

TECHNICAL AND MONITORING TOPICS INCLUDED IN THE PM NAAQS FINAL RULE

**OAR – OAQPS – AQAD & ORD – CEMM - AMCD
February 2024**

Timeline and Upcoming Milestones on Final Decision for Reconsideration of PM NAAQS

Key Milestone	Date
Promulgation of Final Decision	February 7, 2024
Published in Federal Register	Expected about two weeks after promulgation
Effective Date	60 days after publication in the Federal Register

Summary of existing and Final Revised PM Standards

Previous/existing Standards					Final Decisions in 2022 Reconsideration
Indicator	Averaging Time	Primary/Secondary	Level	Form	
PM _{2.5}	Annual	Primary	12.0 µg/m ³	Annual arithmetic mean, averaged over 3 years	Revised level to 9.0 µg/m³
		Secondary	15.0 µg/m ³		Retain
	24-hour	Primary and Secondary	35 µg/m ³	98th percentile, averaged over 3 years	Retain
PM ₁₀	24-hour	Primary and Secondary	150 µg/m ³	Not to be exceeded more than once per year on average over a 3-year period	Retain

* Prior to 2012, PM NAAQS were reviewed and revised several times – established in 1971 (total suspended particulate – TSP) and revised in 1987 (set PM₁₀), 1997 (set PM_{2.5}), 2006 (revised PM_{2.5}, PM₁₀)

Summary of Final Decisions Related to Ambient Air Monitoring:

- **What we finalized:**
 - **PM_{2.5} Network Design** – Modified the PM_{2.5} network design criteria to require monitoring in at-risk communities where there are anticipated effects from sources in the area contributing to poor air quality.
 - **PM Federal Equivalent Methods (FEMs)** - Finalized that valid State, local, and Tribal air monitoring data generated in routine networks and submitted to the EPA may be used to improve the PM concentration measurement performance of approved FEMs.
 - **Remaining Technical Areas** – Finalized editing several technical areas for clarification, consistency with current practices, changes in aerosol composition, and lower concentration levels. These areas include:
 - Data calculations, commercially available second stage separator for the PM_{2.5} FRM, reference and equivalent methods, quality assurance requirements, probe and siting criteria, and monitoring aspects of Air Quality Index (AQI) reporting.

Summary of Technical and Monitoring Topics

- Part 50:
 - Data Calculations in Appendices N and K
 - PM_{2.5} FRM second stage separator in Appendix L
- Part 53:
 - Reference and Equivalent Method Topics
- Part 58:
 - Appendices A and B on QA
 - Appendix C on Methods
 - Appendix D on Network Design
 - Appendix E on Probe and Siting Criteria
 - Appendix G on monitoring aspects for the AQI
- Taking comment on Next Generation Data

Part 50 Appendix N - (PM_{2.5}) and K (PM₁₀) Changes

- Appendix N:
 - Finalized proposal on existing practice of combining data from nearby monitoring sites to determine a valid design value, known as a “site combination.”
- Appendix K:
 - Finalized proposal that PM₁₀ design values be calculated on a site-level basis
 - Finalized proposal on site combinations similar to PM_{2.5}



Part 50 Appendix L - FRM for PM_{2.5} - Addition of the Tisch Cyclone as an Approved Second Stage Separator

Appendix L:

Finalized technical change to Appendix L includes the addition of an alternative PM_{2.5} particle size separator to that of the WINS and VSCC size separators. The new separator is the TE-PM_{2.5} cyclone manufactured by Tisch Environmental Inc., Cleves, Ohio, and has been shown to have size-selective performance equivalent to that of the originally specified WINS impactor with regards to aerodynamic cutpoint and PM_{2.5} concentration measurement.

Part 53 - Modification to site requirements for Class III FEM field testing

Site Requirements:

Updated the Class III comparability tests site requirements for candidate PM_{2.5} FEMs. Took out the requirement that the site “...shall be in a large city east of the Mississippi River, having characteristically high sulfate concentrations and high humidity levels.” Due to dramatic decreases in ambient sulfate concentration in the US, EPA finalized no longer requiring the high sulfate requirement for the Site D requirement.

Part 53 - Modification to range of concentrations required in field testing

Concentration Requirements

For candidate PM_{2.5}, PM_{10-2.5}, and PM₁₀ FEMs, Table C-4 specifies that a number of valid field tests be conducted in specific concentration ranges. However, due to dramatic decreases in ambient particulate matter concentration in the past two decades, EPA is finalizing its proposal to revise the testing specifications in Table C-4 to Subpart C of Part 53 to reflect current levels of ambient particulate matter concentrations for all three metrics.

- For PM₁₀, the acceptable concentration range was revised from 15-300 µg/m³ to 5-300 µg/m³.

Table C-4 also specifies the concentration above and below which 3 valid 24-hour data sets must be obtained.

- For PM_{2.5}, this concentration was reduced from 30 µg/m³ to 15 µg/m³. For PM₁₀, this concentration was reduced from 60 µg/m³ to 20 µg/m³.

Part 53 - Modification to requirements on generation of monodisperse aerosols

Generation of Monodisperse Aerosols

Performance evaluation of candidate FRM and FEM inlets requires the generation of monodisperse aerosols during wind tunnel tests. The currently approved particle generator for this purpose is no longer commercially available nor supported by its manufacturer. EPA finalized a revision to 40 CFR § 53.61(g) to add the MSP Model 1520 FMAG as an approved monodisperse particle generator for conducting the wind tunnel tests.

Edits to fix Typographical Errors

EPA finalized corrections to typesetting errors in 40 CFR § 53. Revisions to Tables A-1, Table B-1, and Table B-3. Figures B-3 and B-5, as well as fixing incorrect formulas in § 53.43(a)(2)(xvi), and § 53.43(b)(2)(iv).

Part 58 Appendices A and B - Quality Assurance

- Finalized 40 CFR Part 58, Appendix A and B technical changes and updates. Changes involved bias and precision equations updates, national QA program changes, technical updates, updates to references, and clarifications.
 - Notably, several comments were received regarding the new precision and bias statistics (Equations 6, 7, and 8) indicating a possible mathematical error that was inflating the statistics. EPA and their support contractor reviewed the statistics and discovered a typographical error in the formulas. The final rule was revised with the corrected formulas.

Calculations for Data Quality Assessments

- Finalized the Appendix A, 4.2.1 Equations 6 and 7 for calculating the Collocated Quality Control Sampler Precision Estimate for PM_{10} , $PM_{2.5}$ and Pb. These equations were revised from the proposal considering comments.
- Finalized the Appendix A, 4.2.5, Equation 8 calculation for the Performance Evaluation Programs Bias Estimate for $PM_{2.5}$. This equation was revised from the proposal considering comments.

Quality System Requirements

- Finalized the Appendix A, 2.3.1.1 total bias goal using new statistics
- Finalized the Appendix A, 2.6.1 pertaining to EPA Protocol Gas standards and PGVP

Part 58 Appendices A and B - QA Summary

Measurement Quality Check Requirements

- Finalized the removal of section 3.1.2.2 allowing NO₂ compressed gas standards to be used to generate audit standards.
- Finalized section 3.1.3.3 requiring annual verification of National Performance Audit Program (NPAP) tank gases to allow ORD verification frequencies – added flexibility where the science supports it.
- Finalized adjusting the minimum value required by Appendix A, 3.2.4 to be considered valid sample pairs for the PM_{2.5} Performance Evaluation Program (PEP) from 3 µg/m³ to 2 µg/m³.

References

- Finalized references and hyperlink updates in Reference sections.
- Finalized the addition of a footnote to Table A-1 to clarify the allowable time between checks.

Part 58 Appendix C – Updates to specifications for modifying PM FEMs

- Federal Equivalent Methods (FEMs) – EPA finalized its proposal that valid State, local, and Tribal air monitoring data generated in routine networks and submitted to the EPA may be used to improve the PM concentration measurement performance of approved FEMs.
 - This approach, initiated by instrument manufacturers, would be implemented as a national solution in factory calibrations of approved FEMs through a firmware update.
 - This would apply to any PM FEM methods (i.e., PM₁₀, PM_{2.5}, and PM_{10-2.5}).
 - The goal of updating factory calibrations would be to increase the number of routinely operating FEMs meeting MQOs across the networks in which they are operated.
 - While the Agency proposed to add this language to more expressly define a process to update factory calibrations of approved PM FEMs, the EPA believes that the existing rules for updating approved FRMs and FEMs found at 40 CFR 53.14 may also continue to be utilized for this purpose as appropriate.
 - Notably Teledyne API recently received an approved update from ORD’s Reference and Equivalency program to their PM_{2.5} continuous FEMs (i.e., T640 and T640x) using these existing rules.
- Approved Regional Methods (ARMs) – Finalized as proposed to remove these provisions

Part 58 Appendix D - Proposed Amendment to the PM_{2.5} Monitoring Network Design Criteria To Address At-Risk Communities

• PM_{2.5} Network Design

- Finalized proposal on modifying the PM_{2.5} network design criteria to require monitoring in at-risk communities where there are anticipated effects from sources in the area contributing to poor air quality.
- Requirement applies to cases where an additional site is required and not already in use for either near road or maximum concentration site.
- Such sites would still need to meet the requirement for being considered “areawide” air quality.

Part 58 Appendix D - Amendment to the PM_{2.5} Monitoring Network Design Criteria To Address At-Risk Communities

– Notes on EPA’s final decision on Amendment to the PM_{2.5} Monitoring Network Design Criteria to Address At-Risk Communities

- Desire to be in an area of poor air quality that also meets EJ criteria as some EJ areas will not have the air quality impacts that others do.
- There is some flexibility for monitoring agencies to pick sites within the construct provided.
- Definition of “At-risk communities” is explicitly tied to the science cited in proposal (PA and ISA).
- While we are finalizing these minimum monitoring requirements, the criteria for siting of monitors in “at-risk” communities can certainly be applied to additional communities above the minimum monitoring requirements.

Part 58 Appendix E – Probe and Siting Criteria

- **Revisions to Part 58 Appendix E - Probe & Monitoring Siting Criteria**
 - **Revised entirely. Mainly editorial and organizational changes to regulation for improved clarity**
 - Provided Separate Section for Open Path Monitoring Requirements
 - Clarified precision of distance measurements used for determining offsets
 - Clarified and reconciled Summary Tables to regulation text
 - Provided flexibility on spacing requirements from minor unrepresentative sources to SLTs
 - Amendments and Clarification for the Spacing from Obstructions and Trees
 - Reinstating Minimum 270° Arc and Clarifying 180° Arc requirement for unobstructed flow
 - Clarification on when Obstacles are deemed Obstructions
 - Amending and clarifying the 10-Meter tree dripline requirement
 - Amended Spacing Requirement for Microscale Monitoring
 - Amended Waiver Provisions to require that after waivers are approved, the waivers be periodically reevaluated by EPA Regional Offices
 - Broadened list of Acceptable Probe Materials for reactive gases

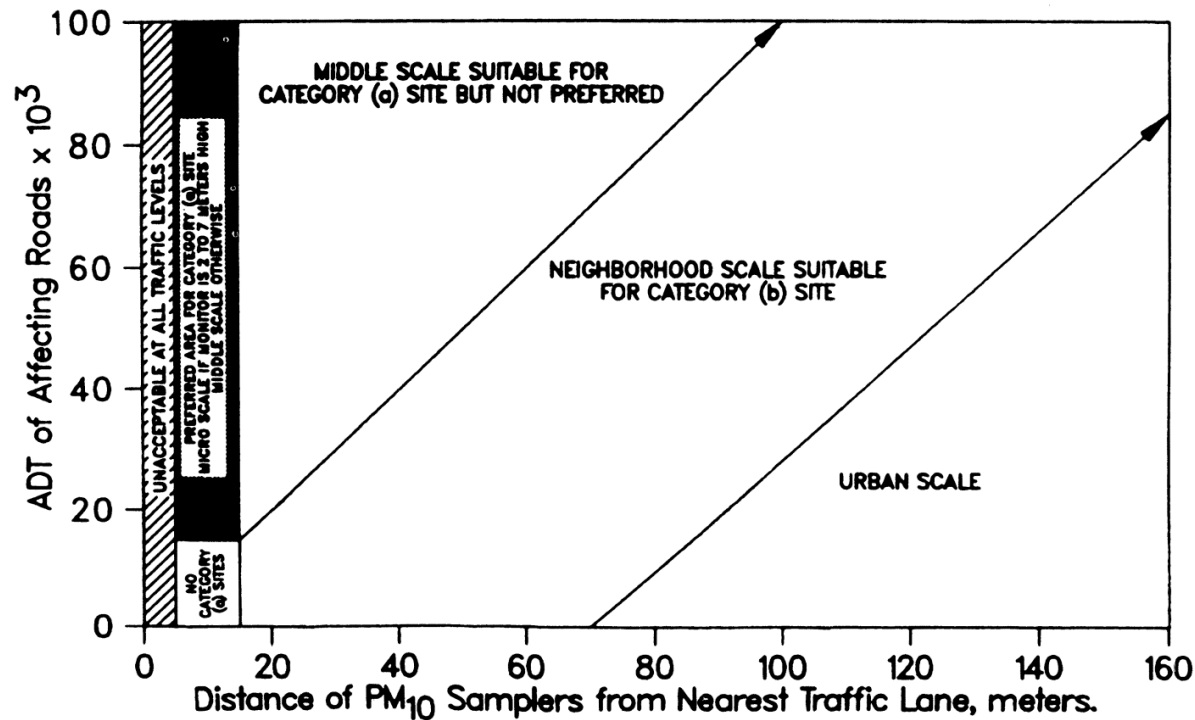
← (See Following Slide)

• **Broadened List of Acceptable Probe Materials for Reactive Gases**

- Acceptable probe materials for sampling reactive gases has not been revised since promulgated in 1979.
 - borosilicate glass, and
 - fluorinated ethylene propylene (FEP) Teflon[®], or their equivalent.
- In response to SLT requests for additional approved probe materials, ORD conducted a study to assess additional materials for sampling O₃, SO₂, NO₂, and CO. Based on ORD's research, EPA finalized the expansion of acceptable materials to:
 - borosilicate glass,
 - fluorinated ethylene propylene (FEP) Teflon[®],
 - Polyvinylidene fluoride (PVDF) Kynar[®],
 - Polytetrafluoroethylene (PTFE),
 - perfluoroalkoxy (PFA), and
 - Nafion[®].

Figure E-1, Pre-2006 Rule Change

Figure 2. Acceptable Areas for PM₁₀ Micro, Middle, Neighborhood, and Urban Samplers Except for Microscale Street Canyon Sites.



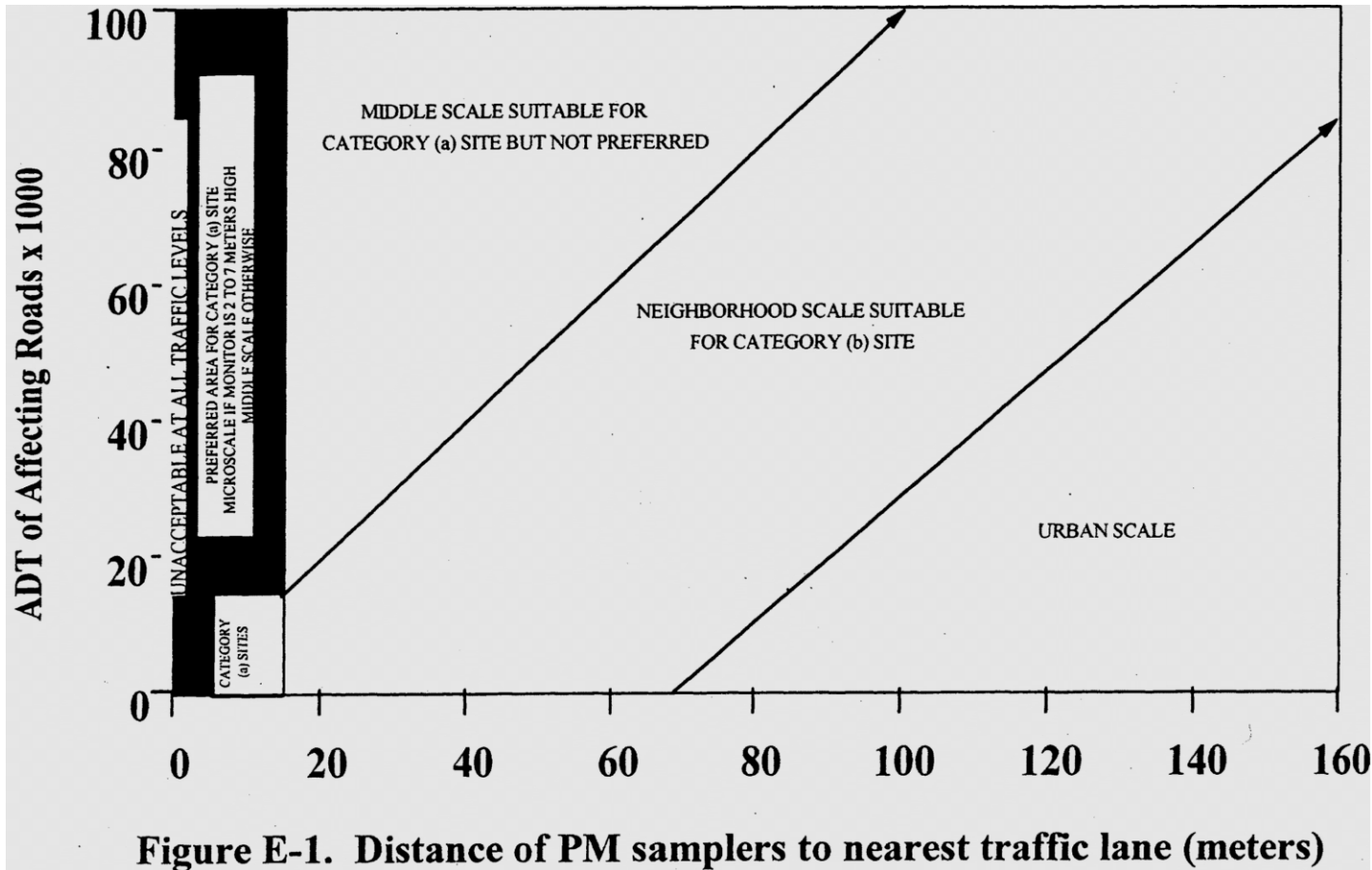
Pt. 58, App. E

40 CFR Ch. I (7-1-04 Edition)

Image quality not great, but readable.

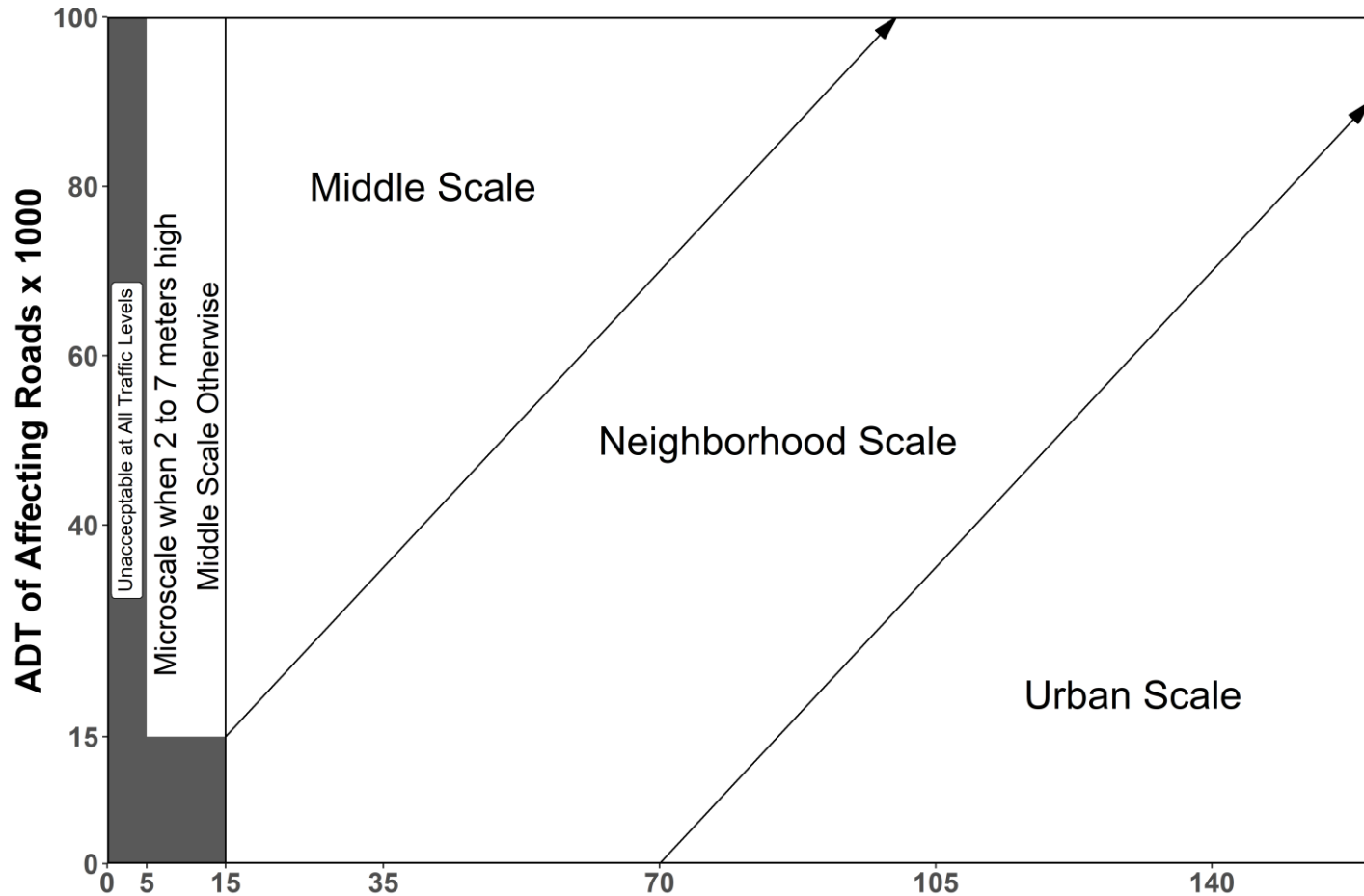
Note:
Category A and Category B definitions were discontinued after 2006.

Figure E-1, Pre-2024 Rule Change



- Image quality poor in CFR when scaled to fit on page.
- Note: Category A and Category B definitions were discontinued after 2006.
- The “NO” in Lower Left Cat A box may have accidentally been redacted by adjacent black bar.

Figure E-1, 2024 Final Rule



- Image quality set at 600 dpi.
- Image made with R ggplot which allows for control of aspect ratio and dpi.
- Removed Cat A and Cat B terminology.
- street canyon & near-road exception.
- Removed lower left box for the 0-15k ADT when <15m.

Figure E-1. Distance of PM Samplers to nearest traffic lane (meters)

Notes: Microscale street canyon sites must reside between 2 and 10 meters from the roadway.
Near-Road sites must be within 50 meters of the roadway.
The slopes of the lines between monitoring scales are one to one.

Appendix G – Air Quality Index (AQI) Monitoring Topics

- **Redefining “daily” AQI reporting from 5 to 7-days/week**
- **Appendix G – Added reg text stating “Submitting hourly data in real-time to the EPA’s AirNow (or future analogous) system is recommended, but not required...”**

Taking Comment on Incorporating Data From Next Generation Technologies

- EPA solicited comment on the most important data uses and data sets to consider in future products incorporating next generation data. Such approaches and/or products could utilize historical or near real-time data.
- Common themes across entities submitting comments:
 - Broad support for use of next generation data, except in cases of regulatory decision making.
 - Multiple entities are already successfully using sensor data and networks. Also, these networks will continue to expand.
 - Support for “fit for purpose”, filling in gaps, finding hot-spots, including in EJ areas, and evaluating network siting with respect to using next generation data.
 - Need to continue to work closely with co-regulated community (SLT’s) and others to understand and use next generation data.
 - Continued development of best practices, data analysis/visualization, and QA/QC for sensor data is highly important to success of using next generation data.
- The EPA will consider this input as it continues its work with the co-regulated community comprised of SLT agencies and other stakeholders to understand and use next generation data and joint efforts to manage the nation’s ambient air.
- As a reminder, there is no regulatory text associated with the solicitation of comments on this section.

Questions and Discussion