

2019-2021 PM_{2.5} Design Values.

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Charting Recent NAAQS Developments and Implications for Air Agencies

by Jason Meyers and Laura Crowder

An overview of state and local air pollution control agencies' roles and responsibilities in implementing control strategies necessary to achieve the NAAQS in light of recent developments.

The U.S. National Ambient Air Quality Standards (NAAQS) program is foundational to improving the nation's air quality. Structured under the U.S. Clean Air Act's (CAA) framework of cooperative federalism, the NAAQS program is administered by the U.S. Environmental Protection Agency (EPA), which reviews and sets health-based (or primary) and public welfare (or secondary) ambient air standards for six "criteria" pollutants.¹ Section 101 of the CAA specifies that air pollution control at its source is the primary responsibility of state and local governments. Actions by state and local governments, which also involve regulated entities and other stakeholders, have successfully achieved significant reductions in the emissions and ambient concentrations of pollutants regulated by NAAQS.²

Section 109(d) of the CAA stipulates that EPA, in consultation with the chartered Clean Air Scientific Advisory Committee (CASAC), shall review each criteria pollutant NAAQS at five-year intervals.³ The review timeline has differed historically, and EPA recently completed the first change to a standard in nearly nine years, tightening the fine particulate matter (PM_{2.5}) NAAQS by 25%.⁴ As the 2024 PM_{2.5} NAAQS are implemented and EPA reviews multiple other NAAQS, there are key regulatory, legal, and technical issues that have important implications for state, local, and tribal air agencies responsible for implementation, monitoring, enforcement, and permitting.

PM_{2.5} NAAQS: Review and Early Implementation

In June 2021, EPA initiated a reconsideration of the agency's December 2020 determination to retain the primary and

secondary PM NAAQS. Based on the CASAC "supplemental" review of underlying science and health data, a proposal was issued in January 2023 to take public comment on a range between 9.0 and 10.0 micrograms per cubic meter (µg/m³) for the primary PM_{2.5} annual standard, a reduction from 12.0 µg/m³ on an annual arithmetic mean, averaged over three years.⁵ As a result, EPA promulgated a new primary annual PM_{2.5} NAAQS of 9.0 µg/m³ on February 7, 2024. The primary 24-hr PM_{2.5} NAAQS of 35 µg/m³; the primary 24-hr NAAQS for coarse particulate matter (PM₁₀) of 150 µg/m³; and the secondary NAAQS for both PM_{2.5} (15.0 µg/m³) and PM₁₀ (150 µg/m³) were retained. The final rule was published in the Federal Register on March 6, 2024, with an effective date of May 6, 2024.⁶

Implementation of the new standard, which was last revised in 2012, will require significant resources and effort from state, local, and tribal air agencies. A February 7, 2024, memorandum from EPA's Office of Air and Radiation (OAR) outlined the process for determining if an area is attaining the 2024 PM_{2.5} NAAQS.⁷ The memorandum prescribes a deadline of February 7, 2025, for states and tribes to submit attainment/nonattainment recommendations for their jurisdictions, which are determined by a complex five-factor analysis that evaluates the most recent three years of monitoring data, emissions data from current sources, meteorology, geography/topography, and area boundaries. Agencies will also have to perform public outreach and associated environmental justice analyses.

A number of complicating factors will need to be addressed as air agencies strive to meet the one-year deadline for

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providing attainment recommendations. Foremost, wildfires and prescribed fires account for 44% of direct PM_{2.5} emissions⁸ and are outside the control of agencies that regulate air pollution (and regularly outside of jurisdictional borders, as with the 2023 Canada wildfires). Because fires will significantly increase three-year design values (DV)⁹ used for recommendations, air agencies must develop exceptional event (EE) demonstrations to exclude smoke-impacted data. Developing an EE demonstration for EPA approval is resource-intensive, involving detailed analyses and often spanning hundreds of pages in length. By January 1, 2025, air agencies must provide initial notification to EPA of the intent to submit EE demonstration(s) and then submit said EE demonstration(s) by February 7, 2025, alongside attainment recommendations.¹⁰

Importantly, state, local, and tribal agencies undertake extensive public outreach efforts during these events to keep the public informed about health risks from smoke and associated PM. As air agencies develop exceptional events packages following a wildfire, prescribed burn, or other event, opportunities for the public to review and comment on the data and demonstration packages are provided.

Another technical hurdle is EPA's correction of biased PM data from approximately 400 Teledyne T640/T640X continuous monitors across the United States. Despite receiving approval by EPA's Reference and Equivalency Program as a Federal Equivalent Method (FEM), these continuous monitors consistently measure PM_{2.5} levels about 20% higher than collocated filter-based Federal Reference Method (FRM) monitors. Smoke impacts from fires can result in even higher biases from these instruments. EPA approved a Network Data Alignment in April 2023 to correct the positive bias moving forward, and then took comment on a plan to retroactively apply the Alignment to data back to 2017.¹¹ State and local agencies note that this is important for having consistent and accurate monitoring data for regulatory, scientific, and public purposes,¹² but requires agencies to submit, review, and certify nearly seven years of data during the limited attainment recommendations period (with additional analyses necessary for smoke-impacted data).

Using quality-assured ambient air monitoring data, EPA intends to make formal area designations two years after the promulgated standard, or February 6, 2026. One year later,

in February 2027, "infrastructure" state implementation plans (SIPs) are due from states to document their ability to implement, maintain, and enforce the new NAAQS. For areas not meeting the PM_{2.5} NAAQS, nonattainment SIPs will be due in August 2027.¹³

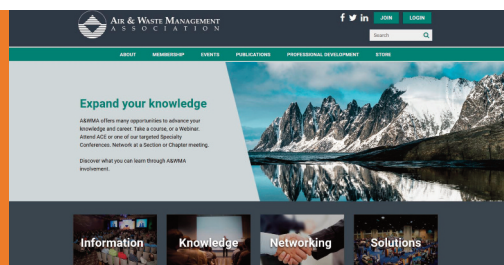
While the revised PM_{2.5} NAAQS was promulgated on February 7, 2024, for attainment purposes, the standard became applicable for permitting purposes on May 6, 2024. As the primary CAA permitting authorities implementing the NAAQS, air agencies must evaluate permits using the PM_{2.5} standard for the Prevention of Significant Deterioration (PSD), which was established by Congress for the New Source Review (NSR) permitting program to ensure that projects can occur while air quality is maintained. The tightened PM_{2.5} NAAQS substantially impacts the PSD program, and air agencies have noted difficulties in PM_{2.5} modeling for projects as the standard approaches background levels, potentially limiting opportunities for new economic development projects. In some areas, exceptional events and monitors sited near roads may also factor into planning and permitting efforts.

Ozone NAAQS Review

As with the PM NAAQS, EPA announced a reconsideration of the December 2020 decision to retain the ozone NAAQS in October 2021. The reconsideration included a "supplemental" review of the supporting science and health studies. Unlike the PM NAAQS, the agency determined that the current evidence did not support lowering the ozone NAAQS. Ultimately, EPA initiated a full statutory review of the ozone standards in August 2023, returning it to the CAA-stipulated five-year interval.¹⁴

Last revised in 2015, the current primary and secondary NAAQS for ground-level ozone is set at 70 parts per billion (ppb), based on the annual fourth-highest daily maximum eight-hour average concentration, as averaged over three years. EPA concluded that the current ozone NAAQS are adequate to protect human health during the review that was completed in 2020, as well as the supplemental review that ended in 2023. The CASAC majority, though, suggested a significant reduction of the ozone NAAQS, noting in its review of the associated policy assessment: "All of the CASAC members, except one, recommend a revised NAAQS level in the range of 55 to 60 ppb to be protective

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of public health.”¹⁵ During deliberations, the CASAC majority also called for setting a separate, distinct secondary standard for ozone to address ecological effects, which would be “uncharted territory” in the words of the CASAC chair.

EPA has indicated that an Integrated Review Plan (IRP) is forthcoming later this year to guide the new review process. The *Fall 2023 Unified Agenda of Regulatory and Deregulatory Actions* (released December 6, 2023) identifies the rule as a long-term action, indicating that a proposal is not expected in 2024.¹⁶

Other NAAQS Reviews

In addition to PM_{2.5} and ozone, EPA is also in the process of three other reviews that include multiple primary and secondary standards:

- The Lead NAAQS were last revised in 2008 and then retained in 2016. The CASAC completed review of the associated IRP in September 2023 and a final rule is not expected in 2024.¹⁷
- Revisions to the nitrogen dioxide (NO₂) NAAQS were last made in 2010, though the agency does not expect regulatory action this year.¹⁸ The CASAC held a meeting to review the associated IRP in April 2024.
- Facing consent decree deadlines, EPA issued a proposed rule in April 2024 based on a combined review of the secondary NAAQS for nitrogen oxides (NO_x) and sulfur oxides (SO_x) that was announced in August 2013,

as well as for PM that was announced in December 2014. The proposal would revise the secondary sulfur dioxide (SO₂) NAAQS “to an annual average, averaged over three consecutive years, with a level within the range from 10 to 15 [ppb]” and retention of the secondary NO_x and PM standards. EPA must issue a final rule by December 10, 2024.¹⁹

Other Factors

Air agencies have begun implementation, enforcement, and permitting efforts for the 2024 PM_{2.5} NAAQS, but there are a few distinct issues that could impact state, local, tribal, and federal work. On March 6, 2024, the day the final rule was published, multiple petitions for review were filed in the U.S. Court of Appeals for the D.C. Circuit challenging the new standard, including petitions from 25 states.²⁰ Judicial review could ultimately determine if (or what of) the final rule remains in effect, even though a court decision may come well into the implementation process.

A more immediate challenge for state and local air agencies is meeting a growing list of CAA obligations in the face of continued resource and staffing constraints. In addition to the PM_{2.5} NAAQS, several significant regulations will enter the implementation phase in 2024, including entirely new rules to control emissions from power plants and the oil and gas sector. Heightened monitoring efforts, such as the ongoing deployment of continuous regulatory monitors and proliferation of air sensors, require commensurate workload

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increases for maintenance, data analysis, and public communication. Despite air agencies shouldering this work, federal funding directed to their air quality programs has remained mostly static for more than a decade and emissions reductions from permitted sources have led to less revenue generated from emissions fees. Further, air agencies have indicated difficulties hiring and retaining a qualified, technical, and experienced workforce.²¹

Conclusion

From review through implementation, EPA's NAAQS program requires a broad range of expertise to inform

processes that have important implications for the nation's air quality and public health. This is particularly true for resource-constrained air agencies that are responsible for the complex and technically challenging core monitoring, modeling, emissions inventory, and planning efforts that. These agencies have a profound understanding of how national environmental efforts must intertwine with local priorities, economic development strategies, and social needs. While air quality standards may change, the foundation for successful implementation requires deep coordination among EPA and the state, local, and tribal agencies working on the ground. **em**

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17. See: RIN: 2060-AU86; <https://www.reginfo.gov/public/do/eAgendaViewRule?publ=202310&RIN=2060-AU86>.
18. See: RIN: 2060-AW08; <https://www.reginfo.gov/public/do/eAgendaViewRule?publ=202310&RIN=2060-AW08>. EPA indicates in Volume 1 of the IRP for NO₂ (pg. 4-1) that: "In September 2023, the Center for Biological Diversity, Sierra Club, and Center for Environmental Health filed a deadline suit regarding completion of the review of the health-based air quality criteria and the primary NAAQS for oxides of nitrogen. That citizen suit has not yet been resolved, and the EPA anticipates that resolution of those claims would inform the schedule for completion of the review." (https://www.epa.gov/system/files/documents/2024-03/no2-irp-volume-1_march-2024.pdf).
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