Comments of the Attorneys General of Massachusetts, California, Connecticut, Delaware, Illinois, Iowa, Maine, Maryland, Michigan, Minnesota, Nevada, New Jersey, New Mexico, New York, North Carolina, Oregon, Rhode Island, Vermont, Virginia, Washington, and the District of Columbia; the Maryland Department of the Environment; the City Solicitor of Baltimore; the Corporation Counsels of Chicago and New York City; the County Attorney of the County of Erie, NY; and the County Counsel for the County of Santa Clara, CA

on

the Environmental Protection Agency's Proposed "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 (Feb. 7, 2019), Docket ID No. EPA-HQ-OAR-2018-0794

April 17, 2019

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EXECUTIVE SUMMARY

The Attorneys General of Massachusetts, California, Connecticut, Delaware, Illinois, Iowa, Maine, Maryland, Michigan, Minnesota, Nevada, New Jersey, New Mexico, New York, North Carolina, Oregon, Rhode Island, Vermont, Virginia, Washington, and the District of Columbia; the Maryland Department of the Environment; the City Solicitor of Baltimore; the Corporation Counsels of Chicago and New York City; the County Attorney of the County of Erie, NY; and the County Counsel for the County of Santa Clara, CA (together "States and Local Governments") respectfully submit these comments on the Environmental Protection Agency's ("EPA") proposal entitled "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 (Feb. 7, 2019) ("Proposal"). Specifically, these comments address EPA's proposed action to revise its 2016 supplemental finding, 81 Fed. Reg. 24,420 (Apr. 25, 2016) ("Supplemental Finding"). EPA issued the Supplemental Finding in response to the Supreme Court's decision in *Michigan v. EPA*, 135 S. Ct. 2699 (2015), which required EPA to take costs into account when evaluating whether it is "appropriate" to regulate coal- and oil-fired electric generating units ("EGUs" or "power plants") under section 112 of the Clean Air Act, 42 U.S.C. § 7412.[1] *See* 84 Fed. Reg. at 2672–80. As these comments explain, the States and Local Governments oppose the Proposal and urge EPA to withdraw it because it is unlawful, lacks a reasoned basis, and threatens enormous public health harms.

In 1990, Congress amended the Clean Air Act to require EPA to regulate emissions of hazardous air pollutants or "HAPs" from power plants were it to find, after studying the public health hazards of those emissions, that it is "appropriate and necessary" to do so. 42 U.S.C. § 7412(n)(1)(A). To date, EPA has affirmed that regulation is appropriate and necessary no less than three times. Nearly twenty years ago, EPA first found that power plants must be regulated under section 112, based on an extensive record reflecting over a decade of scientific research and data on actual power-plant emissions. 65 Fed. Reg. 79,825 (Dec. 20, 2000). Accordingly, EPA listed power plants as a source category subject to regulation under section 112. *Id.* at 79,830; *see* 42 U.S.C. § 7412(c)(1). EPA reaffirmed its appropriate and necessary finding in 2012, relying on a growing body of scientific evidence. 77 Fed. Reg. 9304 (Feb. 16, 2012). And in 2016, pursuant to the *Michigan* decision, EPA further considered the costs of regulating power-plant hazardous air pollution under section 112 and promulgated its Supplemental Finding, once again confirming that regulating power-plant hazardous air pollution is appropriate and necessary.

EPA was correct in those findings, and it remains appropriate and necessary today to control power-plant hazardous air emissions under section 112. Fossil fuel-fired power plants are the Nation's largest source of hazardous air pollution, including acid gases, mercury, and

[1] The Proposal also solicits comment on the results of EPA's residual risk and technology review of the emission standards required under section 112 of the Clean Air Act (*see* 84 Fed. Reg. at 2680–2700), and EPA's proposal to establish a subcategory for acid gas emissions from existing power plants firing bituminous coal refuse (*see id.* at 2700–03).

other toxic metals such as arsenic, chromium, and nickel. *See* 77 Fed. Reg. at 9310. Those pollutants pose severe risks to human health and are especially harmful to certain highly exposed and sensitive populations, including children and subsistence fishing communities. *See id.* at 9347, 9441. Power-plant mercury emissions, in particular, are a major contributor to ubiquitous mercury contamination of U.S. waterways, which, as of 2011, necessitated fish consumption advisories in all fifty States. *See* Section I.A, *infra.* Overwhelming record evidence demonstrates that the public health and environmental benefits of reducing power-plant emissions are vast, and by comparison, the costs of available emission controls are a bargain. *See* Sections I and V.D.1, *infra*.

In April 2015—nearly twenty-five years after passage of the 1990 Clean Air Act Amendments, and nearly fifteen years after EPA made its initial appropriate and necessary finding—power plants were finally required to comply with national, technology-based emission limits, commonly known as the Mercury and Air Toxics Standards or "MATS" Rule, 77 Fed. Reg. 9304 (Feb. 16, 2012). Today, regulated power plants are in full compliance with the standards, achieving a ninety-six percent reduction in power-plant hazardous air pollution emissions—including an eighty-six percent reduction in power-plant mercury emissions. 84 Fed. Reg. at 2689 tbl.4. Those reductions have generated, and continue to generate, significant public health, environmental, and economic benefits for the States and Local Governments—and at a fraction of the predicted cost. *See* Sections I.C and V.D.1, *infra*. Because power-plant mercury emissions traverse state borders, the national mercury emission limits provided by the MATS Rule are a critical buttress to state-level mercury emission control regimes. *See* Section I.B, *infra*.

EPA now claims authority to reverse its thrice-confirmed appropriate and necessary finding and determine instead that it is not appropriate and necessary to regulate power plants under section 112. 84 Fed. Reg. at 2672. Based on a misreading of *Michigan*, EPA rejects its routinely used cost-analysis metrics, which demonstrated the cost-reasonableness of the MATS Rule. EPA proposes to change course in spite of the MATS Rule's proven public health benefits and the States and Local Governments' reliance on the Rule, and over the strenuous objection of the electric power sector, which has made significant investments to comply with the Rule. *See* Sections I and VI.B, *infra*. Indeed, EPA appears to ignore the near-unanimous opposition to the Proposal from regulated industry, trade groups, and public health and environmental organizations alike.

EPA suggests its Proposal would not affect the MATS Rule; but in the same breath, EPA solicits comment on "alternative interpretations" of the effect of its proposed revised finding, including whether EPA would be *obligated* to rescind the MATS Rule upon finalizing a reversal of the appropriate and necessary finding. 84 Fed. Reg. at 2678–79. A leading opponent of the MATS Rule—and one of the very few strong supporters of EPA's Proposal—has already indicated in comments to EPA its view that reversing the appropriate and necessary finding would render the Rule legally vulnerable.[2] Yet, EPA wholly fails to consider that the Proposal,

[2] Public Hearing Comments of Cody Nett, Asst. General Counsel for Murray Energy Corp., on "Reconsideration of Supplemental Finding and Residual Risk and Technology Review for Coal- and Oil-Fired Utility Steam

if finalized, would place critical public health protections at risk and would generate tremendous uncertainty and costs for the States and Local Governments and the electric power sector. *See* Section VI, *infra*.

As detailed in these comments, EPA's proposed revised finding is unlawful and *ultra vires*, and must be withdrawn. It contradicts the text, structure, and purposes of the Clean Air Act, as well as the Supreme Court's directive in *Michigan* and the D.C. Circuit Court of Appeals decision in *New Jersey v. EPA*, 517 F.3d 574 (2008).

The Clean Air Act prohibits EPA from reconsidering its appropriate and necessary finding, which necessitates listing power plants as a source category, unless EPA can satisfy the delisting criteria established by Congress under section 112(c)(9), 42 U.S.C. § 7412(c)(9). Section 112(c)(9) limits EPA's discretion to reconsider its determination to regulate power plants by requiring EPA first to demonstrate that emissions of hazardous air pollutants from every regulated power plant are below certain health and environmental risk thresholds. *See* Section IV, *infra*. EPA is not proposing to delist power plants here—and indeed, EPA's proposed residual risk and technology review, 84 Fed. Reg. at 2680–2700, as well as extensive record evidence on the continuing health and environmental harms of power-plant hazardous air emissions, demonstrates that EPA could not make the required showing. Once the appropriate and necessary finding is finalized, absent EPA's lawful conformance with the delisting procedures mandated by Congress—or a court-ordered vacatur or remand of the finding, which has not occurred—the finding remains valid.[3] EPA's proposed reversal is thus an improper attempt by EPA to evade clear statutory limitations placed on its authority by Congress. *See* Section IV.C, *infra*.

Even if EPA had authority to reconsider its appropriate and necessary finding—and it does not—EPA's proposed finding that the costs of regulation "grossly outweigh" the hazardous air pollution benefits, 84 Fed. Reg. at 2676, would be arbitrary and capricious and unlawful for multiple reasons. For example:

- EPA abandons the reasonable approach to considering costs and benefits it employed in the Supplemental Finding without explaining "good reasons for the new policy" it proposes, as required under *FCC v. Fox*, 556 U.S. 502, 513–15 (2009) (*see* Section V, *infra*);

- EPA disregards the purposes of the Clean Air Act, the Supreme Court's directive in *Michigan*, and federal guidelines on benefit-cost analysis by failing to consider the

Generating Units" 2 (Mar. 18, 2019), Doc. ID No. EPA-HQ-OAR-2018-0794-0523 [Murray Energy Comments] (arguing that EPA "must also take the only logical and defensible next step by rescinding MATS altogether").

[3] Indeed, the D.C. Circuit refused to vacate the MATS Rule on remand from *Michigan* in large part on the grounds that to do so would result in harm to public health. *See White Stallion Energy Ctr., LLC v. EPA*, No. 12-1100 ("*White Stallion II*") (D.C. Cir. Dec. 15, 2015) (order remanding the proceeding to EPA without vacatur of the MATS Rule), Doc. ID No. EPA-HQ-OAR-2009-0234-20567.

benefits of preventing the premature deaths of thousands of Americans each year from harmful air pollutant emissions (*see* Section V.C.1, *infra*);

- EPA arbitrarily ignores substantial categories of unquantified benefits from reducing mercury and air toxics, in contravention of EPA's statutory mandate to protect public health and the environment from hazardous air pollution (*see* Section V.C.2, *infra*);

- EPA blinds itself to relevant facts, ignoring data regarding the actual costs and benefits of controlling power-plant hazardous air pollution and instead proposing to rely on a stale and incomplete record that EPA knows is obsolete and not reflective of facts on the ground (*see* Section V.D, *infra*);

- EPA fails to consider the significant economic, environmental, and public health implications of its proposed revised finding—including the potential tremendous costs to the States and Local Governments of dismantling power-plant emissions standards, which is a distinct risk of EPA's proposed reversal (*see* Section VI.A, *infra*); and

- EPA fails to meet its higher burden to provide a "more detailed justification" for its proposed reversal given the "serious reliance interests" of power companies and ratepayers engendered by EPA's appropriate and necessary finding, *Fox*, 556 U.S. at 515 (*see* Section VI.B, *infra*).

In addition, EPA has tainted this rulemaking process by failing to address apparent ethical violations resulting from EPA Administrator Wheeler's and Assistant Administrator Wehrum's participation in the rulemaking. Because Messrs. Wheeler and Wehrum advocated on behalf of industry to repeal or revise the MATS Rule prior to joining EPA, their participation in this rulemaking may violate the Ethics Pledge they each signed upon their appointment to EPA. *See* Section VII, *infra*. EPA also has unreasonably denied requests for additional public hearings in geographic areas of the country most at risk from harmful emissions of mercury and other hazardous air pollutants from power plants. *See* Section III, *infra*.

Therefore, for all the reasons set forth herein, EPA should withdraw its proposed revised finding, and instead leave undisturbed its original finding, first made in 2000 and affirmed in 2012 and 2016, that it is appropriate and necessary to regulate hazardous air pollution from power plants.

DISCUSSION

I. Background

A. Power-Plant Mercury and Air Toxics Emissions Harm the States and Local Governments.

Power plants are the dominant source of hazardous air pollution in the Nation, annually emitting hundreds of thousands of tons, in the aggregate, of mercury and other air toxics. 77 Fed. Reg. at 9311; ***Exhibit A***, Robert E. Unsworth et al., Industrial Economics, Inc., *The Economic Benefits of the Mercury and Air Toxics Standards (MATS) Rule to the Commercial and Recreational Fishery Sectors of Northeast and Midwest States* 4 (2019) ("IEc Report").[4] Exposure to power-plant hazardous air pollutants can cause a wide range of human health problems, negatively impact the nervous system, and increase the risk of pulmonary and cardiovascular disease.[5] Hazardous air pollutants can be toxic at very low concentrations; for instance, EPA's reference dose for methylmercury—the estimate of the daily exposure that is "likely to be without an appreciable risk of deleterious effects during a lifetime"—is only 0.1 micrograms per kilogram per day. *See* 77 Fed. Reg. at 9351–52. Many power-plant hazardous air pollutants are particularly harmful to certain highly exposed and sensitive populations, such as children and subsistence fishing communities. *See id*. at 9347, 9441; 76 Fed. Reg. at 25,018.[6]

Of particular concern to the States and Local Governments is the mercury emitted by power plants—which contributed half of all U.S. mercury emissions before the MATS Rule took effect. 76 Fed. Reg. at 25,002. Mercury emitted by power plants falls back to the earth, where microorganisms convert it to methylmercury, a potent neurotoxin.[7] Methylmercury moves up the food chain in marine and freshwater ecosystems, increasing in concentration as larger predators consume contaminated prey. MacIntosh et al., *supra* note 5, at 16; IEc Report at 5. The primary route of methylmercury exposure for humans is eating mercury-contaminated fish. 76 Fed. Reg. at 25,000. Seafood accounted for an estimated eighty-two percent of the U.S. population's methylmercury intake between 2010 and 2012.[8] When EPA issued its 2000 appropriate and necessary finding, it found that seven percent of U.S. women of childbearing age

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[4] *See also Cleaner Power Plants*, EPA (Mar. 4, 2019), https://www.epa.gov/mats/cleaner-power-plants.

[5] David L. MacIntosh et al., *Environmental Health & Engineering, Emissions of Hazardous Air Pollutants from Coal-Fired Power Plants* 5, 35 (2011), https://www.lung.org/assets/documents/healthy-air/emissions-of-hazardous-air.pdf.

[6] *See also* EPA, *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards* 7-40 to 7-41 (2011), Doc. ID No. EPA–HQ–OAR–2009–0234–20131 [MATS RIA].

[7] *See* Philippe Grandjean et al., *Adverse Effects of Methylmercury: Environmental Health Research Implications*, 118(8) Envtl. Health Perspectives 1137, 1140–41 (2010), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2920086/pdf/ehp-0901757.pdf; Envtl. Health & Engineering, Inc., *Emissions of Hazardous Air Pollutants from Coal-Fired Power Plants* 16 (2011).

[8] Elsie M. Sunderland, Miling Li, & Kurt Bullard, *Decadal Changes in the Edible Supply of Seafood and Methylmercury Exposure in the United States*, 126(1) Envtl. Health Perspectives 017006-1, 017006-2 (2018), https://ehp.niehs.nih.gov/doi/pdf/10.1289/EHP2644.

were exposed to mercury levels exceeding EPA's reference dose. 65 Fed. Reg. at 79,829–30. Nearly a decade later, Minnesota researchers found that ten percent of tested infants born to mothers residing in Minnesota's Lake Superior Basin exceeded the reference dose.[9] Tellingly, the seasonal exposure pattern observed in that study—greater mercury levels in infants born during summer months—suggested a fish-consumption exposure pathway.

Acute or long-term exposure to methylmercury can lead to numerous deleterious health effects. See ***Exhibit B***, Barbara Morin & Paul J. Miller, Northeast States for Coordinated Air Use Management, *It Remains "Appropriate and Necessary" to Regulate Toxic Air Emissions from Coal- and Oil-fired Electric Generating Units* 15–17 (2019) ("NESCAUM Report"). In adults, mercury exposure is linked to an increased risk of diabetes[10] and autoimmune dysfunction,[11] and is strongly correlated to adverse and potentially fatal cardiovascular effects.[12] Children *in utero* and in early developmental stages are particularly susceptible to mercury exposure,[13] which can cause permanent neurological damage. 76 Fed. Reg. at 25,018.[14] Research estimates that the societal costs of mercury-related decreased IQ in the United States total billions of dollars per year.[15]

The near-ubiquitous mercury contamination of U.S. waters poses a significant threat to public health. As of 2011, all fifty states had mercury-related fish consumption advisories in place.[16] As recently as 2018, over 4,000 fish advisories "affect[ed] almost half of the nation's

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[9] Patricia McCann, Minn. Dept. of Health Div. of Envtl. Health, *Mercury Levels in Blood from Newborns in the Lake Superior Basin* 10, 15 tbl.2 (2011), https://www.health.state.mn.us/communities/environment/fish/docs/glnpo.pdf; *Mercury in Newborns in the Lake Superior Basin*, Minn. Dept. of Health, https://www.health.state.mn.us/communities/environment/fish/techinfo/newbornhglsp.html.

[10] K. He et al., *Mercury Exposure in Young Adulthood and Incidence of Diabetes Later in Life: The CARDIA Trace Element Study*, 36(6) Diabetes Care 1584, 1587 (2013), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3661833/pdf/1584.pdf.

[11] Jennifer F. Nyland et al., *Biomarkers of Methylmercury Exposure Immunotoxicity among Fish Consumers in Amazonian Brazil*, 119(12) Envtl. Health Perspectives 1733, 1736–37 (2011), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3261989/pdf/ehp.1103741.pdf.

[12] Giuseppe Genchi et al., *Mercury Exposure and Heart Diseases*, 14(1) Int'l J. Envtl. Research & Pub. Health 1, 8–9 (2017), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5295325/pdf/ijerph-14-00074.pdf.

[13] Stephanie Bose-O'Reilly et al., *Mercury Exposure and Children's Health*, 40(8) Current Problems in Pediatric & Adolescent Health Care 186, 186 (2010), https://doi.org/10.1016/j.cppeds.2010.07.002.

[14] *See also* Public Health & Environment, World Health Org., *Exposure to Mercury: A Major Public Health Concern* 3 (2007), https://www.who.int/ipcs/features/mercury.pdf (neurological symptoms of prenatal methylmercury exposure can include intellectual disability, "seizures, vision and hearing loss, delayed development, language disorders and memory loss").

[15] Philippe Grandjean & Martine Bellanger, *Calculation of the disease burden associated with environmental chemical exposures: application of toxicological information in health economic estimation*, 16(123) Envtl. Health 1, 4 (2017), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5715994/pdf/12940_2017_Article_340.pdf; Amanda Giang & Noelle E. Selin, *Benefits of mercury controls for the United States*, 113(2) Proceedings of the Nat'l Acad. of Sci. 286, 288 (2016), https://www.pnas.org/content/pnas/113/2/286.full.pdf.

[16] EPA, *2011 National Listing of Fish Advisories* 4 (2013), https://www.epa.gov/sites/production/files/2015-06/documents/technical-factsheet-2011.pdf; *see also* IEc Report at 6–10 (describing fish consumption advisories and

lake acreage, river miles, and coastlines."[17] Bolstering these advisories, a 2009 study found that 48.8% of the sampled fish population of 36,422 U.S. lakes had mercury tissue concentrations exceeding human health criteria.[18] In some states, all or nearly all waters are unsafe for fish consumption due to mercury contamination. And nearly 73,000 river and stream miles and 8,508,000 acres of lakes, reservoirs, and ponds nationwide are impaired under Clean Water Act section 303(d), 33 U.S.C. § 1313(d), due to mercury contamination.[19] In thirteen states—Connecticut, Florida, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, North Carolina, Rhode Island, South Dakota, and Vermont—mercury contamination has become significant enough to require the development of state- or region-wide "total maximum daily loads" or "TMDLs" to meet Clean Water Act water quality standards.[20] *See* 33 U.S.C. § 1313(d)(1) (requiring development of TMDLs for impaired waters). Numerous other states have developed waterbody-specific mercury TMDLs within their borders.[21] As precipitation and air temperatures increase due to climate change, mercury deposition resulting from power-plant emissions may increase, as well.[22] Thus, areas such as the Northeast that are

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other actions taken by states, the federal government, and non-governmental actors to limit public exposure to mercury in fish and shellfish).

[17] Valoree S. Gagnon et al., Great Lakes Research Center, *Eliminating the Need for Fish Consumption Advisories in the Great Lakes Region* 3 (2018), https://www.mtu.edu/social-sciences/docs/res-fishconsumption-policybrief-030718.pdf.

[18] Ki-Hyun Kim et al., *A Review on the Distribution of Hg in the Environment and Its Human Health Impacts*, J. Hazardous Materials 306, 379 (2016), https://www.ncbi.nlm.nih.gov/pubmed/26826963.

[19] *National Causes of Impairment, National Summary of Impaired Waters and TMDL Information*, EPA, https://iaspub.epa.gov/tmdl_waters10/attains_nation_cy.control#causes (last visited Apr. 17, 2019).

[20] *See Northeast Regional Mercury Total Maximum Daily Load* vi (2007), http://ofmpub.epa.gov/waters10/attains_impaired_waters.show_tmdl_document?p_tmdl_doc_blobs_id=74831 [Northeast TMDL]; Fla. Dept. of Envtl. Prot., *Mercury TMDL for the State of Florida* (2013), https://floridadep.gov/sites/default/files/Mercury-TMDL.pdf; Mich. Dept. of Envtl. Quality & EPA, *Statewide Michigan Mercury TMDL: Public Review Draft* (2013), http://www.michigan.gov/documents/deq/wrd-swas-hgtmdl-draft_415360_7.pdf; Minn. Pollution Control Agency, *Minnesota Statewide Mercury Total Maximum Daily Load* (2007), http://www.pca.state.mn.us/index.php/view-document.html?gid=8507 [Minnesota TMDL]; N.J. Dept. of Envtl. Prot., *Total Maximum Daily Load for Mercury Impairments Based on Concentration in Fish Tissue Caused Mainly by Air Deposition to Address 122 HUC 14s Statewide* (2009), https://www.nj.gov/dep/wms/bears/docs/TMDL%20HG%20document%20final%20version%209-8-09_formated%20for%20web%20posting%20js.pdf [New Jersey TMDL]; N.C. Dept. of Envtl. Quality, *North Carolina Mercury TMDL* (2012), http://portal.ncdenr.org/c/document_library/get_file?uuid=aecb3619-c246-4b49-bfd8-fd5541775110&groupId=38364 [North Carolina TMDL]; S.D. Dept. of Env't and Nat. Res., *South Dakota Mercury Total Maximum Daily Load* (Revised Dec. 2016), https://denr.sd.gov/dfta/wp/tmdl/tmdl_statewidemercury.pdf [South Dakota TMDL].

[21] *See TMDL Pollutant Group: Mercury*, EPA, https://iaspub.epa.gov/tmdl_waters10/attains_impaired_waters.tmdls?p_pollutant_group_id=693 (last visited Apr. 17, 2019) (noting that twenty-eight states have at least one mercury TMDL and some states have dozens).

[22] *See* Zhuyun Ye, Huiting Mao, & Charles T. Driscoll, *Primary Effects of Changes in Meteorology vs. Anthropogenic Emissions on Mercury Wet Deposition: A Modeling Study*, 198 Atmospheric Env't 215 (2019), https://doi.org/10.1016/j.atmosenv.2018.10.052 (finding precipitation amount was a dominant factor driving mercury deposition in New York State).

already experiencing heavier storms are likely to face greater challenges in addressing mercury contamination.

Mercury contamination not only harms the residents of the States and Local Governments through consumption of contaminated fish but also limits their ability to enjoy the benefits of recreational fisheries. For example, power-plant mercury emissions "are a significant contributor to total mercury levels in fish and shellfish in the Northeast and Midwest states," leading to fish consumption advisories and other warnings about the risks of mercury contamination. IEc Report at 2–3. Such advisories and warnings in fact change recreational and subsistence fishing behavior as well as consumption patterns for commercially harvested fish and shellfish. *Id.* at 3, 10–13. For instance, research found that the decline in economic value for recreational fishing trips due to the presence of a fish consumption advisory at one New York fishing location was $34.34 per fishing day at that location alone. *Id.* at 15 Ex.4. Other research found that New York State property values within one mile of a lake subject to a mercury-related fish consumption advisory decrease by an average of six to seven percent. *Id.* at 23–24.

Overall, the impacts of power-plant mercury pollution to the States and Local Governments' recreational and commercial fisheries and tourism industries are enormous. *Id.* at 3–4, 14–23. In the twelve Northeast and Midwest states considered in the IEc Report, recreational fishing contributes more than $7.5 billion per year to those states' economic welfare. *Id.* at 3. In total, "the $12.0 billion in annual recreational fishing expenditures and the $1.6 billion in annual commercial fish landings for these 12 states result in a regional economic contribution of 276,696 full-time and part-time jobs, $8.7 billion in earnings, $17.2 billion in value added, and $28.1 billion in output." *Id.* at 22. Even smalls changes to recreator and consumer behavior associated with contamination from power-plant mercury emissions thus "could result in substantial economic impacts to related economic industries at the state or regional level." *Id.* at 22–23. And "[t]he magnitude of economic impacts increases as contamination worsens and [fish consumption advisories] become more restrictive." *Id.* at 3.

B. Nationwide Emissions Standards Are Essential to Address the Harmful Cross-Border Impacts of Power-Plant Mercury and Air Toxics Emissions.

The States and Local Governments have long sought to reduce the dangers that power-plant emissions—particularly mercury—pose to our residents and natural resources. Many of the undersigned states have taken regulatory action to reduce emissions of mercury and other hazardous air pollution from power plants within their borders. At least fourteen states have promulgated limits on mercury emissions from power plants. In most of those states, power plants were obligated under state law to control mercury emissions by the MATS Rule's April 2015 compliance date.[23] Nearly every state with power-plant mercury emission standards has

[23] In fact, power plants in Connecticut, Massachusetts, and New Jersey were complying with those states' mercury standards three to four years before EPA's proposal of the MATS Rule in 2011. Conn. Gen. Stat. § 22a-199 (compliance by July 1, 2008); 310 Mass. Code Regs. § 7.29 (first phase compliance by Jan. 1, 2008); N.J. Admin. Code § 7:27-27.7 (compliance by Dec. 15, 2007); *see also* 5 Colo. Code Regs. § 1001-8:B.VIII (first phase compliance by Jan. 1, 2012); Del. Admin. Code, tit. 7, § 1146-6 (first phase compliance by Jan. 1, 2009); Ill. Admin. Code tit. 35, § 225.230 (compliance by July 1, 2009); Md. Code Regs. tit. 26, § 11.27.03.D (first phase compliance

required more health-protective limits than the MATS Rule.[24] Other states have required power plants to install mercury-monitoring equipment or evaluate the feasibility of mercury controls.

State requirements, however, have not solved, and cannot solve, the problem of interstate hazardous air pollution. Mercury can travel hundreds of miles from the smokestack. *See* 77 Fed. Reg. at 9444. Thirty percent of Minnesota's mercury deposition, for example, originates from out-of-state domestic sources.[25] And a significant portion of Northeast mercury deposition originates from uncontrolled power plants located in other states. *See* NESCAUM Report at 7. Unless those out-of-state power-plant emissions are addressed, Northeast waters will not meet federal water quality standards. *See* Northeast TMDL, *supra* note 20, at 44 (concluding that EPA action to "implement significant reductions from upwind out-of-region sources, primarily coal-fired power plants" is necessary to return fish methylmercury concentrations to safe levels). Also, mercury-contaminated fish are bought and sold in interstate commerce, and individuals that consume store-bought fish thus suffer the downstream effects of power-plant toxic emissions even though they may reside far from the source of the emissions. For example, recent statistics from the California Department of Public Health show blood-mercury levels far exceeding levels of concern among members of Asian/Pacific Island communities in the San Francisco Bay Area, which have high rates of store-bought fish consumption relative to the general population.[26] Nationally-uniform standards are essential to protect the States and Local Governments' residents, natural resources, and economies from the dangerous quantities of mercury and other hazardous air pollution that out-of-state power plants emit.

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by Jan. 1, 2010); Minn. R. 7011.0561 (first phase compliance by Jan. 1, 2018); Mont. Admin. R. 17.8.771 (compliance by Jan. 1, 2010); N.H. Rev. Stat. Ann. § 125-O:11-18 (compliance by July 1, 2013); N.Y. Comp. Codes R. & Regs. tit. 6, § 246.6 (first phase compliance by Jan. 1, 2010); Or. Admin. R. 340-228-0606 (compliance by July 1, 2012); Wis. Admin. Code NR § 446.13 (compliance by Apr. 16, 2016); *see also* Mich. Admin. Code r. 336.2503(1)(a)-(b) (2009) (compliance by Jan. 1, 2015), *modified by* Mich. Admin. Code r. 336.2502a (2013) (exempting covered power plants "for which [MATS] is an applicable requirement relative to emissions of mercury" and, if the Rule ceases to be an applicable requirement, extending compliance date to the sooner of three months from the date of inapplicability or April 16, 2015).

[24] The MATS Rule imposes a mercury emission standard of 1.2 lb/TBtu or 0.013 lb/GW-hr. *See* 77 Fed. Reg. at 9367 tbl.3. Most state rate-based standards are set at 0.6 lb/TBtu or 0.008 lb/GW-hr. *See* Conn. Gen. Stat. § 22a-199(b)(1) (0.6 lb/TBtu); Del. Admin. Code, tit. 7, § 1146-6.2 (0.6 lb/TBtu); Ill. Admin. Code tit. 35, § 225.230(a)(1)(A) (0.008 lb/GW-hr); 310 Mass. Code Regs. § 7.29(5)(a)(3)(f) (0.0025 lb/GW-hr); Mich. Admin. Code r. 336.2503(1)(b) (0.008 lb/TBtu); Minn. R. 7011.0561 (0.008 lb/TBtu); Mont. Admin. R. 17.8.771(1)(b)(ii) (0.9 lb/TBtu); N.J. Admin. Code § 7:27-27.7(a) (3.00 mg/MWh (equivalent to 0.66 lb/TBtu)); N.Y. Comp. Codes R. & Regs. tit. 6, § 246.6(a) (0.6 lb/TBtu); Or. Admin. R. 340-228-0606(1) (0.6 lb/TBtu); Wis. Admin. Code NR § 446.13(1) (0.008 lb/GW-hr).

[25] Minnesota TMDL, *supra* note 20, at 20–21, 45 (stating that federal regulation of those sources, such as power plants, holds most promise for reaching Minnesota's TMDL goals); *see also* New Jersey TMDL, *supra* note 20, at 31 (noting that twenty-six percent of New Jersey's air deposition mercury load originates from five surrounding states); North Carolina TMDL, *supra* note 20, at 6 (noting that fifteen percent of North Carolina's total mercury deposition originates from out-of-state regional sources).

[26] Lauren Baehner, *Metal Levels in Asian/Pacific Island Community Exposures (ACE) Project*, BioMonitoring California Scientific Guidance Panel Meeting (Nov. 8, 2018), https://biomonitoring.ca.gov/events/biomonitoring-california-scientific-guidance-panel-meeting-november-2018.

Consequently, many of the States and Local Governments have engaged in advocacy to compel, support, and defend federal regulation of hazardous air pollution from power plants under the Clean Air Act. That effort has spanned nearly two decades, from EPA's 2000 finding that regulation of power plants is appropriate and necessary, 65 Fed. Reg. 79,825 (Dec. 20, 2000); to EPA's 2005 reversal of that determination, which many of the undersigned states successfully challenged in *New Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008); to its 2012 reaffirmation of the original 2000 finding and issuance of the MATS Rule, 77 Fed. Reg. 9304 (Feb. 16, 2012); and litigation of the MATS Rule before the D.C. Circuit and the Supreme Courts, culminating in the decision in *Michigan*. *See White Stallion Energy Ctr., LLC v. EPA* ("*White Stallion I*"), 748 F.3d 1222 (D.C. Cir. 2014), *rev'd sub nom. Michigan v. EPA*, 135 S. Ct. 2699 (2015).

Following *Michigan*, many of the States and Local Governments continued to defend and support nationwide emission standards, successfully arguing for remand without vacatur of the MATS Rule, and submitting comments to EPA in support of its Supplemental Finding.[27] Several States and Local Governments subsequently intervened in support of EPA in D.C. Circuit litigation challenging the Supplemental Finding, *Murray Energy Corp. v. EPA*, No. 16-1127. EPA's Proposal now jeopardizes continued implementation of the critically important emission controls for which those States and Local Governments have long advocated. And by the same token, the Proposal would undermine EPA's own efforts in developing and implementing the MATS Rule. As described in these comments, the Proposal is an outrageous and wasteful action that is neither compelled nor even supported by legal, scientific, or economic principles.

C. The States and Local Governments Are Benefiting from the MATS Rule.

Since the MATS Rule took effect in 2012, the electric power sector has invested billions of dollars in air pollution controls to meet the Rule's 2015 compliance date.[28] Today, all regulated power plants are in compliance. Compliance has generated, and continues to generate, massive reductions in hazardous air pollutant emissions that are essential to protecting public health and the environment and leveling the regulatory playing field across the country.

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[27] *See* Comments of Massachusetts Attorney General Maura Healey et al. on EPA's Proposed Supplemental Finding (Jan. 15, 2016), Doc. ID No. EPA-HQ-OAR-2009-0234-20551.

[28] Letter from Edison Electric Inst. et al. to William L. Wehrum, Assistant Admin'r, Off. of Air & Radiation, EPA 2 (Mar. 26, 2019), Doc. ID No. EPA-HQ-OAR-2018-0794-0577 [Industry Comments] (stating that the electric power sector has invested $18 billion *total* to comply with the MATS Rule since the Rule took effect); Declaration of James E. Staudt ¶ 5, attached to Comments of Calpine Corp. et al. on EPA's Proposed Supplemental Finding (Dec. 1, 2015), Doc. ID No. EPA-HQ-OAR-2009-0234-20549 [Staudt Declaration] (stating that annual compliance costs were approximately $2 billion through 2016); *see also* Letter from Brian Leen, President & Chief Exec. Off'r, ADA Carbon Solutions, to Peter Tsirigotis, Director, Off. of Air Quality Planning & Standards, EPA 5 (June 29, 2018), Doc. ID No. EPA-HQ-OAR-2018-0794-0794 [Carbon Industry Comments] (stating that the activated carbon industry has invested over $750 million to supply power plants with control technologies to comply with the MATS Rule).

Power-plant mercury emissions, for example, declined eighty-six percent between 2006 and 2017, mainly as a result of the MATS Rule and other emission-control policies. *See* 84 Fed. Reg. at 2689 tbl.4. Research confirms that the MATS Rule "has reduced mercury loadings to aquatic systems, in turn leading to a reduction in mercury levels in fish and shellfish." IEc Report at 3, 5–6. For instance, studies have found that decreased mercury emissions corresponded with declines in mercury contamination in waterbodies and freshwater and saltwater fish species, including Atlantic Bluefin tuna,[29] mid-Atlantic bluefish,[30] and largemouth bass and yellow perch in Massachusetts.[31] *See* NESCAUM Report at 13–14. Declines in mercury fish-tissue concentrations have been observed across the aquatic food chain, including among important commercial and recreational fish species, benefiting human and wildlife health. *See id.* at 14.[32] In addition, pollution-control technologies installed for MATS Rule compliance have also reduced harmful emissions of other regulated pollutants such as sulfur dioxide and particulate matter. For instance, between December 2014 and April 2016, dry sorbet injection systems were installed on 15 gigawatts of coal capacity, and flue gas desulfurization systems (also known as scrubbers) were installed on 12 gigawatts of coal capacity.[33] During 2015, those plants burned eighteen percent less coal than in 2014 and reduced their sulfur dioxide emissions by forty-nine percent.[34]

The economic value to the States and Local Governments of continued emission reductions under the MATS Rule is enormous. Research confirms the MATS Rule saves tens of thousands of people from premature death each year.[35] A 2016 study projected that the total economy-wide benefits associated with the continued implementation of the MATS Rule through 2050 would amount to at least $43 billion considering benefits from reducing mercury emissions alone. *See* Giang & Selin (2016), *supra* note 15, at 288. And as the IEc Report found, "it is reasonable to conclude that the Rule may generate recreational and commercial fishing

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[29] Cheng-Shiuan Lee et al., *Declining Mercury Concentrations in Bluefin Tuna Reflect Reduced Emissions to the North Atlantic Ocean*, 50(23) Science & Tech. 12,825, 12,829–30 (2016), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5161346/.

[30] Cross et al., *Decadal Declines of Mercury in Adult Bluefish (1972-2011) from the Mid-Atlantic Coast of the U.S.A.*, 49 Envtl. Sci. Tech. 9064–72 (2015); *see also* Brian Bienkowski, *Cleaner Bluefish Suggest Coal Rules Work*, Scientific American (July 20, 2015), http://www.scientificamerican.com/article/cleaner-bluefish-suggest-coal-rules-work/.

[31] M.S. Hutcheson et al., *Temporal and Spatial Trends in Freshwater Fish Tissue Mercury Concentrations Associated with Mercury Emissions Reductions*, 48 Envtl. Sci. Tech. 2193 (2014), https://www.ncbi.nlm.nih.gov/pubmed/24494622.

[32] *See also* Lee et al. (2016), *supra* note 29, at 12,829–30; Christopher D. Knightes et al., *Application of Ecosystem-Scale Fate and Bioaccumulation Models to Predict Fish Mercury Response Times to Changes in Atmospheric Deposition*, 28(4) Sci. & Tech. 881, 881–88 (2009), https://doi.org/10.1897/08-242R.1.

[33] U.S. Energy Information Admin., *EIA Electricity Generator Data Show Power Industry Response to EPA Mercury Limits*, Today in Energy (July 7, 2016), https://www.eia.gov/todayinenergy/detail.php?id=26972.

[34] U.S. Energy Information Admin., *Sulfur Dioxide Emissions from U.S. Power Plants Have Fallen Faster Than Coal Generation*, Today in Energy (Feb. 3, 2017), https://www.eia.gov/todayinenergy/detail.php?id=29812.

[35] Vivian E. Thomson, Kelsey Huelsman, & Dominique Ong, *Coal-fired power plant regulatory rollback in the United States: Implications for local and regional public health*, 123 Energy Pol'y 558, 559 (2018), https://www.sciencedirect.com/science/article/pii/S030142151830627X.

benefits in excess of $1 billion *annually*." IEc Report at 4; *see also infra* Section V.D.1. In sum, the MATS Rule is providing enormous continuing health, environmental, and economic benefits to the States and Local Governments.

II. Applicable Legal Standard

Under the Clean Air Act, a reviewing court will invalidate EPA action found to be "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law," or "in excess of statutory jurisdiction, authority, limitations, or short of statutory right." 42 U.S.C. § 7607(b), (d).

An EPA action is arbitrary and capricious and unlawful if the agency fails to "examine the relevant data and articulate a satisfactory explanation for its action including a rational connection between the facts found and the choice made." *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co*., 463 U.S. 29, 43 (1983) (internal quotation marks and citation omitted). Courts will invalidate actions where EPA has "failed to consider an important aspect of the problem" before it. *Id.* Those principles apply with equal force when EPA revises or repeals existing policies. Although EPA need not show that a new policy is "better" than the policy it replaced, it must demonstrate that "it is permissible under the statute, that there are good reasons for it, and that the agency believes it to be better." *Fox*, 556 U.S. at 513–15 (emphases omitted). Further, EPA must "provide a more detailed justification than what would suffice for a new policy created on a blank slate" when "its new policy rests upon factual findings that contradict those which underlay its prior policy; or when its prior policy has engendered serious reliance interests that must be taken into account." *Id.* at 515; *see also Encino Motorcars, LLC v. Navarro*, 136 S. Ct. 2117, 2126 (2016). "Unexplained inconsistency" between a policy and its repeal is "a reason for holding an [agency's] interpretation to be an arbitrary and capricious change." *National Cable & Telecomms. Ass'n v. Brand X Internet Servs*., 545 U.S. 967, 981 (2005).

Courts typically review EPA's interpretation of the Clean Air Act under the two-step framework articulated in *Chevron U.S.A., Inc. v. EPA*, 467 U.S. 837 (1984). At *Chevron* step one, courts evaluate, using the "traditional tools of statutory construction," *id.* at 843 n.9, whether the Act "unambiguously forecloses the agency's interpretation." *Nat'l Cable & Telecomms. Ass'n v. FCC*, 567 F.3d 659, 663 (D.C. Cir. 2009). "If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress." *Chevron*, 467 U.S. at 842–43. But "if the statute is silent or ambiguous with respect to the specific issue," *id.* at 843, courts will look, at step two, to "whether [the agency] has reasonably explained how the permissible interpretation it chose is rationally related to the goals of the statute." *Good Fortune Shipping SA v. Comm'r of Internal Revenue Serv.*, 897 F.3d 256, 261 (D.C. Cir. 2018) (internal quotation marks omitted). The reasonableness of EPA's chosen construction depends, in part, "on the construction's fit with the statutory language, as well as its conformity to statutory purposes." *Goldstein v. SEC*, 451 F.3d 873, 881 (D.C. Cir. 2006) (internal quotation omitted). In interpreting the Clean Air Act, "EPA may not construe the statute in a way that completely nullifies textually applicable

provisions meant to limit its discretion." *Whitman v. Am. Trucking Ass'ns*, 531 U.S. 457, 485 (2001).

III. EPA Did Not Allow Adequate Public Participation in the Rulemaking Process.

EPA has failed to provide sufficient opportunity for public participation in its rulemaking process. Despite requests from many of the undersigned States and Local Governments and dozens of public health and environmental organizations for additional public hearings on the Proposal,[36] EPA has held only *one* public hearing, in Washington, D.C. *See* 84 Fed. Reg. 6739 (Feb. 28, 2019). Given the risks to public health and the environment posed by the Proposal—and the complex, region-specific issues it raises—EPA should hold multiple hearings in geographic areas of the country most vulnerable to mercury and air toxics pollution from the power sector. EPA's refusal to hold additional hearings is particularly unfair to communities in the Great Lakes and Northeast regions, where mercury pollution, particularly from out-of-region sources, continues to be a serious environmental and public health problem.

Considering the severe impacts our States and Local Governments are experiencing from mercury and hazardous air emissions, and the potential significant consequences of the Proposal, as described in these comments, a single hearing is inadequate to afford the public a meaningful opportunity to comment. During the 2011 proposal phase for the MATS Rule, EPA held three hearings in Chicago, Philadelphia, and Atlanta. Residents of our States and Local Governments should at least be afforded equivalent opportunities to evaluate and weigh in on EPA's current Proposal as they were in 2011.

IV. The Proposed Revised Finding is Unlawful and *Ultra Vires* Because EPA Has No Authority to Reconsider Whether Regulation of Power-Plant Hazardous Air Pollution is Appropriate and Necessary (C-1).

Beyond a footnote summarizing general administrative law principles, EPA fails to explain the legal basis for its claimed authority to revise and withdraw its appropriate and necessary finding. *See* 84 Fed. Reg. at 2674 n.3. Such cursory discussion does not satisfy EPA's duty to notify the public of "the major legal interpretations and policy considerations underlying the proposed rule." 42 U.S.C. § 7607(d)(3). But as far as EPA's interpretation of its authority can be surmised from the Proposal, that interpretation is wrong. Although EPA may have authority to reconsider past decisions to the extent permitted by law, and the Clean Air Act generally provides EPA with broad rulemaking authority, section 112 limits the discretion the agency typically would have to reconsider its position.

[36] *See, e.g.*, Letter to Andrew Wheeler, Admin'r, EPA, from the Attorneys General of Massachusetts, Connecticut, Delaware, Illinois, Iowa, Maine, Maryland, Minnesota, Nevada, New Jersey, New York, North Carolina, Oregon, Rhode Island, Vermont, Virginia, and Washington, and the Cities of Chicago and New York Requesting Additional Public Hearings (Mar. 18, 2019), Doc. ID. EPA-HQ-OAR-2018-0794-0509; Letter to Andrew Wheeler, Acting Admin'r, EPA, from Alliance for the Great Lakes et al. Requesting Additional Public Hearings (Feb. 27, 2019), Doc. ID. EPA-HQ-OAR-2018-0794-0261.

The Clean Air Act's plain text, structure, and legislative history confirm that Congress intended EPA to make a single threshold decision about whether regulation of power-plant hazardous air pollution is appropriate and necessary. Once emission standards are in place, Congress sought to protect against agency capture and economic disruption by restricting the conditions under which EPA could unwind those standards. As the D.C. Circuit made clear in *New Jersey*, absent a court order, once EPA makes its appropriate and necessary finding and lists power plants, the only way for EPA to reverse course is by making the risk-based determinations required by section 112(c)(9) to demonstrate that no power plant poses an unacceptably high risk to human health or the environment. 517 F.3d at 583. But EPA cannot do so here. *See, e.g.*, 84 Fed. Reg. at 2679, 2697.

Even if the statutory text were ambiguous, EPA's theory that it could somehow revise or withdraw the appropriate and necessary finding without following section 112(c)(9)'s health-protective procedures would be irrational in light of the statute's structure and purposes. *See Whitman*, 531 U.S. at 485 ("EPA may not construe the statute in a way that completely nullifies textually applicable provisions meant to limit its discretion."); *Goldstein*, 451 F.3d at 881 (reasonableness of agency's statutory construction depends, in part, on its "fit with the statutory language" and "conformity to statutory purposes" (internal quotation marks omitted)). For the same reasons, EPA's alternative theories under which it could (or even must) rescind the MATS Rule without following the section 112(c)(9) procedures are also wrong. EPA's Proposal is therefore unlawful and *ultra vires* and should be withdrawn.

A. The Clean Air Act Prohibits EPA from Reconsidering its Appropriate and Necessary Finding Unless It Follows Health-Protective Statutory Procedures.

1. Statutory Text, Context, and Structure Plainly Prohibit the Proposed Revised Finding.

The plain language of section 112 unambiguously prohibits EPA from reconsidering its appropriate and necessary finding outside of the procedures defined in section 112(c)(9).[37] Enacted as part of the 1990 Clean Air Act Amendments, section 112(n)(1)(A) gave EPA only limited authority to make a one-time finding as to whether power plants should be regulated under section 112, based on a one-time public health study due, and in fact completed, decades ago.[38] It mandates that EPA "shall perform a study of the hazards to public health reasonably anticipated to occur as a result of emissions by [power plants]" and report the results of that study to Congress by 1993; and it requires that EPA "shall regulate [power plants] under this

[37] In addition, a reviewing court, subject to applicable judicial review procedures, may order EPA to revisit an appropriate and necessary finding by remanding the finding to the agency, as the D.C. Circuit did in 2015 on remand following *Michigan*. *White Stallion II* (D.C. Cir. Dec. 15, 2015) (order remanding the proceeding to EPA without vacatur of the MATS Rule), Doc. ID No. EPA-HQ-OAR-2009-0234-20567; *accord New Jersey*, 517 F.3d at 583 (confirming that "section 112(c)(9)'s delisting process or court-sanctioned vacatur" are the only avenues by which EPA could reconsider regulation of power plants under section 112). As discussed in Section IV.B, *infra*, this Proposal is not a continuation of the *White Stallion II* court's remand.

[38] *See* EPA, Off. of Air Quality Planning & Standards, *Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Final Report to Congress* (1998), Doc. ID No. EPA–HQ–OAR–2009–0234–3052.

section, if the Administrator finds such regulation is appropriate and necessary after considering the results of the study." 42 U.S.C. § 7412(n)(1)(A). "Once the appropriate and necessary finding is made, EGUs are subject to section 112 in the same manner as other sources." 77 Fed. Reg. at 9330. Thus, upon finding that it is appropriate and necessary to regulate power-plant hazardous air emissions, as EPA did in 2000, and reaffirmed in 2012 and 2016, the agency no longer had discretion to exercise; section 112(n)(1)(A) requires that EPA "shall regulate" power plants. *See Chevron*, 467 U.S. at 843–44 (agencies have discretion "only when Congress has left a gap for the agency to fill"); *Ethyl Corp. v. EPA*, 51 F.3d 1053, 1060 (D.C. Cir. 1995) ("level of specificity" in Clean Air Act provision "effectively closes any gap the Agency seeks to find and fill").

If EPA later believes its initial determination was made in error, the regulatory off-ramp Congress provided EPA is section 112(c)(9), "Deletions from the list." Under that provision, EPA "may delete any source category from the list" of categories regulated under section 112 if EPA can demonstrate that no source in that category poses an unacceptable risk to human health or the environment. Specifically, EPA would have to make two determinations: first, "that no source in the category" emits hazardous air pollution "in quantities which may cause a lifetime risk of cancer greater than one in one million" to the most exposed individual, and second, "that emissions from no source . . . exceed a level which is adequate to protect public health with an ample margin of safety and no adverse environmental effect will result from emissions from any source." 42 U.S.C. § 7412(c)(9)(B)(i)–(ii). As the D.C. Circuit has confirmed, section 112(c)(9)'s "comprehensive delisting process" unambiguously applies to *all* listed sources, including power plants. *New Jersey*, 517 F.3d at 582–83.

That reading of the text is the only reading consistent with statutory context and structure. *See Util. Air Regulatory Grp. v. EPA*, 573 U.S. 302, 320 (2014) ("[T]he words of a statute must be read in their context and with a view to their place in the overall statutory scheme." (internal quotation marks omitted)). When Congress first passed the Clean Air Act, it found that growth in air pollution had "resulted in mounting dangers to the public health and welfare," 42 U.S.C. § 7401(a)(2), and declared that the purposes of Title I are to "protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population," *id*. § 7401(b)(1); *see also Air All. Houston v. EPA*, 906 F.3d 1049, 1061–62 (D.C. Cir. 2018) (Congress enacted the Clean Air Act "to encourage and promote 'pollution prevention.'" (citing 42 U.S.C. § 7401(c))). Congress added section 112 to the Act in 1970 to further those purposes. *See* Pub. L. No. 91-604, § 4(a), 84 Stat. 1676, 1685 (1970). But decades later, EPA had established emission standards for only seven hazardous air pollutants, and many of the largest sources of toxic pollution, including power plants, were still unregulated. *New Jersey*, 517 F.3d at 578–79.

Congress thus intended in the 1990 Clean Air Act Amendments to remedy "the slow pace of EPA's regulation." *Id.* at 578; *see also* 77 Fed. Reg. at 9327. Motivated by its goal of rapid regulation of hazardous air pollution, Congress "altered section 112 by eliminating much of EPA's discretion in the process." *New Jersey*, 517 F.3d at 578; *see also Nat'l Lime Ass'n v. EPA*, 233 F.3d 625, 634 (D.C. Cir. 2000) (Congress created a strict framework for regulating hazardous air pollution "precisely because it believed EPA had failed to regulate enough

[pollutants] under previous air toxics provisions"). For instance, Congress directly listed 189 hazardous air pollutants, including mercury, 42 U.S.C. § 7412(b)(1), gave EPA one year to list all source categories that emitted the listed pollutants, *id.* § 7412(c)(1), and directed EPA promptly to establish emissions standards for those categories, *id.* § 7412(e). Congress also dispensed with the risk-based approach to establishing emission standards, instead requiring the technology-based "Maximum Achievable Control Technology" or "MACT" standard, mandating that EPA consider public health risks that may remain even after applying MACT standards, and directing EPA to establish more stringent standards as required to protect public health. *Id.* § 7412(d)(2)–(3), (f)(1)–(2). Congress also deliberately "restricted the opportunities for EPA and others to intervene in the regulation of HAP sources" by establishing the section 112(c)(9) criteria for removing a listed source category and barring judicial review of listing decisions until EPA promulgated emission standards for the source category. *New Jersey*, 517 F.3d at 578 (citing 42 U.S.C. § 7412(c)(9), (e)(4)).

If Congress had wanted to provide EPA with broad discretion to revisit or "correct[] flaws" in its initial appropriate and necessary determination, 84 Fed. Reg. at 2670, it would have explicitly provided for that, as it did in other sections of the Clean Air Act, and would not have expressly limited it. *See, e.g.*, 42 U.S.C. § 7409(d)(1) (requiring EPA periodically to revise national ambient air quality standards (NAAQS) according to specific deadlines); *id.* § 7410(k)(6) (allowing EPA to revise its prior approval or disapproval of a state plan submission whenever it determines the action "was in error"); *id.* § 7411(b)(1)(A) (mandating that EPA "shall" revise "from time to time" its list of stationary source categories subject to emission performance standards). No such provision is present in section 112(n), however. *See Russello v. United States*, 464 U.S. 16, 23 (1983) ("Where Congress includes particular language in one section of a statute but omits it in another . . . Congress acts intentionally and purposely in the disparate inclusion or exclusion." (citation omitted)).

In other words, section 112(n)(1)(A) gave EPA limited discretion to activate a one-way switch to "turn on" regulation of power plants after completing and considering its public health study. Once EPA turns on that switch, as it did in its 2000 finding that regulation of power-plant emissions is appropriate and necessary, it must regulate power plants under section 112.[39] *See* 42 U.S.C. § 7412(n)(1)(A). The entirety of section 112 evinces Congress' intent to achieve rapid and strict regulation of hazardous air pollution—keeping the switch turned on—as Congress knew from experience that private parties and even EPA might attempt to intervene in the regulatory scheme to the detriment of Congress' public health goals. Thus, once power plants are so regulated, Congress provided only one statutorily mandated avenue to turn the switch off and reverse course: the section 112(c)(9) procedures. EPA's proposed revised finding is therefore unambiguously foreclosed. *See Chevron*, 467 U.S. at 842–43. *Cf. League of Conservation Voters v. Trump*, No. 3:17-cv-00101-SLG (D. Alaska Mar. 29, 2019) (order on motions for summary judgment) (finding, upon considering statutory text and context, that the

[39] EPA's action listing a source category imposes no direct obligation on any source and is not subject to judicial review, 42 U.S.C. § 7412(e), but it requires EPA to promulgate emission standards for regulated hazardous air pollutants emitted by sources in the listed category, *id.* § 7412(d)(1).

Outer Continental Shelf Lands Act does not authorize the President to revoke prior Presidential actions withdrawing areas of the Outer Continental Shelf from leasing).

2. Legislative History Confirms That Congress Strictly Limited EPA's Discretion to Reconsider Whether Regulation of Power-Plant Hazardous Air Pollution Is "Appropriate."

EPA has failed to point to any evidence in the legislative history of the Clean Air Act indicating that Congress intended to grant EPA discretion to upend settled expectations and reverse its appropriate and necessary finding. In fact, the legislative history suggests the opposite: in the 1990 Clean Air Act Amendments, Congress sought to restrict EPA's intervention in a tight statutory scheme designed to regulate power-plant hazardous air pollution promptly upon a science-based finding by the Administrator that such regulation is appropriate and necessary.

By 1990, Congress viewed EPA's failure to regulate hazardous air pollutants as a "history of abuse and abdication," S. Rep. No. 101-228 (1989), 1990 U.S.C.C.A.N. 3385, 3561. *See also id.* at 3389 (identifying that "very little ha[d] been done since the passage of the 1970 Act to identify and control hazardous air pollutants"). Congress therefore intended its amendments to section 112 to "entirely restructure the existing law, so that toxics might be adequately regulated by the Federal Government." *Id.* at 3513.

With the 1990 Clean Air Act Amendments, Congress also established the Acid Rain Program, a cap-and-trade program for power-plant emissions of sulfur dioxide and nitrogen oxides. Pub. L. No. 101-549, 104 Stat. 2399 (1990). Mindful that power-plant hazardous air pollution could be reduced if plants installed pollution controls to comply with the Acid Rain Program and other requirements of the Clean Air Act, Congress sought to provide a mechanism to account for the effect of those programs on hazardous air pollution. *See, e.g.*, 136 Cong. Rec. 35,075 (1990) (statement of Rep. Michael Oxley); *id.* 36,062 (statement of Sen. David Durenberger). Instead of requiring immediate regulation, Congress mandated that EPA first study threats to public health from power-plant hazardous air pollution remaining after implementation of other Clean Air Act programs, thereby giving power plants a three-year reprieve. *See* 42 U.S.C. § 7412(n)(1)(A); 76 Fed. Reg. at 24,978; S. Rep. No. 101-228, 1990 U.S.C.C.A.N. at 3794.

The additional time afforded to complete the public health study required under section 112(n)(1)(A), and the requirement that the decision to regulate be based on the results of that study, reflected a compromise: Congress wanted to understand what effect, if any, the Acid Rain Program and other Clean Air Act programs would have on emissions of hazardous air pollutants from power plants. 76 Fed. Reg. at 24,978. Congress' approach reflects its intent that EPA would make a one-time determination as to whether power-plant hazardous air pollution remained a serious public health problem after implementing the Acid Rain Program and other Clean Air Act programs, and, if so, that EPA would swiftly address that problem through technology-based regulations under section 112. *See* 136 Cong. Rec. 35,075 (statement of Rep. Michael Oxley) (noting that EPA may regulate power plants "after taking into account

compliance with all provisions of the act"). Thus, legislative history provides further evidence that EPA's Proposal is foreclosed and should be withdrawn.

3. Even if Section 112 Were Ambiguous, EPA's Theory That It Could Somehow Reconsider the Appropriate and Necessary Finding Without Following the Required Statutory Procedures Would Be Unreasonable.

Even if section 112 did not unambiguously foreclose the proposed approach, which it does, EPA's suggestion that it somehow retains discretion or "inherent authority"[40] to revise its finding about the appropriateness of regulating a major source of hazardous air pollution would be unreasonable. *See* 84 Fed. Reg. at 2674 n.3.

"EPA may not construe the statute in a way that completely nullifies textually applicable provisions meant to limit its discretion." *New Jersey*, 517 F.3d at 583 (quoting *Whitman*, 531 U.S. at 485). But EPA's claim of broad reconsideration authority does just that, effectively seeking to annul the criteria for deregulation established by Congress in section 112(c)(9). Courts have struck down similar attempts by agencies to evade statutory limits on their authority. For instance, in *Ivy Sports Medicine, LLC v. Burwell*, 767 F.3d 81 (D.C. Cir. 2014) (Kavanaugh, J., op.), the court evaluated a Food and Drug Administration ("FDA") order reclassifying a medical device following FDA's finding of errors in its initial review of the device. Instead of following the reclassification procedures in the Food, Drug, and Cosmetic Act, however, FDA relied on its "inherent reconsideration authority" to order the device immediately off the market. *Id.* at 82. The D.C. Circuit held that the FDA's order was invalid because "it would be unreasonable under this statutory scheme to infer that FDA retains inherent authority to short-circuit or end-run the carefully prescribed statutory reclassification process." *Id.* at 87. EPA's Proposal is invalid for the same reason. "In short, because [EPA] concededly could have used Section [112(c)(9)] to [deregulate power plants], it [can]not rely on a claimed inherent reconsideration authority to short-circuit that statutory process and revoke its prior [appropriate and necessary] determination to achieve that same result." *Id.*; *see also New Jersey*, 517 F.3d at 583 ("Congress . . . undoubtedly can limit an agency's discretion to reverse itself"); *American Methyl*, 749 F.2d at 835 ("when Congress has provided a mechanism capable of rectifying mistaken action . . . it is not reasonable to infer authority to reconsider agency action").[41]

To now reverse the appropriate and necessary finding and interpret that reversal as having no impact on EPA's regulatory program would further drain section 112(n)(1)(A) of meaning and make a mockery of Congress' intent in enacting it. And to the extent that the

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[40] *See HTH Corp. v. NLRB*, 823 F.3d 668, 679 (D.C. Cir. 2016) ("inherent" powers are more accurately called "statutorily implicit" powers because an agency can exercise its power "only if some provision or provisions of [a statute] explicitly or implicitly grant it power to do so" (citation omitted)).

[41] *Cf. Air All. Houston*, 906 F.3d at 1061 (EPA "may not circumvent specific statutory limits on its actions by relying on separate, general rulemaking authority"); *Humane Soc'y of United States v. Zinke*, 865 F.3d 585, 601–02 (D.C. Cir. 2017) (segmentation of a species listed under the Endangered Species Act is unlawful where, *inter alia*, Fish and Wildlife Service failed to analyze the effect of segmentation on the remnant's status, as omitting such analysis would turn segmentation into "a backdoor route to the *de facto* delisting of already-listed species, in open defiance of the Endangered Species Act's specifically enumerated requirements for delisting").

proposed revised finding is intended to render the MATS Rule vulnerable to legal attack or subsequent administrative rescission (as EPA plainly contemplates in the Proposal, *see* 84 Fed. Reg. at 2679), EPA's novel interpretation would give way to the dissolution of emission standards even though section 112(c)(9)'s health-protective criteria for deregulation are not satisfied. To argue otherwise is to render Congress's scheme as a whole a nullity. "EPA's interpretation of its [reconsideration] authority is not reasonable because it has no stopping point." *Air All. Houston*, 906 F.3d at 1066.

The proposed revised finding is also unreasonable because it would make no sense to interpret the Clean Air Act as providing a loophole for EPA to reevaluate whether regulation of the electric power sector—the largest source of hazardous air pollution that endangers human health—is warranted "on a continuing basis," as EPA proposes, while EPA can reconsider its regulation of other types of sources only in accordance with the stringent section 112(c)(9) criteria. *See* 84 Fed. Reg. at 2674 n.3 (quoting *Brand X*, 545 U.S. at 981). Also, section 112(n)(1)(A) states that EPA shall determine whether regulation of power plants is appropriate and necessary considering hazards to public health that remain "after imposition of the requirements of [the Clean Air Act]." It would be illogical and circular for EPA to have authority to reconsider whether regulation is appropriate *after* EPA has established emission standards controlling power-plant hazardous air emissions and thereby reduced threats to public health.

And whatever the outer boundaries of EPA's inherent authority are, it is patently unreasonable to read into the Clean Air Act authority for EPA to reverse its appropriate and necessary finding *now*.[42] Power plants are in full compliance with the MATS Rule, and the Rule has been controlling hazardous air pollution effectively and at reasonable cost for nearly half of a decade. *See* NESCAUM Report at 11. EPA suggests that a change in Presidential administration "is a perfectly reasonable basis for [EPA's] reappraisal" of its appropriate and necessary finding. 84 Fed. Reg. at 2674 n.3 (quoting *State Farm*, 463 U.S. at 59 (Rehnquist, J., concurring in part and dissenting in part)). But agencies cannot rule by fiat, upsetting longstanding regulatory programs on the basis of political whims and acting without a reasoned basis. *See, e.g.*, *Chapman v. El Paso Natural Gas Co.*, 204 F.2d 46, 53–54 (D.C. Cir. 1953) ("[A] decision may not be repudiated for the sole purpose of applying some quirk or change in administrative policy."); *Upjohn Co. v. Penn. R. Co.*, 381 F.2d 4, 5 (6th Cir. 1967) (invalidating Interstate Commerce Commission's reversal of determination entered three years prior where the agency's sole basis for the reversal was that it had "adopted a different policy"). That is particularly so where, as here "considerable funds have been expended in justifiable reliance upon the earlier [determination]." *Chapman*, 204 F.2d at 54. Indeed, the electric power sector has urged that "EPA should take no action that would jeopardize [power companies']

[42] *See, e.g.*, *Ivy Sports*, 767 F.3d at 86 (agencies' "authority to revisit their prior decisions" must be exercised "in a timely fashion"); *American Methyl Corp.*, 749 F.2d at 835 (agencies' power to correct mistakes through reconsideration is limited to "the period available for taking an appeal"); *Mazaleski v. Treusdell*, 562 F.2d 701, 720 (D.C. Cir. 1977) (agency has power "to reconsider and change a decision if it does so within a reasonable period of time" (internal quotation marks omitted)).

investments [to comply with the MATS Rule] or the underlying rule." *See* Industry Comments, *supra* note 28, at 2.

The D.C. Circuit stressed the importance of such considerations in *American Methyl*, where it held that EPA had no "inherent authority" to revoke a waiver to market a new gasoline blend without complying with the procedural safeguards in section 211(c) of the Clean Air Act, 42 U.S.C. § 7545(c). 749 F.2d at 829–30, 840. The court emphasized that in "upholding Congress's disinclination to grant EPA an unguided and open-ended power to revoke" its prior determination, the court's holding "protect[s] the legitimate expectations" of regulated entities, "comports with basic fairness," and "encourages investment." *Id.* at 839–40. Otherwise, "[l]ike the sword suspended by a hair above the courtier Damocles, the Administrator's claimed revocation authority would pose an ever-present threat" to regulated industry. *Id.* at 840. Such extraordinary risk, as would flow from EPA's proposed interpretation here, does not reflect a reasonable "balancing of the environmental, economic, and administrative goals of the [Clean Air Act]," *New York v. EPA*, 413 F.3d 3, 37 (D.C. Cir. 2005).

Moreover, it would be illogical for EPA to have authority to revise or withdraw its appropriate and necessary finding independent of removing power plants from the list of regulated sources and rescinding emission standards (which it cannot do as a factual matter—*see* Section IV.C, *infra*). *See* 42 U.S.C. § 7601(a)(1) (authorizing regulations necessary to carry out functions under the Clean Air Act). A revised finding that has no effect on EPA's regulatory program, and no public benefit, is a waste of agency resources and inherently irrational. *Cf. Air All. Houston*, 906 F.3d at 1068 (finding rule irrational where EPA tried to "have it both ways" by claiming that rule is necessary to prevent harms to regulated industry but also "does nothing more than maintain the status quo"). Given "the carefully designed regime Congress envisioned in the 1990 Amendments," EPA cannot reasonably interpret the statute to contemplate such a futile exercise. *Id.* at 1065.

4. The D.C. Circuit's Decision in *New Jersey* Confirms That EPA Lacks Inherent Authority to Reconsider the Appropriate and Necessary Finding (C-3).

EPA's proposed revised finding is *déjà vu* for those of the undersigned states that fought successfully to invalidate EPA's action reversing its appropriate and necessary finding more than a decade ago, 70 Fed. Reg. 15,994 (Mar. 29, 2005) ("2005 Rule"). As in the Proposal, the 2005 Rule "revis[ed]" EPA's determination that regulation of power plants is appropriate and necessary while failing entirely to make the stringent public health and environmental findings required by section 112(c)(9); however, the 2005 Rule also went a step further than the Proposal and purported to remove power plants from the section 112 source category list. *Id.* at 15,994, 16,029–33. Many of the States and Local Governments challenged those actions as violating section 112. The D.C. Circuit agreed and vacated the 2005 Rule in its entirety. *New Jersey*, 517 F.3d at 582–84. EPA fails to meaningfully distinguish its current proposed revised finding from the revised finding vacated in *New Jersey*—and indeed, it cannot do so.

EPA's Proposal misconstrues *New Jersey*, suggesting that the court endorsed EPA's claimed authority to reevaluate its appropriate and necessary finding but stopped short of allowing EPA to delist power plants outside of the section 112(c)(9) procedures. *See* 84 Fed. Reg. at 2674 n.3. That reading is wrong. EPA claimed in the 2005 Rule, as it suggests now in the Proposal, that "nothing [in section 112] precludes [EPA] from revising [its] appropriate and necessary finding if [it] determine[s] either that the finding was in error . . . , or that the finding is incorrect given new information." 70 Fed. Reg. at 16,002; *see also* EPA Br. 21–24, July 23, 2007, *New Jersey v. EPA*, No. 05-1097 (D.C. Cir.) ("EPA 2005 Brief") (arguing that "EPA may revise a section 112(n)(1)(A) determination without applying the delisting criteria"). The *New Jersey* court completely rejected EPA's inherent authority theory—including EPA's claimed authority to reconsider its appropriate and necessary finding:

> An agency can normally change its position and reverse a decision, and prior to EPA's listing of EGUs under section 112(c)(1), nothing in the CAA would have prevented it from reversing its determination about whether it was "appropriate and necessary" to do so. Congress, however, undoubtedly can limit an agency's discretion to reverse itself, and in section 112(c)(9) Congress did just that, unambiguously limiting EPA's discretion to remove sources, including EGUs, from the section 112(c)(1) list once they have been added to it. This precludes EPA's inherent authority claim . . . .

New Jersey, 517 F.3d at 582–83; *see also id.* at 581 (stating that because EPA's interpretation of section 112 was unlawful, the court need not reach the question of whether EPA's revised appropriate and necessary determination was arbitrary and capricious); *id.* at 582 (EPA's argument that the statutory delisting process does not apply once EPA reverses its appropriate and necessary finding "deploys the logic of the Queen of Hearts, substituting EPA's desires for the plain text of section 112(c)(9)").

EPA also argued that it must have authority to "correct its own mistake" by revising the appropriate and necessary finding to avoid "an anomalous result" where a court would have power to vacate the appropriate and necessary finding even though EPA could not reverse it. EPA 2005 Brief at 32. The *New Jersey* court dispensed with this notion:

> Congress was not preoccupied with what EPA considers "anomalous," but rather with the fact that EPA had failed for decades to regulate HAP sufficiently. . . . EPA's disbelief that it would be prevented from correcting its own listing "errors" except through section 112(c)(9)'s delisting process or court-sanctioned vacatur cannot overcome the plain text enacted by Congress.

517 F.3d. at 583.

Although the language of the *New Jersey* court's reasoning often focuses on EPA's delisting of power plants and not its revision of the appropriate and necessary finding specifically, this is a consequence of EPA's focusing its argument on its contention that "the delisting criteria at section 112(c)(9) do not apply to EPA action under section 112(n)(1)(A),"

EPA 2005 Brief at 33, and therefore, a revised finding "*ipso facto* must result in removal of power plants from the section 112(c) list," *id.* at 26. The court understood the delisting action to be linked to EPA's theory that it could revise its finding, and rejected it root and branch. *See New Jersey*, 517 F.3d at 582–83. EPA's strained theories of authority are no more lawful now.

B. The Clean Air Act Bars EPA's Alternative Theories Under Which It Could Rescind Emission Standards Without Following Statutory Delisting Procedures (C-4, C-5, C-6, C-7, C-8, C-9, C-10).

EPA seeks comment on two alternative theories under which it could (or even must) "reasonably conclude that the D.C. Circuit's holding in *New Jersey v. EPA* does not limit the Agency's authority to rescind the MATS rule" without following the section 112(c)(9) procedures: first, that the proposed revised finding is a continuation of EPA's response to *Michigan*, and second, that *New Jersey* does not prohibit EPA from rescinding the MATS Rule so long as power plants remain a listed source category under section 112(c). *See* 84 Fed. Reg. at 2679. Both are wrong. *See New Jersey*, 517 F.3d at 578.

Under EPA's first alternative theory, the proposed revised finding "is a continuation of the Agency's response to the Supreme Court's remand" following *Michigan*, and "*New Jersey* does not limit the effect of an action made in response to a Supreme Court decision finding the original action flawed, nor does it limit the Agency's ability to revise its response to a Supreme Court decision." 84 Fed. Reg. at 2679. Each of those premises is wrong.

First, the proposed revised finding is not a continuation of EPA's response to the *Michigan* Court's remand. EPA's response to *Michigan* concluded in 2016 with its finalization of the Supplemental Finding after public notice and comment. *See* 81 Fed. Reg. at 24,420 ("EPA is taking this final action in response to . . . *Michigan v. EPA*"). The Supplemental Finding is the subject of separate ongoing litigation before the D.C. Circuit, *Murray Energy Corp. v. EPA*, No. 16-1127 (filed Apr. 25, 2016) (currently in abeyance). The *Murray Energy* court has not remanded the Supplemental Finding to EPA, and thus, it remains valid. EPA has no authority to reconsider it here.

Second, even if the proposed revised finding were "taken in response to a Supreme Court decision," there is no rational basis for the notion that neither the *New Jersey* decision nor the Clean Air Act requirements the decision describes would apply to EPA's actions, and EPA offers none. *See* 84 Fed. Reg. at 2679. That EPA's appropriate and necessary finding was not reviewed in *New Jersey* does not limit the validity of the court's interpretation of the plain text of section 112; nor does it limit the applicability of the court's holding that EPA lacks authority to delist power plants without following the section 112(c)(9) procedures. *Michigan* interprets the Clean Air Act, it in no way supersedes it. EPA cites no caselaw or legal principles indicating that EPA is immune from otherwise valid and applicable law when responding to a Supreme Court decision—especially *New Jersey*, a decision that rejected EPA's previous similar action in violation of the Clean Air Act.

Third, EPA does not have unlimited authority to revise its response to a Supreme Court decision. EPA is "a creature of statute" and has "only those authorities conferred upon it by Congress." *Michigan v. EPA*, 268 F.3d 1075, 1081 (D.C. Cir. 2001); *see also Louisiana Pub. Serv. Comm'n v. FCC*, 476 U.S. 355, 357 (1986). The federal courts may review EPA action to ensure the agency "stayed within the bounds of its statutory authority," *City of Arlington, Tex. v. FCC*, 569 U.S. 290, 297 (2013); however, they cannot, in their review, put new arrows in the agency's quiver of authority. *See Marbury v. Madison*, 5 U.S. 137, 177 (1803) (the federal courts' duty is "to say what the law is"). Following *Michigan*, the D.C. Circuit's remand of the proceeding to EPA did not grant EPA any special discretion to evade the limits Congress placed on its authority in section 112. Any suggestion to the contrary by EPA conflicts with the foundational principle of separation of powers and must fail.

EPA's second alternative theory is similarly without merit. EPA posits it might have authority to reverse its appropriate and necessary finding and rescind the MATS Rule even if power plants were to remain listed under section 112(c). 84 Fed. Reg. at 2679. According to EPA, although *New Jersey* held that EPA may not delist a source category without following the section 112(c)(9) procedures, "the decision did not address the question whether, in the absence of a valid appropriate and necessary finding, the EPA must regulate EGUs." *Id.* Such parsing cannot withstand scrutiny. The plain text and structure of section 112 make clear that the only pathway to repeal the MATS Rule is through delisting under the section 112(c)(9) procedures. *See* Section IV.A.1, *supra*. So long as power plants remain listed, EPA "shall" enforce emissions standards for those sources. 42 U.S.C. § 7412(d)(1). There is no gap in the regulation of power plants under section 112 for EPA to exercise the discretion it imagines. *See Chevron*, 467 U.S. at 843–44. Furthermore, whether there is "a valid appropriate and necessary finding" is for a court, not EPA, to determine. 84 Fed. Reg. at 2679. As discussed above, EPA has no discretion to reevaluate the "validity" of its appropriate and necessary finding. Thus, EPA's second alternative interpretation also would be contrary to the Clean Air Act and unlawful.

In addition, any final rule resulting from this Proposal that purported to delist power plants or rescind the MATS Rule would violate the Clean Air Act's notice requirement. Section 307(d)(3) of the Act requires EPA to publish notice of a proposed rulemaking, which "shall be accompanied by a statement of its basis and purpose." 42 U.S.C. § 7607(d)(3). To satisfy that requirement, a final rule need not be identical to a proposed rule, but it must be a "logical outgrowth." *See Portland Cement Ass'n v. EPA*, 665 F.3d 177, 189 (D.C. Cir. 2011). A logical outgrowth does "not include [an agency's] decision to repudiate its proposed interpretation and adopt its inverse." *Envtl. Integrity Project v. EPA*, 425 F.3d 992, 998 (D.C. Cir. 2005). EPA has assured the public repeatedly that adoption of the proposed revised finding would not repeal the MATS Rule or remove coal- and oil-fired power plants from the list of source categories regulated under section 112.[43] Given those assurances, EPA could not now adopt the opposite of

[43] *See, e.g.*, 84 Fed. Reg. at 2678–79 (assuring that the MATS Rule and the section 112(c)(1) listing status of power plants "would be unaffected by final action on this proposal"); *id.* at 2672 ("[F]inalizing this action will not remove the Coal- and Oil-Fired EGU source category from the CAA section 112(c)(1) list, nor will finalizing this action affect the existing CAA section 112(d) emissions standards promulgated in 2012 that regulate HAP emissions from coal- and oil-fired EGUs."); *id.* at 2703 ("Because the EPA is not proposing any amendments to the MATS rule, there would not be any cost, environmental, or economic impacts as a result of this proposed action."); *Hearing*

its Proposal by finalizing a rule that rescinds emission standards. *Envtl. Integrity*, 425 F.3d at 998; *see also Allina Health Servs. v. Sibelius*, 904 F. Supp. 2d 75, 90 (D.D.C. 2002) (adopting "the exact opposite interpretation" from the one proposed is "problematic"), *upheld in pertinent part*, *Allina Health Servs. v. Sibelius*, 746 F.3d 1102, 1109–10 (D.C. Cir. 2014). Before any final action rescinding the MATS Rule, EPA must formally and unequivocally propose to take such action.

C. EPA Cannot Make the Statutory Findings Required to Repeal Emissions Standards for Power-Plant Hazardous Air Pollution.

EPA presumably resorts to the logical contortions in its Proposal because the agency is well aware it cannot satisfy the delisting requirements of section 112(c)(9). EPA effectively admits as much. *See* 84 Fed Reg. at 2679–80 (EPA is not conducting a delisting analysis in its Proposal). Even with the MATS Rule in place, the Proposal illustrates that some power plants emit hazardous air pollution "in quantities which may cause a lifetime risk of cancer greater than one in one million" to the most exposed individual, 42 U.S.C. § 7412(c)(9)(B)(i). *See* 84 Fed. Reg. at 2697 tbl.5, 2699 (presenting inhalation risk assessment results that show *current* estimated maximum individual cancer risk is 9-in-1 million and about 193,000 people are estimated to have cancer risks above 1-in-1 million). And the record strongly indicates that deregulating power plants would result in significant "adverse environmental effect[s]," 42 U.S.C. § 7412(c)(9)(B)(ii). *See* Section I, *supra*. In this context, and in the absence of any good countervailing explanation from EPA, EPA's efforts to circumvent section 112(c)(9)'s requirements cannot reasonably be interpreted as anything other than a purposeful attempt to "substitute[e] EPA's desires for the plain text of section 112(c)(9)." *New Jersey*, 517 F.3d at 582.

1. The Health Risks Posed by Power-Plant Hazardous Air Emissions Do Not Meet Statutory Requirements for Delisting.

Even with the MATS Rule in effect, the cancer risk posed by some power plants' emissions exceeds the stringent, health-protective limit Congress established as the first statutory prerequisite for deregulation. *See* 42 U.S.C. § 7412(c)(9)(B)(i). As EPA concedes, "the proposed results of [the residual risk and technology review] indicate that with the MATS rule in place, the estimated inhalation cancer risk to the individual most exposed to actual emissions from the source category is 9-in-1 million." 84 Fed. Reg. at 2679; *see also id.* at 2697 tbl.5, 2699. The proposed residual risk and technology review identifies four units in Puerto Rico with emissions that pose a cancer risk equal to or greater than 1-in-1 million. *Id.* at 2699. And it finds that "emissions from the source category expose approximately 193,000 people to a cancer risk at or above 1-in-1 million." *See id.* Thus, EPA could not meet the first statutory

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on the Nomination of Andrew Wheeler to be Administrator of the Environmental Protection Agency, Before the S. Comm. on Env't and Pub. Works, 116th Cong. 10 (2019) (statement of Andrew Wheeler, Acting EPA Administrator) [Wheeler Nomination Statement] ("EPA is not proposing to remove, or delist, electric generating units from the list of source categories subject to regulation under Section 112 . . . . The proposed Reconsideration . . . would have no effect on mercury emissions reduction levels required under the existing MATS rule.").

prerequisite for delisting even with the MATS Rule in effect, let alone in the absence of regulation.

The proposed residual risk and technology review does not capture the full extent of the cancer risk power-plant hazardous air emissions would pose if the MATS Rule were repealed. EPA has, however, twice evaluated whether power plants could be removed from the list of regulated source categories in accordance with section 112(c)(9)(B)(i). On both occasions, EPA concluded that delisting would result in excessive cancer risk. In 2011, EPA denied a petition from an industry trade group, the Utility Air Regulatory Group ("UARG"), asking EPA to delist coal-fired power plants. *See* 84 Fed. Reg. at 2679–80. UARG asserted the maximum cancer risk from coal-fired power plants was below the statutory criterion of 1-in-1-million. *See id.* at 2680. EPA pointed out, however, that the multi-pathway-risk model UARG relied on indicated that "adult anglers would face cancer risks of 4 in a million" absent regulation. 77 Fed. Reg. at 9365. Given that excessive cancer risk (as well as EPA's finding that coal-fired power plants could not be delisted separately from the broader source category), EPA concluded that coal-fired power plants could not be removed from the section 112(c) list of source categories.[44] That same year, EPA also conducted an independent assessment of whether the delisting criteria could be met, and determined, for the second time, that it did not have authority to delist power plants.[45] Delisting would be no more appropriate today.

2. The Environmental Risks Posed by Power-Plant Hazardous Air Emissions Do Not Meet Statutory Requirements for Delisting.

Even if no power plant emitted pollution that posed a cancer risk greater than 1-in-1 million, EPA still could not make the required showing that "no adverse environmental effect will result from emissions from any source" in the category. 42 U.S.C. § 7412(c)(9)(B)(ii). The extensive record supporting EPA's 2000 finding, 2012 affirmation, and 2016 Supplemental Finding shows that power-plant hazardous air pollution causes tremendous environmental harm.[46]

The harmful ecological effects of power-plant mercury emissions, in particular, are well-documented. *See* Section I.A, *supra*.[47] EPA's 2000 appropriate and necessary finding

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[44] *See* EPA, *Denial of Petitions for Reconsideration of Certain Issues: MATS and Utility NSPS* 73–74 (2015), https://www.epa.gov/sites/production/files/2015-11/documents/20150421denial.pdf.

[45] *See id.*; 84 Fed. Reg. at 2679; EPA, *Supplement to the Non-Hg Case Study Chronic Inhalation Risk Assessment for the Utility MACT "Appropriate and Necessary" Analysis* 14 (2011), Doc. ID. No. EPA-HQ-OAR-2009-0234-19912 (examining the cancer risks associated with the inhalation of hazardous air pollutants other than mercury from a sample set of sixteen coal- and oil-fired power plants and finding that emissions from at least six of those facilities resulted in risks that exceeded the statutory threshold).

[46] EPA's previous two delisting analyses did not reach the second statutory threshold. *See* 77 Fed. Reg. at 9365; 84 Fed. Reg. at 2680.

[47] *See also, e.g.*, C. E. Osborne et al., Biodiversity Research Inst., *Mercury Contamination within Terrestrial Ecosystems in New England and Mid-Atlantic States: Profiles of Soil, Invertebrates, Songbirds, and Bats* (2012), http://www.briloon.org/uploads/BRI_Documents/Mercury_Center/Hidden%20Risk/BRI_2011-09_Osborne.etal.2011.pdf; C.R. DeSorbo et al. *Mercury Concentrations in Bald Eagles Across an Impacted Watershed in Maine, USA*, 627 Sci. of the Total Env't 1515 (2018),

concluded that power plants are a "substantial" source of harmful environmental mercury contamination. 65 Fed. Reg. at 79,827. EPA's 2016 Supplemental Finding reaffirmed that conclusion. *See, e.g.*, 81 Fed. Reg. at 24,423 (power-plant mercury emissions "contribute to adverse impacts on fish-eating birds and mammals"). EPA has further found that "[e]xposure to methylmercury can have serious toxicologic effects on wildlife," as "wildlife consume fish from a much more limited geographic area than do humans which can result in elevated levels of mercury in certain fish-eating species," including some endangered species. 65 Fed. Reg. at 79,830.[48] In a world without the MATS Rule, EPA found, the environmental damage caused by power-plant mercury emissions would only worsen: "increased mercury deposition will lead to increased levels of methylmercury in fish, and . . . increased levels in fish will lead to toxicity in fish-eating birds and mammals, including humans." *Id.* The extensive record evidence demonstrating that deregulating power plants would have tremendously adverse effects for ecosystems and wildlife, as well as the agency's own prior findings, thus indicate EPA could not make the second statutory finding required under section 112(c)(9).

EPA must abandon its unlawful attempt to evade the statutory requirements that it clearly cannot satisfy. *See New Jersey*, 517 F.3d at 582.

V. EPA's Proposed Revised Finding Is Arbitrary and Capricious, Contrary to the Clean Air Act and *Michigan*, and an Unlawful Departure from the Supplemental Finding (C-2).

Even if EPA had authority to reconsider its appropriate and necessary finding—and it does not—EPA's proposed new approach to considering costs under section 112(n)(1)(A) is arbitrary and capricious and unlawful. EPA fails to provide "good reasons" for its rejection of either of the Supplemental Finding's two reasonable alternative approaches to considering costs and benefits. *See Fox*, 556 U.S. at 515. EPA now wrongly claims it was required to conduct a more "direct" benefit-cost comparison and must limit its consideration of benefits to only those non-"ancillary" benefits that may be monetized. *See* 84 Fed. Reg. at 2674–78. Neither *Michigan* nor the Clean Air Act requires EPA, for purposes of its cost consideration, to undertake such a benefit-cost analysis—let alone one that arbitrarily fails to consider whole categories of benefits.

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https://www.ncbi.nlm.nih.gov/pubmed/30857113 (bald eagles in interior Maine and in the Catskill Park region of southeastern New York State are commonly exposed to mercury, primarily from atmospheric deposition, at concentrations associated with neurological and reproductive impacts in birds); Comments of Center for Biological Diversity on the Proposed Supplemental Finding 5–13 (Jan. 15, 2016), Docket No. EPA-HQ-OAR-2009-0234-20559; Comments of Defenders of Wildlife Comments on the Proposed Supplemental Finding 4–8 (Jan. 15, 2016), Docket No. EPA-HQ-OAR-2009-0234-20545.

[48] *See also, e.g.*, R. Dietz et al., *Trends in Mercury in Hair of Greenlandic Polar Bears (Ursus maritimus) during 1892−2001*, 40 Envtl. Sci. Tech. 1120 (2006), https://pubs.acs.org/doi/10.1021/es051636z (finding mercury in federally protected polar bears); Ludo Holsbeek et al., *Heavy Metals, Organochlorines and Polycyclic Aromatic Hydrocarbons in Sperm Whales Stranded in the Southern North Sea During the 1994/1995 Winter*, 38 Marine Pollution Bulletin 304 (1999), https://www.whoi.edu/science/B/people/mhahn/Holsbeek_304.pdf (finding mercury in federally protected sperm whales).

In fact, by failing to consider all relevant costs and benefits of reducing power-plant hazardous air emissions, EPA's proposed new cost-analysis approach disregards the purpose of the Clean Air Act, federal guidelines on economic analysis, and the Supreme Court's directive in *Michigan*. The Proposal arbitrarily ignores the considerable unquantified health benefits from reducing hazardous air emissions, as well as the quantifiable benefits of preventing thousands of premature deaths from harmful particulate matter emissions, which result directly from the technological controls used to capture power-plant emissions of mercury and acid gases. In addition, EPA's proposed new cost-analysis approach arbitrarily turns a blind eye toward evidence of actual (not projected circa 2011) costs and benefits of regulation, including the actual compliance investments made by the electric power sector—which were far below EPA's initial estimate. Because EPA has failed to "examine the relevant data," *State Farm*, 463 U.S. at 43, and to explain that its proposed new approach is "permissible under the statute" *Fox*, 556 U.S. at 515, the Proposal is unlawful and should be withdrawn.

A. The Supplemental Finding's Preferred Approach Was a Reasonable Interpretation of the Clean Air Act and Accorded with *Michigan*.

The Proposal mischaracterizes EPA's preferred approach in the 2016 Supplemental Finding. EPA now contends that, contrary to *Michigan*, the preferred approach did not "fully consider 'the advantages *and* the disadvantages'" of regulating power-plant hazardous air pollution and failed to assess "whether the benefits garnered by the rule were worth it." 84 Fed. Reg. at 2675 (quoting *Michigan*, 135 S. Ct. at 2707 (emphasis in original)). But EPA's preferred approach meaningfully considered costs and weighed costs relative to benefits, consistent with the breadth of section 112. EPA's contention now that its preferred approach relied on irrelevant caselaw also lacks merit. None of the purported flaws identified by EPA provide the "good reasons" necessary to reject EPA's prior interpretation. *See Fox*, 556 U.S. at 515.

1. EPA's Preferred Approach in the Supplemental Finding Appropriately Weighted Consideration of Costs Relative to Benefits, and Meaningfully Considered Costs, Consistent with Congress' Intent.

Under the Supplemental Finding's preferred approach, EPA in fact "consider[ed] cost in a meaningful way relative to benefits." 84 Fed. Reg. at 2675. Consistent with the breadth of section 112(n)(1)(A), as confirmed by *Michigan*, 135 S. Ct. at 2709, EPA properly applied routine cost-impact metrics and considered real-world evidence to assess industry's ability to absorb the costs of regulation. Assessing benefits, EPA properly considered an extensive record of health and environmental harms posed by power-plant hazardous emissions. EPA then conducted a multi-factor weighing of benefits relative to costs. *See, e.g.*, 81 Fed. Reg. at 24,223 (EPA "evaluated the cost estimates in the RIA . . . using several different metrics and weighed these costs against the previously identified advantages of regulating HAP emissions from EGUs.").

As EPA found in 2016, the Supplemental Finding's preferred approach is consistent with the text and context of section 112(n)(1)(A), which reflect Congress' overriding goal of promptly

reducing the dangers posed by toxic air emissions. *See id.* at 24,421.[49] It is also consistent with the Clean Air Act's purposes to "protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare" and to assist states in controlling air pollution, 42 U.S.C. § 7401(a)(2), (b)(1). *See* 81 Fed. Reg. at 24,421. And it is consistent with *Michigan*, which explicitly declined to require EPA, in making its appropriate and necessary determination, "to conduct a formal cost-benefit analysis in which each advantage and disadvantage is assigned a monetary value." 135 S. Ct. at 2711. Multiple states have taken a similar approach to assessing costs in adopting their own mercury-control rules, further demonstrating the rationality of EPA's prior approach. *See* NESCAUM Report at 10.

In adopting the Supplemental Finding, EPA reasonably determined that a full monetized benefit-cost analysis is not required for purposes of the section 112(n)(1)(A) finding due to the magnitude of the public health and environmental benefits of regulation that are inherently difficult to quantify accurately, as well as the challenge of accounting for distributional effects, such as effects on sensitive populations. 80 Fed. Reg. at 75,039–40; *see also Entergy Corp. v. Riverkeeper, Inc.*, 556 U.S. 208, 218–26 (2009) (recognizing that, in the absence of explicit statutory direction, there are many reasonable approaches for EPA to consider cost). Indeed, the focus on quantifiable, monetized benefits in benefit-cost analyses consistently understates the true value of public health and environmental protection, thereby minimizing those benefits in public discourse on proposed regulatory action.[50] Given the statutory goal of preventing public health and environmental risks from hazardous air emissions, 81 Fed. Reg. at 24,421, and EPA's well-supported finding that the cost of reducing those emissions from power plants is reasonable and will not jeopardize an affordable and reliable electricity supply, *id.* at 24,426–27, the Supplemental Finding's preferred approach reasonably met the agency's obligation to give "at least some attention to cost," *Michigan*, 135 S. Ct. at 2707, in deciding whether to regulate.

2. EPA Properly Considered Clean Air Act Caselaw in Devising Its Preferred Approach.

Given the lack of specific direction in section 112(n)(1)(A) about how EPA should consider costs, EPA previously looked to caselaw interpreting the Clean Air Act's open-ended directive under section 111, 42 U.S.C. § 7411(a)(1), to "tak[e] into account" costs in regulating power plants and other stationary source categories. 2015 Legal Memorandum at 18–19. The D.C. Circuit has confirmed that statutory goals are relevant to the agency's exercise of discretion

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[49] *See also* EPA, *Legal Memorandum Accompanying the Proposed Supplemental Finding that it is Appropriate and Necessary to Regulate Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Steam Generating Units (EGUs)* 21–22 (2015), Doc. ID. No. EPA-HQ-OAR-2009-0234-20519 [2015 Legal Memorandum].

[50] *See* Lisa Heinzerling & Frank Ackerman, *Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection* 27–28 (Georgetown Envtl. L. & Pol'y Inst. & Georgetown Envtl. L. Ctr. 2002), http://ase.tufts.edu/gdae/publications/c-b%20pamphlet%20final.pdf; Comments of the Attorney General of New York et al. on EPA's Advance Notice of Proposed Rulemaking—Increasing Consistency and Transparency in Considering Costs and Benefits in the Rulemaking Process 16–18 (Aug. 13, 2018), Doc. ID No. EPA-HQ-OA-2018-0107-0102. *Cf.* Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Oct. 4, 1993) (defining "costs and benefits" to include "qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider").

in analyzing costs under section 111 and that "it is important to consider whether the power sector can reasonably absorb the compliance costs." *Id.* at 19 (citing *Lignite Energy Council v. EPA*, 198 F.3d 930, 933 (D.C. Cir. 1999); *Sierra Club v. Costle*, 657 F.2d 298, 343 (D.C. Cir. 1981); *Portland Cement Ass'n v. Train* 513, F.2d 506 (D.C. Cir. 1975)). EPA reasonably considered those decisions, among other things, in devising its preferred approach to considering costs in the Supplemental Finding. *See id.* at 20.

EPA now contends that section 111 methodologies "are not particularly informative" to its decision about whether to impose higher-cost regulations on existing sources under section 112. *See* 84 Fed. Reg. at 2675. But EPA's summary conclusions fail to demonstrate any impropriety in its prior consideration of section 111 methodologies or provide any defensible rationale for ignoring them now. EPA's consideration of caselaw interpreting a comparable section of the Clean Air Act in evaluating the scope of its discretion under section 112 accords with common agency practice and is consistent with how courts traditionally have assessed the reasonableness of agencies' statutory interpretations. *See, e.g.*, *Lead Indus. Ass'n, Inc. v. EPA*, 647 F.2d 1130, 1148–49 (D.C. Cir. 1980) (considering the interpretation of section 111 in evaluating EPA's ambient air quality standard for lead under section 109); *Motor & Equip. Mfrs. Ass'n, Inc. v. EPA*, 627 F.2d 1095, 1117–18 (D.C. Cir. 1979) (referencing use of the phrase "public health and welfare" across multiple sections of the Clean Air Act in interpreting the meaning of that phrase as used in sections 209 and 202). EPA's claim now that the D.C. Circuit's interpretations of section 111 are irrelevant, either because they relate to regulation of new sources or because the costs at issue differed, is unpersuasive. Economic principles do not change based on whether the agency is analyzing $1 or $100.

Moreover, the Supplemental Finding does not rest on EPA's consideration of section 111 methodologies alone. The record plainly contradicts EPA's contention now that it relied solely or principally on section 111 caselaw in devising its preferred approach, 84 Fed. Reg. at 2674. EPA's preferred approach in 2016 was based on multiple considerations, including the text, structure, and legislative history of section 112 and caselaw interpreting section 112, including the Supreme Court's decision in *Michigan*. *See* 2015 Legal Memorandum at 15–22. EPA's preferred approach is a reasonable interpretation of section 112 even without considering section 111 caselaw. Moreover, the Supplemental Finding's alternative cost-analysis approach does not rely on consideration of section 111 caselaw and is a reasonable, independent basis for EPA's prior finding. *See id.* at 22–25. Therefore, even if the Proposal were correct that section 111 caselaw is irrelevant, a contention the States and Local Governments reject, that impropriety could not provide a rational basis for EPA's proposed new cost-analysis approach. *See Fox*, 556 U.S. at 515.

B. EPA's Supplemental Finding Appropriately Considered How Power Plants Are Different from Other Sources.

EPA previously and correctly read section 112(n)(1)(A) within the broader context of section 112's purpose "to achieve prompt, permanent and ongoing reductions in HAP emissions from stationary sources to reduce the hazards to public health and the environment." 2015 Legal Memorandum at 11. EPA interpreted the statute to "highlight the importance of certain cost

considerations" in deciding whether regulation of power plants is appropriate and necessary but not to require a formal benefit-cost analysis. *Id.* at 15, 22. And even if a benefit-cost analysis were required, EPA reasonably read section 112(n)(1)(A) in the broader context of the Clean Air Act and its legislative history to conclude that "all of the benefits identified in the RIA should be considered in any such analysis," including collateral benefits from reducing criteria pollutant emissions. *Id.* at 22; *see also id.* at 22–25. For instance, as EPA previously recognized, Congress anticipated there would be important, ancillary benefits from the implementation of technology-based standards under section 112(d), and granted EPA permission to "consider the benefits" from the control technologies that reduce the emissions of listed pollutants and "may also have the effect of limiting other [] emissions" that "even in attainment areas, may produce substantial health and environment benefits." S. Rep. No. 101-228, 1990 U.S.C.C.A.N. at 3557; *see also* 2015 Legal Memorandum at 25 n.28.

EPA now contends that its previous contextualized reading of the statute failed to consider the special status of power plants under section 112, as highlighted by the *Michigan* decision. *See* 84 Fed. Reg. at 2675, 2677. That contention is wrong. EPA in 2016 expressly considered that "Congress set a different path for listing EGUs when it enacted section 112(n)(1)(A)," thereby rendering power plants "the only [major] source category" to be "excused from the automatic listing requirement" in section 112. 2015 Legal Memorandum at 11 & n.8. The current Proposal has identified no inconsistency between EPA's 2016 interpretation and the Supreme Court's directive in *Michigan*. Although the Supreme Court considered that "[t]he Clean Air Act treats power plants differently from other sources," 135 S. Ct. at 2707, the Court did not state or imply that the statute's unique treatment of power plants means that EPA must conduct a formal benefit-cost analysis. Indeed, the Court found the opposite. *Id.* at 2711 ("We need not and do not hold that the law unambiguously required the Agency . . . to conduct a formal cost-benefit analysis . . . ."). Nor did the Court suggest that EPA must ignore the collateral benefits of regulation—or even consider that issue. *See id.* (the Court "need not address" EPA's consideration of co-benefits under section 112(n)(1)(A)).

The Court in *Michigan* specifically rejected EPA's prior argument that because cost is irrelevant to EPA's decision to regulate other sources under section 112, a "harmonize[d]" statutory reading would imply that cost is irrelevant to EPA's appropriate and necessary determination, too. *Id*. at 2710. EPA now misuses the court's reference in *dictum* to a "harmonized" reading to exclude contextualized readings of section 112(n)(1)(A) it dislikes, *see* 84 Fed. Reg. at 2675, 2677 (arguing that EPA should reject the Supplemental Finding's preferred approach and should not fully consider co-benefits), while nonetheless relying on statutory context when convenient to support its desired outcome, *see, e.g.*, *id.* at 2677 (referencing the "the overall structure" of the Clean Air Act). But the Court was clear that such "interpretive gerrymanders under which [EPA] keeps parts of statutory context it likes while throwing away parts it does not" are impermissible. *Michigan*, 135 S. Ct. at 2708.

Michigan did not overrule "the fundamental canon of statutory construction" guiding courts and agencies to consider context and, when appropriate, legislative history in interpreting statutory terms. *UARG*, 573 U.S. at 320 (internal quotation marks omitted); *see also, e.g.*, *Natural Resources Defense Council, Inc. v. EPA*, 822 F.2d 104, 111 (D.C. Cir. 1987) (in

reviewing EPA's interpretation of the statutes it administers, courts "look to the statute and, if necessary, legislative history to divine the intent of Congress" and must evaluate the reasonableness of EPA's interpretation of ambiguous text "in light of the language, legislative history, and policies of the statute"). Indeed, the *Michigan* Court itself expressly found that "[s]tatutory context reinforce[d]" its holding. 135 S. Ct. at 2708; *see also id.* at 2705, 2707 (considering how power plants are treated under other subsections of section 112 and how cost is considered in other regulatory contexts).

Try as it might, EPA has failed to identify anything in the *Michigan* decision that precludes the Supplemental Finding's reasonable cost-analysis approach. Unlike the current Proposal's "interpretive gerrymander[ing]," EPA's prior interpretation accords with the text, context, structure, and legislative history of section 112, as well as *Michigan*. EPA has no "good reason[]" to discard it. *See Fox*, 556 U.S. at 515.

C. EPA's Proposed New Approach to Considering Costs and Benefits Is Arbitrary and Capricious and Unlawful Because It Disregards Important Health and Environmental Benefits of Regulating Power-Plant Hazardous Air Pollution.

Under its alternative approach to cost-analysis in the Supplemental Finding, EPA reasonably concluded, based on the benefit-cost analysis presented in the MATS RIA, that the benefits drastically outweigh the costs of regulation. 80 Fed. Reg. at 75,041. Indeed, the MATS RIA amply demonstrates that the MATS Rule is a bargain for human health and the environment. EPA projected compliance would sharply reduce toxic pollution while also producing substantial co-benefits, such as reductions in fine particulate matter, greenhouse gases, and other non-hazardous pollutants. 77 Fed. Reg. at 9424, 9428–32; MATS RIA at 5-1 to 5-7. EPA's analysis also showed that, even with the MATS Rule in effect, electricity prices were projected to be *lower* in 2015 and 2020 than they were in 2010. *See* 77 Fed. Reg. at 9414.

EPA now proposes to use the same MATS RIA data, but to bias its analysis against regulation by excluding from its benefit-cost comparison whole categories of relevant health and environmental benefits identified in the MATS RIA, including the substantial unquantified benefits of reducing hazardous air pollutant emissions and the enormous benefits of reducing emissions of other air pollutants. *See* 80 Fed. Reg. at 2677. Nothing in the Clean Air Act authorizes EPA to arbitrarily exclude that "relevant data" from its consideration. *State Farm*, 463 U.S. at 43. Rather, "fai[ling] to consider [such] an important aspect of the problem," *Michigan*, 135 S. Ct. at 2707 (quoting *State Farm*, 463 U.S. at 53), would be arbitrary and contrary to the Clean Air Act, as well as Supreme Court's decision in *Michigan* and the Executive Branch's own guidelines on economic analysis. It is hard for the public to properly evaluate the merits of an agency action when the agency itself does not consider all of the action's merits. The Proposal's vague description of EPA's proposed new approach also fails to inform the public of exactly how EPA is analyzing costs and benefits. EPA's proposed new approach is thus irrational and unlawful and should not be finalized. *See Fox*, 556 U.S. at 515.

1. EPA Fails to Properly Consider the Substantial and Unavoidable Benefits of Reducing Particulate Matter and Sulfur Dioxide Pollution.

EPA's alternative approach in the Supplemental Finding properly accounted for the significant ancillary benefits (also called collateral benefits or "co-benefits") to public health and the environment from reductions in fine particulate matter and sulfur dioxide that unavoidably result from the technological controls used to capture mercury and the acid gases contained in power-plant emissions. In the Proposal, EPA now takes a hairsplitting position that although it can consider those ancillary benefits, it cannot consider them "equal" to benefits from reducing hazardous air pollution. *See* 84 Fed. Reg. at 2676–77. However, EPA's subsequent discussion, and conclusion that no amount of ancillary benefits could overcome costs to industry, can fairly be read as not meaningfully considering co-benefits in any respect. *Id.* at 2677. EPA's failure to give adequate weight to the thousands of lives saved each year by particulate matter and sulfur dioxide reductions violates the Court's directive in *Michigan*, ignores the agency's statutory duty to protect the public from air pollution, and renders the Proposal arbitrary and capricious. *See Michigan*, 135 S. Ct. at 2707.

i. EPA Must Consider the Inherent Health Benefits of Reducing Particulate Matter and Sulfur Dioxide Pollution as a Relevant Factor in Determining the Appropriateness of Regulating Power-Plant Hazardous Air Emissions.

It is arbitrary and unlawful for EPA to blind itself to the substantial and inherent ancillary benefits resulting from the MATS Rule, namely the health and environmental benefits from reductions in fine particulate matter and sulfur dioxide emissions that result from the majority of controls available to reduce emissions of hazardous metals and acid gases from power plants. Contrary to EPA's suggestion that benefits from reduced emissions of fine particulate matter are tangential to EPA's decision to regulate power plants under section 112, 84 Fed. Reg. at 2677, reducing that pollution will address health risks from air toxics directly by reducing exposure to the non-mercury metals, such as arsenic and selenium, that make up a significant portion of the fine particulate matter emitted by coal-fired power plants. *See* 80 Fed. Reg. at 75,041. As EPA previously recognized, a requirement to reduce emissions of hazardous non-mercury metals necessarily results in reductions of particulate matter because those toxic metals are normally found in particles and, like particle-bound mercury, they are captured by removing the filterable particulate matter emitted by power plants. 80 Fed. Reg. at 75,041.[51] In addition, because the acid gases, selenium, and ionic mercury regulated under section 112 are readily captured by technologies that are typically used to control sulfur dioxide, use of sulfur dioxide control technologies for MATS Rule compliance will remove those toxic pollutants indiscriminately, as

[51] *See also* NESCAUM, *Control Technologies to Reduce Conventional and Hazardous Air Pollutants from Coal-Fired Power Plants* 23–24 (Mar. 31, 2011), http://www.nescaum.org/documents/coal-control-technology-nescaum-report-20110330.pdf/ (describing particulate matter controls that can be used for controlling hazardous air pollutants).

well.[52] The MATS Rule thus targets fine particulate matter and sulfur dioxide as surrogates for certain hazardous air pollutants. *See* 81 Fed. Reg. at 24,438 n.29.

Whether described as direct benefits of MATS Rule controls, or as ancillary or "co-benefits," the benefits associated with particulate matter and sulfur dioxide reductions under the MATS Rule are substantial, reduce health risks most likely to affect sensitive populations, yield important environmental benefits, and are appropriate factors to consider when evaluating the regulation of power plants under section 112. *See State Farm*, 463 U.S. at 43.[53] For instance, exposure to power-plant fine particulate matter is strongly linked to premature death, aggravated asthma, chronic bronchitis, and other cardiopulmonary illnesses. *See* American Thoracic Soc'y Br. *Amici Curiae* in Support of EPA 10–11, Jan. 25, 2017, *Murray Energy Corp. v. EPA*, No. 16-1127 (D.C. Cir.), ECF No. 1657472. The predicted benefits of MATS-Rule-related particulate matter reductions include an estimated 4,200 to 11,000 avoided premature deaths; 2,800 fewer cases of chronic bronchitis; 4,700 fewer non-fatal heart attacks; 830 fewer hospital admissions for respiratory symptoms; 1,800 fewer hospital admissions for cardiovascular symptoms; 540,000 fewer lost work days; and 3,200,000 fewer minor restricted activity days in adults. 77 Fed. Reg. at 9306; MATS RIA at 5-95.

Substantial improvements in public health associated with decreased pollution reduce costs from lost school and work days, emergency room visits, and other health care-related costs. *N. Carolina ex rel. Cooper v. Tennessee Valley Auth.*, 593 F. Supp. 2d 812, 823 (W.D.N.C. 2009), *rev'd on other grounds*, 615 F.3d 291 (4th Cir. 2010); MATS RIA at 5-37 to 5-38, tbl.5-7.[54] Although EPA was unable to quantify all categories of benefits associated with reductions in sulfur dioxide and fine particulate matter (particularly those associated with ecosystem and visibility effects), its estimates of the monetized benefits in 2016 associated with the implementation of the MATS Rule ranged from $59 billion to $140 billion. 76 Fed. Reg. at 25,085.

It would defy commonsense for EPA to ignore those massive and clearly related benefits. Similarly, it would be senseless to decide whether to take a new job considering only the salary but not the benefits of health-care coverage or the benefit of an easier commute, or to decide

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[52] NESCAUM, *Control Technologies to Reduce Conventional and Hazardous Air Pollutants from Coal-Fired Power Plants*, *supra* note 51, at 23–24*; see also id.* at 13, 22 (noting that injection of dry sorbent reagents that react with acid gases (DSI), combined with a downstream particulate matter control device to capture the reaction products, can remove ninety percent of the sulfur dioxide and ninety-eight percent of the hydrochloric acid (regulated under section 112) present in power-plant emissions).

[53] *See also* MATS RIA at ES-12 to ES-13 (co-benefit reductions will have advantageous environmental effects including reductions in visibility impairment, reduced vegetation and ecosystem effects from exposure to ozone, reduced effects from acid deposition (e.g., improved ecosystem functions), and reduced effects from nutrient enrichment (e.g., coastal eutrophication)); *id.* at 7-36 to 7-37 (noting that exposure to fine particulate matter can cause or contribute to adverse health effects, such as asthma and heart disease, that significantly affect many minority, low-income, and tribal individuals and their communities); *id.* at 5-95 (providing estimates of significant improvements in children's health, including reductions in acute bronchitis and asthma, from MATS Rule).

[54] *See generally* Philip J. Landrigan et al., *The* Lancet *Commission on Pollution and Health*, 391 Lancet 462 (2018), https://doi.org/10.1016/S0140-6736(17)32345-0 (discussing the substantial welfare costs of pollution).

whether to order a meal based solely on its calorie count without considering whether the food will be flavorful or nutritious. Like those benefits, the thousands of lives saved and the enormous avoided costs associated with inevitable reductions in particulate matter associated with hazardous air pollution controls are an important and "relevant factor" that EPA must consider in its section 112 analysis. *See Michigan*, 135 S. Ct. at 2709.

ii. EPA's Failure to Adequately Consider the Benefits of Reductions in Harmful Air Pollution Contradicts the Goals of the Clean Air Act and Best Practices of Benefit-Cost Analysis.

EPA misinterprets the text of section 112 and ignores the purpose of the Clean Air Act, which support adequate consideration of saved lives from reductions in particulate matter pollution. The Proposal argues that "it would be highly illogical for the Agency to make a determination that regulation under CAA section 112, which is expressly designed to deal with HAP, is justified principally on the basis of the criteria pollutant impacts of these regulations . . . if the HAP related benefits are not at least moderately commensurate with the cost of HAP controls, then no amount of co-benefits can offset this imbalance." 84 Fed. Reg. at 2676. But the contention that no amount of premature deaths avoided would offset the costs of reducing hazardous air pollution is undeniably counter to the Clean Air Act's unequivocal directive "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare." 42 U.S.C. § 7401(b)(1).

Section 112(n)(1)(A) itself reflects congressional intent that such "co-benefits" be a part of regulatory decisionmaking under that section by directing the agency to consider the co-benefits of hazardous air pollutant reductions related to the regulation of sulfur dioxide and nitrogen oxides under other Clean Air Act programs. *See* 80 Fed. Reg. at 75,041. That evidence of Congressional intent supports EPA's consideration of the benefits that will result from the expected reductions in power-plant particulate matter and sulfur dioxide emissions.

Section 112 legislative history not specifically directed at power plants also supports the consideration of criteria pollutant benefits attributable to the regulation of hazardous air pollution emissions. Specifically, the Senate report for the 1990 Clean Air Act Amendments states: "[w]hen establishing technology-based [Maximum Available Control Technology] standards under this subsection, the Administrator may consider the benefits which result from control of air pollutants that are not listed but the emissions of which are, nevertheless, reduced by control technologies or practices necessary to meet the prescribed limitation." *A Legislative History of the Clean Air Act Amendments of 1990,* Vol. 5, p. 8512; p. 172; Report of the Committee on Environment and Public Works S. 1630.

EPA's Proposal attempts to justify the agency's failure to fully consider benefits associated with reductions of non-hazardous criteria pollutants by noting other provisions of the Clean Air Act that specifically address those pollutants, namely, the national ambient air quality standards program. *See* 84 Fed. Reg. at 2677 (citing, *e.g.*, 42 U.S.C. §§ 7409, 7410). However, the existence of "the cavalcade of statutory provisions governing levels of these pollutants," *id.*, is indication of, if anything, Congress' deep concern about the health and environmental risks

they pose. EPA should not ignore those important risks here. EPA claims that "[t]o the extent that additional reductions of these criteria pollutants are necessary" such action "is best reserved for the NAAQS program." *Id.* But Administrator Wheeler's EPA has shown no willingness or even interest in using the national ambient air quality standards program or other Clean Air Act programs to reduce the continuing grave health risks posed by criteria pollutants. EPA's claim thus lacks any credibility and further suggests that EPA's proposed new cost-analysis approach is an attempt to undermine, rather than support, the Clean Air Act's overriding pollution-reduction goals.

Furthermore, federal guidance on benefit-cost analysis and EPA's own best practices support consideration of the thousands of lives saved by reductions in particulate matter pollution. Executive orders governing regulatory review direct agencies to assess the "actual results of regulatory requirements" and explicitly require analysis of both direct and indirect costs and benefits. Exec. Order No. 13,563 § 1, 76 Fed. Reg. 3821, 3821 (Jan. 21, 2011); *accord* Exec. Order No. 12,866 § 6(a)(3)(C), 58 Fed. Reg. at 51,735. The Office of Management and Budget ("OMB") Circular A-4 calls for agencies to consider "any important" co-benefits, including those "secondary to the statutory purpose of the rulemaking." Office of Mgmt. & Budget, Circular A-4 at 26 (2003) ("OMB Circular A-4"). EPA's own guidelines likewise direct the agency to assess "all identifiable costs and benefits," including both direct effects "as well as ancillary benefits and costs."[55] Adhering to those guidelines, EPA has for decades taken co-benefits into account when evaluating Clean Air Act regulations.[56] It would be beyond arbitrary and capricious for EPA to stray from such well-established decisionmaking practice when thousands of lives are at risk for premature death.

iii. Michigan Confirms That EPA Cannot Ignore the Lives Saved by Reductions in Particulate Matter Pollution.

In proposing to exclude consideration of the saved lives from particulate matter reductions in its appropriate and necessary finding, EPA misinterprets and misapplies the

[55] EPA, *Guidelines for Preparing Economic Analyses* 11-2 (2010), https://www.epa.gov/environmental-economics/guidelines-preparing-economic-analyses; *see also id.* at 8-7 to 8-8 (discussing "indirect costs" that are "incurred in related markets or experienced by consumers or government agencies not under the direct scope of the regulation").

[56] *See, e.g.*, 75 Fed. Reg. 51,570, 51,578, 51,582–83 (Aug. 20, 2010) (considering indirect benefits from reducing carbon monoxide, volatile organic compounds, and nitrogen oxides in regulating hazardous air pollutants from reciprocating internal combustion engines); 72 Fed. Reg. 8428, 8430 (Feb. 26, 2007) (finding that "[a]lthough ozone and $PM_{2.5}$ are considered criteria pollutants rather than 'air toxics,'" their reductions as "are nevertheless important co-benefits" of proposed controls on mobile sources to reduce emissions of benzene and other section 112 pollutants); 63 Fed. Reg. 18,504, 18,585–87 (Apr. 15, 1998) (discussing the indirect benefits of reducing co-pollutants such as volatile organic compounds, particulate matter, carbon monoxide, and sulfur dioxide through section 112 standards for pulp and paper producers); 56 Fed. Reg. 24,468, 24,469, 24,473 (May 30, 1991) (justifying Clean Air Act section 111(b) performance standards and section 111(d) emission guidelines for municipal solid waste landfills based in part on "the ancillary benefit of reducing global loadings of methane"); 52 Fed. Reg. 25,399, 25,406 (July 7, 1987) (considering "the full spectrum of the potential impacts of regulation," including "indirect benefits accruing from concomitant reductions in other regulated pollutants" in deciding to regulate emissions from municipal waste incinerators under section 111(b) and (d) of the Clean Air Act).

Supreme Court's directive in *Michigan*. *Michigan* does not indicate that "it is appropriate not to give equal weight to" monetized particulate matter benefits. 84 Fed. Reg. at 2677. In fact, while the Court explicitly declined to decide the specific issue of whether "ancillary" benefits should be considered, *Michigan*, 135 S. Ct. at 2711, the Court's discussion, reasoning, and holding demonstrate that it would be arbitrary and capricious for EPA to blind itself to the MATS Rule's co-benefits. *See id.* at 2707.

Contrary to EPA's proposed restrictive reading of *Michigan*, the Court's decision stands in harmony with the longstanding administrative law principle that an "agency may not 'entirely fai[l] to consider an important aspect of the problem' when deciding whether regulation is appropriate." *Id.* (quoting *State Farm*, 463 U.S. at 53). *Michigan* pushed EPA to evaluate all relevant factors holistically, not put up blinders that arbitrarily allow consideration of some important facts but not others. With its Proposal, EPA has repeated the same error that was reversed by the *Michigan* court: EPA may not cherry-pick the factors it relies on for purposes of its appropriate and necessary finding to reach a results-driven conclusion.

The "problem" that the MATS Rule seeks to address is hazardous air pollution from power plants, and one undoubtedly "important aspect" of addressing that problem is concomitant reduction in emissions of other pollutants, with very significant accompanying public health and environmental benefits. Thus, EPA's previous analysis and consideration of co-benefits in the Supplemental Finding was the legally proper response to *Michigan*. Indeed, recent caselaw supports consideration of co-benefits. For example, the D.C. Circuit in *U.S. Sugar Corp v. EPA*, 830 F.3d 579 (D.C. Cir. 2016), upheld an EPA regulation that considered co-benefits when analyzing the effects of reducing hazardous air pollutants from boilers, process heaters, and incinerators. *See also Center for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1198 (9th Cir. 2008) (agency should have considered the co-benefits of carbon-emission reductions, and could not, by ignoring those benefits, "put a thumb on the scale by undervaluing the benefits and overvaluing the costs").

Consistent with the principle that an agency must consider all factors relevant to its decision, *Michigan* indicated it would be arbitrary for EPA to ignore indirect or "co-costs." *See Michigan*, 135 S. Ct. at 2707 ("[A]ny disadvantage could be termed a cost. EPA's interpretation precludes the Agency from considering *any* type of cost—including, for instance, harms that regulation might do to human health or the environment."). For instance, the $9.6 billion annual compliance cost estimate that EPA relies on in its Proposal includes costs "that are ancillary to the intended purpose of [the MATS Rule]." 81 Fed. Reg. at 24,439. EPA calculated that estimate for the MATS RIA using the Integrated Planning Model (IPM). Specifically, EPA used the IPM to estimate "the increased expenditures by *the entire power sector* to comply with the [MATS Rule] while continuing to serve a given level of electricity demand."[57] "For example, the $9.6 billion cost estimated in the MATS RIA included costs that would be passed on to

[57] EPA, *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"* 2 (Dec. 14, 2018), Doc. ID No. EPA-HQ-OAR-2018-0794-0007 [Docket Memorandum] (emphasis added).

electricity customers and higher fuel costs, which are beyond the costs borne by owners of coal- and oil-fired units regulated by MATS." 81 Fed. Reg. at 24,439–40. The Proposal incorrectly assumes all system cost differences are "compliance costs" actually born by regulated entities, without making any attempt to distinguish between such costs and indirect costs.

Comparing both direct and indirect costs to only the "direct" benefits associated hazardous air pollutant reductions, as EPA proposes to do now, is not an apples-to-apples comparison. Co-benefits are the mirror image of co-costs.[58] If "any disadvantage can be termed a cost," then, by the same logic, any advantage—including co-benefits—can be termed a benefit. Thus, EPA can no more ignore significant ancillary benefits of regulation than it can ignore significant ancillary costs.[59] Put another way, if EPA were proposing to repeal the MATS Rule, *Michigan* clearly would require the agency to consider the indirect costs of its proposed deregulatory action, including costs associated with increased particulate matter emissions that would result from the repeal. The reverse is equally true. Because the Proposal considers indirect costs but ignores indirect benefits, EPA has put its thumb on the scale against regulation—a result prohibited by *Michigan*.

2. EPA Arbitrarily and Unlawfully Fails to Give Sufficient Consideration to the Substantial Unquantified Benefits of Reducing Mercury and Air Toxics.

In its Docket Memorandum, EPA identifies the benefits of reducing mercury and air toxics, "both quantified and unquantified, as the centrally relevant portion of the analysis for purposes of the appropriate and necessary finding." Docket Memorandum at 1. However, EPA fails to demonstrate that it gave any meaningful consideration in its benefit-cost comparison to the numerous health effects of reducing mercury emissions that EPA has not quantified. The neurologic, genotoxic, immunotoxic, and cardiovascular effects of mercury pollution that EPA determined could not be readily monetized in the MATS RIA must play a central role in EPA's section 112(n)(1)(A) determination to be consistent with *Michigan*, federal cost-benefit guidelines, economic best practices, legislative history, and regulatory precedent. Instead, while disregarding significant and available information on the broad harms of mercury, EPA now arbitrarily narrows its analysis to the monetized effects of IQ loss in "children born to a subset of

[58] For a more detailed discussion of co-benefits as the "mirror image" of indirect costs, *see* Samuel J. Rascoff & Richard L. Revesz, *The Biases of Risk Tradeoff Analysis: Towards Parity in Environmental and Health-and-Safety Regulation*, 69 Univ. Chi. L. Rev. 1763, 1780–90 (2002).

[59] *See White Stallion I*, 748 F.3d at 1266 (opinion of Kavanaugh, J.) (term "appropriate" in section 112(n)(1)(A) "includes consideration of all the relevant factors"), *rev'd sub nom. Michigan v. EPA*, 135 S. Ct. 2699 (2015); *see also, e.g., U.S. Telecom Ass'n v. FCC*, 290 F.3d 415, 424–25 (D.C. Cir. 2002); *Competitive Enter. Inst. v. Nat'l Highway Traffic Safety Admin.*, 956 F.2d 321, 323–35 (D.C. Cir. 1992); *Corrosion Proof Fittings v. EPA*, 947 F.2d 1201, 1224–25, 1229–30 (5th Cir. 1991) (EPA's ban of asbestos-based brakes under Toxic Substances Control Act not supported by substantial evidence where it failed to consider indirect safety effects of substitute options); *Am. Trucking Ass'ns, Inc. v. EPA*, 175 F.3d 1027, 1051–52 (D.C. Cir. 1999) (Clean Air Act's protective public health purpose required EPA to consider all beneficial health effects when setting national ambient air quality standards, rather than only "half of a substance's health effects"), *rev'd, on other grounds sub nom. Whitman v. Am. Trucking Ass'ns, Inc.*, 531 U.S. 457 (2001).

recreational fishers who consume fish during pregnancy"—an incredibly small slice of the MATS Rule's myriad benefits. 84 Fed. Reg. at 2677.

The MATS RIA evaluates numerous health and environmental advantages of regulating hazardous air pollution from power plants, including benefits that, due to methodological and data limitations, EPA determined could not be quantified or assigned monetary value.[60] EPA accounted for those benefits qualitatively, however. For example, the serious harms caused by prenatal exposure to low levels of mercury—including impaired attention, fine motor function, language skills, visual-spatial abilities, and verbal memory—limit children's ability to learn and achieve. 76 Fed. Reg. at 25,018; *see also* 65 Fed. Reg. at 79,829. Those harms impose life-long costs that EPA did not attempt to quantify in evaluating the public health risks of power-plant methylmercury exposure or as part of the MATS RIA. *See* 77 Fed. Reg. at 9353 (explaining that because IQ is "not the most sensitive neurodevelopmental endpoint affected by [methylmercury] exposure" reliance on it "underestimates the impact of reducing methylmercury in water bodies"); MATS RIA at 4-65. Exposure to non-mercury hazardous air pollutants emitted by power plants is also associated with a variety of health conditions that include cancer risks, as well as adverse neurological, cardiovascular, immunological, reproductive, liver, kidney, and respiratory effects. 76 Fed. Reg. at 25,003; MATS RIA at 4-68 to 4-73; Kim et al. (2016), *supra* note 18, at 381–83 (discussing pathologies associated with mercury exposure). EPA recognizes, in both the MATS Rule and the Supplemental Finding, that the MATS RIA reflects only a "small subset of the benefits of reducing [mercury] emissions," 77 Fed. Reg. at 9428, and does not quantify the benefits of reducing the other pollutants controlled by the Rule, *see id*. at 9323, 9363, 9426–28. *See also* 80 Fed. Reg. at 75,040 (noting the limited nature of the MATS rulemaking IQ-loss benefit analysis, and that EPA did not consider ocean or estuarine waterbodies or commercially caught fish as part of its analysis).

The *Michigan* court made clear that it was not requiring EPA to "conduct a formal cost-benefit analysis" or to "assign[] a monetary value" to "each advantage and disadvantage." 135 S. Ct. at 2711. And as EPA properly concluded in adopting the Supplemental Finding, the text of section 112 nowhere contains such a requirement for *any* determination, including the section 112(n)(1)(A) appropriate and necessary finding. 2015 Legal Memorandum at 21–22. By effectively limiting its analysis to consideration of the single benefit it could most easily monetize, EPA urges an interpretation that would impermissibly narrow that standard and is inconsistent with *Michigan*. *See* 135 S. Ct. at 2709 (section 112(n)(1)(A)'s "broad reference to appropriateness encompasses *multiple* relevant factors"). The Proposal necessarily *underestimates* the more than *sixty* distinct categories of unquantified health, environmental, and economic benefits identified in the MATS RIA—contravening Congress's clear intent that EPA carefully analyze health hazards posed by power-plant hazardous emissions. *Compare* 42 U.S.C.

[60] *See, e.g.*,77 Fed. Reg. at 9306 (noting "limitations and uncertainties" of monetary figures); MATS RIA at 4-2 (discussing uncertainty and concluding that mercury benefits were likely underestimated due to data limitations); MATS RIA at ES-9 to ES-13 (describing neurologic, cardiovascular, genotoxic, and immunologic damage to humans and reproductive harm to fish, birds, and mammals that are connected to mercury emissions are particularly difficult to quantify).

§ 7412(n)(1)(A) (directing EPA to regulate after considering its study of health hazards reasonably anticipated to result from power-plant hazardous emissions).

EPA's prior decision in the 2016 Supplemental Finding not to limit its analysis to monetized benefits was consistent with the purpose of section 112 as a whole. Congress understood it would be difficult to quantify, at the initial point of regulation, the benefits of reducing toxic emissions that cause health harms over time and recognized that scientific understanding of the human health effects of toxic pollutant exposure would evolve. S*ee, e.g.*, S. Rep. No. 101-228, 1990 U.S.C.C.A.N. at 3567 (recognizing the difficulties of "giv[ing] sufficient weight" to "substances which express their toxic potential only after long periods of chronic exposure"). Accordingly, while it made technology-based standards and emissions volume the regulatory starting points, it also required a subsequent evaluation of "remaining" or "likely to remain" health risks, 42 U.S.C. § 7412(f)(1)(A), and of whether such risks necessitated more stringent emissions standards, *id.* § 7412(f)(2).

Under EPA's new approach, that overwhelming evidence of the benefits of regulation is rendered essentially irrelevant because such benefits are not *monetized*. That interpretation is contrary to the specific concern Congress expressed about mercury harms, including from power-plant mercury emissions. *See* 42 U.S.C. § 7412(c)(6) (prioritizing development of non-power-plant standards for certain persistent pollutants, including mercury); *id.* § 7412(n)(1)(B), (C) (requiring study of mercury emissions, including from power plants, and health risks); S. Rep. No. 101-228, 1990 U.S.C.C.A.N. at 3515 (noting widespread contamination of fish in northern lakes "attributable to mercury emissions from coal-fired power plants"). Congress expected available information and understanding of the potential harms of hazardous air pollutants to evolve over time. As described *infra*, new information about the effects of hazardous air pollutant emissions on public health and the environment has come to light since the 2011 MATS RIA. In fact, over the last few decades, some of the most important categories of benefits of environmental regulation that were once considered unquantifiable were subsequently quantified. Richard L. Revesz, *Quantifying Environmental Benefits*, 102 Cal. L. Rev. 1423, 1436 (2014).

Because the effects of toxic exposure are difficult to quantify and often can be understood only after years or even decades, the length of time needed even to attempt to conduct a fully monetized analysis further undercuts EPA's contention. *See Portland Cement Ass'n v. Ruckelshaus*, 486 F.2d 375, 387 (D.C. Cir. 1973) (rejecting argument that section 111(a) requires quantified benefit-cost analysis in part because of "the specific time constraints" imposed by Congress for listing sources and setting standards); *see also Entergy Corp.*, 556 U.S. at 232, 235 (Breyer, J., concurring in part and dissenting in part) (interpretation that avoided formal cost-benefit proceedings was reasonable given, in part, Congressional concern that such analyses would "delay[] regulation" and "emphasize easily quantifiable factors over more qualitative factors"); NESCAUM Report at 20 ("While the regulated community has incentive and resources to estimate compliance costs . . . it has no such incentive to monetize public benefits" and government "often lacks the resources to do so."). EPA has thus failed to explain how its new interpretation "is rationally related to the goals of the statute." *Village of Barrington v. Surface Transp. Bd.*, 636 F.3d 650, 665 (D.C. Cir. 2011) (internal quotation marks omitted).

EPA's proposed new cost-analysis approach is also inconsistent with longstanding agency practice. For years, EPA has accounted for unquantified effects as important factors in its regulatory decision-making.[61] EPA's qualitative accounting for these benefits in the MATS RIA is consistent with federal guidelines governing regulatory economic analyses that instruct agencies to include any non-monetized and unquantifiable costs and benefits, and it is appropriate for EPA to consider such benefits in its decision to regulate hazardous air pollution from power-plants.[62] Indeed, there are a great many public policy priorities that cannot be quantified, such as investing in early childhood education[63] and public infrastructure.[64] EPA's longstanding practice of considering unmonetized benefits is consistent with that of the states that have adopted their own rules limiting power-plant mercury emissions. NESCAUM Report at 21. An agency need not put a dollar value on every policy determination it makes. *See, e.g.*, *Fox*, 556 U.S. at 519–20 ("Congress has made the determination that indecent material is harmful to children," and while the agency "adduced no quantifiable measure of the harm" caused by it, the Supreme Court has "nonetheless held that the government's interest in the well-being of its youth . . . justified its regulation" (internal quotation marks omitted)).

3. EPA Fails to Explain the Data and Methodology Used to Analyze Costs Under its Proposed New Approach.

EPA's vague and inconsistent descriptions of its proposed new cost-analysis approach do not satisfy its duty under the Clean Air Act to explain "the methodology used in obtaining the data and in analyzing the data." 42 U.S.C. § 7607(d)(3)(B); *see also State Farm*, 463 U.S. at 43 (EPA must "articulate a satisfactory explanation for its action including a rational connection between the facts found and the choice made"). EPA states that it is not proposing to undertake

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[61] *See e.g.*, 69 Fed. Reg. 38,958, 39,138–39 (Jun. 29, 2004) (evaluating all effects of regulating emissions from non-road diesel engines and "not just those benefits and costs which could be expressed [] in dollar terms"); 64 Fed. Reg. 52,828, 53,023 (Sept. 30, 1999) (considering the "real, but unquantifiable benefits" of section 112 standards for hazardous waste combustors); 55 Fed. Reg. 8292, 8302 (Mar. 7, 1990) ("reject[ing] the position that only quantified information can be considered in" setting section 112 standards for benzene waste and transfer operations).

[62] *See, e.g.*, OMB Circular A-4, *supra*, at 2 (warning agencies against ignoring unquantifiable benefits, because the most efficient rule may not have the "largest quantified and monetized . . . estimate"); Exec. Order No. 13,563 § 1, 76 Fed. Reg. at 3821 (affirming Exec. Order No. 12,866) ("Our regulatory system . . . must take into account benefits and costs, both quantitative and qualitative."); Exec. Order No. 12,866 § 1, 58 Fed. Reg. at 51,741 ("Costs and benefits shall be understood to include both quantifiable measures . . . and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider.").

[63] *See, e.g.*, Economic Policy Institute, *Enriching Children, Enriching the Nation Public Investment in High-Quality Prekindergarten*, Executive Summary (May 2007), https://www.epi.org/publication/book_enriching/ ("Public investment in early childhood education that is effective improves educational outcomes, enhances the quality of life of the recipients of the investment, and creates a range of external benefits to society over and above those to individual students. While such investment can increase the knowledge, skills, and literacy of students, it is not easy to accurately measure this improvement in educational outcomes and there is no un-ambiguous way to translate these improvements into dollar terms.").

[64] *See, e.g.*, Elizabeth McNichol, Ctr. on Budget & Pol'y Priorities, *It's Time for States to Invest in Infrastructure* (March 19, 2019) https://www.cbpp.org/research/state-budget-and-tax/its-time-for-states-to-invest-in-infrastructure ("The interactions between public infrastructure investments and private-sector growth are [] highly complex . . . these sorts of investments' benefits may be difficult to quantify because they occur years in the future or because improvements in quality of life or the environment are less tangible.").

a "formal benefit-cost analysis" in accordance with federal guidance documents or economic best practices, and that it proposes to depart in important respects from the benefit-cost analysis in the 2011 MATS RIA.[65] 84 Fed. Reg. at 2676. But EPA fails to clarify the data and methodologies used under its proposed new approach. *See Brand X*, 545 U.S. at 981 (any "[u]nexplained inconsistency" between a policy and its repeal is arbitrary and capricious). For example:

- EPA uses imprecise terms and fails to explain its treatment of co-benefits. EPA variously interprets the Clean Air Act to require that its cost analysis "focus *primarily* on benefits associated with reduction of HAP," that EPA should not "place *much weight* on the co-benefits of further criteria pollutant reductions," and that "it is appropriate not to give *equal weight* to . . . co-benefits." 84 Fed. Reg. at 2676–77 (emphases added). EPA then apparently fails to compare co-benefits to costs in its benefit-cost analysis.

- EPA fails to explain its treatment of unquantified benefits associated with reducing hazardous air pollution. EPA claims that its proposed new approach "does not discount" such benefits, *id.* at 2678, and that such benefits are a "centrally relevant portion of the analysis," Docket Memorandum at 1, but EPA then apparently excludes non-monetized benefits from its benefit-cost comparison for all relevant purposes. *See* 84 Fed. Reg. at 2678.

- EPA proposes that unquantified benefits associated with reducing hazardous air pollution are "not sufficient, in light of the gross imbalance of monetized costs and HAP benefits, to support a finding that it is appropriate and necessary to regulate EGUs." *Id.* at 2677; *see also id.* at 2678 (The "unquantified benefits of MATS are not sufficient to overcome the significant difference between the monetized benefits and costs of this rule."). But EPA does not explain how it determined that unquantified benefits are "not sufficient" or what the threshold of "sufficiency" is to overcome a disparity in monetized costs and benefits under its proposed new approach. Moreover, EPA's description of its cost-benefit comparison process leaves unclear when and how exactly EPA compared unquantified benefits to costs.

- EPA variously proposes that the "gross disparity," "gross imbalance," or "significant difference" between costs and benefits "is too large to support an affirmative appropriate and necessary finding" but EPA does not explain how it arrived at that conclusion, or what it means by the terms "gross disparity," "gross imbalance," "significant," and "too large," particularly as regards the unquantified benefits. *Id.* at 2677.

[65] Thus, EPA's statement in its memorandum to the rulemaking docket "refer[ing] readers to the 2011 RIA for full details . . . including the underlying methodologies for deriving costs and benefits" is misleading. *See* Docket Memorandum at 1.

- EPA estimates, based on Table 1 in the Docket Memorandum, "that the net target HAP benefits of the rule (HAP benefits–costs) are negative." *Id.* 2678. But EPA fails to explain the data or methodology used to calculate its estimate, given that Table 1 represents "the sum of all unquantified HAP benefits and disbenefits" as the letter "B." Docket Memorandum at 5 tbl.3 & n.d. And EPA provides no analysis or evidence for its conclusion that the total unquantified benefits of reducing hazardous air pollution are less than $9.6 billion. *Id.* at 2 tbl.1; *see also id.* at 5 tbl.3 (purporting to summarize the total costs and benefits of regulation "+ B").

- EPA states that "even assuming that actual costs and benefits differed from projections made in 2011, given the large difference between target HAP benefits and estimated costs, the outcome of the Agency's proposed finding here would likely stay the same." 84 Fed. Reg. at 2678. But EPA provides no data or analysis to support that summary conclusion and fails to explain its methodology in evaluating the proposed likelihood.

Overall, the Proposal leaves the public in the dark as to what data and methodology EPA relies on to determine that the costs of regulating power plants under section 112 "grossly outweigh" the hazardous air pollution benefits. *Id.* at 2676. EPA's glib assertions and hand-waving cannot satisfy the statutory notice requirement or the threshold for reasoned agency decisionmaking. *See* 42 U.S.C. § 7607(d)(3)(B); *State Farm*, 463 U.S. at 43.

D. EPA's 2011 Benefit-Cost Analysis Data Cannot Provide a Rational Basis for EPA to Reconsider the Appropriateness of Regulating Power Plants Under its Proposed New Approach.

The Proposal acknowledges that "the actual costs and benefits of the MATS rule may differ" from the 2011 MATS RIA's analysis. 84 Fed. Reg. at 2678. Indeed, they do—EPA's projection of compliance costs in 2015, $9.6 billion, was nearly five times higher than the actual estimated cost of approximately $2 billion. *See* Staudt Declaration, *supra* note 28, at ¶ 5. And more recent science and data have further bolstered EPA's prior conclusion that the benefits of regulation massively outweigh costs.[66] However, EPA proposes that it is nonetheless "reasonable" for EPA to rely, for the purposes of its proposed revised finding, on the MATS RIA's outdated projections of costs and benefits.[67] 84 Fed. Reg. at 2678 & n.15. EPA's interpretation is untenable for multiple reasons, as discussed below.

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[66] *See, e.g.*, Elsie M. Sunderland et al., *Benefits of Regulating Hazardous Air Pollutants from Coal and Oil-Fired Utilities in the United States*, Envtl. Sci. & Tech. at A (2016), http://eelp.law.harvard.edu/wp-content/uploads/Sunderland_Benefits-Regulating-Haz-Air-Pollutants.pdf (finding that the monetized benefits in the MATS RIA "vastly understate the benefits associated with reductions of those emissions").

[67] The Proposal claims that "EPA has provided an updated comparison of costs and target pollutant benefits" in EPA's Docket Memorandum but fails to clarify that it is only the presentation of a comparison that is updated—the underlying costs and benefits data is unchanged from the 2011 MATS RIA. 84 Fed. Reg. at 2678; *see also* Docket Memorandum at 2 tbl.1.

1. EPA Arbitrarily and Capriciously Fails to Consider Relevant Data Regarding Costs and Benefits.

If EPA has inherent authority or discretion to reconsider its appropriate and necessary finding—a contention the States and Local Governments reject[68]—then EPA must exercise that authority only in accordance with principles of reasoned agency decisionmaking. EPA must "examine the relevant data" including all "important aspect[s] of the problem." *State Farm,* 463 U.S. at 43. For the purposes of EPA's proposed reconsideration, relevant data must include the most up-to-date and accurate data available regarding the costs and benefits of regulating power-plant hazardous air pollution, including data that arose since the 2011 MATS RIA.

Specifically, EPA must consider evidence that the costs of regulating power-plant hazardous air pollution have been far lower than EPA's pre-implementation estimates. In 2011, EPA conservatively estimated that the costs to the electric power sector of complying with the MATS Rule would be $9.6 billion per year. MATS RIA at 3-31 tbl.3-16. In fact, annual compliance costs incurred through April 2016—approximately $2 billion—show that EPA's projection was greatly overestimated. *See* Staudt Declaration, *supra* note 28, at ¶ 5. *Cf.* Industry Comments, *supra* note 28, at 2 (stating that the electric power sector has invested $18 billion *total* to comply with the MATS Rule since the Rule took effect, or approximately $4.5 billion per compliance year). Also, there have been no undue costs to electric ratepayers and no adverse impacts to electric reliability since the MATS Rule took effect.[69] As the NESCAUM Report discusses, it is not unusual for pre-implementation estimates to exceed actual compliance costs, as corroborated by the states' experiences. *See* NESCAUM Report at 11. As noted above, many of the undersigned states have been controlling mercury under state law at reasonable cost, and often to stricter emission standards than the MATS Rule, for years.[70]

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[68] That EPA's irrational choice to use inaccurate data stems from its broader interpretation of section 112(n)(1)(A) further evidences that EPA's interpretation is wrong at bottom. EPA posits that because the appropriate and necessary finding is "a threshold analysis that Congress intended the Agency would complete prior to regulation," EPA should rely on its projections prior to implementation of the MATS Rule even when revisiting that analysis years later. 84 Fed. Reg. at 2678. Reliance on pre-implementation estimates for a section 112(n)(1)(A) finding makes sense under the States and Local Governments' interpretation that EPA has only one-time authority to determine whether regulation of power-plant hazardous air pollution is appropriate and necessary. *See* Section IV *supra*. Under EPA's theory of unlimited inherent reconsideration authority, however, it does not: that the 2011 MATS RIA data could be a basis for reconsidering the appropriate and necessary finding decades from now—and even if the costs of regulation fell to zero dollars—is far-fetched.

[69] Electricity prices for all U.S. sectors rose 7.5% from 2012 to 2018, *see* U.S. Energy Information Admin., Electric Power Monthly tbl.5.3 (Mar. 26, 2019), https://www.eia.gov/electricity/monthly/, while the Consumer Price Index, a common benchmark for inflation, rose 9.4% over the same period. *see Consumer Price Index from 1913 to 2019*, US Inflation Calculator, https://www.usinflationcalculator.com/inflation/consumer-price-index-and-annual-percent-changes-from-1913-to-2008/.

[70] *See, e.g.*, Comments of the National Association of Clean Air Agencies on EPA's Proposed Supplemental Finding 7 (Jan. 15, 2016), Doc. ID No. EPA-HQ-OAR-2009-0234-17620 ("To our knowledge, no source has failed to comply with state deadlines for achieving [mercury] limitations, and no significant adverse impacts on electric system reliability were encountered as units were upgraded to meet state requirements."); *id.* at 6 ("Years, and in some cases decades, of experience demonstrates that [the technologies available to reduce power plant hazardous air pollutant emissions] can reliably deliver the expected performance at reasonable cost.").

EPA also must consider the wealth of recent scientific research and data indicating that the health, environmental, and economic benefits of regulating power-plant hazardous air pollution are orders of magnitude larger than EPA calculated in the MATS RIA. Although the MATS RIA identified many health and environmental benefits from reduced emissions of hazardous air pollution, it monetized only the extremely narrow category of IQ losses for children exposed to mercury through recreationally caught freshwater fish. *See* 77 Fed. Reg. at 9426–27. EPA valued that limited set of benefits between $4 million and $6 million per year. MATS RIA at ES-1, ES-6 tbl.ES-4. Since it promulgated the MATS Rule, EPA has not reevaluated whether it could quantify additional types of benefits. However, "[t]here are widely accepted methods that EPA could have used to monetize [other] benefits" of reduced power-plant mercury emissions. IEc Report at 4.

In fact, research shows that "quantified societal benefits associated with declines in mercury deposition attributable to implementation of MATS are much larger than the amount estimated by EPA in 2011." Sunderland et al. (2016), *supra* note 66, at A. For instance, one 2016 study projected that the cumulative economy-wide benefits associated with implementation of the MATS Rule through 2050 would amount to at least $43 billion considering benefits from reducing mercury emissions alone. Giang & Selin (2016), *supra* note 15, at 288.[71] A 2017 study estimated that the societal costs of the cognitive deficits associated with methylmercury exposure in the United States alone amount to approximately $4.8 billion annually. Grandjean & Bellanger (2017), *supra* note 15, at 4 & tbl.1.[72] Recent research also shows that "as-yet-unquantified benefits to human health and wildlife from reductions in EGU mercury emissions are substantial." Sunderland et al. (2016), *supra* note 66, at A. For example, while EPA did not estimate risks posed by mercury contamination in coastal waters or from commercially caught fish, 76 Fed. Reg. at 25,007, researchers have since identified a strong correlation between decreasing North American mercury emissions and reduced mercury levels in important commercial species along the Atlantic seaboard. Cross et al. (2015), *supra* note 30, at 9064–72; Lee et al. (2016), *supra* note 29, at 12,829–30. Recent research also has linked mercury exposure to potentially fatal adverse cardiovascular effects. Genchi et al. (2017) *supra* note 12, at 8–9. And other research confirms that the MATS RIA underestimated power plants' contribution to local mercury deposition. Sunderland et al. (2016), *supra* note 66, at A.

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[71] *See also* Vincent Nedellec & Ari Rabl, *Costs of Health Damage from Atmospheric Emissions of Toxic Metals: Part 2—Analysis for Mercury and Lead*, Risk Analysis 1 (2016), https://www.researchgate.net/profile/Nedellec_Vincent/publication/298908575_Costs_of_Health_Damage_from_Atmospheric_Emissions_of_Toxic_Metals_Part_2-Analysis_for_Mercury_and_Lead/links/5ae740c70f7e9b837d38255e/Costs-of-Health-Damage-from-Atmospheric-Emissions-of-Toxic-Metals-Part-2-Analysis-for-Mercury-and-Lead.pdf (estimating that the damage cost associated with one kilogram of mercury is 22,937 € (2013) if there is a no-effect threshold, and 52,129 € (2013) if there is none, with ninety-one percent of the cost due to mortality from heart disease and the rest from IQ loss).

[72] *See also* Leonardo Trasande et al., *Public Health and Economic Consequences of Methyl Mercury Toxicity to the Developing Brain*, 113(5) Envt'l Health Perspectives 590, 590 (2005), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1257552/ (documenting $8.7 billion in annual costs from lost productivity alone of methylmercury toxicity, $1.3 billion of which is attributable each year to mercury emissions from U.S. power plants).

In addition, although EPA did not attempt to quantify the economic benefits to recreational or commercial fisheries from reduced mercury contamination, *see* MATS RIA at 5-7 tbl.5-3, states in fact derive substantial economic benefit from those industries, and studies show that mercury fish consumption advisories create enormous costs, including reduced numbers of fishing days and locations. *See* IEc Report at 3–4. Such advisories also decrease consumer demand even in non-sensitive populations not targeted by the advisory. *Id.* at 3. The IEc Report found that in the twelve Northeast and Midwest states it analyzed, changes in recreator and consumer behavior in response to reduced mercury contamination "are likely to result in substantial benefits to the economies and residents of these states and the Nation as a whole." *Id.* at 4. Such benefits include economic welfare benefits as well as regional and national economic activity in the form of jobs and expenditures. *Id.* at 17–18. "For example, if recreational anglers reduce their equipment- and trip-related expenditures by ten percent per year across the 12 states, the economic impact on value-added (equivalent to a GDP reduction) could be on the order of *$1.5 billion annually*." *Id.* at 23. EPA could have monetized those benefits using well-known quantification methods that are "frequently applied by federal agencies bringing damage claims when acting as trustee for natural resources" under other federal laws. *Id.* at 24. Yet EPA wholly failed in its Proposal to "attempt to measure these benefits or even describe them qualitatively." *Id.* at 4; *see also id.* at 24.

In the face of relevant data on the costs and benefits of regulation, EPA cannot "put [its] head in the sand" and "blithely rely on a proxy" it knows to be inaccurate. *Nat'l Ass'n of Regulatory Util. Comm'rs v. U.S. Dep't of Energy*, 680 F.3d 819, 824 (D.C. Cir. 2012) (declaring the Energy Secretary's determination not to adjust nuclear-waste-disposal fees arbitrary and capricious where, *inter alia*, the Secretary based fees on inflated estimates for a since-abandoned disposal site and did not perform a valid cost evaluation). Basic tenets of administrative law and good government obligate EPA to consider up-to-date and accurate information in reconsidering a prior policy choice. *See Nat'l Ass'n of Home Builders v. EPA*, 682 F.3d 1032, 1039–40 (D.C. Cir. 2012) (if an "agency decides to rely on a cost-benefit analysis as part of its rulemaking, a serious flaw undermining that analysis can render the rule unreasonable" (citations omitted)); *Oceana, Inc. v. Ross*, No. 17-5247, slip op. at 12 (D.C. Cir. Apr. 12, 2019) (agency "could not ignore important evidence that was developed between [the date it promulgated a rule] and [the date it adopted a revised rule in response to the court's remand]"); *Med. Waste Inst. v. EPA*, 645 F.3d 420, 426 (D.C. Cir. 2011) (when an agency revises a rule on judicial remand, the court expects it to revisit and update its data and procedures as appropriate). EPA's failure to do so here renders its Proposal arbitrary and capricious.

2. EPA's Proposed New Cost-Analysis Approach Requires EPA to Analyze Appropriate Data on Monetized Benefits.

A second, independent error of EPA's interpretation is that the MATS RIA is unsuited to EPA's proposed new cost-analysis approach. *See State Farm*, 463 U.S. at 43. Although the MATS RIA's analysis provided ample support for the approaches in EPA's Supplemental Finding, EPA now proposes to diverge from its prior analysis in significant ways. Specifically, under its proposed new cost-analysis approach, EPA directly compared projected monetized costs to monetized hazardous air pollution benefits and claims to have estimated that the net

benefits of the MATS Rule are negative. 84 Fed. Reg. at 2677–78. EPA then considered in some unspecified way whether unquantified hazardous air pollution benefits and monetized particulate matter co-benefits were "sufficient to overcome" the "disparity" in monetized costs and benefits. *Id.* at 2678. EPA concluded they were not. *Id.* The MATS RIA, however, was not intended for use in a benefit-costs analysis that focuses primarily, if not exclusively, on monetized costs and benefits, and it cannot reasonably be used for that purpose now.

In preparing the MATS RIA, EPA devoted limited agency resources to monetizing the myriad benefits of reducing hazardous air pollution. As noted above, EPA calculated only a tiny sliver of monetized benefits: neurologic benefits (avoided IQ loss) to children exposed to mercury through recreationally caught freshwater fish. 77 Fed. Reg. at 9426–27. It did not quantify other neurologic effects, or other health effects such as increased cardiovascular health or decreased mortality, or any benefits at all from mercury exposure through channels other than recreationally caught freshwater fish. EPA did not even venture an educated guess as to the value of environmental benefits not directly tied to human health. MATS RIA at 5-6 to 5-7 & tbl.5-3. However, the MATS RIA identified, and EPA considered, those unquantified benefits. *Id.* at 5-59 to 5-92. EPA now wrongly infers that the total value of those many unquantified benefits is "limited" simply because EPA did not quantify it. *See* 84 Fed. Reg. at 2678. That erroneous conclusion is plainly contradicted by the ample record before EPA when it promulgated the MATS Rule and the Supplemental Finding, which includes extensive data on the health and environmental benefits of reducing power-plant hazardous air pollution.

The MATS RIA's poor fit to EPA's new approach is evident from Table 1 in the Docket Memorandum, in which EPA condenses its proposed cost analysis into a simple arithmetic problem. The MATS RIA's qualitative discussion of the massive health and environmental impacts (co-costs) of hazardous air pollution are reduced to the variable "B," which carries no weight in EPA's numbers-only methodology. EPA subtracts $9.6 billion in costs from $0.004–0.006 billion in benefits, plus "B," to estimate approximately $9.6 billion in negative net benefits, plus "B." Docket Memorandum at 2 tbl.1. In concluding that the net benefits of regulation are negative, EPA essentially equated the total value of the unquantified benefits represented by "B" to zero. *See id.*; 84 Fed. Reg. at 2678. *Compare* OMB Circular A-4, *supra*, at 2 (warning agencies against ignoring unquantified benefits, because the most efficient rule may not have the "largest quantified and monetized . . . estimate"). Given section 112's emphasis on the urgency of controlling hazardous emissions from all major sources to prevent health and environmental hazards, Congress could never have intended to excuse power plants from regulation based on such a facile analysis. *See* Section IV.A.1–2, *supra*.

Assuming for the sake of argument that it is reasonable for EPA to reduce its statutory duty to consider costs to an arithmetic problem, EPA must obtain and analyze the data necessary to provide reasonable numerical inputs to its equation. A zero-value "B" variable does not suffice to represent extensive record evidence before EPA, both now and in 2012, of the massive health, economic, and environmental benefits associated with reducing power-plant hazardous air emissions. Failing to do so, EPA's proposed revised finding lacks a rational basis. *State Farm*, 463 U.S. at 43; *Fox*, 556 U.S. at 515 (EPA must "provide a more detailed justification

than what would suffice for a new policy created on a blank slate" when "its new policy rests upon factual findings that contradict those which underlay its prior policy").

VI. The Proposed Revised Finding Is Unlawful Because EPA Fails to Consider Its Significant Implications, Including the Potential Rescission or Invalidation of Emission Standards.

EPA's claim that "there would not be any cost, environmental, or economic impacts as a result of" the Proposal is a thinly veiled effort by EPA to avoid its obligation to consider the significant consequences that may result if the proposed revised finding is finalized. 84 Fed. Reg. at 2703. An agency declaring that its ongoing regulation of an industry is no longer "appropriate and necessary" is no ministerial action—it is extraordinary and inherently disruptive. If finalized, it is foreseeable that opponents will seek administrative rescission or judicial invalidation of the Rule on the basis that EPA has deemed it inappropriate and unnecessary.[73] Indeed, Murray Energy has already publicly argued as much. Murray Energy Comments, *supra* note 2, at 2 (EPA "must . . . take the only logical and defensible next step by rescinding MATS altogether."). And EPA acknowledges potential interpretations of the Proposal that could trigger a cascading effect ending in deregulation of power-plant hazardous air pollution. 84 Fed. Reg. at 2679. EPA cannot reasonably pretend there is no risk its action ultimately could result in significant harm to the regulatory scheme. *Cf. Portland Cement Ass'n*, 665 F.3d at 187 (agencies must "acknowledge and account for a changed regulatory posture the agency creates").

EPA's failure to consider the serious health, environmental, and economic implications of rescission or invalidation of the MATS Rule, which would not be at risk but for the Proposal, renders its Proposal arbitrary and capricious and unlawful. *See Am. Farm Bureau Fed. v. EPA*, 559 F.3d 512, 520 (D.C. Cir. 2009) (an agency acts arbitrarily and capriciously when it fails "to consider a relevant and significant aspect of a problem"). *Cf. El Paso Elec. Co. v. Fed. Energy Regulatory Comm'n*, 201 F.3d 667, 671–72 (5th Cir. 2000) (order was arbitrary where Commission failed to consider potential disadvantages that "[we]re likely results of the Order" and therefore "quite relevant"). Because vitiation of the MATS Rule would be an economically significant regulatory action, EPA also has failed to conduct an economic impact analysis as required under Executive Order 12,866. *Cf.* 77 Fed. Reg. at 9432 (finding the MATS Rule was an economically significant regulatory action); 81 Fed. Reg. at 24,451 (finding the Supplemental Finding was a significant action because "it raise[d] novel legal or policy issues arising out of legal mandates" (internal quotation marks omitted)).

[73] *See* Envtl. & Energy L. Prog., Harv. L. Sch., *Rolling Back the Mercury and Air Toxics Standards: Proposed Withdrawal of "Appropriate and Necessary"* 9 (2019), http://eelp.law.harvard.edu/wp-content/uploads/MATS-Analysis-Goffman-final.pdf (arguing the Proposal "draws a path that could lead to . . . the eventual withdrawal of both the finding and the regulations").

A. EPA Fails to Consider the Enormous Health, Environmental, and Economic Costs to the States and Local Governments of Undermining the MATS Rule.

Rescission or invalidation of the MATS Rule would not materially benefit power companies or electricity consumers. *See* ***Exhibit C***, James E. Staudt, *Andover Technology Partners, Update of the Cost of Compliance with MATS – Ongoing Cost of Controls* 7, 8 tbl.8 (2019) (finding that annual incremental operating costs associated with the MATS Rule are approximately $203 million and avoidable compliance costs would equal approximately $0.17 per megawatt-hour for energy generated by coal-fired power plants). But it could result in massive adverse impacts to the States and Local Governments—which EPA wholly fails to address. As the NESCAUM Report explains, in the absence of enforceable emission standards, there is an economic incentive for power plants to stop operating hazardous air pollution controls. *See* NESCAUM Report at 11–13. It is thus reasonable to expect that regulated power plants in states without state-law mercury-control requirements would operate pollution controls installed to comply with the MATS Rule less frequently or stop operating them altogether. *Id.* Given that the majority of U.S. coal-fired generation capacity is in states without mercury controls under state law, increases in emissions of hazardous air pollution due to vitiation of the MATS Rule could be enormous. *Id.* at 13.

Any increase in emissions of mercury and air toxics within their borders and from upwind states would negatively affect the States and Local Governments. *See id.* at 13–18; Section I, *supra* (discussing the benefits of the MATS Rule to the States and Local Governments). Greater mercury exposure, for example, would increase the risk of neurologic, cardiovascular, and genotoxic harms to human health, and increase the risk of reproductive harm to fish, birds, and mammals. *See* MATS RIA at ES-9 to ES-13. The serious human health harms posed by greater exposure to mercury disproportionately would affect highly exposed and sensitive populations, including children, American Indian tribal communities, and Asian/Pacific Islander communities. *See* 76 Fed. Reg. 24,977–78; Baehner (2018), *supra* note 26, at 17, 21. Increased power-plant emissions of other hazardous air pollutants would increase the risks of cancer and myriad other adverse human health effects. *See* MATS RIA at 4-68 to 4-73; 76 Fed. Reg. at 25,003. And turning off the controls required to meet the MATS Rule would result in significant increases in emissions of fine particulate matter and sulfur dioxide, with substantial resulting health and environmental impacts, most notably the premature deaths of thousands of Americans every year. *See, e.g.*, MATS RIA at 5-95 tbl.5-18 (anticipated health benefits due to particulate matter reductions); *id.* at ES-12 to ES-13 tbl.ES-6 (anticipated beneficial environmental effects); *id.* at 5-59 (expected visibility improvements in national parks and wilderness areas). Increased emissions from the rescission or invalidation of the MATS Rule would be additive to pollution likely to result from other EPA deregulatory actions, if successful, including those in the coal, oil and gas, and light-duty motor vehicle sectors, with potentially compounding effects. And they would tax state and local public resources nationwide by requiring increased investments in education, outreach, public health, and social services necessary to prevent pollutant exposures, treat ensuing morbidity, and accommodate for neurological and developmental harms.

As the IEc Report demonstrates, if the MATS Rule were repealed or invalidated, the economic value of impacts to Northeast and Midwest fisheries alone would be massive—possibly in excess of $1 billion in annual losses. IEc Report at 4. Increases in power-plant mercury emissions in the absence of the MATS Rule would lead to changes in recreator and consumer behavior, with substantial resulting economic impacts for the Northeast and Midwest regions as well as the nation as a whole. *See generally* IEc Report. As discussed in Section V.D.1 *supra*, methods to quantify such impacts are readily available and well-known to EPA. *See id.* at 24. Application of those methods in the Proposal "would provide a more complete and transparent understanding of the actual benefits of the MATS Rule, and as such an understanding of the social and regional economic cost that would result from removing these requirements." *Id.* Despite readily available quantification methods, however, EPA has failed to make any attempt to quantify, or even qualitatively discuss, the costs associated with potential repeal or invalidation of the MATS Rule.

In addition, repeal or invalidation of the MATS Rule would harm those states that rely on required emission reductions to satisfy other pollution-control requirements. As discussed above, many of the undersigned states rely on emission reductions under the MATS Rule to meet TMDL goals under the Clean Water Act. *See* Section I.B, *supra*. Emissions reductions under the MATS Rule also play a key role in state compliance with other Clean Air Act programs. For example, states are required to satisfy national ambient air quality standards for various pollutants that are affected by the MATS Rule. EPA guidance on compliance with national ambient air quality standards for sulfur dioxide and filterable particulate matter specifically contemplates incorporation of MATS-Rule-related reductions into state implementation plan submissions.[74] In addition, as the NESCAUM Report explains, EPA has incorporated the MATS Rule into emission projections that the states rely on, for example, in developing strategies to attain and maintain national ambient air quality standards and to achieve reasonable progress goals under regional haze plans. *See* NESCAUM Report at 17–18. Consequently, repeal or invalidation of the MATS Rule could generate compliance uncertainty for many, if not all, States.[75] That, in turn, would create uncertainty for members of the regulated community seeking permits for any new or modified source that emits either or both sulfur dioxide and particulate matter.

Emission reductions under the MATS Rule are also incorporated into other state and federal pollution-control regimes, including the modeling platforms used in ongoing natural

[74] *See* 42 U.S.C. § 7491; 80 Fed. Reg. 51,052, 51,062 (Aug. 21, 2015) (implementation schedule for 2016 round of sulfur dioxide nonattainment designations designed to allow states to "account for SO2 reductions that will occur over the next several years as a result of implementation of [other] requirements (such as [MATS])"); 80 Fed. Reg. 15,340, 15,349–50 & n.47 (Mar. 23, 2015) (instructing states with moderate nonattainment areas for particulate matter to incorporate sulfur dioxide reductions, such as those from the MATS Rule, into nonattainment modeling); 64 Fed. Reg. 35,747 (July 1, 1999) (regional haze rule); EPA, *General Principles for the 5-Year Regional Haze Progress Reports for the Initial Regional Haze State Implementation Plans* 8 (2013), http://www.4cleanair.org/Documents/haze_5year_4-10-13.pdf ("[R]eductions in SO2 and NOx emissions from EGUs are generally critical elements of each state's regional haze strategy.").

[75] EPA's interstate transport policies also rely on emission projections that include MATS Rule reductions and would be similarly affected if the MATS Rule were to be repealed or invalidated.

resource damage assessments and prior claims and settlement agreements related to mercury-contaminated sites and waterbodies in the States and Local Governments. Rescission or invalidation of the MATS Rule thus would inject uncertainty into federal and state efforts to evaluate the extent of mercury-related injuries and determine the restoration actions needed to return injured natural resources to their pre-contamination baseline and make the public whole for interim losses.

All of those risks to the States and Local Governments would not exist but for EPA's proposed revised finding. EPA's failure to analyze that "important aspect" of its Proposal is arbitrary and capricious and unlawful. *State Farm*, 463 U.S. at 43.

B. EPA Improperly Fails to Analyze Risks to Electricity Consumers and Power Companies That Have Made Substantial Investments to Comply with the MATS Rule.

Power companies have invested billions of dollars to comply with the MATS Rule, and power plants continue to incur ongoing costs associated with operation of hazardous air pollution controls. *See* NESCAUM Report at 12. If the MATS Rule is rescinded or otherwise invalidated as a result of the proposed revised finding (an outcome the States and Local Governments do not concede would be lawful), there is a serious risk that some electricity customers could be forced to bear those costs for years after power plant owners and operators turn off pollution controls. Publicly owned utilities and rural electric cooperatives, for instance, can continue to recover the capital costs of pollution controls directly from their customers even if those controls are no longer providing public health or environmental benefits. Despite calls from the electric power sector, EPA refuses to consider risks to ratepayers and power companies associated with reversing the appropriate and necessary finding.[76]

In addition, EPA fails to consider that in many parts of the country, MATS Rule compliance costs are the subject of ongoing or pending reviews before state public utility commissions. By withdrawing the underlying finding that supports the Rule, EPA's Proposal would generate immediate uncertainty about whether those costs meet the standards for cost-recovery through electricity rates. In so-called "traditionally regulated" jurisdictions, utility commissions allow investor-owned utilities to recover the "prudent" costs of pollution controls through electricity rates. The prudence review considers, for example, whether costs were reasonable and necessary, whether any technologies installed are used and useful, and whether ratepayers will benefit from the investment. All prudent investments will be incorporated into the rate base, while any imprudent costs must be borne by the power companies' shareholders. The appropriate and necessary finding provides critical assurance to the electric power sector that investments in compliance with the MATS Rule were, and will continue to be, prudent. If it is reversed, there is a risk to power companies that state regulators will find some or all of their

[76] *See, e.g.*, Industry Comments, *supra* note 28; Letter from Edison Electric Inst. et al. to William L. Wehrum, Assistant Admin'r, Off. of Air & Radiation, EPA (July 10, 2018), *available at* https://www.eenews.net/assets/2018/07/11/document_gw_04.pdf.

investments to comply with the MATS Rule are imprudent and thus ineligible for cost recovery and a fair rate of return.[77]

Without analyzing potential impacts to ratepayers and power companies, EPA cannot meet its burden to demonstrate that "there are good reasons for [the Proposal], and that the agency believes it to be better." *Fox*, 556 U.S. at 515. Nor has EPA met its higher burden to provide a "more detailed justification" for its new policy given the "serious reliance interests" of power companies and ratepayers engendered by EPA's appropriate and necessary finding. *Id.*

C. EPA Fails to Consider the Proposal's Implications for Ongoing Challenges to the Supplemental Finding.

EPA fails to address the implications of its Proposal for the ongoing litigation of challenges to the Supplemental Finding in *Murray Energy Corp. v. EPA*, No. 16-1127 (D.C. Cir. filed Apr. 25, 2016), which is currently in abeyance pending EPA's reconsideration in the current Proposal. *See* Order, *Murray Energy Corp. v. EPA*, No. 16-1127 (D.C. Cir. Apr. 27, 2017), ECF No. 1672987. In that case, various state and industry groups petitioned the D.C. Circuit for review of EPA's Supplemental Finding. Many of the undersigned States and Local Governments intervened in the case in support of the Supplemental Finding. The *Murray Energy* court has not remanded the Supplemental Finding to EPA and thus has continuing jurisdiction to address alleged legal errors in the Supplemental Finding. The court has been fully briefed on the same issues EPA raises in its Proposal regarding the alleged infirmities of the Supplemental Finding[78]—including, for example, claims that the Supplemental Finding represents an unreasonable interpretation of section 112, that "a more direct comparison of benefits and costs" is required, and that EPA's reliance on the particulate matter air quality benefits resulting from reductions in hazardous air pollution "was flawed." 84 Fed. Reg. at 2674–75. EPA has neither informed the *Murray Energy* court nor addressed in its Proposal how finalization of the Proposal would affect the ongoing case.

This would appear to be another instance, like EPA's proposed "Affordable Clean Energy Rule" to replace standards limiting carbon emissions from existing power plants, 83 Fed. Reg. 44,746 (Aug. 31, 2018), where the agency is insisting that it must take a new regulatory action to comply with the law while putting up obstacles to the D.C. Circuit's determination of whether the agency's previous regulatory action is already in compliance with the law. *See, e.g.*,

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[77] *Cf.* Order No. 12-493, *In the Matter PacifiCorp, dba Pacific Power, Request for a General Rate Revision*, Dkt. No. UE 246, at 17–33 (Or. Pub. Util. Comm'n Dec. 20, 2012), https://apps.puc.state.or.us/orders/2012ords/12-493.pdf (disallowing cost recovery for a portion of utility's $661 million company-wide investment in power-plant emissions controls, where Commission found in prudence review that plants were not yet subject to "binding" federal or state emission limits); Order No. 25,920, *Investigation of Scrubber Costs and Cost Recovery and Determination Regarding Eversource's Generation Assets*, Dkt. Nos. DE 11-250 & DE 14-238, at 26–30 (N.H. Pub. Util. Comm'n July 1, 2016) (approving settlement agreements reducing utility's cost recovery for investment in power-plant emission controls by $25 million where Commission found utility's practices were "contrary to good utility management").

[78] *See, e.g.*, State & Industry Pet'rs Br. 28–58, Mar. 24, 2017, ECF No. 1667698; Resp't EPA Br. 24–60, Mar. 22, 2017, ECF No. 1667291; State & Local Resp't-Intervenors Br. 7–15, Mar. 24, 2017, ECF No. 1667668.

Order, *West Virginia v. EPA*, No. 165-1363 (D.C. Cir. Apr. 28, 2017), ECF No. 1673071 (holding consolidated cases challenging the Clean Power Plan in abeyance). If it is in fact EPA's belief that the law precludes the Supplemental Finding, then EPA should not be protesting a D.C. Circuit ruling on the Supplemental Finding's legality.

VII. This Rulemaking Process Is Tainted by EPA's Failure to Address Administrator Wheeler's and Assistant Administrator Wehrum's Potential Ethical Issues in Connection with the Proposal.

As discussed in these comments, EPA's Proposal offers no rationale based on the Clean Air Act for the agency's choice to act. That raises concerns that the proposed revised finding serves improper motives. Far from dispelling that notion, the Proposal all but declares EPA's desire to dodge Clean Air Act requirements. Although the Proposal affirms that power-plant hazardous air emissions exceed statutory health and environmental thresholds for deregulation, *see* 84 Fed. Reg. at 2679–2700, EPA solicits comment on various legal theories under which it "could reasonably conclude that the [law] does not limit the Agency's authority to rescind the MATS rule" or to find that Rule is not appropriate, *id.* at 2679.

Given that EPA is engaging in a regulatory maneuver that could be motivated by an improper purpose of aiding the fossil-fuel industry, and in particular, the coal industry, the States and Local Governments are concerned EPA is doing just that. Those concerns are not without reasonable basis. For years immediately prior to joining EPA, Administrator Andrew Wheeler was a highly paid coal lobbyist and Deputy Administrator William Wehrum was a lawyer for companies that operate coal-fired power plants.[79] Messrs. Wheeler and Wehrum both advocated on behalf of their former clients to repeal or revise the MATS Rule yet have decided nonetheless to participate in this rulemaking proceeding, in potential violation of ethical standards. *See* Exec. Order No. 13,770 at § 1, ¶¶ 6, 7; 5 C.F.R. §§ 2635.101(b)(14), 2635.502(a)(2), 2635.502(d). EPA has failed to address those potential violations.

As a condition of appointment to their current positions at EPA, Messrs. Wheeler and Wehrum each signed an Ethics Pledge[80] that bars them from participating for two years in "any particular matter involving specific parties that is directly and substantially related to [their] former employer or former clients," Exec. Order No. 13,770 § 1, ¶ 6 (Jan. 28, 2017), including any meeting that is not "open to all interested parties," *id.* § 2(s). As a recent former registered lobbyist, Mr. Wheeler is also barred by his Ethics Pledge from participating for two years in any "particular matter" on which he lobbied during the two years prior to his appointment, or "in the specific issue area in which that particular matter falls." *Id.* § 1, ¶ 7. The participation of Messrs. Wheeler and Wehrum in this rulemaking proceeding within the two-year recusal period

[79] *See* Coral Davenport, *Trump Administration Prepares a Major Weakening of Mercury Emissions Rules*, N.Y. Times, A13, Sept. 30, 2018, https://www.nytimes.com/2018/09/30/climate/epa-trump-mercury-rule.html.

[80] *See* Andrew F. Wheeler Certification of Ethics Agreement Compliance, at 3 (June 1, 2018); William L. Wehrum Certification of Ethics Agreement Compliance, at 3 (Dec. 7, 2017, as amended Sept. 27, 2018). Mr. Wheeler's and Mr. Wehrum's Certifications of Ethics Agreement Compliance are available at the Office of Government Ethics' website: https://extapps2.oge.gov/201/Presiden.nsf/201+Request?OpenForm.

may violate their Ethics Pledge. Their participation may also violate standards of ethical conduct requiring Executive Branch employees to avoid any appearance of partiality.[81]

In the case of Mr. Wheeler, EPA has not justified his failure to recuse himself from this proceeding despite reports indicating that he recently lobbied on the MATS Rule on behalf of his former top client, Murray Energy Corporation ("Murray Energy"), a large coal producer.[82] Notably, Murray Energy is also the lead petitioner in the ongoing legal challenge to EPA's 2016 Supplemental Finding—the very action that Mr. Wheeler's EPA now proposes to reverse. *See Murray Energy Corp. v. EPA*, No. 16-1127 (D.C. Cir. filed Apr. 25, 2016). On behalf of Murray Energy, Mr. Wheeler arranged and attended meetings on March 29, 2017 with Energy Secretary Rick Perry and Robert Murray, Chief Executive Officer of Murray Energy, wherein Mr. Murray distributed and presumably discussed Murray Energy's "Action Plan" for repealing the MATS Rule and other environmental regulations.[83] Mr. Wheeler admitted that "Mr. Murray gave Secretary Perry a copy of his plan." Wheeler Nomination Statement, *supra* note 43. Mr. Wheeler has not denied that the Action Plan was discussed during those meetings. *See id.* The day before the meetings, Mr. Murray also sent Secretary Perry a packet containing draft executive orders that purport to rescind or revisit the MATS Rule and five other regulations.[84] Despite the potential ethical concerns posed by Mr. Wheeler's prior representation of Murray Energy immediately before joining EPA, Mr. Wheeler has refused to recuse himself from this rulemaking proceeding. *See* Exec. Order No. 13,770 at § 1, ¶¶ 6, 7; 5 C.F.R. §§ 2635.101(b)(14), 2635.502(a)(2), 2635.502(d).

EPA has also failed to justify Mr. Wehrum's participation in this proceeding despite his representation of UARG while at his former law firm, Hunton & Williams (now Hunton Andrews Kurth) ("Hunton"). Mr. Wehrum reportedly participated in a June 22–23, 2017 meeting with his client UARG in which UARG's Policy Committee planned its deregulatory

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[81] *See* 5 C.F.R. § 2635.101(b)(14) ("Employees shall endeavor to avoid any actions creating the appearance that they are violating the law or the ethical standards set forth in this part."); *id.* § 2635.502(a)(2) (when there is a reasonable question as to whether an employee's participation in a rulemaking "would raise a question regarding his impartiality," the employee must seek prior authorization); *id.* § 2635.502(d) (procedures to obtain an ethics authorization).

[82] *See, e.g.*, Steven Mufson, *Scott Pruitt's likely successor has long lobbying history on issues before the EPA*, Wash. Post, July 5, 2018, https://wapo.st/2L8srce; Lisa Friedman, *Andrew Wheeler, New E.P.A. Chief, Details His Energy Lobbying Past*, N.Y. Times, Aug. 1, 2018, https://www.nytimes.com/2018/08/01/climate/andrew-wheeler-epa-lobbying.html.

[83] *See* Emily Atkin, *A Coal Baron's Takeover of the EPA is Nearly Complete*, The New Republic, Jan. 16, 2019, https://newrepublic.com/article/152908/coal-barons-takeover-epa-nearly-complete; Rebecca Leber, *The Next Likely EPA Chief has Almost Completed His Former Coal Client's Wish List*, Mother Jones, Jan. 16, 2019, https://www.motherjones.com/politics/2019/01/andrew-wheeler-bob-murray-confirmation-hearing/; Friedman, *supra* note 82; Wheeler Nomination Statement, *supra* note 43.

[84] *See* Memorandum from Robert E. Murray, Chairman, President and CEO, Murray Energy Corp., to James Richard "Rick" Perry, Sec'y of Energy, U.S. Dep't of Energy (Mar. 28, 2017), https://www.eenews.net/assets/2018/06/07/document_gw_01.pdf.

strategy for the coming year.[85] Briefing materials distributed ahead of that meeting indicated that UARG budgeted $200,000 for Hunton to "[p]articipate in litigation challenging EPA's Supplemental Finding . . . and EPA's denial of reconsideration for the 2012 MATS rule," "[c]oordinate member efforts and strategy regarding EPA review and potential reconsideration of [the] Supplemental Finding," and "[m]onitor and participate, as necessary, in MATS-related litigation currently being held in abeyance in the D.C. Circuit," among other related activities.[86] UARG also budgeted $100,000 for Hunton, among other things, to continue coordinating "meetings and other informal communications with incoming EPA decision-makers concerning the Agency's overall approach to the regulation of emissions from electric generating units."[87] Mr. Wehrum invited an EPA official, Mandy Gunasekara, to attend that meeting and indicated that UARG would be interested to hear her speak about EPA's plans regarding "the Mercury and Air Toxics Standard."[88] Despite potential ethical issues posed by Mr. Wehrum's prior representation of UARG immediately before joining EPA, Mr. Wehrum similarly has refused to recuse himself from this rulemaking proceeding. *See* Exec. Order No. 13,770 at § 1, ¶ 6; 5 C.F.R. §§ 2635.101(b)(14), 2635.502(a)(2), 2635.502(d).

In fact, Mr. Wehrum apparently has continued to meet with UARG since joining EPA.[89] For instance, in December 2017, Mr. Wehrum travelled to Hunton's offices to meet with UARG members and update them on regulatory developments, including issues related to the MATS Rule.[90] Mr. Wehrum has argued this meeting did not violate his Ethics Pledge because five power companies were in attendance and it was therefore a "public" meeting.[91] However, all of

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[85] *See* Zack Colman & Alex Guillen, *Documents detail multimillion-dollar ties involving EPA official, secretive industry group*, Politico, Feb. 20, 2019, https://www.politico.com/story/2019/02/20/epa-air-pollution-regulations-wehrum-1191258.

[86] *Available at* https://static.politico.com/59/f4/19e386684cde98d283683e8bbb54/utility-air-regulatory-group.pdf.

[87] *Id.*

[88] *See* Email from William Wehrum, Partner, Hunton, to Mandy Gunasekara, Assistant Adm'r, EPA (May 23, 2017), https://www.documentcloud.org/documents/4776445-EPA-s-William-Wehrum-and-the-Effort-to-Move.html#document/p31/a448254. Mr. Wehrum later requested a meeting between Ms. Gunasekara and UARG specifically to discuss the MATS Rule. *See* Email from William Wehrum, Partner, Hunton, to Mandy Gunasekara, Assistant Adm'r, EPA (July 20, 2017), https://www.documentcloud.org/documents/4776445-EPA-s-William-Wehrum-and-the-Effort-to-Move.html#document/p74/a448254. UARG also asked to work with EPA to revise the MATS Rule in comments on Hunton's letterhead. *See* Email from Andrew Knudsen, Hunton & Williams, to Peter Tsirigotis et al., EPA (May 12, 2017), https://www.documentcloud.org/documents/4776445-EPA-s-William-Wehrum-and-the-Effort-to-Move.html#document/p46/a448254.

[89] Juliet Eilperin, *EPA regulator skirts the line between former clients and current job*, Wash. Post, Feb. 25, 2019, https://www.washingtonpost.com/national/health-science/epa-regulator-skirts-the-line-between-former-clients-and-current-job/2019/02/24/b826b5fa-3767-11e9-a400-e481bf264fdc_story.html?noredirect=on&utm_term=.15bc85a18000.

[90] *See id*; Invitation from Makram Jabar, Hunton, to William Wehrum, Assistant Adm'r, EPA, https://www.washingtonpost.com/invite-form-for-william-wehrum,-from-his-former-law-firm/eed9c891-1a73-473f-96fd-0ea45b0a1923_note.html?questionId=9e918d9c-b85c-454c-9f65-2aae769115e1&utm_term=.004a99d49142; William Wehrum, Assistant Adm'r, EPA, *Clean Air Act: Update on Stationary Source Regulations* (Dec. 7, 2017), https://www.documentcloud.org/documents/4776445-EPA-s-William-Wehrum-and-the-Effort-to-Move.html#document/p190/a448289.

[91] *See* Eilperin, *supra* note 89.

the participating power companies were contributing members of UARG and therefore did not represent the "public" or any meaningful "diversity of viewpoints" on the issues discussed.[92] Under Mr. Wehrum's interpretation, it is difficult to imagine how any meeting with a membership entity like UARG could ever violate his Ethics Pledge.

Despite the potential ethical concerns associated with Mr. Wheeler's and Mr. Wehrum's participation in preparing the Proposal, EPA has made no attempt to assuage the States and Local Governments' legitimate concerns about the integrity of this rulemaking process. Mr. Wheeler's and Mr. Wehrum's failures to recuse may violate ethical standards. Because their participation has incurably tainted this rulemaking, EPA should withdraw the Proposal.

CONCLUSION

For all the reasons set forth above, EPA should not finalize the proposed revised finding and instead should support and uphold its conclusion, first made in 2000 and affirmed in 2012 and 2016, that it is appropriate and necessary to regulate hazardous air pollution from power plants.

Respectfully submitted,

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[92] Memorandum from Andrew R. Wheeler, Deputy Adm'r, EPA, to E. Scott Pruitt, Adm'r, EPA 2 (May 24, 2018), https://wapo.st/2Bw7m7i (stating the Office of Government Ethics advised then Deputy Administrator Wheeler that under his ethics pledge, a meeting "open to all interested parties" means "a multiplicity of parties representing a diversity of viewpoints").

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The Economic Benefits of the Mercury and Air Toxics Standards (MATS) Rule to the Commercial and Recreational Fishery Sectors of Northeast and Midwest States

Final Report | 17 April 2019

prepared for:

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Office of the Attorney General

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State of Minnesota, Pollution Control Agency

State of New Jersey, Department of Environmental Protection

State of New York, Office of the Attorney General

State of Rhode Island, Office of the Attorney General

This report was prepared in response to:

EPA's Proposed Revised Supplemental Finding for the Mercury and Air Toxics Standards, and Results of the Residual Risk and Technology Review

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.

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THE ECONOMIC BENEFITS OF THE MERCURY AND AIR TOXICS STANDARDS (MATS) RULE TO THE COMMERCIAL AND RECREATIONAL FISHERY SECTORS OF NORTHEAST AND MIDWEST STATES

THE ECONOMIC BENEFITS OF THE MERCURY AND AIR TOXICS STANDARDS (MATS) RULE TO THE COMMERCIAL AND RECREATIONAL FISHERY SECTORS OF NORTHEAST AND MIDWEST STATES

INTRODUCTION AND PURPOSE OF THIS REPORT

On December 27, 2018, the U.S. Environmental Protection Agency (EPA) proposed to revise the Supplemental Cost Finding for the Mercury and Air Toxics Standards (the "MATS Rule"), as well as to complete the Clean Air Act (CAA) required risk and technology review associated with the MATS Rule (EPA 2018). On February 7, 2019 EPA published and asked for public comment on a Proposed Rule (EPA 2019). Specifically, EPA proposes to compare the cost of compliance with the MATS Rule solely with what EPA maintains are the direct, monetized benefits specifically associated with reducing emissions of the hazardous air pollutant (HAP) mercury in order to satisfy the duty to consider cost in the context of the CAA section 112(n)(1)(A) "appropriate and necessary" finding (U.S. EPA 2019, pp. 2674). While EPA states that there are unquantified HAP benefits and significant monetized particulate matter (PM) co-benefits associated with the MATS Rule, it notes the Administrator has concluded that the identification of these benefits is not sufficient, in light of what EPA has characterized as the "gross" imbalance of monetized costs and HAP benefits, to support a finding that it is appropriate and necessary to regulate Electric Generating Units (EGUs) under CAA section 112 (EPA 2019, pp. 2677).

Reopening the MATS Rule could result in a lifting of regulatory limits on mercury emissions from EGUs in the United States. This regulatory change could generate a significant increase in mercury emissions from the source category, leading to higher mercury levels in waterbodies that are subject to atmospheric deposition and loadings of mercury. An increase in atmospheric loadings would in turn increase mercury levels in the edible portions of recreationally and commercially harvested fish and shellfish. Given that state and federal agencies, as well as non-governmental entities, provide guidance to recreators and consumers to limit their exposure to mercury from consumption of fish and shellfish, any increases in mercury levels could result in changes in recreator and consumer behaviors. These behavioral changes would have an adverse impact on the wellbeing of recreators and negative consequences for the regional economies of the Northeast and Midwest.

The purpose of this report is to assess the potential impact of elevated mercury fish tissue contamination on the recreational and commercial fishing industries of the Northeast and Midwest,[1] as well as the scale of the potential economic benefits of the MATS Rule on those regionally-important economic sectors. Specifically, we ask the following questions:

- *To what extent do power plant emissions contribute to mercury in the environment, particularly in sportfish and commercially harvested fish tissue (as compared to other sources)?*
- *What actions have Northeast and Midwest states and federal agencies taken to limit the public's exposure to mercury from freshwater and saltwater fish consumption in order to protect public health (i.e., recreationally caught fish consumption advisories (FCAs); commercially harvested seafood health guidelines)?*[2] *What information do recreators and consumers receive from non-governmental organizations on the risks of exposure to mercury from self-caught and commercially caught fish species.*
- *How do FCAs affect anglers' propensity to fish and the associated economic benefits of recreational fishing, including consumer surplus (i.e., values incurred by anglers) and regional economic contributions (i.e., jobs, income) from fishing trip expenditures? How do health guidelines on commercially harvested seafood affect demand for commercially important species, and by extension consumer and producer surplus and jobs/economic activity across the broader regional economy?*
- *What is the scale of recreational fishing activity in the Northeast and Midwest? What is the scale of economic activity associated with commercial catch and revenues? Given the scale of these activities, what is the potential economic benefit of the MATS Rule?*
- *Could EPA estimate the change in economic wellbeing and regional economic activity that has and could result from maintaining the MATS Rule?*

Our findings, described in detail below, are as follows:

- Emissions of mercury from coal-fired EGUs are a significant contributor to total mercury levels in fish and shellfish in the Northeast and Midwest states.

[1] We consider the following states in this report: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont for the Northeast; and Illinois, Michigan, Minnesota, and Wisconsin for the Midwest. However, we note that the benefits of the MATS Rule described in this report also likely exist for other states experiencing elevated fish tissue concentrations of mercury due to emissions from EGUs.

[2] References to "seafood" in this report include fish harvested commercially from both marine and freshwater.

- The existing MATS Rule, effective since 2015, has reduced mercury loadings to aquatic systems, in turn leading to a reduction in mercury levels in fish and shellfish.
- Given the health risks posed by mercury to human health, federal and state agencies have acted to put in place consumption advisories for fish and shellfish harvested commercially, recreationally, and by subsistence fishers.
- These advisories are intended to change individuals' behavior and thus protect sensitive populations and the general public from the health risks of mercury.
- In addition, non-governmental organizations and private businesses provide consumers with information on the risks of consuming fish and shellfish that are high in mercury.
- The public has been shown to respond to these advisories and other sources of information by changing their recreational and subsistence behaviors, as well as their consumption patterns for commercially harvested fish and shellfish.
- The total contribution to economic welfare in the 12 states considered in this analysis resulting from recreational fishing activity is approximately $7.5 billion *per year*.
- Recreational fishing and commercial fish and shellfish harvest and processing are substantial contributors to the regional economies of the Northeast and Midwest. While the specific contributions vary from year to year, recreational fishing contributes $16 billion (2019 dollars) in value added annually (i.e., contribution to regional GDP) to the economies of 12 states in these regions, and approximately 259,000 jobs.[3] Additionally, annual commercial fish landings for these 12 states generate $1.6 billion in value added annually (specific estimate is variable from year to year), and approximately 18,000 jobs.
- Adverse changes in recreational behavior and purchase patterns for commercially harvested fish and shellfish reduces economic welfare (e.g., consumer surplus) and regional economic activity (e.g., jobs and expenditures) in the Northeast and Midwest states.[4] The magnitude of economic impacts increases as contamination worsens and FCAs become more restrictive.

[3] In the context of regional economic impact analysis, which reflects a single-year snapshot of impacts on economic activity levels in a region, the metric "jobs" refers to "job-years," defined as one job lasting one year.

[4] Consumer surplus is the difference between the price of the good or service and the amount we would be willing to pay for that good or service before we would forgo consumption. In the case of recreational behavior, if the cost of a day of fishing (i.e., the cost of getting to a fishing site and the opportunity cost of not working) is less than the participant's willingness to pay for the experience, the individual experiences a gain in consumer surplus (i.e., social welfare). When the quality of a recreational experience declines, the consumer surplus also declines, reflecting a lower willingness to pay for the experience.

- Given the importance of recreational fishing and the commercial fishing and processing sectors to the economies of the Northeast and Midwest, even modest changes in recreator and consumer behavior in response to reductions in mercury concentrations from the MATS Rule are likely to result in substantial benefits to the economies and residents of these states and the Nation as a whole. While this report does not evaluate the specific effects of the MATS Rule on contaminant and FCA levels, this analysis does find that it is reasonable to conclude that the Rule may generate recreational and commercial fishing benefits in excess of $1 billion *annually*.
- There are widely accepted methods that EPA could have used to monetize the benefits of reduced mercury concentrations in recreationally caught and commercially harvested fish. These benefits would include both regional economic performance (including jobs and expenditures) as well as social welfare benefits. However, despite the availability of these methods, neither the previous EPA rulemaking nor the current proposed rulemaking attempt to measure these benefits or even describe them qualitatively.

THE ROLE OF POWER PLANT EMISSIONS IN CONTRIBUTING TO MERCURY CONCENTRATIONS IN FISH AND SHELLFISH

Mercury (Hg) is an element found throughout the environment. It exists in elemental (metallic), organic (methylmercury), and inorganic forms. Natural sources of mercury enter the environment from volcanic activity, forest fires, and weathering of rocks (UNEP 2019). Anthropogenic sources of mercury include fossil fuel combustion, artisanal and small-scale gold mining and other mining activities, industrial activity, and incineration of waste (Giang and Selin 2016, UNEP 2019, Driscoll *et al.* 2013, Pacyna *et al.* 2010). In addition to primary sources of mercury, mercury can be remobilized from environmental sources (e.g., soil, sediment, water) where previously deposited (UNEP 2019, Giang and Selin 2016).

While mercury is an element and is thus naturally occurring, atmospheric deposition of mercury has increased by a factor of two to five since preindustrial times, with even higher increases in deposition rates in industrialized areas (Fitzgerald *et al.* 1998, Krabbenhoft and Sunderland 2013, Swain *et al.* 1992, UNEP 2019). Burning of fossil fuels—mainly coal—is a significant source of anthropogenic mercury, contributing 24 to 45 percent of total global anthropogenic mercury emissions (UNEP 2019, Pacyna *et al.* 2010). In North America, fuel combustion is the highest contributor of anthropogenic mercury emissions, estimated to be around 60 percent of total anthropogenic emissions. North American anthropogenic sources, on average, contribute roughly 20 to 30 percent of total mercury atmospheric deposition within the continental United States (Selin *et al.* 2007). The remainder comes from anthropogenic sources in other countries and from natural sources.

Mercury is released in the form of gaseous elemental mercury (Hg^0) from EGUs during combustion. Once in the atmosphere, it can be transported over short and long distances (Giang and Selin 2016, Driscoll *et al.* 2013). In the atmosphere, it reacts with oxidants to form water soluble inorganic mercury species (Hg^{II}) where it can then be deposited via precipitation to terrestrial and aquatic ecosystems. Some of this mercury is then cycled through aquatic systems where it can form organic mercury (methylmercury; Vijayaraghavan *et al.* 2014, Krabbenhoft and Sunderland 2013). Methylmercury, a known toxicant for wildlife and humans, is known to biomagnify through food chains, with higher trophic level organisms acquiring increasingly large body burdens (UNEP 2019). Nearly all the mercury in humans, fish, and predatory insects is in the form of methylmercury (Harris *et al*. 2007, Mason *et al.* 2000, Cristol *et al.* 2008, Driscoll *et al*. 2007). Overall, the proportion of methylmercury in organisms is a function of food chain length (Knightes *et al*. 2009). Fish are predominantly exposed to mercury in the water column (via atmospheric deposition), but are also exposed through contaminated sediments and terrestrial transport from the watershed where mercury has been stored (Harris *et al*. 2007, Mason *et al*. 2012). Humans are subsequently exposed to methylmercury via fish consumption.

The distance that emitted mercury can travel depends on the form emitted; elemental mercury (Hg^0) can transport further than particulate or mercury gas (Hg^{II}), which are generally deposited closer to the source (Giang and Selin 2016, Driscoll *et al*. 2013). Studies have suggested that, although the timeframe over which the impacts occur is uncertain, a reduction in inorganic mercury loading would directly reduce exposure of fish and subsequent mercury concentrations in fish (Vijayaraghavan *et al*. 2014, Mason *et al*. 2012, Selin *et al*. 2010, Harris *et al.* 2007, Krabbenhoft and Sunderland 2013, Giang and Selin 2016; Knightes *et al*. 2009).

Overall, there is broad agreement in the literature that a decline in anthropogenic mercury inputs will lead to a relatively proportional decrease in fish tissue concentrations (Giang and Selin 2016, Lee *et al*. 2016, Cross *et al*. 2015, Vijayaraghavan *et al*. 2014, Evers *et al*. 2011). Giang and Selin (2016) modeled various policies and mercury reduction scenarios on a national and global scale relative to a no policy scenario. Their results show that from the baseline of year 2005, by the year 2050, with the MATS Rule in place, there would be a 20 percent reduction in mercury deposition in the Northeast and a six percent reduction in deposition to global oceans relative to a no policy scenario. The authors note that, while reductions in mercury emissions will result in national reductions in exposure to mercury from fish consumption, there are potential uncertainties in predicting the timeframe associated with these benefits due to ecosystem dynamics, as well as mercury from sources outside the U.S. Other studies have modeled emission reductions in North America and subsequent regional reductions in mercury, noting that emission reductions would particularly affect mercury concentrations in fish in the Northeast (Selin *et al*. 2010). Lee *et al*. (2016) found a 19 percent decline in Atlantic bluefin tuna mercury concentrations from 2004-2012 relative to a 20 percent decline in North Atlantic mercury emissions from 2001-2009. With fewer samples, Cross *et al*.

(2015) found a similar reduction in bluefish tissue concentration from 1972 to 2011 in response to reductions in atmospheric deposition and other mercury inputs (e.g., point source).

Depending on where fish species reside in the water column, their prey, and the physiochemical parameters of the system, the response of mercury concentrations in fish to a reduction of mercury from EGUs will range from a rapid reduction over a few years or decades to long-term reductions over centuries (Vijayaraghavan *et al*. 2014, Knightes *et al*. 2009). For example, using a lake in New Hampshire as a modeled case study for mercury reductions in fish tissue, Vijayaraghavan *et al*. (2014) found it would take more than 50 years for fish tissue to proportionally reflect the reduction in atmospheric mercury deposition as a result of local and regional emissions reductions. However, fish tissue would begin to reflect reductions in atmospheric mercury deposition within three to eight years.

In short, while the timeframe of reductions in mercury concentrations in fish tissue in response to emissions reductions ranges, the relationship is clear: Policy changes requiring a reduction in mercury emissions from EGUs will reduce mercury deposition and subsequent fish tissue mercury concentrations. These changes in fish tissue mercury concentrations and human exposure from fish consumption will vary by location, species, and watershed and waterbody, but are expected to occur widely across the Northeast and Midwest.

ACTIONS STATES HAVE TAKEN TO LIMIT PUBLIC EXPOSURE TO MERCURY IN FISH AND SHELLFISH

As described above, coal-fired EGUs are a significant source of mercury emissions in North America. As such, emissions from this source are a significant contributor to mercury concentrations in fish and shellfish caught, purchased, and consumed in the United States. Federal and state agencies are responsible for disseminating information about mercury levels in self-caught and purchased fish products and encouraging safe consumption habits for members of the public. For example, by issuing FCAs, federal and state agencies seek to limit the population's exposure to high mercury levels and avoid adverse health effects in the population, including especially sensitive populations (e.g., pregnant women, young children). In addition to governmental guidelines, popular seafood chains and retailers, public health research organizations, environmental and consumer advocacy groups, and educational organizations provide consumers with materials to encourage and facilitate safe fish consumption.

Federal and state agencies generally provide details on safe fish consumption behaviors based on waterbody, fish size and species, serving size, and serving frequency (see Exhibit 1 below). Consumption advisories are generally categorized as either targeting a sensitive population (i.e., pregnant women, women of childbearing age, young children, and adolescents) and general population, reflecting the role mercury plays in neurological development (U.S. Environmental Protection Agency 2017). Appendix A includes three

examples of general statewide safe fish guidelines: Michigan and Vermont both provide a general list of fish species from their respective waterbodies, chemical(s) of concern, size of fish, and servings per month based on consumers' classification as a "sensitive population. Massachusetts lists advisories for specific waterbodies that include advice regarding which species of fish should be avoided by certain populations (or in some instances, all populations) based on the presence of certain contaminants. In addition to providing specific advisory information, the U.S. EPA, the U.S. Food and Drug Administration, and many states provide information on the risk of health effects of mercury exposure in humans, contextual information on bioaccumulation and biomagnification of mercury in fish, and undertake contamination monitoring and mitigation efforts.

EXHIBIT 1. EXAMPLES OF FEDERAL AND STATE MERCURY ADVISORIES AND GUIDANCE

JURISDICTION	HOW INFORMATION IS COMMUNICATED	EXAMPLE OF GUIDANCE	OTHER INFORMATION	SOURCE
U.S. Environmental Protection Agency	Webpages and factsheets	Recommended serving size and frequency for about 60 fish species based on their mercury levels for sensitive populations		http://www2.epa.gov/choose-fish-and-shellfish-wisely
U.S. Food and Drug Administration	Chart targeted at pregnant women and parents	Serving amount and size for "best", "good", and "to avoid" choices	Data collected from 1990 – 2012 of mercury levels in commercial fish and shellfish	https://www.fda.gov/Food/ResourcesForYou/Consumers/ucm393070.htm
State of Connecticut, Department of Public Health	Guides for fish caught in Connecticut waters and store-bought fish	Weekly/monthly serving amount for fish species for general and sensitive populations, monthly serving amount for fish species caught in Connecticut waterbodies		http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387460&dphNav_GID=1828&dphPNavCtr=|#47464
State of Illinois, Department of Public Health	List of specific fish species with mercury advisories	Meal amount per week or month for fish species for general and sensitive populations	Interactive map of waterbodies per county that lists all the fish advisories, including pictures of each species	http://dph.illinois.gov/topics-services/environmental-health-protection/toxicology/fish-advisories
Commonwealth of Massachusetts, Department of Public Health	List of waterbodies/towns in Massachusetts with fish consumption advice, guidelines for fish consumption for marine and fresh waterbodies	Advice is provided for fish species and recommended monthly fish consumption amounts for general and sensitive populations	Searchable directory of advisories per waterbody and town	http://www.mass.gov/dph/fishadvisories

JURISDICTION	HOW INFORMATION IS COMMUNICATED	EXAMPLE OF GUIDANCE	OTHER INFORMATION	SOURCE
State of Maine, Center for Disease Control & Prevention	Safe eating guidelines for freshwater fish in Maine waterbodies and saltwater bodies	Freshwater guide: recommended monthly serving amount Saltwater guide: serving amount for sensitive and general populations	Poster with images and a scale of fish-mercury levels in store-bought and self-caught fish; Maine Center for Disease Control and Prevention's Family Fish Guide which details fish type, size, serving amount, fish origin, and cooking methods are safe to eat for sensitive populations	http://www.maine.gov/dhhs/mecdc/environmental-health/eohp/fish/
State of Michigan, Department of Community Health	Statewide safe fish guidelines, and regional Eat Safe Fish Guides for species found in Michigan waterbodies	Serving size based on person's weight, size of fish caught, monthly serving suggestion, chemical of concern	Guide for safe serving amount of fish from a grocery store or restaurant that also includes information on omega-3 fatty acids	http://www.michigan.gov/eatsafefish
State of Minnesota, Department of Health	Safe eating guidelines for general and sensitive populations; list of Minnesota waterbodies and corresponding meal advice for general and sensitive populations	Serving amount and frequency of MN caught and purchased fish, fish size	Level of mercury in fish and corresponding meal frequency for general and sensitive populations	http://www.health.state.mn.us/divs/eh/fish/index.html
State of New Hampshire, Fish and Game Department	Fish consumption guidelines for freshwater and saltwater	Recommendations for monthly serving amount/size of fish, no specific information of species and water body guidelines easily accessible		http://www.wildlife.state.nh.us/fishing/consume-fresh.html
State of New Jersey, Departments of Environmental Protection and Health	List of all species in each waterbody with an advisory; there are separate lists for estuarine & marine waters, and inland waterbodies	Serving frequency for general and sensitive populations	Images of fish species; interactive map to locate waterbody specific advisories	http://www.state.nj.us/dep/dsr/njmainfish.htm
State of New York, Department of Health	List of advisories per waterbody in each region of the state	Fish species, serving frequency recommended for general and sensitive populations, chemicals of concern		https://www.health.ny.gov/environmental/outdoors/fish/health_advisories/

JURISDICTION	HOW INFORMATION IS COMMUNICATED	EXAMPLE OF GUIDANCE	OTHER INFORMATION	SOURCE
State of Rhode Island, Department of Health	Brochure targeted to pregnant women and parents	List of safe species of RI-caught fish and generally low mercury level fish		http://www.health.ri.gov/healthrisks/poisoning/mercury/about/fish/
State of Vermont, Department of Health	List of general fish consumption guidelines and for specific waterbodies	Fish species and serving frequency per general and sensitive populations		http://healthvermont.gov/health-environment/recreational-water/mercury-fish
State of Wisconsin, Department of Natural Resources	List of general and specific waterbody fish consumption advisories	Fish species, fish size, serving frequency for general and sensitive populations	Search directory of county and advisory area (waterbody)	http://dnr.wi.gov/topic/fishing/consumption/

Consumers also can access information on fish and shellfish safety, health benefits/effects, and consumption from additional sources. Retail chains, research organizations/academic institutions, environmental advocacy groups, and consumer protection groups publish contextual information on mercury consumption, and safe consumption guidelines. These sources of information can sometimes be redundant of state and federal guidelines, and are designed to be supplemental to official advisories, to ensure that consumers have all pertinent information available to them prior to purchasing or consuming potentially toxic fish product. Some of these sources include:

- The grocery chain Whole Foods publishes "Mercury in Seafood: Frequently Asked Questions" which explains the health concerns of elevated levels of methylmercury in fish, and lists fish species safe for consumption, while referring to EPA and FDA guidelines;
- The Safina Center at Stony Brook University's "Mercury in Seafood: A Guide for Consumers" recommends serving size for several popular fish species and discusses risks and signs of methylmercury exposure. The Safina Center also publishes brochures for health care professionals and a full report on mercury in the environment;
- The Gelfond Fund for Mercury Research & Outreach's "Seafood Mercury Database" aggregates government data and scientific literature of mercury levels in commercial fish in the U.S.;
- Environmental Working Group publishes a "Consumer Guide to Seafood" and has an interactive "Seafood Calculator" tool that allows users to input their weight and basic health condition to get specific recommendations of species of serving size based on mercury content, omega-3 fatty acid content, and sustainability; and

- Environmental Defense Fund's "Seafood Selector" gives recommended serving size of fish species based on age, the fish species' eco-rating, contaminant level, and omega-3 level.

FCAs aim to reduce the amount of fish consumed to safe levels, and/or suggest safer alternatives for consumers (e.g., switching species consumed). Research on the role of advisories on consumer behavior suggests that they are a useful public health tool in reducing methylmercury exposure levels in sensitive human populations. An analysis of the effectiveness of advisory scenarios on minimizing blood-mercury levels in humans from fish consumption suggests that strategies that aim to reduce methylmercury exposure through reducing fish consumption overall are more effective than strategies intended to encourage safer alternative species (Carrington *et al.* 2004). One study focused on responses to an FDA advisory in 2001 found that information-based advisories can achieve the agency goal of minimizing consumption of mercury in fish if the advisories are targeted toward the sensitive populations of pregnant women, children, and women of child-bearing age (Shimshack, Ward, and Beatty 2007). Shimshack *et al.* found that education and readership were determinants of people's responses to fish health advisories, suggesting that advisories need to be more accessible and targeted towards the highest risk and lowest educated population to ensure FDA's goals of reducing exposure to mercury from fish consumption through reduced purchases and therefore consumption of fish products (2007). Furthermore, a survey study by the Epidemic Intelligence Service at the Centers for Disease Control demonstrated that awareness of sport fish health advisories in Midwest states among women, people of color, and persons with lower educational attainment is low compared to traditionally targeted licensed angles who tend to be white men (Tilden *et al.* 1997). This finding suggests that accessible and targeted communication of the risks and health effects associated with fish consumption are crucial in effectively decreasing mercury exposure through consumption (Tilden *et al.* 1997).

THE ROLE OF ADVISORIES AND HEALTH GUIDELINES IN ANGLER AND CONSUMER BEHAVIOR

While advisories are likely to reduce the public's exposure to mercury by modifying consumption patterns of fish and shellfish, these behavioral changes reduce social welfare and adversely impact regional economies. In this section we consider impacts to both recreational anglers as well as consumers purchasing fish and shellfish commercially sold in the marketplace.

RECREATIONAL FISHING

Numerous published studies have identified the negative impact that FCAs have on the quantity and quality of recreational fishing trips. The primary reason that anglers change their behavior in response to FCAs is because they are concerned about consuming species covered by the FCA or sharing it with friends and family. Since some anglers may practice catch-and-release fishing, they may not be affected. However, since many

anglers fish to keep and consume their catch, FCAs do have an impact on recreational fishing behavior.

When recreational anglers change their behavior, there are two types of economic losses: 1) lost social welfare value of fishing to recreationists (i.e., the consumer surplus they experience from fishing) and 2) lost regional economic activity. The term social welfare value refers to the difference between the maximum amount a recreationist would be willing to pay to participate in a recreational activity and the actual cost of participating in that activity. This is referred to by economists as consumer surplus or net economic value.

A decline in value for recreational fishing trips can arise for the following reasons:

- Anglers may continue to fish at affected sites, but enjoy their fishing less (i.e., diminished use);
- Anglers may choose to fish at other sites (i.e., substitute use); and
- Anglers may forgo fishing entirely (i.e., lost use).

The behavioral responses above and losses in economic value have been documented for mercury-based advisories (e.g., Tang *et al*. 2018; Jakus and Shaw 2003; Jakus *et al*. 2002; Hagen *et al*. 1999; Chen and Cosslett 1998; MacDonald and Boyle 1997) as well as for other contaminants (e.g., MacNair and Desvousges 2007; Morey and Breffle 2006; Hauber and Parsons 2000; Parsons *et al*. 1999; Jakus *et al*. 1998, 1997; and Montgomery and Needelman 1997). Claims for lost economic value due to recreational mercury-based fishing advisories have been developed for several natural resource damage assessments (NRDAs) (e.g., Confederated Tribes of the Colville Reservation *et al*. 2012; Texas General Land Office *et al*. 2001; IEc 2017).

Economic value is distinct from the amount that anglers actually spend on their trips, such as gasoline to fuel their vehicles to reach a site or to make purchases of fishing gear. These expenditures support regional economic activity in the form of jobs and income.[5] When anglers take fewer trips or spend less money on their trips due to FCAs, there is a decline in regional economic activity associated with recreational fishing.

In the sections below, we summarize available literature on behavioral responses of recreational anglers to FCAs and the resulting impacts on economic value and regional economic activity. The discussion emphasizes impacts from mercury-based FCAs, but includes impacts from other contaminants (e.g., polychlorinated biphenyls or PCBs) to provide additional perspective on how FCAs affect behavior as the literature is reasonably consistent, regardless of contaminant source.

[5] The summation of trip expenditures and economic value incurred when a trip is taken is called an angler's willingness to pay.

Changes In Recreator Behavior

Several studies, which are summarized in Exhibit 2, have demonstrated that anglers change their behavior in response to FCAs. The behavioral responses to FCAs include changing fishing destination (i.e., substitute use) and taking fewer trips (i.e., lost use), as well as other responses such as targeting different species, eating fewer fish or refraining from consumption entirely (including sharing it with others), and changing cooking methods.[6] While some anglers might not report changes in their behavior, they may still enjoy their fishing less (i.e., diminished trips) or have concerns about consuming their catch. Any of these behavioral responses results in a decline in value if the angler feels worse off than if the FCA were not present. Further, anglers may take fewer trips or spend less money on their trips due to FCAs, which results in a decline in regional economic activity.

Recent data demonstrate that recreational fishing is a popular activity in the Northeast and Midwest. Exhibit 3 presents estimates of annual fishing days taken to selected states in these regions and in total. Applying the range of percentages from Exhibit 2 to the user day estimates in Exhibit 3 results in a large estimated number of affected user days, which may be expressed either in terms of changes in participation, substitution, or diminished use or through other behavioral responses (e.g., changing target species, eating fewer fish). Losses in recreational fishing value associated with these behavioral responses are described in the next section.

EXHIBIT 2. RECREATIONAL ANGLER BEHAVIORAL RESPONSES TO FCAS

STUDY	LOCATION	BEHAVIORAL RESPONSES
USFWS and Stratus Consulting (1999)	Lower Fox River/ Green Bay	-30% spend fewer days fishing -31% change locations fished -23% target different species -45% change the species they keep to eat -47% change the size of fish they keep to eat -45% change the way they clean/prepare fish -25% change the way they cook fish
Connelly *et al*. (1990)	New York	-17% take fewer trips -31% change fishing locations -46% change cleaning/cooking methods -51% eat fewer fish from the site -17% eat different species -11% no longer eat fish from the site

[6] While changes in cooking and preparation methods can be effective for fat-soluble contaminants (e.g., PCBs), they are largely ineffective for mercury contamination since mercury does not concentrate in specific body tissues.

STUDY	LOCATION	BEHAVIORAL RESPONSES
Connelly *et al*. (1992)	New York	-18% take fewer trips -45% change cleaning methods -25% change the size of fish consumed -21% change cooking methods -70% eat less fish from the site -27% eat different species -17% no longer eat fish from the site
Connelly *et al*. (1996)	Lake Ontario	-79% use risk-reducing cleaning methods -42% use risk-reducing cooking methods -32% would eat more fish in the absence of FCAs
Kunth *et al*. (1993)	Ohio River	-37% take fewer trips -26% change fishing locations -26% change targeted species -23% change cleaning methods -17% change the size of fish consumed -13% change cooking methods -42% eat less fish from the site -13% no longer eat fish from the site
Vena (1992)	Lake Ontario	-16% take fewer trips -30% change fishing locations -20% change targeted species -31% change cleaning methods -53% eat less fish from the site -16% no longer eat fish from the site
MacDonald and Boyle (1997)	Maine	-15% would consume more fish -10% would fish more days -5% would fish more waters -5% would fish different waters
Silverman (1990)	Michigan	-10% take fewer trips -31% change fishing locations -21% change targeted species -56% change cleaning methods -41% change the size of fish consumed -28% change cooking methods -56% eat less fish from the site -31% eat different species
West *et al*. (1993)	Michigan	-86% change cooking methods (Great Lakes anglers) -80% eat different species (Great Lakes anglers) -46% eat less fish from the site (overall) -27% change cooking methods (overall) -80% are aware of advisories; of these 80%, 75% change cleaning methods

EXHIBIT 3. ESTIMATES OF ANGLERS AND FISHING EFFORT NORTHEAST AND MIDWEST STATES[7]

STATE	ANGLERS	DAYS OF FISHING	AVERAGE DAYS PER ANGLER
Connecticut	342,000	4,705,000	14
Illinois	1,044,000	13,343,000	13
Maine	341,000	3,873,000	11
Massachusetts	532,000	8,367,000	16
Michigan	1,744,000	28,177,000	16
Minnesota	1,562,000	21,702,000	14
New Hampshire	228,000	4,370,000	19
New Jersey	766,000	9,454,000	12
New York	1,882,000	29,874,000	16
Rhode Island	175,000	2,080,000	12
Vermont	207,000	2,215,000	11
Wisconsin	1,247,000	21,284,000	17
Total	10,070,000	149,444,000	15

Source: USFWS and U.S. Census Bureau (2018)

Lost Value for Recreational Fishing

Several studies estimate the decline in economic value for recreational fishing trips due to the presence of FCAs. Exhibit 4 summarizes the estimated decline in value per trip to a site with an FCA for selected studies. These studies use a well-accepted method—random utility site choice models—and the results can be standardized for comparison (see footnote to Exhibit 4). In site choice models, anglers are assumed to choose sites that maximize their utility (i.e., the value gained). The utility of a site is a function of the cost to access the site (e.g., travel cost) and other site attributes, such as expected catch rates, species available and the presence and severity of FCAs. All else equal, anglers get more utility from sites without FCAs. The model can be used to estimate the decline in value due to the presence of an FCA.

While the locations, methods, and valuation scenarios (i.e., type of affected species, number of sites) vary across these studies, the key takeaways are two-fold: 1) FCAs reduce recreational fishing values; and 2) the decline in value increases with the restrictiveness of the advisory (e.g., the lost value associated with a *Do Not Eat* FCA is greater than the loss associated with an *Eat No More Than One Meal Per Week* FCA).

[7] Note that, across these 12 states, approximately 68 percent of angling participants take part in freshwater fishing, and freshwater fishing accounts for 81 percent of all angling trips.

EXHIBIT 4. SELECTED ESTIMATES OF LOST VALUES ASSOCIATED WITH FCAS[A]

STUDY	LOCATION	LOST VALUE PER FISHING DAY AT SITE WITH A FCA (2019$)
Montgomery and Needelman (1997)	New York	Mixture of "Eat no more than one meal per month" and "Do not eat" FCAs: $34.34
Jakus *et al.* (1997)	Tennessee	Mixture of "Limited" and "Do not eat" FCAs: $25.49
Jakus *et al*. (1998)	Tennessee	Mixture of "Limited" and "Do not eat" FCAs: $24.14
MacNair and Desvousges (2007)	Lower Fox River/ Green Bay	"Limited" FCA: $3.37 "Do not eat" FCA: $11.56
Morey and Breffle (2006)	Lower Fox River/ Green Bay	Mixture of "Unlimited " and "Eat no more than one meal per week" FCAs: $4.04 Mixture of "Eat no more than one meal per month" and "Do not eat" FCAs: $33.78

Notes:

A. The lost values in this table are standardized by dividing the coefficient associated with FCAs by the coefficient associated with the travel cost variable. This standardization provides an estimate of the lost value conditional on choosing a site with a FCA. We refer to this estimate as the lost value per fishing day at a site with a FCA to distinguish it from the lost value per fishing day at any site. Without this adjustment, the lost values are not comparable, as they are affected by the relative importance of the sites that have advisories and by researchers' choices regarding the set of fishing trips to include in the model.

In extreme cases, contamination in fish can result in regulatory closures to recreational fishing (e.g., upper Hudson River from 1976-1994). In most cases, however, contamination results in the issuance of FCAs and anglers are able to continue accessing a contaminated waterbody if they wish. Since sites are not usually closed due to contamination in fish, anglers tend to lose a fraction of their total trip value rather than the entire trip value.

Exhibit 5 presents estimates of total trip values for recreational fishing to contextualize the estimates in Exhibit 4.[8] These estimates are derived from data generated by U.S. federal government agencies, and are broadly applied to a range of analyses used to support policy evaluations and environmental damage assessments. Combining the user day estimates from Exhibit 3 with the value per day estimates from Exhibit 5 yields an estimate in the billions of dollars (regardless of which value(s) is applied).

[8] To the extent that the reported estimates of trip values are for sites that have mercury advisories, either site specific or statewide, the value of these trips may be even greater.

For example, if we assume that the average fishing trip creates a value of $50 to the participant, the estimated economic welfare value of recreational fishing in the 12 states would be approximately $7.5 billion. This represents the full value of fishing across the 12 states that would be realized absent the effects of FCAs (see Exhibit 4). While we do not have information to precisely account for the effects of the MATS Rule on FCAs, and therefore on recreational fishing trip values, we consider the potential for the Rule to generate recreational fishing benefits on the order of $1 billion. Specifically, if the MATS Rule improves the value per recreational fishing trip by $6.70, the aggregate value of recreational fishing across the 12 states would be increased by approximately $1 billion. Given the effects of FCAs on the value of recreational fishing trips described in Exhibit 4 (ranging up to a reduction in $34 per trip), we find that it is reasonable that the benefits of the MATS Rule could easily be $6.70 per trip or greater. Thus, we expect that the MATS Rule results in recreational fishing benefits of $1 billion or more annually.

EXHIBIT 5. SELECTED STUDIES WITH ESTIMATES OF VALUE PER FISHING DAY

STUDY	SUMMARY	VALUE PER USER DAY (2019$)
Rosenberger (2016)	The Recreation Use Values Database (RUVD) summarizes literature on the value of outdoor recreation on public lands. It is the result of seven literature reviews dating back to 1984. The most recent review, sponsored by the USDA Forest Service, was completed in 2016 and contains nearly 3,200 value estimates in per person per activity day units. These estimates are based on over 400 studies of recreation activities in the U.S. and Canada from 1958 to 2015. The database provides value estimates for different activities by census region.	Northeastern U.S. Census Region, freshwater fishing: $83.81 Northeastern U.S. Census Region, saltwater fishing: $86.22 Midwestern U.S. Census Region, freshwater fishing: $50.25
USFWS (2016)	The addendum to the 2011 National Survey of Fishing Hunting and Wildlife-Associated Recreation contains economic values per fishing day by state for bass, trout, or walleye. The survey is conducted every five years by the US Census Bureau and sponsored by the United States Fish and Wildlife Service (USFWS). The 2016 survey did not contain these estimates due to budget constraints.	*Bass* Illinois: $51.58 Massachusetts: $31.40 Rhode Island: $15.70 *Trout* Connecticut: $33.64 Maine: $43.73 New Hampshire: $48.22 New Jersey: $21.31 New York: $65.04 Vermont: $30.28 *Walleye* Michigan: $16.82 Minnesota: $63.92 Wisconsin: $35.88

Lost Regional Economic Activity Associated with Recreational Fishing

While the preceding sections summarize impacts to recreational anglers themselves in the form of lost economic value, there are also negative consequences for regional economic activity when anglers take fewer trips or spend less on the trips they take due to FCAs (e.g., shorter trips). Expenditures on recreational fishing provide sales for businesses (e.g., bait shops, gear outfitters, gas stations), and in turn, these businesses make purchases from other firms in the region to support their operations. Furthermore, employees of these firms make additional purchases with their wages. The summation of these effects represents the total economic contribution of recreational activities to a region, which can be measured in terms of jobs and income, though other measures may be used. Estimates of the regional economic importance of the recreational fishing sector in select states is presented in the next section.

COMMERCIAL FISHING

As noted above, consumers have a range of sources of information on the risks posed by consuming mercury in fish and shellfish purchased in markets. While studies have not been published that estimate the change in demand for seafood products (or the price of these products), we would expect that efforts by some consumers to (1) limit the quantity of fish consumed, and/or (2) to substitute away from certain species of fish will impact both the quantity of fish demanded and the price obtained by this industry for some products. As discussed in the next section, landings of commercial fish and shellfish generate over $1.6 billion dollars in sales in the 12 states considered in this analysis. As such, even modest changes in market demand could have a significant impact on the income of harvesters and processors, with subsequent impacts on the economies of the 12 states considered in this report.

THE IMPORTANCE OF RECREATIONAL FISHING AND COMMERCIAL FISH AND SHELLFISH HARVEST AND PROCESSING IN THE NORTHEAST AND MIDWEST

To understand the potential benefits of reductions in mercury levels in fish and shellfish, we consider the regional economic importance of both recreational fishing behavior and commercial fish harvest and processing. Specifically, this analysis applies input-output multipliers along with publicly available data on recreational angling expenditures and commercial landings to evaluate the regional economic impacts associated with recreational fishing and commercial harvest in select states.

INPUT-OUTPUT MULTIPLIERS

The Regional Input-Output Modeling System (RIMS II or "RIMS") applies a standard input-output modeling approach to analyze the economic impacts or multiplier effects

associated with a change in demand within one or more sectors of the economy.[9] Developed by the U.S. Bureau of Economic Analysis, RIMS uses data on national input-output accounts to model the relationships and spending patterns between different industries. Based on these relationships, RIMS provides sector-specific and geographic-specific multipliers that evaluate how a change in economic activity (i.e., spending or demand) in one sector results in economic activity in other sectors within a geographic region (U.S. BEA 2013).

The RIMS multipliers translate changes in economic activity into economic impacts across four metrics: employment, earnings, value added, and output.

- **Employment**: This reflects a mix of full-time and part-time job-years (defined as one job lasting one year) that result from employment demand created by spending activity.
- **Earnings**: This captures all employment-related income received as part of the employment demand, including employee compensation and proprietor income.
- **Value Added**: This reflects the total value of all output or production, minus the cost of intermediate outputs (i.e., Gross Domestic Product).
- **Output**: This reflects the total value of all output or production, including the costs of intermediate and final outputs (i.e., sales).

This analysis applied RIMS Type II multipliers, which incorporate direct, indirect, and induced effects:

- **Direct Effects**: These are production changes that directly result from an activity or policy. In this analysis, the direct effects are equal to the recreational angling expenditures or commercial fish landings, which we allocate to appropriate economic sectors.
- **Indirect Effects**: The multiplier effects that result from changes in the output of industries that supply goods and services to those industries that are directly affected (i.e., impacts on the factors of production for the directly affected sectors).
- **Induced Effects**: Changes in household consumption arising from changes in employment and associated income that result from direct and indirect effects.

To understand these effects, consider an example where recreational anglers buy additional equipment from a local bait shop (direct effects). That bait shop may in turn increase its purchases of supplies from other businesses in the region to support its

[9] To conduct the input-output modeling, this analysis used state-specific RIMS Type II multipliers from the RIMS 2016 dataset, which was the most current version of these data that are publicly available.

operations (indirect effects). Employees benefiting from these increases in spending may then spend more themselves (induced effects).

RECREATIONAL FISHING

To analyze the regional economic impacts associated with recreational fishing, this analysis gathered recreational angling expenditure data from state-specific reports published as part of the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (USFWS and U.S. Census Bureau 2018).[10] Exhibit 6 summarizes the annual recreational fishing expenditure data by state for trip-related, equipment-related, and total spending, as reported in the state-specific reports. All expenditure estimates have been converted to 2019 dollars using the Consumer Price Index.

EXHIBIT 6. ESTIMATES OF ANNUAL RECREATIONAL FISHING EXPENDITURES BY STATE (2019$)[11]

STATE	ANGLERS	ANNUAL TRIP-RELATED EXPENDITURES	ANNUAL EQUIPMENT-RELATED EXPENDITURES	ANNUAL TOTAL EXPENDITURES
Connecticut	342,000	$290,070,461	$199,384,964	$489,455,425
Illinois	1,044,000	$417,561,021	$673,245,251	$1,090,806,272
Massachusetts	532,000	$284,501,650	$226,181,643	$510,683,293
Maine	341,000	$240,746,226	$176,218,217	$416,964,443
Michigan	1,744,000	$1,225,379,517	$1,496,351,625	$2,721,731,141
Minnesota	1,562,000	$1,036,804,729	$1,670,513,217	$2,707,317,946
New Hampshire	228,000	$169,765,753	$64,070,482	$233,836,235
New Jersey	766,000	$546,091,107	$710,127,691	$1,256,218,798
New York	1,882,000	$1,186,333,921	$1,014,431,925	$2,200,765,845
Rhode Island	175,000	$94,123,671	$51,708,305	$145,831,976
Vermont	207,000	$101,202,991	$46,054,269	$147,257,259.99
Wisconsin	1,247,000	$681,205,982	$909,584,424	$1,590,790,406
Total	10,070,000	$6,273,787,028	$7,237,872,012	$13,511,659,041

[10] The 2011 report is the latest version to report state-specific values.

[11] The regional economic analysis in this report relies on recreational angling expenditure estimates broken out into detailed line items for trip-related, equipment-related, and other expenses (e.g., food, lodging, boating costs, artificial lures and flies). These reported disaggregated estimates by line item do not always sum to the total expenditure estimates for each state, as reported in Exhibit 6. For example, the detailed expenditure line items for Connecticut sum to 83 percent of the total recreational angling expenditures estimated for the state (91 percent for Illinois and New Hampshire; 92 percent for Vermont; 99 percent for Wisconsin; and approximately 100 percent for all other states). To the extent that the detailed expenditure data do not sum to the total recreational angling expenditure estimates for a state, this analysis may underestimate the regional economic impacts associated with recreational angling in that state.

In the appendix of each state-specific report, these total annual trip-related and equipment-related expenditures are broken down into more detailed expenditure line items. Trip-related spending categories include line items such as food, lodging, and transportation, while equipment-related categories include line items such as "reels, rods, and rod-making components" and "artificial lures and flies." This analysis mapped each of these detailed expenditure line items to corresponding RIMS sectors, which included industries defined as "food services and drinking places," "accommodations," and "other retail."

The analysis then applied state-specific and sector-specific RIMS multipliers to the corresponding state-by-state total spending amounts for each RIMS sector. These RIMS multipliers translate the expenditure amounts into estimates of regional economic impacts on employment demand, value added, and output.

Exhibit 7 summarizes the state-by-state results of this analysis. These regional economic impact estimates for recreational angling include direct, indirect, and induced effects.

EXHIBIT 7. ANNUAL REGIONAL ECONOMIC IMPACTS OF RECREATIONAL FISHING EXPENDITURES BY STATE (2019$)

STATE	EMPLOYMENT (JOBS)	EARNINGS ($)	VALUE ADDED ($)	OUTPUT ($)
Connecticut	6,666	$228,243,642	$460,834,368	$748,478,095
Illinois	19,983	$665,317,305	$1,305,284,266	$2,164,735,554
Massachusetts	8,842	$292,655,175	$593,491,314	$968,345,102
Maine	8,989	$239,954,740	$453,171,787	$739,109,734
Michigan	59,161	$1,697,413,376	$3,178,958,350	$5,240,046,989
Minnesota	55,065	$1,687,013,209	$3,239,786,409	$5,369,380,086
New Hampshire	3,538	$111,389,124	$230,329,220	$374,447,756
New Jersey	22,194	$754,204,825	$1,560,657,028	$2,557,479,074
New York	35,359	$1,196,860,993	$2,524,234,433	$4,105,442,367
Rhode Island	2,249	$71,039,141	$154,530,617	$251,997,610
Vermont	2,519	$68,381,808	$135,742,775	$222,127,681
Wisconsin	34,336	$944,406,087	$1,767,276,300	$2,924,547,680
Total	258,902	$7,956,879,425	$15,604,296,867	$25,666,137,726

The results suggest that the $13.5 billion in total annual recreational fishing expenditures across these 12 states generate total regional economic impacts of 258,902 full-time and part-time jobs, $8.0 billion in earnings, $15.6 billion in value added, and $25.7 billion in output (2019 dollars)

COMMERCIAL FISHING

To analyze the regional economic impacts associated with commercial fishing, this analysis gathered commercial seafood landings data published by the NOAA Fisheries, Fisheries Statistics Division (NOAA 2019). This NOAA division collects and publishes commercial landings data on a state-by-state basis, and has separate databases for ocean landings and Midwest landings.[12] We collected the most recent annual landings data from both databases, which consisted of 2017 estimates for ocean landings and 2016 estimates for Midwest landings. The estimated landings and values for Vermont are based on a white paper focused on the scope and value of commercial fish harvest and sales in Vermont.[13] Exhibit 8 summarizes the combined annual commercial landings by state in terms of whole weight (pounds) and dollar value. The dollar value estimates have been converted to 2019 dollars using the Consumer Price Index.

EXHIBIT 8. ESTIMATES OF ANNUAL COMMERCIAL FISH AND SHELLFISH LANDINGS BY STATE (2019$)

STATE	WHOLE WEIGHT (POUNDS)	DOLLAR VALUE ($)
Connecticut	10,118,122	$14,116,116
Illinois	No Data	No Data
Massachusetts	242,136,690	$622,841,959
Maine	208,677,144	$526,176,214
Michigan	6,200,910	$8,561,092
Minnesota	244,714	$225,037
New Hampshire	10,621,078	$36,028,922
New Jersey	198,601,927	$196,087,550
New York	24,904,141	$49,555,181
Rhode Island	84,107,764	$103,697,265
Vermont	459,432	$966,991
Wisconsin	2,670,112	$3,167,164
Total	788,742,034	$1,561,423,491

[12] For the state-by-state breakdown, the "landings data do not indicate the physical location of harvest but the location at which the landings either first crossed the dock or were reported from" (NOAA 2019).

[13] The estimates for Vermont account for 2012 landings and estimated value from January through September and, therefore, likely underestimate the total value of landings for that year. The values are adjusted to 2019 dollars using the Consumer Price Index. The white paper of landings and values in Vermont collected by the Vermont Department of Fish and Wildlife was provided to IEc on April 12, 2019.

This analysis mapped the dollar value of commercial fish and shellfish landings (i.e., total sales) to the corresponding RIMS sector of "fishing, hunting and trapping."[14] State-specific RIMS multipliers for this industry were then applied to the state-by-state annual commercial landings values. These RIMS multipliers translate the dollar value of landings into estimates of regional economic impacts on employment demand, value added, and output.

Exhibit 9 summarizes the state-by-state results of this analysis. These regional economic impact estimates for commercial fishing include direct, indirect, and induced effects.

The results suggest that the $1.6 billion in annual commercial fish landings for these 12 states generate total regional economic impacts of 17,794 full-time and part-time jobs, $700 million in earnings, $1.6 billion in value added, and $2.4 billion in output.

EXHIBIT 9. ANNUAL REGIONAL ECONOMIC IMPACTS OF COMMERCIAL FISH LANDINGS BY STATE

STATE	EMPLOYMENT (JOBS)	EARNINGS ($)	VALUE ADDED ($)	OUTPUT ($)
Connecticut	151	$6,415,775	$14,449,256	$22,320,402
Illinois	No Data	No Data	No Data	No Data
Massachusetts	6,495	$269,752,852	$627,762,410	$961,294,279
Maine	6,520	$250,617,731	$533,700,534	$823,991,952
Michigan	164	$4,288,251	$9,079,038	$14,303,016
Minnesota	4	$114,589	$244,885	$393,387
New Hampshire	No Data	No Data	No Data	$36,028,922
New Jersey	2,334	$98,710,472	$219,500,403	$347,388,703
New York	911	$22,047,100	$50,189,488	$77,206,972
Rhode Island	1,155	$45,906,779	$104,153,533	$160,544,105
Vermont	No Data	No Data	No Data	$966,991
Wisconsin	60	$1,536,708	$3,273,898	$5,151,392
Total	17,794	$699,390,257	$1,562,353,445	$2,449,590,123

RECREATIONAL AND COMMERCIAL FISHING

Recreational and commercial fishing activities in these 12 states generate significant regional economic activity. This analysis finds that the $12.0 billion in annual recreational fishing expenditures and the $1.6 billion in annual commercial fish landings for these 12 states result in a regional economic contribution of 276,696 full-time and part-time jobs, $8.7 billion in earnings, $17.2 billion in value added, and $28.1 billion in output. At this scale of economic activity, even small shifts in recreational fishing

[14] The primary economic activity within this sector is fish harvesting.

behavior or consumer purchasing as a result of elevated mercury concentrations could result in substantial economic impacts to related economic industries at the state or regional level. For example, if recreational anglers reduce their equipment- and trip-related expenditures by ten percent per year across the 12 states, the economic impact on value-added (equivalent to a GDP reduction) could be on the order of *$1.5 billion annually.*

ASSUMPTIONS, LIMITATIONS, AND CAVEATS

The following assumptions, limitations, and caveats apply to interpreting the results of this analysis:

- This analysis applied state-specific RIMS multipliers. As a result, it does not capture indirect and induced economic impacts that may have occurred outside each state (for example, if certain indirect or induced economic activity "leaked" beyond a state into neighboring states). To the extent that any economic activity produced by recreational or commercial fishing expenditures resulted in increases in regional economic activity outside each state, the output results may be understated.
- This analysis assumed that all sales and business activity related to commercial landings occurred within the state where landings were reported. In practice, commercial fishing businesses may operate in those states but be based in other states. For example, the analysis estimates that New Hampshire had approximately $36.0 million in commercial landings, but the RIMS multipliers suggest that did not generate any jobs, earnings, or value added for the state. Similarly, data from Vermont identify approximately $1 million in commercial landings, although the RIMS multipliers do not identify any associated indirect and induced impacts for the state. This may be because these economic impacts accrued to businesses that operate in New Hampshire and Vermont but are based in other states or that the U.S. Bureau of Economic Analysis (BEA) did not have sufficient industry-specific data to estimate the multiplier effects. In either case, the economic impact results reported may be understated for New Hampshire and Vermont.

IMPACTS OF FCAS TO HOUSING VALUES

Recent evidence demonstrates that mercury-based FCAs have a negative impact on property values. Tang *et al*. (2018) used the hedonic pricing method to estimate that New York State property values within one mile of an FCA-designated lake due to mercury decrease by an average of six to seven percent. The method uses property transaction data and information about various attributes of properties (i.e., size of house, quality of schools, proximity to open space for recreation and urban centers for work) to estimate a model that can be used to deduce the contribution of a given attribute to the sales price. Numerous published studies have estimated the impact of various measures of environmental quality on property values, though this is the only study we are aware of

that estimates the impact of mercury-based FCAs on nearby property values. Since property values should capitalize the value of recreational opportunities, at least for occupants of the property, the estimates presented in Tang *et al*. (2018) should not be considered unique from the estimates of lost value to recreationists presented in a previous section, but as additional evidence that elevated mercury levels in fish have broad economic consequences.

WELL ACCEPTED AND WIDELY USED METHODS EXIST THAT EPA COULD USE TO QUANTIFY THE ECONOMIC BENEFITS ASSOCIATED WITH THE MATS RULE ON RECREATIONAL AND COMMERCIAL FISHERIES

As described above, there is ample evidence of the contribution of coal-fired EGUs to mercury levels in fish and shellfish. Elevated mercury levels lead to changes in consumer and recreator behavior, informed by state and federal health advisories and other information provided by non-governmental entities. These behavioral changes generate losses in consumer surplus and adverse impacts on regional economic activity.

In both EPA's 2011 Regulatory Impact Analysis (RIA) for the MATS Rule (U.S. EPA 2011) and the current proposed rule (U.S. EPA 2019) there was no attempt to quantify or monetize the social welfare or regional economic benefits resulting from changes in recreator or consumer behavior due to reductions in mercury emissions from the MATS Rule. Conversely, with the proposed rule, EPA has made no effort to account for the costs to states associated with changes in recreator and consumer behavior should EPA's reversal of its appropriate and necessary finding ultimately lead to abolishment of the standards (emissions limits) themselves, and a subsequent increase in mercury fish tissue concentrations.

Recreational and subsistence fishing as well as commercial fish harvest and processing play a substantial role in the economies and cultures of the Northeast and the Midwest. As such, even modest changes in mercury levels could have significant economic implications. Widely utilized and well accepted methods are available to place monetary values on the reduction in mercury concentrations in fish and shellfish that have and are expected to result from the MATS Rule. These are the same economic methods frequently applied by federal agencies bringing damage claims when acting as trustee for natural resources under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the1990 Oil Pollution Act, as well as the same methods widely used in the context of benefit analyses conducted under 316(b) of the Clean Water Act. Application of these methods to the MATS Rule would provide a more complete and transparent understanding of the actual benefits of the MATS Rule, and as such an understanding of the social and regional economic cost that would result from removing these requirements.

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APPENDIX A:

EXAMPLES OF GENERAL STATEWIDE SAFE FISH GUIDELINES

HEALTH ALERT

The Vermont Department of Health recommends that people limit eating some fish caught in Vermont waters.

These advisories are based on tests of fish caught in Vermont waters and scientific information about the harmful effects of mercury and, in the case of large lake trout in Lake Champlain and all fish in the Hoosic River, PCBs (polychlorinated biphenyls).

You can mix and match fish (you catch or buy) with the same limits, but once you meet the lowest limit eat no more fish that month. Do not eat the monthly limit within a single week.

Store bought fresh and canned fish—including tuna—have mercury levels that are about the same as many Vermont-caught fish. Add in store bought fish when you decide how many fish meals to eat each month.

One fish meal = 8 ounces uncooked fish

For more information call
1-800-439-8550
healthvermont.gov

VERMONT
DEPARTMENT OF HEALTH

	Women of childbearing age and children age 6 and under	Everyone else
GENERAL ADVISORY:		
Brown Bullhead Pumpkinseed	No more than 5 meals/month	No Restrictions
Walleye	0 Meals	No more than 1 meal/month
American Eel Chain Pickerel Lake Trout Smallmouth Bass	No more than 1 meal/month	No more than 3 meals/month
Largemouth Bass Northern Pike Yellow Perch (10 inches and larger)	No more than 2 meals/month	No more than 6 meals/month
Brook Trout Brown Trout Rainbow Trout White Perch Yellow Perch (smaller than 10 inches)	No more than 3-4 meals/month	No Restrictions
All Other Fish	No more than 2-3 meals/month	No more than 9 meals/month
SPECIAL ADVISORIES:		
Lake Carmi - Walleye	No more than 4 meals/month	No Restrictions
Lake Champlain Lake Trout (larger than 25 inches)	0 meals (includes all children under 15)	No more than 1 meal/month
Smallmouth Bass (19 inches and larger)	0 meals	No more than 1 meal/month
Yellow Perch (smaller than 10 inches)	No more than 5 meals/month	No Restrictions
Shelburne Pond Yellow Perch (smaller than 10 inches)	No more than 5 meals/month	No Restrictions
Hoosic River - All Fish	0 meals	0 meals
Deerfield Chain (Grout Pond, Somerset Reservoir, Harriman Reservoir, Sherman Reservoir, and Searsburg Reservoir)		
Brook Trout Brown Bullhead	No more than 5 meals/month	No Restrictions
Brown Trout (14 inches and smaller) Rainbow Smelt Rainbow Trout Rock Bass Yellow Perch	No more than 1 meal/month	No more than 3 meals/month
Brown Trout (larger than 14 inches) All Other Fish	0 meals	No more than 1 meal/month
15 Mile Falls Chain (Comerford Reservoir and Moore Reservoir)		
White Sucker	No more than 1 meal/month	No more than 3 meals/month
All Fish	0 meals	No more than 2 meals/month
15 Mile Falls Chain (McIndoes Reservoir)		
Yellow Perch	No more than 2 meals/month	No more than 6 meals/month
All Other Fish	No more than 1 meal/month	No more than 3 meals/month

v.May 2013

Statewide Safe Fish Guidelines

Michigan Department of Community Health

- Michigan is lucky to have over 11,000 lakes, rivers, and streams. Because of that huge number, it is not possible to test every fish species from every lake, river, or stream in the state.
- These general guidelines are based on the typical amount of chemicals found in fish filets tested from around the state. Some fish may be higher or lower.
- If any of these fish are listed in the *Eat Safe Fish Guide* for the lake or river you are fishing in, use those guidelines instead of the Statewide Safe Fish Guidelines. The *MI Servings* recommendation will be more exact for that lake or river because those filets have been tested.
- These general guidelines can be used for lakes, rivers, and fish species not included in the *Eat Safe Fish Guide*.

To get a free copy of the *Eat Safe Fish Guide*, visit www.michigan.gov/eatsafefish or call 1-800-648-6942.

eat safe fish

Michigan Department of Community Health

MDCH

Use the Statewide Safe Fish Guidelines ONLY if:

- **your lake or river is not listed in the *Eat Safe Fish Guide*, OR**
- **your lake or river is listed in the *Eat Safe Fish Guide*, but the fish species is not listed.**

Type of Fish	Chemical of Concern	Size of Fish (length in inches)	MI Servings per Month*
Black Crappie	Mercury	Any Size	4
Bluegill	Mercury	Any Size	8
Carp	PCBs	Any Size	2
Catfish	PCBs & Mercury	Any Size	4
Largemouth Bass	Mercury	Under 18"	2
		Over 18"	1
Muskellunge (Muskie)	Mercury	Any Size	1
Northern Pike	Mercury	Under 30"	2
		Over 30"	1
Rock Bass	Mercury	Any Size	4
Smallmouth Bass	Mercury	Under 18"	2
		Over 18"	1
Suckers	Mercury	Any Size	8
Sunfish	Mercury	Any Size	8
Walleye	Mercury	Under 20"	2
		Over 20"	1
White Crappie	Mercury	Any Size	4
Yellow Perch	Mercury	Any Size	4

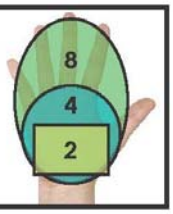
See page 2 to learn about *MI Servings

What is *MI Serving*?

You can use the information below to find out how much fish is in a *MI Serving* ("my serving") for you. If you're planning on eating more than 1 *MI Serving* of fish at a single meal, aim to eat fish that are listed as 2-8 *MI Servings* per month to be sure you're within the safe range.

My Michigan, *MI Serving* Size

- ☑ 8 ounces of fish = size of an adult's hand (large oval)
- ☑ 4 ounces of fish = size of the palm of an adult's hand (small circle)
- ☑ 2 ounces of fish = size of half a palm of an adult's hand (rectangle)



How much is *MI Serving*?

Weight of Person	*MI Serving* Size
45 pounds	2 ounces
90 pounds	4 ounces
180 pounds	8 ounces

Weigh Less?

For every 20 pounds less than the weight listed in the table, subtract 1 ounce of fish.

For example, a 70 pound child's *MI Serving* size is 3 ounces of fish.
90 pounds - 20 pounds = 70 pounds
4 ounces - 1 ounce = a *MI Serving* size of 3 ounces

Weigh More?

For every 20 pounds more than the weight listed in the table, add 1 ounce of fish.

For example, a 110 pound person's *MI Serving* size is 5 ounces of fish.
90 pounds + 20 pounds = 110 pounds
4 ounces + 1 ounce = a *MI Serving* size of 5 ounces

Are you pregnant? Fish is good for you and your baby! Use your pre-pregnancy weight to find your *MI Serving* size. It is best to avoid eating fish labeled as "Limited" if you're pregnant or breastfeeding.

About the Statewide Safe Fish Guidelines

- The Statewide Safe Fish Guidelines are set to provide safe options for everyone.
- They can be used by children, pregnant or breastfeeding women, and people who have health problems, like cancer, heart disease, or diabetes.
- The Statewide Safe Fish Guidelines can also be used by healthy adults to avoid getting too much of the chemicals in their bodies.
- Chemicals like PCBs and dioxins are linked to cancer, diabetes, and other illnesses.
- Mercury can cause damage to your brain, heart, and nerves.
- MDCH tests only the filet of the fish, and they use science-based calculations to find how much fish is safe to eat. With the Statewide Safe Fish Guidelines and the *Eat Safe Fish Guide*, everyone can now choose safer fish.

Questions? Please visit www.michigan.gov/eatsafefish or call 1-800-648-6942 for more information.

Freshwater Fish Consumption Advisory List

Massachusetts Department of Public Health
Bureau of Environmental Health
(617) 624-5757
November 2018

WATER BODY	TOWN(s)	FISH ADVISORY*	HAZARD*
Aaron River Reservoir	Cohasset, Hingham, Scituate	P1 (all species), P2 (CP, YP), P4	Mercury
Alewife Brook	Arlington, Belmont, Cambridge,Somerville	P1 (C), P3 (C)	PCBs
Ames Pond	Tewksbury	P1 (LMB), P3 (LMB)	Mercury
Ashland Reservoir	Ashland	P1 (all species), P5	Mercury
Ashley Lake	Washington	P1 (YP), P3 (YP)	Mercury
Ashfield Pond	Ashfield	P1 (LMB), P3 (LMB)	Mercury
Ashumet Pond	Mashpee, Falmouth	P1 (LMB), P3 (LMB)	Mercury
Atkins Reservoir	Amherst, Shutesbury	P1 (all species), P5	Mercury
Attitash, Lake	Amesbury, Merrimac	P1 (all species), P2 (LMB), P4	Mercury
Badluck Lake	Douglas	P6	Mercury
Baker Pond	Brewster, Orleans	P1 (YP), P3 (YP)	Mercury
Baldpate Pond	Boxford	P1 (all species), P2 (LMB), P4	Mercury
Ballardvale Impoundment of Shawsheen River	Andover	P1 (LMB & BC), P3 (LMB & BC)	Mercury
Bare Hill Pond	Harvard	P1 (LMB), P3 (LMB)	Mercury
Bearse Pond	Barnstable	P1 (LMB, SMB), P3 (LMB, SMB)	Mercury
Beaver Pond	Bellingham, Milford	P1 (CP, LMB), P3 (CP, LMB)	Mercury
Big Pond	Otis	P1 (all species), P2 (LMB), P4	Mercury
Boon, Lake	Hudson, Stow	P1 (LMB & BC), P3 (LMB & BC)	Mercury
Box Pond	Bellingham, Mendon	P1 (WS), P2 (WS)	DDT
Bracket Reservoir (Framingham Reservoir #2) – See Sudbury River			
Browning Pond	Oakham, Spencer	P1 (LMB, YP), P3 (LMB, YP)	Mercury
Buckley Dunton Lake	Becket	P1 (LMB), P3 (LMB)	Mercury
Buffomville Lake	Charlton, Oxford	P1 (all species), P5	Mercury
Burr's Pond	Seekonk	P1 (LMB), P3 (LMB)	Mercury
Cabot Pond – See Rumford River			
Canton River (between the Neponset River and Neponset Street dam)	Canton	P1 (all species), P2 (AE, WS), P4	PCBs, DDT
Cedar Swamp Pond	Milford	P1 (all species), P5	Mercury
Chadwicks Pond	Boxford, Haverhill	P6	Mercury
Charles River (between the South Natick Dam in Natick and the Museum of Science Dam in Boston/ Cambridge)	Boston, Cambridge, Dedham, Dover, Natick, Needham, Newton, Watertown, Wellesley, Weston, Waltham	P1 (C, LMB), P2 (C), P3 (LMB)	PCBs, Pesticides
Charles River (between the Medway Dam in Franklin and Medway and the South Natick Dam in Natick)	Dover, Franklin, Medfield, Medway, Millis, Natick, Norfolk, Sherborn	P1 (all species), P5	Mercury, Chlordane, DDT
Chebacco Lake	Essex, Hamilton	P1 (LMB), P3 (LMB)	Mercury
Clay Pit Pond	Belmont	P6	Chlordane
Cochato River, Ice Pond and Sylvan Lake	Randolph, Holbrook, Braintree	P1 (all species), P2 (BB & C & AE), P4	Pesticides
Cochichewick, Lake	North Andover	P1 (LMB, SMB), P3 (LMB, SMB)	Mercury
Cochituate, Lake (including Middle, North, South, and Carling Basins)	Framingham, Natick, Wayland	P1 (all species), P2 (AE)	PCBs

* See page 7 for codes.

WATER BODY	TOWN(s)	FISH ADVISORY*	HAZARD*
Concord River (from confluence with Sudbury and Assabet Rivers to the Faulkner Dam in Billerica)	Concord, Carlisle, Bedford, Billerica	P1 (all species), P2 (LMB), P4	Mercury
Connecticut River	Entire length of Massachusetts, including all towns from Northfield through Longmeadow	P1 (all species), P2 (CC & WC & AE & YP)	PCBs
Copicut Reservoir	Dartmouth, Fall River	P6	Mercury
Copicut River	Dartmouth, Fall River	P1 (all species), P2 (AE), P3 (LMB)	PCBs, Mercury
Cornell Pond	Dartmouth	P1 (all species), P2 (AE), P3 (LMB)	PCBs, Mercury
Crystal Lake	Haverhill	P1 (all species), P2 (LMB), P4	Mercury
Damon Pond	Chesterfield, Goshen	P1 (CP, LMB), P3 (CP, LMB)	Mercury
Dennison, Lake	Winchendon	P1 (LMB), P3 (LMB)	Mercury
Dodgeville Pond - See Mechanics Pond			
Drinkwater River/ Indian Head River/North River (Betweeen the Forge Pond Dam in Hanover and Route 3 in Norwell/ Pembroke) and Factory Pond	Hanson, Hanover, Norwell, Pembroke	P6	Mercury
Duck Pond	Wellfleet	P6	Mercury
Dyer Pond	Wellfleet	P6	Mercury
East Brimfield Reservoir	Brimfield, Sturbridge	P1 (all species), P5	Mercury
East Monponsett Pond	Halifax	P1 (LMB), P3 (LMB)	Mercury
Echo Lake	Hopkinton, Milford	P1 (all species), P2 (LMB), P4	Mercury
Factory Pond - See Drinkwater River			
Fall Brook Reservoir	Leominster	P1 (all species), P5	Mercury
Farrar Pond	Lincoln	P1 (BC, CP, LMB), P3 (BC, CP, LMB)	Mercury
Flax Pond	Lynn	P1 (AE, WP), P2 (AE)	DDT, Chlordane
Flint Pond	Tyngsborough	P1 (all species), P2 (LMB), P4	Mercury
Forest Lake	Methuen	P1 (LMB), P3 (LMB)	Mercury
Forge Pond	Littleton, Westford	P1 (LMB), P3 (LMB)	Mercury
Fort Meadow Reservoir	Hudson, Marlborough	P1 (WS), P3 (WS)	Chlordane
Foster Pond	Swampscott	P1 (AE), P2 (AE)	DDT
Fosters Pond	Andover, Wilmington	P1 (all species), P5	Mercury
Freeman Lake – See Newfield Pond			
French River (Between the Hodges Village Dam in Oxford and the North Webster Village Pond Dam in Webster)	Oxford, Webster	P1 (all species), P2 (LMB), P4	Mercury
Fulton Pond - See Rumford River			
Gales Pond	Warwick	P1 (YP), P3 (YP)	Mercury
Garfield, Lake	Monterey	P1 (LMB), P3 (LMB)	Mercury
Gibbs Pond	Nantucket	P1 (all species), P5	Mercury
Goodrich Pond	Pittsfield	P6	PCBs
Great Herring Pond	Bourne, Plymouth	P1 (SMB), P3 (SMB)	Mercury
Great Pond	Truro	P1 (all species), P5	Mercury
Great Pond	Wellfleet	P6	Mercury
Great South Pond	Plymouth	P1 (all species), P5	Mercury
Grove Pond	Ft. Devens, Ayer	P6	Mercury
Haggetts Pond	Andover	P1 (all species), P2 (LMB), P4	Mercury
Hamblin Pond	Barnstable	P1 (SMB), P3 (SMB)	Mercury
Hardwick Pond	Hardwick	P1 (LMB), P3 (LMB)	Mercury
Heard Pond	Wayland	P6	Mercury
Heart Pond	Chelmsford, Westford	P1 (LMB), P3 (LMB)	Mercury
Hickory Hills Lake	Lunenburg	P1 (all species), P5	Mercury

WATER BODY	TOWN(s)	FISH ADVISORY*	HAZARD*
Hocomonco Pond	Westborough	P6	PAHs
Holland Pond	Brimfield, Holland, Sturbridge	P1 (all species), P5	Mercury
Hood (or Hoods) Pond	Topsfield, Ipswich	P1 (all species), P2 (LMB, YP), P4	Mercury
Hoosic River (from the channelized section in North Adams to the MA/VT state line)	N. Adams, Williamstown	P6	PCBs
Horn Pond	Woburn	P1 (LMB), P3 (LMB)	DDT
Horseleech Pond	Truro	P1 (LMB), P3 (LMB)	Mercury
Hovey's Pond	Boxford	P1 (all species), P5	Mercury
Housatonic River (See footnote 1)	All towns from Dalton through Sheffield	P6 (also includes frogs and turtles)	PCBs
Ice Pond – See Cochato River			
Indian Head River – See Drinkwater River			
Ipswich River (between the Bostik Findley Dam in Middleton and the Sylvania Dam in Ipswich)	Boxford, Danvers, Hamilton, Ipswich, Middleton, Peabody, Topsfield, Wenham	P1 (all species), P5	Mercury
Johns Pond	Mashpee	P1 (all species), P2 (SMB), P4	Mercury
Johnsons Pond	Groveland, Boxford	P1 (LMB), P3 (LMB)	Mercury
Kenoza Lake	Haverhill	P6	Mercury
Kingman Pond – See Rumford River			
Knops Pond	Groton	P1 (LMB), P3 (LMB)	Mercury
Konkapot River (From the Mill River Dam in New Marlborough to its confluence with the Housatonic River)	Sheffield, New Marlborough	P1 (all species), P5	Mercury
Lakes whose names begin with "Lake" are listed under the second word in their name (so that Lake Pentucket is listed under "Pentucket," etc.)			
Lashaway, Lake	North Brookfield, East Brookfield	P1 (LMB, SMB), P3 (LMB, SMB)	Mercury
Lawrence Pond	Sandwich	P1 (LMB), P3 (LMB)	Mercury
Leverett Pond	Boston, Brookline	P1 (C), P2 (C)	DDT
Lewin Brook Pond	Swansea	P1 (BC, LMB), P3 (BC, LMB)	Mercury
Little Chauncy Pond	Northborough	P1 (BC, LMB), P3 (BC, LMB)	Mercury
Locust Pond	Tyngsborough	P1 (all species), P5	Mercury
Long Pond	Brimfield, Sturbridge	P1 (all species), P5	Mercury
Long Pond	Dracut, Tyngsboro	P1 (all species), P5	Mercury
Long Pond	Rutland	P1 (all species), P5	Mercury
Long Pond	Wellfleet	P6	Mercury
Long Pond (Rochester) – See Snipituit Pond			
Lost Lake	Groton	P1 (LMB), P3 (LMB)	Mercury
Lowe Pond	Boxford	P1 (all species), P2 (LMB), P4	Mercury
Lowell Canals (see footnote 2)	Lowell	P1 (all species), P2 (AE), P4	Mercury, Lead, PCBs, DDT
Lower Mystic Lake	Arlington, Medford	P1 (WS), P2 (WS)	PCBs, DDT
Malden River	Everett, Malden, Medford	P6	PCBs, Chlordane, DDT
Manchaug Pond	Douglas, Sutton	P1 (LMB), P3 (LMB)	Mercury
Martins Pond	North Reading	P1 (LMB & BC & YP), P3 (LMB & BC& YP)	Mercury
Mashpee Pond	Mashpee, Sandwich	P1 (SMB), P3 (SMB)	Mercury
Massapoag Lake	Sharon	P1 (LMB), P3 (LMB)	Mercury
Massapoag Pond	Dunstable, Groton, Tyngsboro	P1 (all species), P5	Mercury

1 Fish taken from feeder streams to the Housatonic River should be trimmed of fatty tissue prior to cooking.
2 For Lowell Canals, the public is advised to consume only the fillet of those species not specifically listed in the advisory.

WATER BODY	TOWN(s)	FISH ADVISORY*	HAZARD*
Mechanics Pond, Dodgeville Pond, and the section of the Ten Mile River that connects them	Attleboro	P1 (WP), P3 (WP)	Chlordane
Merrimack River (from the MA/NH state line to Broadway Dam in Lawrence)	All towns from Tyngsborough through Lawrence	P1 (WS & LMB), P3 (WS & LMB)	Mercury
Miacomet Pond	Nantucket	P1 (all species), P2 (WP), P4	Mercury
Mill Pond	Burlington	P1 (LMB), P3 (LMB)	Mercury
Mill Pond (SuAsCo Reservoir) above GH Nichols Dam	Westborough	P1 (all species), P2 (LMB)	Mercury
Mill River	Hopedale	P1 (all species), P5	PCBs
Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague)	Athol, Erving, Montague, Orange, Phillipston, Royalston, Wendell, Winchendon	P1 (all species), P2 (AE, BT), P4	PCBs
Millvale Reservoir	Haverhill	P1 (all species), P2 (LMB)	Mercury
Mirror Lake	Ft. Devens, Harvard	P1 (LMB), P3 (LMB)	Mercury
Monomonac, Lake and the North branch of Millers River (Between the outlet of Lake Monomonac and the inlet of Whitney Pond)	Winchendon	P1 (all species), P5	Mercury
Moores Pond	Warwick	P1 (AE, CP), P3 (AE, CP)	Mercury
Morewood Lake	Pittsfield	P6	PCBs
Mother Brook (between Charles River and Knight Street Dam)	Dedham, Boston	P1 (C, LMB, WS), P3 (C, LMB, WS)	Mercury, DDT
Mother Brook (between the Knight Street Dam and the Neponset River)	Boston	P1 (all species), P2 (AE, WS), P4	PCBs, DDT
Muddy River	Boston, Brookline	P1 (all species), P2 (BB & C & AE), P4	PCBs
Mystic River (between outlet of Lower Mystic Lake and Amelia Earhart Dam)	Arlington, Everett, Medford, Somerville	P6	PCBs, Chlordane, DDT
Nabnasset Pond	Westford	P1 (LMB), P3 (LMB)	Mercury
Neponset River (between the Hollingsworth & Vose Dam in Walpole and the Walter Baker Dam in Boston)	Boston, Canton, Dedham, Milton, Norwood, Sharon, Walpole, Westwood	P1 (all species), P2 (AE, WS), P4	PCBs, DDT
New Bedford Reservoir	Acushnet	P1 (AE, LMB), P3 (AE, LMB)	Mercury, DDT
Newfield Pond (= Freeman Lake)	Chelmsford	P1 (LMB), P3 (LMB)	Mercury
Nippenicket, Lake	Bridgewater, Raynham	P1 (all species), P2 (LMB), P4	Mercury
Noquochoke Lake	Dartmouth	P1 (all species), P2 (LMB & AE), P4	Mercury, PCBs
North River – see Drinkwater River			
Norton Reservoir – See Rumford River			
Nutting Lake	Billerica	P1 (all species), P5	Mercury
Otis Reservoir	Otis, Tolland	P1 (all species), P5	Mercury
Otter River (between the Seaman Paper Dam in Templeton and the confluence with the Millers River in Winchendon)	Templeton, Winchendon	P1 (all species), P2 (BB & WS), P4	PCBs
Pelham Lake	Rowe	P1 (LMB), P3 (LMB)	Mercury
Pentucket Pond	Georgetown	P1 (all species), P2 (LMB & BC), P4	Mercury
Pentucket, Lake	Haverhill	P6	Mercury
Pepperell Pond	Pepperell, Groton	P1 (all species), P2 (LMB), P4	Mercury
Peters Pond	Sandwich	P1 (all species), P5	Mercury
Pettee Pond	Walpole, Westwood	P1 (LMB), P3 (LMB)	Mercury
Plainfield Pond	Plainfield	P1 (LMB), P3 (LMB)	Mercury
Pleasant Pond	Hamilton, Wenham	P1 (LMB), P3 (LMB)	Mercury
Plowshop Pond	Ft. Devens, Ayer	P6	Mercury
Pomps Pond	Andover	P1 (all species), P2 (LMB), P4	Mercury

WATER BODY	TOWN(s)	FISH ADVISORY*	HAZARD*
Ponkapoag Pond	Canton, Randolph	P1 (all species), P5	Mercury
Pontoosuc Lake	Pittsfield, Lanesborough	P1 (LMB), P3 (LMB)	Mercury
Populatic Pond	Franklin, Medway, Norfolk	P1 (all species), P5	Mercury, Chlordane, DDT
Powder Mill Pond	Barre	P1 (all species), P5	Mercury
Puffer Pond	Ft. Devens Sudbury Training Annex, Maynard	P6	Mercury
Quabbin & Wachusett Reservoirs (See footnote 3)	New Salem, Shutesbury, Petersham, Hardwick, Ware, Pelham, Belchertown, Boylston, West Boylston, Sterling, Clinton	See footnote 3	Mercury
Quaboag Pond	E. Brookfield, Brookfield	P1 (all species), P2 (LMB), P4	Mercury
Quannapowitt, Lake	Wakefield	P1 (C), P3 (C)	DDT
Quinebaug River (from dam at Hamilton Reservoir through East Brimfield Reservoir/Long Pond, including Holland Pond)	Brimfield, Holland, Sturbridge	P1 (all species), P5	Mercury
Red Bridge Pond	Wilbraham	P1 (BC, LMB), P3 (BC, LMB)	Mercury
Reservoir #6	Sutton	P1 (all species), P5	Mercury
Reservoir Pond	Canton	P1 (LMB, WP), P3 (LMB, WP)	Mercury
Rice City Pond	Northbridge, Uxbridge	P1 (all species), P2 (C, WS), P4	PCBs, DDT
Riverdale Pond	Northbridge	P1 (all species), P5	PCBs
Rock Pond	Georgetown	P1 (all species), P2 (LMB), P4	Mercury
Rohunta, Lake (Middle, North, and South Basins)	Orange, Athol, New Salem	P1 (all species), P5	Mercury
Rolling Dam Impoundment	Blackstone	P1 (all species), P2 (C, WS), P4	PCBs, DDT
Round Pond East	Truro	P1 (all species), P2 (LMB), P4	Mercury
Round Pond West	Truro	P1 (YP), P3 (YP)	Mercury
Rumford River (from Glue Factory Pond Dam; Fulton, Kingman, & Cabot ponds; Norton reservoir)	Foxborough, Mansfield, Norton	P6	Dioxin, Pesticides
Ryder Pond	Truro	P6	Mercury
Saltonstall, Lake	Haverhill	P1 (LMB), P3 (LMB)	Mercury
Sampsons Pond	Carver	P1 (BB, WP), P3 (BB, WP)	Mercury, DDT
Sargent Pond	Leicester	P1 (LMB), P3 (LMB)	Mercury
Sawdy Pond	Fall River, Westport	P1 (LMB), P3 (LMB)	Mercury
Shawsheen River - See Ballardvale Impoundment			
Sheep Pond	Brewster	P1 (all species), P5	Mercury
Sherman Reservoir	Rowe, Monroe	P1 (all species), P2 (YP), P4	Mercury
Shirley Lake	Lunenburg	P1 (all species), P5	Mercury
Silver Lake	Pittsfield	P6	PCBs
Silver Lake	Wilmington	P1 (LMB, YB), P3 (LMB, YB)	Mercury, DDT
Slough Pond	Truro	P1 (all species), P2 (LMB), P4	Mercury
Snake Pond	Sandwich	P1 (all species), P2 (SMB), P4	Mercury
Snipituit Pond and Long Pond	Rochester	P1 (BC & LMB), P3 (BC & LMB)	Mercury
Snow Pond	Truro	P1 (LMB), P3 (LMB)	Mercury

3 Children younger than 12 years, pregnant women, and nursing women should not consume fish except for lake trout less than 24 inches long and salmon. All other people should not eat smallmouth bass, largemouth bass, or lake trout greater than 24 inches long; may eat unlimited amounts of salmon and lake trout less than 24 inches long; and should limit consumption of all other Quabbin and Wachusett Reservoir fish species to one five-ounce meal per week.

WATER BODY	TOWN(s)	FISH ADVISORY*	HAZARD*
South Pond (= Quacumquasit Pond)	Sturbridge, Brookfield, E. Brookfield	P1 (all species), P5	Mercury
Spectacle Pond	Sandwich	P1 (all species), P5	Mercury
Spectacle Pond	Wellfleet	P1 (YP), P3 (YP)	Mercury
Spicket River - See Stevens Pond & Spicket River			
Spy Pond	Arlington	P1 (C), P2 (C)	DDT, Chlordane
Stern Reservoir (Framingham Reservoir #1) – See Sudbury River			
Stevens Pond & Spicket River (from Stevens Pond to Music Hall Dam in Methuen)	Lawrence, Methuen	P1 (C, LMB, WS), P3 (C, LMB, WS)	Mercury, DDT
Stevens Pond	North Andover	P1 (LMB), P3 (LMB)	Mercury
Stockbridge Bowl	Stockbridge	P1 (LMB), P3 (LMB)	Mercury
Sudbury Reservoir	Marlborough, Southborough	P1 (all species), P2 (Bass)	Mercury
Sudbury River (from Ashland to its confluence with the Assabet and Concord Rivers), Stern Reservoir, and Bracket Reservoir	All towns from Ashland through Concord	P6	Mercury
Sylvan Lake – See Cochato River			
Ten Mile River – see Mechanics Pond			
Texas Pond (= Thayer Pond)	Oxford	P1 (LMB), P3 (LMB)	Mercury
Thayer Pond – see Texas Pond			
Tom Nevers Pond	Nantucket	P1 (all species), P5	Mercury
Turner Pond	Dartmouth, New Bedford	P1 (all species), P5	Mercury
Upper Naukeag Lake	Ashburnham	P1 (all species), P2 (LMB, SMB), P4	Mercury
Upper Reservoir	Westminster	P1 (all species), P2 (LMB), P4	Mercury
Wachusett Lake	Princeton, Westminster	P1 (LMB), P3 (LMB)	Mercury
Wachusett Reservoir – See Quabbin Reservoir			
Waite Pond	Leicester	P1 (all species), P2 (CP), P4	Mercury
Wakeby Pond	Mashpee, Sandwich	P1 (SMB), P3 (SMB)	Mercury
Walden Pond	Concord	P1 (LMB & SMB), P3 (LMB & SMB)	Mercury
Walden Pond	Lynn, Lynnfield, Saugus	P1 (LMB), P3 (LMB)	Mercury
Wampanoag, Lake	Ashburnam, Gardner	P1 (all species), P5	Mercury
Warner's Pond	Concord	P1 (LMB), P3 (LMB)	Mercury
Wenham Lake	Beverly, Wenham	P1 (all species), P2 (AE, LMB), P4	Mercury, DDT
Wequaquet Lake	Barnstable	P1 (LMB, SMB), P3 (LMB, SMB)	Mercury
West Monponsett Pond	Halifax, Hanson	P1 (LMB), P3 (LMB)	Mercury
Whitehall Reservoir	Hopkinton	P1 (all species), P2 (YB), P4	Mercury
Whitings Pond	North Attleborough, Plainville	P1 (B, LMB), P3 (B, LMB)	Mercury
Whitmans Pond	Weymouth	P1 (AE), P2 (AE)	DDT
Whitney Pond	Winchendon	P1 (all species), P2 (CP), P4	Mercury
Windsor Lake	Windsor	P1 (LMB), P2 (LMB)	Mercury
Willet Pond	Walpole, Norwood, Westwood	P1 (LMB), P3 (LMB)	Mercury
Winthrop, Lake	Holliston	P6	Dioxin
Wrights Reservoir	Gardner, Westminster	P1 (all species), P5	Mercury

Advice Codes

P1 (all species)	Children younger than 12 years or age, pregnant women, women of childbearing age who may become pregnant, and nursing mothers should not eat any fish from this water body.
P1 (species)	Children younger than 12 years or age, pregnant women, women of childbearing age who may become pregnant, and nursing mothers should not eat any of the affected fish species (in parenthesis) from this water body.
P2 (species)	The general public should not consume any of the affected fish species (in parenthesis) from this water body.
P3 (species)	The general public should limit consumption of affected fish species (in parenthesis) to two meals per month.
P4	The general public should limit consumption of non-affected fish from this water body to two meals per month.
P5	The general public should limit consumption of all fish from this water body to two meals per month.
P6	No one should consume any fish from this water body.

Fish Codes

AE	American Eel	CCS	Creek C hubsucker	SMB	Smallmouth Bass
B	Bluegill	CP	Chain Pickerel	WC	White Catfish
BB	Brown Bullhead	FF	Fallfish	WP	White Perch
BC	Black Crappie	GRS	Green Sunfish	WS	White Sucker
BT	Brown Trout	LMB	Largemouth Bass	YB	Yellow Bullhead
C	Carp	LNS	Longnose Sucker	YP	Yellow Perch
CB	Calico Bass	P	Pumpkinseed		
CC	Channel Catfish	RT	Rainbow Trout		

Hazard Codes

PCB=polychlorinated biphenyls
PAHs=polycyclic aromatic hydrocarbons

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It Remains "Appropriate and Necessary" to Regulate Toxic Air Emissions from Coal- and Oil-fired Electric Generating Units

By Barbara Morin and Paul J. Miller

April 17, 2019

I. Introduction

a. Overview

The Northeast States for Coordinated Air Use Management (NESCAUM)[1] has developed this report in response to the February 7, 2019 U.S. Environmental Protection Agency (EPA) 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*[2] (referred to here as the "Reconsideration Proposal"). In this action, EPA has proposed to withdraw its long-standing and well-documented "appropriate and necessary" finding first made in 2000[3] and subsequently reaffirmed in 2012[4] and 2016.[5] The finding underpins pollution control requirements for mercury and other hazardous air pollutants (HAPs, also referred to as "air toxics") emitted by coal- and oil-fired electric generating units (EGUs). EPA established these requirements in the 2012 Utility Mercury and Air Toxics Standards (MATS)[6] and the affected EGUs have now complied with the emission limits. MATS continued existence, however, could be put at legal risk should EPA withdraw the rule's "appropriate and necessary" basis.

Prior to MATS, the states in the NESCAUM region, as well as a number of other states, developed their own state programs to control mercury, an important air toxic emitted by coal-fired EGUs. The state rulemakings often took a "multi-pollutant" approach that also included requirements to reduce emissions of acid- and ozone-forming precursor pollutants (e.g., nitrogen oxides, sulfur dioxide). During the development of their rules, the states used a number of approaches in assessing the costs, benefits, and feasibility of controlling multiple pollutants

[1] NESCAUM is the regional association of the state air pollution control agencies in Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont (www.nescaum.org).
[2] 84 Fed. Reg. 2670-2704 (February 7, 2019).
[3] 65 Fed. Reg. 79,825-79,831 (December 20, 2000).
[4] 77 Fed. Reg. 9304-9513 (February 16, 2012).
[5] 81 Fed. Reg. 24,420-24,452 (April 25, 2016).
[6] 77 Fed. Reg. 9304-9513 (February 16, 2012).

within a single program. Because the state rules pre-dated the original federal promulgation of MATS, they served as early examples of the practicality of the later MATS requirements.

Mercury has received special attention because of its elevated presence in commercially and recreationally important fish consumed by the public, as well as its adverse environmental impacts on loons and other wildlife. Due to elevated fish mercury levels, all the NESCAUM states have issued fish consumption advisories for fish caught in most or all the waters within each state.[7] To address this problem, New York and the New England states successfully petitioned EPA in 2007 to establish a Northeast Regional Mercury Total Maximum Daily Load (TMDL) under section 303(d) of the Clean Water Act.[8] The Northeast Regional Mercury TMDL established a mercury budget at a reduced level that the states project will allow for safe fish consumption and the lifting of state fish consumption advisories.

In setting their regional TMDL, the Northeast states considered multiple cross-media mercury sources. These encompassed out-of-region and in-region combustion sources emitting mercury to the air that subsequently deposited to the surface, municipal wastewater treatment plants directly discharging to water, non-municipal wastewater discharges, and stormwater. Based on 1998 emissions, modeled atmospheric deposition contributed 97.9 percent of the total mercury load to the region's waters, with the majority share coming from out-of-region sources. In order to achieve the target fish tissue mercury concentrations, the states determined it will require an at least 98 percent reduction in atmospheric mercury deposition arising from anthropogenic sources relative to 1998 levels.[9]

To address mercury released within their own borders, the Northeast states have been implementing multiple rules limiting mercury emissions from in-state emission sources. These measures have included limits on coal-fired power plants, medical waste incinerators, municipal waste combustors, and sewage sludge incinerators.[10] Initial measures reduced the modeled in-

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[7] *See* U.S. EPA, *State, Territory and Tribe Fish Advisory Contacts*, https://fishadvisoryonline.epa.gov/Contacts.aspx (accessed April 5, 2019).
[8] US EPA Region 1 letter to CT DEP, *Notification of Approval of Northeast Mercury TMDL* (December 20, 2007). New Jersey followed with its own successful mercury TMDL petition in 2009 [EPA Region 2 Decision Letter, *Review of Total Maximum Daily Load (TMDL) for Mercury Impairments Caused Mainly by Air Deposition in 122 HUC 14s Statewide, New Jersey (NJ)* (September 29, 2009)].
[9] New England Interstate Water Pollution Control Commission, *et al.*, *Northeast Regional Mercury Total Maximum Daily Load* (October 24, 2007). Available at http://click.neiwpcc.org/mercury/mercury-docs/FINAL%20Northeast%20Regional%20Mercury%20TMDL.pdf (accessed April 5, 2019).
[10] NESCAUM, *Tracking Progress in Reducing Mercury Air Emissions* (September 2007). Available at http://www.nescaum.org/documents/northeast-states-succeed-in-reducing-mercury-in-the-environment/final-

region mercury deposition contribution attributable to Northeast state sources from 43 percent in 1998 to 19 percent in 2002. Conversely, the modeled relative in-region contribution from out-of-region sources (upwind states and international) rose from 57 percent in 1998 to 81 percent in 2002.[11]

While the Northeast states have made significant progress in reducing in-region mercury releases, these reductions will not be sufficient to ensure that fish are safe to eat unless comparable out-of-region national and international measures occur. According to the Northeast Regional Mercury TMDL analysis:

> The Northeast region's ability to achieve the calculated TMDL allocations is dependent on the adoption and effective implementation of national and international programs to achieve necessary reductions in mercury emissions. Given the magnitude of the reductions required to implement the TMDL, the Northeast cannot reduce in-region sources further to compensate for insufficient reductions from out-of-region sources. . . . Specifically, it is Northeast States' position that the data and analyses in this TMDL demonstrate that: . . . (B.) EPA must implement significant reductions from upwind out-of-region sources, primarily coal-fired power plants; and (C.) MACT provisions of section 112(d) of the CAA should be adopted as the mechanism for implementing this TMDL.[12]

After having moved forward, however, EPA now seeks to reverse course by adopting a new and highly restrictive view of the value of the health and environmental benefits achieved by MATS. The new analysis dismisses the majority of the benefits associated with reducing EGU air toxics, and as a result, the Agency now asserts that the remaining benefits no longer justify the "appropriate and necessary" finding that forms the legal basis for MATS.

Although the Agency has not proposed withdrawing the MATS emission standards, if EPA were to finalize its withdrawal of the finding, it could pave the way for administrative appeal or expose MATS to future legal challenge that could result in a court striking down the standards, and put the Northeast states' public health and environment at increased risk. Vacating MATS would create economic incentives for coal- and oil-fired EGUs not to operate, or operate at diminished effectiveness, their installed pollution controls where not required for other purposes.

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nescaum-mercury-success-story.pdf/ (accessed April 5, 2019).

[11] New England Interstate Water Pollution Control Commission, *et al.*, *Northeast Regional Mercury Total Maximum Daily Load* (October 24, 2007), at p. 7.

[12] *Ibid.* at p. 44.

As noted in this document, there is historical precedent for EGUs dialing back or turning off installed pollution controls when not required to operate them. Because the Northeast states are downwind from states with large coal- and oil-fired EGUs that lack their own state standards that could backup the loss of MATS, increased air toxic emissions from those states will result in increased deposition within the Northeast region.

This document provides a broader overview of the extent of the numerous impacts that HAPs emitted by coal- and oil-fired EGUs have on public health and the environment. Rather than fully accounting for these in its Reconsideration Proposal, EPA selectively ignores or overly discounts multiple other exposure pathways (e.g., most fish consumption pathways for mercury exposure) and multiple other benefits from reducing the public's exposure through those pathways (e.g., decreased risk of fatal heart attacks and diabetes). EPA also discounts to zero the impacts of air toxics to the environment, such as known impacts of mercury on wildlife.

EPA also applies a new approach to cost-benefit analysis that is ill-suited for assessing the full benefits of reducing HAPs from coal- and oil-fired EGUs. EPA uses a cost-benefit approach that is overly narrow and heavily discounts or ignores hard to monetize benefits. This approach is incomplete and potentially misleading when applied to air toxics where many of the adverse impacts, hence benefits, occur over long time periods or are widely disbursed and difficult to directly link to a unique causal factor at a specific point in time. States that previously adopted their own multipollutant pollution control programs recognized that the full benefits of their rules were not always amenable to monetization,[13] and therefore considered the multiple health and environmental benefits using a broader set of considerations.

Furthermore, EPA, in a reversal of long-standing regulatory practice and at odds with the federal government's own guidelines, dismisses the co-benefits from reductions in fine particulate matter that it asserts are not the "target pollutants" under MATS. Most non-mercury metal air toxics, however, are physically bound within primary particulate matter emitted by coal- and oil-fired EGUs and are reduced by using particulate matter pollution controls. Therefore, reductions in particulate matter are a natural and unavoidable consequence of the MATS requirements to reduce non-mercury metal air toxics. EPA's revised approach ignores this direct relationship and

[13] *See, e.g.*, 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 (p. 62). Available at: http://www.dnrec.delaware.gov/dwhs/Info/Regs/Documents/8969c5c8305d44318a38de77339cdf66multi_p_TechSptDoc1.pdf.

assigns it no benefit.

Based on a fuller accounting of the health and environmental benefits as well as historical control costs of the MATS requirements, and consistent with long standing regulatory analysis prior to the narrow approach EPA adopts in the Reconsideration Proposal, we conclude that EPA lacks a reasonable basis for its proposed action and that it remains both appropriate and necessary to regulate toxic air emissions from coal- and oil-fired EGUs.

b. NESCAUM background

NESCAUM was established in 1967 as a forum among its northeastern state members to exchange technical information, promote cooperation in regard to air pollution control issues of regional concern, and assist the states in implementing national environmental programs required under the Clean Air Act and other federal legislation. To accomplish these objectives, NESCAUM facilitates technical committees and workgroups, sponsors frequent air quality trainings, participates in national discussions, and organizes a variety of research initiatives. Many of NESCAUM's activities culminate in technical analyses, published reports, and workshops designed to provide support to our member states or disseminate state-of-the-art information concerning air pollution control issues.

With respect to air toxics, NESCAUM has been deeply involved over a number of years in the evaluation of their impacts on public health and the environment within the Northeast. These activities include:

- Analyzing the trace metal and sulfur content in wood fuels and heating oil sold in the Northeast;
- Reviewing control technologies to reduce conventional and hazardous air pollutants from coal-fired EGUs;
- Characterizing organic HAPs and other air pollutants from wood burning appliances;
- Evaluating relative cancer risks from conventional and reformulated gasolines;
- Quantifying the comparative contributions of different mercury pollution sources and source regions to mercury deposited from the air to land and water in the Northeast;
- Conducting state-level monitoring and modeling analyses of air toxics; and
- Improving source-specific estimates in mercury air emission inventories within the NESCAUM states.

A more complete listing of these and other NESCAUM activities with links to individual

documents is available at www.nescaum.org.

c. Mercury and other hazardous air pollutants in the Northeast

The EPA has presented a summary of the cancer and non-cancer impacts for mercury, the non-mercury toxic metals, acid gases, and organic HAPs, including dioxins/furans that the MATs rule addresses.[14] Mercury has received special attention as a health and environmental problem among the NESCAUM states. Mercury deposition from upwind sources has significantly affected aquatic and terrestrial environments in the Northeast, resulting in states having to issue fish consumption advisories to protect human health.

Over 15,000 fish samples collected in the Northeast confirm widespread mercury contamination of aquatic ecosystems, threatening human health and wildlife without broad regional efforts to reduce significant local and upwind sources of mercury emissions. Mercury contamination also threatens the tourist and recreational fishing industries, which contribute $3 billion a year to the Northeast's regional economy.

In a 1997 study, the EPA modeled the transport and deposition of mercury emissions associated with selected categories of major combustion and manufacturing sources, including coal- and oil-fired EGU boilers. The study showed that the Northeast had one of the highest annual mercury deposition rates in the country and that, in areas with flat terrain, at least 75 percent of the mercury emitted by the modeled facilities was transported more than 50 km downwind from the facility. Monitoring data corroborated the modeling results.[15]

In 2007, NESCAUM conducted a modeling study to apportion contributions, by geographical area and by source category, to mercury deposition in the NESCAUM region. The analysis used an emissions inventory[16] developed by NESCAUM for 2002, after controls were implemented in the region for three mercury emission source categories: municipal waste combustors; medical waste incinerators; and sewage sludge incinerators. The modeling study calculated that in 2002, upwind sources in states outside of the NESCAUM region were responsible for nearly 60% of the domestic U.S. contribution to deposition in the NESCAUM states; upwind EGUs alone were

[14] US EPA, *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards*, EPA-452/R-11-011 (December 2011).
[15] US EPA, *Mercury Study Report to Congress, Volume III: Fate and Transport of Mercury in the Environment*, EPA-452/R-97-005 (1997).
[16] NESCAUM, *Inventory of Anthropogenic Mercury Emissions in the Northeast*, Boston, MA (2005). Available at http://www.nescaum.org/documents/inventory-of-anthropogenic-mercury-emissions-in-the-northeast/.

responsible for 36% of those impacts.[17] As an outgrowth of this work, all the NESCAUM states, collectively or individually, petitioned EPA under the Clean Water Act to establish total maximum daily loads (TMDLs) for mercury entering the waters of the Northeast, which EPA approved.[18]

Working with the New England Interstate Water Pollution Control Commission (NEIWPCC), NESCAUM in 2008 used an EPA-sponsored modeling analysis[19] to further refine its previous results showing that much of the mercury entering the Northeast's aquatic ecosystems is deposited from the air, and a significant portion of this mercury comes from emission sources outside the region. That analysis concluded that nearly half of the mercury associated with U.S. sources that is deposited across New York and the New England states comes from within these states and another 40 percent is attributable to sources in states immediately upwind, including Pennsylvania, New Jersey, Ohio, West Virginia, and Maryland.[20] As part of a Clean Water Act sec. 319(g) conference that focused on mercury TMDL water quality impairment issues in New York and the six New England states, EPA reviewed NESCAUM's analysis and found its results virtually identical with EPA's own results.[21]

While mercury receives a large share of the attention, other non-mercury air toxic emissions from coal- and oil-fired EGUs affect the Northeast. For example, researchers have implicated nickel emissions from oil combustion with an increased risk in daily mortality.[22] In the Northeast, EGUs burning No. 6 residual oil are a large source of these emissions.

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[17] NESCAUM, *Modeling Mercury in the Northeast United States*, Boston, MA (2007). Available at http://www.nescaum.org/documents/mercury-modeling-report_2007-1005b_final.pdf/.

[18] US EPA Region 1 letter to CT DEP, *Notification of Approval of Northeast Mercury TMDL* (December 20, 2007) (this is a regional mercury TMDL covering the states of CT, ME, MA, NH, NY, RI and VT); EPA Region 2 letter to NJ DEP, *Review of Total Maximum Daily Load (TMDL) for Mercury Impairments Caused Mainly by Air Deposition in 122 HUC 14s Statewide, New Jersey (NJ)* (September 25, 2009).

[19] US EPA. "Model-based Analysis and Tracking of Airborne Mercury Emissions to Assist in Watershed Planning." Final Report, U.S. EPA Office of Wetlands, Oceans, and Watersheds, Washington, DC (August 2008), http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/upload/final300report_10072008.pdf (accessed June 11, 2011).

[20] NESCAUM, *Sources of Mercury Deposition in the Northeast United States*, Boston, MA (2008). Available at http://www.nescaum.org/documents/nescaum-sources-of-hg-depo-in-northeast_2008-final.pdf/. The modeling results are consistent with NESCAUM's earlier 2007 assessment, with the differences between in-region and out-of-region source contributions to Northeast deposition attributable to differences in each model's mercury emissions inventories, emitted mercury species profiles by source type, meteorological years, and boundary conditions (*see* p. 12).

[21] US EPA. "Determination of Mercury Deposition Contributions from States Outside the Northeast." Presentation by Dwight Atkinson, U.S. EPA, at Clean Water Act Section 319(g) Mercury Conference, Philadelphia, PA, June 22-23, 2010.

[22] Lippmann, M., K. Ito, J.S. Hwang, P. Maciejczyk, and L.C. Chen. Cardiovascular Effects of Nickel in Ambient

d. NESCAUM state efforts to reduce mercury released into the environment

In light of the dangers posed by mercury contamination, the Northeast states have been aggressively regulating in-region mercury releases to the air for a number of years. These efforts have been aimed at reducing mercury in products entering into waste streams, in addition to direct releases into air and water. A summary of efforts in 2007 noted:

> Since 2000, the Northeast states have enacted major legislation to address mercury use in products and ultimately in solid and hazardous waste. […] Mercury collection and recycling efforts by the Northeast States led to an estimated 7.5 tons of mercury recovered from homes, schools, hospitals, and other locations throughout the region. Some of the actions that have contributed to these reductions include the recycling of 41,764 mercury-containing thermostats, the collection of 120,973 mercury automobile switches and 213,322 mercury thermometers, and the removal of 4,696 lb of mercury from 456 schools.[23]

Additional efforts among the Northeast states include adopting laws or regulations requiring the installation of dental amalgam separators in dental offices to reduce the amount of mercury going to wastewater treatment facilities. Strict emission limits on municipal waste combustors reduced their mercury air emissions in the Northeast states by 85% from the late 1990s, from more than 14,000 lb to approximately 2,000 lb of emitted mercury. Additional deep reductions have occurred from medical waste incinerators within the region, where state limits resulted in mercury decreases of greater than 95% from these sources, falling from almost 1,600 lb in 1998 to 58 lb in 2002.[24]

Prior to the federal MATS rule in 2011, the NESCAUM states had already begun imposing by rule or legislation stringent mercury limits on coal-fired EGUs, and these were largely in place by the mid-2000s. Emissions requirements for coal-fired EGUs adopted in the Northeast include the following:

- Connecticut enacted legislation in June 2003 requiring coal-fired units in the state to meet emissions requirements by July 1, 2008.[25]
- Massachusetts promulgated regulations in May 2004 to limit mercury emissions from

Air. *Environ. Health Perspect.* 114(11): 1662-1669 (2006).
[23] King, S., P. Miller, T. Goldberg, J. Graham, S. Hochbrunn, A. Wienert, and M. Wilcox. Reducing Mercury in the Northeast United States. *EM*, Air & Waste Management Association (Pittsburgh, PA), pp. 9-13 (May 2008).
[24] *Ibid.*
[25] Connecticut General Statute section 22a-199 (2003).

four large coal-fired EGUs in the state relative to 2000-2001 levels.[26] The deadline for compliance with Phase 1 (minimum 85% mercury capture) of those requirements was January 1, 2008. Compliance with more stringent Phase II requirements (minimum of 95 percent mercury capture) was required by October 1, 2012.

- New Hampshire adopted state legislation calling for a state-wide 80 percent reduction in coal-fired EGU mercury emissions no later than July 1, 2013.[27]
- New Jersey adopted rules in August 2005 limiting mercury emissions from coal-fired boilers by December 15, 2007.[28]
- New York State adopted rules in 2007 capping mercury emissions from coal-fired EGUs in the years 2010-2014 and limiting those emissions by 2015.[29]

Many of these state emission limits are well below that required by the federal MATS rule.

e. State rules did not impose significant burdens on costs of reliability

Prior to EPA's final promulgation of MATS, a number of states had already adopted stringent limitations on mercury emissions from new and existing fossil fuel EGUs, often as part of multi-pollutant programs that included control cost considerations for sulfur dioxide (SO_2) and nitrogen oxides (NO_X). Rules covering EGUs in Delaware,[30] Maryland,[31] Massachusetts,[32] New

[26] 310 CMR 7 (2004).
[27] RSA 125-O:11-18 (2006).
[28] N.J.A.C. 7:27-27.1 *et seq.* (2004).
[29] 6 NYCRR Part 246 (2007).
[30] 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.
[31] 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.
[32] 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.

Jersey,[33] New York,[34] and Wisconsin[35] are illustrative of the cost considerations taken by these states.

In their rulemakings, the states recognized a broader range of public health and environmental benefits and put these considerations within an overall cost context affecting the electric generation industry as well as consumers. For example, Delaware and New York estimated the impact of their rules on retail electricity prices. While they projected an increase in cost of electricity generation for the affected EGUs, they concluded that it was not of sufficient magnitude to expect increased rates for consumers.[36,37]

With state rules now having been in place for over a decade, the historical experience in the states that adopted mercury standards show that the control costs did not impose an unreasonable burden on the covered EGUs, did not cause a drastic rise in electricity rates, and did not undermine electric grid reliability. As discussed below, a retrospective analysis of the MATS implementation, which has comparable requirements to those in the state rules, showed that actual costs were lower than projected costs and did not adversely affect the reliability of the grid.[38]

II. Control Costs

Actual control costs for EGUs to comply with MATS have been less than originally estimated by

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[33] 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/).
[34] 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.
[35] 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.
[36] 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 (p. 50). Available at: http://www.dnrec.delaware.gov/dwhs/Info/Regs/Documents/8969c5c8305d44318a38de77339cdf66multi_p_TechSptDoc1.pdf.
[37] 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 (p. 24). Available upon request from the New York State Department of Environmental Conservation and included as an attachment to these comments.
[38] *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).

EPA. 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.[39] A number of factors contributed to the substantially lower actual compliance costs. These factors include:[40]

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. NESCAUM's 2000 retrospective review of several air pollution programs 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. Examples of programs for which costs were prospectively overestimated include the California Low Emissions Vehicle program and requirements for SO_2 controls pursuant to Title IV of the Clean Air Act.[41]

III. Northeast states will be adversely impacted if MATS requirements are rescinded

a. Withdrawing the "appropriate and necessary" finding puts the MATS requirements at legal risk

In EPA's Reconsideration Proposal, the Agency does not propose to revoke the MATS standards (although it does invite comment on that option); EPA proposes only to withdraw the "appropriate and necessary" finding. Withdrawing the finding—which, under the Clean Air Act obligates EPA to regulate EGU HAPs—could render the MATS standards vulnerable to legal challenge. Should the MATS standards be vacated or rescinded by future legal or administrative action, it creates the threat that EGUs now in full compliance with MATS would stop operating their installed controls. This is not entirely speculation, as the following historical context shows.

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[39] *Ibid.* Staudt Declaration.
[40] *Ibid.* Staudt Declaration.
[41] NESCAUM, *Environmental Regulation and Technology Innovation: Controlling Mercury Emissions from Coal-Fired Boilers,* September 2000. Available at: http://www.nescaum.org/documents/rpt000906mercury_innovative-technology.pdf.

Ceasing operations of those controls would cause adverse impacts in downwind Northeast states.

b. Operation of installed controls

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.[42]

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 those 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,[43] and complied with MATS requirements in 2017.[44]

There typically is a financial cost associated with operation of the controls used to remove regulated pollutants from EGU emissions.[45] As a result, there is an economic incentive for EGUs to discontinue operating pollution controls absent an enforceable obligation to do so under a permit, regulation, or court order.[46] For example, an analysis by the Ozone Transport Commission showed that in 2012, numerous coal-fired EGUs equipped with post-combustion NO_X emission controls, in particular selective catalytic reduction controls, stopped or limited operation of those controls and instead chose to achieve compliance with the federal Clean Air Interstate Rule by purchasing NO_X emissions allowances, presumably because it was less expensive to do so.[47] A specific example is the coal-fired Montour Power Plant in Pennsylvania,

[42] US 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#.
[43] *Ibid.*
[44] US EIA, 2017 Form EIA-860 Data – Schedule 6B, Emission Standards and Control Strategies, (September 13, 2018) https://www.eia.gov/electricity/data/eia860/.
[45] Examples of these costs are for the purchase of control reagents, parasitic energy load to run the controls, and additional operation and maintenance of the control equipment.
[46] McNevin, T.F., Recent increases in nitrogen oxide (NO_X) emissions from coal-fired electric generating units equipped with selective catalytic reduction, 66 *JAWMA* 66-75 (2016), DOI: 10.1080/10962247.2015.1112317.
[47] *See* Statement from the Ozone Transport Commission Requesting the Use and Operation of Existing Control Devices Installed at Electric Generating Units (June 13, 2013), http://www.otcair.org/upload/Documents/Formal%20Actions/Statement_EGUs.pdf.

where a company spokesperson stated that in 2015, it was much cheaper to buy allowances than run its already installed NO_X controls.[48]

Thus, there is precedent to expect that the coal-fired EGUs not located within the 11 states[49] requiring controls under state law will not operate or will limit operation of the controls that they installed to comply with MATS requirements if that rule is no longer in effect. This is particularly likely for controls specific to mercury reduction, such as activated carbon injection and halogen (e.g., bromine) addition, that cost money to operate and that can be readily turned off without affecting compliance with other non-mercury pollution control obligations.

Given that the majority of the nation's coal-fired EGU capacity is located in states without state-based mercury controls—such as Indiana, Pennsylvania, Ohio, West Virginia, and Texas—uncontrolled mercury emissions in the event of full or partial vacatur or repeal of MATS could be substantial. Uncontrolled mercury emissions from Pennsylvania's coal-fired EGUs are of particular concern to the NESCAUM states because Pennsylvania has numerous coal-fired EGUs and contributes significantly to mercury deposition in the NESCAUM states, due to its proximity to the region and prevailing weather patterns.[50]

c. Impacts of mercury deposition on natural resources

As documented in recent studies, reductions in mercury emissions associated with implementation of state and federal rules have resulted in decreased mercury levels in waterbodies and in freshwater and saltwater fish. Examples of studies documenting those reductions include:

- Core sediment samples taken from the Great Lakes and nearby lakes showed a 20% mean decline in mercury accumulation attributable to domestic emissions reductions.[51]
- Mercury concentrations in largemouth bass and yellow perch in lakes in a mercury

[48] O'Neill, J.M., *N.J. Air Quality Takes a Hit*, The Record (Bergen County, NJ), May 17, 2015 (quoting a company spokesperson, "[t]oday, the cost of using installed controls far exceeds the cost of obtaining allowances in the trading market.").
[49] *See* 5 COLO. CODE REGS. § 1001-8:B.VIII.c (first phase compliance by Jan. 1. 2012); CONN. GEN. STAT. § 22a-199(b)(1) (compliance by Jul. 1, 2008); DEL. ADMIN. CODE, tit. 7, § 1146-6.1 (first phase compliance by Jan. 1, 2009); ILL. ADMIN. CODE tit. 35, § 225.230(a) (compliance by Jul. 1, 2009); MD. CODE REGS. tit. 26, § 11.27.03.D (first phase compliance by Jan. 1, 2010); 310.
[50] NESCAUM 2008 Report, *supra* note 10, at 18 (showing that Pennsylvania contributed approximately 22 percent of all U.S. domestic mercury deposition in New York and the six New England states, even prior to when the NESCAUM states began to reduce their own power plant mercury emissions).
[51] Drevnick, P.E., *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.

hotspot area of Massachusetts showed declines of 44% and 43%, respectively, between 1999 and 2011, a period in which major reductions in mercury air emissions from combustion sources occurred in the region.[52]

- 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 Mid-Atlantic Bight (defined as the continental shelf waters from Cape Cod, Massachusetts, to Cape Hatteras, North Carolina) with decreasing U.S. mercury air emissions.[53]

Decreases in mercury contamination of fish are associated with human health benefits, as discussed in the following subsection. In addition, a reduction in mercury contamination will decrease the detrimental impacts on fish and fish-eating wildlife, including:

- 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

[52] Hutcheson, M.S., C.M. Smith, J. Rose, C. Batdorf, O. Pancorbo, C.R. West, J. Strube, and C. Francis. Temporal and Spatial Trends in Freshwater Fish Tissue Mercury Concentrations Associated with Mercury Emissions Reductions, 48 *Environ. Sci. Technol.* 2193-2202 (2014), DOI: 10.1021/es404302m.
[53] Cross, F.A., D.W. Evans, and R.T. Barber. 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.

- Effects on the white ibis and other piscivorous bird species, including decreased foraging efficiency, decreased reproductive success and altered pair behavior, resulting in a reduction in fledglings.[54]

Mercury contamination of fishing areas, largely due to atmospheric mercury deposition, has led many states, including the NESCAUM member states, to issue widespread fish consumption advisories. Advisories warn residents, particularly women of child bearing age, to avoid or severely curtail fish consumption. Wildlife are not able to choose to avoid these exposures. Without MATS to limit these mercury emissions, the Northeast states will have little chance to address these persistent harms to the region's natural resources caused by EGUs located upwind and outside the region.

d. Impacts of mercury deposition on human health

As discussed above, emitted mercury, when deposited in or carried into waterbodies, is readily converted to methylmercury (MeHg), a particularly toxic and persistent form of mercury. MeHg bioconcentrates in the food chain, and, as a result, mercury levels in fish tissue can be as much as 10 to 100 million times greater than concentrations in water.[55] Therefore, consumption of fish, including freshwater fish and saltwater fish and shellfish, are the major route of human exposure to mercury.

Human health effects linked to mercury exposure include the following:

- Children exposed to MeHg during a mother's pregnancy can experience persistent and lifelong IQ and motor function deficits. There is no known threshold below which these effects do not occur.[56]
- In adults, high levels of MeHg exposure have been associated with adverse cardiovascular effects, including increased risk of fatal heart attacks.[57]
- Other adverse health effects of MeHg exposure that have been identified in the scientific

[54] US EPA, *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards*, EPA-452/R-11-011 (December 2011), Chapter 4.
[55] Driscoll, C.T., Y.-J. Han, C. Chen, D. Evers, K.F. Lambert, T. Holsen, N. Kamman, and R. Munson. Mercury Contamination on Remote Forest and Aquatic Ecosystems in the Northeastern U.S.: Sources, Transformations, and Management Options, *BioScience* 57(1):17-28 (2007).
[56] Grandjean, P. and M. 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.
[57] Genchi G., M.S. Sinicropi, A. Carocci, G. Lauria, and A. Catalano. Mercury Exposure and Heart Diseases, 14 *Int. J. Environ. Res. Public Health* 74 (2017), DOI:10.3390/ijerph14010074.

literature include endocrine disruption,[58] diabetes risk,[59] and compromised immune function.[60]

EPA's Regulatory Impact Analysis (RIA) in support of the MATS rule only monetized the effect of loss of IQ points for a certain subset of the exposed U.S. population. However, it is important that all of the health impacts listed above be carefully evaluated in any regulatory action that may increase mercury exposures. Consideration of cardiovascular effects is particularly critical. In 2011, a group of experts convened by 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."[61]

Note that fish with high MeHg levels also frequently have high levels of heart protective omega-3 fatty acids.[62] That correlation tends to mask the cardiovascular effects of MeHg in epidemiological studies and has made the development of quantitative risk factors for the MeHg-MI link more challenging. However, as discussed below, monetizing MI reductions associated with reduction in MeHg exposures would significantly increase the quantified benefits associated with the MATS rule.

As previously noted, a recent study convincingly linked decreased levels decreased mercury air emissions with decreased concentrations of MeHg in bluefish captured in the Mid-Atlantic Bight (the continental shelf waters from Cape Cod, Massachusetts, to Cape Hatteras, North Carolina).[63] The study's authors concluded that, assuming that bluefish are representative of other marine

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[58] Tan, S.W., J.C. Meiller, and K.R. Mahaffey. The endocrine effects of mercury in humans and wildlife, *Crit. Rev. Toxicol.* 39 (3), 228−269 (2009).
[59] He, K., P. Xun, K. Liu, S. Morris, J. Reis, and E. Guallar. Mercury exposure in young adulthood and incidence of diabetes later in life: the CARDIA trace element study, 36 *Diabetes Care* 1584−1589 (2013).
[60] Nyland, J. F., M. Fillion, R. Barbosa, Jr., D.L. Shirley, C. Chine, M. Lemire, D. Mergler, and E.K. Silbergeld. Biomarkers of methylmercury exposure and immunotoxicity among fish consumers in the Amazonian Brazil, 119 *Environ. Health Perspect.* 1733− 1738 (2011).
[61] Roman, H.A., T.L. Walsh, B.A. Coull, E. Dewailly, E. Guallar, D. Hattis, K. Mariën, J. Schwartz, A.H. Stern, J.K. Virtanen, and G. Rice. 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).
[62] Mahaffey, K.R., R.P. Clickner, and R.A. Jeffries. Methylmercury and Omega-3 Fatty Acids: Co-occurrence of Dietary Sources with Emphasis on Fish and Shellfish, 107 *Environ. Res.* 20–29 (2018).
[63] Cross, F.A., D.W. Evans, and R.T. Barber. 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.

predators, reduced mercury releases will result in lower mercy public mercury exposures associated with eating marine fish. Those reductions in mercury intakes will likely 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.[64]

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.[65] Because tuna species collectively provide more mercury (~40%) to the U.S. population than any other source,[66] it is clear that there will be significant health and economic benefits associated with saltwater fish consumption that come from reducing U.S. EGU mercury emissions.

The absence of MATS would put at risk public health in the Northeast states from the consumption of mercury-tainted fish, while diminishing the important health benefits of a diet that includes fish. In addition, the vitality of the Northeast's marine fisheries is put at risk, threatening the future prospects of an already stressed but economically important component of the Northeast states' economies.

e. Impacts on compliance with other Clean Air Act requirements

The EPA has incorporated MATS into its 2011 emissions modeling platform that projects emission baselines into the future.[67] States rely upon these projections in developing pollution control strategies to attain and maintain national ambient air quality standards (NAAQS). For example, Connecticut has included EPA's 2017 baseline projections for emissions of NO_X, which include MATS reductions, in its most recent ozone state implementation plan (SIP) submittal.[68] While MATS may not specifically require limitations on NO_X as an ozone precursor,

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[64] Cusack, L.K., E. Smit, M.L. Kile, and A.K. Harding. 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.
[65] Lee, C.-S., M.E. Lutcavage, E. Chandler, D.J. Madigan, R.M. Cerrato, and N.S. Fisher. 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.
[66] Sunderland, E.M. Mercury exposure from domestic and imported estuarine and marine fish in the U.S. seafood market, 115 *Environ. Health Perspect.* 235−242 (2007).
[67] US EPA, *Technical Support Document (TSD) Preparation of Emissions Inventories for the Version 6.2, 2011 Emissions Modeling Platform*, (August 2015). Available at https://www.epa.gov/sites/production/files/2015-10/documents/2011v6_2_2017_2025_emismod_tsd_aug2015.pdf.
[68] Connecticut Department of Energy and Environmental Protection, *8-Hour Ozone Attainment Demonstration for*

EPA has included the program in its projections because of its impact on reducing ozone precursor emissions in Connecticut and upwind states. Similarly, EPA has previously credited sulfur dioxide and particulate matter reductions from MATS in concluding that these would help eastern states meet the revised daily and annual fine particulate matter NAAQS with no additional controls needed.[69] Removal of MATS alters those projections and undermines the states' ability to achieve the relied-upon reductions associated with MATS to help attain and maintain compliance with the ozone and particulate matter national ambient air quality standards.

In addition to the national ambient air quality standards, EPA requires states to develop long-term strategies that address visibility-impairing haze in designated federally protected national parks and wilderness areas ("Class I areas"[70]), and these strategies must consider "Emission reductions due to ongoing air pollution control programs[.]"[71] As part of these considerations, EPA requires states with Class I areas to include MATS among the federal measures that they use to establish reasonable progress goals in their state haze plans.[72] In the NESCAUM region, four states have Class I areas – Maine, New Hampshire, New Jersey, and Vermont. Removal of MATS will hinder the ability of these and other states with Class I areas to achieve the reasonable progress goals in their haze plans.

IV. Co-benefits and non-monetized benefits of the MATS rule

In EPA's Reconsideration Proposal, it adopts for the first time a cost-benefit approach in which benefits that can be monetized are virtually the only factors considered in its "appropriate and necessary" finding. This overly constrains EPA's approach to one narrow slice of the full benefits reasonably attributable to MATS. EPA also for the first time dismisses the substantial

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the Connecticut Portion of the New York-Northern New Jersey-Long Island (NY-NJ-CT) Nonattainment Area, Technical Support Document, Enclosure A, Revision to Connecticut's State Implementation Plan (August 2017). Available at https://www.ct.gov/deep/lib/deep/air/ozone/ozoneplanningefforts/SouthwestConnecticutAttainmentSIPFINAL.pdf (*see* pp. 56-57).

[69] US EPA, *Regulatory Impact Analysis for the Final Revisions to the National Ambient Air Quality Standards for Particulate Matter*, EPA-452/R-12-005 (December 2012). Available at https://www3.epa.gov/ttnecas1/regdata/RIAs/finalria.pdf.

[70] "Class I areas" are national parks larger than 6,000 acres and national wilderness areas larger than 5,000 acres that were in existence when the Clean Air Act was amended in 1977. *See* National Park Service, *Class I Areas*, https://www.nps.gov/subjects/air/class1.htm (accessed March 22, 2019).

[71] 40 CFR 51.308(f)(2).

[72] 82 Fed. Reg. 3078-3129 (January 10, 2017), at 3092.

"co-benefits" from reductions in other air pollutants, most notably fine particulate matter, based on the assertion that these are not the intended target of MATS, therefore cannot be meaningfully considered. Neither of those drastic changes are consistent with good practice in economic analysis, and both contradict the federal government's own guidance in conducting a regulatory impact analysis.

a. Non-monetized benefits of HAP reductions

EPA's RIA for the MATS rule monetized only one exposure-health endpoint, loss of IQ points in children who were exposed prenatally to MeHg via maternal ingestion of self-caught freshwater fish. The RIA states that that endpoint was used 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."[73]

EPA did not attempt to monetize the benefits of reducing risks of any of the other health and environmental endpoints associated with exposure to MeHg that are listed above, including the increased risk of myocardial infarction in adults. It also did not monetize the benefits associated with a reduction in MeHg in saltwater fish and in commercially purchased fish. The RIA states that EPA did not attempt to monetize those pathways for two reasons: "(1) for self-caught saltwater fish, we are unable to estimate the reduction in fish tissue methylmercury that would be associated with reductions in mercury deposition from U.S. EGUs, and (2) for commercially purchased ocean fish, it is nearly impossible to determine the source of the methylmercury in those fish, and thus we could not attribute mercury levels to U.S. EGUs."[74] While NESCAUM recognizes that there are uncertainties in quantifying these exposures, it is essential that these pathways be included in any benefit analysis, because they are the main MeHg exposure pathways for most of the U.S. population.

b. Expanded quantitative analyses of the benefits of HAP reductions

Several recent analyses have estimated the benefits of the reductions in exposures to MeHg associated with lower EGU emissions. Those analyses, which have yielded benefit estimates that are considerably higher than those calculated in the RIA, include:

[73] US EPA, *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards*, EPA-452/R-11-011 (December 2011), Chapter 4.
[74] *Ibid.*

- A calculation of 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. Those costs were valued at $4.8 billion per year.[75]
- 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.[76]
- 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. This 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, assumed an EGU mercury emissions cap of 26 tons per year, based on an earlier EPA proposal. Because EPA's final MATS rule resulted in a four-fold greater decrease in EGU 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.[77]

c. Consideration of benefits of HAP reductions that cannot be monetized

It is essential that EPA also meaningfully account for benefits associated with the MATS rule that cannot be monetized, and do so for both human health and ecological benefits. Frequently, there is more information available to monetize costs than benefits. While the regulated community has incentive and resources to estimate compliance costs (and, as noted earlier, typically overestimates costs), it has no such incentive to monetize public benefits. 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.

The Office of Management and Budget's (OMB) guidance on best practices in conducting

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[75] Grandjean, P. and M. 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.
[76] Rice, G.E., J.K. Hammitt, and J.S. Evans. A Probabilistic Characterization of the Health Benefits of reducing Methyl Mercury Intake in the United States, 44 *Environ. Sci. Technol.* 5216-5224 (2010), DOI:10.1021/es903359u.
[77] NESCAUM, *Economic Valuation of Human Health Benefits of Controlling Mercury Emissions from U.S. Coal-Fired Power Plants*, February 2005. Available at: http://www.nescaum.org/documents/rpt050315mercuryhealth.pdf.

regulatory analyses clearly supports serious consideration of all benefits, including those that cannot be monetized. The OMB's 2003 Circular A-4 notes that "[w]hen important benefits and costs cannot be expressed in 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.[78]

States that have adopted their own rules limiting mercury emissions from EGUs also identified numerous important benefits associated with their rules that they were not able to fully monetize. Delaware, for example, stated that, "while it is evident that economic benefits will accrue," it "was not able to obtain sources of information that quantify the economic impact of mercury emissions reductions on neurological effects, cardiovascular effects, genotoxic effects, immunotoxic effects, or ecological effects."[79] Consistent with the OMB's guidelines and states' experiences, NESCAUM believes that the presently quantifiable benefits do not capture the full value of HAPs reductions associated with the MATS rule, making EPA's proposed cost-benefit comparison incomplete and potentially misleading, thus necessitating the use of other approaches to better consider those benefits.

d. Consideration of co-benefits from reduction of criteria pollutant exposures

The EPA's 2016 Supplemental Finding included a formal cost-benefit analysis that found the monetized benefits associated with implementation of the MATS rule far outweighed the costs of compliance. In the Supplemental Finding, EPA stated that while in its preferred approach it was not relying on the rule's monetized co-benefits to reaffirm its "appropriate and necessary" finding, the results of its formal cost-benefit analysis provided further evidence in support of the basis for MATS.

In the current Reconsideration Proposal, EPA is proposing to reverse that finding because most of the monetized benefits calculated in the benefit-cost analysis are associated with what it views as ancillary reductions in non-HAP emissions. Specifically, most of the monetized benefits in the Supplemental Finding's formal cost-benefit analysis are associated with reductions in fine particulate matter ($PM_{2.5}$). Those reductions are a co-benefit of the installation of control

[78] Office of Management and Budget (OMB), *Circular A-4: Regulatory Analysis,* 2003, p. 10.
[79] 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 (p. 62). Available at: http://www.dnrec.delaware.gov/dwhs/Info/Regs/Documents/8969c5c8305d44318a38de77339cdf66multi_p_TechSptDoc1.pdf.

technology that reduces emissions of $PM_{2.5}$, nitrogen oxides and sulfur dioxide, as well as HAPs. Note that in addition to direct (primary) $PM_{2.5}$ emissions from EGUs, nitrogen oxides and sulfur dioxides emitted by EGUs react in the atmosphere to form secondary $PM_{2.5}$.

The EPA's minimization of the importance of co-benefits (also called ancillary benefits) in the Reconsideration Proposal contradicts guidance on this subject in OMB's Circular A-4, which states the following:

> 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).
>
> You should begin by considering and perhaps listing the possible ancillary benefits and countervailing risks. However, highly speculative or minor consequences may not be 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.[80]

OMB's reiterated its position on this issue in draft guidance that it issued in 2017, which stated that "[t]he 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."[81]

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[80] Office of Management and Budget (OMB), *Circular A-4: Regulatory Analysis,* 2003, p. 26.
[81] 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.

In addition, EPA uses filterable particulate matter emitted by coal- and oil-fired EGUs as a surrogate for non-mercury metal air toxics because these metals are closely associated with filterable particulates.[82] Therefore, controls that reduce filterable particulate matter from coal- and oil-fired EGUs are responsible for achieving reductions of these non-mercury metals. As a factual matter, control of filterable particulates emitted from EGUs is integrally linked to control of most metal toxics emitted by the same facilities.

V. Summary

Almost 20 years after EPA first found it "appropriate and necessary" to limit mercury and other air toxics emitted by coal- and oil-fired EGUs (and reaffirmed it twice), the Agency now proposes to withdraw the finding. In doing so, EPA presents no new scientific assessment that air toxics emitted by EGUs no longer threaten public health and the environment. Instead, EPA presents a drastically scaled-back approach to assessing the benefits from reducing EGU air toxic emissions. In doing so, EPA conducts a cost-benefit analysis where the Agency contrasts only one narrow slice of monetized benefits against an outdated and demonstrably wrong monetized set of control costs. As a practical matter and with no prior precedent, EPA is now dismissing all other benefits of MATS that it does not assign a dollar value to, which by implication is the same as assigning them a value of zero dollars.

Furthermore, EPA inexplicably ignores standard good accounting practice and federal OMB guidance by dismissing MATS co-benefits that it has itself recognized may be relied upon by states in developing strategies to achieve compliance with other Clean Air Act requirements.

By basing its proposal to withdraw its previous "appropriate and necessary" finding on a narrowly constrained cost-benefit analysis that is incapable of adequately considering all the impacts of the HAPs covered by MATS, EPA fails to provide an informed analysis. In reviewing a more complete and extensive record of the range of benefits achievable by the MATS rule, and recognizing the actual historical costs of MATS compliance, we conclude that EPA lacks a proper foundation for withdrawing its long-standing "appropriate and necessary" finding.

[82] 77 Fed. Reg. 9304-9513 (February 16, 2012), at 9402.

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Update of the Cost of Compliance with MATS – Ongoing Cost of Controls

White Paper

By

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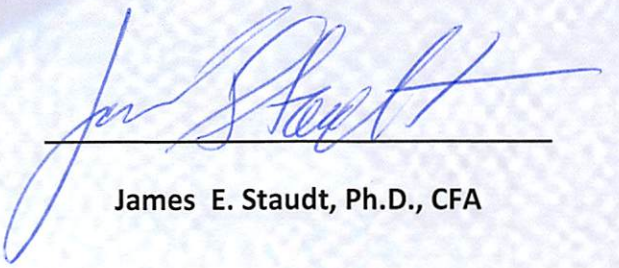
April 15, 2019



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Purpose

The purpose of this effort is to estimate annual operating costs associated with the Mercury and Air Toxic Standards (MATS). In effect, what the impact would be in terms of operating costs if MATS was rescinded. These operating costs include:

1. Operating and maintenance costs associated with Activated Carbon Injection (ACI) – this includes the cost of activated carbon as well as any energy used for the systems, waste disposal and maintenance costs.
2. Operating and maintenance costs associated with Dry Sorbent Injection (DSI) - this includes the cost of lime or trona as well as any energy used for the systems, waste disposal and maintenance costs.
3. Operating and maintenance costs associated with chemical injection – this would include the costs associated with bromine (or other oxidizing chemicals) as well as chemicals used to control reemission of mercury in wet scrubbers
4. Operating and maintenance costs associated with monitoring Hg and HCl

Although there were some scrubber and Electrostatic Precipitator (ESP) upgrades performed for MATS, these generally do not result in an increase in operating or maintenance costs. Also, any fabric filter retrofits performed for MATS (which were few in number) cannot be "undone". Therefore, rescinding the MATS rule will not make a change in the operating costs for those units that retrofit fabric filters in response to MATS.

This methodology will estimate the costs that were incurred in 2018 as that is the last full year of operating data. This update is important for a number of reasons.

1. The complexion of the coal utility fleet has changed substantially over the past few years, as many units, particularly unscrubbed units, have been retired. This impacts the need for consumables such as activated carbon which is used mostly on unscrubbed boilers.
2. Those facilities that have continued to operate are often operating at a lower capacity factor than they were a few years ago, which also impacts the operating costs.
3. There is more data available on the operation of air pollution control and monitoring technologies than there was during the previous estimate, making current estimates more accurate and reflective of actual costs being incurred.

In this effort the operating costs will be built up from a "bottom up" approach. This is done by looking at the total installations of various technologies and determining the associated operating cost. This approach will not examine any costs associated with changes in the fleet fuel mix that might be attributable to MATS. First, as determined by the Department of Energy, the primary reason for the increased use of natural gas versus coal was sustained low natural gas prices.[1] As a result MATS had a very small impact on decisions to increase use of natural gas for power generation. Another impact

[1] United States Department of Energy, "Staff Report to the Secretary on Electricity Markets and Reliability", August 2017, pg 13.

that is not explored here is the effect of MATS retirements. While there were a substantial number of coal retirements during the time period leading up to the MATS compliance dates and even coincident with MATS dates, most of these facilities were uneconomical even without MATS, in part due to the competition from natural gas and other generating technologies, and were destined for retirement.

Also, in examining the impact of MATS versus state rules requiring mercury control it was determined that only those facilities that did not already have state rules in place would be impacted with regard to mercury monitoring and controls in the event MATS were rescinded. On the other hand, these facilities would be impacted with respect to other MATS emissions requirements.

Finally, some facilities use more capital intensive technologies, such as capture membranes, that have low operating costs. These facilities are also relatively few in number. Because of the small numbers and the low operating costs associated with these technologies, they will not be addressed in this study.

The US Environmental Protection Agency's 2018 Air Markets Program Data (AMPD) was used to determine the pollution controls installed, the level of generation, the capacity,[2] the number of units and the number of chimneys.[3] This is shown in Table 1. For unscrubbed facilities, it was assumed that these facilities had ACI for mercury controls even if no mercury controls were reported. Also, if DSI was reported for a facility that also had a scrubber, it was assumed that the DSI system was for SO3 rather than HCl because the scrubbers were adequate for HCl compliance (below 0.20 lb/MMBtu SO2). Besides, these are few in number and will not impact the total by much. For the purpose of this effort the operating costs for mercury controls on facilities in states with mercury rules that predate MATS and would stay regardless of rescinding of MATS are shown, but are subtracted from the costs that would be saved in the event of rescinding of MATS.

Operating and Maintenance Costs Associated with ACI installed for MATS Compliance

Operating costs for ACI include variable operating costs associated with sorbent consumption (VOMR), waste disposal, if needed (VOMW), power consumption (VOMP) and fixed operating and maintenance costs (FOM). Variable operating costs for sorbent consumption for any application will vary based upon the conditions. Table 2 shows estimated VOMR for activated carbon for a range of applications.

The costs therefore range from about 0.10 mill/kWh to about 1.0 mill/kWh. The most costly conditions are those where there is SO_3 conditioning or high sulfur coal. These, fortunately, are not the most common situations. The more common situations utilize lower treatment rates, resulting in costs on the order of 0.30 to 0.70 mills/kWh or less.

Variable operating costs will also include disposal costs for waste. Activated carbon will increase the amount of fly ash that must be disposed of. In many cases it does not adversely impact fly ash sales because suppliers have developed "concrete friendly" carbons and are also able to utilize much lower treatment rates than in the past. Trends have been for increases in fly ash utilization, despite more

[2] Capacity in MW was estimated as dividing the reported rated heat input in MMBtu/hr by 10.5 (assuming a heat rate of 10.5 million Btu/MWhr

[3] Because of common chimneys at some plants, there are fewer chimneys than electric generating units.

widespread use of activated carbon. In fact, in 2017 64% of coal combustion products (CCPs) were reutilized, a record.[4] If fly ash is sold, there is no waste impact. If fly ash is disposed ofit will increase the cost of disposal in proportion to the carbon used. If disposal cost is $50/ton ($0.025/lb) and carbon costs around $1/lb, disposal cost is roughly 2.5% of the cost of purchasing the carbon. In light of the increased utilization of fly ash that will mitigate the likelihood of disposal, this assumption is a conservative one.

Table 1. Control Technologies

	MW rating	# of chimneys	# of units	Total MWh
No State Hg Rules (total)	**244,150**	**387**	**438**	**1,001,117,603**
ACI	5,475	13	14	12,407,787
ACI	18,668	37	38	82,057,285
ACI DSI	6,829	8	9	29,613,640
FF	3,949	8	16	16,282,022
FF PAC	10,067	17	17	44,922,314
FF PAC DSI	1,792	3	3	9,417,212
Scrubber, ESP no ACI	67,893	87	106	247,908,135
Scrubber, ESP ACI	15,555	24	24	71,234,233
Scrubber, ESP, ACI, DSI	447	1	1	1,373,206
Scrubber, FF no ACI	67,137	115	127	275,712,012
Scrubber, FF ACI	42,796	66	73	204,409,791
Scrubber, FF, ACI, DSI	741	2	2	3,128,205
HS ACI	446	2	3	742,376
HS ACI	637	1	1	979,761
HS ACI FF	813	1	1	427,082
HS ACI FF	906	2	3	502,544
State Hg Rules (total)	**61,169**	**116**	**125**	**215,058,853**
ACI	4,408	10	12	14,118,051
ACI	5,771	14	15	17,339,033
ACI DSI	3,571	5	8	10,480,991
FF	1,197	7	8	3,632,220
FF PAC	250	1	1	103,496
FF PAC DSI	751	2	2	2,753,440
Scrubber, ESP no ACI	18,329	28	33	71,270,330
Scrubber, ESP ACI	6,577	9	11	18,187,734
Scrubber, FF no ACI	7,781	22	17	19,946,891
Scrubber, FF ACI	11,881	16	16	55,786,497
HS ACI	274	1	1	465,408
HS ACI	380	1	1	974,763
Grand Total	**305,319**	**503**	**563**	**1,216,176,456**

[4] American Coal Ash Association, "Coal Ash Recycling Reaches Record 64 Percent Amid Shifting Production and Use Patterns", November 13, 2018, https://www.acaa-usa.org/Portals/9/Files/PDFs/Coal-Ash-Production-and-Use-2017.pdf

Table 2. The variable operating cost of sorbent for current, state of the art, commercial carbons.[5]

Coal-Fired Site	Product	AQCS	Fuel	DSI	FGC	% Removal Hg	mill/Kwh
1	DARCO® Hg-LH EXTRA SP	SCR/FF	Low Chlorine Subbit.	None	None	94	0.086
2	DARCO® Hg-LH EXTRA SP	CS-ESP	Local W.Subbit	None	None	80	0.222
3	DARCO® Hg-LH EXTRA SP	CS-ESP	Local W.Subbit	None	None	80	0.244
4	DARCO® Hg-LH EXTRA SP	CS-ESP	Low Chlorine Subbit.	None	None	87	0.328
5	DARCO® Hg-LH EXTRA TR	CS-ESP/wFGD	High Sulfur Bit.	Calcium-based	None	82	0.375
6	DARCO® Hg-LH EXTRA TR	CS-ESP	PRB/Bit. Blend	Sodium-based	None	88	0.663
7	DARCO® Hg EXTRA	CS-ESP	Low Chlorine Subbit.	None	SO_3 (6ppm)	90	0.789
8	DARCO® Hg-LH EXTRA SR	CS-ESP	PRB	None	SO_3 (7ppm)	90	0.872
9	DARCO® Hg EXTRA SR	SNCR/ESP/wFGD	High Sulfur Bit.	None	None	96	0.980

Other variable operating costs include energy, estimated as about $0.01/MWh from the Sargent & Lundy memo on mercury control. [6]

Fixed operating costs for operation and maintenance are estimated at 1.4% of capital cost, including overhead, per the Sargent & Lundy memo. ACI capital costs are assumed to be $15/kW on average.

Using these factors and the information in Table 1, the costs for operating ACI systems are shown in Table 3. This is a significant drop from what was estimated only about two years ago. The reason is twofold. First, generation levels for facilities that are equipped with ACI are much lower than they were. Second, facility owners and mercury sorbent suppliers have optimized their operation and sorbent products to reduce the amount of material that is needed.

Table 3: Estimated operating costs for ACI systems

	VOMR	VOMW	VOMP	FOM	Total
ACI in States without Hg Rules	$99,757,000	$2,494,000	$4,729,000	$22,666,000	$129,646,000
ACI in states with Hg rules	$29,897,000	$746,000	$1,239,000	$7,364,000	$39,246,000
Total	$129,654,000	$3,240,000	$5,968,000	$30,030,000	$168,892,000

Operating and Maintenance Costs for DSI Systems installed for MATS compliance

DSI systems potentially include trona as well as lime injection systems. VOMR is estimated by assuming roughly 2 lb of lime or trona reagent per lb of total acid gas (using SO_2 since it is usually present in much larger quantities than HCl), an average 0.50lb SO_2/MMBtu coal[7], average heat rate of 10,500 Btu/kWh,

[5] Fessenden, J., Satterfield, J., "Cost Effective Reduction of Mercury Using Powder Activated Carbon Injection", March 2, 2017

[6] Sargent & Lundy, "IPM Model – Updates to Cost and Performance for APC Technologies Mercury Control Cost Development Methodology Final", March 2013, Project 12847-002, Systems Research and Applications Corporation

[7] The average weighted outlet SO_2 emission rate for DSI equipped units was 0.20 lb/MMBtu. Assuming an average SO_2 capture rate of 60% (about midway between 50% and 70% - the typical rates for ESP or FF equipped units, respectively) results in and uncontrolled rate of 0.50 lb/MMBtu

and a cost of hydrated lime or trona equal to $150/short ton. [8] It should be noted that for units that fire coal from the Powder River Basin (PRB), the lime or trona consumption would be much less and in many cases no lime or trona would be necessary to be added – the DSI system is added primarily as a precaution.

Variable operating costs will also include disposal costs for waste. DSI will increase the amount of fly ash that must be disposed of. Generally, it does not adversely impact fly ash sales because the most commonly used reagent is lime, which will generally improve fly ash marketability. If fly ash is disposed of, it will increase the cost of disposal in proportion to the lime used. Disposal cost is estimated at $50/ton. Since 64% or more of the industry's coal ash is recycled, it is reasonable to assume that 36% of the facilities already need to dispose of waste.

Other variable operating costs include energy, estimated as about $0.39/MWh from the Sargent & Lundy memo on DSI. [9]

Fixed operating costs for operation and maintenance are estimated at 1.4% of capital cost, including overhead, per the Sargent & Lundy memo. The Sargent & Lundy memo includes two additional operators for a DSI system, which would increase operating costs from what is assumed. This is not correct. DSI systems are simple systems that do not require additional operators. In any event, the impact of this is small compared to the VOMR.

Using these factors, the estimated costs for operating DSI systems is shown in Table 4

Table 4. Estimated operating costs for DSI systems

	VOMR	VOMW	VOMP	FOM	Total
DSI operating costs	$16,600,000	$5,608,000	$21,604,000	$4,789,000	$53,812,000

This is lower than previously estimated, largely because the previous estimate was based upon an assumed SO_2 rate that turned out to be far too high as most DSI systems are in fact on lower sulfur coal units. Other factors include lower generation rates and retirements.

Operating and Maintenance Costs for Other technologies installed for MATS compliance

Chemical additives for Hg compliance add operating cost. Hg oxidation and scrubber additives for mercury control were estimated in the 2015 ICAC Market forecast[10] to be in the range of $80-$100 million for the years 2018-2019. It was estimated at a cost of $90 million per year. On the other hand,

[8] Treatment rate from: Fitzgerald, H., "Hydrated Lime DSI - Solution for Acid Gas Control (SO3, HCl, and HF)", MARAMA /ICAC SO2/HCl CONTROL TECHNOLOGIES WEBINAR, July 19, 2012
Also, USGS 2018 Minerals Commodity Summary , shows 2018 cost of lime hydrate of $150/metric ton, or about $135 per short ton. $150/short ton is than assumed in this evaluation. Trona had similar costs.

[9] Sargent & Lundy, "IPM Model – Updates to Cost and Performance for APC Technologies, Dry Sorbent Injection for SO2 Control Cost Development Methodology – Final", March 2013, Project 12847-002, Systems Research and Applications Corporation

[10] Institute of Clean Air Companies, 2015 Annual Market Study, pp 19-20

this needs to be adjusted for revised generation levels versus the assumptions used at that time. In that previous estimate a total coal generation level of about 1 billion MWh[11] was assumed for units with wet FGD, versus 728 million MWh actually experienced on units with wet FGD systems 2018. Therefore, the $90 million value previously assumed is adjusted for the lower generation to about $66 million, shown in Table 5. This is distributed between those states with state rules versus those without on the basis of generation with wet FGD in those states.

Table 5. Operating costs for Chemical Addition

States without Hg rules	$52,858,000
States with Hg rules	$12,675,000
Total	$65,533,000

Operating and Maintenance Costs of Hg CEMS

Operating costs of Hg CEMS include the labor and materials for operating and maintaining the equipment as well as the cost of Relative Accuracy Test Audits and other compliance requirements of the CEMS. This was estimated as roughly $40,000 per year[12] and with 387 chimneys in states without Hg rules and 116 chimneys in states with Hg rules. This results in costs of shown in Table 6. The $40,000/year estimate is lower than previous estimates and is based upon more recent, published information.

Table 6. Operating costs for Hg CEMS

States without Hg rules	$15,480,000
States with Hg rules	$4,640,000
Total	$20,120,000

[11] 998,749,500 MWh, this was taken from Andover Technology Partners' proprietary model which assumed a 70% capacity factor.

[12] Estimated from slide 20 Wilber, K., "EGU MATS Compliance - Hg CEM Systems Challenges and Opportunities", Electric Utility and Energy Confernce, February 16-18, 2015, San Diego

Operating and Maintenance Costs of HCl monitoring

Scrubbed units for the most part can demonstrate compliance with the HCl requirements of MATS maintaining adequately low SO_2 emission rates. Therefore, for most scrubbed units there is no additional monitoring need for HCl. There are 133 chimneys on unscrubbed units. Most facilities will comply through periodic stack tests with EPA Method 26A. Since, like a PM test it is an extractive sample, this is estimated to cost in the same range as a PM stack test (which is also performed quarterly at an estimated price of $8500/time[13] or $34,000 per year). This equates to $4.5 million per year in total as shown in Table 7.

Table 7. Operating and Maintenance costs of HCl Monitoring

Total	4,522,000

Operating costs associated with increased PM measurement frequency

For those facilities that do not already have a PM CEMS due to Consent Decree or other requirement, facilities have had to increase PM measurement frequency to quarterly measurements as a result of MATS. Some facilities may already have quarterly measurement requirements that are imposed by the state. Others may only have annual requirements. It is not possible to determine the incremental cost of increased PM measurement due to MATS frequency industrywide because of the use of PM CEMS under Consent Decrees and other factors. However, like Hg and HCl measurement costs, it will be substantially less than the cost of controls.

Total possible cost savings industrywide in the event of MATS being rescinded

Total annual operating costs for all MATS technologies that would be reduced or eliminated in the event MATS was rescinded are shown in Table 8. These do not include those costs associated with mercury controls and monitoring in those states that have Hg rules that predated MATS and would stay in effect regardless of whether or not MATS was rescinded. As shown, the total impact is on the order of $203 million. It is true that this does not account for the cost associated with PM or non-mercury metals measurements. However, these should be small compared to the $203 million for other costs. The impact on generation costs nationwide would average only about $0.17/MWh for energy generated by coal-fired power plants, which accounts for less than one-third of all generation.[14]

[13] $8500 per quarter, from https://www.powermag.com/simplify-mats-compliance-particulate-matter-continuous-emission-monitors/?printmode=1

[14] In 2018 total generation from coal was only 27.4% of total generation https://www.eia.gov/tools/faqs/faq.php?id=427&t=3

Table 8. Total Annual Operating Costs for MATS technologies.

ACI in States without Hg Rules	$129,646,000
DSI	$53,812,000
Hg CEMS (no state rules)	$15,480,000
HCl	$4,522,000
Scrubber Chemicals (no state Hg rules)	$52,858,345
Total incremental cost of MATS	$203,460,000
Total 2018 MWh gross – all electric utility coal units	1,216,176,456*
$/MWh gross savings	$0.17*
Note: Not included in the above are mercury control and monitoring costs in states with pre-existing mercury rules that would remain in effect regardless of MATS * Net generation from coal in 2018 is reported as 1,146,000,000 MWh, which would result in a cost of $0.18/MWh.	