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Sample Tracking and Storage  
UCD SOP #903, Version 1.2  
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# UCD CSN Standard Operating Procedure #903

## Sample Tracking and Storage

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

*October 31, 2022  
Version 1.2*

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**DOCUMENT HISTORY**

<b>Revision</b>	<b>Release Date</b>	<b>Initials</b>	<b>Section/s Modified</b>	<b>Brief Description of Modifications</b>
1.0	8/21/2020	JAG	All	New document.
	5/26/2021	LMK	9	Update image.
1.1	7/31/2021	SRS	8	Previous sections 8 & 9 now subsections 8.1 & 8.2.
1.2	10/31/2022	LMK	8.2	Added procedure for resolving failed temperature check.

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## 1. PURPOSE AND APPLICABILITY

This standard operating procedure (SOP) describes the procedure for tracking and storage of samples (PTFE and quartz filters) analyzed as part of the EPA Chemical Speciation Network (CSN) contract.

## 2. SUMMARY OF THE METHOD

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

## 3. DEFINITIONS

- **Chemical Speciation Network (CSN):** EPA's PM<sub>2.5</sub> 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

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

## 8. PROCEDURAL STEPS

### 8.1 Filter Tracking

CSN filters are shipped to UC Davis from the CSN Sample Handling Laboratory (Wood PLC) with a Chain of Custody (COC; Figure 1). There are separate COC documents for each filter type; UC Davis currently receives PTFE and quartz sampled filters. An electronic copy of each COC is also available. This document lists an itemized inventory including number of samples, filter type, analysis requested, and status (invalid or valid). The COC is utilized to perform filter inventory upon receipt by UC Davis. Following inventory, the COC stays with the filters as they move to different laboratories for analysis. For further information regarding COCs refer to *UCD CSN SOP #904*:


*Receiving and Inventorying, UCD CSN TI #302C: Sample Change, and UCD CSN TI #277A: Optical Analysis.* Following completion of analyses, COC forms are archived.

Figure 1. CSN Chain of Custody (COC) form.

### CSN Laboratory Chain of Custody Form












Ship Date and Name:

Receive Date and Name:

Analysis Request ID:   
Δ0000063

Intended Sample Date:

Set #:

Barcode/Filter Analysis ID	Filter Type	Analysis Requested	Invalid?
Filter Analysis ID  F185715	Teflon 220812071	XRF	<input type="checkbox"/>
Filter Analysis ID  F185718	Teflon 220812072	XRF	<input type="checkbox"/>
Filter Analysis ID  F185721	Teflon 220812073	XRF	<input type="checkbox"/>
Filter Analysis ID  F185724	Teflon 220812074	XRF	<input type="checkbox"/>
Filter Analysis ID  F185727	Teflon 220812075	XRF	<input type="checkbox"/>
Filter Analysis ID  F185730	Teflon 220812076	XRF	<input type="checkbox"/>
Filter Analysis ID  F185733	Teflon 220812077	XRF	<input type="checkbox"/>
Filter Analysis ID  F185736	Teflon 220812078	XRF	<input type="checkbox"/>
Filter Analysis ID  F185739	Teflon 220812079	XRF	<input type="checkbox"/>
Filter Analysis ID  F185742	Teflon 220812080	XRF	<input type="checkbox"/>
Filter Analysis ID  F185745	Teflon 220812081	XRF	<input type="checkbox"/>

### 8.2 Storage Conditions

CSN filters must be kept at a temperature below 4 °C with exceptions allowed during preparation prior to analysis and during analysis. Time spent outside refrigerated conditions is minimized, and a temperature log is used for each laboratory refrigerator where CSN filters are stored. The refrigerator temperature is recorded daily, excluding weekends and holidays, by a laboratory technician (Figure 2).

Filters initially arrive at the AQRC in coolers containing ice packs and are moved to the laboratory for inventory. If the shipment is delayed and/or the ice packs appear to be melted, the Data & Reporting Group is notified for flagging of filters with the TT qualifier flag (TT – Transport Temperature is Out of Specs). Petri trays containing filters are stored in zippered plastic bags. Samples remain in zippered plastic bags unless undergoing analysis. The filters are unpacked from coolers and placed in refrigerators maintained at temperatures below 4 °C.

Figure 2. AQRC laboratory refrigerator temperature log.

Temperature Log			
Refrigerator Serial Number: WA91102886			
Date	Time	Temperature	Initials

When samples are removed from refrigeration and transported between AQRC laboratories, the filters are placed back into cold storage upon receipt by the next analytical lab. Prior to analysis filters are removed from refrigeration and allowed to reach room temperature. Following analysis, filters are returned to refrigeration. Filters remain refrigerated until prepared for cold storage archive; see Figure 3 for a flowchart of CSN sample movement at AQRC from receipt to archiving.

If the daily temperature check for a refrigerator is above 4°C, the temperature is logged and the lab supervisor and lead lab technician are notified. A secondary temperature probe is placed in the refrigerator. The temperature is checked again within 30 minutes. If the original probe and secondary probe both show a temperature under 4 °C, then this is recorded on the daily temperature log and no further action is required. The secondary probe can be removed.

If both probes show a temperature greater than 4 °C then all CSN samples in this refrigerator must be moved to another, working refrigerator. Note on the temperature log the time samples were removed from the non-functioning refrigerator. An email is sent notifying the lab manager and QA manager of the issue. A “Do Not Use” sign is placed on the non-functioning refrigerator. If the two probes are in disagreement work with the lab supervisor or lead lab technician to resolve the issue.

When preparing filters for archive, zippered bags containing Petri trays with filters are placed in plastic bins. Icepacks are temporarily placed inside the archive bins during transportation to archive storage at the UC Davis Buckeye Cottage or UC Davis Sprocket facilities. The temperature at UC Davis Buckeye Cottage and UC Davis Sprocket cold storage facilities is maintained between 0-4 °C and monitored via a remote alarm system. If the archive cold storage exceeds the specified temperature range, an email alert is sent to the Laboratory Group Manager, Program Manager, and designated Laboratory Technician, and a maintenance technician is dispatched to investigate and resolve the event that triggered the alarm.

For further details regarding filter archive storage refer to *UCD CSN SOP #901: Long-Term Archiving of Filters*.

Figure 3. Flowchart of CSN Teflon sample movement at AQRC from receipt to archiving.

