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U.S. Environmental Protection Agency

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RE: Comments of the American Public Power Association on the National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units Proposal, (Docket Id. No. EPA-HQ-OAR-2018-0794, 90 Fed. Reg. at 25,535, June 17, 2025)

Dear Honorable Lee Zeldin:

The American Public Power Association (APPA) appreciates the opportunity to submit comments in response to the Environmental Protection Agency's (EPA or Agency) proposal to repeal specific amendments to the National Emission Standards for Hazardous Air Pollutants (NESHAP): Coal- and Oil-Fired Electric Utility Steam Generating Units (EGUs) rule, commonly referred to as the Mercury and Air Toxic Standards (MATS).[1] Among the amendments that EPA proposes to repeal are the revised filterable particulate matter (fPM) emission standard, which serves as a surrogate for non-mercury (Hg) hazardous air pollutants (HAP) metals for existing coal-fired EGUs; the fPM emission standard compliance demonstration requirements; and the mercury emission standard for lignite-fired EGUs. APPA supports the repeal of the 2024 MATS Residual Risk and Technology Review (2024 MATS RTR) final rule and reverting to the 2012 MATS rule.

APPA is a trade association composed of not-for-profit, community-owned utilities that provide electricity to 2,000 towns and cities nationwide. APPA protects the interests of the more

[1] 90 Fed. Reg. at 25,535 (June 17, 2025) (Proposed Rule).

than 55 million people that public power utilities serve and the 100,000 people they employ. Our association advocates and advises on electricity policy, technology, trends, training, and operations. Our members strengthen their communities by providing superior service, engaging citizens, and instilling pride in community-owned power.

APPA highlights the following points for EPA's review and consideration, which are discussed in more detail herein:

- APPA supports the repeal of the fPM standard for coal and oil-fired power plants, which EPA revised from 0.030 to 0.010 pounds per million British thermal units (lb/MMBtu). The new limits impose $10.5 million/ton costs for non-Hg metal HAPs and $34,500/ton for fPM, which is not cost-effective given that EPA did not change its residual risk determination.
- APPA supports EPA's proposal to repeal the requirement to use particulate matter continuous emissions monitoring system (PM CEMS) as the only compliance demonstration for fPM emission standards for coal-and oil-fired EGUs.
- APPA supports changes to the PM CEMS monitoring provisions to promote flexibility and accuracy.
- APPA supports allowing public power utilities to choose quarterly stack testing (QST), the low-emitting EGU (LEE) program, particulate matter continuous parametric monitoring system (PM CPMS), and PM CEMS to demonstrate compliance with the fPM standard.
- APPA recommends that the Agency eliminate the new minimum volume and mass per run requirements for fPM compliance testing at coal plants, as these requirements would increase costs without meaningful environmental benefits.

1. Introduction

Public power utilities remain committed to maintaining clean air in our communities and protecting the environment. Our members have made significant investments to reduce emissions and become compliant with the suite of air regulations that the Agency has promulgated over the last thirteen years. APPA members continue to pay for those environmental compliance investments through loan obligations. For these reasons, APPA members have a significant stake in the revisions proposed in this rulemaking.

EPA completed a required residual risk and technology review under Clean Air Act (CAA) section 112 (f)(2) and (d)(6) for coal and oil-fired EGUs in 2020, then made amendments in 2024 following another technology review.[2] Now, the Agency is reconsidering those 2024 changes and proposing to reverse them based on an evaluation that the cost-effectiveness ratios for the revised fPM emission standards are higher than what EPA has previously deemed cost-

[2] 85 Fed. Reg. at 31,286, (May 22, 2020) (MATS 2020 rule).

effective in similar regulatory actions and requiring coal and oil-fired power plants to install continuous emissions monitoring systems (CEMS) for particulate matter (PM) compliance would be an unnecessary expense.[3] APPA submitted comments in response to EPA's 2023 proposal to revise the MATS RTR.[4] APPA's 2023 MATS comments outlined concerns about the Agency's analysis of the fPM and mercury baselines, on which the proposed limits are founded, the removal of compliance measure flexibilities, and the assumptions in EPA's regulatory impact analysis (RIA).[5] Our prior observations regarding the implementation challenges in the 2024 MATS RTR remain true.

Since 2010, mercury and other HAP emissions have dropped substantially. Compared to 2010, the facilities affected under the MATS rule in 2023 reduced their mercury emissions by 91 percent.[6] This decline stems from several key factors: power plants have installed new pollution control equipment and upgraded existing systems that simultaneously reduce multiple types of pollutants. Additionally, operational shifts have played a role, including changes in fuel types and increased reliance on natural gas power plants, which produce minimal mercury and other HAPs compared to other fuel sources. Beyond the MATS rule, complementary programs targeting sulfur dioxide (SO_2) and nitrogen oxide (NOx) emissions at the regional and state levels have also helped achieve these mercury and HAP reductions at regulated facilities. We expect these emission reductions to continue.

2. Technical Comments on Proposed Rule

The Agency is soliciting comments on all aspects of the Proposed Rule, and requests comments on specific questions. The following section includes APPA's responses to the questions EPA has posed. Accompanying APPA's comments is a technical report titled "Particulate Monitoring Technical Report," which serves as the basis of APPA's comments on the monitoring provisions in the 2024 MATS RTR.[7]

a. Question #1: Should the revision of the fPM standard for existing coal-fired EGUs from 0.030 lb/MMBtu to 0.010 lb/ MMBtu be repealed, as proposed, because the cost-effectiveness of the revised fPM standard is inconsistent with the EPA's prior CAA section 112(d)(6) technology review determinations for other source categories?

[3] Proposed Rule at 25,537.
[4] Comments of the American Public Power Association on the National Emission Standards for Hazardous Air Pollutants: Coal-and-Oil-Fired Electric Utility Steam Generating Units Review of the Residual Risk and Technology Review; Proposed Rule, 88 Fed. Reg. 24854 (April 24, 2023) Docket ID No. EPA–HQ–OAR–2018–0794-1185 (APPA 2023 MATS Comments).
[5] *Id*.
[6] Environmental Protection Agency, Progress Report, https://www.epa.gov/power-sector/progress-report-emissions-reductions#hg (Last Updated September 12, 2024).
[7] "Particulate Monitoring Technical Report," prepared by RTP Environmental Associates, Inc. for the ETech Air Collaboration Workgroup on August 10, 2025 (PM Technical Report) (Attachment 1).

The fPM standard of 0.010 lb/MMBtu should be repealed based on EPA's finding that the cost-effectiveness of the revised limit is inconsistent with prior CAA section 112(d)(6) cost-effectiveness findings. EPA justifies its position in the final 2024 MATS RTR to set lower fPM limits by stating that the 2024 MATS RTR is consistent with CAA section 112's direction to achieve the "maximum degree of emissions reductions while taking into account the statutory factors, including cost."[8] EPA confuses the appropriate standard to be used in the RTR review, which is described in CAA section 112(d)(6) rather than section 112(d)(2).

Oversimplification of section 112 misstates the appropriate standard and ignores EPA's RTR charge. CAA section 112(d)(6) requires EPA, on an ongoing periodic basis, to revisit and update emission standards that it has already set for each source. No less than every eight years, EPA must "review, and revise as necessary (taking into account developments in practices, processes, and control technologies), emission standards promulgated under this section."[9] That review ensures that, over time, EPA maintains source standards compliant with the law and on pace with emerging developments that create opportunities to do even better however, as EPA determined in the 2020 MATS RTR analysis, that the residual risks from coal-fired and oil-fired EGUs were acceptable and did not identify any new technologies to control HAPs for these units.[10]

The 2024 MATS RTR ranks among the Agency's least cost-effective regulations in terms of costs per unit HAP emissions reduced. EPA itself acknowledged that the cost-effectiveness ratios significantly exceed levels previously deemed ineffective for identical pollutants under the same section 112(d)(6) standard.[11] The Agency's 2024 MATS RTR estimated that the fPM and non-Hg metals limits would impose costs of approximately $10.5 million per ton of non-Hg metal HAP and $34,500 per ton of fPM.[12] While these costs exceed thresholds the Agency has rejected for other sources, the more striking point is that EPA projects negative net benefits.

EPA dismissed these poor cost-effectiveness metrics by claiming comparisons to prior rulemakings were "inapt" due to different regulated industries.[13] However, EPA provided no rationale for this position, despite its own stated practice of considering cost-effectiveness estimates from previous rulemakings when evaluating new rules—a practice EPA followed in every rulemaking it cited as precedent for the 2024 MATS RTR rule's novel cost considerations. Cost-effectiveness analysis inherently requires comparing factors across industries and rulemakings. [14]

[8] 42 U.S.C. §7412(d)(2).
[9] Id. § 7412(d)(6).
[10] 85 Fed. Reg. at 31,314 (May 22, 2020).
[11] 89 Fed. Reg. at 38,523 (2024 MATS RTR).
[12] 89 Fed. Reg. at 38,511
[13] 89 Fed. Reg. at 38,524.
[14] *Sierra Club v. EPA*, 353 F.3d 976, 986 (D.C. Cir. 2004).

EPA's cost-effectiveness defense is further undermined by severely undercounting affected facilities. While EPA claimed only thirty-three units would incur compliance costs, significantly more units must install additional controls to meet the revised fPM standard, contrary to EPA's assertion that most power plants already have the necessary controls. EPA has consistently avoided addressing these points, instead issuing a historically cost-ineffective rule without adequate justification.

b. Question #2: Are there other cost-effective and achievable fPM limits for existing coal-fired EGUs that are based on developments in practices, processes, and control technologies that the EPA should consider as an alternative to repealing the 0.010 lb/MMBtu standard?

There are no other cost-effective and achievable fPM limits to consider as an alternative to the 0.010 lb/MMBtu standard. Costs must be balanced against the benefits of further HAP reductions.[15] If new particulate matter control technology were available, but no HAP reductions are necessary, then the new technology would be unnecessary. In this case, not only are there no new technologies, but the current risk level has been determined to be acceptable.

c. Questions #3 and #4: fPM Emissions Compliance Demonstration

APPA supports the Agency's proposal to repeal the compliance demonstration requirements for fPM emission standards for all coal-and oil-fired EGUs in the 2024 MATS RTR. There is no statutory justification for revising monitoring equipment and changing monitoring methodologies in an RTR. Our members currently avail themselves of compliance flexibility built into the MATS Rule. It would affect public power entities if the Agency eliminated these avenues for changes that lengthen correlation testing.

i. <u>EPA Should Reinstate the Use of Quarterly Stack Testing and PM Continuous Parametric Monitoring Systems (Question 3).</u>

The Proposed Rule seeks comments on whether QST and PM CPMS options should be reinstated for the fPM standard, given that alternative air pollution control indicators can adequately detect malfunctions, and PM CEMS costs may not justify their transparency benefits over more efficient pollutant control methods.[16]

APPA supports the reinstatement of QST and PM CPMS as a compliance option for fPM standard. The 2024 MATS RTR requires facilities to demonstrate compliance with the fPM limit of 0.010 lb/MMBtu using PM CEMS for coal-fired and lignite-fired units. EPA supported its new requirement by claiming PM CEMS offer "increased transparency and accelerated identification of anomalous emissions."[17] EPA states that Congress intended for CAA section 112 to achieve

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[15] *Michigan v. EPA,* 576 U.S. 742 (2015).
[16] 90 Fed. Reg. at 25,545.
[17] 88 Fed. Reg. at 24,857 (2023 MATS RTR Proposal).

significant reductions of HAP and that PM CEMS can carry out this intent by enabling owners or operators to detect and correct control device or process issues quickly.[18]

However, there have been no meaningful technology or monitoring changes since 2012 that would disqualify stack testing. Quarterly monitoring is a sufficient frequency to assure compliance, consistent with EPA's findings in 2012. We also note that EGUs may employ other parametric methods to comply with various standards, such as continuous opacity monitoring systems (COMS) for opacity measurement, which serve as compliance indicators.

CAA section 112 standards neither require continuous emissions monitoring nor express a preference for it.[19] EPA needs only to demonstrate reasonable assurance of compliance with emissions standards.[20] The EPA previously determined that stack testing was an adequate compliance measure in both 2012 and 2020. Since 2023, EPA has provided no record evidence showing the inadequacy of stack testing. EPA has previously maintained that quarterly stack tests sufficiently ensure compliance, and the U.S. Court of Appeals for the District of Columbia Circuit (D.C. Circuit) has found EPA's reasoning sound.[21]

APPA supports the continued use of PM CPMS as a compliance option because they provide a comparable level of compliance assurance at a lower cost than PM CEMS. Despite limited past adoption, EPA has not proven PM CPMS inadequate for real-time fPM emission indication. The fact that few facilities have selected PM CPMS as a compliance option does not negate its value in terms of compliance flexibility. PM CPMS offer a more practical and cost-effective way to monitor emissions compliance. Unlike PM CEMS, which require expensive and complex testing procedures, PM CPMS establishes a simpler relationship between the monitoring equipment's measurements and the actual PM concentrations in the stack.

The most significant advantage becomes clear when you compare the testing requirements. Traditional PM CEMS correlations often require facilities to deliberately detune their pollution control equipment or reinject ash into the system during testing. These procedures, while scientifically valid, create additional operational disruptions, increase testing costs, and can temporarily increase emissions during the testing period itself.

PM CPMS eliminates these problematic requirements. Facilities can conduct their annual verification testing under normal operating conditions without artificial manipulation of their control systems. This translates directly into reduced testing time, lower labor costs, fewer operational disruptions, and the elimination of the environmental costs associated with deliberately increasing emissions during testing periods.

[18] See §63.10005(b)(5)).
[19] See, e.g., *Sierra Club v. EPA*, 353 F.3d 976, 990-91 (D.C. Cir. 2004).
[20] *Id*. at 991 ("There is no presumption in favor of any particular type of monitoring.").
[21] See *White Stallion Energy Ctr v. EPA*, 748 F.3d 1222, 1255 (D.C. 2014) (reversed on other grounds).

APPA recommends the Agency revise the MATS PM CPMS provision to avoid imposing a more stringent standard. In cases where CPMS uses the same measurement principles as PM CEMS, EPA should eliminate the requirement for 75 percent operating limits or the highest PM CPMS output during a performance test. Rather, the operating limit should be based on CPMS output that corresponds to the emission limit, thus allowing a source to use all available compliance margin, especially if EPA retains the 0.010 lb/MMBtu limit.

ii. PM CEMS Have Limitations

In the 2024 MATS RTR, the Agency touted PM CEMS as providing "increased transparency" with unquantifiable benefits to operators and the public. However, EPA incorrectly treated this data as reliable, precise measurements without acknowledging inherent limitations. PM CEMS do not directly measure fPM. Instead, they serve as compliance verification tools that provide reasonable assurance that fPM emission limits are being met.

The PM Technical Report's analysis on PM CEMs reveals "allowable measurement error impacts all reported emissions such that reported values should not be considered to be absolute but rather should be considered to have an error bar around each measured value."[22] This allowable measurement error is established by Performance Specification 11 (PS-11) and Quality Assurance Procedure 2 (Procedure 2) and is currently equivalent to ±25% of the emissions standard, which results in an error of ±0.0075 lb/MMBtu. Beginning in July 2027, if the more stringent performance specification takes effect, this error increases to ±37.5% or ±0.00375 lb/MMBtu. This evidence shows PM CEMS provides concentration indications, not finite direct measurements. The transparency benefit is undermined when the underlying data lacks the precision EPA assumes.

APPA supports EPA's removal of the stricter performance specification for PS-11 and Procedure 2 from Appendix C, as proposed.

EPA must incorporate allowable measurement errors in future data analyses. While PM CEMS demonstrate reasonable compliance assurance, alternative MATS compliance options (PM CPMS, QST, and LEE testing) offer superior accuracy and cost-effectiveness that EPA should evaluate.

APPA members face significant cost concerns regarding PM CEMS implementation. Our members must bear both the upfront capital expenses for equipment purchase and installation, as well as ongoing operational costs. PM CEMS represent a higher financial burden compared to traditional stack testing methods, with total costs encompassing initial equipment and installation expenses plus recurring annual operating expenditures.

iii. Quarterly Stack Testing and the LEE Program: Offer Accuray and Cost-Effective Monitoring Options (Question #4)

[22] PM Technical Report at 11.

The Proposal seeks comments on reinstating the LEE program for fPM and non-Hg metal HAPs.[23] APPA supports EPA's proposal to reinstate the LEE program for fPM and non-Hg metal HAPs. For a facility to qualify as a LEE source for fPM and non-Hg metal HAPs under MATS, a source must demonstrate its emissions are below the applicable standard based on quarterly stack testing over a three-year period, which is not an easy endeavor. The units that choose to stack tests and attain low fPM levels should be rewarded with a lower frequency of testing for MATS compliance. These units are frequently subject to annual PM testing to satisfy other regulatory requirements in their Title V permits. Public power utilities continue to perform annual stack tests for permit compliance. COMS or other parametric monitoring may be a feasible tool to ensure that the operations of the EGU remain consistent with those during the performance test.[24]

As noted in comments on the 2023 MATS RTR proposal CAA section 112 technology review focuses specifically on control technologies that affect air toxic emissions, not on compliance measures that lack direct correlation to emissions improvements.

iv. <u>The Cost of the LEE Program and Quarterly Stack Testing is Less Than PM CEMS</u>

The PM Technical Report supports EPA's Proposed Rule, which concludes that annual QST compliance costs are lower than PM CEMS requirements. The analysis reveals even more significant cost advantages for the LEE compliance option, which demonstrates cost effectiveness that is 20 to 30 times better than PM CEMS. See Table 1 from the PM Technical Report below.

	PM CEMS (Non-Beta Gauge)	PM CEMS (Beta Gauge)	QST	LEE
EPA	72,325		60,270	
RTP	82,968	108,194	57,098	4,431
RTP Testing Costs (including HCl cost sharing)			37,490	2,797

Table 1 PM CEMS and Testing Cost Summary

The LEE option becomes particularly attractive for units that also qualify for LEE status under hydrogen chloride (HCl) regulations, since these facilities can conduct combined stack testing for both HCl and fPM limits simultaneously, creating additional cost sharing benefits that maximize efficiency.

These substantial cost reductions from QST and LEE options were notably absent from EPA's 2024 MATS RTR cost comparison analysis, which focused primarily on comparing CEMS against stack testing without fully accounting for these more economical alternatives.

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[23] 90 Fed. Reg. at 25,545.
[24] APPA 2023 MATS Comments at 21.

The PM Monitoring Technical Report findings demonstrate that both QST and LEE remain the most cost-effective compliance pathways even under scenarios where EPA might eliminate minimum sampling requirements as recommended in other sections of these comments. This cost advantage reinforces the practical value of maintaining flexible compliance options that achieve environmental protection goals while minimizing economic burden on regulated facilities.

The analysis highlights how EPA's cost-benefit calculations may have overlooked significant opportunities for achieving compliance objectives through more economically efficient means.

Further, units with enforceable shutdown schedules that have not qualified as fPM LEE units should continue using existing emissions testing schedules past the proposed compliance date without installing PM CEMS. These schedules were negotiated considering the costs of stack testing versus equipment installation; making post-hoc changes is unreasonable.

Units qualified as fPM LEE (demonstrating emissions below 0.015 lb/MMBtu over three years of quarterly testing) with enforceable shutdown schedules should test at the current LEE frequency or annually, whichever is maximum. Quarterly testing provides no environmental benefit for these units and only adds cost.

The cost of LEE or quarterly HCl/fPM stack testing is less than PM CEMS operation. APPA supports EPA's proposal to retain the quarterly stack testing and LEE compliance options in the final rule because the associated costs and environmental impacts are significantly lower than PM CEMS, particularly for low emitters. Any subsequent cost analysis by the Agency should consider LEE compliance costs and the cost-sharing effects for units that test both fPM and HCl simultaneously.

v. PM CEMS Monitoring Provisions Can Be Improved to Offer Flexibility and Reduce Costs

1. Conditional Valid Data Provisions

Performance Specification (PS-11) and response correlation audit (RCA) testing procedures frequently generate periods of invalid data that must be reported as monitor downtime. When this testing stems from monitor malfunctions or test failures during out-of-control periods, facilities must also report these instances as deviations, potentially triggering enforcement actions and increasing ongoing compliance costs.

The downtime associated with PS-11 and RCA testing can be substantial. PS-11 testing requires a mandatory seven-day calibration drift assessment before correlation testing begins, resulting in more than seven days of downtime. The final rule's minimum sampling requirements have further extended testing duration and associated monitor downtime periods.

RCA testing conducted following failed relative response audit (RRA) results can create even more significant downtime, potentially lasting days or weeks, depending on stack testing vendor availability and boiler scheduling. When back-ordered replacement parts are required, delays can extend longer. This downtime does not reflect poor monitor operation or maintenance practices but rather illustrates the inherent challenges of meeting PS-11 and Procedure 2 requirements. For PM CEMS replacements, downtime represents efforts to continuously improve fPM monitoring capabilities.

The PM Technical Report recommends implementing conditionally valid data provisions similar to those established in Part 75 regulations to mitigate monitor downtime associated with PS-11 and RCA testing. Under this approach, facilities would conduct one or more probationary quality assurance checks, such as calibration error tests or absolute correlation audits, prior to initiating monitor recertification or immediately following monitor repairs or failed RRA or RCA events.

These probationary quality assurance checks would temporarily validate data collection, provided that required follow-up testing is completed within a defined timeframe. Upon successful completion of follow-up tests, all data collected between the probationary checks and final testing would be considered valid for compliance purposes.

This proposed method offers straightforward implementation through the application of new equations to raw monitor output, producing adjusted values retroactively. PM CEMS correlation calculations are typically managed by the Data Acquisition and Handling System, facilitating seamless integration of this approach. EPA's proposal to remove the PS-11 and Procedure 2 performance specifications introduced in the final rule would further minimize the frequency of failed RRA and RCA tests, enhancing the effectiveness of this recommended solution.

2. *Adding QA Operating Periods and Grace Periods Would Minimize Emissions*

The PM Technical Report recommends revising the MATS Appendix C requirements to align with the "QA Operating Quarter" and "Grace Period" provisions found in 40 C.F.R. Part 75. These changes would give EGUs with reduced dispatch more flexibility and help reduce emissions from unnecessary test runs.

Currently, the MATS rule mandates testing within the lesser of 720 operating hours or one calendar quarter—but still requires tests in the next calendar quarter, even if the unit wouldn’t otherwise operate. This forces facilities to run expensive tests solely to meet the timeline. Instead, adopting the Part 75 approach would allow facilities to delay quality assurance testing until the unit resumes regular operations, as long as it's within a reasonable 720-hour window.

3. RCA Testing Should Only be Required Under Limited Circumstances

RTP recommends limiting RCA testing to cases where an RRA fails or when operational changes indicate a significant shift in flue gas characteristics, as identified through methods like the fuel flow-to-load check in 40 C.F.R. Part 75. Requiring routine RCAs without evidence of change unnecessarily increases testing costs and environmental impacts.

d. Question # 5: EPA solicits comment on retaining the updated minimum volume per run or minimum mass per run requirements for fPM compliance demonstration for coal-fired and integrated gasification combined cycle units.

In the Proposed Rule, EPA states that "retaining the additional option of sample mass would reduce measurement uncertainty and may reduce test run durations and therefore reduce fPM testing costs."[25] However, this may not fully reflect the practical impact. Maintaining the mass or volume requirements does not appear to reduce fPM testing costs compared to the original MATS rule. While providing flexibility through the option of using either sample mass or volume is an improvement over the 2023 Proposed RTR's single requirement of a minimum sample volume per run (regardless of collected mass), the 2024 MATS RTR rule's requirement for a minimum volume or mass per run could increase testing costs. This is especially relevant for units utilizing QST, LEE, and PM CEMS, where additional time may be needed to complete each test. EPA is encouraged to consider that this new requirement could increase costs without delivering significant benefits.

Increasing the minimum sample volume or mass per test run only improves data quality when there is significant variability between runs under the same test conditions—such as during QST/LEE testing or at a consistent particulate loading level for PM CEMS testing. The PM Technical Report points to a study conducted by the Electric Power Research Institute (EPRI) in 2023, that analyzed 91 quarterly stack tests (assumed volume of 1 dry standard cubic meter (dscm)) and 183 LEE tests (assumed volume of 2 dscm) and found that doubling the sample volume did not meaningfully reduce the relative standard deviation between test runs.[26] The measurement uncertainty observed in the study was consistent with the expected uncertainty of ±15–20% for the test methods themselves. Therefore, increasing sample mass or volume is not necessary to improve measurement accuracy.

If the requirement is retained, sources should be expected to sample for a sufficient duration to reasonably collect the anticipated minimum mass. However, sources should not be penalized if actual emission rates are lower than expected and result in collecting less mass.

[25] 90 Fed. Reg. at 25,542.
[26] PM Technical Report at 25.

e. Question #8: Should the Agency consider whether, when weighing the costs associated with developments under a CAA section 112(d)(6) technology review, there would be any meaningful risk reduction from reductions in HAP emissions based on potential revisions to emission standards resulting from those developments?

Clean Air Act section 109(b)(1) mandates that EPA establish National Ambient Air Quality Standards (NAAQS) that "shall be ambient air quality standards the attainment and maintenance of which in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health." EPA has set PM NAAQS, and most U.S. monitoring stations currently meet these standards.

In the 2024 final rule's RIA, EPA acknowledged significant limitations in its benefits assessment: "The estimates of monetized benefits under the final rule are lower than estimated at proposal... EPA is unable to quantify the potential benefits of any HAP reductions for this rule. EPA is unable to quantify the potential benefits of any reductions of non-Hg HAP metals... we do not project major changes in emissions of the criteria and GHG pollutants monetized in the benefit-cost analysis. Consequently, the monetized benefits of the rule are lower than previously projected."[27]

EPA's 2024 health benefits analysis was incomplete due to time constraints and has not been updated since. The RIA bases benefit calculations on individuals' "willingness to pay (WTP) for the risk change" rather than actual air quality improvements in specific geographic areas from rule implementation.[28]

Given that much of the nation already meets current PM and ozone NAAQS it is inappropriate to monetize health benefits from potential criteria pollutant reductions in areas already in attainment. Additionally, EPA incorrectly assumes all PM species have equivalent health impacts, despite established scientific evidence showing varying toxicity among different PM types.

Based on these concerns, APPA recommends that EPA proceed with finalizing the Proposed Rule.

[27] 2024 Regulatory Impact Analysis (RIA) at ES-16.
[28] RIA at 4-13.

3. Conclusion

Thank you for your consideration of these comments. We appreciate the opportunity to comment on the Proposed Rule and look forward to engaging with the Agency on our comments. Please contact Ms. Carolyn Slaughter (202-467-2900 or CSlaughter@publicpower.org) with questions regarding these comments.

Sincerely,

Carolyn Slaughter

Sr. Director, Environmental Policy

American Public Power Association

ATTACHMENT 1

National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-fired Electric Utility Steam Generating Units Docket ID No. EPA-HQ-OAR-2018-0794

Particulate Monitoring Technical Report

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On June 17, 2025, the Environmental Protection Agency (EPA) released a proposed rule, entitled "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units" (Proposed Repeal Rule).[1] The Proposed Repeal Rule would repeal specific amendments of the 2024 Mercury and Air Toxics Standards (MATS) under Clean Air Act (CAA) Section 112, promulgated in the final rule entitled "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units Review of the Residual Risk and Technology Review," 89 Fed. Reg. 38508 (May 7, 2024) (the 2024 Final Rule). This Technical Report, developed by RTP Environmental Associates (RTP), considers the Proposed Repeal Rule and focuses on the filterable particulate matter (fPM) technical data and the monitoring and testing provisions associated with the Proposed Repeal Rule. In particular, RTP focuses on several aspects not addressed during the 2023 comment period for the 2023 Proposed Risk and Technology Review (RTR) rule (2023 Proposed RTR)[2]. These areas include: (1) evaluation of the changes EPA made between the 2023 Proposed RTR and the 2024 Final Rule; (2) new fPM data from electric generating units (EGUs) since the 2023 comment period; (3) updated timelines; and (4) EPA's strategy in the Proposed Repeal Rule as it relates to the feasibility of the fPM limitation and PM CEMS and correlation testing.

The data presented in this technical paper evaluate:

- The achievability of a revised fPM standard
- The reliability, cost-effectiveness, and environmental cost of various fPM compliance demonstration methods
- The impact of use of revised specifications for Performance Specification 11 (PS-11) and Quality Assurance Procedure 2 (Procedure 2) as stated in MATS Appendix C, Section 1.2 and Section 1.3 for sources equipped with PM CEMS
- Any new data to support the individual and total non-mercury metallic hazardous air pollutants (non-Hg HAP) emission standard
- The cost and benefit of retaining the updated minimum volume per run or minimum mass per run requirements for fPM reference method test runs

In addition, RTP presents suggestions for improvements to the PM CEMS monitoring provisions for sources that elect to comply with the fPM emission limitation using CEMS.

[1] 90 Fed. Reg. 25535 (June 17, 2025).
[2] Proposed Rule, National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units Review of the Residual Risk and Technology Review, 88 Fed. Reg. 24854 (Apr. 24, 2023) (2023 Proposed RTR).

A. The fPM emission standard

1. EGU fPM emission variability has been continually observed.

RTP's observations on EPA's fPM methodology in the 2024 Technical Memo

EPA released the 2024 Technical Memorandum,[3] which is an update to the 2023 Technical Memorandum, on the date that EPA released the 2024 Final Rule. In the 2024 Technical Memo, EPA acknowledged that its 2023 analysis was based on one quarter of data for 48 EGUs and two quarters of data for 155 EGUs. In the 2024 Technical Memo, EPA improved its analysis by analyzing all available historical fPM compliance data for 62 EGUs. The analysis included sources relying on PM CEMS, quarterly stack testing (QST), and Low Emitting EGU (LEE) compliance determination methods. RTP agrees with the Agency's statement that gathering available data from WebFIRE and CEDRI is cumbersome and commends EPA's efforts to analyze additional data as the more robust analysis clearly exhibits larger variability than was captured during EPA's previous analysis of only one or two quarters of data.

EPA's 2024 Technical Memo also identified additional sources (beyond those identified in the 2023 Technical Review) that require upgrades to existing controls or installation of additional controls to consistently meet any lower fPM limit. However, RTP observes that an even more complete analysis of all EGUs, beyond the 62 EGUs analyzed in 2024, would identify more sources that cannot consistently achieve a reduced fPM emission rate and would further increase the cost of compliance with the 2024 Final Rule revised fPM emissions limitation of 0.010 lb/mmBtu.

RTP update of fPM data from 2023-2025

RTP analyzed fPM emissions data from stack tests, PM CPMS, and PM CEMS from 34 monitoring locations since the closure of the 2023 Proposed RTR comment period. The objective of this analysis was to include more recent data and evaluate whether these data present similar variability as was present in earlier data sets and to further support that variability is not limited to only certain control device configurations. RTP presents these new data for various control device configurations and compliance demonstration methodologies in Appendix A and discusses selected graphs of these data for demonstration purposes.

[3] 2024 Update to the 2023 Proposed Technology Review for the Coal- and Oil-Fired EGU Source Category, Docket ID No. EPA-HQ-OAR-2018-0794-6919 (2024 Technical Memo).

RTP continues to see variability in fPM datasets, which is due to a variety of factors discussed *infra*. RTP observes variability in reported fPM emission rates in units equipped with PM CEMS as demonstrated in Figure 1 and Figure 2. As shown in Figure 1, PM CEMS quarterly data show variability between 0.005 lb/mmBtu and 0.014 lb/mmBtu for this coal-fired unit that is equipped with a baghouse (B) and dry limestone (DL) scrubber. As shown in Figure 2, PM CEMS quarterly data show variability between 0.005 lb/mmBtu and 0.024 lb/mmBtu for this coal-fired unit that is equipped with an electrostatic precipitator (ESP), baghouse and wet limestone scrubber (WLS). Each of these units are equipped with a baghouse and PM CEMS, but neither can consistently achieve the 2024 Final Rule revised limit of 0.010 lb/mmBtu. Figure 1 and 2 present the different emissions reduction capabilities of two units employing the same control device (baghouse). These side-by-side examples demonstrate that site-specific factors that affect PM reduction capabilities, such as different control device sizes, unit and control device vintage, and control device design, to name a few.

Two important points are highlighted by the data presented in Figure 1 and Figure 2. First, PM CEMS (and PM CPMS) capture operational variability including startups, shutdowns, and load cycling. EPA must account for variability, and resulting emissions shifts, when using PM CEMS (or PM CPMS) data to set a compliance standard. The compliance standard should contain sufficient margin to accommodate the entire range of operation modes. As presented in Figure 2, RTP observes more variability in reported fPM emission rates in saturated stacks as opposed to dry stacks. This variability is understandable considering that the addition of wet flue gas desulfurization after the primary particulate control device changes the composition and characteristics of the particles exiting the stack. At times, such as during periods of scrubber upset or mist eliminator issues, the fPM emission rate increases because of a change in the optical characteristics and particle size distribution relative to the PM CEMS correlation. Second, PM CEMS may experience mathematical shifts in reported emission rates as part of routine quality assurance of the monitor as discussed *infra*. The quarters in which mathematical shifts occurred are identified in Figure 1 (no correlation shifts) and Figure 2 (two correlation shifts) by light orange bars in the quarter in which the shifts occurred. RTP observes that these mathematical shifts occur more frequently and have a greater impact on reported fPM emissions rates in saturated stacks as opposed to dry stacks and distinguishes between wet stack and dry stack applications in each graph contained in Appendix A of this document. The limitations of PM CEMS will be discussed further below.

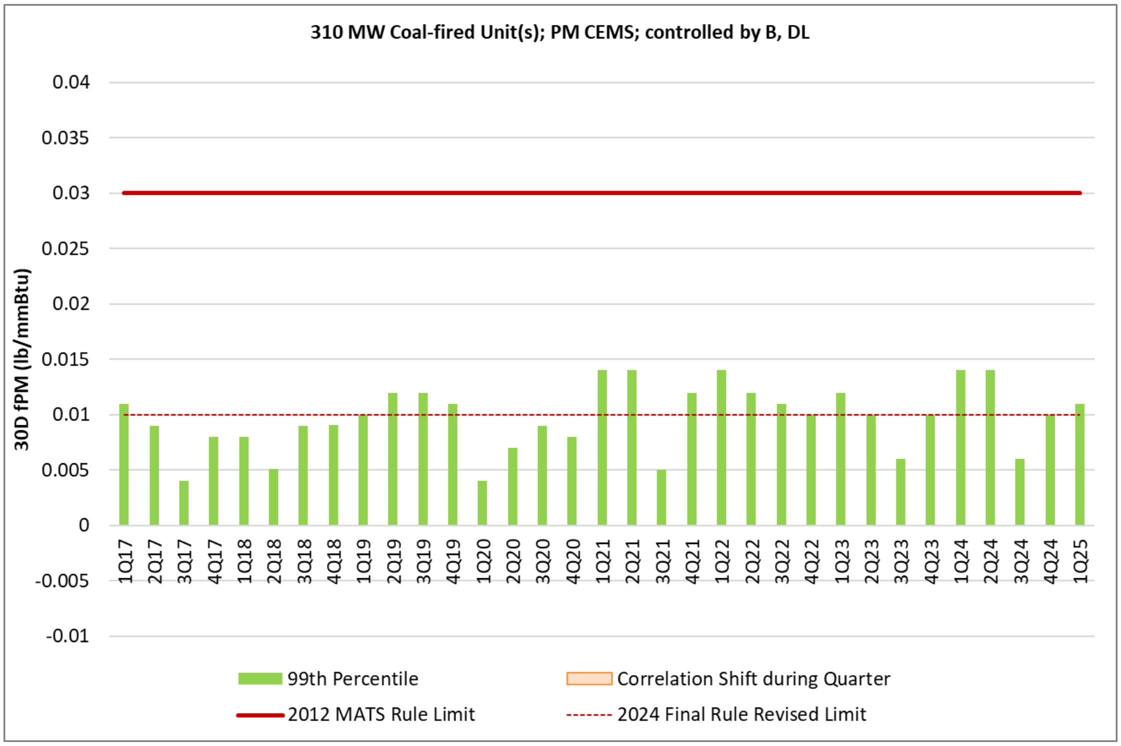

Figure 1 PM CEMS data from 2017-2025 from a 310 MW coal-fired unit equipped with a baghouse (B) and dry limestone scrubber (DL).

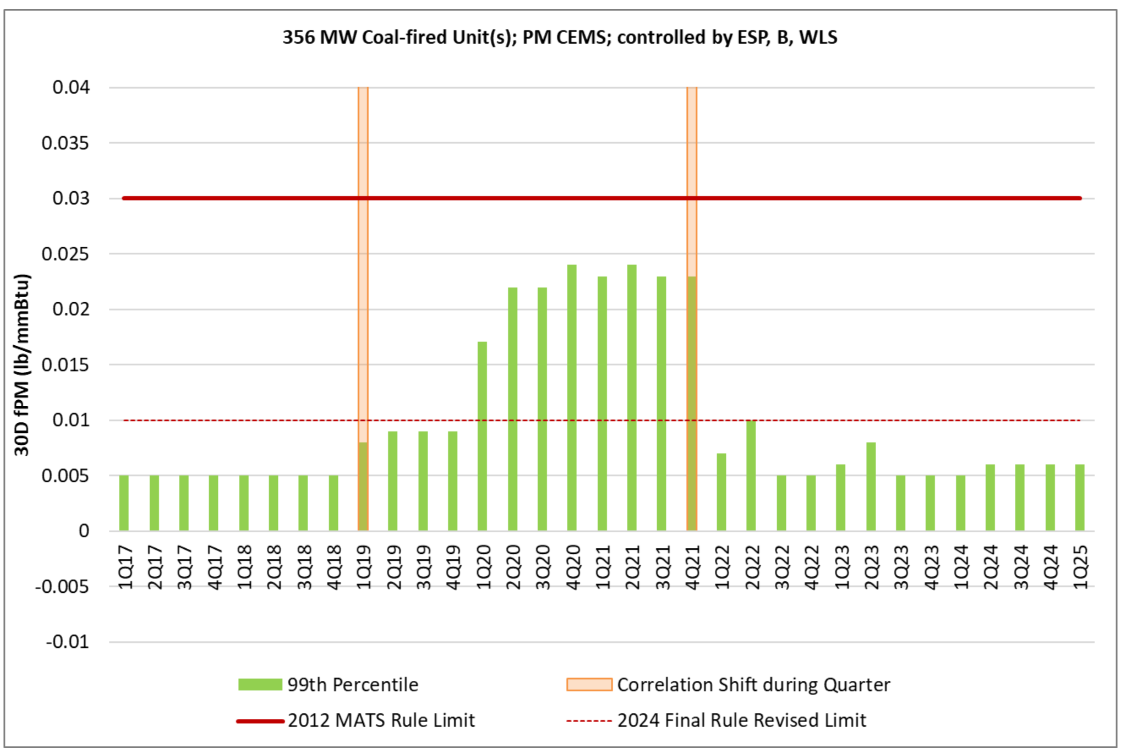

Figure 2 PM CEMS data from 2017-2025 from a 356 MW coal-fired unit equipped with an electrostatic precipitator (ESP), baghouse (B) and wet limestone scrubber (WLS).

RTP's conclusions regarding the EPA's 2024 methodology

EPA's more robust analysis and RTP's updated dataset clearly show that low fPM emissions during a single quarter do not indicate that the same level of compliance can be consistently achieved (and with sufficient compliance margin) over time. Acknowledging this fundamental fact, the 2024 Final Rule revised its terminology to refer to the selected presumed emission rate value as the "lowest achieved emission rate" rather than the "lowest achievable emission rate." The revised terminology better characterizes EPA's flawed data approach but does not resolve fundamental issues with EPA's methodology.

The following Figure 3 and Figure 4 are duplicated from EPA's analysis in the 2024 Technical Memo for the Coronado Generating Station (Coronado). Figure 3 shows the mean of all 30-day average fPM emission rate data separated by quarter and the 99th percentile 30-day average fPM emission rate separated by quarter as presented by EPA. Because the quarterly averages of 30-day averages do not represent unique data points, they should not be included in the analysis. Figure 4 presents each 30-day average fPM emission rate as well as a multi-year mean and median value for Coronado.

EPA has stated that distinct data points should be used in establishing emission limits and has stated that staggered or overlapping measurements are not independent, ignore potential variability,[4] and cannot be used for PM CEMS correlations. Similarly, quarterly or multi-year mean and median values are not independent measurements, ignore normal operational variability, and should not be used in establishing revised emission limits.

RTP finds that neither the mean nor the median values established on a quarterly basis or multi-year basis have relevance on compliance, which is on a continuous basis updated at the end of each boiler operating day. Unless EPA elects to adjust the demonstration of compliance for EGUs to a multi-year average, all assessments of performance and cost should be based on independent 30-boiler operating day averages. RTP disagrees with EPA's inclusion of values like those in Figure 3 and Figure 4 in EPA's data analysis, presentation of data, and cost calculations. Compliance is required at all times, not based on quarterly averages and certainly not based on the average of data reported over the previous seven or more years. RTP's analysis in Appendix A indicates the 99th percentile 30-boiler operating day average value for PM CEMS equipped units without indicating the mean or median values.

[4] EPA Memorandum, "*Policy on Overlapping or Staggered Stack Test Runs*" (Nov. 8, 2016), https://www.epa.gov/sites/default/files/2016-11/documents/gd-053.pdf

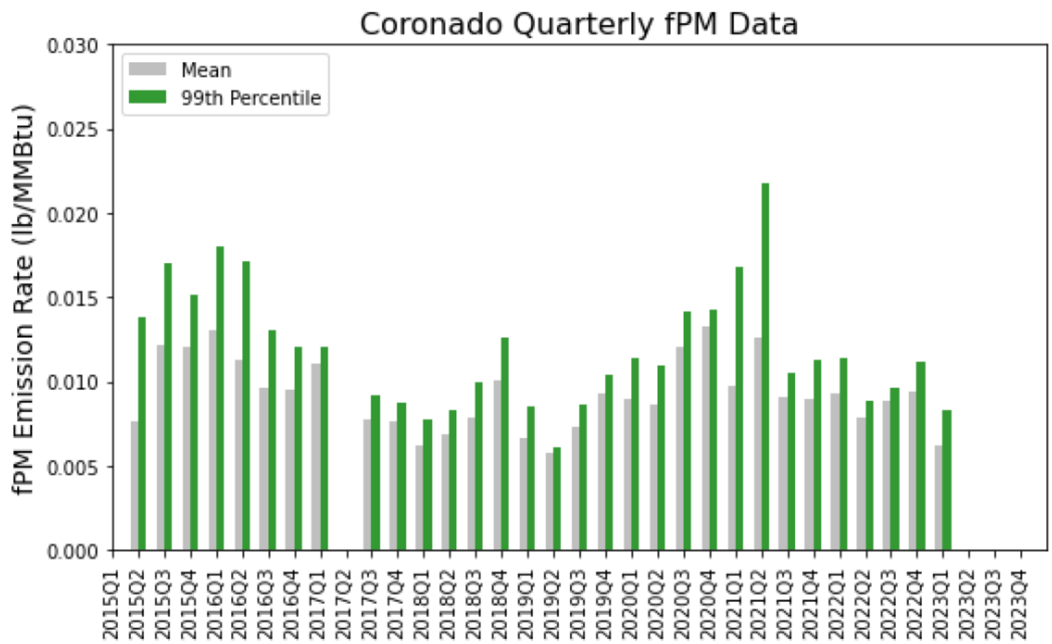

Figure 3 2024 EPA Technical Memo Mean and 99th Percentile fPM Emission Rate by Quarter

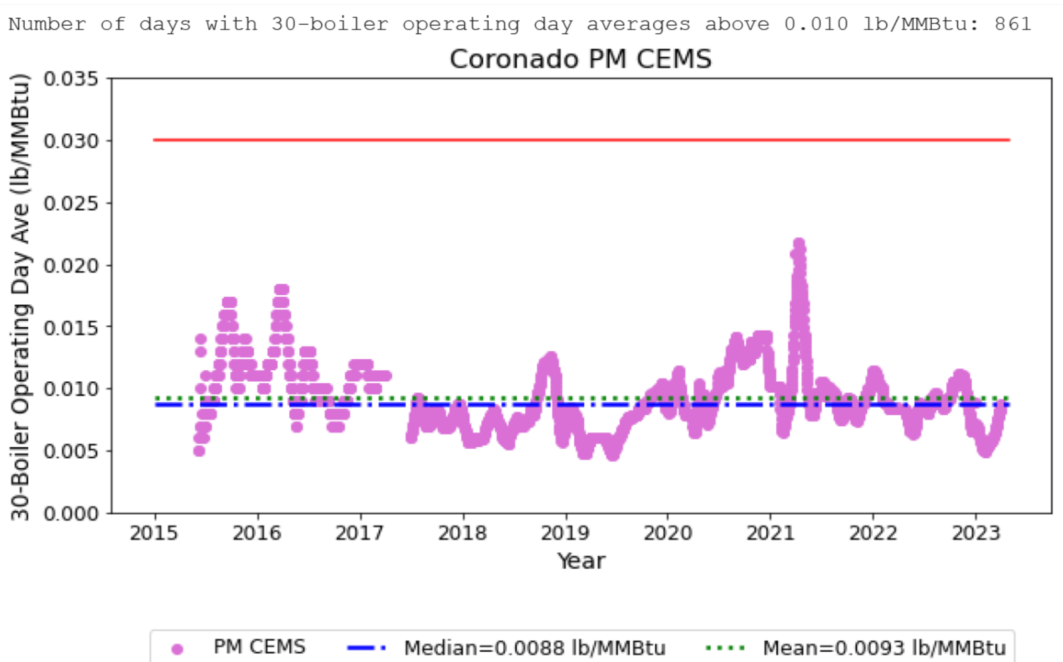

Figure 4 2024 EPA Technical Memo Daily fPM Emission Rate and Multi-year Mean and Median Value

The following Figure 5 from EPA's analysis in the 2024 Technical Memo identifies EPA's cost methodology. EPA assumes no costs or emission reductions if the lowest achieved fPM rate and the multi-year average rate is less than the potential fPM limit. EPA assumes only minimal cost if the lowest achieved fPM rate is less than the revised limit for the 2024 Final Rule while the multi-year average is greater than the revised limit.

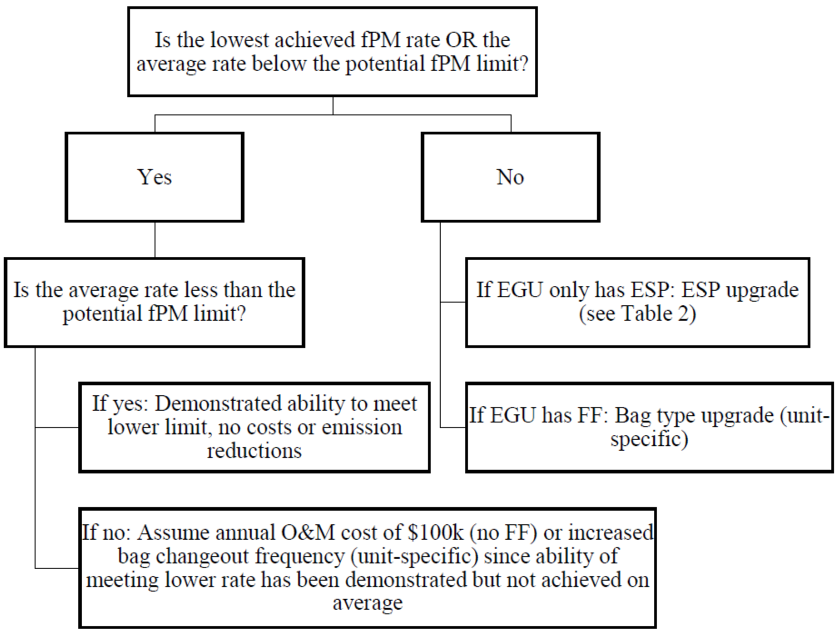

Figure 5 2024 EPA Technical Memo Updated PM Control Assumptions

Using Coronado's daily average values presented in Figure 4 above, the mean rate is 0.0093 lb/mmBtu, yet there were 861 days with a 30-boiler operating day average above 0.010 lb/mmtu, the revised fPM limit for the 2024 Final Rule. Capital or operation and maintenance (O&M) costs would certainly need to be invested regardless of the multi-year mean value to consistently meet a limit of 0.010 lb/mmBtu. However, EPA's methodology as illustrated by Figure 5 and as reflected in the 2024 Technical Memo[5] assumes no additional costs must be expended for Coronado to comply with the 2024 Final Rule.

RTP identifies two additional examples that illustrate the fallacy of EPA's entire cost methodology. RTP presents the quarterly stack test fPM rates for a 652 MW coal-fired unit in Figure 6. For this unit, the quarterly emission rates are variable and do not demonstrate that the unit can consistently achieve an emission rate of 0.010 lb/mmBtu. However, EPA's lowest achieved fPM rate assumption (based on an evaluation of only four selected quarters) is 0.00498 lb/mmBtu, and EPA's average rate

[5] *See* EPA 2024 Technical Memo.

is 0.00983 lb/mmBtu as reflected in the 2024 Technical Memo Attachment 1 spreadsheet "Unit-Level Information & Inputs" tab.[6] Since both of EPA's presumed rates are less than 0.010 lb/mmBtu, EPA assumes no additional cost for the unit to meet the revised limit. The fPM emissions data presented in Figure 6 show many quarters above the revised limit of 0.010 lb/mmBtu. Clearly, this ESP-controlled unit cannot achieve consistent compliance with the revised limit for the 2024 Final Rule without significant investment.

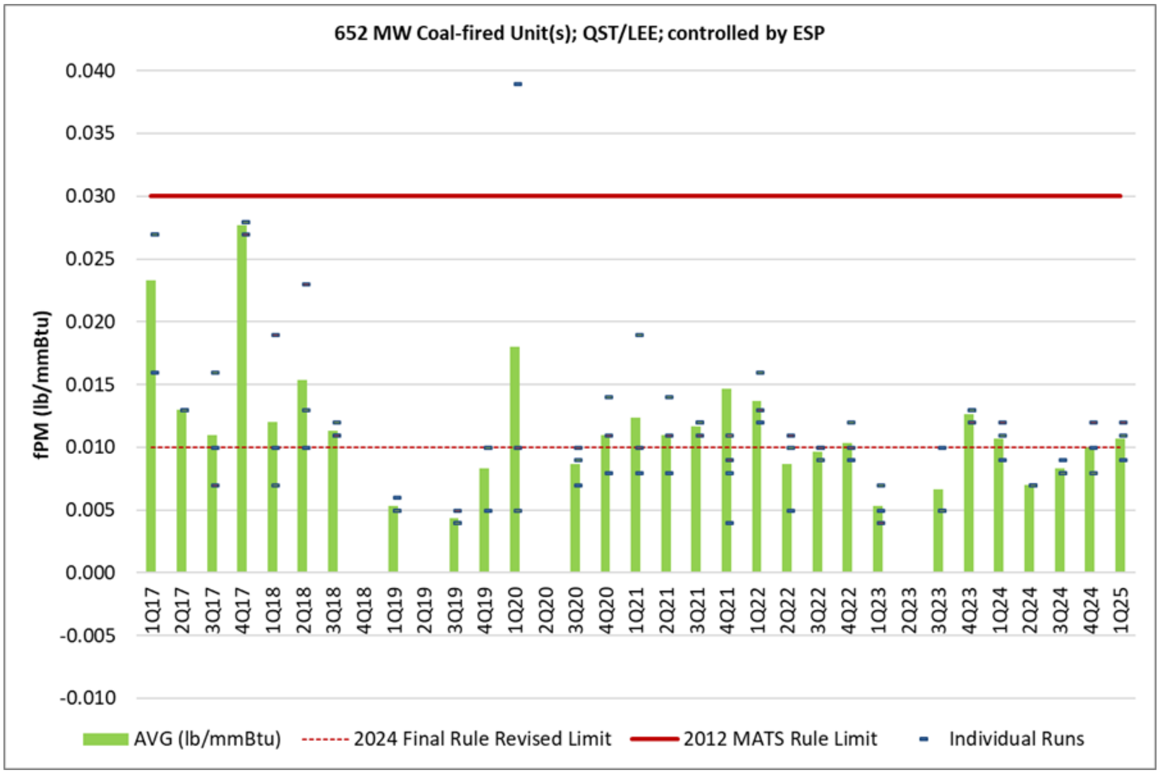

Figure 6 QST data from 2017-2025 from a 625 MW coal-fired unit equipped with an electrostatic precipitator (ESP) (EPA lowest achieved emission rate =0.00498 lb/mmBtu; EPA average emission rate = 0.00983 lb/mmBtu).

A second example of deficiencies in EPA's cost calculations is a 713 MW coal-fired unit equipped with an ESP. Figure 7 illustrates variable quarterly fPM rates with numerous quarters in excess of 0.010 lb/mmBtu based on stack testing results. EPA's lowest achieved emission rate assumption for the unit presented in Figure 7 is 0.01462 lb/mmBtu, and EPA's average emission rate assumption for the unit is 0.01278 lb/mmBtu, as reflected in the 2024 Technical Memo Attachment 1 spreadsheet "Unit-Level Information & Inputs" tab.[7] Even though both of EPA's presumed values are above

[6] *See* EPA 2024 Technical Memo.
[7] *Id.*

the 2024 Final Rule revised limit, EPA assumes no costs or emission reductions for the unit in the 2024 Technical Memo Attachment 1 spreadsheet "FF Install Estimated Costs" tab.[8] Clearly, the fPM emissions data presented in Figure 7 demonstrate that the unit cannot achieve consistent compliance with the revised limit for the 2024 Final Rule without significant investment.

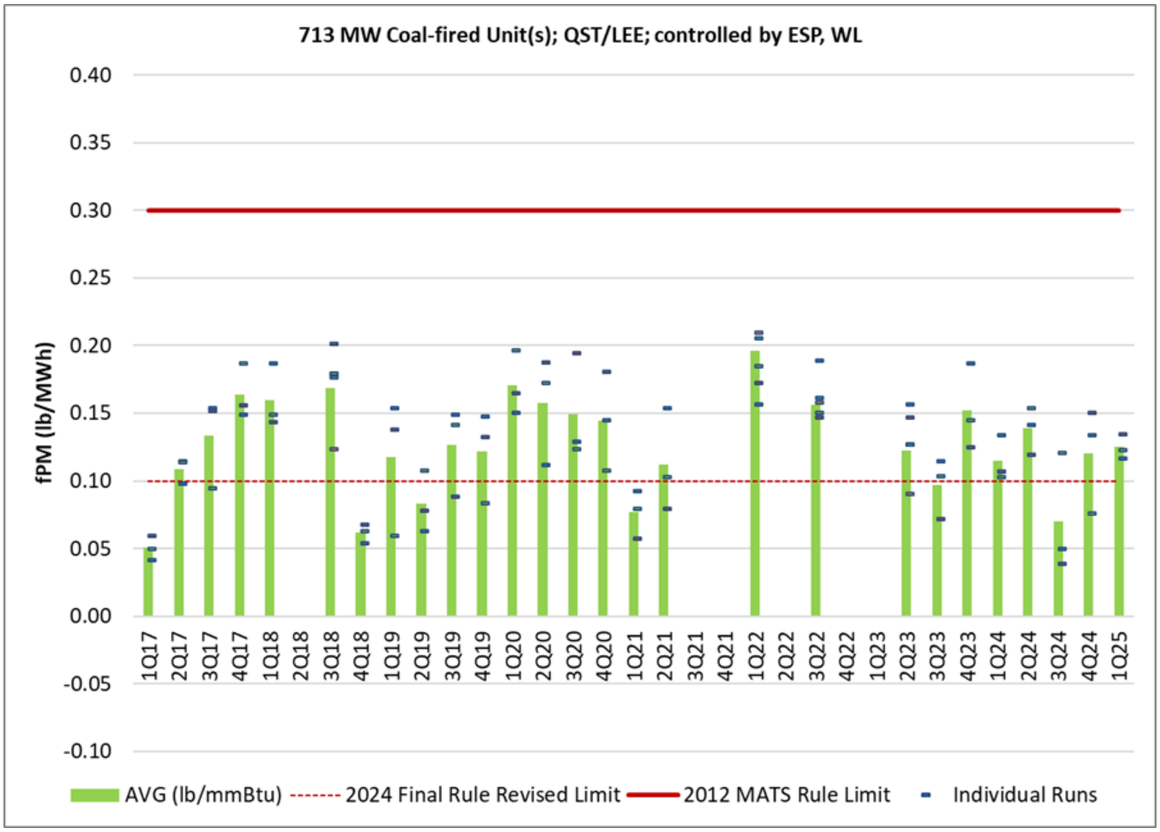

Figure 7 QST data from 2017-2025 from a 713 MW coal-fired unit equipped with an electrostatic precipitator (ESP) and wet limestone (WL) scrubber (EPA lowest achieved emission rate =0.01462 lb/mmBtu; EPA average emission rate = 0.01278 lb/mmBtu).

Setting aside whether it is legally appropriate to use data as a "development," instead of actual new developments or technologies, all available data should be included in any future analysis and should be categorized prior to analysis based on the compliance demonstration method (PM CEMS, PM CPMS, QST, or LEE) and stack characteristics (wet or dry). The Agency has access to compliance data for each required compliance period (30-boiler operating day averages for PM CEMS equipped units, quarterly stack test data, or triennial LEE testing) and should use all available data to determine what is achievable. EPA should not rely on selected time periods to determine if a value was

[8] *See* EPA 2024 Technical Memo.

achieved once and then apply an assumption that it can always be achieved continuously.

2. EPA failed to consider significant factors affecting fPM data.

The fPM data analysis included in the 2023 Proposed RTR and updated in the 2024 Technical Memo[9] is fatally flawed. EPA's analysis does not consider other factors that may impact reported emission rates such as unit dispatch and PM CEMS measurement inaccuracy. In its analysis, EPA includes numeric values for non-boiler operating days and PM CEMS out-of-control periods in supporting its lowest achieved, median, and mean fPM rates. Non-boiler operating days should not be used because MATS compliance is demonstrated based on the arithmetic average of 30-*boiler operating days*[10] of quality-assured CEMS data converted to the units of the standard. Likewise, PM CEMS out-of-control periods[11] should not be used because these data are also excluded from the 30-boiler operating day average to determine MATS compliance.

A review of the data[12] provided in Excel format for DB Wilson shows that EPA's analysis included calendar days that do not meet the definition of "Boiler Operating Day" in the MATS Rule.[13] These days were clearly identified in the semiannual and quarterly reports submitted by the source, but EPA overlooked these indications and included all values in its calculation of mean and median values. Because EPA has yet to provide a standard format for reporting MATS compliance averages,[14] sources have no choice but to periodically report compliance averages to EPA in various formats.

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[9] *See* 2024 Technical Memo.
[10] An alternate emission averaging period of 90-days may be elected for Hg compliance.
[11] An out-of-control period is a period during which PM CEMS fails to meet one of the specifications of 40 CFR Part 60 Appendix F Procedure 2. Section 10.8 of Procedure 2 prohibits use of these data as follows, "[W]hen your PM CEMS is out of control, you may not use your PM CEMS data to calculate emission compliance or to meet minimum data availability requirements described in the applicable regulation."
[12] DB Wilson fPM CEMS Compliance Data, https://downloads.regulations.gov/EPA-HQ-OAR-2018-0794-6882/content.xlsx
[13] Pursuant to 40 CFR § 63.10042, a "Boiler operating day" means a 24-hour period that begins at midnight and ends the following midnight during which any fuel is combusted at any time in the EGU, excluding startup periods or shutdown periods. It is not necessary for the fuel to be combusted the entire 24-hour period. Per 40 CFR § 63.10021(b) compliance is demonstrated based on the 30-boiler operating day rolling average basis, updated at the end of each new boiler operating day.
[14] 40 CFR § 63.10031(g) requires that sources use the ECMPS Client Tool to submit quarterly reports including 30-boiler operating day averages for PM CEMS beginning the first calendar quarter 2024. "(H)owever due to development delays of ECMPS 2.0 and planned changes to reporting format (changing from XML to JSON) there is currently a mismatch between the required XML reporting formats specified in the rule and the and records available for reporting in ECMPS 1.0" https://www.epa.gov/power-sector/frequent-questions-about-capd-re-engineering-effort#mats5

EPA includes PM CEMS out-of-control periods in its analysis of data for DB Wilson. In the 2024 Technical Memo, EPA states "Data from DB Wilson also show rapidly decreasing 30 boiler operating day rolling average fPM rates from approximately 0.025 lb/MMBtu in mid-2017 to approximately 0.009 lb/MMBtu in early 2019." RTP notes that the decreasing 30-boiler operating day rolling average occurs immediately after multiple PM CEMS Relative Response Audit (RRA) attempts that did not meet Procedure 2 specifications and a subsequent adjustment to the PM CEMS correlation consistent with the requirements of 10.5(1)(ii) of Procedure 2.[15] The PM CEMS was considered out-of-control between November 3, 2017 and November 27, 2017, yet the data were included in EPA's analysis of the mean and median emission rates. The PM CEMS was again out of control between November 12, 2019 and January 10, 2020 and required a subsequent adjustment to the PM CEMS correlation.[16] The PM CEMS was considered out-of-control during this time, but these data were included in EPA's analysis.

Changes in reported emission rates that correspond to correlation adjustment clearly do not represent a "development" in emission controls or work practices but rather a shift in the PM CEMS correlation response. Considering this change a "development" is a faulty assumption. EPA erred in the 2024 Technical Memo by asserting these decreasing averages from mid-2017 to early 2019 are worthy of a development. This example illustrates the danger of relying only on emissions data for a RTR analysis without examining the reasons for a step-change. A shift in PM CEMS correlation response may or may not indicate a true change in fPM concentration because PM CEMS are not a direct measurement of fPM. A further discussion of the limitations of PM CEMS is provided in Section B.1.

EPA notes an additional shift in reported emissions by stating "30-day rolling average fPM rates dropped sharply in early 2023 to approximately 0.007 lb/MMBtu." This shift in the reported PM CEMS responses did correspond to both an upgrade to control equipment as well as a change in the PM CEMS correlation. The PM CEMS correlation adjustment occurred December 14, 2022 when a new correlation was performed as part of the PS-11 test to recertify the PM CEMS after installation of a new scrubber to enhance the control efficiency of air emissions.

DB Wilson has demonstrated compliance with the 2012 MATS fPM emission limitation of 0.030 lb/mmBtu, has conducted PM CEMS quality assurance tests as required, and

[15] The results of these RRAs and subsequent correlation adjustment are available for download from WebFIRE.
[16] The results of the RRA and subsequent correlation adjustment are available for download from WebFIRE.

has submitted operating and emissions data as required. However, EPA's analysis of that data to determine a lowest achieved, mean, and median fPM rate is flawed. The rates that EPA referred to as being "achieved on multiple occasions for long periods of time" actually refer to rates that EPA incorrectly calculated using non-boiler operating days and PM CEMS out-of-control data. DB Wilson is only one example of the data included in the 2024 Technical Report that should have been excluded.

RTP presents the periods in the DB Wilson data that should have been omitted in EPA's 2024 Technical Report and analysis. Figure 8 identifies 30-day average fPM rates and identifies data that should have been excluded because they were not boiler operating days or are PM CEMS out-of-control periods. PM CEMS out-of-control periods and correlation shifts are clearly indicated in Figure 8. In summary, EPA's 2024 data selections were flawed and do not support revision of the fPM rate.

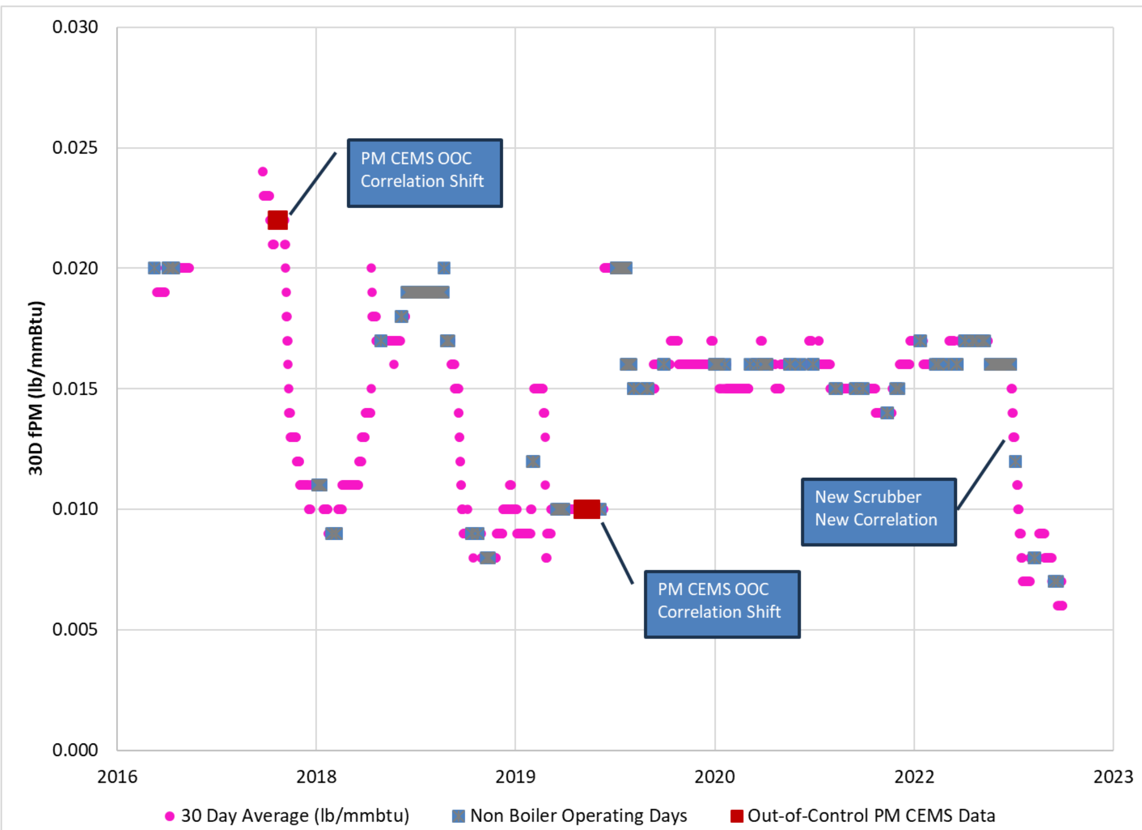

Figure 8 fPM Compliance Data from DB Wilson from 2017-2023 from 2024 Technical Memorandum updated with Correlation shifts and Test Failures.

3. RTP's analysis finds that even units with state-of-the-art fPM controls cannot consistently meet the 2024 Final Rule revised fPM limitation of 0.010 lb/mmBtu.

RTP presents additional data for various control device configurations and compliance demonstration methodologies in Appendix A of this document. The data show that even sources that are currently equipped with baghouses, such as the units presented in Figure 1 and Figure 2, are unable to consistently meet the revised fPM emission limit of 0.010 lb/mmBtu, especially in wet stack applications as presented in Figure 2. These sources are already equipped with state-of-the-art emission controls.

B. Methods of fPM compliance demonstration

1. Limitations of PM CEMS and the use of PM CEMS data

Allowable measurement error limits how PM CEMS data can be used

PM CEMS provide a reasonable assurance of compliance with the fPM emission limitation but are not a direct measurement of fPM. PM CEMS are not assessed with known concentrations of fPM but are correlated by comparing the PM CEMS response to EPA reference method (RM) test data. The correlation is verified by an annual RRA or triennial Response Correlation Audit (RCA).

Each PM CEMS emission value measured and reported contains a degree of uncertainty, called "allowable measurement error" to reflect the accuracy tolerance that is allowable by EPA's regulations, based on EPA CEMS measurement specifications. This allowable measurement error impacts all reported emissions such that **reported values should not be considered to be absolute.** They should be considered to have an error bar around each measured value. For PM CEMS, the "allowable measurement error" is established based on the requirements found in PS-11 and Procedure 2. The allowable measurement error of currently operational PM CEMS is ±25% of the value equivalent to 0.030 lb/mmBtu (±0.0075 lb/mmBtu). For PM CEMS-equipped units, RTP supplements the quarterly variability discussion with error bars equivalent to ±0.0075 lb/mmBtu in Appendix A of this document.

The relatively large degree of allowable error is based on the limitations of the instruments themselves, as well as the correlation methods employed. These error bands are important to consider in light of how EPA used PM CEMS data in the 2024 Final Rule. EPA used PM CEMS as exact values to justify the revised fPM limitation of 0.010 lb/mmBtu; however, these data are not reliable for that purpose. Each PM CEMS datapoint represents a value that is within ±25% if 0.030 lb/mmBtu (±0.0075 lb/mmBtu) rather than an exact value. EPA inappropriately used these non-finite values as evidence to support lowering the fPM limitation. This use of PM CEMS data without considering allowable measurement error is a significant flaw in EPA's 2024 technical analysis.

Allowable measurement error is larger with the 2024 revised accuracy specification

As part of the 2023 Proposed RTR, EPA had intended to establish a tighter accuracy specification of 25% of the proposed emission limit of 0.010 lb/mmBtu (±0.0025 lb/mmBtu). Previous analysis performed by RTP[17] and verified by EPA's own analysis[18] shows that any reduction in the RRA and RCA specification results in a significant increase in test failures. This analysis showed that currently operating PM CEMS were not capable of meeting the tighter accuracy specifications. The failure analysis was so significant that in the 2024 Final Rule, EPA acknowledged that an alternative performance specification was needed to prevent frequent test failures. Instead of retaining an accuracy specification of ±25% of the revised emission limit (±25% of 0.010 lb/mmBtu equates to ±0.0025 lb/mmBtu), EPA finalized an adjusted PM CEMS accuracy specification of ±25% of the value equivalent to 0.015 lb/mmBtu (±0.00375 lb/mmBtu). The revised PM CEMS accuracy specification equates to an allowable error of ±37.5% of the new fPM emission standard. Even if EPA were to establish a tighter accuracy specification for PM CEMS, each data point would still represent a value that is considered true within the tolerances of the specification – not the exact value. For these reasons, the allowable measurement error must be considered when monitoring data is used to establish any emission limit.

PM CEMS correlation shifts can cause a step change unrelated to boiler operation.

In addition, EPA failed to assess the impact of revised PM CEMS correlations on reported emissions. PS-11 and Procedure 2 address the steps to be taken to establish a revised PM CEMS correlation if the RRA and RCA specifications are not met. Shifting PM CEMS correlations may occur as a result of changes in boiler operation or emission control performance but can also be related to a myriad of other changes such as PM CEMS performance, optical properties of particles, or changes in the methods used to establish or verify the correlation. The shifts in correlations are identified during the RRA or RCA, but the change that occurred to precipitate the shift may have occurred at any time. Many sources have experienced what could be perceived to be a step-change in reported emission values without any identified change to boiler operation or control

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[17] EPRI, "*Particulate Matter Continuous Emission Monitoring System Data Evaluation*," Report 3002027695 (2023).

[18] Memorandum from S. Boone, RTI International to C. Fellner, EPA, "*Memorandum: Summary of Review of 36 PM CEMS Performance Test Reports versus PS11 and Procedure 2 of 40 CFR 60, Appendices B and F*" (Dec. 17, 2023), https://www.regulations.gov/docket/EPA-HQ-OAR-2018-0794 (RTI Memo).

device performance. These shifts could be perceived to be a change in operational practices without more information. In actuality, correlation shifts are a mere mathematical adjustment to the raw response of the PM CEMS. For PM CEMS-equipped units, RTP supplements the quarterly variability and allowable measurement error discussion with an indication of the quarter in which correlation shifts occurred in Appendix A of this document as illustrated in Figure 2.

RTP conclusions regarding the limitations of PM CEMS

In the 2024 Final Rule, EPA states that PM CEMS provide increased transparency and access to emissions data. EPA describes this transparency as an unquantifiable benefit to operators of affected sources and to the public. But EPA assumes these data are reliable, finite direct measurement values without limitations. RTP has identified the accuracy limitations of PM CEMS and shifts in reported emission values based solely on mathematical corrections in this Report. Based on these facts, RTP more appropriately characterizes PM CEMS as an indication of the concentration of fPM emissions, not finite direct measurements. EPA should factor in PM CEMS data allowable error in any future data exercise. PM CEMS certainly show a reasonable assurance of compliance with emission standards, but other current MATS compliance demonstration options (PM CPMS, QST, and LEE testing) offer accuracy and cost benefits that EPA should consider.

2. Cost effectiveness of PM CEMS

RTP supports the determination that PM CEMS are more costly than the QST/LEE compliance options in the Proposed Repeal Rule. However, EPA made this determination without reconsidering the underlying cost analysis[19] for the 2024 Final Rule. Consequently, RTP reviewed costs for accuracy and to confirm whether the QST/LEE compliance options continue to remain more cost effective than PM CEMS. RTP conducted a cost analysis comparing PM CEMS and quarterly stack test/LEE compliance costs under the proposed repeal scenario. A summary of the analysis is presented in Table 1 with details of RTP's updated cost analysis presented in Appendix B of this document. As shown in Table 1, the testing costs (whether QST or LEE) are much less than the cost of PM CEMS. The cost differential is even more pronounced when including cost sharing for sources which are also performing quarterly testing for hydrogen chloride (HCl).

[19] Memo from Barrett Parker, EPA to Docket ID No: EPA-HQ-OAR-2018-0794*, "Revised Estimated Non-Beta Gauge PM CEMS and Filterable PM Testing Costs*," (Dec. 21, 2023).

Table 1 PM CEMS and Testing Cost Summary (EPA Analysis vs. RTP Analysis)

	PM CEMS (Non-Beta Gauge)	PM CEMS (Beta Gauge)	QST	LEE
EPA	72,325		60,270	
RTP	82,968	108,194	57,098	4,431
RTP Testing Costs (including HCl cost sharing)			37,490	2,797

For PM CEMS, the EPA data shows an Equivalent Uniform Annual Cost (EUAC) of approximately $72,000, which compares closely to an EUAC of $83,000 (average with and without ash reinjection) calculated by RTP. The EPA analysis does not clearly identify whether the Agency's estimates include the additional costs associated with ash reinjection, although based on the data presented it appears that testing costs may represent the average cost with and without ash reinjection. The EPA analysis did not include beta gauge instrument in the analysis, presumably because non-beta gauge instruments have been shown by various commenters to have lower associated cost. RTP provides an updated cost estimate for beta gauge PM CEMS. The average EUAC is $108,000 (average with and without ash reinjection), which supports EPA's determination that beta gauge costs are higher than non-beta gauge instruments. For quarterly stack testing, EPA estimates an average annual cost of $60,000/year, which is reasonably close to RTP's estimate of $57,000/year.

RTP's analysis and EPA's analysis differ after this point. EPA does not account for potential cost sharing for sources that are also performing quarterly testing for hydrogen chloride (HCl). RTP estimates an average annual cost of $37,500/year for quarterly fPM testing that is done in conjunction with quarterly HCl testing. EPA also does not account for the decrease in estimated annual testing costs for sources able to use the LEE compliance option. RTP estimates an annual average cost of $4,400 for LEE triennial fPM testing and $2,800 for triennial fPM testing that is performed in conjunction with LEE triennial HCl testing. In summary, stack testing is less expensive than PM CEMS especially when accounting for options to cost share and LEE.

3. Cost effectiveness of PM CPMS

RTP supports EPA's revised determination in the Proposed Repeal Rule that PM CPMS are an appropriate fPM compliance demonstration method. Although few sources have elected to rely on PM CPMS in the past, EPA provided no evidence that CPMS are insufficient to provide interested parties real time indication of fPM emissions. The fact that CPMS were not a selected compliance option previously does not negate their value in offering compliance flexibility. Users of CPMS establish operating limits, verify operating limits on an annual basis, and initiate corrective actions if operating limits are exceeded. Therefore, CPMS provide the benefit of quick identification and correction of control device malfunctions without many of the disadvantages of PM CEMS.

PM CPMS have distinct advantages over other compliance options. First, the procedures for establishing PM CPMS operating limits are less costly than the testing for PM CEMS. A linear relationship is established between the PM CPMS output signal to zero-point data and the PM concentration determined during compliance test stack testing. If emissions during the compliance test are less than or equal to 75% of the emission limit, the operating limit is established at a value equivalent to 75% of the emission limit based on the linear relationship established. If emissions during the compliance test exceed 75% of the emission limit, the operating limit is established at a value equivalent to the average PM CPMS output recorded during the PM compliance test. The performance test is repeated annually to reassess the operating limit. Unlike PM CEMS correlations, the annual testing requirement does not specifically require control device detuning or ash reinjection. As a result, a source using a standard PM CEMS device as a PM CPMS would spend less time and money on testing activities and would not experience additional environmental costs of PM CEMS as discussed below.

RTP estimates that the cost for PM CPMS ranges from an EUAC of approximately $53,000–$78,000, depending on the instrumentation selected and assuming annual verification of the PM CPMS without ash reinjection.

EPA should maintain the option to rely on CPMS operating limits to comply with the MATS Rule. In cases where CPMS use the same measurement principle as PM CEMS, EPA should modify the CPMS operating limit to be consistent with that of PM CEMS. Specifically, a source should not be limited to 75% of the emission limitation or the highest PM CPMS output during the performance test. The source should be limited to the PM CPMS output that corresponds to the emission limit based on the annual compliance test. This is particularly important in the event that the Agency decides to lower the PM standard since a further reduction would reduce or eliminate the available compliance margin. Additional testing to verify or reassess the operating limit should be conducted only if the 30-day average PM CPMS output is in excess of the operating level that is equivalent to the emission limit, not 75% of the emission limitation.

4. Availability and timing of new PM CEMS

PM CEMS are currently used by approximately one third of sources subject to the current MATS Rule fPM standard. EPA must consider the timeframes necessary for the remaining sources to install PM CEMS to meet the compliance deadlines. All associated installation tasks and potential delays due to supply chain issues should be considered.

Table 2 provides a breakdown of the tasks involved in PM CEMS installation based on an assessment conducted by EPRI.[20] The table highlights that installation of a new PM CEMS includes many tasks that involve various parties (i.e., structural engineers, instrument vendors, data acquisition handling systems (DAHS) vendors, stack testers, consultants). EPRI recommends a minimum of 12 – 18 months to select, procure, install and certify a new PM CEMS although this estimate is based on typical market conditions. RTP agrees with this estimate but notes that it does not reflect delays associated with market conditions in which affected sources are competing for the same resources from a limited number of vendors within the same compliance timeframe.

Table 2 Breakdown of PM CEMS Installation Tasks

Activity
Budgeting of Capital Expenditure
Site Evaluation of Technologies
Site Evaluation of Equipment Detuning Methods
Port/Ancillary Equipment Installation
Order to Delivery of Selected PM CEMS
Installation of PM CEMS
Operating Period Evaluation
7-Day Calibration Drift
PS-11 Correlation Testing
DAHS Modifications/Data Verification
Initial Compliance Demonstration (Collection of First Compliance Average)

Source: EPRI (2024)

In the 2024 Final Rule, EPA relied on information provided by Andover Technology Partners[21] that stated "*CEMS, in general, can be deployed in a matter of months. All facilities could have PM CEMS and HCl CEMS installed within a year.*" The 2023 Andover Report appears to be based primarily on vendor-quoted delivery times associated with new PM CEMS orders (typically 8-12 weeks).

[20] *Particulate Matter Continuous Emission Monitoring System Guidance, Selection, Installation, Operations, and Reporting*, EPRI Report 3002030260 (2024).
[21] Andover Technology Partners, "*Assessment of Potential Revisions to the Mercury and Air Toxics Standards*," (June 15, 2023) (2023 Andover Report), Docket ID No. EPA-HQ-OAR-2018-0794.

This timeframe is significantly understated based on RTP's survey of sources that recently replaced PM CEMS.[22] RTP recently received delivery quotes of 6-12 weeks for Envea monitors (depending on model), up to 12 weeks for Durag models, and up to 8 weeks for SICK models. Other sites using these same manufacturers indicated actual lead times of 20 weeks or more for models equipped with Hastelloy probes, which are most likely to be used in stacks equipped with wet scrubbers. MSI, the manufacturer of the BetaGauge instrument, is not taking orders for new beta gauge models until the third quarter of 2027.

The delivery quotes are sometimes significantly understated[23] and neglect many other aspects of installation that may be far more time-consuming (i.e., coordination of port installation with unit outages, evaluation of monitoring technologies, evaluation of equipment detuning methods). Finally, for those sources that may require control equipment upgrades, some of the tasks described in Table 2 are dependent on the completion of upgrade projects, which would significantly increase the timeframe for installation and certification for a new PM CEMS.

EPA should consider realistic timelines when evaluating the timing for any new CEMS installations. EPA should consider all tasks involved in a new installation and should account for changing market conditions that may cause significant delays. EPA should discount estimates that are based only on quoted delivery times, such as the 2023 Andover Report. A three-year compliance timeframe is necessary for most sources to install and certify a new PM CEMS. An additional extension of up to one year may be needed to account for PM CEMS market uncertainty and to accommodate sources where installation may be delayed due to control equipment upgrades. Finally, EPA should adjust any anticipated timelines based on the regulatory uncertainty associated with this rulemaking.

5. Environmental cost of PM CEMS

RTP supports the repeal of the requirement to demonstrate compliance with the fPM emission limitation based solely on PM CEMS. We request that EPA consider the environmental impacts of PM CEMS correlation testing and the benefits of alternative approaches with minimal or no environmental impact such as QST, LEE, or PM CPMS.

PS-11 requires that sources establish a correlation curve based on three different levels of PM mass concentration across the complete operating range of the source. Procedure 2 requires that sources periodically conduct a RCA, which validates the

[22] Replacement PM CEMS would typically require less time to coordinate since site evaluation, ancillary equipment installation and DAHS modifications may already be complete.
[23] Vendor quoted delivery times do not reflect custom requirements that are often encountered in practice.

correlation again across three different levels of PM mass concentration. To perform the PS-11 correlation testing and the RCA, a source must artificially increase PM emissions for many hours to achieve the required emissions levels. PS-11 states that the operator "should try to establish the relationships between operating conditions and PM CEMS response, especially those conditions that produce the highest PM CEMS response over 15-minute averaging periods, and the lowest PM CEMS response as well." The maximum 15-minute PM CEMS response will likely be orders of magnitude higher than typical emissions and will likely be higher than the 30-boiler operating day emission standard. Many sources likely do not experience these levels of emissions at any point in a typical year but must produce elevated emissions for the sole purpose of correlating the monitor.

Figure 9 illustrates the total fPM mass reported for each calendar day from a source equipped with a PM CEMS. The unit's fPM emissions are typically 200 lb/day or less. However, once every three years the source is required by Procedure 2 to intentionally detune its control devices to verify the correlation of its PM CEMS. The dates of the RCA are clearly seen in Figure 9 in which daily emissions are up to 8-10 times what they are during normal operation. As such, PM CEMS require that a source intentionally create pollution for the sole purpose of calibrating its emission monitoring system contrary to the intent of the MATS rule. The environmental costs of PM CEMS should be considered before requiring their widespread use.

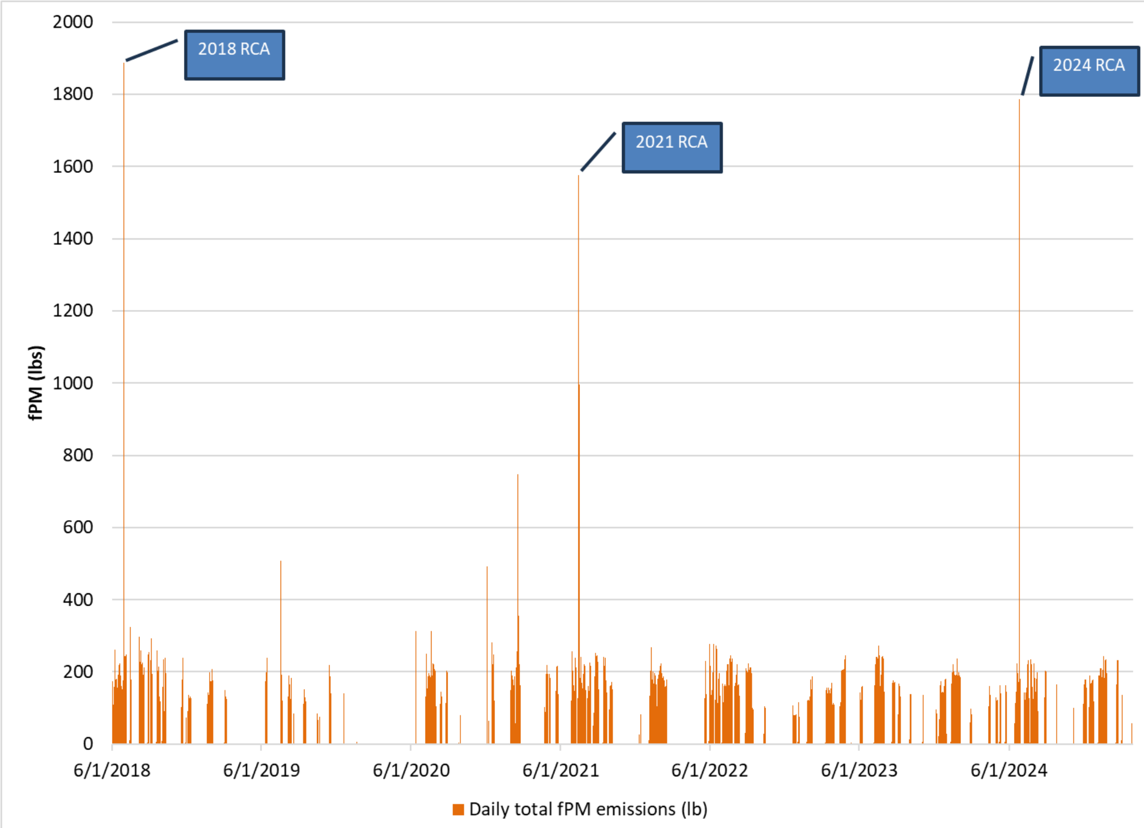

Figure 9 RTP Example of fPM Emissions during Correlations and Normal Operation

In addition to increased PM emissions, units equipped with wet scrubbers may also experience other adverse effects in the form of increased SO_2 and Hg emissions resulting from scrubber detuning. Fouling of scrubber chemistry may also result in increased SO_2 emissions and/or replacement of contaminated slurry, particularly for those sources that sell scrubber byproduct. In fact, at least one utility that utilizes PM control device detuning makes it a regular practice to dispose of contaminated scrubber slurry after each test resulting in lost gypsum sales, increased disposal costs, and unnecessary landfill of otherwise useful material.

Finally, the source operator may be forced to run a unit for the sole purpose of completing a compliance test. In this scenario, the compliance test would force the unit to operate when it is not otherwise dispatched for market reasons. The result is more emissions and costs.

The scenario identified above would be exacerbated by any more stringent PS-11/Procedure 2 performance specification. Based on an EPRI analysis[24] and EPA's own

[24] EPRI, "*Particulate Matter Continuous Emission Monitoring System Data Evaluation*," Report 3002027695 (2023).

analysis,[25] lowering of the RRA and RCA specifications (for example ±25% of 0.015 lb/mmBtu or less) would result in ongoing RRA failures for many units that would require more frequent RCA testing and even greater environmental impacts. For this reason, the RTP supports the EPA's decision to remove the more stringent performance specification in the proposed repeal and remove the requirement to use PM CEMS as the sole compliance demonstration method.

RTP also requests that EPA consider monitoring approaches other than PM CEMS that do not have these environmental impacts, such as PM CPMS or parametric monitoring.

C. Revised non-Hg metallic HAP emission standard

In the 2024 Final Rule, EPA slashed emission limits for individual and total non-mercury (Hg) HAP metals by one-third. Lowering both the individual and total non-Hg HAP metals by one-third is consistent with the 2024 Final Rule revised fPM limitation reduction of 0.010 lb/mmBtu, which is one-third of the 2012 MATS Rule limitation of 0.030 lb/mmBtu.

fPM is not classified as a hazardous air pollutant (HAP). Rather, it is used as surrogate to demonstrate compliance with non-Hg HAP metal emission limits. During the development of the 2012 MATS Rule, EPA established a correlation between fPM and non-Hg HAP metal emissions based on emissions test data collected as part of the 2010 "Information Collection Request" (ICR) for coal- and oil-fired electric-generating units (EGU). The 2010 ICR included both the submission of historical emissions test data, and the performance of both fPM and non-Hg HAP metal reference method emissions tests.

For the 2024 Final Rule, the revised fPM emission limit was based on both stack test results and PM CEMS data submitted by MATS-affected sources. Since an overwhelming majority of MATS-affected sources opted to demonstrate compliance with the non-Hg metal HAP through complying with the fPM limit, EPA had a robust database of fPM emissions data. In contrast, a very limited number of MATS-affected sources opted to demonstrate compliance conducting quarterly non-Hg metal HAP reference method testing. EPA had limited data since the original 2010 ICR to establish a revised non-Hg metals emission limit and based the revision solely on the presumed relationship between non-Hg metal and fPM.[26] EPA did not appear to validate these assumptions based on more recent non-Hg metal and fPM test data and had an insufficient basis for revising the standard.

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[25] *See* RTI Memo.

[26] EPA-HQ-OAR-2018-0794-6909 *Estimating Non-Hg HAP Metals Reductions for the 2024 Technology Review for the Coal-Fired EGU Source Category*, EPA-HQ-OAR-2018-0794-0010 *Emission Factor Development for RTR Risk Modeling Dataset for Coal- and Oil-fired EGUs,* and EPA-HQ-OAR-2018-0794-4536 *Non-mercury Metals Content of Filterable Particulate Matter*

Only a single source reported quarterly non-Hg metal HAP data for MATS Rule compliance. RTP reviewed the quarterly non-Hg metal HAP reference method data[27] available for the source and finds that 16 of the 22 non-Hg metal HAP test results do not support the achievability of the revised standard in the 2024 Final Rule.

The lack of non-Hg metal HAP data is problematic since the emission control configuration of the EGU fleet has changed substantially since the 2010 ICR. The implementation of the MATS Rule required EGUs to install control devices that either were not prevalent or non-existent during the 2010 ICR. Primarily, the proliferation of activated carbon injection (ACI) systems and other Hg control methodologies in the EGU sector to maintain compliance with the MATS Rule Hg standards present a substantive change in how EGUs are currently operated compared to operations prior to and during the 2010 ICR.

In EPA's supporting statement for the 2010 ICR,[28] the following statement was issued regarding applicability of historical data:

> *The originally collected data (through the 1999 ICR) are now over 10 years old and address only coal-fired electric utility steam generating units and only mercury emissions from such units. The Agency is aware that significant changes have been made in the intervening years in the number of operating coal- and oil-fired units, in industry ownership practices, and in emission control configurations. Further, in light of the statutory requirements for establishing emission standards under CAA section 112(d) and the recent case law interpreting those requirements, the Agency believes that it needs additional data from both coal- and oil-fired electric utility steam generating units. Therefore, the Agency has concluded that obtaining updated information will be crucial to informing its decision on the national emission standards for hazardous air pollutants (NESHAP) for coal- and oil-fired electric utility steam generating units.*

Despite this prior acknowledgement that a data gap of more than 10 years is problematic, EPA did not collect more recent data in support of the revised standard in the 2024 Final Rule. Instead, EPA simply relied on the 2010 fPM to metal ratios to slash the non-Hg HAP metal emission limits proportionally to the revised fPM standard.[29] RTP appreciates EPA's willingness to retain the total and individual non-Hg HAP metal emission limits – the actual HAPs regulated by the MATS Rule. Yet, it is incumbent upon EPA to be consistent in its

[27] The results of the Method 29 non-Hg metal stack testing events are available for download from WebFIRE.
[28] EPA-HQ-OAR-2009-0234-0102 (Dec. 24, 2009).
[29] EPA-HQ-OAR-2018-0794-6909 *Estimating Non-Hg HAP Metals Reductions for the 2024 Technology Review for the Coal-Fired EGU Source Category*, EPA-HQ-OAR-2018-0794-0010 *Emission Factor Development for RTR Risk Modeling Dataset for Coal- and Oil-fired EGUs,* and EPA-HQ-OAR-2018-0794-4536 *Non-mercury Metals Content of Filterable Particulate Matter*

rulemaking process and not revise established emission limits without any substantive data to support those revisions.

EPA must also consider the dynamics of how fPM and non-Hg HAP metal emissions correlate. A couple of factors in the measurement of non-Hg HAP emissions may significantly impact the direct correlation of fPM and non-Hg HAP emissions. One important aspect for Reference Method (RM) 29, the test method for quantification of non-Hg metal HAP emissions, is that the capture of the non-Hg HAP metals occurs in two locations in the sampling train. The "front-half" capture is on the sample particulate filter and the sample rinses of the sample nozzle and probe liner located upstream of the sample filter. The "back-half" capture is located in the impinger solutions of the RM 29 sampling train. The correlation of the "front-half" non-Hg metal HAP mass and fPM mass is likely to be consistent. However, it is unknown how non-Hg metal HAPs collected in the "back-half" of the sampling train correlate with lower fPM emissions. It is also unclear whether non-Hg metal HAP emissions that are not collected in the particulate phase of the sampling train correlate at the same fPM ratios at lower fPM emission rates. For metals like Selenium (Se), it is particularly important to determine whether this correlation is the same because the majority of the sample mass is routinely captured in the "back-half".

Another concern regarding measurement of non-Hg HAP metals is the detection limits of the reference method. For example, Antimony (Sb), Beryllium (Be) and Cadmium (Cd) were consistently reported at or below the detection limits during the 2010 ICR. It is unknown whether these specific metals were at the quantification limit during the 2010 ICR without a complete review of the 2010 ICR analytical data. Demonstration of compliance at a lower emission limit with species that were already at the detection levels of the test method could be an impossible proposition. The measurement uncertainty associated with levels at the minimum detection level (MDL) "is generally about ±50%."[30] Even at the level of quantitation (LOQ), which is generally defined as three (3) times the MDL, the measurement uncertainty for "EPA Air test methods are ±15 to 20%." These are significant measurement uncertainties.

In summary, RTP supports retaining the non-Hg HAP metal emissions limit(s) of the 2012 MATS Rule. If EPA were to consider revising the limit(s), RTP urges EPA to obtain non-Hg HAP metal emissions data and develop standards that are substantiated, rather than relying on mathematical assumptions that coincide with the revised fPM emission limitation.

[30] Stef Johnson, EPA, "More Ado About Next to Nothing – Bringing Minimum Detection Levels into Focus", https://www3.epa.gov/ttn/emc/meetnw/2015/moreado.pdf

D. Minimum volume per run or minimum mass per run

EPA states in the Proposed Repeal Rule that, "The EPA believes that retaining the additional option of sample mass would reduce measurement uncertainty and may reduce test run durations and therefore reduce fPM testing costs."[31] This statement is not accurate because maintaining the mass or volume requirements does not reduce fPM costs compared to the 2012 MATS Rule requirements. Retaining the option of sample mass or volume is preferable to the 2023 Proposed RTR's singular option of collecting a minimum volume for each test run (without any consideration of collected mass). The 2024 MATS Rule minimum volume per run or minimum mass per run will increase testing costs for QST, LEE, and PM CEMS – equipped units as it will require additional time to complete each test. EPA should recognize that this new requirement is more costly and not necessary, as described herein.

Increasing the minimum volume or minimum mass per run only improves data quality if significant run-to-run variability is observed at a single test condition either during QST/LEE testing or at a single particulate loading level during PM CEMS testing. In 2023, EPRI conducted an analysis[32] of 91 quarterly stack tests at a presumed volume of 1 dscm and 183 LEE tests at a presumed volume of 2 dscm and found that doubling the sampling volume did not discernably impact the relative standard deviation of the test runs. The measurement uncertainty that was observed in the EPRI study results were similar to the uncertainty of ±15-20% associated with test method performance.[33] It is not necessary to increase the sample mass or volume to reduce reference method measurement uncertainty.

[31] 90 Fed. Reg. at 25542.
[32] EPRI, "*Particulate Matter Continuous Emission Monitoring System Data Evaluation*," Report 3002027695 (2023).
[33] Stef Johnson, EPA "More Ado About Next to Nothing – Bringing Minimum Detection Levels into Focus", https://www3.epa.gov/ttn/emc/meetnw/2015/moreado.pdf

Table 3 Reference Method Uncertainty by Sample Volume

Emission Level	Quarterly (1 dscm)			LEE (2 dscm)		
	# of Sets	Mean (lb/mmBtu)	Mean RSD	# of Sets	Mean (lb/mmBtu)	Mean RSD
≤0.006 lb/mmBtu	41	0.004	13.5%	134	0.005	18.0%
>0.006 and ≤0.010 lb/mmBtu	14	0.008	17.9%	34	0.008	15.3%
>0.010 and ≤0.015 lb/mmBtu	13	0.012	9.1%	12	0.012	14.2%
>0.015 lb/mmBtu	23	0.023	14.8%	3	0.017	11.2%

Source: EPRI (2023)

EPA also states that it is important for a sufficient quantity of fPM to be collected *especially when testing is being conducted to correlate or certify a PM CEMS*. This, too, is inconsistent with RTP's observations. Based on RTP's experience performing correlations, RRAs and RCAs for existing PM CEMS, run-to-run reference method variability is most often observed at elevated emission levels, not at low levels. This variability is not caused by the collection of insufficient mass or volume but is most likely due to the upset conditions that must be artificially created for the sole purpose of performing the correlation testing. These elevated test conditions (those under detuned conditions) are also most impactful in determining the overall shape of the PM CEMS correlation and represent the most mass collected.

At low levels for a set of three or more test runs at the same condition, run-to-run the scatter is most frequently observed in the PM CEMS response (the x-axis in the correlation graphs). This can be attributed to the fact that PM CEMS exhibit minimal resolution at low levels (<5 mg/acm) especially in wet stack applications. Figure 10 provides an example of an actual PM CEMS correlation that includes low-level emissions. The limited run-to-run variability demonstrates that an increase in sample mass or volume is not needed to improve the correlation. Decisions regarding the appropriate duration of test runs should be left to stack testing professionals, who are best equipped to make determinations on a case-by-case basis. By specifying a minimum volume or mass with undemonstrated accuracy improvements, EPA limits the exercise of discretion in the field.

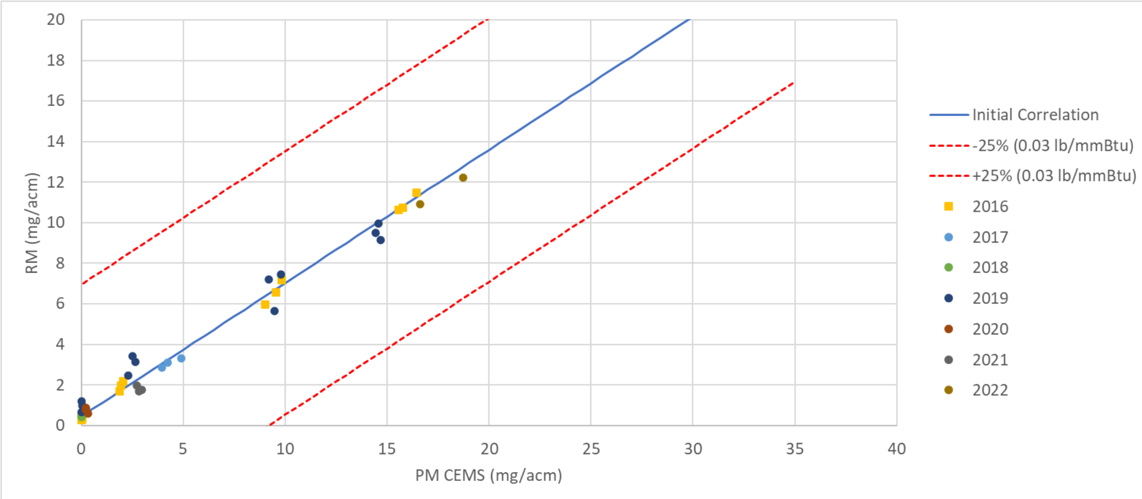


Figure 10 Example of Low-Level Correlation and QA Test Variability

If EPA chooses to retain the minimum volume or mass requirement, the requirement should be adjusted to state that each non-zero point[34] test run should collect a minimum sample volume of 4 dscm per run or should be ***of sufficient duration for an expected catch*** of 6.0 milligrams. When performing reference method testing, the exact mass collected is not known until hours or even days after the completion of the testing event. For example, a source may conduct each test run of sufficient duration for an expected catch of 6.0 mg based on previous testing results but may end up collecting slightly less. Certainly, it is not EPA's intent to penalize a source for emitting less than is expected. Historical test results should enable sources to reasonably estimate the mass that will be collected; however, sources should not be required to repeat test runs based solely on the collection of less mass than expected.[35]

E. PM CEMS monitoring improvements

RTP requests that EPA consider the following improvements to the current PM CEMS monitoring provisions in Appendix C of the rule. We also support EPA's proposed elimination of the new performance specification for PS-11 and Procedure 2 that was introduced in the 2024 Final Rule, as this will reduce the impact of the issues discussed below. Regardless of the issues discussed in the prior sections, RTP requests consideration of the following monitoring improvements since they will reduce the ongoing

[34] Section 8.6(5) of PS-11 describes the process for collecting zero point data for use during correlation testing. Test runs used to establish zero point data should not be subject to any minimum mass or volume requirements.
[35] This is analogous to calculation of pre-sample spiking level in Section 8.2.6.1 of EPA Method 30B in which the spiking level is determined based on the Hg mass *expected to be collected* in section 1 of the sorbent trap.

compliance costs and environmental impacts associated with initial certification and routine QA testing for PM CEMS.

1. Include conditionally valid data provisions

PS-11 and RCA testing often cause periods of invalid data that is reported as monitor downtime. If the need for the testing is related to monitor malfunction or test failure (out-of-control period), then this data must also be reported as a deviation which may trigger enforcement action and increase ongoing compliance costs. Downtime associated with PS-11 and RCA testing may be significant. In the case of a PS-11 test, the 7-day calibration drift must be performed before the correlation testing resulting in more than seven days of downtime. The minimum sampling requirements in the 2024 MATS Final Rule increased the duration of the testing and the associated monitor downtime. If an RCA is conducted due to a failed RRA,[36] then downtime could be substantial (days or weeks) depending on the availability of a stack testing vendor and the boiler. If back-ordered parts are involved, the delay could be even longer. Importantly, this downtime does not indicate poor monitor operation or maintenance. Rather, it reflects the challenge of complying with PS-11 and Procedure 2 requirements. In the case of PM CEMS replacements, the downtime reflects an effort to continuously improve fPM monitoring.

RTP recommends incorporating conditionally valid data provisions similar to those in Part 75 to help mitigate the monitor downtime associated with PS-11 and RCA testing. Specifically, the facility could perform one or more probationary quality assurance (QA) checks—such as a calibration error test or an absolute correlation audit (ACA) —prior to the start of a monitor recertification or immediately after a monitor repair or failed RRA or RCA. These QA checks would temporarily validate data, provided that the required follow-up testing is successfully completed within a defined time period. If the follow-up tests are successful, all data collected between the probationary checks and the final testing would be considered valid. The proposed method could be easily implemented by applying a new equation to the raw monitor output to produce the adjusted values retroactively because PM CEMS correlation calculations are typically handled by the DAHS.

2. Include QA operating quarters and grace periods

RTP recommends that the MATS Appendix C requirements incorporate the use of "QA Operating Quarters", and "Grace Periods," similar to the provisions of 40 CFR Part 75. These changes would also introduce much-needed flexibility for the growing number of

[36] EPA is proposing to remove the PS-11 and Procedure 2 performance specification that was introduced in the 2024 Final MATS Rule that would minimize the number of failed RRA and RCA tests.

EGUs experiencing reduced dispatch and help to minimize emissions associated with routine testing.

Although the current rule incorporates a modified version of a grace period that relies on the lesser of 720 EGU (or stack) operating hours or one calendar quarter, this approach still requires testing during a subsequent calendar quarter regardless of whether the EGU (or stack) would otherwise operate. Running a unit solely for the purpose of completing an RRA or RCA imposes unnecessary and significant costs on what is already an expensive testing process. Adopting the "QA Operating Quarter" and "Grace Period" concepts from Part 75 would allow facilities with infrequent operations to defer QA testing until normal operations resume, while still ensuring that tests are conducted within a reasonable 720-operating hour period.

RTP makes the following specific recommendations to add additional flexibility for the growing number of sources with limited dispatch:

- RRAs should be conducted once every four QA Operating Quarters. If an RRA is not completed within four QA Operating Quarters or eight calendar quarters, it should be conducted within a 720-unit (or stack) operating hour grace period following the end of the four QA Operating Quarters or the eighth successive calendar quarter.
- Notwithstanding our recommendation to either extend the frequency of periodic RCAs or eliminate periodic RCAs, RTP recommends for ongoing RCAs to be conducted on the basis of QA Operating Quarters rather than calendar quarters. If an RCA is not conducted within a specified number of QA Operating Quarters, it should be conducted within a 720-unit (or stack) operating hour grace period.

3. Reduce RCA test frequency

RTP recommends that RCA testing should only be required when an RRA fails or when operational changes suggest a significant shift in flue gas characteristics. These shifts could be identified by mathematical analysis similar to the flow-to-load check of 40 CFR Part 75. Requiring recurring RCAs when there is no reason to doubt the representativeness of the existing correlation increases testing costs (i.e., stack testing, specialized support cost, and detuning or ash injection costs) and environmental impacts.

Conclusion

This technical report reviews reported fPM emission rate data from operating sites and updates the emissions data since the 2023 Proposed MATS RTR comment period closed. It also evaluates the achievability of emission standards presented in the 2024 Final Rule using these new data. RTP's analysis results in the following conclusions:

- The emission data show that EPA did not adequately consider operational variability in establishing the 2024 Final Rule revised fPM standard of 0.010 lb/mmBtu. EPA did not consider normal operational variability of units and control devices and did not consider the accuracy limitations of reported data from PM CEMS.
- By relying on multi-year average emission rates, EPA underestimated the cost of complying with the 2024 Final Rule revised fPM standard of 0.010 lb/mmBtu. Sources must demonstrate compliance (and sufficient compliance margin) in each discrete 30-boiler operating day period. In addition, the EPA analysis incorrectly included data for non-boiler operating days and PM CEMS out-of-control periods in its calculation of average emission rates.
- PM CEMS allowable inaccuracies and correlation shifts have a significant impact on reported emissions, which must be considered when using PM CEMS data for standard setting. Reported values should not be considered to be absolute. They should be considered to have an error bar around each measured value. The allowable measurement error of currently operational PM CEMS is ±0.0075 lb/mmBtu. Correlation shifts occur more frequently and have a greater impact on reported emission rates for saturated stacks such as those following wet FGDs.
- PM CEMS are more costly, take more time to install and certify, and have greater environmental costs than other MATS compliance options.
- A non-Hg metallic HAP emission standard should be retained. However, the 2024 Final Rule revised non-Hg metallic HAP emission standard was not supported by recent technical data. The revised standard was based on a relationship between fPM emission rates and non-Hg metallic HAP emission rates that was established more than a decade ago. Significant changes have been made in testing procedures and emission control configurations. It is not appropriate to revise the non-Hg metallic HAP emission standard without supporting data.
- The minimum volume per run or minimum mass per run requirements that the Proposed Repeal Rule seeks to retain does not decrease the cost of testing. An increase in sample volume or mass is only needed if unacceptable run-to-run variability is encountered. If the requirement is retained, sources should be required to sample for a sufficient duration to collect an expected minimum mass. A source should not be penalized for emission rates that are lower than expected that then result in less mass collection.
- For sources relying on PM CEMS, EPA should include conditionally valid data provisions, QA operating quarter definitions and grace period provisions consistent

with 40 CFR Part 75. RCAs should not be required based on the passage of calendar quarters but should only be required based on operational changes or data analysis that indicates that a correlation shift may have occurred.

Appendix A Quarterly fPM Variability

Background

RTP evaluated the quarterly variability based on stack characteristics (wet or dry) and compliance demonstration method (PM CEMS or QST/LEE). For PM CEMS, the 99^{th} percentile 30-boiler operating day average in each quarter is presented along with error bars reflecting the allowable measurement error of PM CEMS and an indication of quarters during which the PM CEMS correlation shifted. For QST/LEE, the individual test run results are presented along with the average of the test runs. The data are presented relative to the 2012 MATS Rule Limit of 0.030 lb/mmBtu (or 0.30 lb/MWh) and relative to the 2024 Final Rule Revised Limit of 0.010 lb/mmBtu (or 0.10 lb/MWh).

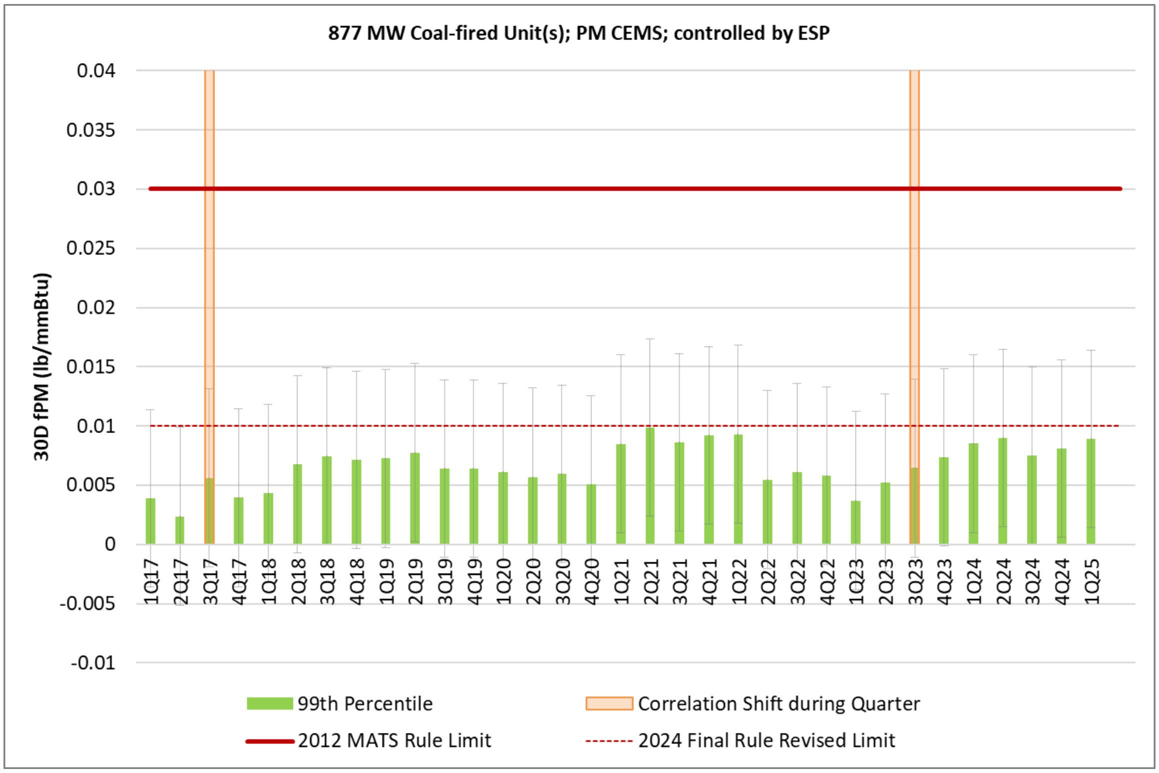
Dry Stacks

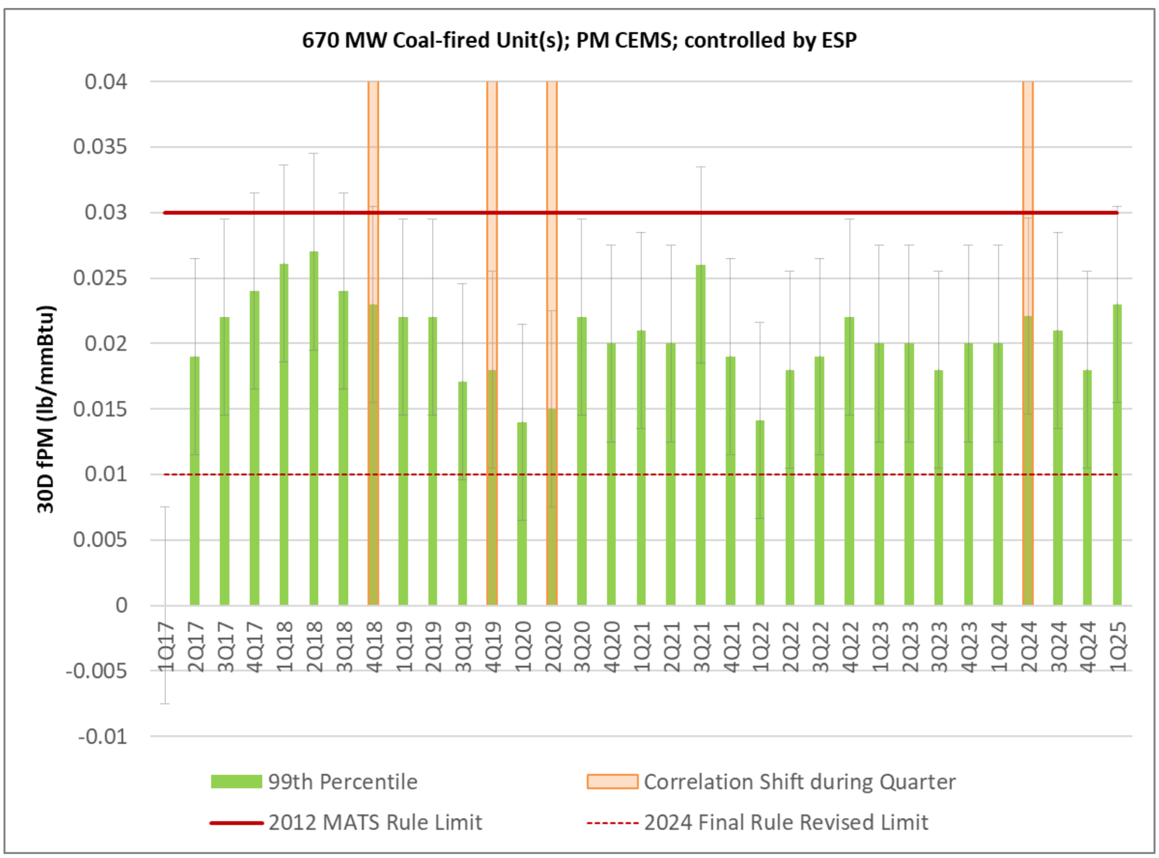
The data presented for dry stacks represent emission units that are controlled by electrostatic precipitators (ESP) or fabric filter baghouses (B) without wet limestone scrubbers (WLS). If the units are equipped with dry limestone (DL) scrubbers an indication is provided in the chart.

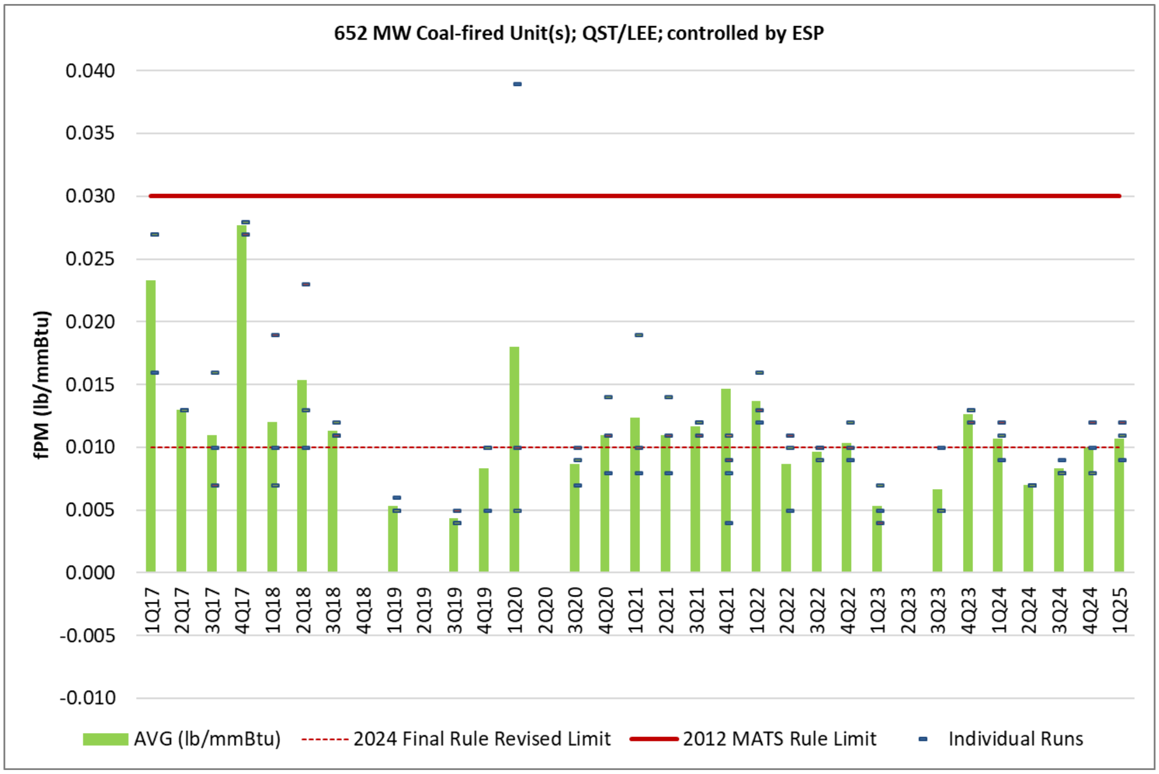
Wet Stacks

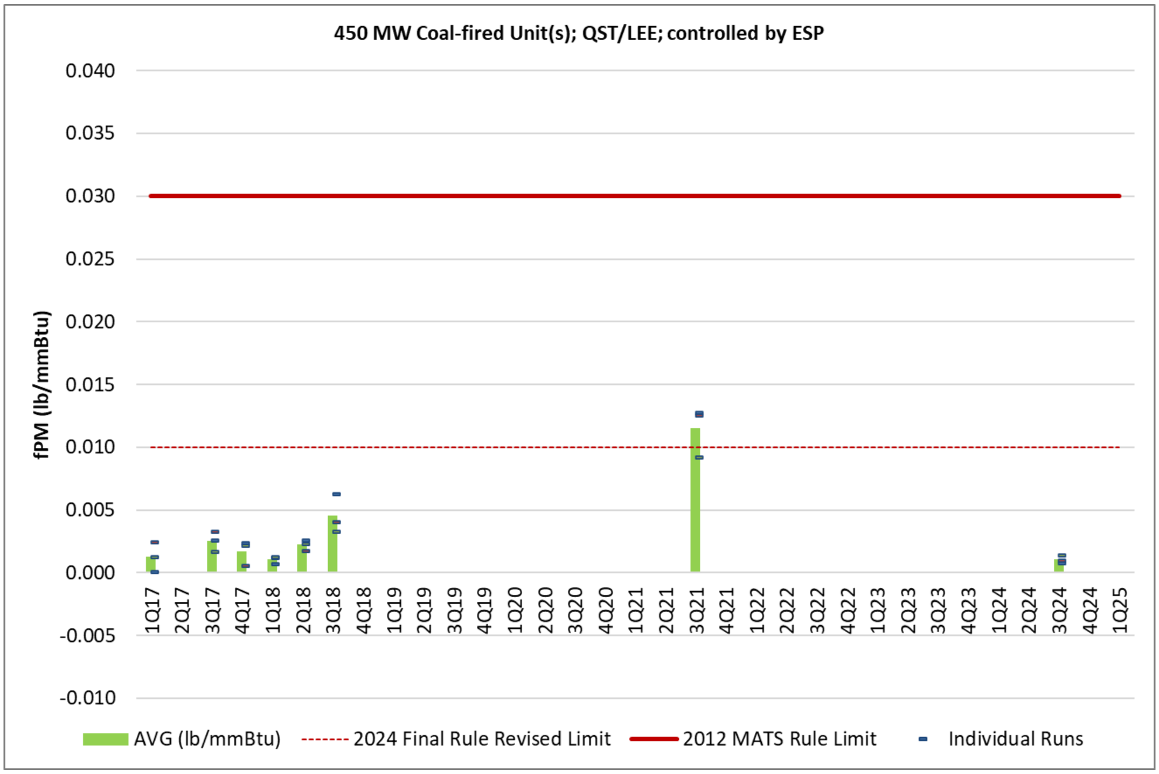
The data presented for wet stacks represent emissions from units in which the final control device is a wet limestone scrubber. The primary fPM control device may be an ESP or baghouse and is indicated in each chart. Data for wet stacks are presented separately from dry stacks to capture reference method variability and especially PM CEMS variability in wet stack applications. The use of PM CEMS is uniquely challenging in saturated stacks such as those that occur after wet scrubbers. The correlation of PM CEMS is more challenging and the optical characteristics and mass of fPM in a wet stack is more variable. For wet stack applications, PM CEMS correlation adjustments happen more frequently and the adjustment has a greater impact on reported emissions. The surrogacy between fPM emission rates and non-Hg metallic HAP emissions has not been established during periods of scrubber upset.

Dry Stacks – Without Baghouses

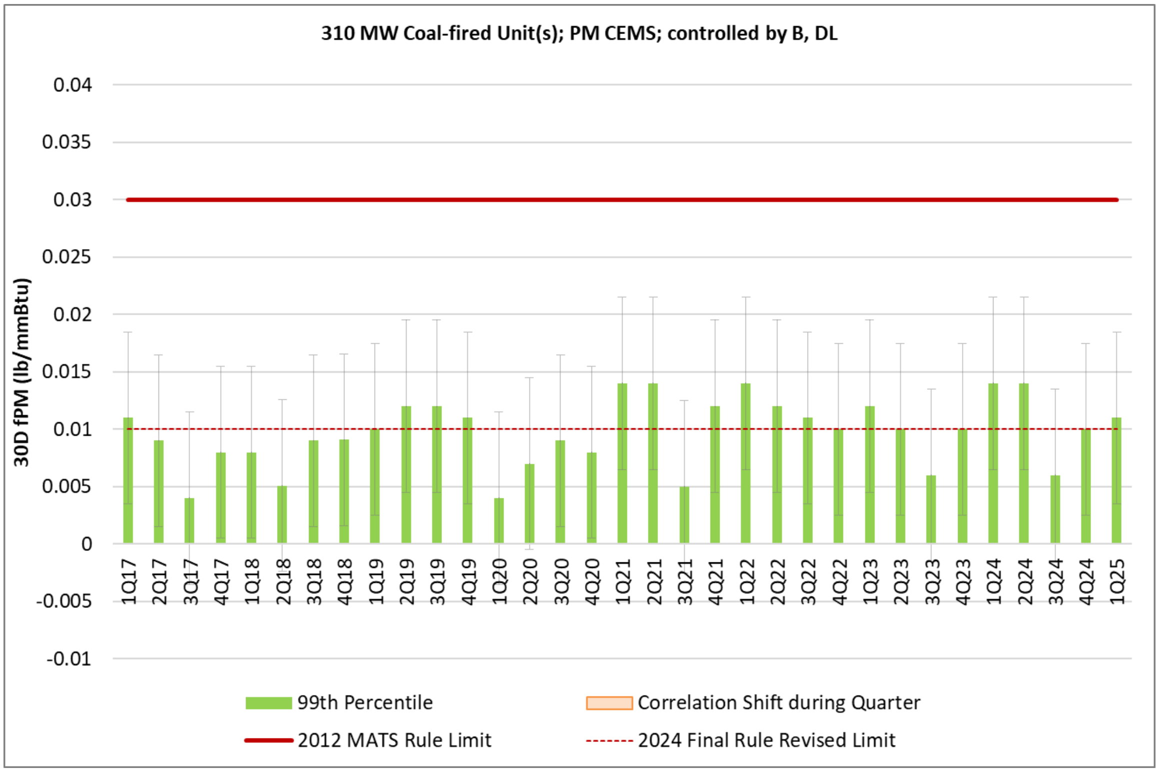


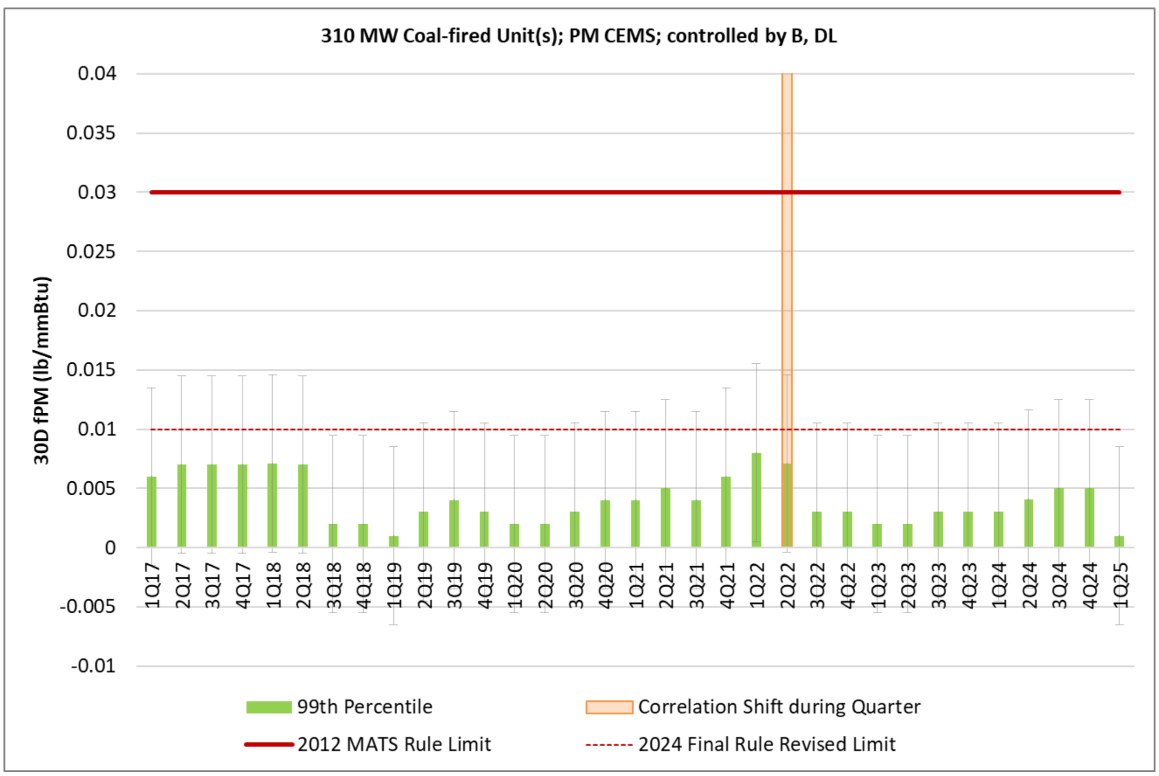


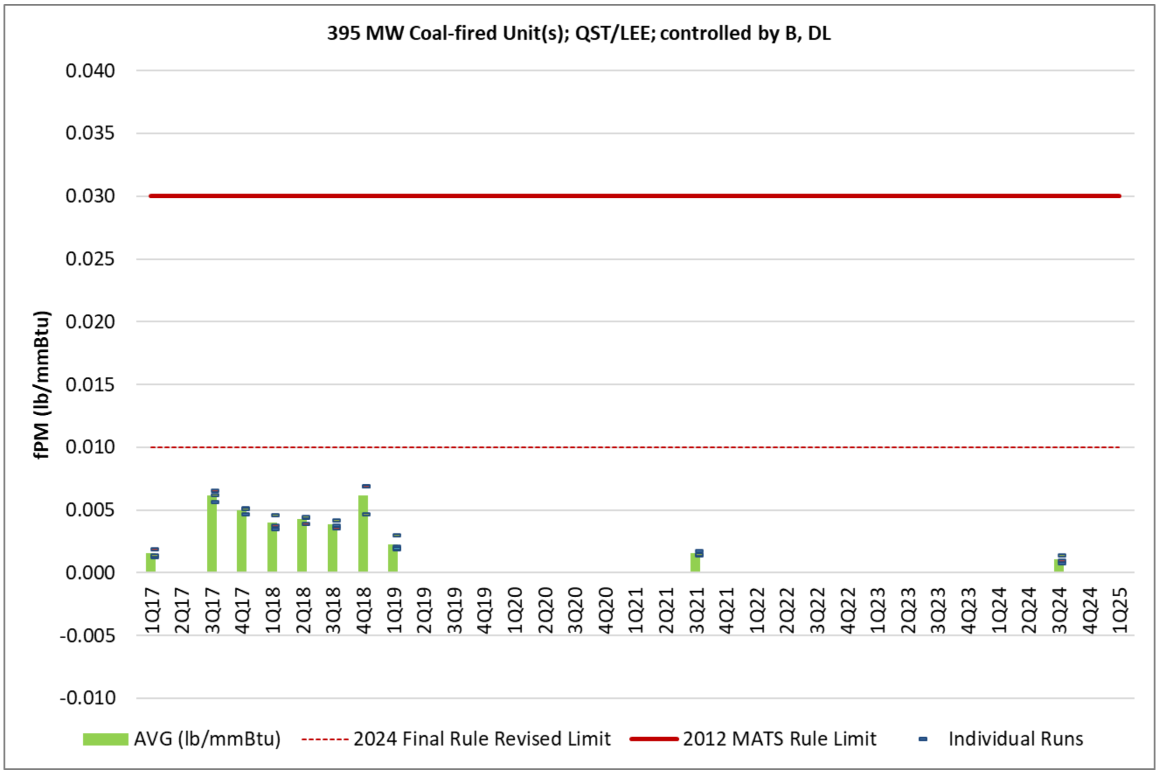

652 MW Coal-fired Unit(s); QST/LEE; controlled by ESP
fPM (lb/mmBtu)
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
-0.010
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
AVG (lb/mmBtu)
2024 Final Rule Revised Limit
2012 MATS Rule Limit
Individual Runs

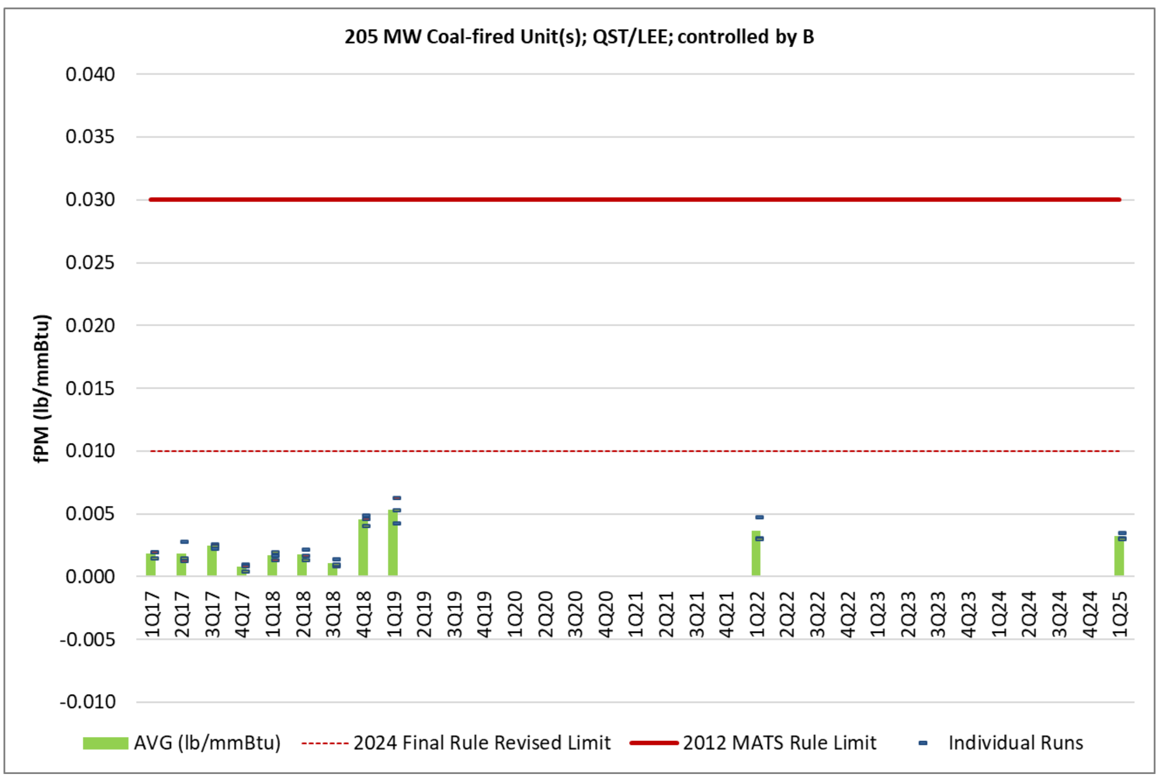

450 MW Coal-fired Unit(s); QST/LEE; controlled by ESP
fPM (lb/mmBtu)
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
-0.010
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
AVG (lb/mmBtu)
2024 Final Rule Revised Limit
2012 MATS Rule Limit
Individual Runs

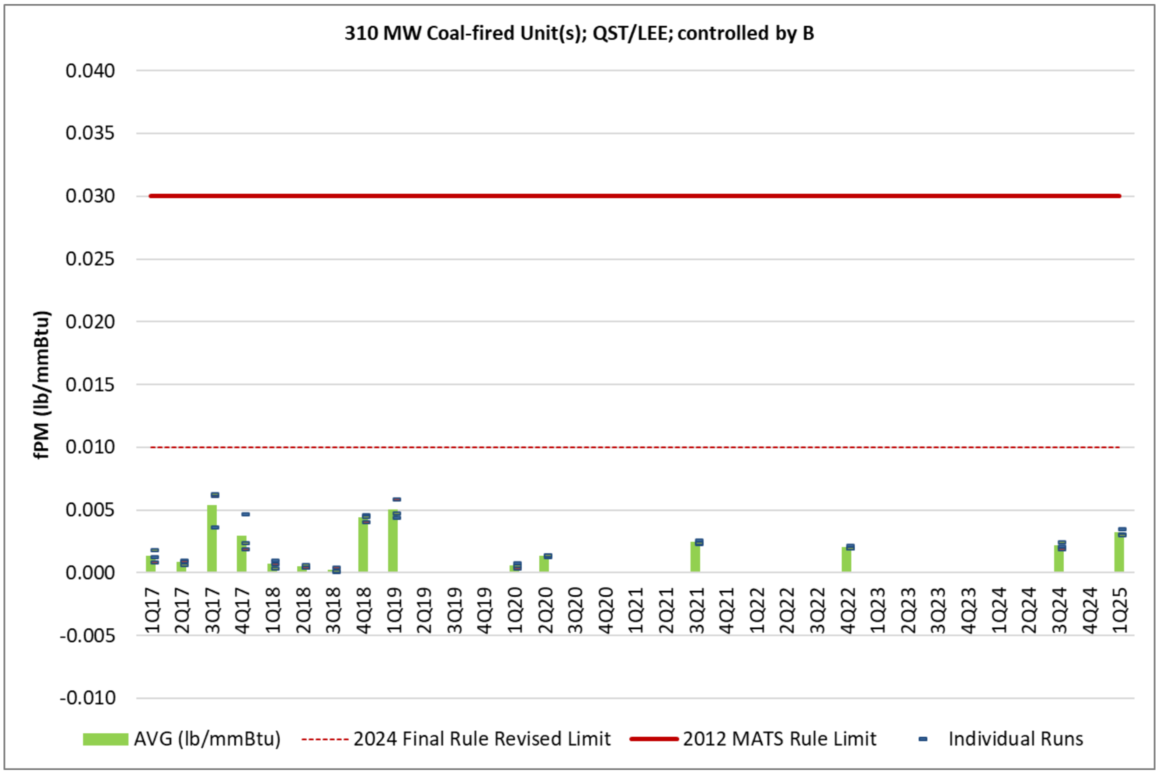
Dry Stacks – With Baghouses



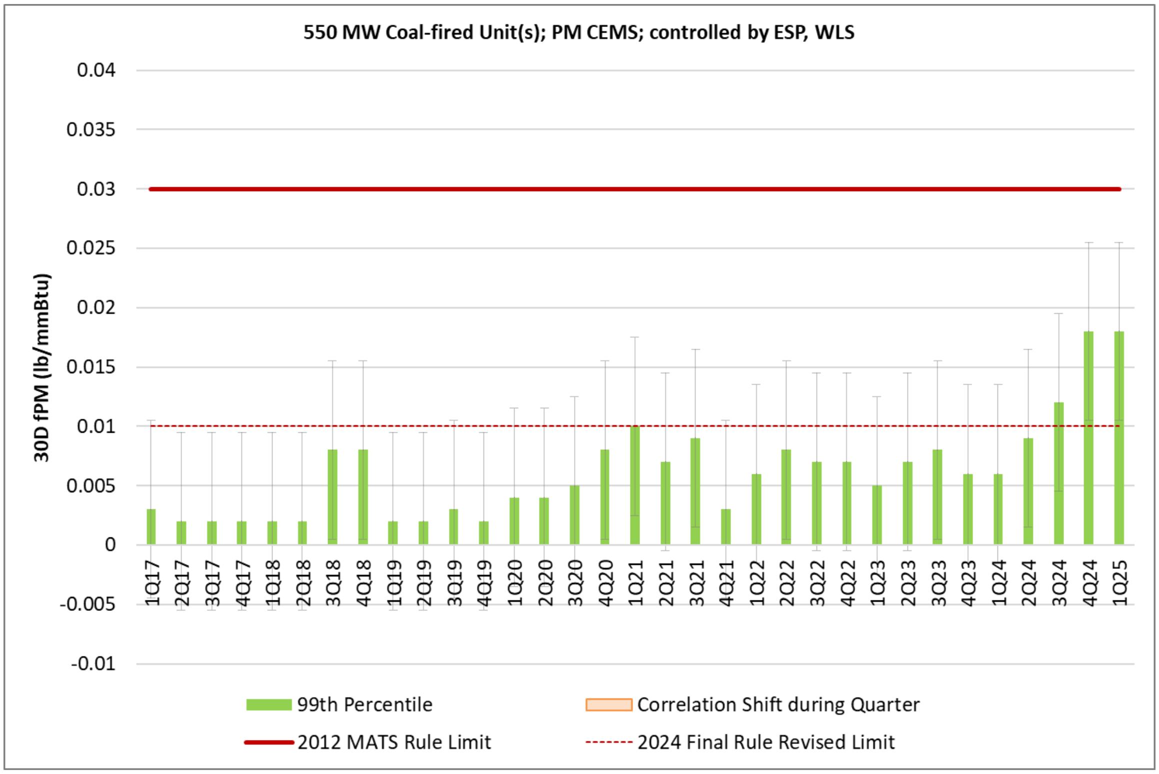


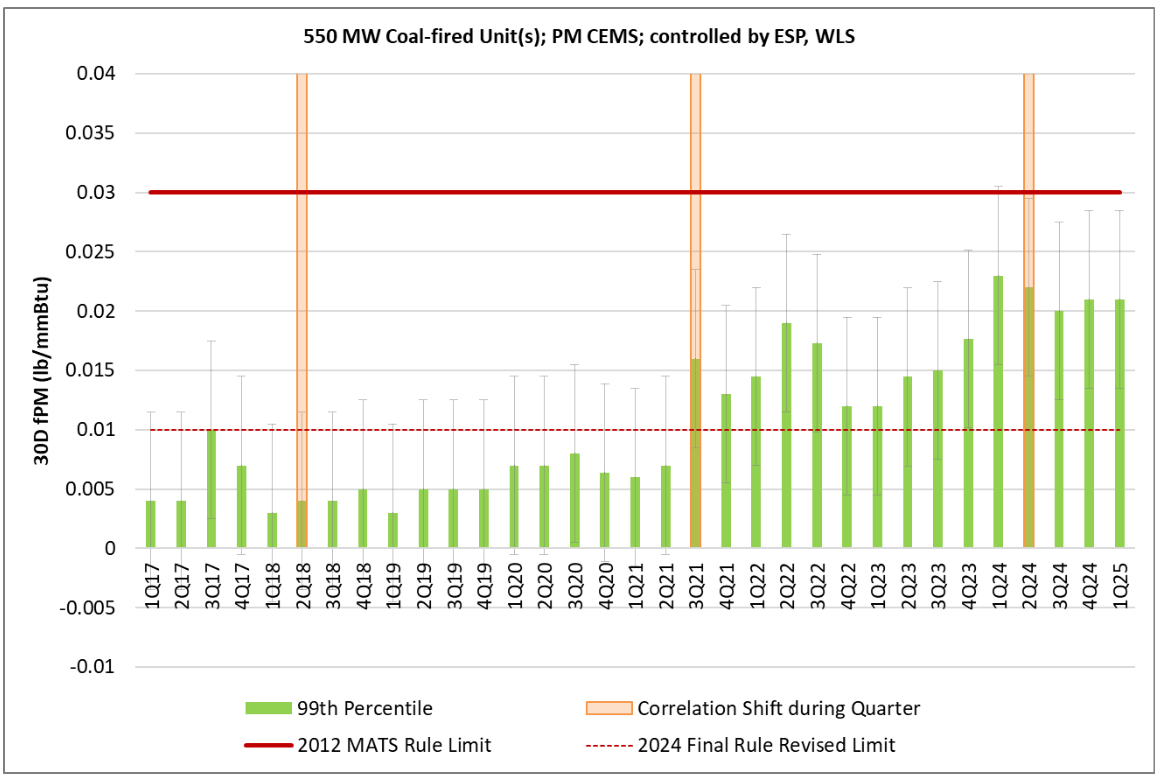

395 MW Coal-fired Unit(s); QST/LEE; controlled by B, DL
fPM (lb/mmBtu)
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
-0.010
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
AVG (lb/mmBtu)
2024 Final Rule Revised Limit
2012 MATS Rule Limit
Individual Runs

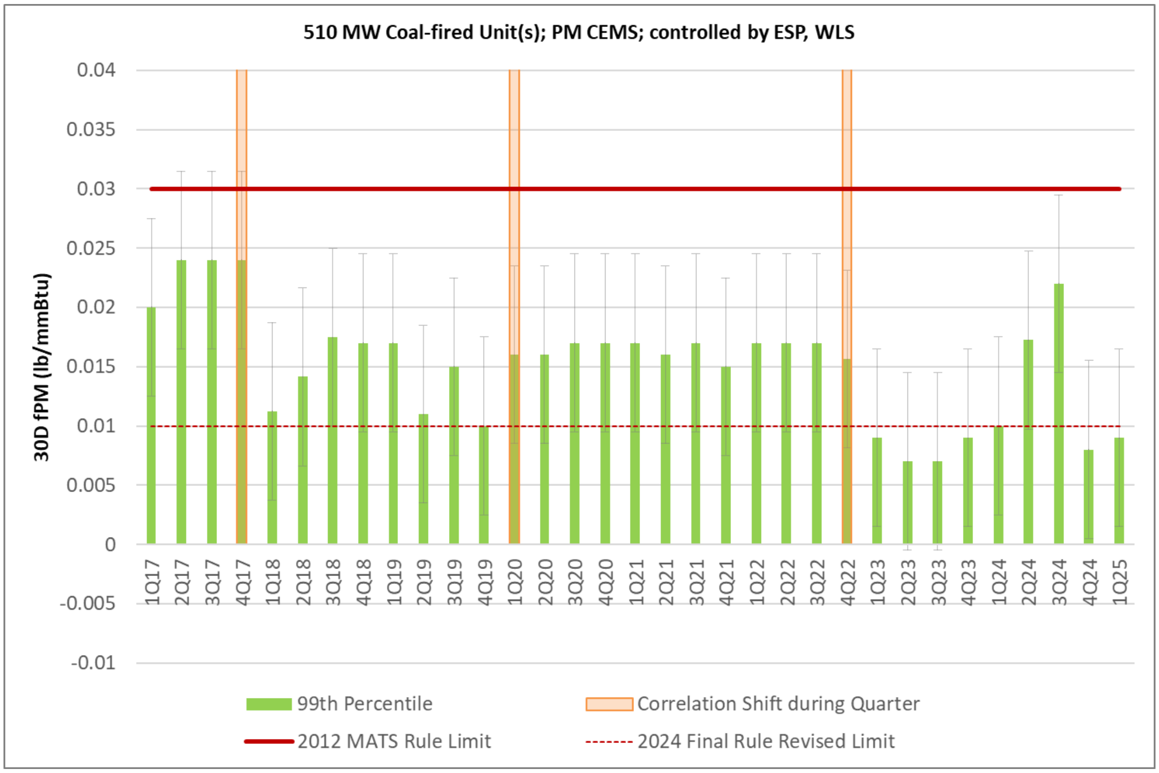

205 MW Coal-fired Unit(s); QST/LEE; controlled by B
fPM (lb/mmBtu)
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
-0.010
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
AVG (lb/mmBtu)
2024 Final Rule Revised Limit
2012 MATS Rule Limit
Individual Runs

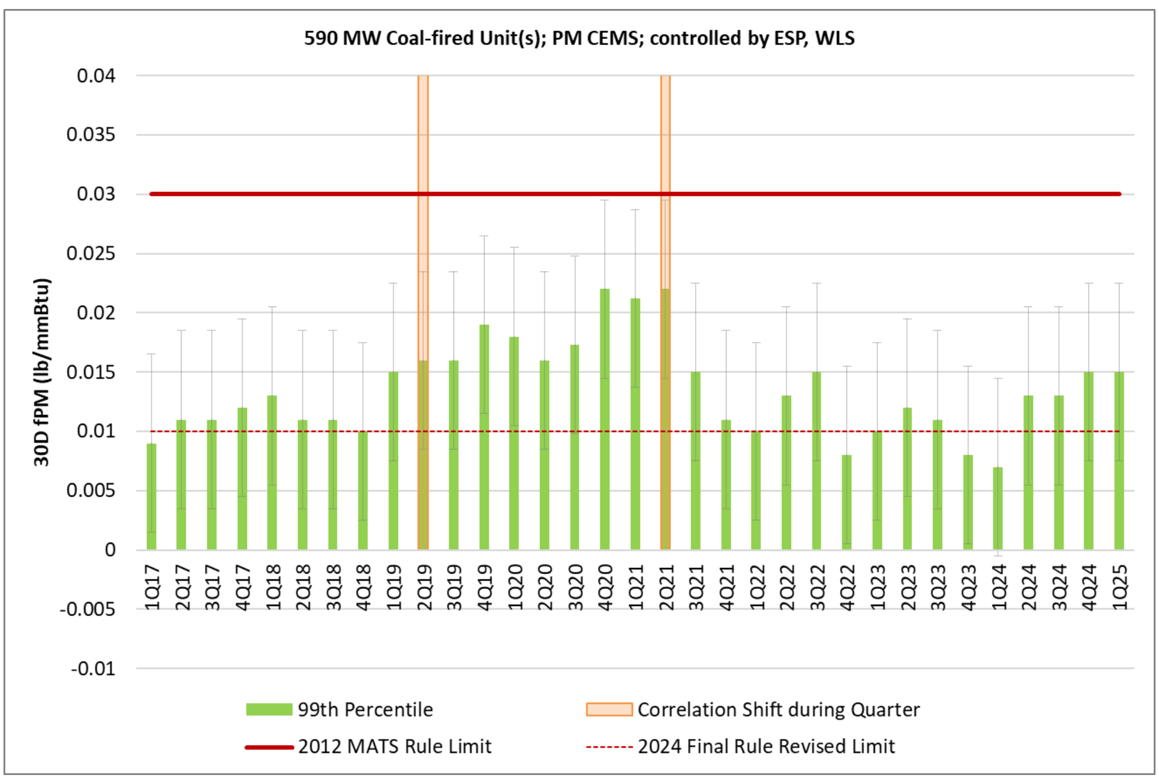

310 MW Coal-fired Unit(s); QST/LEE; controlled by B
fPM (lb/mmBtu)
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
-0.010
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
AVG (lb/mmBtu)
2024 Final Rule Revised Limit
2012 MATS Rule Limit
Individual Runs

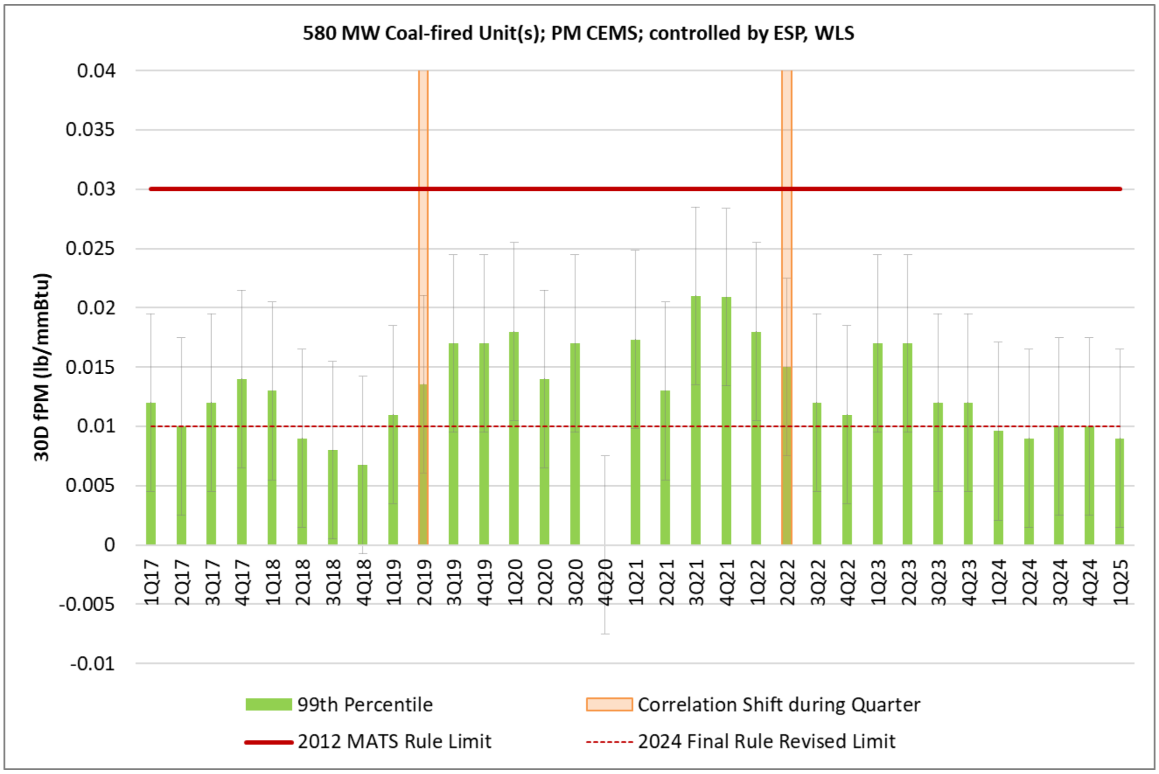
Wet Stacks – Without Baghouses

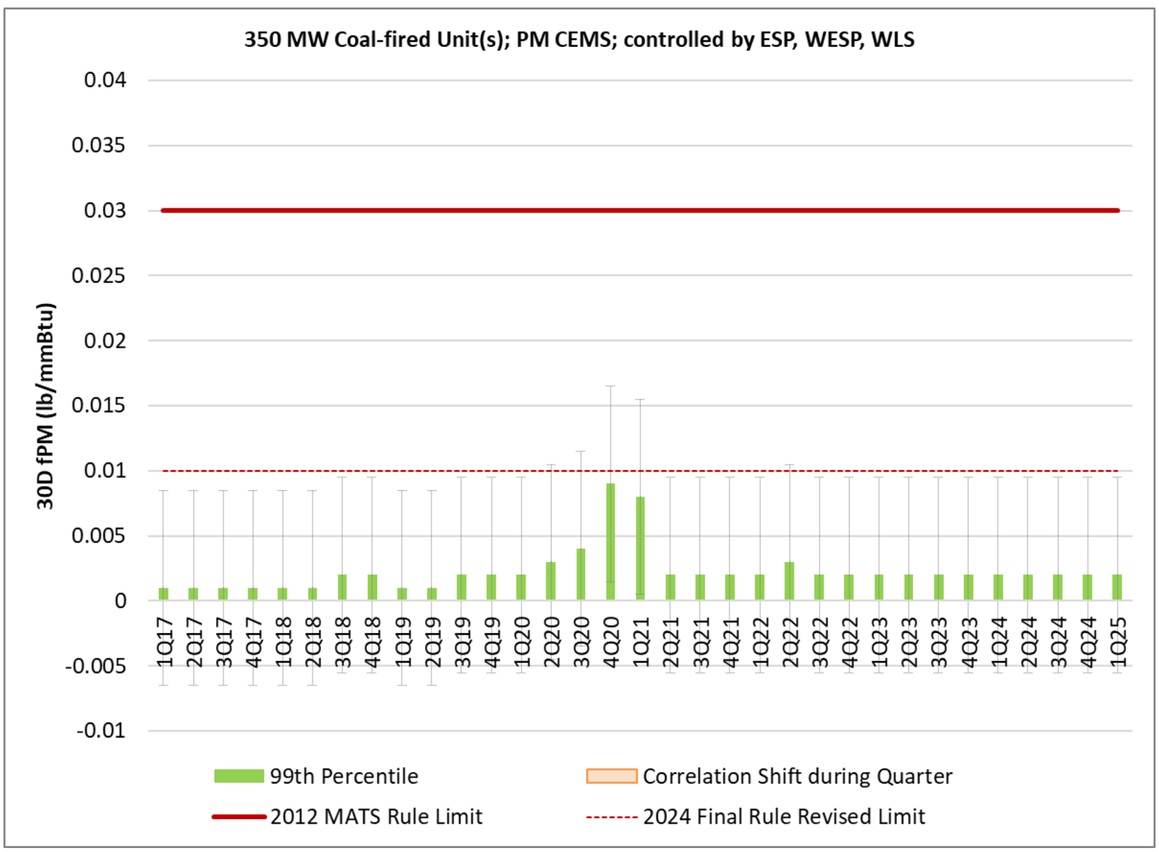


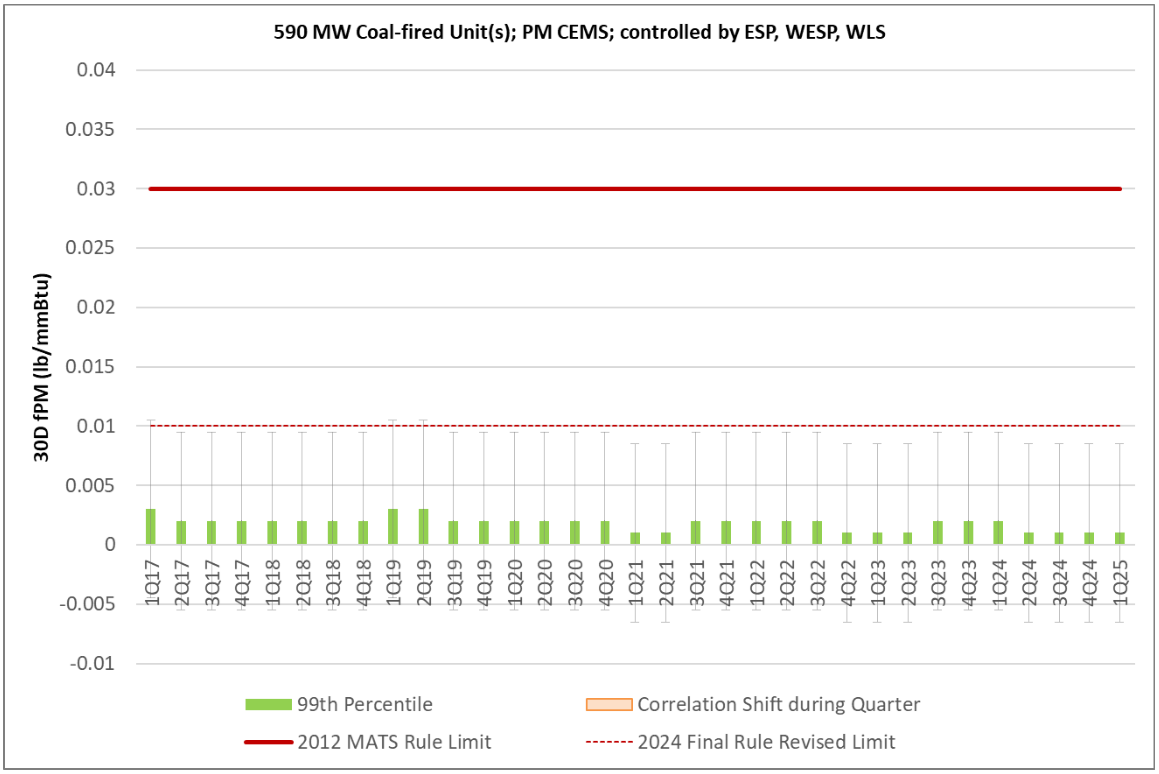


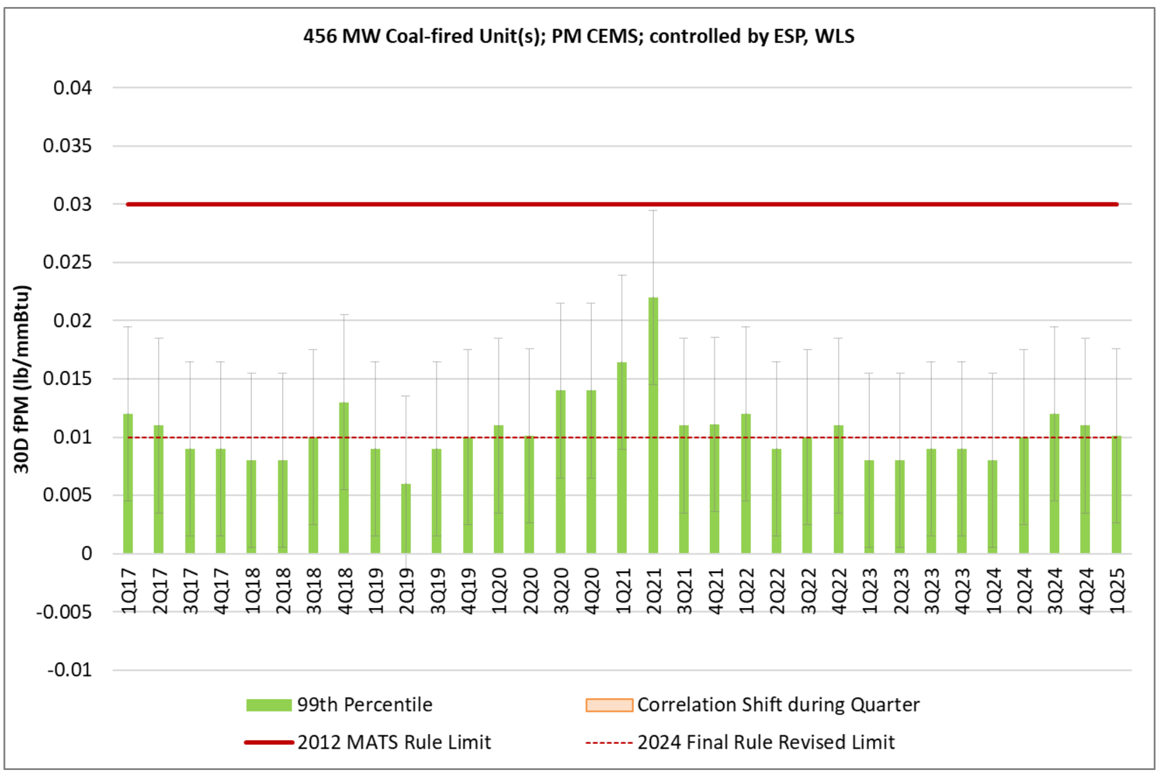

510 MW Coal-fired Unit(s); PM CEMS; controlled by ESP, WLS
30D fPM (lb/mmBtu)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Revised Limit

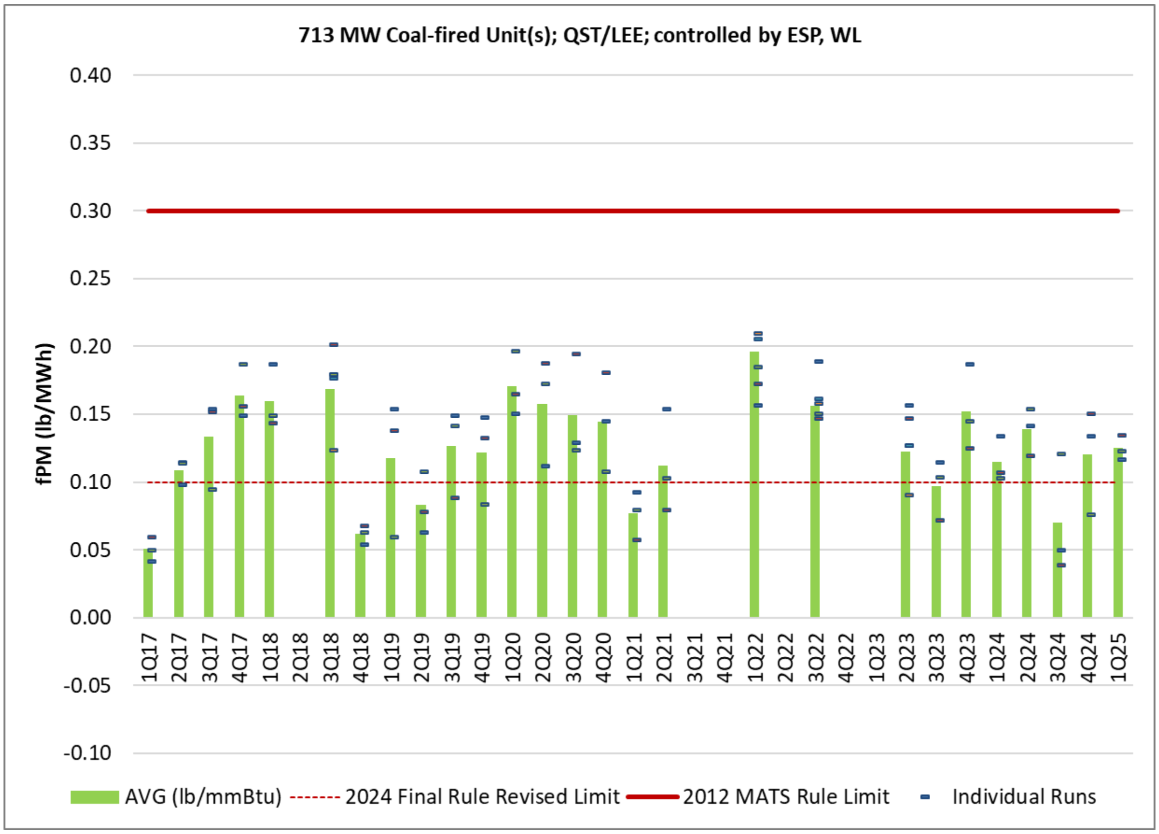

590 MW Coal-fired Unit(s); PM CEMS; controlled by ESP, WLS
30D fPM (lb/mmBtu)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Revised Limit

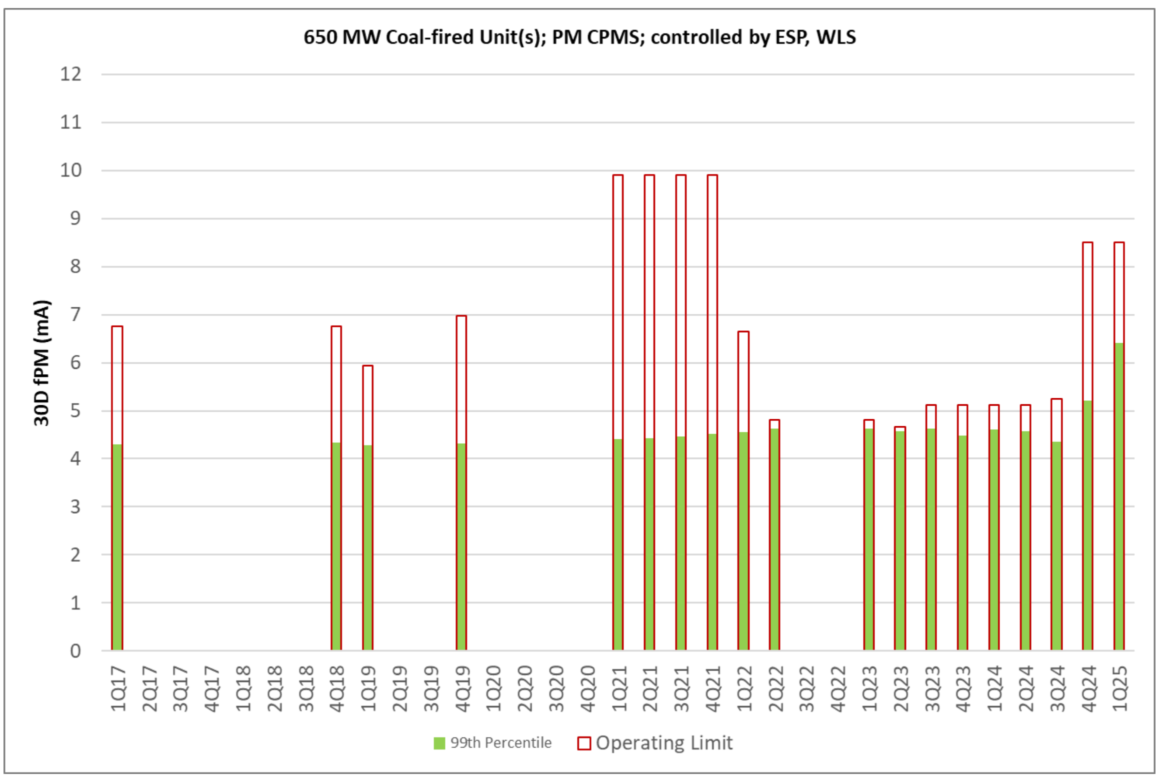

580 MW Coal-fired Unit(s); PM CEMS; controlled by ESP, WLS
30D fPM (lb/mmBtu)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Revised Limit

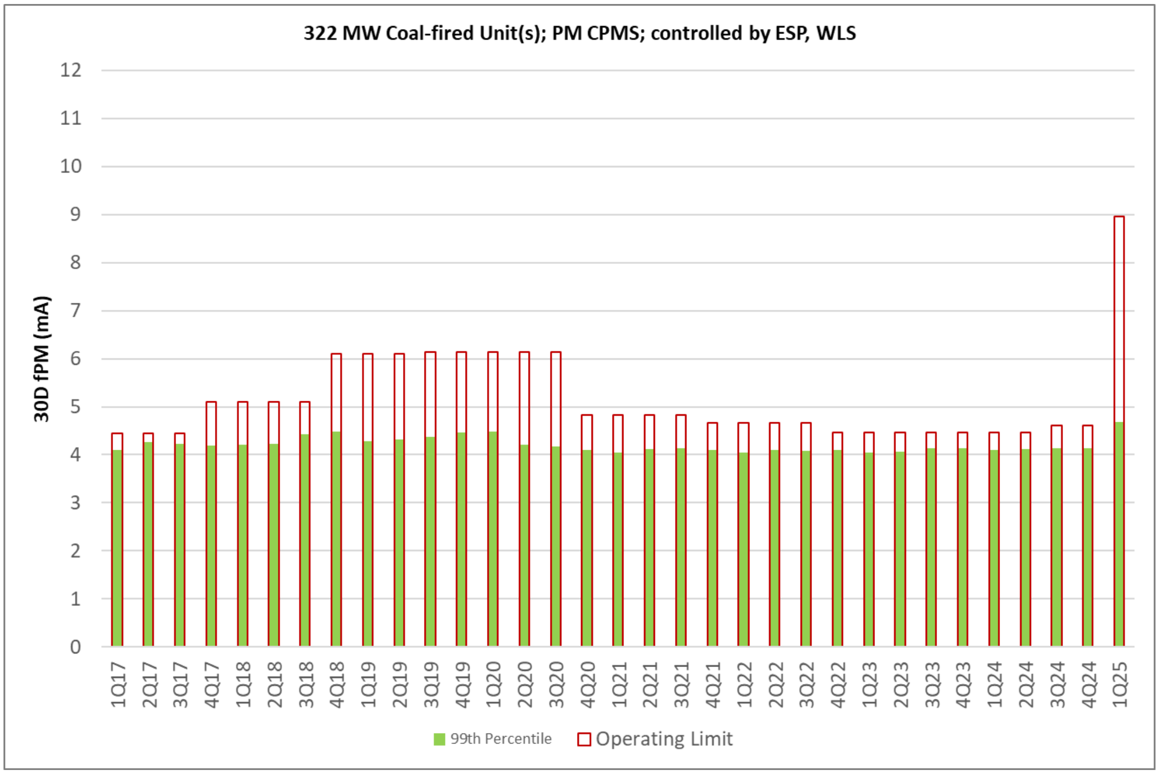

350 MW Coal-fired Unit(s); PM CEMS; controlled by ESP, WESP, WLS
30D fPM (lb/mmBtu)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Revised Limit

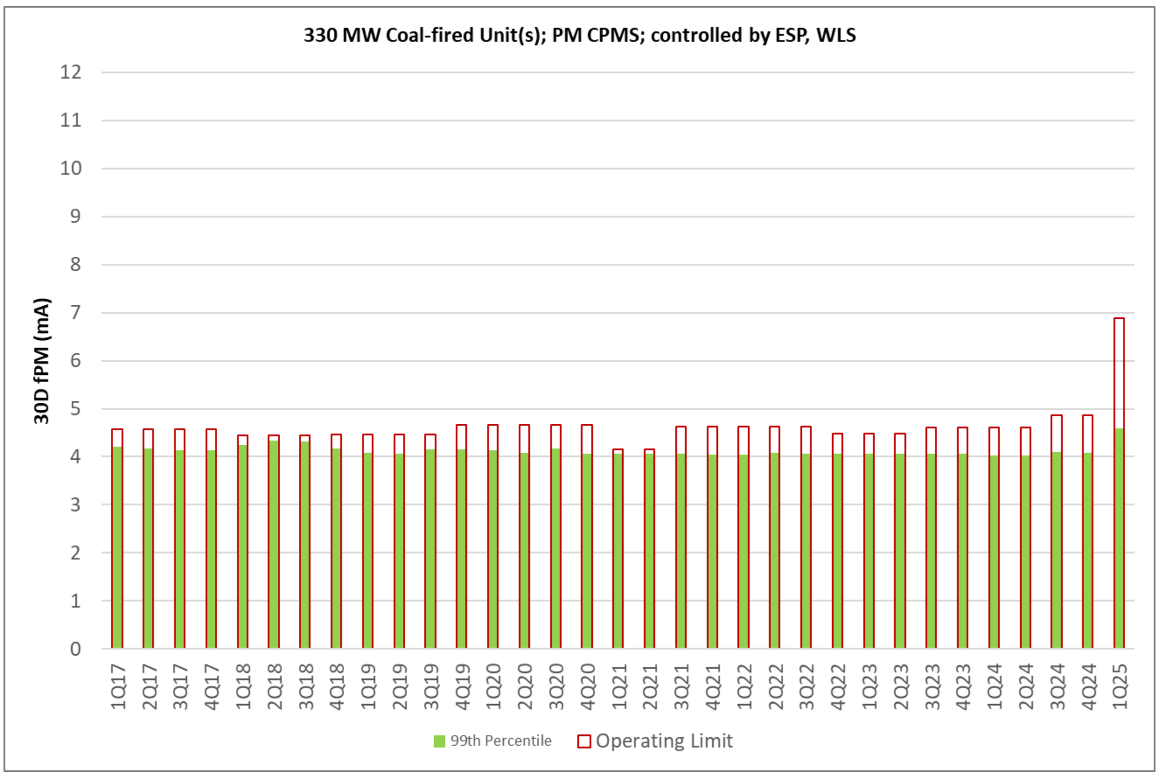

590 MW Coal-fired Unit(s); PM CEMS; controlled by ESP, WESP, WLS
30D fPM (lb/mmBtu)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
1Q17
2Q17
3Q17
4Q17
1Q18
2Q18
3Q18
4Q18
1Q19
2Q19
3Q19
4Q19
1Q20
2Q20
3Q20
4Q20
1Q21
2Q21
3Q21
4Q21
1Q22
2Q22
3Q22
4Q22
1Q23
2Q23
3Q23
4Q23
1Q24
2Q24
3Q24
4Q24
1Q25
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Revised Limit

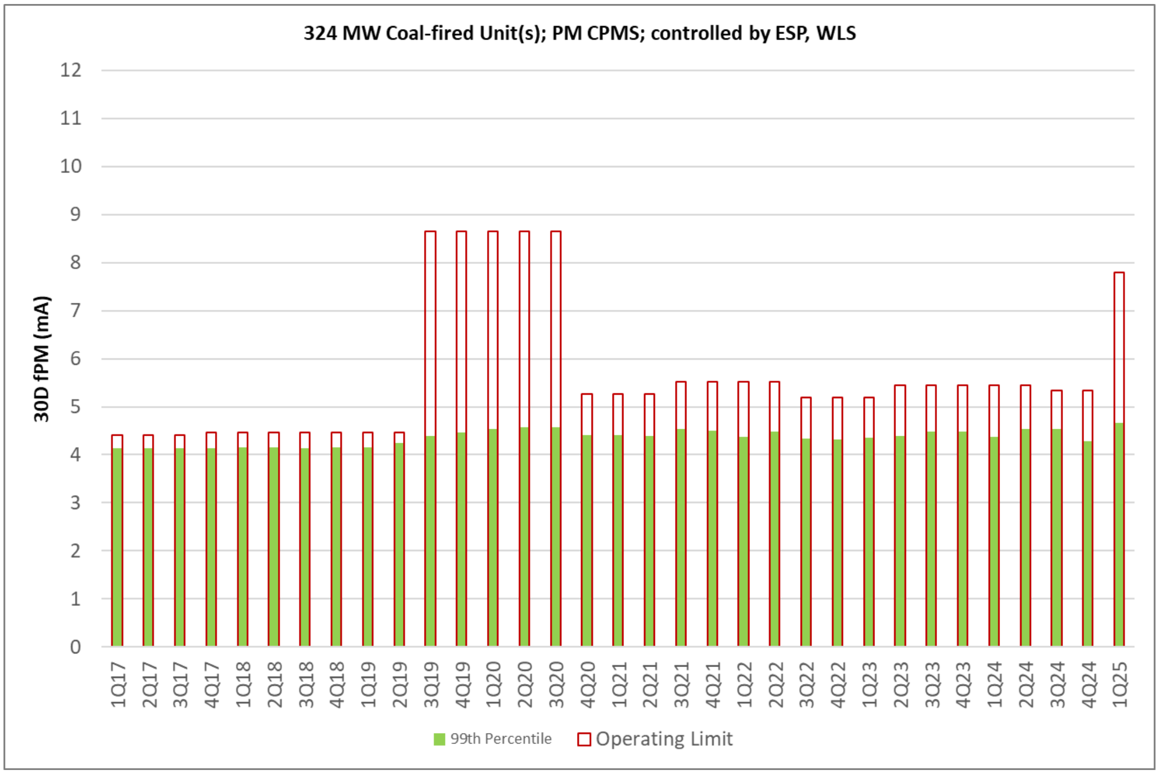

456 MW Coal-fired Unit(s); PM CEMS; controlled by ESP, WLS
30D fPM (lb/mmBtu)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
1Q17
2Q17
3Q17
4Q17
1Q18
2Q18
3Q18
4Q18
1Q19
2Q19
3Q19
4Q19
1Q20
2Q20
3Q20
4Q20
1Q21
2Q21
3Q21
4Q21
1Q22
2Q22
3Q22
4Q22
1Q23
2Q23
3Q23
4Q23
1Q24
2Q24
3Q24
4Q24
1Q25
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Revised Limit

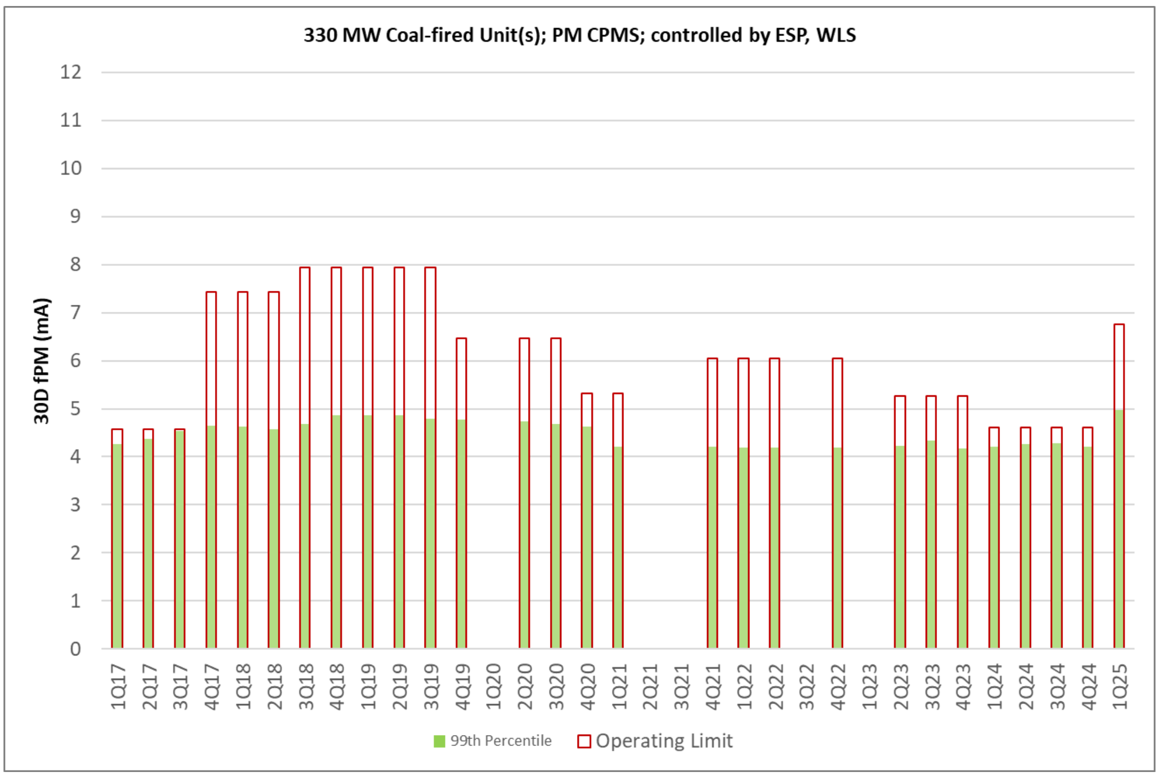

713 MW Coal-fired Unit(s); QST/LEE; controlled by ESP, WL
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
-0.05
-0.10
fPM (lb/MWh)
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
AVG (lb/mmBtu)
2024 Final Rule Revised Limit
2012 MATS Rule Limit
Individual Runs


650 MW Coal-fired Unit(s); PM CPMS; controlled by ESP, WLS
12
11
10
9
8
7
6
5
4
3
2
1
0
30D fPM (mA)
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
99th Percentile
Operating Limit

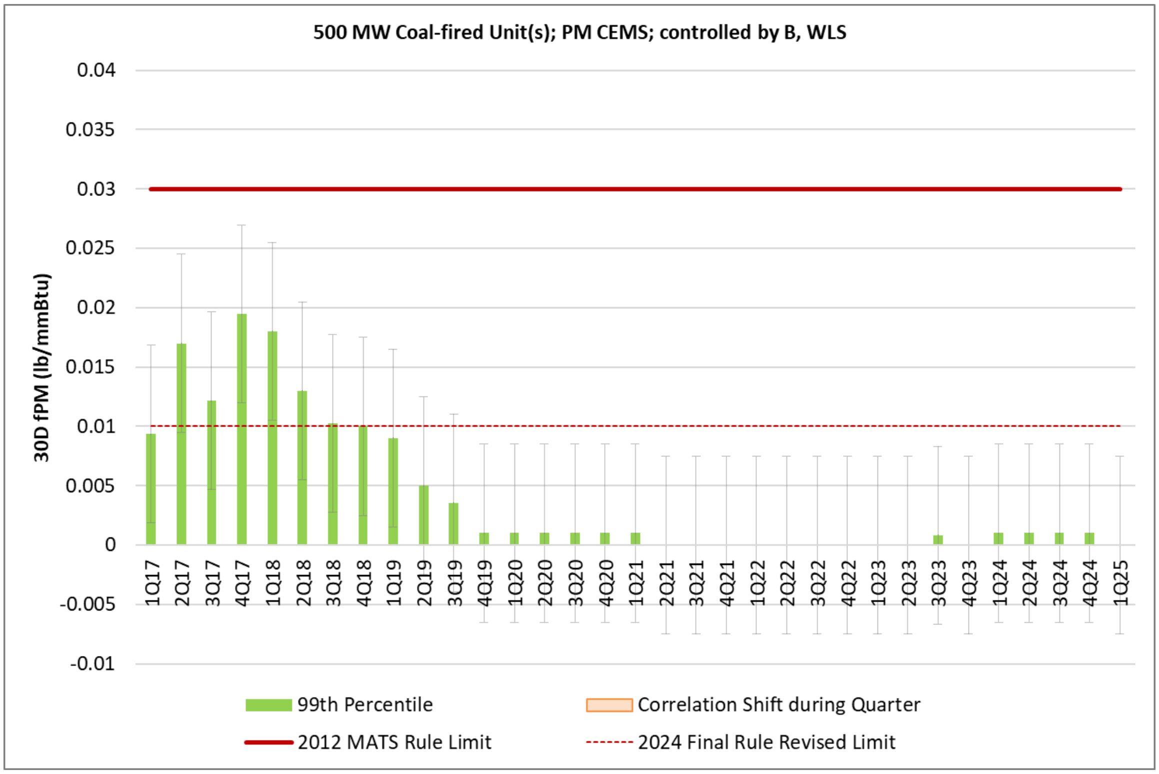

322 MW Coal-fired Unit(s); PM CPMS; controlled by ESP, WLS
30D fPM (mA)
0
1
2
3
4
5
6
7
8
9
10
11
12
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
99th Percentile
Operating Limit

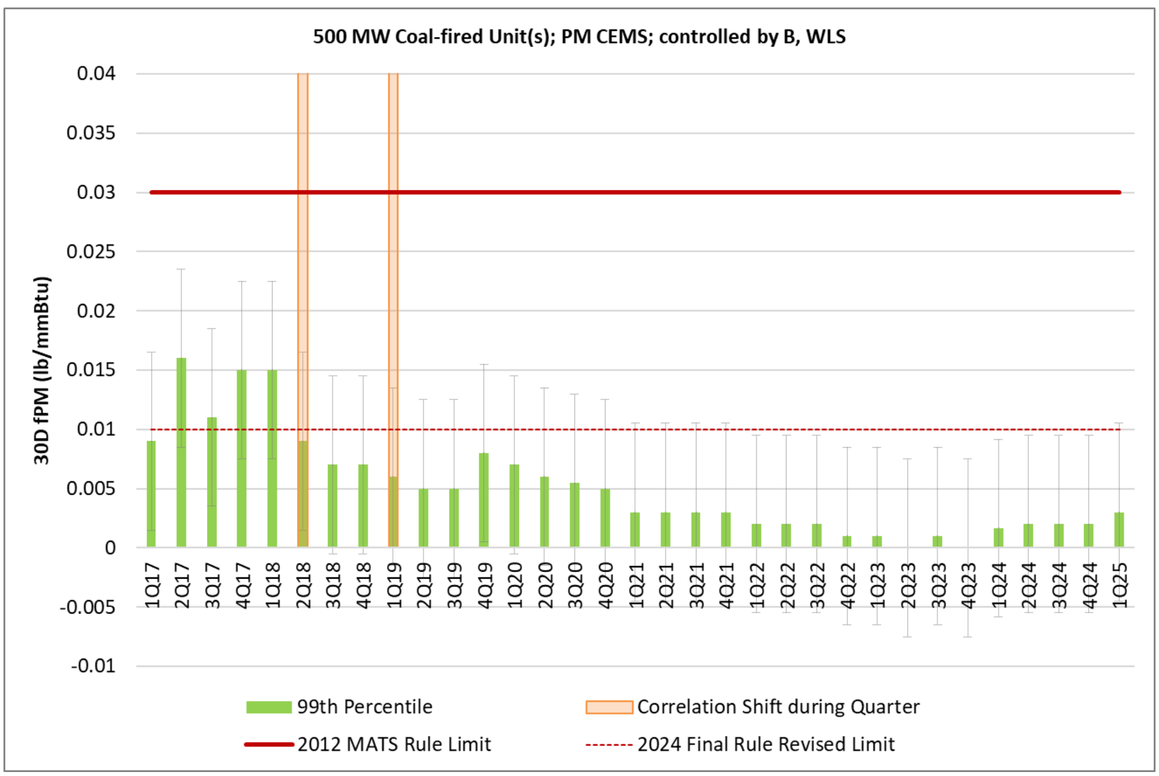

330 MW Coal-fired Unit(s); PM CPMS; controlled by ESP, WLS
30D fPM (mA)
0
1
2
3
4
5
6
7
8
9
10
11
12
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
99th Percentile
Operating Limit

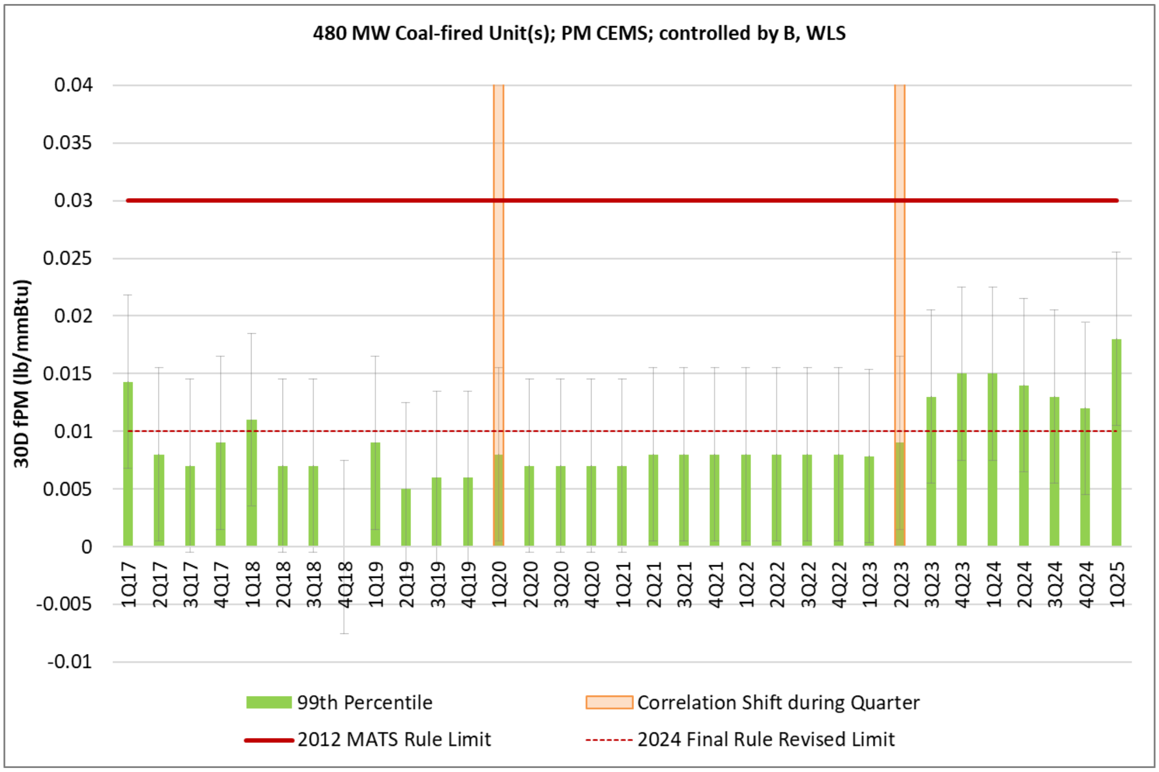

324 MW Coal-fired Unit(s); PM CPMS; controlled by ESP, WLS
30D fPM (mA)
0
1
2
3
4
5
6
7
8
9
10
11
12
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
99th Percentile
Operating Limit

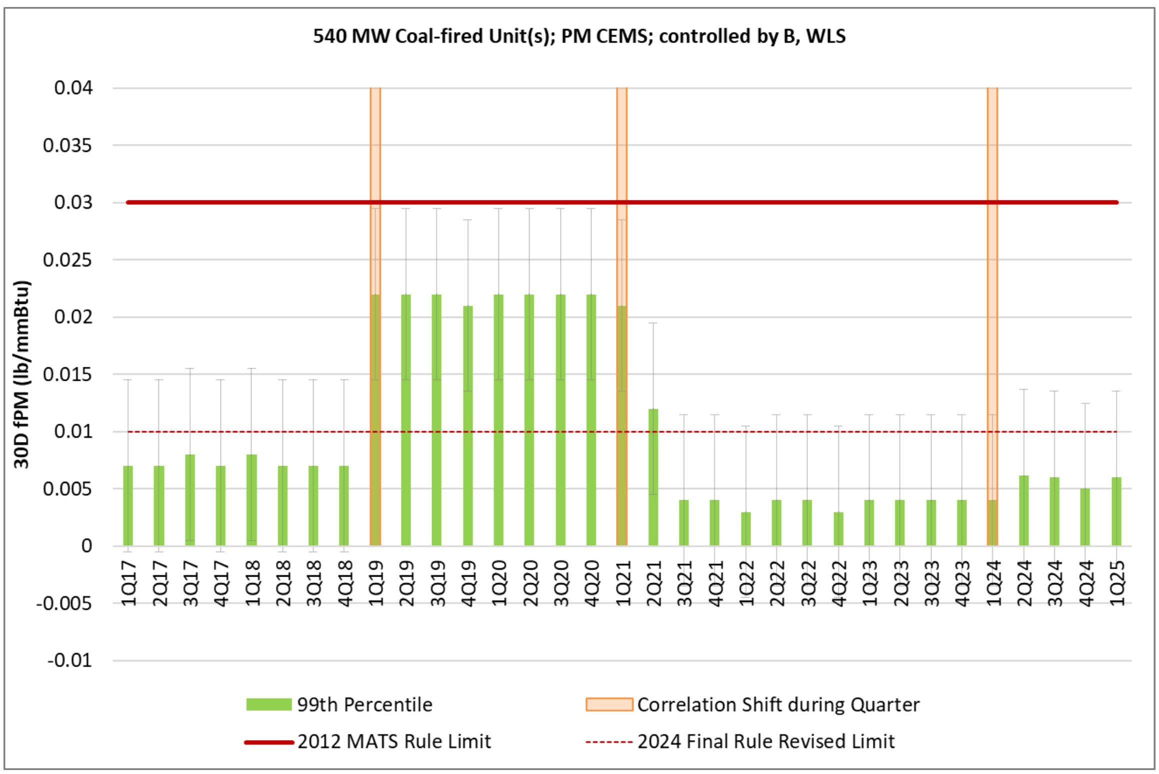

330 MW Coal-fired Unit(s); PM CPMS; controlled by ESP, WLS
30D fPM (mA)
0
1
2
3
4
5
6
7
8
9
10
11
12
1Q17 2Q17 3Q17 4Q17 1Q18 2Q18 3Q18 4Q18 1Q19 2Q19 3Q19 4Q19 1Q20 2Q20 3Q20 4Q20 1Q21 2Q21 3Q21 4Q21 1Q22 2Q22 3Q22 4Q22 1Q23 2Q23 3Q23 4Q23 1Q24 2Q24 3Q24 4Q24 1Q25
99th Percentile
Operating Limit

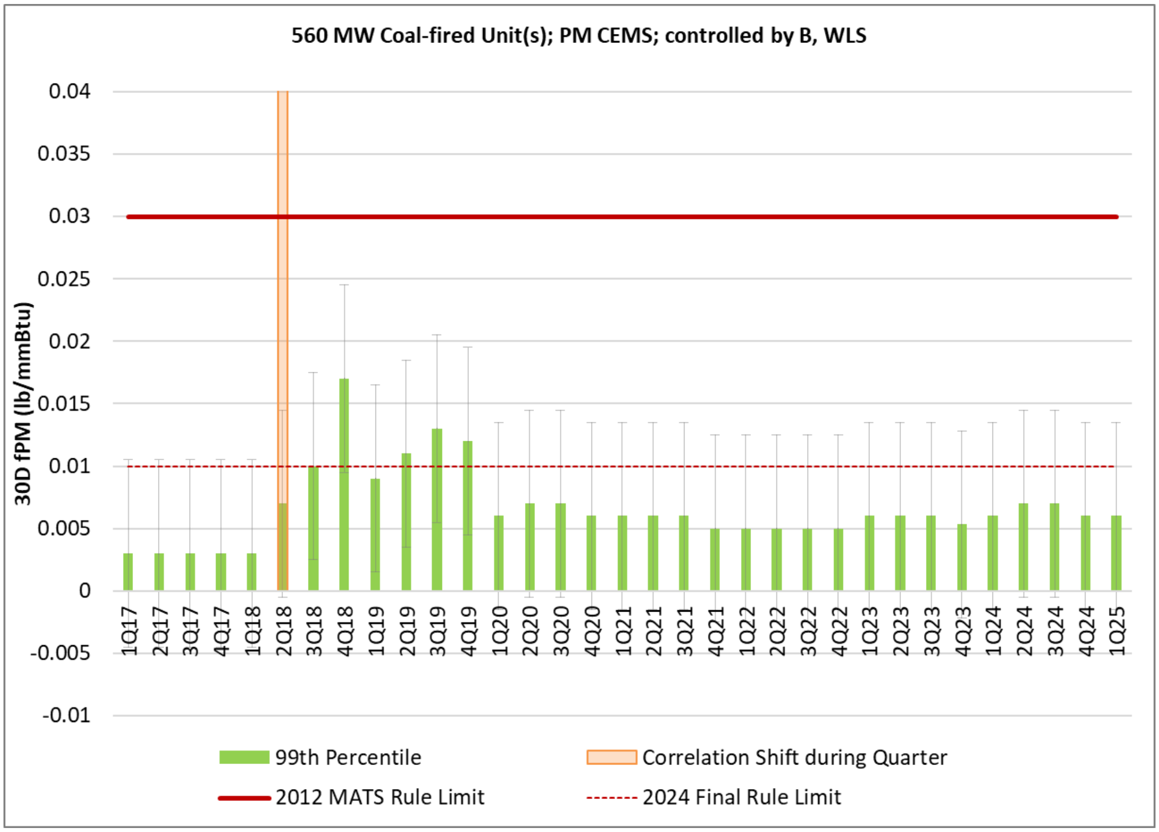
Wet Stacks – With Baghouses

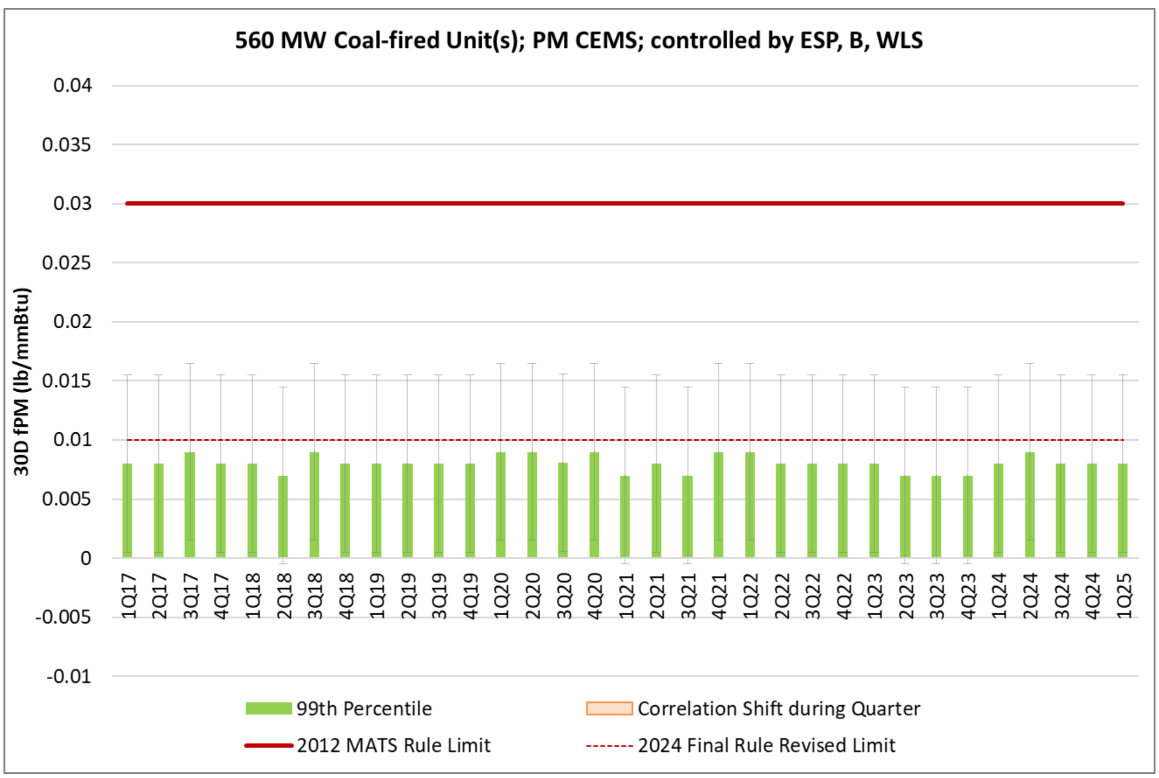


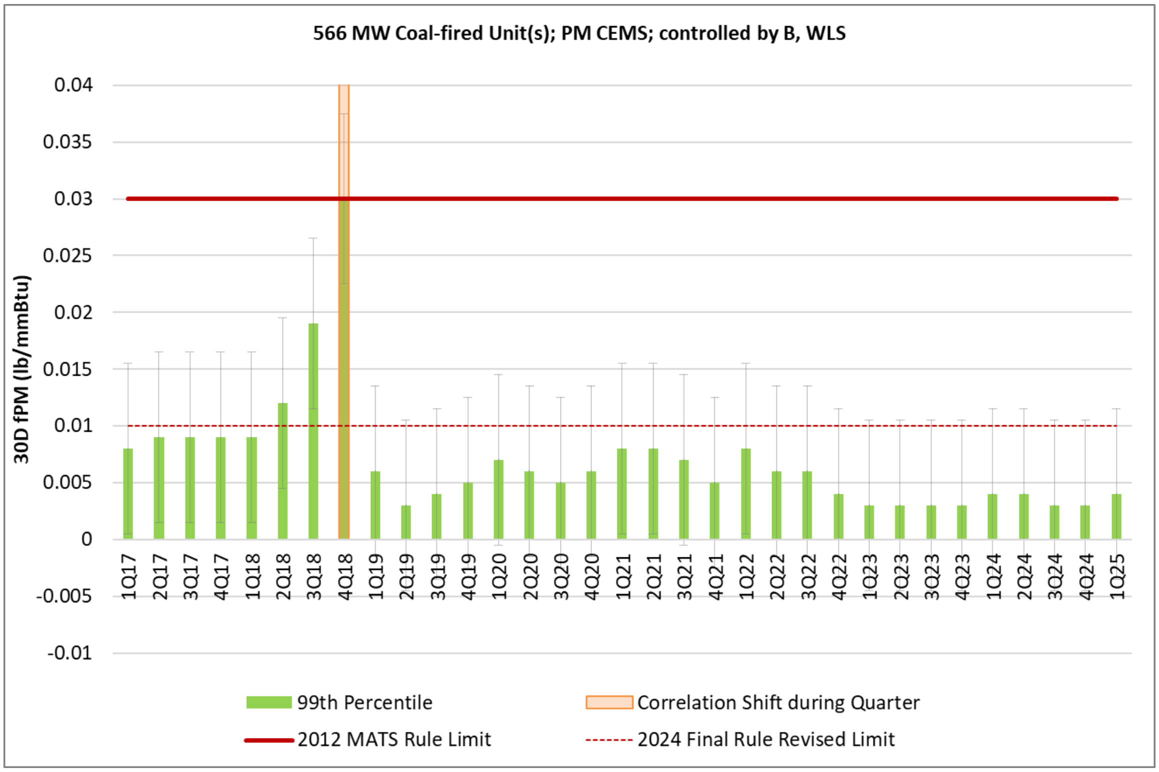


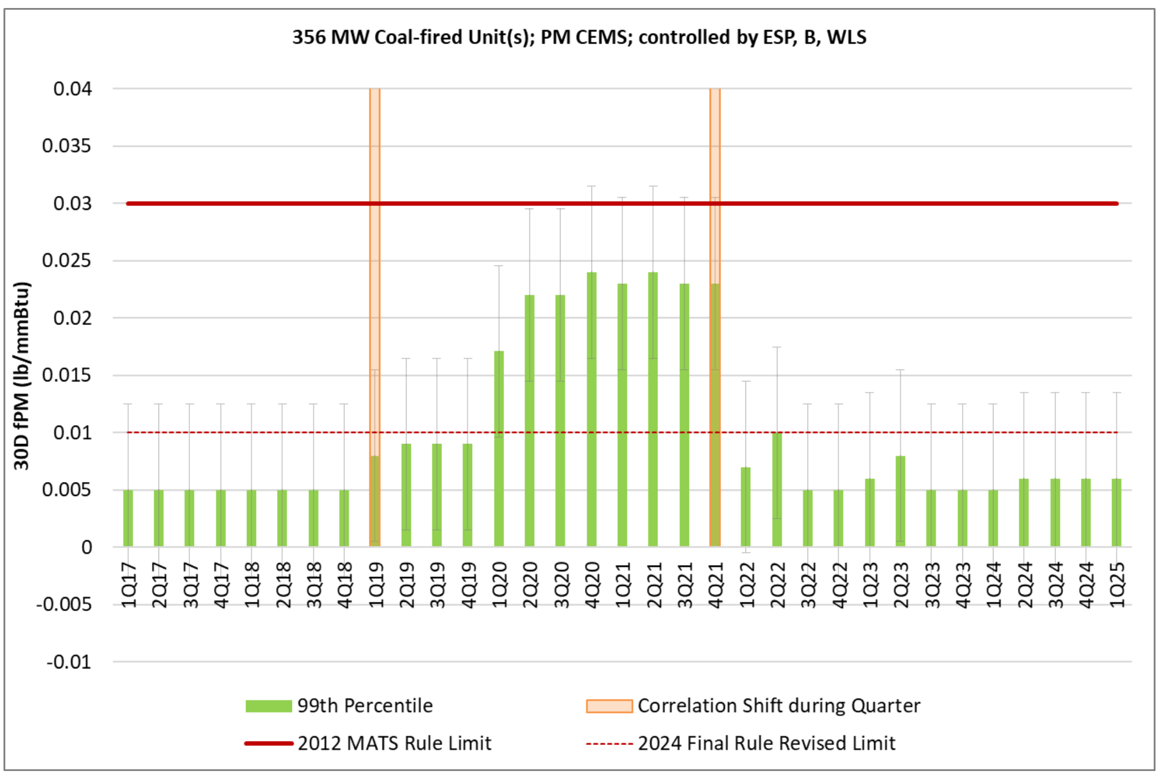

480 MW Coal-fired Unit(s); PM CEMS; controlled by B, WLS
30D fPM (lb/mmBtu)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
1Q17
2Q17
3Q17
4Q17
1Q18
2Q18
3Q18
4Q18
1Q19
2Q19
3Q19
4Q19
1Q20
2Q20
3Q20
4Q20
1Q21
2Q21
3Q21
4Q21
1Q22
2Q22
3Q22
4Q22
1Q23
2Q23
3Q23
4Q23
1Q24
2Q24
3Q24
4Q24
1Q25
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Revised Limit

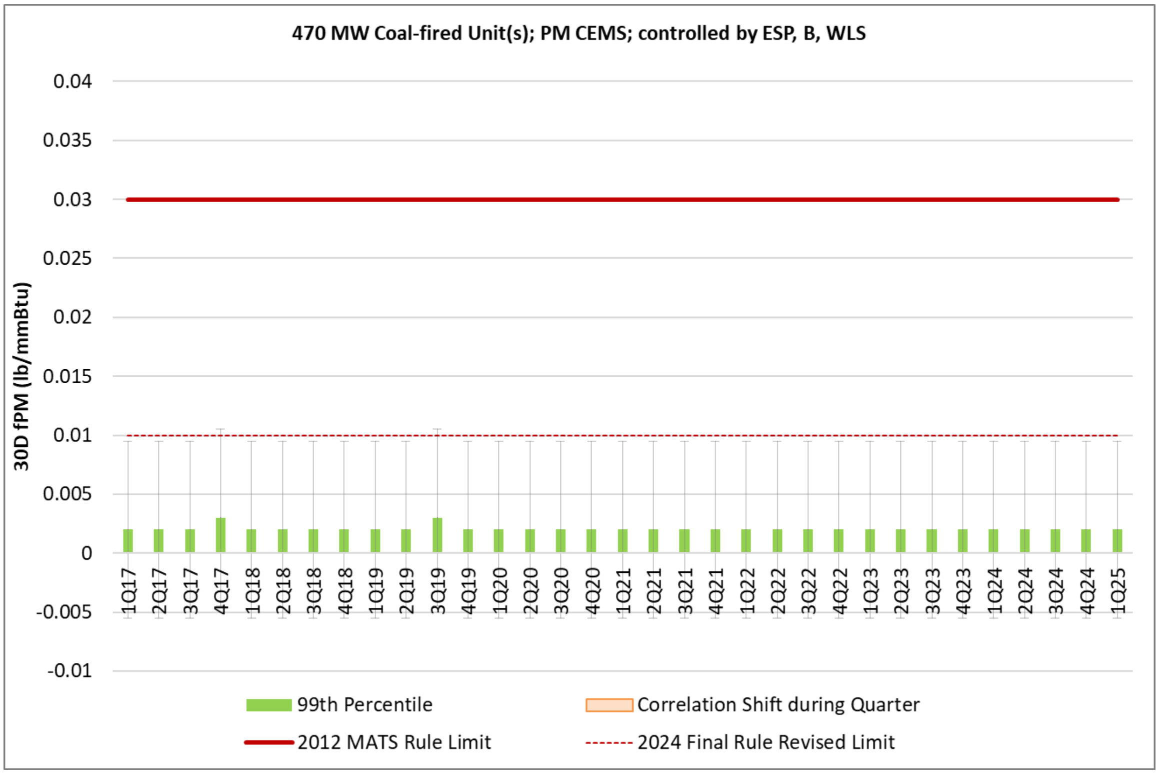

540 MW Coal-fired Unit(s); PM CEMS; controlled by B, WLS
30D fPM (lb/mmBtu)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
1Q17
2Q17
3Q17
4Q17
1Q18
2Q18
3Q18
4Q18
1Q19
2Q19
3Q19
4Q19
1Q20
2Q20
3Q20
4Q20
1Q21
2Q21
3Q21
4Q21
1Q22
2Q22
3Q22
4Q22
1Q23
2Q23
3Q23
4Q23
1Q24
2Q24
3Q24
4Q24
1Q25
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Revised Limit

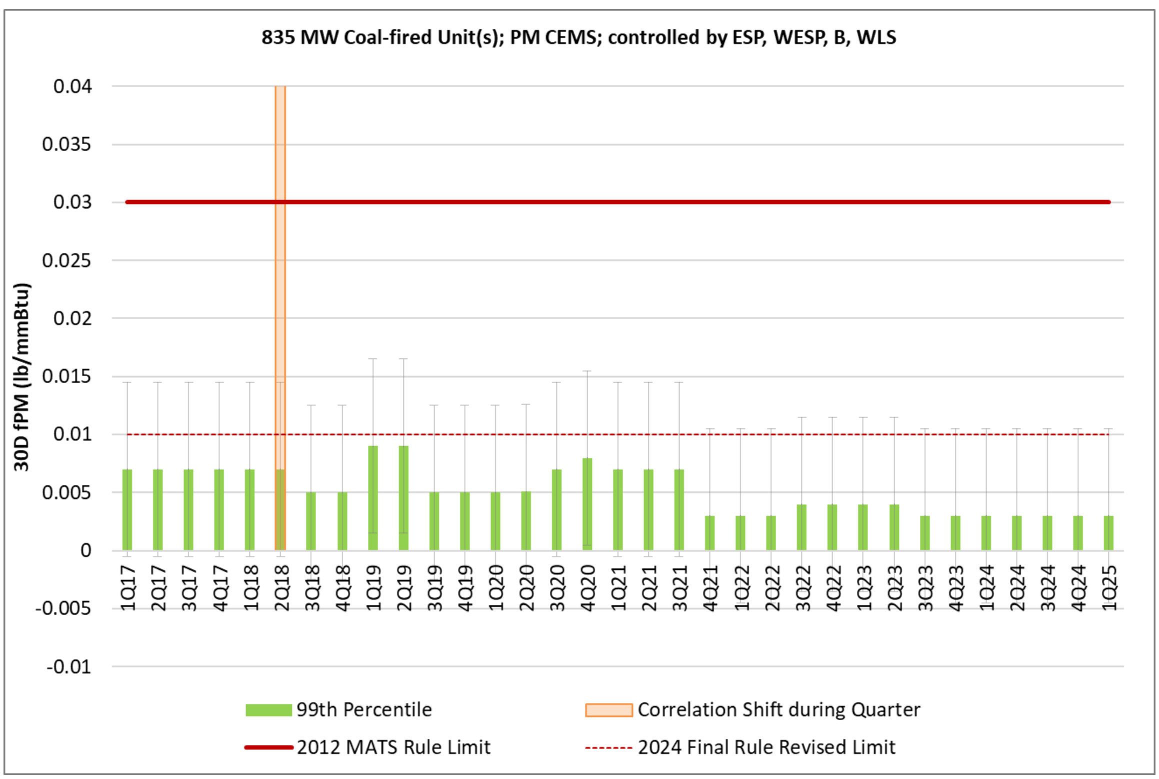

560 MW Coal-fired Unit(s); PM CEMS; controlled by B, WLS
30D fPM (lb/mmBtu)
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Limit

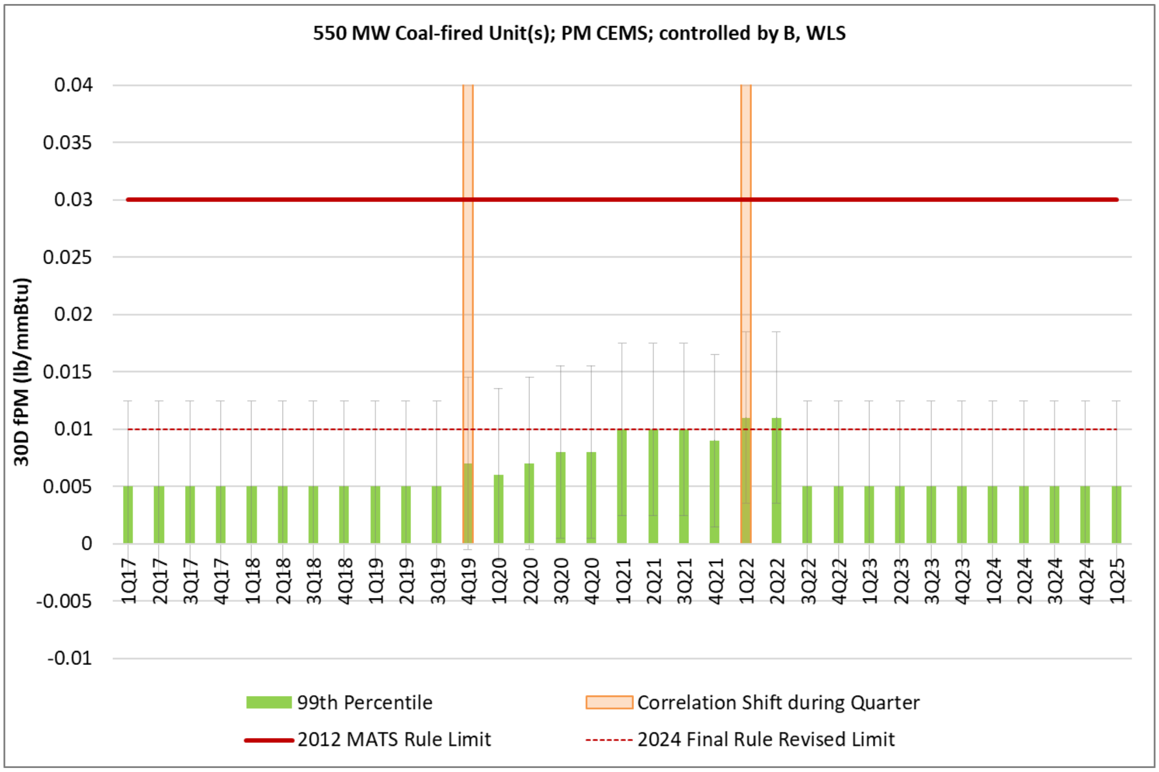

560 MW Coal-fired Unit(s); PM CEMS; controlled by ESP, B, WLS
30D fPM (lb/mmBtu)
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Revised Limit


566 MW Coal-fired Unit(s); PM CEMS; controlled by B, WLS
30D fPM (lb/mmBtu)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
1Q17
2Q17
3Q17
4Q17
1Q18
2Q18
3Q18
4Q18
1Q19
2Q19
3Q19
4Q19
1Q20
2Q20
3Q20
4Q20
1Q21
2Q21
3Q21
4Q21
1Q22
2Q22
3Q22
4Q22
1Q23
2Q23
3Q23
4Q23
1Q24
2Q24
3Q24
4Q24
1Q25
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Revised Limit


356 MW Coal-fired Unit(s); PM CEMS; controlled by ESP, B, WLS
30D fPM (lb/mmBtu)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
1Q17
2Q17
3Q17
4Q17
1Q18
2Q18
3Q18
4Q18
1Q19
2Q19
3Q19
4Q19
1Q20
2Q20
3Q20
4Q20
1Q21
2Q21
3Q21
4Q21
1Q22
2Q22
3Q22
4Q22
1Q23
2Q23
3Q23
4Q23
1Q24
2Q24
3Q24
4Q24
1Q25
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Revised Limit


470 MW Coal-fired Unit(s); PM CEMS; controlled by ESP, B, WLS
30D fPM (lb/mmBtu)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
1Q17
2Q17
3Q17
4Q17
1Q18
2Q18
3Q18
4Q18
1Q19
2Q19
3Q19
4Q19
1Q20
2Q20
3Q20
4Q20
1Q21
2Q21
3Q21
4Q21
1Q22
2Q22
3Q22
4Q22
1Q23
2Q23
3Q23
4Q23
1Q24
2Q24
3Q24
4Q24
1Q25
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Revised Limit


835 MW Coal-fired Unit(s); PM CEMS; controlled by ESP, WESP, B, WLS
30D fPM (lb/mmBtu)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
1Q17
2Q17
3Q17
4Q17
1Q18
2Q18
3Q18
4Q18
1Q19
2Q19
3Q19
4Q19
1Q20
2Q20
3Q20
4Q20
1Q21
2Q21
3Q21
4Q21
1Q22
2Q22
3Q22
4Q22
1Q23
2Q23
3Q23
4Q23
1Q24
2Q24
3Q24
4Q24
1Q25
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Revised Limit


550 MW Coal-fired Unit(s); PM CEMS; controlled by B, WLS
30D fPM (lb/mmBtu)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
1Q17
2Q17
3Q17
4Q17
1Q18
2Q18
3Q18
4Q18
1Q19
2Q19
3Q19
4Q19
1Q20
2Q20
3Q20
4Q20
1Q21
2Q21
3Q21
4Q21
1Q22
2Q22
3Q22
4Q22
1Q23
2Q23
3Q23
4Q23
1Q24
2Q24
3Q24
4Q24
1Q25
99th Percentile
Correlation Shift during Quarter
2012 MATS Rule Limit
2024 Final Rule Revised Limit

Appendix B PM CEMS Cost Details

Background

EPA received a number of comments on the 2023 Proposed MATS RTR that the Agency overstated costs associated with the quarterly stack test option and understated costs associated with the PM CEMS compliance option. In response, EPA conducted a revised cost analysis of non-beta gauge PM monitors using data submitted by commenters (EPA-HQ-OAR-2018-0794). The analysis included a total of five PM CEMS cost estimates and 11 stack testing cost estimates, each adjusted for statistical outliers. EPA did not include beta gauge instruments in the analysis, presumably because non-beta gauge instruments have been shown by various commenters to have lower associated cost.

RTP's updated PM CEMS cost analysis

RTP presents an updated, revised analysis of the PM CEMS cost data prepared by RTP in 2023 and submitted to the docket by commenters.[37] The revised analysis uses the same assumptions as the original analysis with the following adjustments:

- Annual audit costs were adjusted to reflect an average RRA failure rate of 20% based on an average failure rate determined by EPA.[38]
- Initial monitor certification and annual audit costs assume that extended test runs needed to achieve the minimum sampling requirements in the final rule (4 dscm/run) are only necessary for baseline or low-level test conditions.[39]
- All costs were updated to reflect 2024$ based on the CEPCI

Table B-1 provides a comparison of the Agency's cost analysis used in the final rule with the revised cost analysis prepared by RTP for non-beta gauge monitors. Costs include a breakdown in one-time costs (initial equipment purchase and certification), annual costs (capital recovery, O&M, and routine audits), and the EUAC. The EPA analysis does not clearly identify whether their estimates include the additional costs associated with ash reinjection, although based on the data presented for the Commenters it appears that testing costs may represent the average cost with and without ash reinjection.

The EPA data shows an EUAC of approximately $72,000, which compares to the RTP-calculated EUAC of $83,000 (average with and without ash reinjection). While both

[37] The cost analysis was prepared by RTP Environmental Associates, Inc. and submitted in multiple comment packages. See EPA-HQ-OAR-2018-5971, EPA-HQ-OAR-2018-5971, EPA-HQ-OAR-2018-5971).
[38] *See* RTI Memo.
[39] The rule allows a minimum catch of 6 mg or a minimum sampling volume of 4 dscm/run. Some units may be able to meet the minimum catch requirement with a lower sampling volume although this is a site-specific determination that cannot be accurately accounted for in this analysis.

estimates are similar, the Agency's estimate would likely be much lower if they used the same assumption as RTP that extended test runs would only be needed at baseline or low-level test conditions.

Table B-1 Non-Beta Gauge PM CEMS Costs (EPA Revised Analysis v RTP Revised Analysis)

			RTP Estimate	
		EPA Average	**Average cost (2024$) w/o ash reinjection**	**Average cost (2024$) w/ash reinjection**
One Time Costs	Instrument and Installation		94,647	94,647
	Other Initial Costs		81,504	114,954
	Sum		176,151	209,601
Annual Costs	Capital Recovery	27,983	19,377	23,056
	O&M		19,941	19,941
	Audits		36,159	47,462
	Other Annual Costs			
	Sum	44,342	56,100	67,404
EUAC		**72,325**	**75,476**	**90,460**

RTP also provides an updated cost estimate for beta gauge PM CEMS using these same assumptions. As shown in Table B-2, the average EUAC is $108,000 (average with and without ash reinjection), which supports EPA's determination that beta gauge costs are higher than non-beta gauge instruments.

Table B-2 Beta Gauge PM CEMS Costs (RTP Revised Analysis)

		Average cost (2024$) w/o ash reinjection	**Average cost (2024$) w/ash reinjection**
One Time Costs	Instrument and Installation	204,902	204,902
	Other Initial Costs	81,504	114,954
	Sum	286,406	319,856
Annual Costs	Capital Recovery	31,505	35,184
	O&M	33,039	33,039
	Audits	36,159	47,462
	Other Annual Costs		
	Sum	69,198	80,502
EUAC		**100,702**	**115,686**

RTP also evaluated the stack testing costs used to support the EPA's determination in the proposed repeal. RTP estimates testing costs for both the QST and LEE compliance options based on the analysis submitted to the docket by Commenters 5971, 5974, and

5958[40] (see EPA-HQ-OAR-2018-5971, EPA-HQ-OAR-2018-5971, EPA-HQ-OAR-2018-5971). The RTP analysis uses the same data and assumptions as the original analysis except costs are adjusted for inflation.

EPA's updated cost analysis[41] for annual stack test cost is based on the average of 11 cost estimates provided by Commenters using EPA Method 5. EPA then doubles these costs to reflect the equivalent cost of Method 5I and screens the resulting dataset for outliers. This approach significantly overstates stack testing costs. While Method 5I is an accepted test method according to the MATS rule, the use of paired trains is not used in practice for compliance testing and rarely used for PM CEMS correlation testing. In addition, EPA further overstates cost by assuming that Method 5I costs are double the Method 5 costs. While the method uses dual sampling trains, the sampling trains are operated simultaneously during the same test. Method 5I costs would be less than double the Method 5 costs. Finally, EPA does not identify the sampling volume or test run duration associated with the cost data used in their analysis although the range in costs suggests that it may be a combination of sampling volumes, which may skew testing costs.

Table B-3 provides a comparison of the EPA and RTP's annual stack test costs. EPA estimates an average annual cost of $60,000/year, which is reasonably close to RTP's estimate of $57,000/year. RTP also estimates annual testing costs associated with the LEE compliance ($4,400) which was not addressed by EPA's updated cost analysis. RTP also estimates the impact of cost-sharing for sources which are performing stack testing for fPM in conjunction with HCl stack testing. As presented in Table B-3, consideration of cost-sharing reflects an annual testing cost of $37,500/year for QST and $3,000/year for LEE further demonstrating the cost effectiveness of QST/LEE compliance options.

Table B-3 QST/LEE Costs (EPA Revised Analysis vs. RTP Revised Analysis)

Test Type		Test Run Volume (dscm/run)	Cost/3-Run Test	Site Technical Support	Annual Testing Cost
Quarterly fPM	EPA				60,270
	RTP (2024$)	4	12,745	1,529	57,098
	RTP (w/HCl Cost Sharing) (2024$)	4	8,333	1,529	37,490
LEE fPM	RTP (2024$)	4	11,765	1,529	4,431
	RTP (w/HCl Cost Sharing) (2024$)	4	6,863	1,529	2,797

[40] The cost analysis was prepared by RTP Environmental Associates, Inc. and submitted under multiple comment packages.
[41] Memo from Barrett Parker, EPA, to Docket ID No: EPA-HQ-OAR-2018-0794, *Revised Estimated Non-Beta Gauge PM CEMS and Filterable PM Testing Costs* (Dec. 21, 2023).