was most likely not analyzed at XRF.
10. If a result file is not found on any of the instruments for the filter with missing analysis, work with the lab lead to determine if the filter should be loaded for XRF analysis.

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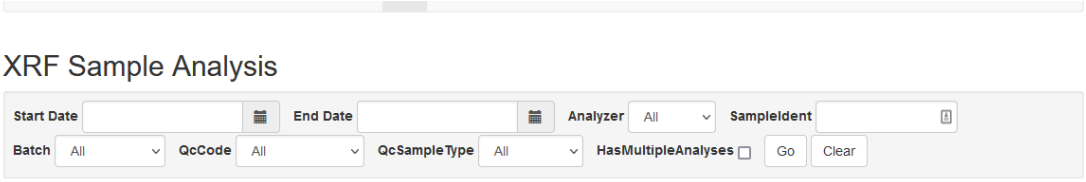
11. If a filter does not have an assigned tray and tray position in the web app, check for any comments listed by the CSN sample handling lab to determine if the filter was shipped to our location. Comments from the CSN sample handling lab are visible in the web app and the CSN status page. The filter may not have been returned from the field to the sample handling lab for various reasons. The filter will still be listed on the "Filters Not Analyzed by XRF" list but should have a comment referencing the filter issue and if it was not shipped.

9.11.2 Check for Duplicate Analyses

1. Go to the CSN web app, https://csn.aqrc.ucdavis.edu/.
2. Click on Analyses, then XRF.
3. The XRF Sample Analysis screen allows various filtering options, seen below:

Figure 15. XRF sample analysis filtering.



4. From the Batch dropdown menu, select the batch being completed and click go. This will only show results for the selected batch.
5. Check the "Has Multiple Analyses" box. This will filter the selected batch and show any results with more than 1 analysis per filter. This will return filters analyzed as planned replicates and any filters reanalyzed.
6. For each replicate filter under the "Has multiple analyses" list, verify there is a replicate (QC code 6) and a valid analysis (QC code 1).
7. Replicates for XRF analysis should only occur over the weekend. Verify the dates for any replicate results. Replicate results occurring Friday evening through Monday morning are expected. Work with the lab lead to investigate any replicate results outside of this window.
8. For each reanalyzed filter under the "Has multiple analyses" list, verify there is a reanalyzed (QC code 2) and a valid analysis (QC code 1). Reanalyzed filters should also have a comment entered explaining why the filter was reanalyzed.
9. Any filter listed with multiple analyses and the same QC code needs to be investigated. For example, if a filter has two analysis results listed as QC code 6 and no analysis results listed as QC code 1, work with the lab lead to determine which result should be listed as QC code 1. All filters need to have 1 valid analysis result (QC code 1). Similarly, if a filter has two

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results listed as valid (QC code 1) work with the lab lead to determine which result needs to be changed to a different QC code, filters can only have 1 valid result (QC code 1).

A summary is then emailed to the lab manager and spectroscopist verifying all filters have a valid analysis and duplicates are reconciled. Fill out the Batch Completeness template located here, U:\IMPROVE_Lab\CSN\Batch Completeness\XRFSave as the current batch and email the completed file to the lab manager and spectroscopist for review. Additionally, include any outstanding filter analysis issues that cannot be resolved in the batch completeness email. The lab manager or spectroscopist will approve the completed file and then another email is sent to the CSN QA officer releasing the batch for validation.

10. QUALITY ASSURANCE AND QUALITY CONTROL

Not applicable.

11. REFERENCES

Not applicable.

12. APPENDIX

12.1 Panalytical Epsilon 5 XRF Analysis

The following includes previous TI material on queue files that is specific to XRF analysis run by the Panalytical E5 instruments only. The Panalytical E5 XRF instrument generates sample analysis queue files as needed.

The XRF queue file can be defined as 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.

XRF queue files are generated per batch for the Epsilon 5s and include the Barcode ID, Sample ID, and Application information. The sample changer software uses the data within the queue file to link the Filter Analysis Barcode with the Sample identity and the application. The queue file includes all samples regardless of status and may include lab blanks.

To generate the XRF queue file, access the CSN Data Management Site and select *Batches* from the top menu. Select *View Record Details* next to the batch number and select *Generate XRF Queue*. Choose the XRF instrument from the analyzer dropdown and the application field will auto-populate. Leave the “Include Lab Blanks” and “Include Invalid

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Filters" boxes checked and click "Go". Save the queue file to *U:\IMPROVE_Lab\XRF_Epsilon_5|CSN|Queue files|Year|Instrument name.* Change the file name to E5_queue_batch#_instrument name.

For additional information regarding uploading queue files to the Epsilon 5 instruments, refer to *UCD CSN TI #302C: Sample Changes for 8-Position Trays*.

Check the local transmission folder for the instrument located here, C:\PANalytical\Epsilon5\Userdata\Transmission. If this folder is empty, then nothing further is needed. If there is a .txt file listed here, open the file and compare the Barcode ID listed in the file to the filter missing analysis. If this file belongs to the filter missing analysis, then copy the file and paste it into the relevant instrument XRF transmission folder located here, U:\XRF Transmission. Pay careful attention when pasting the file; if it is placed in the wrong instruments folder it will not transmit correctly.

Figure 16 below depicts sample receiving and inventorying for the Panalytical E5 instrument.

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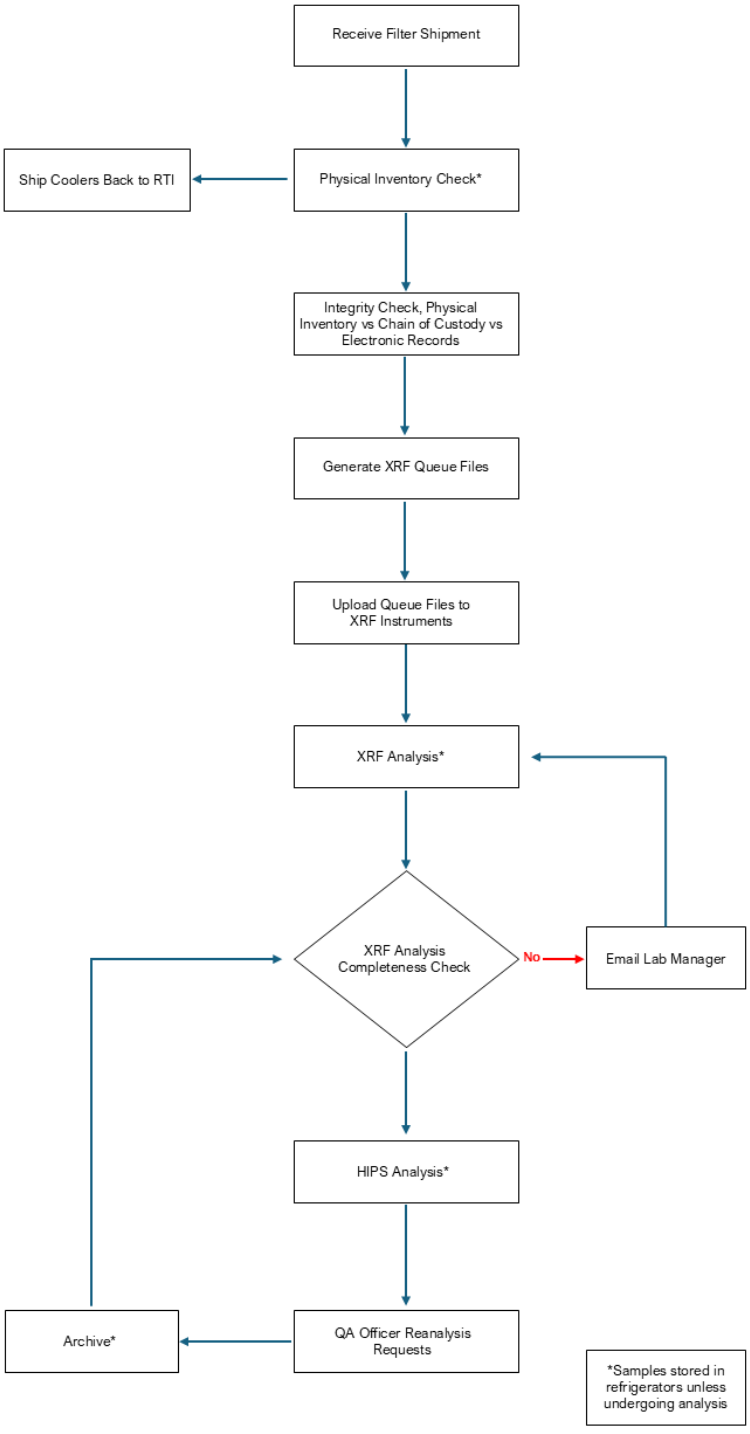
Figure 16. Flowchart of sample receiving to archiving under Panalytical E5 usage.