June 23, 2023

TO: U.S. ENVIRONMENTAL PROTECTION AGENCY
FR: THE INSTITUTE OF CLEAN AIR COMPANIES
RE: EPA-HQ-OAR-2018-0794-5545

The Institute of Clean Air Companies (ICAC) appreciates the opportunity to offer comments in response to EPA's Proposed Rule to amend the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Coal- and Oil-Fired Electric Utility Steam Generating Units (EGUs), commonly known as the Mercury and Air Toxics Standards (MATS). ICAC is a national trade association of companies that supply greenhouse gas management, air pollution control and monitoring systems, equipment, and services for stationary sources. For 60 years, ICAC member companies have helped to clean the air by developing and installing reliable, cost-effective control and monitoring systems.

We support technology-neutral and flexible policies that enable cost-competitiveness and a diverse set of technologies to compete in the market. ICAC's comments focus on lignite-fired EGUs, the use of fabric filters, PM CEMS, and cost and implementation assumptions.

Again, ICAC appreciates the opportunity to offer comments on this notice of proposed rulemaking, and we look forward to answering any further questions should EPA seek additional information.

Best regards,

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## Introduction

The Institute of Clean Air Companies (ICAC) appreciates the opportunity to respond to the Environmental Protection Agency's (EPA) on EPA's Proposed Rule to amend the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Coal- and Oil-Fired Electric Utility Steam Generating Units (EGUs), commonly known as the Mercury and Air Toxics Standards (MATS).

ICAC is a trade association headquartered in Arlington, VA, and represents more than thirty companies in the air pollution control, greenhouse gas management, and emissions measurement industry. ICAC members have successfully developed and deployed solutions to address emissions challenges for more than 60 years and are uniquely positioned to provide their expertise on emerging clean technologies and advancing clean technology markets. ICAC members have successfully commercialized solutions for the industrial, power, oil and gas, and maritime sectors, and have worked to address challenges that emerge at the nexus of air and water pollution management. Pollutants managed by member technologies include mercury, acid gases, PM, NOx, SOx, VOCs, HAPs, GHGs, HCl, and coal ash. Our members have operations in all fifty states and range from multi-national corporations with thousands of employees to small businesses focused on local emission challenges.

Our current assessment incorporates existing pre-MATS implementation studies updated by post-implementation operational experiences and data. Our combined findings lead us to provide the following comments.

1. The lower mercury emission rate of 1.2 lb/TBtu may not be achievable for lignite-fired units.
2. For fabric filters the 0.01 lb/MMBtu is preferred.
3. The cost for CEMs is outdated and is now higher than presented originally.
4. The costs for sorbent/additive injection are likely underestimated.

## Lignite-Fired EGUs

EPA does not specify the technology for Hg compliance, which is unchanged from the current MATS rule. For lignite-fired EGUs, the proposed Hg emission limit was reduced from 4 lb/TBtu to 1.2 lb/TBtu. For non-lignite-fired coal EGUs, the limit of 1.2 lb/TBtu was left unchanged in the proposal.

EPA's rationale for changing the lignite emission limit was that activated carbon performance has improved since 2011 and currently some lignite units are meeting the 4 lb/TBtu limit with apparently low levels of Hg removal. Thus, there is room to increase Hg removal in lignite units.

Staudt's analysis[1] of data for lignite Hg emissions showed an inverse relationship between Hg emission rate and estimated Hg capture. The lowest emission rates (1-1.25 lb/TBtu) were associated with the highest estimated Hg capture (85%-88%). The highest emission rates (~3.8 lb/TBtu) were associated with 57%-58% estimated Hg capture. That is, the worst-performing units were operating with low Hg removals that are very much less than possible with state-of-the-art control technologies and less than removal levels demonstrated by the best-performing units. The majority of the low-rank virgin coal units already use ACI and could increase their treatment rate to achieve higher Hg capture rates. Staudt estimated that an emission limit of 1 lb/TBtu for lignite-fired units would require less than 95% capture in every case, and in most cases much less. He estimated that the additional operating cost would be less than or equal to 1 mill/kWh. Achieving 1.2 lb/TBtu Hg emissions at a modest cost increase seems reasonable.

The Hg inlet numbers utilized in the proposed rule appear to be underestimated. Fort Union lignite (ND and MT) and Gulf Coast lignite (TX and MS), as reported by USGS in Fact Sheet FS-095-01, are indicated at 14 lbs/TBtu and 27 lbs/Tbtu, respectively. Using the values indicated by the USGS, 2021 removal would be 80%-90%. With the higher Hg inlet numbers, 92% - 98% reduction in the Hg content would be needed to achieve a 1 lb/TBtu. As indicated above, Hg reduction is an inverse relationship between treatment and removal. As the Hg content is reduced, the opportunity for a Hg molecule to become captured by a sorbent is decreased or becomes more challenging. The proposed lower Hg compliance rates may require substantially more chemical to be applied for treatment of the emissions. Furthermore, given the specific mechanisms involved in Hg capture, it is possible that Hg reduction may be maximized and 1.2 lb/TBtu or lower may not be achievable~~,~~ in practice.

**Fabric Filters**

It is ICAC's understanding that the proposed 0.01 lb/MMBtu for fPM, EPA assumes that approximately eight existing ESPs may need physical equipment upgrades to comply with the proposed fPM emission standard. However, certain wet scrubbed units may need to install fabric filters (FF) to meet the 0.01 lb/MMBtu limit.

EPA assumes that to reduce fPM to 0.006 lb/MMBtu or below, fabric filters would be required and that 65 units would need to install a new FF or modify an existing FF to meet the lower revised fPM emission limit. If the fPM limit were lowered to 0.006 lb/MMBtu instead of 0.01 lb/MMBtu, units with ESPs may be required to add FFs.

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[1] Staudt J. *Analysis of PM and Hg Emissions and Controls from Coal-Fired Power Plants*. Andover Technology Partners, 2021. https://www.andovertechnology.com/wp-content/uploads/2021/08/PM-and-Hg-Controls_CAELP_20210819.pdf.

ICAC suggests that the age and retirement date of affected units with ESPs should be considered. If an affected unit is planning to retire soon after the effective date of the proposal, installation of FFs would not be a cost-effective choice for the plant owner, who might choose to shut down the plant early and unnecessarily stress electricity generation supply or capacity. To maximize the flexibility of existing coal-fired units, maintain grid flexibility and to provide flexibility in the electric transmission system, the 0.01 lb/MMBtu standard should be preferred.

**PM CEMS**

To address emissions of certain non-Hg metal HAP, the 2012 MATS rule set individual emission limits for each of the regulated non-Hg metals emitted from coal- and oil-fired EGUs. Alternatively, affected sources were provided opportunity to sum the emission rates of each of the non-Hg metals for demonstrating compliance for "total non-Hg metals". The 2012 MATS rule also allows affected sources to meet a filterable PM (fPM) emission standard as a surrogate for the non-Hg metals.

In the current proposal, once promulgated, EPA's proposal will shift almost all EGUs to PM CEMS; these EGUs will no longer be permitted to use periodic performance stack testing or PM continuous parameter monitoring systems (CPMS) to comply with the fPM emission limit. EPA's proposal also seems to change the PM CEMS minimum sample from 1 dscm to 4 dscm. The exception is that the compliance limits and measurement methods for liquid oil-fired EGUs are left unchanged.

Many EGUs are already using PM CEMS. Appendix C lists 275 EGUs; 38% of those use PM CEMS. Most of the rest use stack testing for PM emission compliance. Existing EGUs that fire coal or solid-oil derived fuel will no longer be permitted to demonstrate compliance with total non-mercury (Hg) HAP metals or individual non-Hg HAP metals emissions limits using stack testing, but instead must meet the fPM limit by using a PM CEMS.

As part of the proposed revision, EGUs will not be permitted to use the low-emitting EGU (LEE) option for compliance demonstration for fPM, total non-Hg HAP metals, or individual non-Hg HAP metals. However, the LEE option can still be used for certain prescriptive circumstances.

ICAC notes that EPA's proposed changes to fPM compliance mean that reducing gas-phase non-Hg HAPs (primarily selenium) would not have an impact on compliance, since gas-phase metals are not measured by PM CEMS.

**Efficiency and Costs Assumptions**

ICAC would like to raise a few points regarding estimates for PM CEMS. We note that in the Federal Register notice, EPA mentions meeting with ICAC to discuss cost estimates for equipment and installation of PM CEMS and attributes numbers to both.

We would suggest that there are more nuances in arriving at cost estimates, such as whether lower-cost paths or higher-end paths are taken, etc., ICAC also observes that EPA does not state explicitly if they included the cost of a PM CEMS in their estimates for compliance costs of individual plants. We see that Jim Staudt's report (cited in the RTR Proposal and entered in the docket[1]) quoted an estimated installed cost of $250,000 for PM CEMS. Our current assessment is that this number is now dated and that a more reasonable assumption is an updated estimated installation cost of $350,000 for PM CEMS. This increased cost can be attributed to ongoing supply chain challenges, requirements for specialized installation and significantly higher cost of project management labor. Furthermore, if PM CEMS becomes the only permitted method for compliance demonstration, several potentially affected sources with which ICAC members have conferred have suggested that redundant monitoring systems may be necessary to maintain acceptable compliance assurance reliability measures.

The document "2023 Technology Review for Coal- and Oil-Fired EGU Source Category" Table 12 and 13 may have underestimated the compliance quantities for the 2021 compliance year. First, we suggest that the chemical additives may be underestimated given that 2021 was the last year of the refined coal production tax credit program. Under the refined coal production tax credit program, refined coal was generally produced by mixing chemicals and/or other additives with conventional coal. The additives applied, specific to affect Hg capture, were intended to increase the proportion of mercury oxides in the exhaust gases from the combustion of coal, such that pollution control technologies may more readily capture Hg from the exhaust. The chemical additives were supplied to the refined coal producer and the power plant combusting the refined coal received the benefit of the chemical treatments based on the stipulated coal process. The quantities of chemical additives provided by the refined coal producers are not included in the estimates. Additionally, it seems likely that the sorbent calculations in Table 12 for 2021 are underestimated by several million pounds. Table A below was prepared to estimate the predicted sorbent used per hour based on the sorbent injection rates in pounds/ MMacf used in Table 12. The formula used to calculate the predicted sorbent rate average hourly pounds sorbent per hour in Table A is:

*Avg sorbent Used (lb/MMacf) x MW of unit X 0.004 MMacf/MW (lignite average conversion) X 60 min/hr X 2021 Plant utilization( %) = Estimated Average Pounds Sorbent per hour*

Based on the recalculation, Table 12 in "2023 Technology Review for the Coal – and Oil-Fired EGU Source Category" underestimated the sorbent usage on the above units by approximately 5.26 million pounds. Table A relies on the generation reported to EIA to calculate the utilization of the plant in 2021, so the plant utilization or how much generation was produced versus what the plant was capable of producing was factored into the sorbent usage.

Table A – Recalculation of Sorbent Usage

| Plant Unit | Avg. Sorbent Injection (lb/MMacf) from Table 11 | Plant Utilization 2021% of production (EIA Coal Generation) | Predicted Average Sorbent Used (lb/hr) | | Reported Avg Sorbent (lb/hr) Table 11 |
|---|---|---|---|---|---|
| Spiritwood Station 1 | 4.0 | 20 | 19 | | 13.2 |
| Leland Olds 1 | 3.9 | 55 | 111 | | 45.0 |
| Leland Olds 2 | 2.5 | 40 | 106 | | 55.0 |
| Milton R Young 2 | 1.6 | 71 | 130 | | 43.0 |
| Milton R Young 1 | 1.3 | 67 | 53 | | 19.0 |
| Major Oak Power 1 | 1.9 | 69 | 55 | | -- |
| Major Oak Power 2 | 1.9 | 83 | 66 | | -- |
| Red Hills Generating Facility 1 | 2.6 | 61 | 98 | | 36.0 |
| Red Hills Generating Facility 2 | 2.4 | 61 | 90 | | 36.0 |
| Oak Grove 1 | 0.1 | 81 | 18 | | 8.0 |
| Oak Grove 2 | 0.3 | 76 | 48 | | 17.0 |
| San Miguel 1 | 2.7 | 53 | 141 | | 59.5 |

Since the quantities of sorbent and chemical additives may have been underestimated, it is possible that the estimated 2021 costs are also underestimated. Therefore, the cost of compliance with the proposed 1.2 lb/Tbtu is underestimated.

**Conclusion**

The promulgation of an incrementally more stringent fPM standard to reduce emissions of total non-mercury (Hg) HAP metals or individual non-Hg HAP metals emissions limits may be warranted. Such consideration of increasingly stringent health-protective standards should be advised by not only the current performance of the fleet of affected sources but by the risk posed to the “maximum exposed individual” for continued exposure of total non-mercury (Hg) HAP metals or individual non-Hg HAP metals emissions. With EGUs in operation under the MATS rule since 2016, much operational experience and updated data have been incorporated into ICAC’s comments for EPA to consider:

1. The lower mercury emission rate of 1.2 lb/TBtu may not be achievable for lignite-fired units.
2. For fabric filters the 0.01 lb/MMBtu is preferred.
3. The cost for CEMs is outdated and is now higher than presented originally.
4. The costs for sorbent/additive injection are likely underestimated.

ICAC remains committed to regulatory actions that support environmental stewardship and protect human health. ICAC member companies are proud of their role in helping to clean the air by developing and installing reliable, cost-effective control and monitoring systems that have enabled compliance with environmental requirements. In addition to mercury, ICAC has achieved reductions across a broad range of pollutants, including NOx, SOx and particulate matter, as well as VOCs, acid gases and a host of other toxic air pollutants. ICAC would welcome the opportunity to meet with EPA to address discrepancies in cost estimates for PM CEMS equipment and installation or clarify any issue raised in these comments. We stand ready to assist EPA in further cost-effective air pollution reduction efforts and in developing the most accurate and reliable monitoring systems for air pollutants.