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Andrew Wheeler, Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460
Attention: Docket ID No. EPA–HQ–OAR–2018–0794

Re: National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units—Reconsideration of Supplemental Finding and Residual Risk and Technology Review

Dear Administrator Wheeler:

The Northeast States for Coordinated Air Use Management (NESCAUM) offer the following comments on the U.S. Environmental Protection Agency's (EPA's) Proposed Rule "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units—Reconsideration of Supplemental Finding and Residual Risk and Technology Review" [84 Fed. Reg. 2670-2704 (February 7, 2019)] (*hereinafter* the "Reconsideration Proposal"). NESCAUM is the regional association of air pollution control agencies representing Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

<u>Overview</u>

The EPA's Reconsideration Proposal to find that it is not "appropriate and necessary" to regulate hazardous air pollutant (HAP) emissions from coal- and oil-fired Electric Utility Steam Generating Units (EGUs) is seriously flawed because it does not provide a full and fair accounting of the benefits associated with implementation of the original Mercury and Air Toxics Standards (MATS) rule. It also grossly overstates the rule's actual costs, which are now of historical record.

In the Reconsideration Proposal, EPA has employed a cost-benefit methodology that is incapable of fully considering the benefits of controlling HAPs from coal- and oil-fired EGUs. In applying this methodology, EPA implicitly and without foundation assigns a value of zero to difficult-to-monetize benefits from reductions in air toxics. Instead, EPA asserts there is a "gross imbalance of monetized costs and HAP benefits" that justifies its now reconsidered decision to withdraw its previous "appropriate and necessary" finding.[1] EPA is only able to find a "gross imbalance" by doing (erroneously) what it says it cannot do – fully monetizing the associated health and environmental benefits of the rule. For all intents and purposes, EPA assigns a value of zero to all benefits outside the restricted confines of "Avoided IQ loss associated with methylmercury

[1] 84 Fed. Reg. 2670-2704 (February 7, 2019), at 2677.

exposure from self-caught [freshwater] fish consumption among recreational anglers."[2]

As we document later in these comments, it is well known in the health and environmental research community that there are significant additional and real health and ecosystem benefits from reduced exposure to mercury and other air toxics emitted by coal- and oil-fired EGUs. A cost-benefit methodology that considers the majority of these health and environmental benefits as having no intrinsic value is on its own terms too limited in scope and of little use for informed decision-making.[3]

In EPA's previous "appropriate and necessary" finding, as well as in the states' own practices in setting power plant mercury emission limits prior to the promulgation of MATS, there are other more valid approaches for assessing the costs and benefits of reducing air toxics from power plants. EPA should return to its previous "appropriate and necessary" finding that relied on more appropriate methods to evaluate the costs and benefits from reducing air toxics from coal- and oil-fired EGUs.

For the reasons given in these comments, EPA should withdraw its Reconsideration Proposal and keep in place its previous "appropriate and necessary" finding for the MATS rule.[4] The prior finding was established with a fuller set of considerations and hewed more closely to long-accepted guidelines and best-practices in environmental rulemakings.

I. EPA's Reconsideration Proposal does not adequately account for the non-monetized benefits of reductions in HAP exposures associated with implementation of the MATS rule.

The Reconsideration Proposal dismisses the validity of the "cost reasonableness test" to evaluate whether the costs associated with complying with the MATS requirements are reasonable. This was one of the methods used in the EPA's 2016 "Supplemental Finding That It Is Appropriate and Necessary To Regulate Hazardous Air Pollutants From Coal- and Oil-Fired Electric Utility Steam Generating Units" [81 Fed. Reg. 24420 – 24452 (April 25, 2016)] (*hereinafter* 2016 Supplemental Finding). In the current Reconsideration Proposal, EPA states that the cost reasonableness test "failed to consider cost in a meaningful way relative to benefits."

NESCAUM strongly disagrees with EPA's dismissal of the validity of the cost reasonableness test. That test analyzed the reasonableness of costs using several independent metrics and

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[2] U.S. EPA, *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards*, EPA-452/R-11-011 (December 2011). *See* Table ES-4, p. ES-6.

[3] Notwithstanding EPA's December 14, 2018 Memorandum to the docket *Compliance Cost, HAP Benefits, and Ancillary Co-Pollutant Benefits for "National Emission Standards for Hazardous Air Pollutants: Coal-and Oil-Fired Electric Utility Steam Generating Units -- Reconsideration of Supplemental Finding and Residual Risk and Technology Review,"* an assignment of the letter "B" to unquantified benefits is not an adequate substitute for more thoughtful analyses.

[4] 81 Fed. Reg. 24420-24452 (April 25, 2016).

weighed those costs against both monetized and non-monetized benefits associated with the HAP reductions in the MATS rule. Meaningful consideration of non-monetized benefits is essential to this analysis.

Available information on monetized benefits and costs is typically asymmetrical. While the regulated community has strong incentives and deep resources to estimate compliance costs (and, as noted later, typically overestimates costs), it has no such incentive to monetize public benefits that it does not earn a return on. While government can help fill this information imbalance, it often lacks the resources to do so. Furthermore, benefits that accrue over long time periods or are widely disbursed and difficult to directly link to a unique causal factor at a specific point in time may be overly discounted or completely ignored. This is exactly what EPA does in the Reconsideration Proposal.

Prior to MATS implementation, a number of states applied approaches consistent with a "cost reasonableness" test in adopting their own mercury power plant limits as part of multi-pollutant state regulations. Power plant rules in Delaware,[5] Maryland,[6] Massachusetts,[7] New Jersey,[8] New York,[9] and Wisconsin[10] are illustrative of the cost considerations taken by these states. States recognized a broad range of public health and environmental benefits from their rules, and considered these often as part of multi-pollutant programs that included control cost considerations for sulfur dioxide and nitrogen oxides.

The U.S. Office of Management and Budget's (OMB's) guidance on regulatory analyses clearly supports serious consideration of all benefits, including those that cannot be monetized. The OMB's 2003 Circular A-4 notes that "When important benefits and costs cannot be expressed in

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[5] Delaware Department of Natural Resources & Environmental Control, Division of Air & Waste Management, Air Quality Management Section, *Technical Support Document for Proposed Regulation No. 1146, Electric Generating Unit (EGU) Multi-Pollutant Regulation*, September 2006 (pp. 47-56). Available at: http://www.dnrec.delaware.gov/dwhs/Info/Regs/Documents/8969c5c8305d44318a38de77339cdf66multi_p_TechSptDoc1.pdf.

[6] Maryland Department of the Environment, *Technical Support Document for Proposed COMAR 26.11.27, Emission Limitations for Power Plants*, December 26, 2006 (pp. 36-41). Provided by the Maryland Department of the Environment and included as an attachment to these comments.

[7] Massachusetts Department of Environmental Protection, Bureau of Waste Prevention, Division of Planning and Evaluation, *Evaluation of the Technological and Economic Feasibility of Controlling and Eliminating Mercury Emissions from the Combustion of Solid Fossil Fuel*, December 2002. Available at: www.mass.gov/eea/docs/dep/toxics/stypes/mercfeas.pdf.

[8] New Jersey Register, *Air Pollution Control: Control and Prohibition of Mercury Emissions*, Vol. 36, No. 1, 123(a), January 5, 2004 (available on-line via LexisNexis® at http://www.lexisnexis.com/njoal/).

[9] New York State Department of Environmental Conservation, 6 NYCRR Part 246, *Mercury Reduction Program for Coal-Fired Electric Utility Steam Generating Units*, 6 NYCRR Part 200.9, *Referenced Material Revised Regulatory Impact Statement*, 2006. Available upon request from the New York State Department of Environmental Conservation and included as an attachment to these comments.

[10] Wisconsin Department of Natural Resources, Bureau of Air Management, *Factsheet on Rule to Control Mercury Emissions from Coal-Fired Power Plants*, revised August 2008. Available at: http://dnr.wi.gov/files/PDF/pubs/am/AM392.pdf.

monetary units, benefit-cost analysis is less useful, and it can even be misleading, because the calculation of net benefits in such cases does not provide a full evaluation of all relevant benefits and costs."[11]

The final MATS RIA in 2011 identifies a range of health and environmental impacts associated with exposure to mercury and other HAPs emitted by EGUs. However, that analysis monetizes benefits for only one health endpoint, loss of IQ points in children who were exposed prenatally to methylmercury (MeHg) via maternal ingestion of self-caught freshwater fish. The RIA states that it focused on that endpoint because of "the availability of thoroughly-reviewed, high-quality epidemiological studies assessing IQ or related cognitive outcomes suitable for IQ estimation, and the availability of well-established methods and data for economic valuation of avoided IQ deficits."[12]

The RIA does not quantify the benefits associated with reducing HAP exposures via other exposure routes or with other health and environmental endpoints. Mercury emitted from EGUs can be transported over long distances, causing widespread contamination. When it is deposited into waterbodies, it is converted to MeHg, a highly toxic and persistent form of mercury that bioconcentrates in fish. Therefore, a large portion of the fish-eating U.S. population is exposed to mercury emitted by EGU facilities.

Important fish-related human exposure routes cited in the RIA but not included in the monetized analysis in that document include:

- Ingestion of self-caught saltwater fish;
- Ingestion of commercially purchased fresh and saltwater fish; and
- Post-natal ingestion of fish by children.

The RIA states that EPA did not attempt to evaluate benefits for saltwater fish because, in its view, it is difficult to determine the source of methylmercury in those fish, hence an exposure connection to U.S. power plants.[13] However, it is essential that this pathway, as well as commercially purchased fish, be included in the benefit analysis, because most of the U.S. population ingests fish in those categories.

A 2005 NESCAUM analysis calculated that the health benefits to the public associated with reduced EGU mercury emissions would be as high as $4.9 billion (2000$) per year.[14] This

[11] Office of Management and Budget (OMB), *Circular A-4: Regulatory Analysis*, 2003, p. 10.
[12] U.S. EPA, *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards*, EPA-452/R-11-011 (December 2011), p. 4-30.
[13] U.S. EPA, *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards*, EPA-452/R-11-011 (December 2011), Chapter 4.
[14] NESCAUM, *Economic Valuation of Human Health Benefits of Controlling Mercury Emissions from U.S. Coal-Fired Power Plants*, Boston, MA (February 2005). Available at: http://www.nescaum.org/documents/rpt050315mercuryhealth.pdf.

analysis, which included health endpoints (e.g., cardiovascular effects and premature mortality) and exposure pathways (e.g., ocean-caught fish) that were not included in the RIA analysis, assumed a power plant mercury emissions cap of 26 tons per year, based on an earlier EPA proposal in 2002. Because EPA's final MATS rule resulted in a four-fold greater decrease in power plant mercury emissions below NESCAUM's assumed 26 tons per year, the full health benefits of MATS would be even larger than suggested by NESCAUM's 2005 estimates.

A recent study convincingly linked mercury air emissions and mercury levels in saltwater fish tissue. The researchers reported that the concentration of mercury in bluefish collected off the North Carolina coast in 2011 was 43% lower than the concentration measured in 1972 and noted that this reduction, approximately 10% per decade, "is similar to estimated reductions of mercury observed in atmospheric deposition, riverine input, seawater, freshwater lakes, and freshwater fish across northern North America." The authors also cited eight additional studies conducted between 1973 and 2007 that confirm the decrease in mercury levels in bluefish captured in the MidAtlantic Bight (defined as the continental shelf waters from Cape Cod, Massachusetts, to Cape Hatteras, North Carolina) with decreasing U.S. mercury air emissions.[15]

The study's authors concluded that reductions in mercury air releases across northern North America were reflected in the decline of mercury in bluefish and, assuming that bluefish are representative of other marine predators, the reduced mercury releases are reducing the public's mercury intake via marine fish. These reductions may have the largest benefit for women living in Atlantic coastal areas, who have, on average, higher mean mercury blood levels than other U.S. women of child-bearing age, as documented in the National Health and Nutrition Examination Survey.[16]

Consistent with the bluefish findings, another study found declining mercury concentrations in bluefin tuna in the Northwest Atlantic Ocean, and the declines paralleled decreases in North American mercury emissions being exported to the North Atlantic.[17] Because tuna species collectively provide more mercury (~40%) to the U.S. population than any other source,[18] it is clear that there will be significant health and economic benefits associated with saltwater fish consumption that come from reducing U.S. power plant mercury emissions.

As discussed above, loss of IQ points was the only health effect that was monetized in the final 2011 MATS RIA. The RIA, however, identified several additional health effects that have been

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[15] Cross *et al.*, Decadal Declines of Mercury in Adult Bluefish (1972–2011) from the Mid-Atlantic Coast of the U.S.A., 49 *Environ. Sci. Technol.* 9064–9072 (2015), DOI: 10.1021/acs.est.5b01953.
[16] Cusack *et al.,* Regional and Temporal Trends in Blood Mercury Concentrations and Fish Consumption in Women of Child Bearing Age in the United States Using NHANES Data from 1999–2010, 16 *Environ. Health* 10-20 (2017), DOI 10.1186/s12940-017-0218-4.
[17] Lee *et al.*, Declining Mercury Concentrations in Bluefin Tuna Reflect Reduced Emissions to the North Atlantic Ocean, 50 *Environ. Sci. Technol.* 12825-12830 (2016), DOI: 10.1021/acs.est.6b04328.
[18] Sunderland, Mercury exposure from domestic and imported estuarine and marine fish in the U.S. seafood market, 115 *Environ. Health Perspect.* 235−242 (2007).

linked to exposure to mercury and other HAPs associated with EGU emissions. Those non-monetized health effects include:[19]

- Other neurological effects associated with exposures to MeHg, including impacts on motor skills and attention/behavior, sensory effects and effects on brain development and memory functions;
- Immune, cardiovascular and other systemic health effects; and
- Possible genotoxic and carcinogenic effects. Note that the World Health Organization's International Agency for Research on Cancer (IARC) classifies MeHg as "possibly carcinogenic to humans."

The cardiovascular effects of ingestion of MeHg are particularly critical. In 2011, a group of experts convened by the EPA found "the body of evidence exploring the link between MeHg and acute myocardial infarction (MI) to be sufficiently strong to support its inclusion in future benefits analyses, based both on direct epidemiological evidence of an MeHg–MI link and on MeHg's association with intermediary impacts that contribute to MI risk."[20] Note that MeHg levels correlate well with levels of heart protective omega-3 fatty acids in fish.[21] That correlation has made the development of quantitative risk factors for the MeHg-MI link from epidemiological studies more challenging. However, as discussed below, monetizing MI reductions associated with reduction in MeHg exposures would significantly increase the quantified benefits associated with the rule.

The RIA also documents, but does not attempt to monetize, the impact of mercury on wildlife. Those impacts include:

- Impacts on insectivorous terrestrial species such as songbirds, bats, spiders, and amphibians;
- Reproductive effects, including deficits in sperm and egg formation, histopathological changes in testes and ovaries, and disruption of reproductive hormone synthesis in several fish species, including trout, bass (large and smallmouth), northern pike, carp, walleye and salmon;
- Significant adverse effects in breeding loons, including behavioral (reduced nest-sitting), physiological (flight feather asymmetry), and reproductive (chicks fledged/territorial pair) effects and reduced survival; and
- Effects on the white ibis and other piscivorous bird species, including decreased foraging efficiency, decreased reproductive success and altered pair behavior,

[19] U.S. EPA, *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards*, EPA-452/R-11-011 (December 2011), Chapter 4.
[20] Roman *et al.*, Evaluation of the Cardiovascular Effects of Methylmercury Exposures: Current Evidence Supports Development of a Dose–Response Function for Regulatory Benefits Analysis, 119 *Environ. Health Perspect.* 607–614 (2011).
[21] Mahaffey *et al.*, Methylmercury and Omega-3 Fatty Acids: Co-occurrence of Dietary Sources with Emphasis on Fish and Shellfish, 107 *Environ. Res.* 20–29 (2018).

resulting in a reduction in fledglings.

Mercury contamination of fishing areas has led many states, including the NESCAUM member states, to issue widespread fish consumption advisories.[22] Deposition of atmospheric mercury contributes substantially to the mercury levels in those waterbodies. Advisories warn residents, particularly women of child bearing age, to avoid or severely curtail fish consumption. Such advisories often require people to choose between forgoing this important, affordable source of protein and risking the toxic effects of mercury. Wildlife are not able to choose to avoid these exposures.

As with many of the human health effects, monetization of wildlife benefits from reductions in mercury emissions is not straightforward. However, EPA would be negligent if it did not utilize a method like the cost reasonableness test used in the 2016 Supplemental Finding to fully consider the body of evidence that links mercury emissions and significant non-monetized effects on human health and wildlife. Note that the OMB guidance states that, "It will not always be possible to express in monetary units all of the important benefits and costs. When it is not, the most efficient alternative will not necessarily be the one with the largest quantified and monetized net-benefit estimate." In this situation, lack of consideration of all health and environmental benefits associated with the reconsidered "appropriate and necessary" finding, including those benefits that are not monetized, is leading EPA to propose a dangerous decision regarding the MATS rule.

II. EPA should include more recent information on the monetized benefits to human health and the environment associated with the "appropriate and necessary" finding.

In this Reconsideration Proposal, EPA does not revisit the state-of-science since its 2011 final MATS RIA. More recent analyses monetizing the benefits of the reductions in exposures to MeHg associated with EGU emissions yield benefit estimates that are considerably higher than those presented in the 2011 RIA. These analyses include:

- Societal costs associated with exposure to MeHg in the U.S., including costs borne by the health care system, by the individual and the household, and by employers and insurers – these were calculated to be $4.8 billion per year.[23]
- Using a probabilistic model, researchers calculated that a 10% reduction in the U.S. population's exposure to MeHg would be associated with a savings of $860 million per year, based on reductions in fatal heart attacks and IQ gains.[24]

[22] *See* U.S. EPA, *State, Territory and Tribe Fish Advisory Contacts*, https://fishadvisoryonline.epa.gov/Contacts.aspx (accessed February 26, 2019).
[23] Grandjean and Bellanger, Calculation of the Disease Burden Associated with Environmental Chemical Exposures: Application of Toxicological Information in Health Economic Estimation, 16 *Environ. Health* 123 (2017), DOI: 10.1186/s12940-017-0340-3.
[24] Rice *et al.*, A Probabilistic Characterization of the Health Benefits of Reducing Methyl Mercury Intake in the

NESCAUM strongly urges EPA to incorporate the more recent scientific knowledge to ensure that best current practices are utilized for analyzing the benefits of the MATS reductions and to ensure that all currently quantifiable exposure routes and health endpoints are considered.

III. Accounting for co-benefits is a standard and important part of any cost-benefit analysis.

In addition to the cost reasonableness test discussed above, EPA's 2016 Supplemental Finding included a formal cost-benefit analysis.[25] That analysis found that the monetized benefits associated with implementation of the MATS rule far outweighed the costs of compliance. In the 2016 Supplemental Finding, EPA stated that the results of this formal cost-benefit analysis provide further evidence that regulating EGUs is "appropriate and necessary."

In the current Reconsideration Proposal, EPA is proposing to reverse that finding because the majority of the monetized benefits calculated in the cost-benefit analysis are "co-benefits" associated with reductions in non-HAP emissions. Specifically, most of the monetized benefits in the 2016 Supplemental Finding's formal cost-benefit analysis are associated with reductions in the formation of atmospheric fine particular matter ($PM_{2.5}$).

NESCAUM strongly supports the inclusion of all benefits, including co-benefits, in all regulatory analyses. Failure to fully consider co-benefits in cost-benefit analyses disregards important and fundamental factors that are standard in regulatory rulemaking assessments.

A. Ignoring co-benefits conflicts with OMB guidelines on conducting regulatory cost-benefit analysis.

The EPA's stance in the Reconsideration Proposal to ignore co-benefits contradicts OMB's Circular A-4 guidelines on conducting cost-benefit analysis, which state:

> Your analysis should look beyond the direct benefits and direct costs of your rulemaking and consider any important ancillary benefits and countervailing risks. An ancillary benefit is a favorable impact of the rule that is typically unrelated or secondary to the statutory purpose of the rulemaking (e.g., reduced refinery emissions due to more stringent fuel economy standards for light trucks) while a countervailing risk is an adverse economic, health, safety, or environmental consequence that occurs due to a rule and is not already accounted for in the direct cost of the rule (e.g., adverse safety impacts from more stringent fuel-economy standards for light trucks).
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> You should begin by considering and perhaps listing the possible ancillary benefits and countervailing risks. However, highly speculative or minor consequences may not be

United States, 44 *Environ. Sci. Technol*. 5216-5224 (2010).
[25] 81 Fed. Reg. 24420-24452 (April 25, 2016).

> worth further formal analysis. Analytic priority should be given to those ancillary benefits and countervailing risks that are important enough to potentially change the rank ordering of the main alternatives in the analysis. In some cases the mere consideration of these secondary effects may help in the generation of a superior regulatory alternative with strong ancillary benefits and fewer countervailing risks. For instance, a recent study suggested that weight-based, fuel-economy standards could achieve energy savings with fewer safety risks and employment losses than would occur under the current regulatory structure.[26]

This position was reiterated in draft guidance issued by OMB in 2017, which stated that "The consideration of co-benefits, including the co-benefits associated with reduction of particulate matter, is consistent with standard accounting practices and has long been required under OMB Circular A-4."[27]

B. Standard practice in good utility resource planning also includes consideration of co-benefits.

Similar to EPA's failure to follow OMB guidelines, EPA's cost-benefit approach is also not consistent with good practice in utility resource planning. According to a 2015 menu of options developed by the Regulatory Assistance Project for the National Association of Clean Air Agencies (NACAA), good utility planning should examine a suite of impacts that come from electricity generation, transmission and delivery – including all environmental impacts, those easily monetized and those that must be approximated. Each of the 26 chapters in the menu "looks at co-benefits of the approach, including benefits to society and the utility system. Costs and cost-effectiveness are also explored."[28]

Many state and regional authorities use a form of integrated resource planning (IRP) requiring their utilities to take a periodic systematic approach to their future needs for generation and demand resources. These efforts document the lowest cost resources from various perspectives. For example, the Tennessee Valley Authority's (TVA's) process for developing its recent draft IRP focuses on "ensuring that the final plan is low-cost, risk-informed, environmentally responsible, reliable, diverse and flexible."[29] The TVA draft IRP considers 14 metrics within its draft plan, and system cost is only one of multiple factors, including considerations of risk, environmental stewardship, operational flexibility, and the macroeconomic effects in the region TVA serves.

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[26] Office of Management and Budget (OMB), *Circular A-4: Regulatory Analysis* (2003), p. 26.
[27] Office of Management and Budget (OMB), *2017 Draft Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act* (2017), p. 13.
[28] NACAA, *Implementing EPA's Clean Power Plan: A Menu of Options*, Washington, DC (May 25, 2015), at ES-1. Available at http://www.4cleanair.org/sites/default/files/Documents/NACAA_Menu_of_Options_HR.pdf.
[29] TVA, *2019 Integrated Resource Plan - Draft*, Chattanooga, TN (February 2019), at ES-2. Available at https://www.tva.gov/file_source/TVA/Site%20Content/Environment/Environmental%20Stewardship/IRP/2019%20Documents/TVA%20Draft%20IRP%20Vol%20I-reduced.pdf.

C. Reductions in $PM_{2.5}$ are a direct benefit of reducing most metal HAPs under MATS.

Finally, we point out that the metal HAPs covered by the MATS rule, with the exception of mercury, are controlled using particulate control equipment. Because many of the metal HAPs are physically incorporated into $PM_{2.5}$ emitted by the EGUs, the controls needed to reduce those HAPs by necessity reduce $PM_{2.5}$.[30] The $PM_{2.5}$ reductions, therefore, are a direct result of the installation of control technologies to reduce metal HAPs. For that reason alone, it is entirely logical and appropriate to include the benefits of $PM_{2.5}$ reductions in the "appropriate and necessary" finding.

IV. EPA overstates the costs of EGU HAPs controls, which are now sunk costs and part of the historical record.

A. Actual control costs for power plants to comply with MATS are less than given by EPA.

The technology cost estimates cited in the Reconsideration Proposal, which were developed in 2011 prior to implementation of the MATS rule, overstate actual compliance costs. A retrospective analysis of MATS compliance costs by industry representatives estimated those costs to be about $2 billion annually, which is less than one-quarter of EPA's prospective annual cost estimate of $9.6 billion.[31] According to that retrospective analysis, a number of factors contributed to the substantially lower actual compliance costs:

1) Improved dry sorbent injection and activated carbon injection technologies at significantly lower costs;
2) Significantly lower natural gas prices than EPA estimated; and
3) Less generation capacity installing fabric filters, dry flue gas desulfurization (FGD) systems, and wet FGD upgrades than EPA estimated.

It is not unusual for the actual costs of complying with air pollution regulations to be substantially lower than pre-compliance estimates. In 2000, NESCAUM undertook a retrospective review of several air pollution programs and found a repeated pattern of high EPA cost estimates and much higher industry cost projections (often by a factor of two or more) as rules were promulgated, with lower actual compliance costs once the programs were implemented.[32]

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[30] NESCAUM, *Control Technologies to Reduce Conventional and Hazardous Air Pollutants from Coal-Fired Power Plants*, Boston, MA (March 31, 2011). Available at http://www.nescaum.org/documents/coal-control-technology-nescaum-report-20110330.pdf/.

[31] *White Stallion Energy Center, LLC v. EPA*, D.C. Circuit Case No. 12-1100, Motion of Industry Respondent Intervenors to Govern Future Proceedings, filed September 24, 2015 (*see* Declaration of James E. Staudt and accompanying exhibits).

[32] NESCAUM, *Environmental Regulation and Technology Innovation: Controlling Mercury Emissions from Coal-Fired Boilers*, Boston, MA (September 2000). Available at: http://www.nescaum.org/documents/rpt000906mercury_innovative-technology.pdf.

Because EGUs have already complied with the MATS rule, compliance costs are now known and actual, rather than projected. The Reconsideration Proposal ignores the known costs of the now wide-spread compliance with MATS and instead simply repeats pre-compliance overestimates from 2011.

B. Because EGUs have already complied with the MATS rule, any evaluation of present and future costs should consider amortized capital expenses associated with the purchase and installation of controls as a baseline expense.

The initial MATS compliance deadline was April 16, 2015. According to the U.S. Energy Information Administration (EIA), coal-fired plants with a total capacity of 87 GW installed pollution control equipment and nearly 20 GW of coal capacity was retired by that date. The EPA granted one-year extensions to coal plants with a total capacity of 142 GW, which allowed those facilities to operate until April 2016 while finalizing compliance strategies.

An additional one-year extension, to April 2017, was granted to five plants with a combined capacity of 2.3 GW to ensure electric reliability. Two of the five plants were retired, one converted to natural gas, and one installed MATS-compliant controls by that date. The remaining plant, Oklahoma's Grand River Energy Center, was given another emergency extension, to July 2017, for reliability issues,[33] and complied with MATS in 2017.[34]

Incremental compliance costs cited in the current Reconsideration Proposal were developed in the Regulatory Impact Analysis (RIA) for the final MATS rule in 2011. The RIA characterizes those costs as follows:

> The annual incremental cost is the projected additional cost of complying with the final rule in the year analyzed, and includes the amortized cost of capital investment (at 6.15%) and the ongoing costs of operating additional pollution controls, investments in new generating sources, shifts between or amongst various fuels, and other actions associated with compliance.[35]

Because EGUs have already incurred the costs associated with capital investments to comply with MATS requirements, amortization of those costs is not dependent on future actions relative to the rule and should be considered as baseline expenses in any current or future cost analyses.

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[33] U.S. EIA, Coal Plants Installed Mercury Controls to Meet Compliance Deadlines, *Today in Energy* (September 18, 2017), https://www.eia.gov/todayinenergy/detail.php?id=32952#.
[34] U.S. EIA, 2017 Form EIA-860 Data – Schedule 6B, Emission Standards and Control Strategies, (September 13, 2018), https://www.eia.gov/electricity/data/eia860/.
[35] U.S. EPA, *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards*, EPA-452/R-11-011 (December 2011), Chapter 3.

V. The MATS rule, in concert with State rules, has successfully reduced mercury exposures due to EGU emissions without causing undue hardships.

According to EPA Toxic Release Inventory (TRI) data, on-site EGU mercury air emissions decreased by 86% between 2006 and 2016.[36] A number of states adopted their own power plant mercury controls prior to MATS, with the decrease in on-site EGU mercury air emissions becoming particularly dramatic in the years leading up to the MATS compliance dates. Mercury emissions from EGUs in 2016 (13,880 pounds) were 34% of those in 2014 (40,820 pounds).

Those reductions in mercury air emissions are partially attributable to decreased coal burning. According to TRI, net electricity generation from coal decreased by 38% between 2006 and 2016. However, a more substantial portion of the mercury emissions reduction was due to installation of emissions controls. The TRI reports that the rate of release of mercury to air per GWh of electricity generated from coal dropped 77% during that period.[37]

Several studies, which are summarized in Sunderland *et al.*[38] have documented substantial declines in domestic atmospheric and ecologic mercury concentrations attributable to reductions in U.S. mercury emissions. Those studies include the following:

- Atmospheric mercury and sulfur dioxide were measured at a site in a relatively pristine area in western Maryland >50 km downwind of EGUs in Ohio, Pennsylvania and West Virginia from 2006 to 2015. Annual average atmospheric levels of gaseous oxidized mercury, sulfur dioxide, fine particulate mercury and gaseous elemental mercury declined by 75, 75, 43 and 13%, respectively, during that period and were strongly correlated with EGU mercury emissions in the upwind states.[39]
- Core sediment samples taken from the Great Lakes and nearby lakes showed a 20% mean decline in mercury accumulation attributable to domestic emissions reductions.[40]
- Mercury concentrations in largemouth bass and yellow perch in lakes in a mercury hotspot area of Massachusetts showed declines of 44 and 43% between 1999 and 2011, a period with major reductions in mercury air emissions from combustion sources in that area.[41]

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[36] U.S. EPA, *Electric Utilities Mercury Releases in the 2016 TRI (Toxics Release Inventory) National Analysis*, (January 2018). Available at: https://www.epa.gov/trinationalanalysis/electric-utilities-mercury-releases-2016-tri-national-analysis (accessed February 25, 2019).
[37] *Ibid.*
[38] Sunderland *et al.*, Benefits of Regulating Hazardous Air Pollutants from Coal and Oil-Fired Utilities in the United States, 50 *Environ. Sci. Technol.* 2117-2120, (2016).
[39] Castro *et al.*, Effectiveness of Emission Controls to Reduce the Atmospheric Concentrations of Mercury, 49 *Environ. Sci. Technol.* 14000-14007 (2015).
[40] Drevnick *et al.*, Spatial and Temporal Patterns of Mercury Accumulation in Lacustrine Sediments across the Laurentian Great Lakes Region, 161 *Environ. Pollut.* 252-260 (2012), DOI: 10.1016/j.envpol.2011.05.025.
[41] Hutcheson *et al.*, Temporal and Spatial Trends in Freshwater Fish Tissue Mercury Concentrations Associated with

- As discussed above, marked decreases in saltwater fish were also documented in Atlantic coastal fisheries in response to decreases in mercury emissions.[42]

Together, these studies demonstrate the effectiveness of the MATS rule, in concert with state rules, in reducing atmospheric mercury and mercury deposition to U.S. ecosystems that have resulted in lower human and ecological exposures to this persistent bioaccumulate highly toxic substance. Furthermore, the historical record in the states that adopted mercury standards in rulemakings prior to MATS, and now with full implementation of MATS itself, renders it self-evident that the control costs did not impose an unreasonable burden on the covered power plants, did not cause a drastic rise in electricity rates, and did not undermine electric grid reliability.

VI. EPA should not stablish a subcategory for emissions of acid gas HAP from existing EGUs firing eastern bituminous coal refuse.

In its October 2018 testimony to a joint legislative committee, the Appalachian Region Independent Power Producers Association (ARIPPA), which represents refuse coal-fired EGUs in Pennsylvania and West Virginia, advocated for a variety of economic measures that would make the continued operation of those facilities economically viable. The testimony identified several marketplace challenges faced by that industry and stated that "Competition from low-priced natural gas and subsidized renewables has driven wholesale electricity prices in the [regional grid system] down dramatically in recent years. […] Consequently, the price we can receive for our commodity is significantly below the cost to produce it."[43]

Among other economic remedies identified in the testimony, ARIPPA asked for a relaxation of the MATS emissions standards as they apply to EGUs burning coal refuse. According to ARIPPA, "All coal refuse-fired electric generating units in Pennsylvania qualify as mercury and particulate matter low emitting electric generating units as specified by the MATS rule requirements. However, four Pennsylvania plants consuming bituminous coal refuse are unable to comply with the regulation's [hydrogen chloride] and [sulfur dioxide] acid gas requirements." The testimony goes on to say that, "(b)y removing coal refuse piles from the environment, reclaiming the sites to productive uses and using the refuse as an alternative fuel for the production of electricity, the coal refuse to energy industry provides a range of environmental, economic, and societal benefits to the Commonwealth."[44]

Mercury Emissions Reductions, 48 *Environ. Sci. Technol.* 2193-2202 (2014).

[42] Cross *et al.*, Decadal Declines of Mercury in Adult Bluefish (1972–2011) from the Mid-Atlantic Coast of the U.S.A., 49 *Environ. Sci. Technol.* 9064–9072 (2015), DOI: 10.1021/acs.est.5b01953.

[43] Comments of J. Gibbons, Appalachian Region Independent Power Producers Association (ARIPPA), to the Joint Legislative Air and Water Pollution Control and Conservation Committee, Pennsylvania General Assembly (October 4, 2018). Available at http://arippa.org/wp-content/uploads/2018/12/J.Gibbons-Testimony-10-4-18.pdf (accessed February 27, 2019).

[44] *Ibid*.

NESCAUM is aware of the environmental impacts associated with the waste coal piles located throughout historical coal-mining areas, including leaching of metals and acids into nearby waterways and the propensity for fires in those piles. In addition, in many cases, EGUs that burn coal refuse bear the cost of removing those piles. However, a number of other issues exist about environmental and health issues associated with EGU coal refuse combustion.

Waste coal properties are not uniform, and can vary greatly in sulfur concentrations and heat content, with bituminous coal waste ("gob") having relatively higher sulfur levels. It is our understanding that a number of coal waste facilities are having difficulty in meeting the MATS 0.02 lb/MMBtu limit for sulfur dioxide (SO_2) and were granted up to four additional years to comply with the MATS requirements. At the same time, we also understand that several waste coal facilities have been able to comply with all the MATS limits.

Coal refuse has higher concentrations of mercury and other toxic metals than virgin coals. Those toxic materials, which are not destroyed by combustion in EGUs, are emitted as air pollutants and retained in the ash. The combustion process also creates additional HAPs, including polycyclic aromatic hydrocarbons and acid gases, as well as criteria air pollutants. While we recognize that coal refuse-firing facilities are equipped with air pollution control devices enabling them to comply with the MATS mercury limits, that benefit is limited by the low energy value of coal refuse. Because refuse-fired facilities must burn more fuel to produce a megawatt of electricity, mercury emissions per unit of energy production are higher at those facilities than at many conventional coal-fired EGUs. In addition, because combustion only reduces the volume of the refuse by about 15%, it does not solve the problem of disposal of that material, although the ash may be stabilized and reused in some cases.

In consideration of the full range of environmental issues associated with combustion of this material discussed above, it is NESCAUM's view that EPA should not take any action that allows the most polluting units in this category (units that cannot meet the MATS requirements) to continue to operate if they cannot comply with those limitations.

VII. EPA should not take any action to remove the basis of the MATS rule.

The Reconsideration Proposal requests comment on whether the EPA has the authority or obligation to delist EGUs from CAA section 112(c) and rescind (or to rescind without delisting) the MATS rule. We do not offer comment on whether EPA has legal authority to delist EGUs. For all the reasons listed above, EPA has no obligation, because it has no factual basis, for withdrawing its earlier "appropriate and necessary" finding, delisting EGUs from CAA section 112(c), or rescinding the MATS rule.

<u>Summary</u>

In its Reconsideration Proposal, EPA has failed to apply appropriate cost-benefit methods in a situation where the public health and environmental harms are well-known but difficult to quantify on a purely monetary basis. Due to the narrow focus on monetization in EPA's present analysis and an inadequate consideration of non-monetized benefits, the benefits associated with HAP reductions in the Reconsideration Proposal are grossly underestimated. EPA further tips the scales by disregarding OMB guidelines and accepted accounting principles when ignoring what it considers to be co-benefits not attributable to the "target pollutants." Reductions in $PM_{2.5}$ levels are a direct and inseparable result of the MATS rule, making these important components of any cost-benefit analysis that should not be excluded.

Furthermore, we now have the benefit of hindsight to place the MATS rule costs on more solid footing. We know that EPA's original analyses of the costs associated with implementing this rule were (and continue to be) overestimated. We know that the MATS rule has been implemented without undue economic impacts and without adversely affecting electric system reliability. We know that the implementation of the MATS rule, in concert with state rules, has reduced atmospheric mercury and mercury deposition to ecosystems. We know that these measures have resulted in demonstrable reductions in human and ecological exposures to this persistent and highly toxic substance.

In summary, the proposed change in the "appropriate and necessary" determination in this Reconsideration Proposal relies on an inappropriate methodology incapable of adequately assessing the health and environmental impacts of the MATS rule. Its application generates artificial results at odds with the historical reality created by the actual implementation of the MATS rule. Lacking a valid basis, the proposal should be withdrawn.

Sincerely,

Paul J. Miller
NESCAUM Executive Director

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