



PM_{2.5} Chemical Speciation Network (CSN)

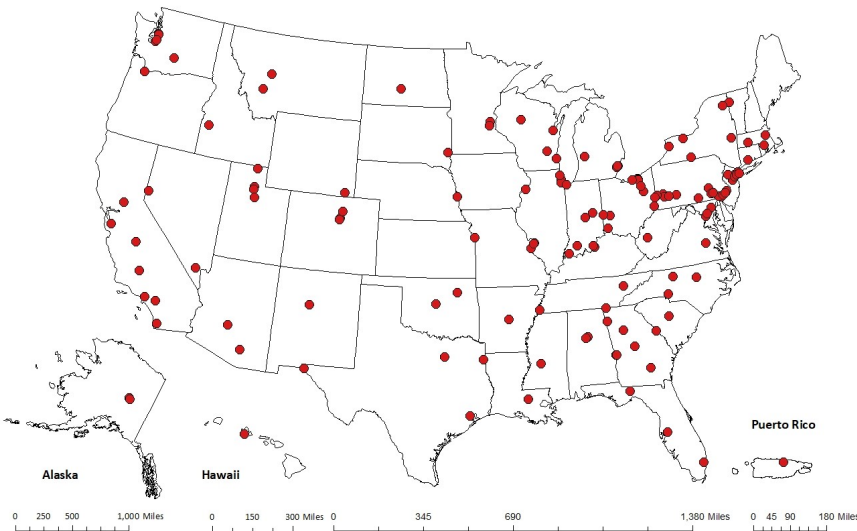
Questions Regarding CSN

If you have any questions regarding CSN, contact us using the CSNsupport@sonomatech.com email address. This email address puts you in touch with EPA, the sample handling/shipping and gravimetric laboratory (Wood Environment & Infrastructure Solutions, Inc. or Wood), the sample analysis laboratory (University of California at Davis or UC Davis), and the CSN Data Analysis and Reporting Tool (DART) support team (Sonoma Technology).

Wood has also created a new email address for site operators to contact them regarding shipping and handling requests. Please use csnfield@woodplc.com for any questions specifically related to late shipments, stopping and starting sample collection, and any other issues related to the logistics of shipping and handling.

CSN Site Map

There are currently 140 CSN Trends and Supplemental sites supported by the centralized contract laboratories Wood and UC Davis.



Met One Super SASS

URG 3000N

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Special points of interest

- The 2021 Shipping and Sampling Calendars for CSN are now available
- New DART Web Address: <https://dart.sonomatech.com>
- Changes to CSN Program Contacts

2021 Shipping and Sampling Schedules

The 2021 CSN shipping and sampling schedules for 1-in-3 and 1-in-6 sampling are now available. Copies of the schedules were placed in each shipping container that was shipped to the site operators and also emailed to site operators and EPA CSN Region representatives.

The schedules have also been posted on EPA's CSN AMTIC web site at: <https://www.epa.gov/amtic/chemical-speciation-network-csn-general-information>



New DART Web Address

The Data Analysis and Reporting Tool (DART) web address has changed to <https://dart.sonomatech.com>. DART is no longer hosted in AirNowTech.

Agencies can request access to DART by setting up an account using the [Log In](#) tab at the top of the DART home page or requesting DART access through: CSNsupport@sonomatech.com.

Once logged in, DART users who are assigned to be agency administrators can configure CSN reviewers using the "Manage Users" link.

Data validation resources, which include the CSN data validation guide, quick reference guide, and validation training videos can be found at the bottom of EPA's AMTIC page located here: <https://www.epa.gov/amtic/chemical-speciation-network-data-reporting-and-validation>.

Collocation of Filter-Based PM_{2.5} Mass Measurements at CSN STN and NCore

As the PM_{2.5} monitoring program continues to evolve towards more PM_{2.5} continuous Federal Equivalent Methods (FEMs) and fewer Federal Reference Methods (FRMs), we want to clarify our need for maintaining filter-based monitoring at a limited number of Chemical Speciation Network (CSN) stations. The CSN is comprised of the Speciation Trends Network (STN) and supplemental speciation sites. For the STN sites, we are requesting that monitoring agencies maintain operation of an FRM on at least a one-in-three day sampling schedule. Many, but not all, STN stations are collocated with NCore which already has a requirement for maintaining filter-based sampling on at least a one-in-three day schedule; however, nine STN sites are located at a site other than an NCore station. For these nine STN sites we are requesting that operation of a PM_{2.5} FRM be maintained on at least a one-in-three day schedule. We are requesting that FRMs be maintained at these additional nine stations in the STN so that filters are available should they be needed for special studies or addi-

tional analysis. Please reach out to your EPA Regional Office if you have questions about this request.

The nine STN sites not located at NCore are:

- * Bakersfield, CA (AQS ID 06-029-0014)
- * Chicago, IL (AQS ID 17-031-0076)
- * Essex, MD (AQS ID 24-005-3001)
- * Minneapolis, MN (AQS ID 27-053-0963)
- * Rutgers, NJ (AQS ID 34-023-0011)
- * Elizabeth Lab, NJ (AQS ID 34-039-0004)
- * Bronx, NY (AQS ID 36-005-0110)
- * Burlington, VT (AQS ID 50-007-0012)
- * Milwaukee, WI (AQS ID 55-079-0010)

PM_{2.5} continuous monitors reported to AirNow are of additional value when collocated with CSN as these data are made available to help validate CSN data through the "Data Analysis and Reporting Tool" (DART). We encourage monitoring agencies to operate PM_{2.5} continuous monitors at all CSN stations including supplemental stations and the locations where STN is not collocated with NCore.

Freezing Ice Packs, Packing and Shipping Procedures: Best Practices

Despite changes to the type of freezer pack used to control the temperature of filter shipments, the Filter Handling Lab (Wood) continues to receive a high percentage of shipments above the target criterion of 4°C. In order to help reduce the frequency of shipments that do not meet the transport temperature criterion, please review the packing and shipping instructions below. These best practices for packing, ice pack freezing, and shipping sample modules were also shared with site operators and managers in October 2020.

1. Upon receipt from Wood, remove the freezer packs and freeze them at $\leq -18^{\circ}\text{C}$ (0°F) for a minimum of 3 days (≥ 72 hours) to ensure samples arrive at the FHL at temperatures $\leq 4^{\circ}\text{C}$. Inability to achieve sufficient cooling may result in temperatures exceeding 4°C when received at the Wood.
2. On shipping day, pack the insulated shipping box with the large bag containing Met One canisters, URG cartridge and CF Card, ensuring components match the Field Sampling Chain-of-Custody (FSCOC).
3. Place one freezer pack on each of the four

sides and on top of the bag containing the components in the insulated box, then place the FSCOC in its own bag between top ice pack and foam top. Note, do not use a freezer pack on the bottom of the components since the Met-One sampling canisters can pierce the freezer packs.

4. Drop the package at the shipping location for overnight shipment to Wood. Avoid leaving the package in warm temperatures or in the sun for prolonged periods prior to drop-off at the shipping location.



Requesting URG Audit Cartridges or Filters

Previously, EPA’s Ambient Air Monitoring Group (AAMG) was supplying CSN operators and auditors with URG audit cartridges or audit cartridge filters. Wood is now supporting this effort. If you need a replacement URG audit cartridge or audit cartridge 25-mm quartz filters, please contact Wood at: csnfield@woodplc.com.




Naming Convention for URG Data Files

On November 24, 2020, Wood sent a note to site operators regarding the naming conventions for URG data files on the memory cards. The note is repeated here.

In order to use the data files from your URG3000N memory cards, the instrument must be configured properly so that unique filenames are created for your site. *You will only need to update your instrument once - the new settings will be retained. If you have not yet updated your Q number, please follow the instructions below:*

1. When prompted to change filter, select F4=more (4 times) and then select F1=site configuration.
2. When prompted for your location code, type in your 9-digit AQS ID. The AQS ID can be found in Section B “Site and Sampler Information” on your Custody and Field Data Form. In the example below, the AQS ID is 010730023.
3. When prompted for the serial number*, type in the first 4 alphanumeric of your Q number**. The Q number can be found directly below the barcode on your Custody and Field Data Form. In the example below, you would type in “Q001”. Note: using the F1 key (up arrow) will increment numbers from 0 to 9, and then iterate letters from A to Z.
4. When prompted for the number of modules, press enter=next.
5. When prompted to select your sampling schedule, press enter=next.
6. When prompted for sampling interval, press enter=next.
7. When prompted for sample time/hour, press enter=next.
8. When you return to the site configuration screen, press bksp=back (4 times).
9. Continue with routine filter change procedure.

		PM2.5 CSN CUSTODY AND FIELD DATA FORM		<input type="checkbox"/> White (return to lab) <input type="checkbox"/> Yellow (site retains) <input type="checkbox"/> Pink (lab)	
Q0012015112002		Serial Number* (First 4 alphanumeric of Q number)			
A. CUSTODY RECORD (Name, Date)		Bin ID: ALA02-C	Set: 3Q		
Name: ABARNARD Date: 11/16/2015		3. Site Out:		Name: Date:	
1. Laboratory Out:		2. Site In:		4. Laboratory In:	
B. SITE AND SAMPLER INFORMATION					
1. Site AQS Code: 010730023		5. Site Name: Birmingham - North Birmingham			
2. Sampler S/N:		6. Intended date of use: Friday, November 20, 2015			
3. Sampler Type: URG 3000N		7. Date of Sampler Setup:			
4. Sampler POC: 5		8. Operator's Name:			

*The first four alphanumeric of your Q number will differ from the serial number associated with your URG3000N. This is OK. Please type in the first four alphanumeric of your Q number because this is a unique identifier for your site that will create unique file names on your memory card.
 **For collocated sites with 1 controller, enter the first four alphanumeric associated with the Q number of your PRIMARY sampler.

2019 Site Summaries Now Available

Starting in 2017, our analysis laboratory contractor, University of California at Davis (UC Davis) has compiled individual CSN site summaries.

These summaries include information on the site AQS ID, site latitude/longitude, completeness, daily reconstructed fine mass (RCFM), long-term trends in RCFM, chemical composition, and a map of RCFM as compared to both nearby CSN and Inter-agency Monitoring of PROtected Visual Environments (IMPROVE) monitoring sites.

To view all CSN site summaries for 2017, 2018, and 2019, please visit: <https://aqrc.ucdavis.edu/csn-field-sites-maps>

CSN Data Advisories

When issues are identified that affect CSN data, we have started to compile data advisories to let the CSN community and data users know about potential issues.

To view the current CSN data advisories, please visit:

<https://aqrc.ucdavis.edu/csn-documentation>



Changes to CSN Program Contacts

Melinda Beaver is now the Program Lead for CSN. **Doug Jager** has assumed responsibility as the Quality Assurance Lead. **Joann Rice** continues to support the program as the Technical Point of Contact.

See the CSN Contact list on the next page for email addresses and phone numbers for Melinda, Doug, and Joann.

Coming Soon: Filter-based Light Absorption Measurements

Since June 2018, UC Davis has been measuring filter light absorption using the PTFE filters from CSN. A Hybrid Integrating Plate/Sphere (HIPS) system is used for this analysis. The HIPS system uses a 632.8 nm laser to illuminate the backside of a sampled filter. Both reflected and transmitted light are collected and used to calculate the filter absorption coefficient, Fabs. The IMPROVE network already measures and reports this Fabs value to AQS.

Now that we have a few years of Fabs data from CSN, we are working on a plan to use the data in validation review procedures and also to submit the data to EPA's Air Quality System. We will provide more information on the measurement and results as we get closer to submitting the data.

Using a Subset of CSN Teflon® Filters for a Special Study Comparing XRF to ICPMS

The CSN has been operating since 2000 with elements being analyzed by X-Ray Fluorescence (XRF). With continued improvements in air quality and decreasing PM_{2.5} concentrations over time, the percentage of non-detects for the 33 measured elements continues to increase. Some of the PM_{2.5} elements of most interest are not always detected above the XRF method detection limits (MDLs).

EPA is working with UC Davis on a special study to explore the use of Inductively Coupled Plasma Mass Spectrometry (ICPMS) instead of XRF to analyze Teflon® filters for CSN. ICPMS offers much improved MDLs for many elements when compared to XRF MDLs. Analysis by ICPMS has also become more affordable and less expensive than in the past.

One downside to ICPMS is that filters are destroyed for analysis and no longer available for archive or future analysis. For this study, at least 3 Teflon® filters from each site will be

analyzed by ICPMS. Filters will be selected from the 2020 sampling year. Some sites will have 4 filters analyzed by ICPMS, and if a site has a particularly high concentration for some elements, it is possible that 6-7 filters will be analyzed from that site.

All filters will be analyzed by XRF prior to the destructive ICPMS analysis so no routine data will be lost.

Filters will be analyzed from different seasons to capture seasonal variations and from a range of concentrations and environments to evaluate the comparison at both low and high concentrations and aerosol composition. Where possible, collocated filters will be used.

The final product planned for this study will be a journal article describing the results.

For questions on this study, contact Joann Rice at: rice.joann@epa.gov.

Special Study: FTIR of PM_{2.5} FRM Teflon® Filters

EPA and UC Davis are collaborating on a study to conduct FTIR (Fourier Transform Infrared Spectroscopy) analysis of Teflon® filters collected at approximately 15 PM_{2.5} FRM sites. This study is in addition to the ongoing FTIR analyses of the Teflon® filters collected by the CSN network.

The motivation for this study is to compare the FTIR results between the filters from the two networks to assist with method development. This study will also explore the ability of FTIR to provide speciation information beyond organic and elemental carbon, including sulfate, nitrate, and organic functional groups. The results are also of interest for the evaluation and development of methods used in applying photochemical models in regulatory assessments.

We have reached out to approximately 15 sites (shown on map) to initiate discussions about

obtaining filters from 2016 for this study. We expect to initiate analysis of the filters by early spring, 2021.

For questions on this study, please contact Melinda Beaver at beaver.melinda@epa.gov.



Now Reporting Soil and Reconstructed Mass to AQS

To aid data users and researchers using CSN data for a variety of data comparisons, we were asked to start reporting Soil and RCM to EPA's Air Quality System (AQS). Both Soil (88348) and RCM (88401) are calculated parameters. Both parameters were added to each active CSN monitor on the national contract. These data were previously delivered to DART to aid in data validation, but were not being delivered to AQS. These data were delivered starting with the 2019 CSN data.

Soil and RCM are calculated as follows:

$$\text{Soil} = 2.2 * \text{Aluminum} + 2.49 * \text{Silicon} + 1.63 * \text{Calcium} + 2.42 * \text{Iron} + 1.94 * \text{Titanium}$$

$$\text{RCM} = 4.125 * \text{Sulfur} + 1.29 * \text{Nitrate} + \text{Soil} + 1.8 * \text{Chloride} + \text{Elemental Carbon} + 1.4 * \text{Organic Carbon}$$

The AQS parameter codes and descriptions used in the calculation of Soil and RCM are provided in these tables.

Soil Parameters	Description
88104	Aluminum
88165	Silicon
88111	Calcium
88126	Iron
88161	Titanium

RCM Parameters	Description
88169	Sulfur
88306	Nitrate
88348	Soil
88203	Chloride ion
88321	Elemental Carbon
88320	Organic Carbon

CSN Field Operations QAPP Revision

The CSN program is working on an updated CSN Field Operations QAPP to replace the current version. The QAPP was most recently updated in 2012 and is posted at <https://www.epa.gov/amtic/chemical-speciation-network-field-qapps-and-sops>.

Once revised, this national CSN Field QAPP will be available to state, local, and tribal agencies to adopt and implement.

Our tentative timeframe for completion is to finalize by the end of 2021. If you would like to review a draft version of the QAPP, please let your CSN Regional Representative know.

CSN Contacts

Wondering who the right people are to contact regarding CSN? The current contacts are:

EPA Contacts

Program Lead: Melinda Beaver; beaver.melinda@epa.gov; 919-541-1062

Technical Point of Contact: Joann Rice; rice.joann@epa.gov; 919-541-3372

Quality Assurance: Doug Jager; jager.doug@epa.gov; 919-541-4804

Mega Performance Evaluation Program: Neelson Watkins; watkins.neelson@epa.gov; 919-541-5522

Regional Contacts

Region 1: Catie Taylor; taylor.catherine@epa.gov; 617-918-8607

Region 2: Gavin Lau; lau.gavin@epa.gov; 212-637-3708

Region 3: Lori Hyden; hyden.loretta@epa.gov; 215-814-2113

Region 4: Keith Harris; harris.keith@epa.gov; 706-355-8624

Region 5: Chad McEvoy; mcevoy.chad@epa.gov; 312-886-6084

Region 6: Josh Madden; madden.joshua@epa.gov; 214-665-7251 and Fran Verhalen; verhalen.frances@epa.gov; 214-665-2172

Region 7: Leland Grooms; grooms.leland@epa.gov; 913-551-5010

Region 8: Josh Rickard; rickard.joshua@epa.gov; 303-312-6460

Region 9: Dena Vallano; vallano.dena@epa.gov; 415-972-3134

Region 10: Chris Hall; hall.christopher@epa.gov; 206-553-0521

General Contacts

CSNsupport@sonomatech.com and/or csnfield@woodplc.com

