

Air Quality Modeling, Monitoring and Other Technical Updates



*AAPCA Spring Meeting
2023*

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Ambient Monitoring Updates



Source: GAO File Photo.



American Rescue Plan – Status Update

- **Competitive Grant (\$20M)**
 - **December 2021** - Request for Applications (RFA) Opened
 - **March 2022** - RFA Closed; 206 eligible proposals received
 - **October – November 2022** - Notification and Announcement of Selections (132 projects; \$53.4M)
 - **January 2023** - Completed requested debriefings for unsuccessful applicants
 - **1st Quarter 2023** - Anticipated Awards
 - The awards process is taking longer than EPA anticipated due to the increased number of selected applications made possible by Inflation Reduction Act funding.
- **Direct Awards (\$22.5M)**
 - Direct award funding from the ARP is being used to address health outcome disparities from pollution and the COVID-19 pandemic.
 - Grants were awarded to state, Tribal and local air agencies to enable continuous monitoring of fine particle pollution (PM_{2.5}) and replace other aging air monitoring equipment.
 - State, Tribal, and local agencies implementing grant workplans.
- **EPA Regional Office Short-term Community Monitoring Projects (\$5M)**
 - EPA Regions continue to implement their sensor loan programs and mobile monitoring platforms as they receive equipment. (<https://www.epa.gov/air-sensor-toolbox/air-sensor-loan-programs>)

<https://www.epa.gov/arp>



PM NAAQS Reconsideration and Ambient Monitoring

- Published in the FR on January 27th, 2023. Public comment period through March 28, 2023.
- Two important monitoring related topics connected with the reconsideration:
 - **PM_{2.5} network design and relationship to environmental justice**
 - **How to improve FEM/FRM comparability**
 - Use of PM_{2.5} continuous FEMs is dominated by two companies with a total of four methods (89% of the operating network in 2022):
 - Met One BAM 1020 and BAM 1022
 - Teledyne API T640 and T640x
 - EPA has proposed a revision to the monitoring regs to allow improvement of PM concentration measurement performance for approved FEMs.
 - Teledyne API recently (Feb 24th) submitted to EPA ORD's reference and equivalency program an improvement to their T640 and T640x method performance with SLT collocated FRM data. This application was submitted under the existing rules and is in review.
 - Recommend monitoring agencies assess their FRM and continuous FEM data quality and for cases where they may have one of more sites with outliers (relative to data in other agencies) pursue additional support and training as needed.

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PM NAAQS Reconsideration and Ambient Monitoring

Quality Assurance Changes

Technical Updates were made to Appendices A, B, and E to include improvements, clarifications, efficiencies and correction where data or expertise dictate.

Important Highlights:

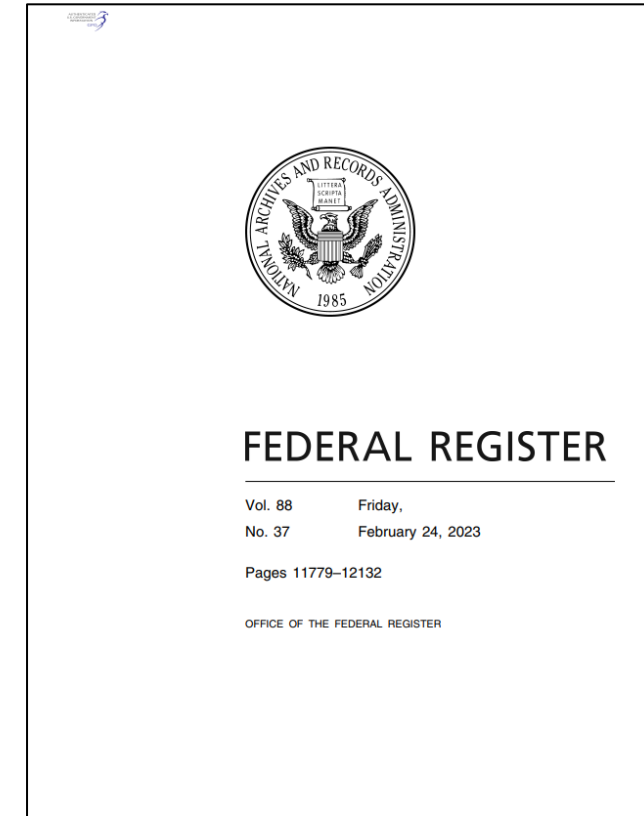
- New metrics for calculating precision and bias were created to account for high bias as a result of lower ambient concentrations in Appendix A and B.
- Reorganized Appendix E to separate traditional ambient air monitoring requirements from open path monitoring requirements.
- Added specificity and clarity for existing Appendix E requirements.

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Ozone Absorption Cross-Section – Proposed 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 new 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**.
- Changing cross section value (α) in two places: Sections 4.1 Principle and 4.5 Procedure
 - **Old** α = absorption coefficient of O₃ at 254 nm = **308 ± 4** atm⁻¹ cm⁻¹ at 0 C and 760 torr
 - **New** α = absorption coefficient of O₃ at 254 nm = **304.39** atm⁻¹ cm⁻¹ with an uncertainty of **0.94** atm⁻¹ cm⁻¹ at 0C and 760 torr
- Minor changes to references
 - Adding Hodges et. al., 2019 <https://doi.org/10.1088/1681-7575/ab0bdd>
 - Updating revised dates for the Ozone TAD and QA Handbook Volume II
 - Comment period closed March 27, 2023
 - Goal: finalize by end of 2023



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

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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

Community Scale Air Toxics Ambient Monitoring (CSATAM) grants competition

- Last competition was in 2020; next competition slated for 2024
- Options are being evaluated to enhance the competition with IRA funds



Important Quality Assurance Updates

Technical Systems Audit Training in 2023

- TSA training event is in the planning stages but is tentatively slated for October in the RTP, NC area. This training event is open to EPA QA staff **and** state, local and tribal monitoring organization QA staff. Details coming in the next few weeks.

Protocol Gas Verification Program - New AQS Transaction

- A new requirement will require monitoring organizations to input cylinder identification information into AQS to support an upcoming enhanced QA transaction file. This is a new action that will be used to support the PGVP in identifying and testing gas providers. Guidance on this new transaction is upcoming.

Issued Amended Guidance to 2017 memorandum, *EPA Review of Monitoring Organization QAPP's for Critical Criteria Conformance*

- The above memorandum was revised to clearly indicate that conditional approval for QAPPs that do not include validation criteria from the QA Handbook will no longer be granted. It also reaffirms EPA's expectation that QAPPs include the validation templates from Appendix D of the QA handbook.

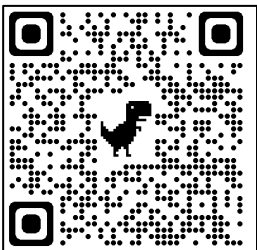
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2023 Air Sensors QA Workshop

Dates:	July 25-27, 2023
Location:	Research Triangle Park, NC
Event Type:	Hybrid (In-person and Virtual)
Venue:	Announcement Coming Soon
Cost:	Free
Pre-registration:	Now open!

- 3-day hybrid event for both in-person and virtual attendees and presenters and will include presentations and panel discussions with various air sensor experts.
- The workshop will help the air sensor community better understand established and emerging QA methods for collecting fit-for-purpose air sensor data and any associated limitations.
- OAR and ORD are cosponsoring the event.
- **Fun Fact:** Approximately 70% of the projects awarded under the ARP grant competition involve at least one air quality sensor.



Emission Inventory Updates





2016v3 Modeling Platform

- The 2016v3 platform emissions for 2016 and 2023 were released publicly on January 31, 2023
 - <https://www.epa.gov/air-emissions-modeling/2016v3-platform>
- These emissions were used for AQ modeling related to interstate transport to support the final SIP actions and the Good Neighbor final rule modeling
- In 2016v3, the EPA has addressed comments on the 2016v2 platform submitted on and prior to the Good Neighbor and SIP action proposals
 - For 2016, updates included using more data from 2017 NEI; adding lightning NOx; and updated biogenic, solvent, and combination truck emissions
 - For 2023 projections, updates included EGU emissions and changes to other sectors using Annual Energy Outlook 2022 and Terminal Area Forecast 2021
 - See the 2016v3 Technical Support Document for more details

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Development of the Next Regulatory Platform



- MJOs and states requested that EPA consider options for a regulatory platform for a year later than 2016
- Following a review of air quality conditions and the availability of measurement data for recent years, EPA proposed 2022 as the base year for the next regulatory platforms
- Feedback on the selection of 2022 was provided by MJOs in February
- The new platform is being designed to meet state / local and EPA regulatory modeling needs for ozone, regional haze, and other topics
 - Future years are likely to include 2026, a year in early 2030s, and 2038
- A collaborative effort will be organized to prioritize topics of shared interest
- The current target for first version of the platform is calendar year 2024, followed by a second version in 2025

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AirToxScreen Updates

2019 AirToxScreen released Dec 2022

- <https://www.epa.gov/AirToxScreen>
- Data will be included in 2023 EJScreen update

2020 AirToxScreen planned for end of 2023

- Now on annual schedule
- SLT emission edits included in final 2020 NEI
- Starting with 2020, plan to include point source risk at the census-block level

2021 AirToxScreen emissions review scheduled for summer 2023

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Air Emissions Reporting Rule

AERR updates under consideration for the 2023 inventory reporting year:

- Updating the nonpoint emissions requirements to use current best practices and meet transparency and quality assurance goals
- Ensure that AERR requirements are consistent with the latest emissions documentation available to data reporting agencies
- Considering emissions reporting directly from permitted facilities in Indian country when an Indian tribe is not required to report emissions data
- An approach to acknowledge and incorporate CAERS in some cases

AERR updates under consideration for later inventory years:

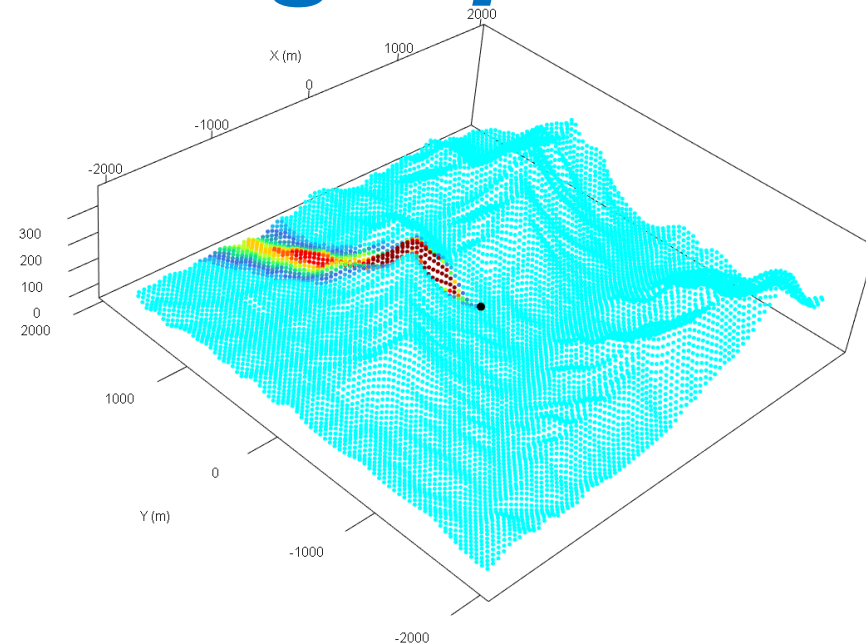
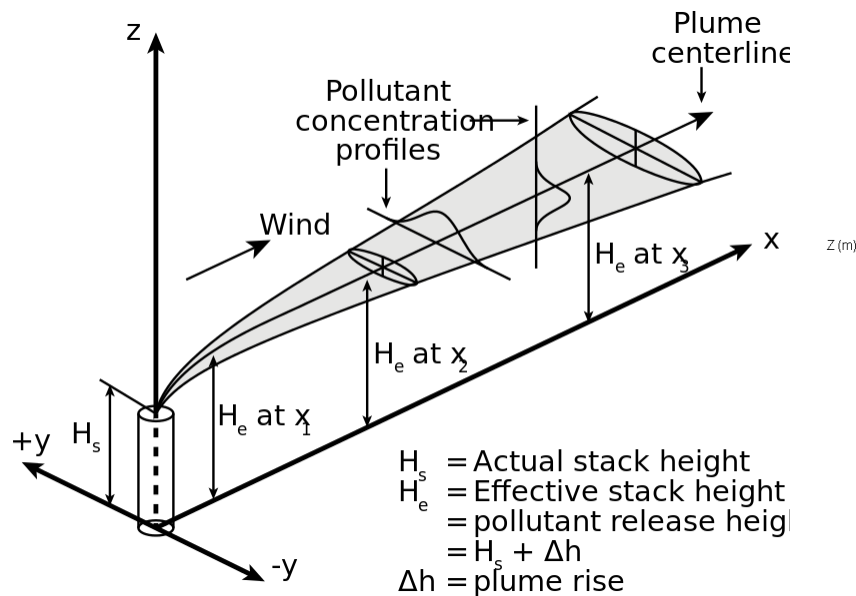
- Improving air toxics emissions data
- Improving fires emissions data for prescribed fires
- Improving emissions from small electric generation (e.g., backup generators)

Small Business Advocacy Panel has completed

AERR shows on EPA regulatory agenda as a July 2023 proposal

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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 NO₂ 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 September)
 - 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 NO₂ chemistry options... assumes full conversion of NO_x to NO₂
 - 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
 - 8 formal approvals by EPA Regional Offices with concurrence from the Model Clearinghouse over the past year, <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

- EPA Region 7 Office (Kansas City) – June 28-29, 2023
- No Stakeholder Day... only co-regulatory agencies this year
- Hybrid (In-person with a virtual participation option)
- <https://www.epa.gov/scram/2023-regional-state-and-local-dispersion-modelers-workshop>

- 2023 RSL **Photochemical** Modelers' Workshop

- Aug/Sept timeframe (TBD)... likely 3 afternoon sessions
- OAQPS, ORD, and co-regulatory agencies
- Virtual only

- 13th Conference on Air Quality Models

- EPA RTP Office (Durham) – November 14-15
- Triennial AQ Modeling Conference (CAA, Section 320)
- Public hearing for proposed AERMOD / Appendix W revisions
- Hybrid (In-person with a virtual participation option)

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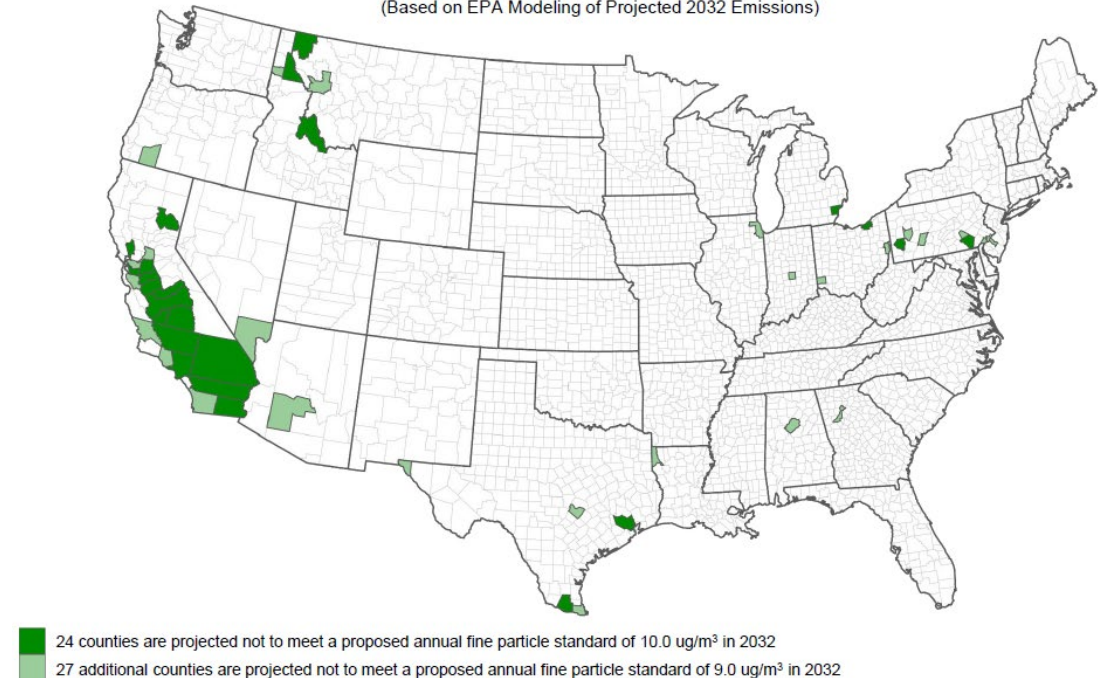


PM NAAQS Reconsideration Regulatory Impact Analysis

- 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 $\mu\text{g}/\text{m}^3$ 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

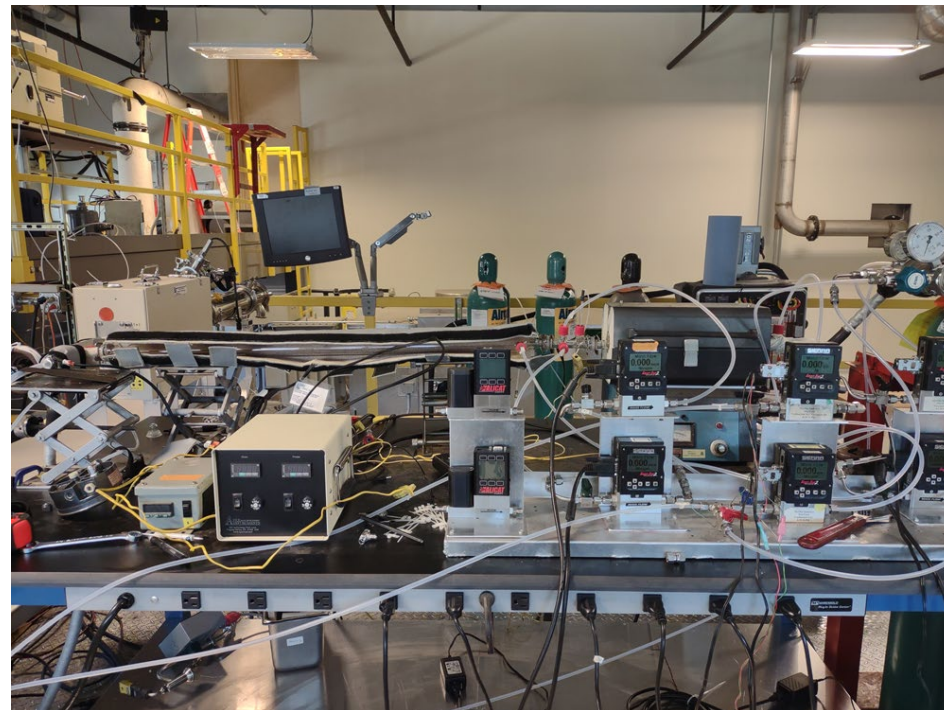
EPA Projections Show Most Counties Would Meet the Proposed Primary Fine Particle Standards in 2032

(Based on EPA Modeling of Projected 2032 Emissions)



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Measurement Technology Updates





EPA Method 23 Updates

Method 23 Revisions – We are soon finalizing extensive revisions to Method 23 for measurement of dioxins and furans.

- Designed to make the analytical portion of Method 23 as performance-based as possible.
 - Provides flexibility for method application without compromising data quality.
- Revisions include measurement of PCB and PAH compounds.
- Proposal published on January 14, 2020 with associated comment period that closed March 16, 2020.
- We anticipate final promulgation in March of 2023. Final revisions will be posted on our website:

<https://www.epa.gov/emc/emc-recent-additions>

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Video Imaging Spectral Radiography (VISR)

Video Imaging Spectro-Radiometry (VISR) –

- Investigating a cost-effective, more technologically advanced and real-time or near real-time approach to monitoring flare efficiency of NSPS or NESHAP regulated flares at industrial sites.
- A remote measurement system that for assessment of combustion efficiency and heat release of a variety of flare types using optical techniques.
- Suitable for in-plant monitoring and process control feedback as well as remote/ mobile monitoring of flare efficiency from beyond the fence line.
- Currently evaluating in blind studies for accuracy and used in multiple feasibility studies for short- and long-term use.
- MTG has been working to ensure the precision of the measurement is acceptable for compliance use.
- Expecting to propose an EPA method for this in late 2024

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Test Method Revisions Rulemaking

Test Methods Update Rulemakings–

- In April 2022 EPA proposed corrections to typographical and technical errors, updates to outdated procedures, and revisions to add clarity and consistency with other monitoring requirements.
- The rule addresses Methods 1, 4, 7, 19, 25, 25C, 26, 315, and 323; Performance Specifications 1, 2, 4B, 6, 12A and 16; and Procedures 1 and 5 of Appendix F.
- We expect the final rulemaking to be published in March, 2023.

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Wood Heating Test Method Update

- Using Integrated Duty Cycle operating and fueling cycle methods developed by NYSERDA/NESCAUM
- Multi year, bi-coastal study to characterize precision and variability of several IDC test methods.

West Coast Lab	East Coast Lab
Wood Heaters – Complete	Wood Heaters – Ongoing
Hydronic Heaters – Ongoing	Hydronic Heaters – Beginning soon
Pellet Hydronic Heaters – Beginning soon	Pellet Hydronic Heaters - Complete
Pellet Heaters – Summer 2023	Pellet Heaters – Summer/Fall 2023
Warm-air Furnaces – Spring 2024	Warm-air Furnaces – Spring 2024

- Proposal of these as EPA test methods to follow this study

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Questions?