Air Quality Modeling, Monitoring and Other Technical Updates

AAPCA Fall Meeting

September 26 - 28, 2023

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U.S. EPA Office of Air Quality Planning & Standards

Ambient Monitoring Updates

Source: GAO File Photo.

American Rescue Plan – Status Update

Competitive Grant

- EPA selected 132 projects, in 37 states, to receive over $50 million (ARP+IRA funds) to conduct ambient air monitoring of pollutants in communities across the country with environmental and health outcome disparities.
- As of **August 1, 2023**, over half of the grants have been awarded by EPA Regional Offices. EPA Regions continue to work with remaining applicants on their workplans.
- EPA has contracted an organization to provide grant recipients with quality assurance support and technical assistance at no additional charge.

Direct Awards

- Approximately 33% of the $22.5 million is being used for upgrading or supplementing manual $PM_{2.5}$ samplers with continuous $PM_{2.5}$ analyzers across the national network.
- The remaining direct award funds are being used by State, Tribal, and Local air agencies to upgrade aging monitoring equipment at existing monitoring stations across the national ambient air network.
- Air agencies are using the direct award grant funds to voluntarily establish over 30 new monitoring sites in and near underserved communities or rural areas.

EPA Regions continue to implement their sensor loan programs and mobile monitoring platforms as they receive equipment: www.epa.gov/air-sensor-toolbox/air-sensor-loan-programs.

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More information: https://www.epa.gov/arp

PM NAAQS Reconsideration and Ambient Monitoring

- Published in the FR on January 27th, 2023. Public comment period closed March 28, 2023.
- Two important monitoring topics associated with the reconsideration:
  - **$PM_{2.5}$ network design and relationship to environmental justice**
    - EPA proposed to keep most existing sites in their current place
    - EPA proposed that siting of any new or moved sites could be impacted by the proposed network design modification to address at-risk communities
  - **Improve FEM/FRM comparability**
    - Use of $PM_{2.5}$ continuous FEMs is dominated by two companies with a total of four methods (89% of network in 2022):
      - Met One BAM 1020 and BAM 1022; generally, match SLT FRMs, but the 1020 can have outliers – both high and low
        - Recommend monitoring agencies assess their FRM and continuous FEM data quality and for cases where they may have one or more sites with outliers (relative to data in other agencies) pursue additional support and training
      - Teledyne API T640 and T640x; consistent high bias across the network being addressed
    - EPA proposed a revision to the monitoring regs to allow improvement of PM concentration measurement performance for approved FEMs

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Teledyne API – PM Federal Equivalent Method - Update

On June 12th, 2023, Teledyne API announced they have received approval from EPA's Reference and Equivalency Program on modifications to their T640 and T640x PM Federal Equivalent Methods (FEMs).

- New firmware from T-API for the T640/T640x PM FEMs include availability of a "network data alignment factor" intended to improve data comparability with monitoring agency operated FRM samplers.

What have we learned so far? – Early analysis of collocated T640 FEMs with and without the firmware update indicate the network data alignment update is working.

•EPA recommends that monitoring agencies submit valid ambient temperature data to AQS for any site operating a T640 or T640x FEM that may be used in a design value calculation for the design value years and other years of interest as ambient temperature factors into the network data alignment.

•Note: there is valid on-site ambient temperature data from the T640 and T640x; however, other valid on-site ambient temperature data may also be used.

Figure 3. Factory options screen, including T640 Data Alignment.

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Teledyne API – PM Federal Equivalent Method – Update

EPA held several calls with SLTs to share information on the update. Highlights include:

- The modifications of the T640 and T640x FEMs are intended to address an approximate ~20% positive bias relative to State, local, and Tribal (SLT)-operated PM2.5 Federal Reference Methods (FRMs). This same modification approach is also being used on the PM10 measurements.
- While monitoring agencies may test the firmware first, EPA does recommend doing the upgrade to better align FEM and FRM data.
- Series of new method codes available for AIRNow and AQS reporting.
- **EPA intends to address the issue of already collected data with the original firmware in a separate action anticipated after an expected final rule for the reconsideration of the NAAQS.**

GAO Response – Asset Management

- SLTs will share asset data with EPA Regions on an annual basis, using a standard reporting template, focusing mainly on physical hardware and direct supporting infrastructure that are needed to generate data.
- EPA plans to provide a final asset management plan in 2023.

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Ozone Absorption Cross-Section – Final Rule

- The absorption cross-section (absorption coefficient, α) is a parameter used to determine atmospheric ozone concentrations based on the amount of light absorbed at an ultraviolet (UV) wavelength of 253.65 nm
- The updated value is an advancement in science and measurement technology that represents a more accurate and precise value than the current value
- Proposed rule to update 40 CFR part 50, appendix D was published in the **Federal Register 2/24/2023** and the comment period **closed 3/27/2023**
- Two comments received
  - Implementation date of January 1, 2024, provides insufficient time to implement and requires purchase of new equipment
    - Response: Timeline was revised to begin implementation January 1, 2025, with full implementation January 1, 2026. New equipment will not be required. Monitors will be calibrated against the new value or adjusted by vendor firmware updates if available.
  - The change will make the NAAQS more stringent
    - Response: The potential increase in ambient concentrations, due to the updated cross-section, is within the precision of the method and already included in the ozone measurements
- Plan to finalize the rule Fall of 2023

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www.regulations.gov EPA-HQ-OAR-2022-0007

Ambient Air Toxics Overview

National Air Toxics Trends Station (NATTS) update

- As of January 2023, we have 25 active NATTS sites, measuring VOCs, PAHs, Carbonyls, and metals.
  - We require 19 "Tier 1" compounds within NATTS, but routinely get nearly 100 compounds reported.
- Eastern Research Group (ERG) continues serving as our national contract laboratory.
- IRA funding will be used to streamline and modestly grow NATTS; planning currently commencing.

Methods Development

- OAQPS continues to work with ORD to develop, improve, and characterize measurement methods.
- Ongoing efforts to evaluate and improve characterization of EtO using TO-15/A.
- Efforts to evaluate emerging continuous technologies for EtO, Formaldehyde, and multi-pollutant platforms.
- Investigating new work for sorbent method improvement or development for priority or high interest compounds.

Important Quality Assurance Updates

Protocol Gas Verification Program - New AQS Transaction

- A new requirement will require monitoring organizations to input cylinder identification information into AQS to support the enhanced QA transaction file.

- These AQS features remain optional until at least mid-2024. This is action supports the PGVP in identifying and testing gas providers. More information on this new transaction is upcoming.

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2023 Air Sensors QA Workshop

Date:	July 25-27, 2023
Location:	Research Triangle Park, NC
Attendees:	250 In-person 750 Virtual 15 Exhibitor Booths
Power Outages:	1

OAR and ORD cosponsored a 3-day hybrid workshop focused on helping the air sensor community better understand established and emerging QA methods for collecting fit-for-purpose air sensor data.

EPA continues to work on posting the recordings and presentations publicly, but this will take several weeks while we make the files 508 compliant. (Note: if you registered for the event, you already have access to the recordings in Whova!)

We are summarizing the workshop into a presentation and a manuscript to provide sensor users with quality assurance best practices for a variety of applications.

Inflation Reduction Act

There are five air monitoring provisions in the Inflation Reduction Act of 2022 (IRA):

- 60105(a) Fenceline Monitoring
- 60105(b) Multipollutant Monitoring
- 60105(c) Sensors
- 60105(d) Wood Heaters
- 60105(e) Methane Monitoring

Inflation Reduction Act

IRA Air Monitoring Direct Awards Needs Assessment

- EPA plans to make direct, non-competitive awards to state, local, and Tribal air agencies using a portion of funds available under IRA sections 60105(a-c).
- EPA is conducting a needs assessment to better understand air monitoring needs across eligible air agencies and will use the results of the needs assessment to inform an allocation methodology to distribute a portion of the IRA Air Monitoring funding across the national monitoring network.
- EPA plans on awarding funds using 103 authorities.

Target Deadline	Milestone
August 7, 2023	Begin identification of needs of State, Local, and Tribal Air Agencies
September 8, 2023	SLT Air Agency Needs Assessment Due
Fall 2023	EPA Determines Allocation Methodology and Drafts Grants Guidance
Late Winter/Early Spring 2024	EPA Releases Grants Guidance for SLT Air Agencies
Through 2024	SLT Air Agency Workplan Development and EPA Awards

Inflation Reduction Act

Community Scale Air Toxics Ambient Monitoring Grant Competition

- EPA will fund the 2024 Community Scale Air Toxics Ambient Monitoring competitive grant using STAG and IRA (Fenceline) Funding.

Target Timeframe	Milestone
Fall 2023	Finalize and prepare the Notice of Funding Opportunity (NOFO) for posting
Winter 2024	NOFO Opens Informational Webinar
Spring 2024	NOFO Closes Application Evaluations Begin
Fall 2024	Notification of Selections
Winter 2025	Anticipated Awards

Inflation Reduction Act

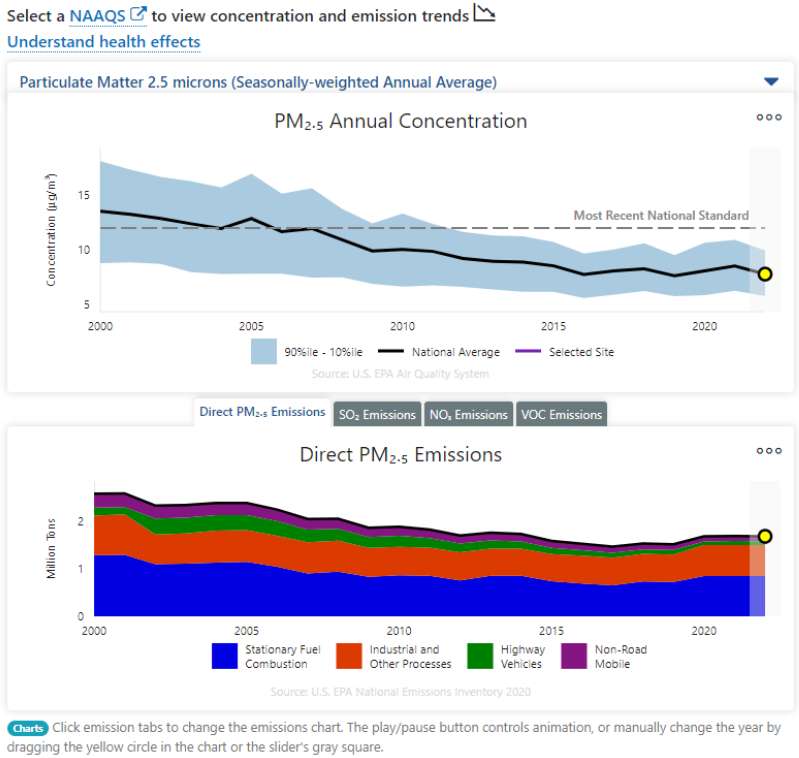
Other IRA Air Monitoring Activities

- Investing in ambient and fenceline Air Toxics Measurement and Method Development
- Supporting EPA Regional Office Mobile Monitoring Platforms and Sensor Loan Programs
- Planning to offer Training Webinar on Air Sensors
- OAP is investing in the CASTNET program by procuring and installing new equipment to enable robust air quality, climate, and environmental assessments to support rural and tribal communities (POC: Melissa Puchalski, puchalski.melissa@epa.gov)

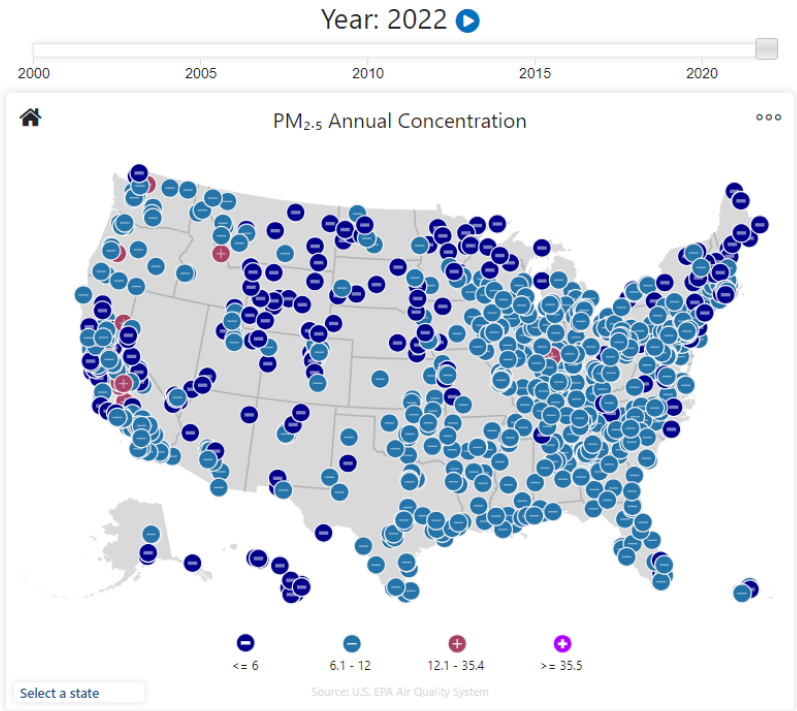
Tools and Resources

Air Quality Trends

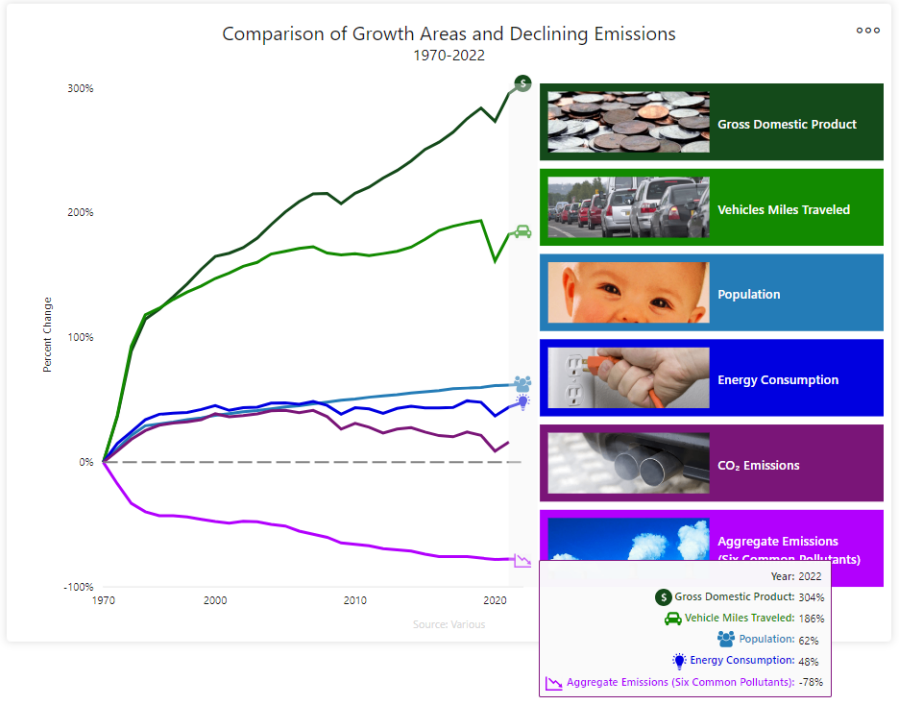
Criteria Pollutant Trends Show Clean Air Progress



Charts Click emission tabs to change the emissions chart. The play/pause button controls animation, or manually change the year by dragging the yellow circle in the chart or the slider's gray square.



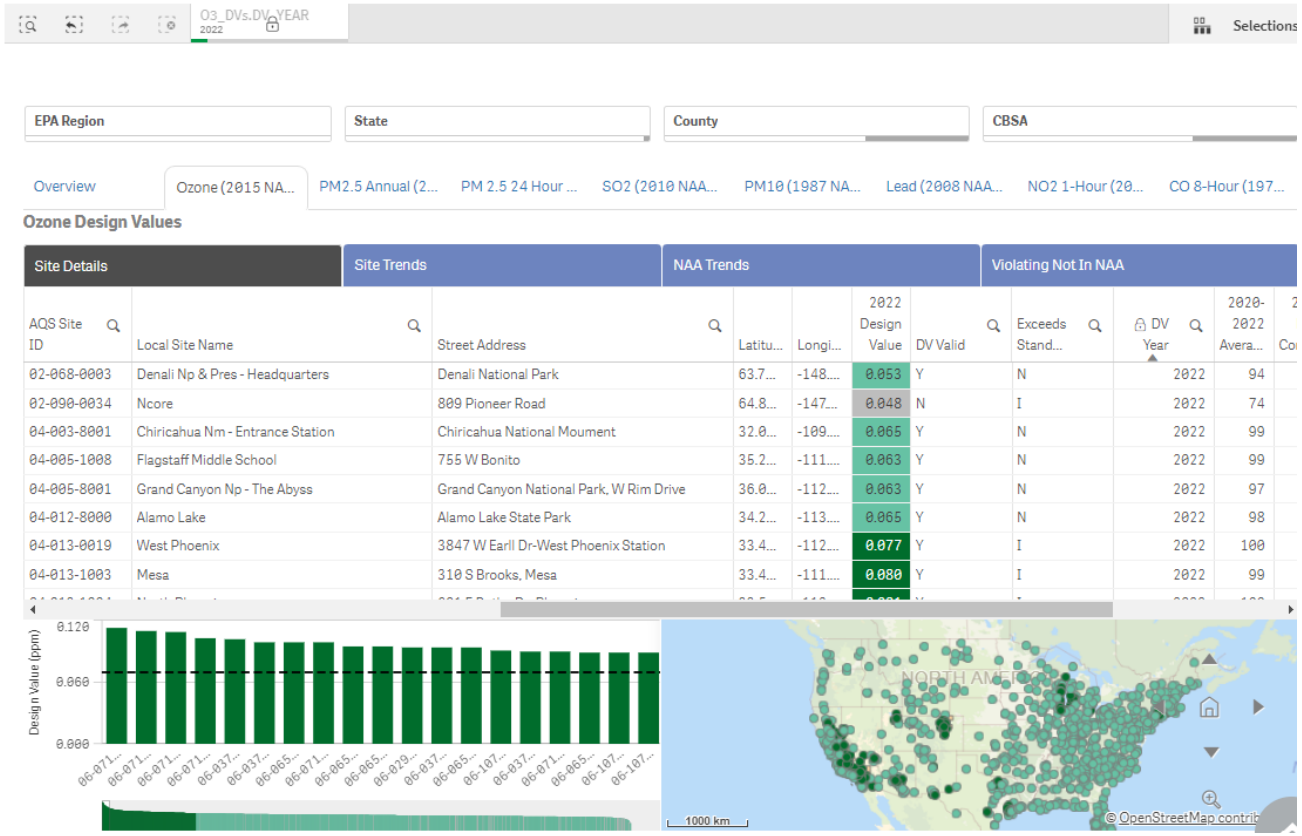
Map Symbols indicate values above or below the most recent standard. Click any point to display annual concentration data. Double click the map to zoom in and click the home button to reset. Please be patient with map exports.

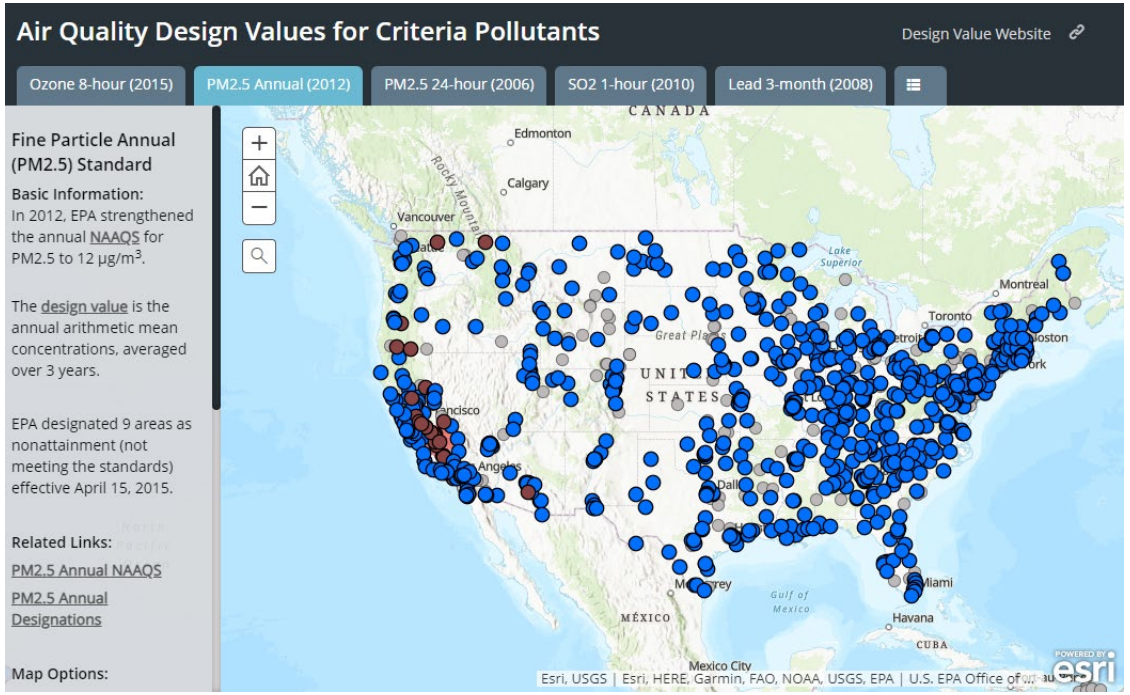


https://gispub.epa.gov/air/trendsreport/2023

Design Value Resources

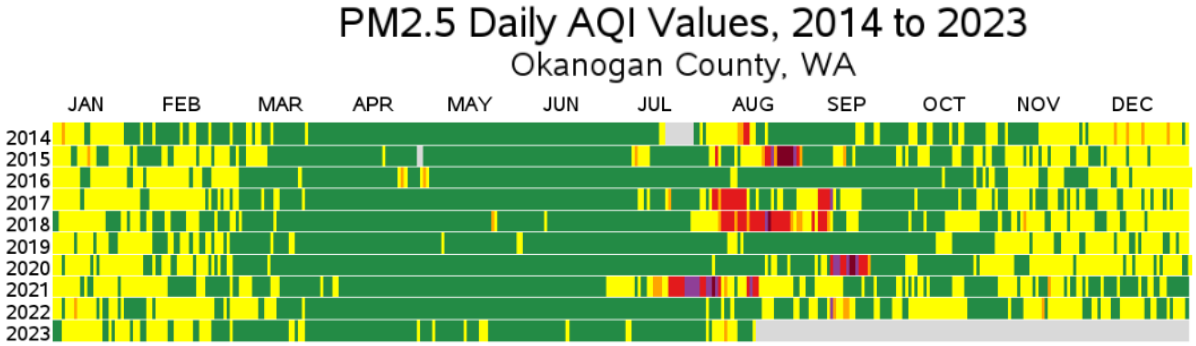
Design Value Interactive Tool

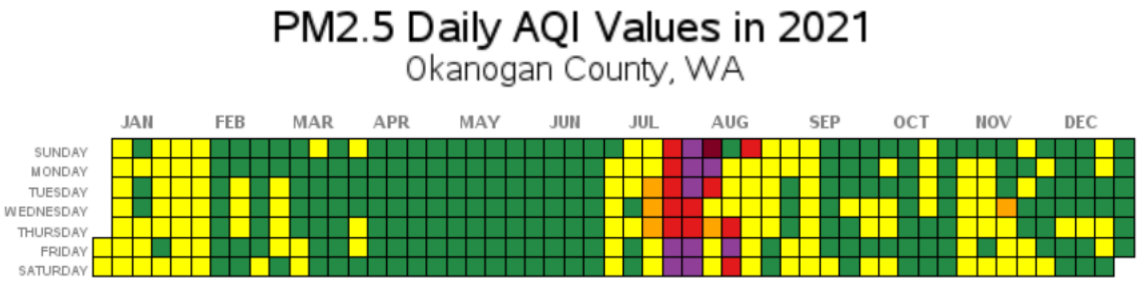


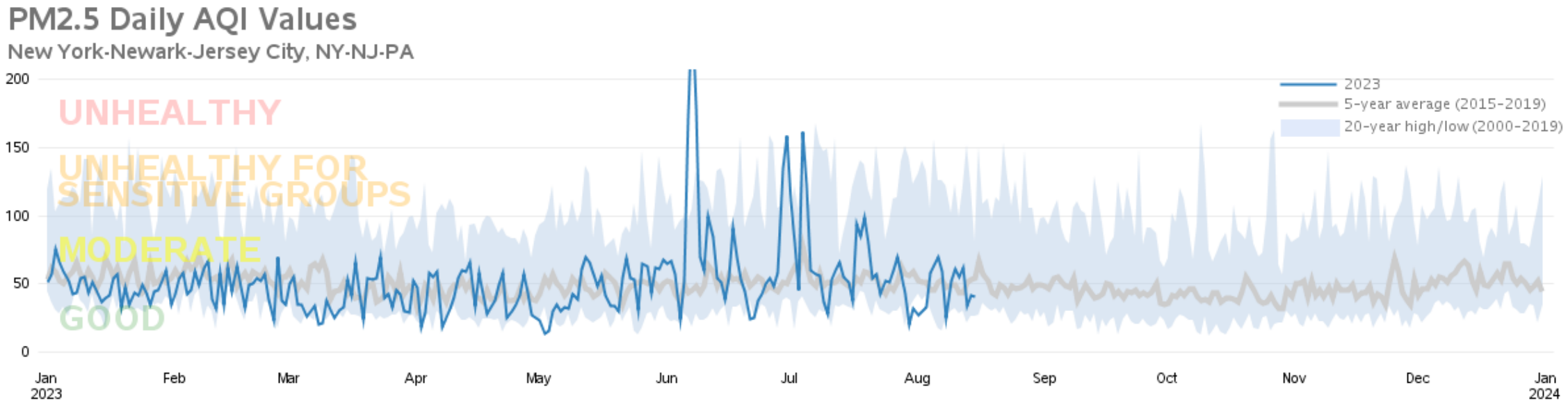


https://www.epa.gov/air-trends/air-quality-design-values

Data Visualization Tools







Source: U.S. EPA AirData <https://www.epa.gov/air-data>
Generated: August 16, 2023

Emission Inventory Updates

Update on 2022 Regulatory Platform Emissions

The Collaborative process for the platform has started

- Co-leads: Zac Adelman (LADCO), Mary Uhl (WESTAR), Alison Eyth (OAQPS)
- Discussions were held at the 2023 Emissions Inventory Conference

Existing national emissions workgroups have received updates

- Data will be shared once available

There are two 2022-specific workgroups

- Projections (adelman@ladco.org) and Fires (vukovich.jeffrey@epa.gov)

Year 2022 activity data have been requested for onroad VMT and fires

2022v1 timing

- S/L/T data reviews for base year inventories expected April 2024, and analytic year inventories during Summer 2024
- Base year emissions to be finalized by summer 2024 and analytic emissions for 2026, 2032, and 2038 by fall 2024

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AirToxScreen Updates

2019 AirToxScreen released Dec 2022

- https://www.epa.gov/AirToxScreen
- Data is included in 2023 EJScreen update

2020 AirToxScreen now planned for February 2024

- Additional time for State, Local, and Tribal (SLT) preview prior to release
- SLT emission edits included in final 2020 NEI
- Starting with 2020, point source risk will be at the census-block level

2021 AirToxScreen emissions review scheduled for fall 2023

- 2021 AirToxScreen still on schedule for Dec 2024 release

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Risk POC: Woody.Matt@epa.gov

National Emissions Inventory (NEI) Recent Milestones and Plans

Completed March - April 2023

- 2020 NEI public release including technical support documentation (TSD), summaries, and query tools
- Final version of 2020 EPA tools and estimates released for remaining nonpoint data sources
- Updated Air Emissions Trends summaries – new methodology for years 2002 through 2019

Completed July 2023

- Release of final 2023 NEI Plan, reflecting 45-day SLT review and comment period
- 2020 NEI TSD errata documentation added

Expected Fall 2023

- Decisions on nonpoint methodology changes (intended for 2023 NEI), including potential reorganization for residential wood combustion
- Continued NEI and EIS newsletter updates to stakeholders every 3-4 weeks
- 2021 AirToxScreen review

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Combined Air Emissions Reporting System (CAERS) Update

CAERS V4 released February 6, 2023 (includes DC monthly reporting, Maine and Idaho QA checks):

- Current users: GA (2019), DC & Pima AZ (2020), RI (2021), ID, ME, 11 pilot facilities from AZ (2022)
- Future users: AZ (all facilities), MT & MS (2024-2025 timeframe), others seeking management approval for onboarding in 2024 and later
- Additional SLTs have test accounts, and/or are seeking management approval to adopt CAERS
- Always seeking new SLTs for our Product Design Team (PDT)

Process:

- Test accounts can be used to explore CAERS
- Ready to onboard?
  - Start CROMERR process ASAP
  - Customizations possible through EPA or EN Grant applications are an option for funding.

New:

- Automatic system to system data retrieval ("APIs") from CAERS available and being tested by AZ and MT
- JSON upload for facilities almost complete
- Automatically updated emission factors from WebFIRE

Upcoming:

- Ongoing enhancements requested by industry and SLTs
- Facility data alignment and stack test data sharing with CEDRI
- Enhancements to flow with TRI

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Air Emissions Reporting Rule (AERR)

The proposal published in the Federal Register on August 9, 2023
https://www.federalregister.gov/documents/2023/08/09/2023-16158/revisions-to-the-air-emissions-reporting-requirements

You may submit written comments through October 18, 2023

- Comments can be sent via www.regulations.gov, docket ID EPA-HQ-OAR-2004-0489
- Email and fax options are available in the preamble

AERR Website: https://www.epa.gov/air-emissions-inventories/air-emissions-reporting-requirements-aerr

Webinars – registration required

- SLT webinars announced through NACAA, AAPCA, and NEI contacts
- Public webinars announced through AERR website

Clarifying questions can be sent to NEI_Help@epa.gov (Please include AERR in the subject line)

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Emissions Data for IRA Climate Pollution Reduction Grants

Work on planning grant deliverables are beginning, with implementation grant deliverables on the horizon.

- Will require technical assistance for applicants to meet requirements.

A website for easily obtaining 2020 NEI data has been developed.

- Includes county/process emissions information for all nonpoint, onroad, and nonroad sources.
- Includes facility emissions information for all point sources.

CPRG trainings have been provided, with more targeted Technical Assistance Forums rolling out.

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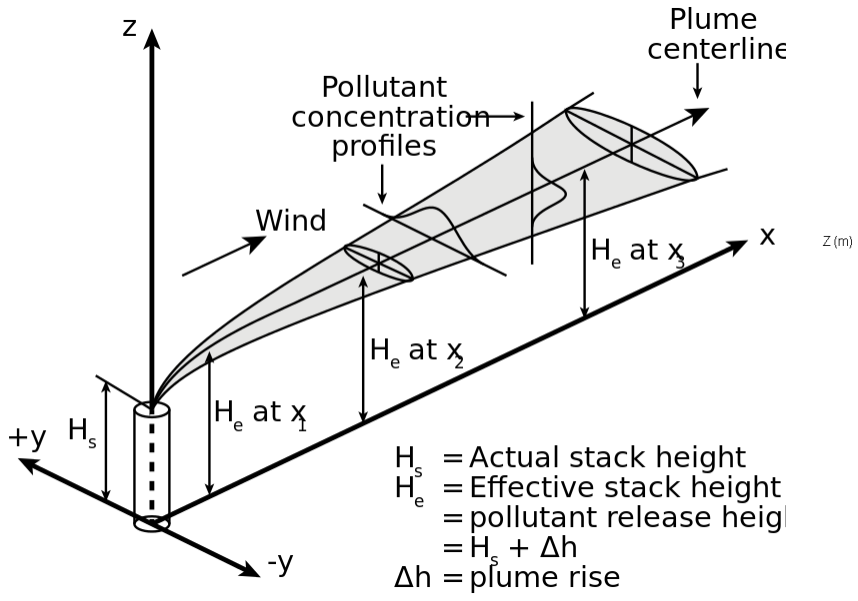
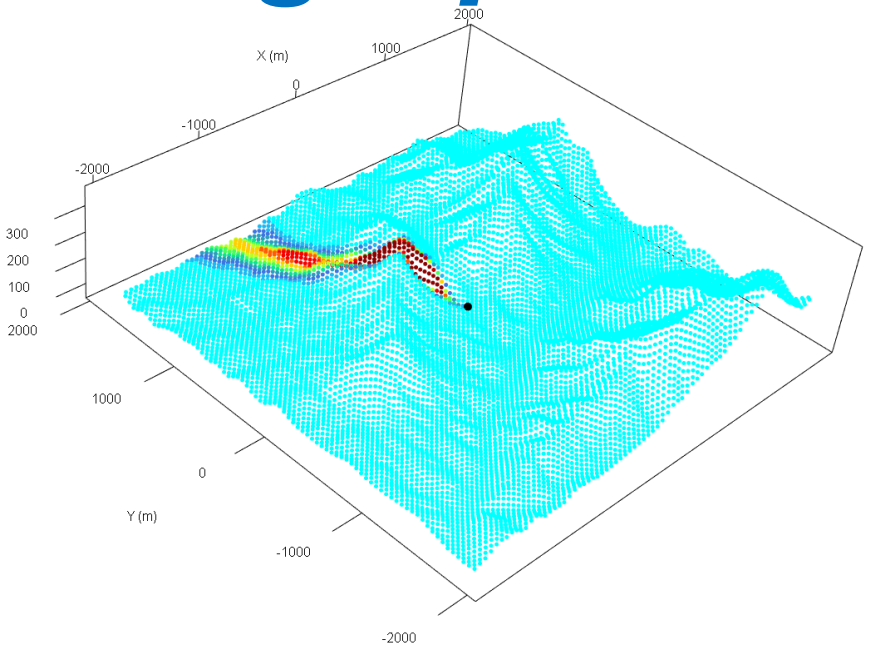
Air Quality Modeling Updates





AERMOD Modeling System Updates

- AERMOD/AERMET Version 22112
  - Released June 27, 2022
- Priority Development Activities *(Considerations for regulatory updates)*
  - RLINE for Mobile Source Modeling
  - Generic Reaction Set Method (GRSM) for NO_2 Conversion
  - PRIME Downwash
  - COARE Algorithms in AERMET for Offshore Modeling
  - Aircraft Plume Rise
- **Proposal Schedule for 2023**
  - Model code lockdown (late April)
  - Model testing and documentation; Appendix W regulatory text updates (Spring/Summer)
  - Proposed AERMOD/Appendix W rule and AERMOD Modeling System code release (mid-late October)
  - 13th Modeling Conference/public hearing (November 14-15)
- Other Development Initiatives *(Ongoing)*
  - Platform Downwash/Shoreline Fumigation
  - AREA Source Meander
  - Urban Source Improvements

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Overwater / OCS Permitting Support

- Numerous offshore wind energy and oil/gas projects seeking permits and needing to perform compliance demonstration assessments/modeling
- Ongoing policy related complications (ambient air, assessment need of construction emissions, etc.)
- Technical concerns with the Offshore and Coastal Dispersion (OCD) model:
  - Lacking Tier 2 / 3 NO_2 chemistry options… assumes full conversion of NO_X to NO_2
  - Lacking advancements of PRIME downwash algorithms to assess impacts in cavity/wake regions of structures
  - Lacking ability to include varying background concentrations
  - Older model that doesn't appropriately calculate output in the form of newer NAAQS standards
- AERCOARE-AERMOD alternative model option
  - Use of COARE algorithm for appropriate characterization of the marine boundary layer using either buoy or prognostic meteorological data
  - When platform downwash and shoreline fumigation are determined to not be of concern, AERMOD with use of AERCOARE offers a viable alternative
  - 9 formal approvals by EPA Regional Offices with concurrence from the Model Clearinghouse since 2019 and 2 additional alternative model requests are under consideration for approval now, https://cfpub.epa.gov/oarweb/MCHISRS/ *(Use search term AERCOARE)*

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AQ Modeling Workshops & Conferences

- 2023 Regional, State, and Local (RSL) Dispersion Modelers' Workshop
  - Conducted hybridly at the EPA Region 7 Office (Kansas City) – June 28-29, 2023
  - Presentations available at: https://gaftp.epa.gov/Air/aqmg/SCRAM/workshops/2023_RSL_Modelers_Workshop/2023_RSL_Modelers_Workshop-Final_Agenda.pdf
  - 2024 Workshop planning is already underway with tentative agreements in place for hosting in Denver, CO (CDPHE Offices).
- 2023 RSL Photochemical Modelers' Workshop
  - Originally earmarked for Oct 31-Nov 2, 2023 as a virtual only meeting
  - Now postponed until Spring 2024 for better alignment with PM NAAQS and Regional Haze Rule revisions schedules
  - Considerations for combining with 2024 RSL Dispersion Modelers' Workshop, similar to weeklong 2012 Workshop in Chicago
- **13th Conference on Air Quality Models**
  - EPA RTP Office (Durham) – November 14-15, 2023 – In-person only
  - Triennial AQ Modeling Conference (CAA, Section 320)
  - Public hearing for proposed AERMOD / Appendix W revisions
  - All presentations and a transcription of the proceedings from the 13th Conference will be placed into the Docket for the proposed rule

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PM NAAQS Reconsideration Regulatory Impact Analysis

- $PM_{2.5}$ design values were projected to 2032 to inform the PM NAAQS Proposal Regulatory Impact Analysis
  - 2016v2-based modeling platform
  - Limited screening of extreme values to help address wildfire influence in 2014-2018 base-year monitoring
- Emission reductions from 'on-the-books' rules in the 2032 case continue the progress in $PM_{2.5}$ concentrations in recent decades
  - The number of counties above 9 μg/m³ in the 2032 projection is about half the number for 2021 DVs
- Reductions in direct PM emission in exceedance areas will be important beyond the 'on-the-books' rules
  - Also helps to address exposure disparities

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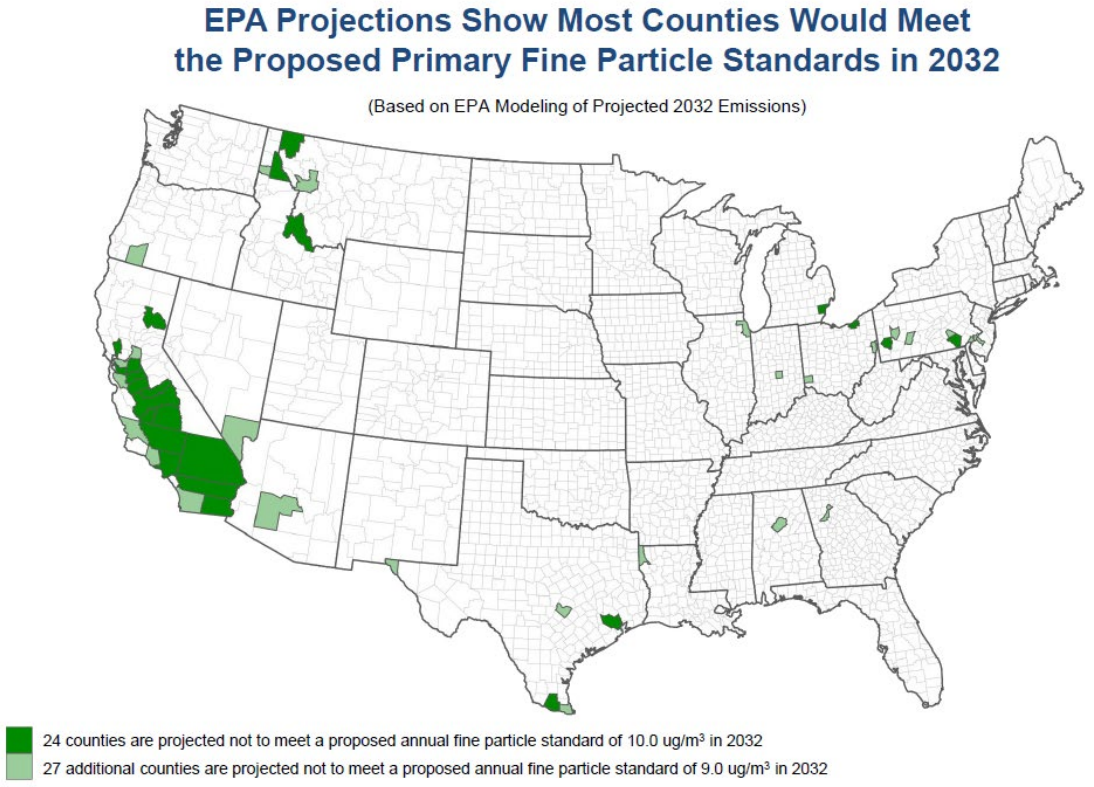
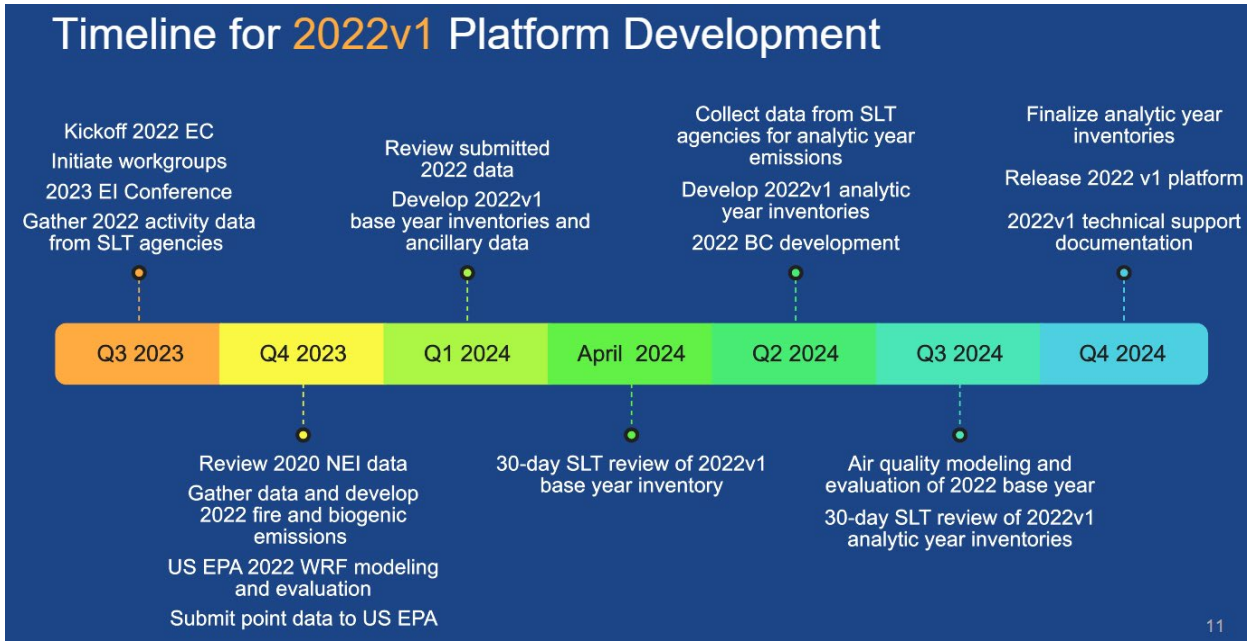


Base Year Modeling Platform Review

- Considerations for an new modeling platform
  - Review of EPA's modeling guidance for selecting a base year
  - Emissions data and trends
  - Monitoring data and trends: Ozone, PM, NOy concentrations
  - Conducive meteorological conditions
- Based on analyses relevant to these considerations, EPA has identified 2022 as the most appropriate year for a new regulatory emissions modeling platform
- Discussions with MJO's on collaboration are on-going



Source Monitoring Updates

Fenceline / Sorbent Monitoring

- EPA has recently proposed expanded applications of fenceline monitoring
  - Hazardous Organic NESHAP (HON), benzene, butadiene, vinyl chloride, ethylene oxide, ethylene dichloride, and chloroprene
  - Coke Oven NESHAP, Benzene
  - Integrated Iron and Steel, Chromium
- Method Development
  - Proposed Method 327, canister based measurement for volatile organic HAPS (ethylene oxide and vinyl chloride) – **FINAL Spring 2024**
    Talking Point – optimized canister approach building off TO-15A
  - Future Revisions to 325A/B, expanded compound list and new sorbent material – **Proposal Summer 2024**
    Talking Point – expanding scope to support HON compounds.
  - New Method for Fenceline Metals – **Fall 2024**

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Method 23 Update

- Method 23 (Dioxin/Furan testing) updates – Final (March 2023)
  - Improves analytical approach and sensitivity for Dioxins/Furans
  - Adds options to measure PCB compounds and PAH compounds, if desired
  - Laboratories are adapting to new analytical practices

- Starting work on EPA Method 31 – Dioxin/Furan testing using a different analytical finish to accommodate future laboratory technology (MS/MS)
  - Soon to be published as OTM-049 (November 2023)
  - Expect to propose as Method 31 in 2024

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Wood Heater Updates

- Revocation of Alt 125 /127 (Cordwood test method) final Feb. 23, 2022
- Large effort precision study of IDC wood heater test method and TEOM measurement of PM
  - West coast lab work – 52 test runs on 3 wood heater models burning D. fir and maple – completed
  - East coast lab work – Same stoves, 52 more tests, maple and birch – underway
- 21 tests conducted with paired TEOM devices at EPA – ORD – complete
  - 21 tests examining TEOM measurements for ruggedness (sensitivity to change) completing August, 2022.
- Precision testing of hydronic heater IDC method – West coast work is underway
  - West coast lab work – 54 test runs of hydronic cord wood and pellet fired heaters
  - East coast lab work – Same 54 test runs, in different order than West coast. Exchanging appliances – Pellet heater tests complete (East)
- OAQPS supporting OECA on test report review of Alaska identified test report issues
  - New checklist revisions (April 2023) to Third Party Certifiers has demonstrated to improve new report completeness

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Questions?