NAAQS Regulatory Review & Rulemaking Coalition

January 6, 2026

Enterprise Quality Management Division
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Re: Request for Correction under the Information Quality Act of: (1) EPA's Approval of Four Modification Requests for the T640-T640x PM FEM Monitors; and (2) EPA's Retroactive Application of the Approved Modification of the T640 and T640X Monitors to Concentration Data for $PM_{2.5}$ in EPA's Air Quality System (AQS)

To Whom It May Concern:

The NAAQS Regulatory Review & Rulemaking Coalition (hereinafter NR3 Coalition or Coalition) submits this Request for Correction (RFC) under the Information Quality Act (IQA) of 2000 (Section 515 of the Fiscal Year 2001 Treasury and General Government Appropriations Act, Pub. L. No. 106-554),[1] the Office of Management and Budget (OMB) Guidelines for Ensuring and Maximizing the Quality, Utility, and Integrity of Information disseminated by Federal Agencies (OMB IQA Guidelines),[2] and the Environmental Protection Agency's (EPA) Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by the Environmental Protection Agency (EPA IQA Guidelines).[3]

The Coalition requests correction under the IQA and EPA's and OMB's IQA Guidelines of both:

(1) The modification factors disseminated by EPA in its "Approval of Four Modification Requests for the T640-T640x PM FEM Monitors;" and

(2) The application of these modification factors in EPA's "Retroactive Application of the Approved Modification of the T640 and T640X to all of the Concentration Data for ($PM_{2.5}$) from the T640 and T640X monitors in the EPA's Air Quality System (AQS)"

due to their failure to meet the core IQA requirements for quality and objectivity.

As defined by EPA and OMB Guidelines, "objectivity" requires that the disseminated information is "being presented in an accurate, clear, complete, and unbiased manner, and as a matter of substance, is accurate, reliable, and unbiased." The evidence presented below from

[1] Treasury and General Government Appropriations Act, Pub. L. No. 106-554, § 515 (Fiscal Year 2001).
[2] Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies, Republication, 67 Fed. Reg. 8452 (Feb. 22, 2002).
[3] Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by the Environmental Protection Agency, October 2002 (EPA IQA Guidelines).

several independent state analyses and EPA's own research convincingly shows that the Biden EPA's dissemination of the Teledyne API (TAPI) modification factors for its T640 and T640X Federal Equivalent Methods (FEM) monitors and its subsequent application of these modification factors to the $PM_{2.5}$ concentration data included in EPA's Air Quality System (AQS) fail to meet the core IQA standards for quality and objectivity. In light of this evidence, the Coalition requests in this RFC that EPA:

a. Immediately notify states of the potential for a significant residual positive bias in the FEM Teledyne T640 and T640X monitors and other light scattering monitors.

b. Suspend the use of the Teledyne T640 and T640X FEM monitoring data in cost-imposing regulatory and permitting decisions.

c. Conduct a thorough independent review of the accuracy of the final modification factors and the operation of the Teledyne T640 and T640X and other FEM light scattering monitors.

d. Specifically test, as part of this review, the accuracy of the Teledyne and other FEM light scattering monitors in conditions of high $PM_{2.5}$ concentrations and air quality impacted by smoke/biomass emissions.

e. Propose additional adjustment factors to the Teledyne T640 and T640X and other light scattering FEM monitors based on the results of the accuracy testing to minimize bias in all tested conditions.

f. Peer review the resulting FEM accuracy tests and any proposed additional modification factors to the Teledyne T640 and T640X and other light scattering FEM monitors in accordance with EPA's Peer Review Handbook for Influential Scientific Information.

g. Allow a minimum of a 90-day public notice and comment period on any proposed FEM monitor modification factors.

h. Establish a process going forward to independently test the accuracy of any future FEM monitor in a range of conditions, including high $PM_{2.5}$ concentrations and high smoke conditions, before approving the use of the monitor.

i. Evaluate the testing and the performance of previously approved FEM monitors.

1. Coalition Members Are Significantly Impacted by EPA's Approved Teledyne Modification Factors and the Resulting Adjusted Air Quality Values

The members of the Coalition are significantly impacted by EPA's dissemination of the final modification factors for the T640 and T640X FEM monitors and the resulting disseminated $PM_{2.5}$ air quality values in EPA's AQS.

The Coalition's membership includes an array of companies that own and operate manufacturing facilities in the US that are subject to NAAQS-related air quality requirements. Coalition members (including members of associations that belong to the Coalition) include chemical,

forest and paper, fuel and petrochemical, iron and steel, fertilizer, and aluminum production manufacturers, as well as mining companies and cement, stone and gravel, corn, cotton, cottonseed, and oilseed processors. All of these diverse manufacturers share a common exposure to NAAQS-related compliance obligations, including emission controls on existing facilities in nonattainment areas and stringent NAAQS-related permitting requirements and controls for new facilities or facilities seeking to expand in attainment and nonattainment areas. Accurate, unbiased $PM_{2.5}$ design values are central to all of these compliance obligations. An unaddressed positive bias can result in millions of dollars in additional compliance costs that may be unnecessary to attain air quality levels under the NAAQS program deemed requisite to protect public health and welfare.

Comments from the air agencies in Region 10 document the clear adverse impacts of using inaccurate FEM monitors on communities and manufacturers, such as those in the Coalition.[4] From 2018 to 2019, the Oregon Department of Environmental Quality (DEQ) placed six T640X monitors into service. According to the air agency comments, Oregon officials quickly noticed discrepancies with the T640s, estimating concentrations 20-70 percent higher than those measured by collocated FRMs and nephelometers. Although these issues were reportedly communicated to TAPI, EPA's Office of Research and Development (ORD), and EPA's Office of Air Quality Planning and Standards (OAQPS), the Region 10 air agency comments note that "attempts to assess and correct the response were unsuccessful, including a recent update to the instrument firmware." This failure led to disastrous results for Klamath Falls. According to the filed comments, "DEQ was required to accept biased data and an elevated design value for the Klamath Falls $PM_{2.5}$ nonattainment area. Efforts by the community to reduce emissions were seemingly invalidated."[5] The Coalition's interest is to ensure that additional efforts by its members to reduce emissions are not similarly invalidated by the use of FEM monitors that yield elevated and inaccurate values.

2. EPA's and OMB's IQA Guidelines Apply to the Biden EPA's Disseminated Teledyne T640 and T640X Modification Requests and Retroactive Application of the Modification Factors to $PM_{2.5}$ Concentration Data

EPA and OMB IQA Guidelines apply to the information disseminated by EPA in both: (1) its "Approval of Four Modification Requests for the T640-T640x PM FEM Monitors;" and (2) the application of the modification factors in EPA's "Retroactive Application of the Approved Modification of the T640 and T640X to all of the Concentration Data for $PM_{2.5}$ from the T640 and T640X monitors in the EPA's Air Quality System (AQS)."

Section 515(a) of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554; H.R. 5658) directed OMB to issue government-wide guidelines that "provide policy and procedural guidance to Federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies." The OMB Guidelines also directed agencies subject to the Paperwork Reduction Act (44 U.S.C. § 3502(1)) to issue their own information quality guidelines to ensure and maximize the quality, objectivity, utility, and integrity of information,

[4] Air Quality Agencies of EPA, Region 10 Comments (Mar. 15, 2024).
[5] *Id*. at 2.

including statistical information, by no later than one year after the date of issuance of the OMB Guidelines.

Consistent with IQA statutory requirements and OMB Guidelines, EPA's IQA Guidelines seek to ensure and maximize the quality, including objectivity, utility, and integrity, of disseminated information. EPA defines "objectivity" as focused "on whether the disseminated information is being presented in an accurate, clear, complete, and unbiased manner, and as a matter of substance, is accurate, reliable, and unbiased."[6] EPA further states in its Guidelines that the collection, use, and dissemination of information of known and appropriate quality is integral to ensuring that EPA achieves its mission.

EPA further establishes that its IQA Guidelines apply to "information" EPA disseminates to the public. "Information," for purposes of these Guidelines, generally includes any communication or representation of knowledge, such as facts or data, in any medium or form. EPA also notes, for purposes of its IQA Guidelines, that "EPA disseminates information to the public when EPA initiates or sponsors the distribution of information to the public." This includes, according to the EPA IQA Guidelines, circumstances when EPA "distributes information prepared or submitted by an outside party in a manner that reasonably suggests that EPA endorses or agrees with it" or "if EPA in its distribution proposes to use or uses the information to formulate or support a regulation, guidance, policy, or other Agency decision or position."

Given that EPA actively approved and subsequently disseminated to the public the four modification factors for the T640-T640x PM FEM monitors and then retroactively applied them to $PM_{2.5}$ values in its official Air Quality System (AQS) used by EPA and states for regulatory decisions, EPA's actions and the disseminated information are clearly subject to the IQA and EPA's IQA Guidelines.

3. EPA's 30-Day Public Comment Period Was Insufficient

EPA's 30-day public comment period was insufficient due to EPA's failure to: (1) include critical information in the regulatory docket during the 30-day comment period on the Network Data Alignment equations; and (2) provide stakeholders sufficient time to assess the accuracy of the proposed modification adjustments.

Although EPA states it "generally will not consider a RFC that could have been submitted during the comment period of a rulemaking or other action," the Coalition notes that EPA's 30-day comment period, which ended March 15, 2024, was clearly too short a time period for affected state and local air agencies and other stakeholders to collect information and test the accuracy of the proposed adjustment factors, analyze the resulting information, and submit those analyses for consideration. Detailed state analyses of the effectiveness of the adjustment factors were not completed until well after the comment period closed and were not included in the docket for the public to evaluate.

Furthermore, EPA failed to provide critical information necessary to review the adjustment factors and comment effectively. Of central importance, EPA failed to provide the adjustment algorithms on which the adjustment factors are based. In response to initial inquiries, EPA

[6] EPA, IQA Guidelines at 15.

determined that the algorithms were confidential business information (CBI) and therefore would not be released outside of EPA. However, as EPA notes in its May 13, 2024, "Summary of and Response to Public Comments on the EPA's Plan to Update $PM_{2.5}$ Data from T640/T640X PM Mass Monitors,"[7] many commenters, whether supportive or critical of the planned retroactive update, expressed concern over the secrecy of the Network Data Alignment equations to be used for the T640/T640X method update and the lack of transparency. These concerns were summarized in Georgia Environmental Protection Division's (Geogia EPD) March 15, 2025, comments:

> Georgia EPD requests that EPA release the algorithm used in the Network Data Alignment so that affected agencies can better understand the relationship between the Teledyne T640/T640X measurements and the FRM measurements. This will allow agencies that operate these monitors to better understand the data they are using to make regulatory decisions and develop SIPs. Updating data used to make regulatory decisions with a secret "black box" algorithm is not appropriate. Transparency of this algorithm is key and will allow agencies to communicate the updated concentrations to the regulated community in an informed manner and answer any questions the community may have in light of these updates.[8]

While EPA stated in its May 2024 summary and response to comments that it relayed those concerns to the Teledyne FEM monitor manufacturer, and that TAPI subsequently agreed to make public the Network Data Alignment equations the T640/T640X modification factors, EPA did not post TAPI's summary (dated April 14, 2024) of its basis for the adjustment factor "Development of an FRM alignment factor for the Teledyne API T640 and T640x particulate matter monitors"[9] until May 13, 2024, almost two months after the public comment period closed on March 14, 2024.[10] EPA should have reopened the comment period once it posted the TAPI summary.

EPA also failed to notify the public of its release of its retroactive modification of the $PM_{2.5}$ values in the Air Quality System until its May 16, 2024, Federal Register Notice, "Update of $PM_{2.5}$ Data from T640/T640X PM Mass Monitors," released more than two months after the comment period closed.[11] Recognizing the importance of the modified values and the potential issues surrounding their application, EPA recommended in the Federal Register notice that air agencies review the updated data by May 28, 2024, and contact their EPA Regional office with any questions.[12] Because this recommended individual state consultation process lacks

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[7] EPA, Summary of and Response to Public Comments on the EPA's Plan to Update $PM_{2.5}$ Data from T640/T640X PM Mass Monitors (May 16, 2024).

[8] Georgia Environmental Protection Division (EPA-HQ-OAR-2023-0642) (Mar. 15, 2024) at 1-2.

[9] https://www.regulations.gov/document/EPA-HQ-OAR-2023-0642-0029.

[10] EPA also failed to submit to the docket a letter from TAPI committing to removing its CBI claim on the Network Data Alignment equations until May 13, 2025.

[11] EPA, Update of PM2.5 Data from T640/T640X PM Mass Monitors, 89 Fed. Reg. 42,874 (May 16, 2024) (11720-02-OAR).

[12] For detailed information regarding EPA's retroactive update of air quality data and how these data may be used, please see the document titled, "Supplemental Information on the EPA's Update of $PM_{2.5}$ Data from T640/T640X PM Mass Monitors," located in the docket for this action at https://www.regulations.gov under Docket

transparency and accountability, affected stakeholders do not know how many states had questions with regard to EPA's retroactively adjusted values and the nature of the those concerns. As discussed further below, at least one state agency publicly noted inaccuracies in the released retroactively "corrected" values. As noted above, EPA should have reopened the comment period to allow for these and other comments and should have considered such comments in its decision making.

4. EPA Failed to Meet the IQA's Standard for Quality and Utility

As explained below, the information disseminated by EPA in its "Approval of Four Modification Requests for the T640-T640x PM FEM Monitors" and the application of such adjustment factors in EPA's "Retroactive Application of the Approved Modification of the T640 and T640X to all of the Concentration Data for $PM_{2.5}$ from the T640 and T640X monitors in the EPA's Air Quality System (AQS)" fail to meet the IQA's standard for quality and utility.

Under the OMB and EPA IQA Guidelines, the "objectivity" standard focuses on whether the disseminated information "is being presented in an accurate, clear, complete, and unbiased manner, and as a matter of substance, is accurate, reliable, and unbiased." Preliminary analyses submitted to EPA during the short 30-day public comment period on the modification factors and expanded on in subsequent analyses submitted or presented to EPA confirms that the disseminated modification factors and EPA's application of those factors to $PM_{2.5}$ data included in its AQS do not meet the IQA's "quality" standard.

a. EPA knew early on in its adoption of the Teledyne T640 and T640X monitors of the presence of a consistent positive bias

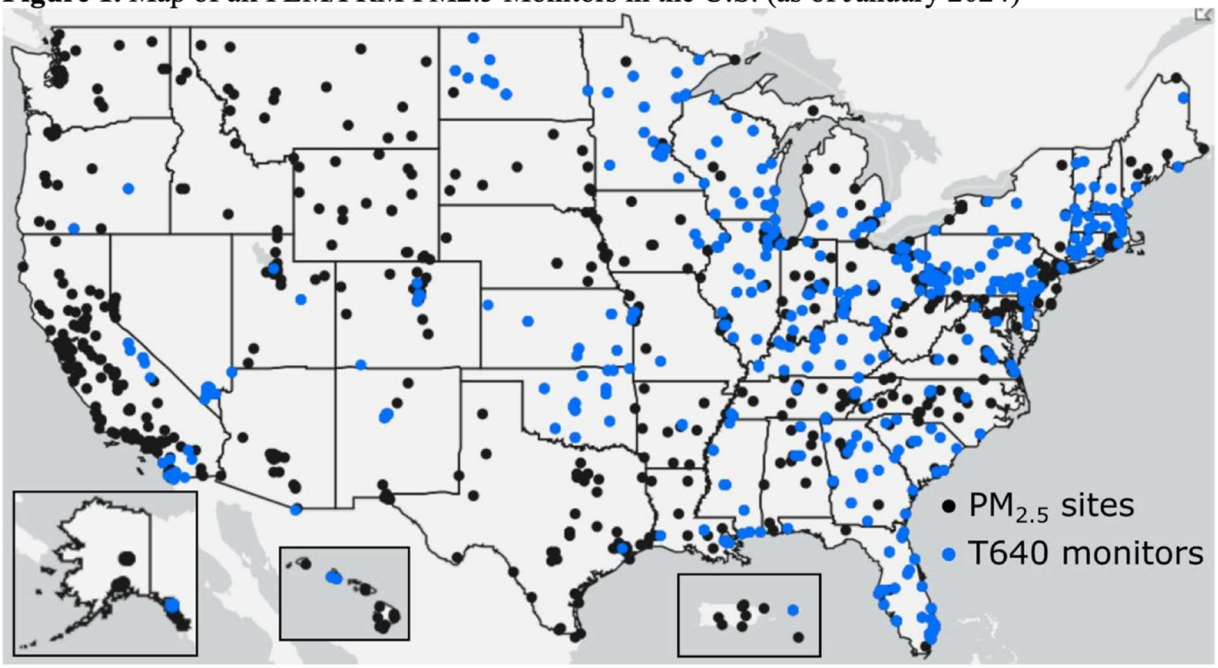
In 2016, EPA approved the Teledyne TAPI Model T640 PM mass monitor (T640) and the TAPI Model T640X (T640X) as Federal Equivalent Method Monitors for $PM_{2.5}$ (81 Fed. Reg. 45,285 (Jul. 13, 2016)). By early 2017, state monitoring agencies began operating T640 and T640X PM FEM monitors in their networks due to the ability of these FEM monitors to provide continuous monitoring of fine particulate matter ($PM_{2.5}$) at a lower capital and operational cost compared to Federal Reference Method (FRM) monitors. However, as EPA states in its May 13, 2024, Supplemental Information on the EPA's Update of $PM_{2.5}$ Data from T640/T640X PM Mass Monitors (Supplemental Information Release), early in their adoption, state monitoring agencies reported a relatively consistent positive bias compared to collocated FEM monitors of about 20 percent, with even higher biases reported for sites with smoke impacts from fires.[13] Despite the confirmed bias, the network of T640 and T640X $PM_{2.5}$ FEM monitors continued to grow. According to EPA, T640 and T640X $PM_{2.5}$ FEM monitors have been rapidly adopted nationwide, with nearly 400 of these instruments reporting state air quality data in 2023 (see Figure 1 below).[14]

ID No. EPA-HQ-OAR-2023-0642 and on the EPA's website at https://www.epa.gov/aqs/aqs-memos-monitoring-and-policy.

[13] EPA, Supplemental Information on the EPA's Update of PM2.5 Data from T640/T640X PM Mass Monitors (May 13, 2024).

[14] *Id*. at 2.

Figure 1. Map of all FEM/FRM PM2.5 Monitors in the U.S. (as of January 2024)



In 2022, the Clean Air Scientific Advisory Committee (CASAC) recommended that the FEM bias be addressed in its advice on the 2024 reconsideration of the $PM_{2.5}$ standards.[15] CASAC's consensus responses to EPA's charge questions include the following recommendations:

> The EPA should include a detailed summary of the number of FEMs and FRMs (see example in Table 1 below) as well as indicating how many FEMs are meeting the data quality requirements necessary for determining compliance with the $PM_{2.5}$ NAAQS. The FEM bias needs to be addressed to make the FRMs and FEMs more comparable. One option would be to allow states to develop correction factors for co-located FRMs and FEMs. These correction factors could be used to adjust FEM concentrations downward (or upward) to be comparable to FRMs. Another option would be for the EPA to revise the "equivalency box" (EB) criteria used to judge whether the bias of a new continuous $PM_{2.5}$ monitor relative to an FRM is acceptable during field testing.[16]

Despite the significance of CASAC's recommendations, there is no clear evidence that the Biden EPA acted on the recommendations, relying instead on TAPI to address potential inaccuracies without independently reviewing the adequacy of the proposed TAPI modification factors and without allowing states to develop their own correction factors, as recommended by CASAC, based on collocated FEM monitors.

[15] EPA-CASAC-22-002, CASAC Review of the EPA's Policy Assessment for the Reconsideration of the National Ambient Air Quality Standards for Particulate Matter (External Review Draft – October 2021) (Mar. 18, 2022).

[16] *Id*. at 11 of 132.

In 2023, Teledyne released a proposed modification to correct the bias that was subsequently approved by EPA's ORD without releasing an independent evaluation of the adequacy of the manufacturer's proposed correction factor. In March 2024, EPA sought public comment on the correction factor, Update of $PM_{2.5}$ Data from T640/T640X PM Mass Monitors.[17] Although the comment period provided states and stakeholders with only 30 days to submit comments, several comments raised concerns over the adequacy of the proposed adjustment factor.

b. Analyses of the final Teledyne modification factors completed after the public comment period closed provide clear evidence of a continued, substantial positive bias

Analyses released after the public comment period closed and EPA applied the approved modification factors to the $PM_{2.5}$ data in its AQS provide evidence of a continued positive bias after the correction factor was applied. In a May 28, 2024, letter to EPA, Georgia EPD reported a continued average positive bias in Georgia of 9.59 percent (with six individual sites showing a positive bias above 10 percent, and only two sites showing a less than 5 percent bias) after the EPA-approved adjustment algorithms were applied.[18] The Georgia EPD letter raises several technical concerns with the proposed algorithm adjustments that were not raised during the public comment period. For instance, Georgia EPD notes:

> EPA does not explain why the bias between the FRM and FEM is higher with colder temperatures. In warmer temperatures, condensable PM species may volatize off the FRM filters leading to larger differences between the FRM and FEM concentrations. However, the adjustment algorithm described in Table 1 does the opposite and applies a larger bias adjustment in the colder months when volatilization off the FRM filter is less problematic.

The letter further reports that the uncorrected FEM bias increases as the FEM concentration increases – a fact that is at odds with the Teledyne adjustment algorithm that applies fixed adjustment factors when the temperature is above 20°C and the FEM concentration is above 5 $\mu g/m^3$, and when the temperature is at or below 20°C and the FEM concentration is above 10 $\mu g/m^3$. This means the potential for higher positive biases in air quality data is more likely to affect design values. Based on 2021-2023 design values using the current EPA alignment algorithm, Geogia EPD estimates that it will approximately double the number of exceptional event petitions (from 125 to 250) that would need to be submitted. Because this letter was sent to EPA after the comment period closed on March 15, 2024, it was not included in the public docket.

Regulatory problems created by attempts to correct the TAPI monitor bias cascaded down to individual county monitoring decisions and reports. According to the "2025 Ambient Air Monitoring Plan" filed by the Tennessee Shelby County Health Department (SCHD), a two-year NAAQS exclusion was granted to the use of the values collected from a Teledyne T640X due to

[17] EPA, Update of $PM_{2.5}$ Data From T640/T640X PM Mass Monitors (Docket ID No. EPA-HQ-OAR-2023-0642), 89 Fed. Reg. 42,874 (May 16, 2024); Notice of Opportunity to Comment, 89 Fed. Reg. 11,831 (Feb. 15, 2024).

[18] Georgia Environmental Protection Division responses to EPA's Update of $PM_{2.5}$ Data from T640/T640X PM Mass Monitors (Docket ID No. EPA-HQ-OAR-2023-0642) (May 28, 2024).

"high bias and ratio" that were discovered upon using the EPA $PM_{2.5}$ Continuous Monitor Comparability Assessment. The county reports that a "significant bias" began after the SCHD installed the Teledyne firmware update to the T640X on October 25, 2023. After many attempts to correct the issue, SCHD reports that the instrument was replaced by a new T640X on December 17, 2024.

Many of these concerns were subsequently summarized in a December 2024 letter to EPA from the Association of Air Pollution Control Agencies (AAPCA). In this letter, AAPCA reports (and attaches) the results of a follow-up national analysis by Georgia EPD of 68,000 FRM/FEM measurements at over 200 sites nationwide that had FRM monitors collocated with T640/X monitors. After implementing the Teledyne adjustment algorithm, Georgia EPD found that, from 2018 to 2023, the Teledyne monitors at 68 sites, or 31 percent of locations, had a bias exceeding 10 percent, with an average overall normalized mean bias of 6.4 percent across all sites.[19] The analysis found that, after implementing the Teledyne bias adjustment algorithm, the multiyear average bias of the T640/X instruments at individual monitoring sites was up to 7.9 µg/m3 (57.6 percent) higher than the FRM data.

In a September 26, 2025, presentation at the AAPCA 2025 Fall Business Meeting, Georgia EPD confirmed its state-wide analysis of EPA adjusted FEM monitor values to collocated FRM monitors showing a normalized average positive mean bias of 9.59 percent, with four out of 13 monitors showing a normalized positive mean bias greater than 14 percent. The presentation included a map of its national analysis of 68,000 paired FRM/FEM samples that shows FEM Teledyne monitors in many states have FEM monitor bias in excess of 20 percent compared to collocated FRM monitors.

As summarized in AAPCA's letter, other states conducting similar analyses confirmed the continued positive bias after implementing the Teledyne adjustment factor.[20] The Oklahoma Department of Environmental Quality found a 10 to 22 percent positive bias at three sites with FRM samplers, substantially increasing the risk of additional nonattainment designations after applying the Teledyne adjustment factors. Similarly, the Texas Commission on Environmental Quality found an 8 to 37 percent positive bias across six monitoring sites, while West Virginia's Department of Environment found a 22.46 positive bias above the FRM at one of its monitors after applying the EPA approved adjustment modifications. Based on these analyses and others, AAPCA requested that Teledyne re-evaluate the Teledyne adjustment algorithm such that the comparability with the collocated FRM measurements results in an overall bias much closer to zero.

c. The final Teledyne modification factors fail to address the potential for higher positive bias at higher, policy-relevant $PM_{2.5}$ concentrations

According to AAPCA's December 2024 summary of state concerns, a major concern with the current Teledyne adjustment algorithm is that it applies a constant adjustment value of 0.925 $\mu g/m^3$ to all values over 5.0 $\mu g/m^3$ (when the hourly temperature is greater than 20°C) and a constant adjustment value of 1.861 $\mu g/m^3$ to all values over 10.0 $\mu g/m^3$ (when the hourly

[19] Association of Air Pollution Control Agencies Comments (Dec. 20, 2024) at 2.
[20] *Id*.

temperature is less than or equal to 20°C). However, the FRM/FEM comparison clearly demonstrates that this approach does not match the data at higher $PM_{2.5}$ concentrations and that the bias adjustment needs to increase as the Teledyne FEM $PM_{2.5}$ concentrations increase.[21] A higher bias at higher $PM_{2.5}$ concentrations that could have a greater impact on design values and permitting decisions reinforces the regulatory significance of the disseminated data and the need for correction.

Many of the state comments on the proposed Teledyne adjustment factor also focused on EPA's acknowledgment in its supporting documentation for the proposed modification factors of "even higher positive biases" at sites with smoke impacts from fires that were not specifically addressed by the Teledyne adjustment factor.[22] Region 10 Air Offices reported that six Teledyne T640S placed in service in Oregon produced concentration estimates that were 20 to 70 percent higher than collocated FRMs and nephelometers.[23] Their comments recommended tests in Northwestern cities in California, Oregon, Washington, Idaho, or Alaska regularly impacted by wildfire and wintertime smoke from home heating, given that biomass combustion (including wildfires, prescribed fires, agricultural maintenance, and residential heating) represents 51.7 percent of emissions nationwide. AAPCA also requested that EPA immediately begin working with monitoring agencies to review and further correct, as needed, data influenced by smoke from fires.[24] EPA's subsequent summary and response to comments failed to address this important problem.

EPA's failure to independently test the accuracy of the Teledyne monitors during periods of high smoke is also troublesome because it appears to ignore a 2023 EPA ORD and US Forest Service study that: (1) identified significant T640 monitoring errors in biomass burning chamber studies; and (2) clearly noted the significance of these errors for complying with the $PM_{2.5}$ standard:[25]

> The observed large positive and negative artifacts in the T640 PM mass determination have the potential to result in false exceedances of the $PM_{2.5}$ NAAQS or in the disqualification of monitoring data through an exceptional event designation. In addition, the observed artifacts in smoke impacted air will have a detrimental effect on providing reliable public information when wildfires occur and also in identifying reference measurements for small sensor evaluation studies.[26]

The authors emphasize that accurate methods, such as FRM and BAM-1022, at smoke impacted sites "will reduce the burden of developing and reviewing exceptional event request packages,

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[21] *Id*. at 2-3.

[22] EPA, Teledyne Data Update NOA Supporting Documentation 2024 (Feb. 15, 2024) at 2 ("The bias on the T640 and T640X PM2.5 FEMs has been reported as relatively consistent across sites and methods with continuous FEMs reading about 20% higher than collocated FRMs. Even higher positive biases have been reported for sites with smoke impacts from fires.")

[23] Air Quality Agencies of EPA, Region 10 Comments (Mar. 15, 2024).

[24] AAPCA Comments on Proposed Update of PM2.5 Data From T640/T640X PM Mass Monitors (Mar. 15, 2024).

[25] Long, et al. "Summary of $PM_{2.5}$ measurement artifacts associated with the Teledyne T640 PM Mass Monitor under controlled chamber experimental conditions using polydisperse ammonium sulfate aerosols and biomass smoke" JOURNAL OF THE AIR & WASTE MANAGEMENT ASSOCIATION 2023, VOL. 73, NO. 4, 295–31.

[26] *Id*. at 1.

data loss/disqualification, and provide states with tools to adequately evaluate public exposure risks and provide accurate public health messaging during wildfire/smoke events."

d. State analyses also indicate EPA may have misapplied the Teledyne modification factors when it retroactively applied them to $PM_{2.5}$ data in the AQS

In its May 28, 2024, letter to EPA, Georgia EPD notified EPA of errors in applying the Teledyne modification to AQS data, stating that it found "numerous instances where the algorithm was not implemented correctly," resulting in additional errors in the agency's dissemination of the corrected values in its AQS data.[27]

After replicating the EPA adjusted values to verify that the alignment algorithm was applied correctly to the FEM data, Georgia EPD found many inconsistencies between the EPA adjusted values and the replication values. According to EPD officials, these inconsistencies caused the FEM data to have up to a $1 \mu g/m^3$ difference between the EPA adjusted FEM concentration and the replication adjusted FEM concentration. Other errors cited by Georgia EPD included improper use of signage (less than or equal (≤) versus less than (<)), improper rounding, and incorrect calculations.

Georgia EPD went on to recommend "that EPA halt their current implementation of their alignment algorithm until all the issues identified by state and local air programs have been satisfactorily resolved." Because the public comment period had already closed, and EPA had finalized the adjustment factor, it remains unclear how many state agencies or stakeholders are aware of Georgia EPD's findings and their potential implications for their state data and regulatory decisions.

e. The positive FEM bias may extend to other FEM $PM_{2.5}$ monitors besides Teledyne T640 and T640X FEM monitors

Although most of the analyses of FEM monitor accuracy have focused on the Teledyne T640 and T640X monitors, researchers at the National Council for Air and Stream Improvement, Inc. (NCASI) evaluated FEM monitors across different manufacturers, measurement methods, EPA regions, and sampling location types. Its analysis, published in *Atmosphere* in August 2024[28] (based on 2019 to 2022 pre-network adjusted Teledyne T640 and T640X FEM monitor values), found that light scatter-based FEM monitors demonstrate, on average, a higher mean and median bias compared to beta attenuation monitors across all EPA regions (28% vs. 12%). The study reports that light scatter-based instruments operate under the assumption that all particulates share identical optical properties. This assumption, however, may not hold when dealing with particles that exhibit diverse optical properties. For instance, the authors note that aerosol water content can significantly alter the size and distribution of particles in the air that can change their optical properties, which in turn can produce measurement inaccuracies for light scatter-based FEM monitors. If true, this suggests that other light scattering FEM monitors, such as the

[27] Georgia EPD letter to EPA at 1 (Dec. 28, 2024).

[28] Khan, Tanvir R., Zachery I. Emerson, and Karen H. Mentz. 2024. "Evaluation of Fine Particulate Matter ($PM_{2.5}$) Concentrations Measured by Collocated Federal Reference Method and Federal Equivalent Method Monitors in the U.S." *Atmosphere* 15, no. 8, 978 (Aug. 2024).

GRIMM EDM 180, could share a similar bias. Further assessment of FEM monitors that combine light scattering photometry with beta attenuation, such as the Thermo Scientific Model 5030 SHARP, is also warranted.

5. The Teledyne T640/T640X Modification Factors Represent "Influential" Scientific Information under the Agency's IQA Guidelines and Peer Review Handbook

EPA IQA Guidelines define "influential," when used in the phrase "influential scientific, financial, or statistical information," to refer to information that the agency can reasonably determine that its dissemination will have a clear and substantial impact on important public policies or private sector decisions.[29] EPA further states that it recognizes that influential scientific, financial, or statistical information should be subject to a higher degree of quality (for example, transparency about data and methods) than information that may not have a clear and substantial impact on important public policies or private sector decisions.

There is little doubt that EPA's dissemination and approval of the Teledyne modification factors and their application to AQS data meet the definition of influential scientific information. As EPA notes in its May 13, 2024, "Supplemental Information on the EPA's Update of $PM_{2.5}$ Data from T640/T640X PM Mass Monitors," the agency "anticipates that the updated data will be relevant to upcoming $PM_{2.5}$ NAAQS implementation-related activities, including any forthcoming initial area designations, any future redesignation actions, and findings of attainment that may rely on monitoring data from the previous 3 to 5 years."[30] In this regard, EPA stresses the near-term application of the modification factors to $PM_{2.5}$ designations, stating the "update will impact the ambient monitoring data used for these designations due to the widespread use of the TAPI T640 and T640X monitors, particularly in the eastern U.S."

EPA also notes the importance of the adjustment modifications to exceptional event petitions, stating that the agency anticipates the adjusted data will affect "event-influenced exceedances/violations" and exceptional event demonstrations associated with any initial area designations process or "any other action of regulatory significance regarding the $PM_{2.5}$ NAAQS."[31]

6. To Meet Objectivity and Quality Standards under the EPA And OMB Guidelines, EPA Should Have Classified Teledyne Modification Factors as Influential Scientific Information and Required Peer Review of the Information Prior to its Release

EPA's IQA Guidelines state that appropriate peer review of influential scientific information is essential to ensure the objectivity, utility, and integrity of information. In section 4.2, on Peer Review Policy, the IQA Guidelines state that "major scientifically and technically based work products (including scientific, engineering, economic, or statistical documents) related to Agency decisions should be peer-reviewed."[32]

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[29] EPA IQA Guidelines at 19.

[30] Supplemental Information on the EPA's Update of PM2.5 Data from T640/T640X PM Mass Monitors (May 2024) at 5.

[31] *Id*.

[32] EPA IQA Guidelines at 11.

EPA clearly erred in failing to require peer review of the Teledyne modification factors. Consistent with the agency's IQA Guidelines, EPA's Peer Review Handbook requires the agency to peer review "influential scientific information" (ISI) and to conduct external peer reviews of "highly influential scientific assessments" (HISA). EPA's Peer Review Handbook defines the term "influential scientific information" to mean scientific information the agency reasonably can determine will have or does have a clear and substantial impact on important public policies or private sector decisions. EPA notes in its Peer Review Handbook that the interpretation of the term "influential" is consistent with OMB's government-wide IQA Guidelines and the IQA Guidelines of the agency.

EPA further defines HISA as a subset of ISI for which the OMB Peer Review Bulletin specifies additional peer review considerations, including that peer reviewers be external, non-EPA experts. OMB has defined a HISA as ISI that "the agency or the Administrator determines to be a scientific assessment that: (i) could have a potential impact of more than $500 million in any year, or (ii) is novel, controversial, or precedent-setting or has significant interagency interest."

EPA notes that OMB defines a scientific assessment broadly as "an evaluation of a body of scientific or technical knowledge, which typically synthesizes multiple factual inputs, data, models, assumptions, and/or applies best professional judgment to bridge uncertainties in the available information." It is clear from these definitions that EPA's approval and dissemination of the adjustment factors for the Teledyne monitors meet the definition of an ISI if not HISA, given the novel application of the modification factors, the complexity of the scientific judgements needed to develop one set of modification factors, and the significant impact those judgements would have on $PM_{2.5}$ designations, attainment demonstrations, the imposition of area-wide costly emission controls, exceptional event demonstrations, 179B petitions, and individual permit decisions that could determine whether a new source is built or an existing source is expanded.

7. Recommendation for Corrective Action

In light of the serious errors in the disseminated Teledyne modification factors and "corrected" $PM_{2.5}$ data in EPA's AQS, the Coalition requests that EPA independently test the accuracy of the EPA-approved and disseminated Teledyne modification factors and the accuracy of other light scattering FEM monitors prior to making any $PM_{2.5}$ designations or other cost-imposing regulatory decisions based on light scattering FEM monitoring data. These actions are required under the IQA and under EPA's and OMB's IQA Guidelines. Moreover, their absence raises concerns that EPA's subsequent designations and other related actions were arbitrary and capricious in violation of the Clean Air Act and the Administrative Procedure Act.

Based on the evidence from state analysis of collocated FEM/FRM data showing a clear positive bias unaddressed by the final modification factors for the Teledyne monitoring data, the Coalition requests in this RFC that EPA:

a. Immediately notify states of the potential for a significant residual positive bias in the FEM Teledyne T640 and T640X monitors and other light scattering monitors.

b. Suspend the use of the Teledyne T640 and T640X FEM monitoring data in cost-imposing regulatory and permitting decisions.

c. Conduct a thorough independent review of the accuracy of the final modification factors and the operation of the Teledyne T640 and T640X and other FEM light scattering monitors.

d. Specifically test, as part of this review, the accuracy of the Teledyne and other FEM light scattering monitors in conditions of high $PM_{2.5}$ concentrations and air quality impacted by smoke/biomass emissions.

e. Propose additional adjustment factors to the Teledyne T640 and T640X and other light scattering FEM monitors based on the results of the accuracy testing to minimize bias in all tested conditions.

f. Peer review the resulting FEM accuracy tests and any proposed additional modification factors to the Teledyne T640 and T640X and other light scattering FEM monitors in accordance with EPA's Peer Review Handbook for Influential Scientific Information.

g. Allow a minimum of a 90-day public notice and comment period on any proposed FEM monitor modification factors.

h. Establish a process going forward to independently test the accuracy of any future FEM monitor in a range of conditions, including high $PM_{2.5}$ concentrations and high smoke conditions, before approving the use of the monitor.

i. Evaluate the testing and the performance of previously approved FEM monitors.

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The NR3 Coalition appreciates your review and consideration of this request. If possible, please confirm receipt of these materials by return email. Additionally, do not hesitate to contact me should you have any questions or requests for additional information.

Sincerely,

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