

UCD CSN Standard Operating Procedure #901

Long-Term Archiving of Filters

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

*July 31, 2020
Version 1.2*

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DOCUMENT HISTORY

Date Modified	Initials	Section/s Modified	Brief Description of Modifications
11/30/18	NJS	All	Rewording for clarity and reformatting to be consistent with all other SOPs.
06/20/19	MGN	All	Update archiving procedures for Quartz filters
4/28/20	LMK	8, 9, 10	Rewording for clarity of archive conditions for Quartz and Teflon, information on CSN archive form used for retrieving/returning samples, updated figures.

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1. PURPOSE AND APPLICABILITY

This standard operating procedure (SOP) describes the procedure for long-term archiving of samples (Teflon and quartz filters, and extracts of nylon filters) analyzed under the EPA Chemical Speciation Network (CSN) contract.

2. SUMMARY OF THE METHOD

Filter samples collected for the CSN network are archived under specific conditions for potential reanalysis. This method describes the documentation and sample handling practices necessary to maintain sample integrity.

3. DEFINITIONS

- **Chemical Speciation Network (CSN):** EPA's PM_{2.5} sampling network, with sites located primarily in urban areas.

4. HEALTH AND SAFETY WARNINGS

Not applicable.

5. CAUTIONS

Not applicable.

6. INTERFERENCES

Not applicable.

7. PERSONNEL QUALIFICATIONS, DUTIES, AND TRAINING

The Air Quality Research Center (AQRC) laboratory staff assigned to this project have been trained on this SOP.

8. ARCHIVING CONDITIONS

Quartz and Teflon filters are stored for the life of the contract in Petri slide holders within Petri slide trays. Petri slide trays of filters are placed in heavy-duty zippered plastic bags and stored in refrigerators or cold storage rooms maintained between 0 °C and 4 °C. Quartz and Teflon filters for the current CSN contract are stored in the following locations, refrigerators housed in Jungerman hall, UC Davis Buckeye Cottage, UC Davis Sprocket Building and UC Davis Surge building. The temperature of refrigerators within

Jungerman hall used for storing CSN filters are monitored daily by laboratory staff. The temperature of cold storage rooms located at UC Davis Buckeye Cottage and Sprocket Building are monitored at all hours via a remote alarm system.

8.1 Quartz Filters

Quartz filters for the current CSN contract are stored on the UC Davis campus at Jungerman hall and UC Davis Buckeye Cottage. Quartz filters from previous CSN contracts are stored by UC Davis off-campus at a cold storage facility in Sacramento, California. Full trays are placed in heavy-duty plastic zippered bags and plastic boxes (36 trays per box) for storage in a refrigerated room. Individual filters are located by box number, batch number, tray number and *ContractorFilterAnalysisID*.

8.2 Teflon Filters

Teflon filters are archived for the life of the contract, sorted by *ContractorBatchNumber*, *IntendedUseDate*, *ContractorSetNumber*, and *ContractorFilterAnalysisID* into Petri slide trays. Individual filters are located by box number, batch number, tray number, and *ContractorFilterAnalysisID*.

Teflon filters from the current and previous CSN contracts are stored on-campus at UC Davis. For the first five years (current contract), Teflon filters are housed in Jungerman Hall, UC Davis Sprocket Building and UC Davis Buckeye Cottage. After that time, samples are stored at room temperature in the UC Davis storage facility (Surge Building).

8.3 Nylon Filter Extracts

Nylon filter extracts are archived for six months in extraction vials. They are grouped in laboratory batches, and placed in heavy-duty plastic zippered bags and plastic bins for refrigerated storage maintained at or below 4 °C (but not below freezing).

Filter extracts are stored by the ions analysis laboratory subcontractor (RTI; Research Triangle Park, North Carolina).

9. PROCEDURE FOR ARCHIVING FILTERS

9.1 Sample Shipping and Receiving

Refer to RTI SOP and UCD TI for shipping and receiving:

UCD CSN TI #302B: Receiving and Inventorying of CSN Samples

RTI SOP: Determination of Anions and Cations Extracted from Nylon Filters by Ion Chromatography (IC)

9.2 Generating Archive List

The CSN Archive list is an electronic list of the samples in a Petri tray. The Archive list is filter type specific that includes the following information for each sample; the position number, FilterID, BarcodeID, Intended Use Date, Set, Batch, type, Purpose, Null code, and Manufacturer number (for Teflon filters only).

9.3 Teflon/Carbon Filters – Archive Labels

Filter Labels: Filter labels are generated by Wood PLC and correspond to the *ContractorFilterAnalysisID*. Labels have a barcode and text (Figure 1), and may be located on the front or back of the Petri slide.

Figure 1. Filter label (same as *ContractorFilterAnalysisID* and *BarcodeID*).



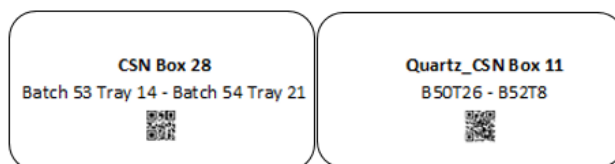
Petri Tray Labels: The laboratory technician prints unique Petri tray labels during the inventory process. The labels include the *ContractorBatchID*, tray number, and QR barcode for each Petri tray (Figure 2). Only the last two digits of the *ContractorBatchID* are used for the label (e.g. A000019 is Batch 19). To differentiate between Teflon and Quartz trays add “Quartz” to the tray label (e.g. Quartz- B19T1).

Figure 2. Petri tray label.



Archive Box Labels: The archive box label includes the box name, the range of trays, and QR barcode (Figure 3). The box range is indicated as *Batch XX Tray XX – Batch XX Tray XX*. To differentiate between Teflon and Quartz boxes, add “Quartz” to the box label (e.g. Quartz- CSN Box 6).

Figure 3. Archive box label.



9.4 Full Trays

Once a tray is full, the *TrayID* is associated with the box number. Thirty-six trays are assigned to each box number, and a list of trays (including archive date and laboratory technician initials) is generated for each box (Figure 4). Filters remain in trays in the archive boxes until they are logged out or removed (e.g. returned to a state, turned over to EPA, etc.).

Figure 4. Partial Tray list for CSN Box 5.

Box Details

SetYear	2016	Created	3/13/2017 1:42:13 PM	<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
Box Number	5	CreatedBy	marigaby		
BoxLabel	CSN Box 5				

Trays

Tray number	Tray label	Filters	
1	Batch 11 Tray 15	50	Details
2	Batch 11 Tray 16	50	Details
3	Batch 11 Tray 17	50	Details
4	Batch 11 Tray 18	50	Details
5	Batch 11 Tray 19	50	Details
6	Batch 11 Tray 20	50	Details
7	Batch 11 Tray 21	49	Details
8	Batch 11 Tray 22	50	Details
9	Batch 11 Tray 23	50	Details
10	Batch 11 Tray 24	50	Details
11	Batch 11 Tray 25	50	Details
12	Batch 11 Tray 26	50	Details
13	Batch 11 Tray 27	50	Details
14	Batch 11 Tray 28/ Batch 12 Tray 1	50	Details
15	Batch 12 Tray 2	50	Details
16	Batch 12 Tray 3	50	Details
17	Batch 12 Tray 4	50	Details

9.5 Transportation Conditions

Pack the Archive box with ice packs to keep the temperature between 0-4 ° C during transportation. Remove the ice packs after placing the box in the refrigerator.

10. PROCEDURE FOR REMOVING FILTERS FROM ARCHIVING

10.1 Identify Samples

Samples can be searched in the CSN web app by Filter ID or Barcode ID on the filter details page. The filter detail page shows the box number, batch number, tray number and the position number for a specific sample. Information for retrieving filters is recorded in the CSN Archive form, "U:\IMPROVE_Lab\XRF_Epsilon5\CSN\Filter Archive\CSN_Archive_YYYYMMDD_Template.xlsx".

Figure 5. CSN Archive Form.

Box	Batch	Tray	Position	BarcodeID	Filter ID	Manufacturer #	Date Removed from Archive	Initials	Date Returned to Archive	Initials
32	60	1	8	F173869	177456	220807782				
32	60	1	50	F174898	179571	220809051				

10.2 Locate Samples

After collecting the electronic information for the sample(s) from the web app the laboratory technician can then retrieve the filter(s) from archive. The CSN Archive form is filled out prior to retrieving samples from archive and is used to assist in physical retrieval of samples. Locate the archive bin containing the sample, locate the tray where the sample is stored and then based on the position retrieve the individual sample. Once samples have been retrieved from archive the CSN Archive form is updated with the date removed and initials.

10.3 Return Samples to Archive

Samples are returned to archive by placing the samples in the correct position, tray and box. The CSN filter archive form used for retrieving samples from archive is utilized for returning filters. Once samples are returned to archive the CSN Archive form is updated with the date returned and initials.

11. EQUIPMENT AND SUPPLIES

Archival of samples makes use of Petri slides, slide trays, and archive bins. These holders are available commercially from multiple scientific product vendors.

12. QUALITY ASSURANCE AND QUALITY CONTROL

Not Applicable.

13. REFERENCES

UCD CSN TI #302B: Receiving and Inventorying of CSN Samples

RTI SOP: Determination of Anions and Cations Extracted from Nylon Filters by Ion Chromatography (IC)