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July 7, 2023

David Putney
Sector Policies and Programs Division (D243–02)
Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency
Research Triangle Park, NC 27711

RE: National Emission Standards for Hazardous Air Pollutants (NESHAP): Taconite Iron Ore Processing Amendments; Proposed Rule (88 FR 30917); Docket No: EPA–HQ–OAR–2017–0664

Dear Mr. Putney:

The American Iron and Steel Institute (AISI), representing Cleveland-Cliffs Inc., jointly submits these comments on the proposed Taconite Ore Processing Amendments with the United States Steel Corporation. AISI serves as the voice of the American steel industry in the public policy arena and advances the case for steel in the marketplace as the preferred material of choice. AISI also plays a leading role in the development and application of new steels and steelmaking technology. AISI is comprised of member companies, including electric arc furnace steelmakers and integrated steelmakers, and associate members who are suppliers to, or customers of, the steel industry.

In summary of the major points, EPA should take the following procedural steps and revise its proposal before issuing any final rule:

- EPA is required to submit this proposal to the Office of Management and Budget's Office of Information and Regulatory Affairs (OMB/OIRA) for review. This is a major rule as it will adversely affect in a material way a significant sector of the economy, competition, and jobs (among other things) and it also raises novel legal and policy issues that warrant OMB/OIRA review. EPA's estimations are dramatically low and need to be revised (which would bring the costs of the review well above the $100M threshold for mandatory OMB review). Even if the costs were below the threshold, the impact to this industry is such that OMB review is warranted.

- In consideration of the existing low-risk to human health and the environment, the minimal potential to reduce emissions, and the unprecedented costs associated with implementing

this proposed rule, EPA should avoid this outcome and finalize standards for mercury that are consistent with congressional intent.

- While we believe that EPA has sufficient justification and authority to not finalize the proposed mercury standards in this NESHAP, if EPA does decide to proceed, then EPA must address procedural and technical concerns associated with its MACT standard setting procedures further described in our comment letter. EPA should not proceed with its proposed mercury standard, which was derived by placing all indurating furnaces in a single source category (without subcategorization) and calculating "best performing" sources based on emissions from furnaces fed by low-mercury ore, not as a function of the control technology utilized. Instead, EPA must use the available discretion (in many steps of the standard-setting process as described in our comment letter) to develop a mercury standard that accounts for unique characteristics of the taconite iron ore source category, specifically the naturally occurring mercury variability of the ore – both between mines and even within a given mine. Any such action needs to include the legally permissible and technically-justified alternative standard-setting options explained in these comments.

- In assessing the proposed mercury standard, EPA must consider the implications of the actual anticipated costs of these actions. For some emission units, if the proposal were to be finalized as is, the cost would exceed **$5 billion per ton of mercury removed, which is effectively about $2.6 million *per pound***. This exceeds the cost of any Section 112 rule that research conducted by AISI found in its research preparing these comments. Even using *EPA's* unrealistically low assessment of the proposal's costs the proposal cannot be justified under the provisions of Section 112(d). Additionally, EPA conducted no analysis of potential benefits and failed to conduct an appropriate analysis of the economic impacts on the taconite mining facilities affected—instead arbitrarily focusing on impacts to the global sales revenue of the parent companies.

- EPA should not finalize any of its proposed standards for acid gases because no technology developments warrant amendments to the current standards applicable to those HAPs. First, acid gas standards are not compelled by the *LEAN* decision and EPA has not shown what technological developments have occurred since 2003 that would lower emissions of acid gases. Second, the proposal grossly underestimates compliance costs and therefore does not consider the *actual* compliance costs, which is a critical element of a Section 112(d)(6) technology review.

- EPA should seek an extension of the currently agreed upon deadline to issue the final rule because this deadline was negotiated with litigants without adequate consideration of the time required to finalize a rulemaking that addresses *LEAN*. If litigants will not agree to a time frame that is consistent with EPA conducting an adequate analysis of the extensive information that has been submitted and is being submitted in this rulemaking, EPA has an obligation to go to the court on its own and seek appropriate time.

AISI appreciates your serious consideration of these comments on EPA's proposed rule. This rulemaking is critically important to both the taconite iron ore processors and the North American

steel companies that they supply. If you have any questions or would like to discuss these comments, please do not hesitate to contact me at 202.452.7122.

Sincerely,

Paul Balserak
Vice President, Environment

cc: Joseph Goffman
Peter Tsirigotis
Steve Fruh
Chuck French

COMMENTS OF THE

AMERICAN IRON AND STEEL INSTITUTE

AND

UNITED STATES STEEL CORPORATION

Comments on
National Emission Standards for Hazardous Air Pollutants:
Taconite Iron Ore Processing Amendments; Proposed Rule

88 Fed. Reg. 30,917 (May 15, 2023)

Docket No. EPA-HQ-OAR-2017-0664

SUBMITTED JULY 7, 2023

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INTRODUCTION

The American Iron and Steel Institute (representing Cleveland-Cliffs Inc.) and the United States Steel Corporation (jointly, Industry Commenters) submit these comments on the U.S. Environmental Protection Agency's (EPA) proposed rule to revise the National Emissions Standards for Hazardous Air Pollutants for the Taconite Iron Ore Processing Source Category.[1]

In evaluating a regulatory proposal by any federal agency, it is important to place the rulemaking in context—to understand what the regulated entities do and why they do it. This source category is a prime example of the need for such a frame of reference since the importance of taconite may not be obvious to regulators and the public. Taconite is a product that is critical and absolutely necessary to the production of integrated iron and steel manufacturing in the United States, a sector that has been shown to be essential to the nation. It:

- Provides over $520 billion in economic output, supporting over 2 million jobs.
- Increases by $2.66 the total output of the U.S. economy for every $1 increase in sales from iron and steel mills.
- Generates over $56 billion in tax revenues annually, which go back into federal infrastructure and local communities.
- Has been determined to be ***essential for national security*** *(*and such security being dependent on a healthy and competitive domestic steel industry*)*.[2]

The iron and steel industry is a core critical infrastructure industry impacting transportation systems, electric power grid, water systems, and energy generation systems. (See https://www.cisa.gov/topics/critical-infrastructure-security-and-resilience/critical-infrastructure-sectors/critical-manufacturing-sector

EPA promulgated its Residual Risk and Technology Review (RTR) for this source category with a finding that residual risks remaining after implementation of the original NESHAP were *well below* acceptable levels. This finding is important because EPA included in its risk assessment conservative assumptions both in terms of the emission levels[3] of the pollutants EPA now proposes

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[1] EPA, *National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing Amendments*, Proposed Rule, 88 Fed. Reg. 30,917 (May 15, 2023).

[2] In a study conducted under Section 232 of the Trade Expansion Act of 1962 (19 U.S.C. §1862), the U.S. Department of Commerce determined that *domestic steel production is essential for national security and that domestic steel production depends on a healthy and competitive U.S. industry***.** *See* https://www.bis.doc.gov/index.php/other-areas/office-of-technology-evaluation-ote/section-232-investigations (emphasis added).

[3] For example, EPA assumed mercury speciation of 93 percent elemental mercury and 7 percent divalent mercury for emissions from pellet indurating furnaces and ore drying sources but assumed 80 percent elemental mercury and 20 percent divalent mercury for ore crushing and handling, pellet handling, and fugitive dust emission control plan sources, which skewed risk estimates high. Acknowledging this issue, EPA concluded that it would not redo the risk analysis "[b]ecause any re-analysis would not have a significant impact on the risk estimates and [EPA's] conclusions

to regulate (or to regulate more stringently) and in terms of the exposure of individuals to any such risks.[4] Specifically, EPA found that "since the current NESHAP results in low risk to human health (cancer risk of 2-in-1-million (actual emissions) and 5-in-1-million (revised allowable emissions), noncancer HI [Hazard Index] below 1 (actual and allowable emissions) for this source category," additional controls were not cost-effective and should not be promulgated as new requirements.[5]

The current proposal states that the amendments to regulate mercury are to "ensure that all [HAP] emissions … from sources in the source category are regulated" and to "revise the existing emission standards for [HCl] and [HF]."[6] Again, context is important. The fundamental conclusion that the source category's risk is significantly below the risk levels EPA has deemed acceptable for industries across the United States remains in place.[7] First, EPA's conservative risk estimate based on actual emissions has changed to 5-in-1-million[8] (again, while low, the small risk presented is driven by arsenic, nickel, and beryllium, and, notably, not mercury or acid gases) and the actual emissions target-organ-specific hazard index (TOSHI) has been reduced to 0.1 and the Hazard Index (HI) remains at acceptable levels.[9]

As EPA conducts its evaluation of what changes to the regulations, *if any*, might be appropriate (or permissible), it is important that the risk levels and the conclusions of the ample margin of safety (AMOS) analysis be borne in mind and *factored into* how EPA addresses any obligations under the *LEAN v. EPA* case and any additional, discretionary revisions EPA decides to implement.

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that the risks posed after implementation of the MACT are acceptable and that no revisions are necessary to provide an ample margin of safety …". Response to Public Comments, Taconite Iron Ore Processing NESHAP at 15.

[4] As with other RTRs, EPA used "a health-protective assumption of a 70-year exposure duration, in which populations are conservatively presumed to be exposed to airborne concentrations at their residence continuously, 24 hours per day for a full lifetime, including childhood." *Id.* at 27. In addition, "unit risk estimates for HAP [were] considered a plausible upper-bound estimate with an appropriate age-dependent adjustment factor; actual potency is likely to be lower and some of which *could be as low as zero*." *Id.* (emphasis added).

[5] *Id.* at 37.

[6] *Id.*

[7] EPA has slightly revised these risk estimates, but no meaningful change has occurred.

[8] EPA, Memorandum re Taconite Iron Ore Processing RTR Docket EPA-HQ-OAR-2017-0664 at Table 2 – Comparison of Taconite Iron Ore Processing Source Category Baseline Inhalation Risk Assessment Results from the 7/28/20 Final Rule to the 2023 Updated Results, EPA-HQ-OAR-2017-0664-0261 (Mar. 9, 2023).

[9] *Id*. (explaining that mercury is *not* a risk driver in this estimate).

EXECUTIVE SUMMARY

Industry Commenters explain in detail the technical and legal support for their comments below. In summary of the major points, EPA should make the following changes to its proposal and take the following procedural steps before issuing any final rule:

- EPA is required to submit this proposal to the Office of Management and Budget's Office of Information and Regulatory Affairs (OMB/OIRA) for review. This is a major rule as it will adversely affect in a material way a significant sector of the economy, competition, and jobs (among other things) and it raises novel legal and policy issues that warrant OMB/OIRA review.[10] We note that EPA has estimated the economic impacts of the proposal at less than $100 million annually such that it would avoid OMB review based on that criterion. As discussed below, EPA's estimations are dramatically low and need to be revised (which would bring the costs of the rule into the range of an economically significant rule under the executive order). Even if the costs were below the threshold, the impact to this industry is such that OMB review is warranted.

- EPA should seek an extension of the currently agreed-upon deadline to issue the final rule from the court because this deadline was negotiated with litigants without adequate consideration of the time required to finalize a rulemaking that addresses *LEAN*. If litigants will not agree to a time frame that is consistent with EPA conducting an adequate analysis of the extensive information that has been submitted and is being submitted in this rulemaking, EPA has an obligation to go to the court on its own and seek appropriate time.

- In addition to seeking appropriate time to ensure the agency conducts reasoned decision-making, any final rule needs to be limited to the "gap-filling" for mercury necessary to address the *LEAN* decision and should not include other elements, such as revisions to existing standards that already address acid gases, particularly if the rule is to be finalized before mid-2024 (much less the currently scheduled date of November 2023) as EPA currently plans. The acid gas proposal is not required by *LEAN*. Even if EPA does not state definitively that it is withdrawing the acid gases proposed limits, EPA should at least defer action on the acid gas elements of the proposal because they are discretionary under the *LEAN* decision (and on any other discretionary new requirements).

- EPA should not finalize the proposed mercury standard, which was derived by placing all indurating furnaces in a single source category and class and calculating "best performing" sources based on emissions from furnaces fed by low-mercury ore, not as a result of any control technology being utilized. Instead, EPA must use the available discretion (in many steps of the standard-setting process as explained below) to develop a mercury standard that accounts for unique characteristics of the taconite iron ore source category, specifically the naturally occurring mercury content variability of the ore – both between mines and even within the same mine.

[10] *See* Exec. Order No. 12,866, 3 C.F.R. 638 (1994).

- Any such action needs to include the following legally permissible and technically-justified alternative standard-setting options explained in these comments:
    - Re-evaluation of best-performing *facilities*;
    - Reconsideration of establishment of subcategories (given the 2003 rulemaking conclusions); and
    - Reassessment of add-on control feasibility and cost.

- EPA is not constrained by the statute to finalize mercury standards that are inconsistent with congressional intent. The agency's interpretation of judicial precedent should be revisited and when reexamined, it shows that Congress has not dictated the absurd result the proposal says is compelled here. This rulemaking is the ideal case for correcting the interpretations of the statute that have become conventional, yet unexamined, wisdom that led to the proposal's conclusions. This rule is an opportunity for EPA to course-correct in this regard because:
    - The risk is well below acceptable thresholds;
    - The reductions to be achieved are minimal;
    - The cost of achieving such minimal reductions is beyond what has been imposed in any other context.

  On these facts, EPA should revisit its assumed interpretations and decline to take this step that is inconsistent with congressional directives.

- EPA should not finalize any of its proposed standards for acid gases because no technology developments warrant amendments to the current standards applicable to those HAPs. First, new acid gas standards are not compelled by the *LEAN* decision, and EPA has not shown what technological developments have occurred since 2003 that would support revising the existing limits applicable to these constituents. Second, the proposal grossly underestimates compliance costs and therefore does not consider the *actual* compliance costs, which is a critical element of a Section 112(d)(6) technology review.

- If EPA proceeds with new acid gas standards (which it should not), any final rule limits would need to account for (1) the limited data underlying the calculation of the proposed standards underrepresentation of estimated emissions, (2) non-technology factors impact on emissions through the use of the permissible standard-setting options presented in these comments, and (3) anticipated compliance costs (which need to be revised to be accurate), add-on control efficacy, and technical feasibility. Such an analysis would clearly result in limits that are significantly higher than those proposed.

- Any final rule needs to revise the cost estimates in the proposal to reflect the actual anticipated costs of these actions. For some emission units, if the proposal is finalized, the cost would exceed **$5 billion per ton of mercury removed, which is effectively about $2.6 million *per pound***. This exceeds the cost of any Section 112 rule that research conducted by Industry Commenters found in its research preparing these comments. Even when considering EPA's unrealistically low assessment of the proposal's costs lead to such high removal costs that the proposal cannot be justified under the provisions of Section 112(d).

- The proposal estimates total capital costs of $129 million and total annualized costs of $71 million for the 11 affected furnaces to achieve a combined annual mercury reduction of just over 450 pounds. Even accepting EPA's cost and mercury reduction calculations (which are incorrect), this cost equates to **$154,000 per pound** and over **$308 million per ton** of mercury removed, which is a level far beyond any previous 112 requirement for industrial sources and thus exorbitantly expensive (and unprecedented),[11] given the small amount of mercury reduction and EPA's own prior health risk assessment establishing that the reductions were not necessary to protect human health and welfare. Even the flawed alternative proposal involving emissions averaging includes *per-pound* costs exceeding $105,000—which is more than double the cost-effectiveness values EPA has historically rejected as being unreasonable for beyond-the-floor analyses.

- Industry's more accurate and more realistic facility-specific estimates for total capital costs are six to eight times higher than EPA's estimates, at almost a *billion dollars*. The *per-furnace* capital costs range from $44-$86 million, with annualized costs of $10-$22 million. **For some units, the annual *per-pound* cost to reduce mercury emissions would be over $2.6 million**. With an overall annual **per-pound mercury removal cost of $400,000**, the cost-effectiveness for this particular MACT is truly unprecedented and above any known such cost (especially when considering EPA's determination of low and acceptable risk and finding of an ample margin of safety even when using extremely conservative upper-end estimates). Indeed, the mercury costs are unreasonable even compared with the Mercury and Air Toxics Standard that was struck down by the U.S. Supreme Court, which had costs of $240,000 per pound ($480 million per ton). Similarly, in the Brick and Structural Clay Products NESHAP, the cost was $156,000 per ton for 20 tons of mercury reduction.

- **Here, even with EPA's estimates, the rule would impose $71 million in annual costs for less than 500 *lbs*. (not tons) of mercury reduction, in a source category that EPA has confirmed is well below acceptable risk levels. With the calculations that correct EPA's error in the emissions baseline, the reductions would be about 242 lbs. of mercury for $185 million. That cannot be justified.**

- Finally, EPA conducted no analysis of potential benefits and failed to conduct an appropriate analysis of the economic impacts on the taconite mining facilities affected—instead arbitrarily focusing on impacts to the global sales revenue of the parent companies.

[11] As noted above, Industry Commenters researched recently finalized Section 112 rules and found no rule that even approached the costs EPA proposes to impose on this industry.

I. The Taconite Iron Ore Processing Industry Is Critical to the Success of the United States' Steel Industry, and the American Steel Industry Is Critical to the Economic Vitality of the Country.

The processing of taconite iron ore is necessary to steelmaking. Because heating iron ore in the presence of a reductant yields metallic iron, iron ore is the source of primary iron for the world's iron and steel industries. According to the U.S. National Minerals Information Center, the domestic production of iron ore is essential for the economical production of steel in this country, which, in turn, is essential to maintain a strong industrial base.[12]

The importance of these integrated industries is demonstrated by the fact that almost all (98%) iron ore is used in steelmaking.[13] Moreover, the United States considers steelmaking so vital to our economy and national security that the Defense Logistics Agency (within the Department of Defense) maintains secure supplies of strategic and critical materials, like iron ore, in the U.S. National Defense Stockpile. The 2020 report of the National Minerals Information Center highlighted that in fiscal year 2019 alone, Defense Logistics Agency Strategic Materials acquired nearly $15 million of new stock for the National Defense Stockpile, and, at the end of that year, the minerals stored, including iron ore, were valued at over $1 billion, indicating how vital the domestic supply of key minerals is to national security.[14]

Of course, it is not surprising that steelmaking has been designated by the U.S. Government as a key component of our national defense and critical infrastructure. The industry provides essential inputs to numerous domestic economic sectors, including automobiles (including components for electric vehicles with recent advances in lighter weight steel), farm equipment, household appliances, food packaging, many types of buildings, including homes, and highway construction.[15]

Additionally, the American steel industry is the cleanest and most energy-efficient of the leading steel industries in the world.[16] Of the nine major steel-producing countries, steel production in the U.S. has the lowest energy usage and embodied CO_2 emissions per ton of steel produced.[17]

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[12] U.S. Department of Interior and U.S. Geological Survey, *Mineral Commodity Summaries 2018* at 88 (2018), available at https://tinyurl.com/3sc9skp9.

[13] Tuck, C., *Iron Ore Statistics and Information,* National Minerals Information Center, available at https://tinyurl.com/ywr4uak3 (last visited June 29, 2023).

[14] *See supra* at 6, n.10 (explaining that, pursuant to the Defense Production Act of 1950, the U.S. Geological Survey advises the DLA on its acquisition and storage of these essential minerals for the national security of the country. *Id.*

[15] *See, e.g.*, Congressional Research Service, *Domestic Steel Manufacturing: Overview and Prospects* (May 17, 2022), available at https://tinyurl.com/47ccbwsh.

[16] AISI Sustainability Fact Sheet; *see also* www.steel.org for additional information on the sustainability initiatives of the steel industry.

[17] Hasanbeigi, "Steel Climate Impact: An International Benchmarking of Energy and CO_2 Intensities," Global Efficiency Intelligence (2022).

The taconite industry is an important reason for the industry's comparative success in this regard over other countries.[18]

The taconite iron ore processing industry has significant national importance with the steel industry being at the core of critical American manufacturing sectors. The taconite industry is also a vital part of state and local economies. Currently providing direct employment for approximately 5,000 U.S.-based personnel, the taconite industry is an important driver of the regional economy where taconite ore processing facilities are located, along the Mesabi Iron Range in Minnesota and the Marquette Iron Range in the Upper Peninsula of Michigan. Beyond direct employment, the industry creates a significant secondary economy in the areas where the plants operate. Indeed, the taconite iron ore processing industry provides benefits to the local economies in these regions that otherwise face high unemployment rates for their relatively low populations. Taconite ore production also yields significant economic contributions to the states in which these facilities operate through various taxes and royalty payments. The industry supports both direct and indirect jobs, allowing a substantial number of American families facing challenging economic circumstances, who may even be living below the poverty line, to improve their prosperity and health by obtaining good-paying jobs to support their needs. Local communities thrive due to taconite ore processing facilities.

As highlighted at a February 23, 2023 congressional hearing on "Dependence on Foreign Adversaries: America's Critical Minerals Crisis," producing taconite domestically is important to local economics, gross domestic product, and national defense:

> An interesting thing that I think we fail to take into account all the time is the mining in northern Minnesota is huge for that area. But when that taconite is shipped off to the refineries, there is a value added part to that. And then, if that steel out of those refineries goes into automobile manufacturing or building construction, there is even more value added to that.

… [W]e produce about $90 or $120 billion worth of raw materials through recycling and mining in the United States, that when that gets processed, it becomes a value of about $900 billion, but when that process material gets manufactured, it adds about $3.6 trillion to the U.S. GDP. And this is about much more than mining, it is about national security, it is about supply chains, but it is also about creating incredible jobs for union workers and non-union workers alike, and being able to grow our economy and prosper here. But it starts with mining. If you don't have the raw materials, you can't do the other part of it.[19]

[18] *See, e.g.*, *supra* at 88, n.10 ("The United States was estimated to have produced 1.8% and consumed 1.4% of the world's iron ore output.")

[19] U.S. Congress, Hearing of the House Subcommittee on Oversight and Investigations, Committee on Natural Resources, "Dependence on Foreign Adversaries: America's Critical Minerals Crisis" Statement of Westerman, B., Chairman, at 41, (Feb. 9, 2023) available at https://tinyurl.com/4r6tmbcx (last visited June 29, 2023) (emphasis added).

With respect to the role of the taconite industry in addressing climate change, which has been highlighted as a national security issue, a witness at the House hearing explained:

> [I]f you want the lightweight steels that are needed for cars, for tank armor, those types of things, we need to have mining capabilities in the United States to produce it. And, of course, [Minnesota] produces most of our [ore to make steel] from taconite mines.[20]

These joint comments represent the entirety of the taconite iron ore processors in the United States. Seven taconite mines exist in the United States. They are operated by two companies and are supported by dozens of AISI represented associate members. AISI members include both integrated and electric arc furnace steel producers, as well as associate members who are suppliers to or customers of the steel industry. AISI serves as the voice of the American steel industry in the public policy arena and advances the case for steel in the marketplace as the material of choice. AISI also plays a lead role in the development and application of new steels and steelmaking technology. U. S. Steel is a leading steel manufacturer which operates two domestic taconite iron ore processing facilities. For more than 100 years, U. S. Steel Corporation has been a vital part of America's history, security, and infrastructure. With sustainability being a main driver, American steel producers have worked successfully to reduce their environmental footprint even while producing the high-quality, advanced, and highly recyclable steel that the U.S. economy requires.

The Biden administration's support for Buy American policies and its actions to strengthen and secure critical supply chains in the U.S. show recognition of the need for a government partnership with the steel industry that promotes economic growth while also preserving and protecting public health and our shared environment.[21] This is entirely consistent with the goals of the Clean Air Act, as reflected in Section 101(b)(1) to "protect and enhance our nation's air resources" while "promot[ing] the productive capacity" of the nation.[22] To that end, we urge EPA to work with other agencies and the Office of the President to ensure a cohesive strategy among all federal agencies to promote and support the taconite mining and steel industries with reasonable policies and regulation that ensure continued vitality of these essential operations. This is particularly important given the sheer number, and the economic implications, of a host of regulations being brought to bear simultaneously on the taconite iron ore industry and the steel industry as well.[23]

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[20] *Id.* at 55 (Statement of Moats, M., Prof. and Dept. Chair, Materials Science and Engineering, Missouri University of Science and Technology).

[21] *See* The White House, *FACT SHEET: Biden-Harris Administration Delivers on Made in America Commitments* (Mar. 4, 2022), https://tinyurl.com/y2x8xadk.

[22] 42 U.S.C. § 7401(b)(1).

[23] The following rules included in EPA's Spring 2023 regulatory agenda are representative examples of the avalanche of rules impacting the industry in the immediate future: Regional Haze Federal Implementation Plans (FIPs) (Texas, others), continued Regional Haze evaluations for new planning periods, FIP for PM2.5 contingency measures, expected lowering of the PM2.5 NAAQS and associated implications, steel-making RTR and associated rulemaking, decarbonization efforts, EPA's Good Neighbor Plan, Wild Rice sulfate standards, FIP for PM2.5 contingency measures, FIP for Indian Reservations in Idaho, Oregon, Washington, Federal Baseline Water Quality Standards for Indian Reservations, Clean Water Act Section 404 regulation for Tribes and State programs.

As a matter of good government, and to ensure consistent and sound federal policy, we hope that the numerous federal agencies that work to promote the steel industry will be consulted with respect to this regulation given the threat that the proposal poses to industry operations, which as discussed above, are essential to the U.S. economy and the country's defense.

While the Administration has been extremely supportive of steel as both a necessity to our domestic economy and a competitive advantage more broadly, this EPA proposal does not align with the basic principles outlined above. As explained above, the Clean Air Act seeks to improve the country's air resources *and* to promote its productive capacity.[24] Therefore, in interpreting Section 112 and in making choices among permissible interpretations of the statute, EPA needs to consider both of these goals and ensure that any adopted interpretations of the statute are consistent with intended results, from both an emission reduction and economic impact perspective. To the extent that EPA determines that its interpretation of the statute is compelled, yet leads to results that Congress did not contemplate, EPA needs to examine that conclusion carefully to ensure the outcomes are in fact compelled. As EPA is aware, it is ill-advised to jump too easily to the conclusion that the statute compels a result when options are available under the statute to avoid it, even if such options go against historical practice. As in *UARG v. EPA*,[25] when presented with facts that suggest the historic viewpoint is incorrect, EPA needs to re-examine that viewpoint, rather than blindly following past practice.

The best performers are not using the unproven technology that EPA would be mandating. To meet the proposed mercury MACT limit, indurating furnaces would need to be equipped with add-on mercury control technology. None of the 18 indurating furnaces in the United States has ever installed or operated mercury controls and none are available. EPA has suggested that technology could be transferred from other industry sectors to indurating furnaces, but the taconite iron ore processing facilities are unique, and the technology is not necessarily transferrable—especially given that EPA is recommending a combination of not only activated carbon injection controls, which would be challenging enough for a new application, but also high efficiency venturi scrubbers. Even if the controls are installed and function as intended, companies would still have no certainty as to how well the technologies will remove the mercury. Unproven technology and unknown removal efficiencies create real concerns about the cost of achieving

[24] 42 U.S.C. § 7401(b)(1).

[25] In the rulemaking that led to the Supreme Court's decision in *Util Air Reg. Grp v. EPA*, 573 U.S. 302 (2014), when the agency began regulation of GHG emissions, EPA mistakenly believed that it had no choice but to adhere to an interpretation that the Clean Air Act compelled regulation with the absurd result that 6 million facilities would become subject to Title V permitting (as compared with about 14,700 sources then-issued) and that the Prevention of Significant Deterioration (PSD) permitting program would balloon to 41,000 permits per year (when previously only about 280 PSD permits were issued each year). *See EPA,* Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 Fed. Reg. 31,514, 31,535 (June 3, 2010), available at https://www.federalregister.gov/d/2010-11974/p-351 (Tailoring Rule). Commenters on the Tailoring Rule proposal had explained to EPA that it could avoid this extreme result, but EPA rejected these comments, opting instead for an interpretation that created a result that Congress plainly did not intend when it enacted the PSD provisions of the Act—that thousands of plants would trigger PSD permitting when less than a hundred had historically triggered this review annually. As we explain here, EPA can likewise interpret Section 112 in a manner that will avoid results contrary to congressional-intent. We urge EPA to adopt those comments in this rulemaking, rather than pursuing its ill-advised approach, leading to the need to proceed through the courts once again to accept a statutory interpretation that could be accepted now.

compliance and enforcement exposure for failing to achieve what may be unattainable. This is not the program that Congress envisioned. Congress said that existing sources should look to the best technological performers (hence the term MACT) and apply that technology (D.C. Circuit case law notwithstanding). It did not contemplate effectively conducting lab experiments for hundreds of millions of dollars with a "figure it out" mentality. The floor was not just to bring sources that were not installing the industry standard controls up to a minimum level; it was to ensure that the minimum controls were actually proven (and any beyond the floor analysis would then be available to determine if more could reasonably and cost-effectively be done).
Congress certainly never intended for EPA to set limits that would require companies to "just figure it out" at significant cost. Before proceeding, EPA should take into account industry's concerns regarding the technological feasibility of mercury controls and reconsider its proposal accordingly.

II. The Taconite Iron Ore Processing Source Category Has Been Determined Conservatively to Present Low, Acceptable Risk to the Population, and the Existing Rule Provides an Ample Margin of Safety to Protect Public Health.

After conducting a thorough and its typically conservative analysis in 2020 as part of the Taconite Iron Ore Processing Risk and Technology rulemaking (Taconite RTR), EPA made its residual risk assessment based on Congress's direction under Section 112(f) as to acceptable risk levels. EPA concluded that the current emission levels were "*acceptable and the standards provided an ample margin of safety to protect public health*."[26] More specifically, EPA concluded in 2020 that there was "no significant potential for multipathway health effects."[27]

Following receipt of new emissions data from the seven affected taconite processing facilities as part of this rulemaking, EPA has now updated both the 2020 risk inhalation risk analysis and also the multipathway risk assessment. EPA has determined that the risk for this source category "remains well within the range of acceptability," and, importantly, it specifically did "not identif[y] *any* information that would change the ample margin of safety analysis finalized in the 2020 RTR final rule."[28] Indeed, EPA said that based on these results, it was not proposing to change its prior decision from 2020 regarding risk acceptability or ample margin of safety.

A. EPA's findings from the two recent risk analyses confirm that the risks associated with taconite iron ore processing facilities are very low.

EPA has repeatedly found that mercury and acid gases are not risk drivers and that, in any event, the risk is extremely low—*i.e.*, less than five percent of the 100-in-1-million benchmark from the Benzene NESHAP case that Congress adopted in Section 112(f).[29] Specifically, EPA has determined risk from the entire taconite iron ore processing source category to be *substantially*

[26] EPA, *National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing Amendments*, 88 Fed. Reg. 30917, 30,928 (Proposed May 15, 2023).
[27] *Id.*
[28] *Id.* at 30,929 (emphasis added).
[29] 88 Fed. Reg. at 30,928-29 ("Specifically, the maximum individual cancer risk (MIR) based on actual emissions (lifetime) increased from 3-in-1 million to 5-in-1 million (driven by arsenic, beryllium and nickel from fugitive dust sources and indurating furnaces).")

less than 100-in-1 million benchmark (5-in-1-million based on actual emissions and 6-in-1-million based on allowable emissions), with the risk of cancer incidence at 0.002 cases per year (based on actual emissions) and 0.003 cases per year (based on allowable emissions).[30] Out of these figures, it bears nothing that the multi-pathway risk analysis is the only relevant risk assessment for mercury. In its 2020 review, EPA found there was *no significant potential* for multi-pathway effects and found the acute inhalation risk to be *acceptable*. Now, in 2023, EPA has confirmed that "[t]he results of the updated inhalation risk analysis and the updated multipathway risk assessment indicate that the risk for the Taconite Iron Ore Processing source category . . . still remains well within the range of acceptability."[31] To say the least, this is quite an understatement. EPA has found risk to be acceptable and has declined to revise rules for other industries where the risk was found to be some ten to fifteen times higher than the risk posed by this source category.[32]

Notably, EPA's risk memorandum in the docket plainly indicates that acid gases are also not risk drivers for this source category.[33] Thus, there can be no risk-based justification for the discretionary decision, which EPA concedes is not required by the statute, to impose stringent limits individually on HCl and HF.[34]

B. EPA significantly overestimated current levels of mercury emissions and yet the risks associated with mercury did not materially change or alter EPA's determination that human health is being protected with an ample margin of safety.

The March 9 Risk Analysis Report memorializes the process used to conduct the new health risk assessment. EPA states in the March 9 Risk Analysis Report that that, rather than taking expected reductions in hazardous air pollutant emissions into account based on the proposed MACT limits, EPA first performed a baseline risk analysis using the updated emissions data. The March 9 Risk Analysis Report states that EPA specifically relied on revised emissions data reflected in another EPA document titled "Emissions Data Collected in 2022 for Indurating Furnaces Located at Taconite Iron Ore Processing Plants" (February 2023).[35] As explained more fully in Sections IV and VI below, EPA's 2022 dataset contains errors that led EPA to overstate the annual mercury emissions rate for one taconite processing facility as well as the total for all facilities combined. This error propagates through EPA's analysis. Instead of an annual emission rate of 121.8 pounds per year based on recent stack testing from 2017-2022 for the Keetac facility, the errors in the 2022

[30] *Id.*
[31] 88 Fed. Reg. at 30,929.
[32] *See, e.g.,* EPA, National Emission Standards for Hazardous Air Pollutants: Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry, Final Rule, 71 Fed. Reg. 76,603, 76,605 (Dec. 21, 2006) (current HON rule protects public health with ample margin of safety with cancer risk 100-in-1-million (actual and allowable emissions) and rejecting additional emissions control option at $6 million per year because cost is "unreasonable given the minor associated improvements in health risks [100-in-1-million to 60-in-1-million]"); EPA, National Emission Standards for Hazardous Air Pollutants: Engine Test Cells/Stands Residual Risk and Technology Review, Final Rule, 85 Fed. Reg. 34,325 (June 3, 2020) (cancer risk 20-in-1-million (actual emissions) 70-in-1-million (allowable emissions)).
[33] Taconite Iron Ore Processing 2023 Risk Analysis Report (March 9, 2023), EPA-HQ-OAR-2017-0664-0261 (the "March 9 Risk Analysis Report").
[34] 88 Fed. Reg. at 30,929.
[35] EPA-HQ-OAR-2017-0664-0256.

dataset led to an incorrect estimate of 342.2 pounds per year. This overstatement by more than 220 pounds makes EPA's recent health risk assessment exceedingly conservative. For the entire industry, EPA estimated the baseline at 1,010 pounds per year when the correct number was 816 pounds per year.[36]

EPA appears to have added yet another layer of conservatism to its analysis. The March 9 Risk Analysis Report explains that EPA took the amount of the emissions increase (when it compared the data available in 2020 to the new information it had available in 2022), and then multiplied those increases by unexplained "scaling" factors. EPA multiplied the increase in arsenic by 4.4 and the increase in mercury by 2.4. EPA used the resulting information to adjust the multipathway risks for cancer and noncancer HI for mercury. EPA's August 23, 2019, memorandum identified an emission rate of 103 pounds of mercury per year for the Keetac facility, which was used in the residual risk review. EPA's 2022 dataset overstated that facility's emissions, as noted above, at 342.2 pounds per year, an increase of 239.2 pounds per year. If a scaling factor of 2.4 were added to the increase of 239.2 pounds per year, the new health risk assessment was overly and severely conservative (in fact, wrong), yet the incorrect result still indicated that while there was the slightest of increases from 0.02 to 0.05, the impacts remained well within levels that are sufficiently protective of human health. Thus, there can be no question that the risk is well below acceptability thresholds.

C. Even using EPA's new linear scaling approach, which creates artificially (and inappropriately) high risk estimates, the risk remains well within the range of acceptability.

In 2023, EPA performed what it called a "linear scaling of the multipathway risks using a conservatively high estimate of the revised emissions" for arsenic and mercury. These admittedly conservative and artificially inflated emission rates resulted in adjusted multipathway risks for cancer associated with arsenic from 0.9 in 1 million. The adjusted noncancer hazard quotient for mercury increased from 0.02 to 0.05. Again, even with these artificial increases, the risks remained "well within the range of acceptability."

EPA should conduct a new industry-wide multi-pathway risk assessment focused on mercury emissions (and parse-out impacts/risks for each of the three forms of mercury) and compare the results of that assessment with the impacts/risks if the industry were to install ACI. Only then would it be possible to ascertain specifically what if any value might be derived, in terms of reduction of risk to public health and the environment, from the installation of such controls. Of course, with such risk already being well below the acceptability threshold, even for those facilities that do not utilize ACI, it is evident that no meaningful benefit would result from the installation of such controls.

[36] The owners of the Keetac facility alerted EPA to the error in its transposition of test results for the facility, but due to the rushed deadline and a lack of willingness to approach other litigants for an extension, EPA determined that 2 months was insufficient time to make any corrections. Because commenters had not seen the specifics of the proposal at that time, no one was on notice as to how dramatically the error would affect all of EPA's economic and benefits analysis.

D. In evaluating discretionary decisions under the Clean Air Act, the very low, acceptable risk here must guide EPA's exercise of that discretion.

EPA determined that this source category presents on the lower end of risk for source categories evaluated under Section 112. And, EPA has found in other cases that adding control requirements for risks at this level is not appropriate. For example, in the Primary Magnesium NESHAP, EPA stated:

> Based on our reevaluation of this information and an updated analysis, we estimate these controls would have capital cost of about $1 million, annual costs of $600,000, and would achieve about 2 grams reduction per year (95 percent reduction), with cost effectiveness of $289,000 per gram of dioxin removal, and the maximum cancer risk would be reduced from 7-in-1 million to about 1-in-1 million (for more details see Legacy Docket A-2002-0043, Document II-B-5). Due to the relatively high cost, coupled with the small reduction in dioxin emissions, we conclude that these controls are not cost effective, and would only achieve modest reduction in risks.[37]

EPA has provided no analysis or justification for treating taconite iron ore processing facilities so much more stringently than primary magnesium facilities. It has provided no explanation for its decision to exercise its discretion in the manner that it proposes, which itself is a failure to conduct reasoned decisionmaking and to deal with critically important aspects of the problem as required by judicial precedents.

E. EPA's claim of health benefits from the mercury and acid gas reductions is wholly unsupported in the record.

The preamble for the current rulemaking contains no analysis of health benefits from this extraordinarily costly rulemaking. The scant acknowledgement of health benefits at all is a passing reference made by EPA in the course of explaining why its proposal is not subject to Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks. Specifically, EPA states that it "does not believe the environmental health or safety risks addressed by [its] action present a disproportionate risk to children" to start with, and that, since the rulemaking "proposes health benefits to children by reducing the level of HAP emissions emitted by taconite iron ore processing plants," there was no reason, much less any mandate, for EPA to conduct any further analysis under EO 13045.[38] Of course, it does not follow that a health benefit will necessarily occur whenever there is a reduction in emissions of a pollutant, and EPA is not asserting as much. Rather, EPA is making this statement, for which it otherwise marshals no supporting data or analysis, simply as a means of explaining why it need not seek to quantify what EPA itself recognizes would be, at best, a *de minimis* improvement in risk, if the effects of the proposed action can be identified at all. Even more, the reductions that EPA states would result from the proposal would be accompanied by the generation of *different* pollutants. But EPA has

[37] Primary Magnesium NESHAP, 86 Fed. Reg. 1390 (Jan 8, 2021).
[38] Proposed Rule at 30,933.

not analyzed the interplay between the increases in emissions it is mandating versus the decreases.[39]

Finally, we note that the suggestion of some commenters that further reducing the very small amount of mercury emissions from the facilities in this industry will provide health benefits stands in contrast to the State of Minnesota's analysis, which demonstrates that 90 percent of the mercury that is present in the state's water and land emanates from non-Minnesota sources (i.e., other states or other countries). Indeed, if the emissions from these plants were eliminated entirely, Minnesotans risk would remain essentially the same.[40]

III. The Proposed Rule Should Be Revised to Align with the Goals and Intent of the CAA and the Standard-Setting Provisions of Section 112.

A. CAA Section 101(b)(1) provides two goals for implementation of the Act – to preserve and enhance the nation's air quality resources *and* to promote the productive capacity of the population.

Among the stated purposes of the Clean Air Act is to "protect and enhance" the "Nation's air resources" so as to promote both the "public health and welfare" *and* the "productive capacity of its population." CAA § 101(b)(1); 42 U.S.C. § 7401(b)(1). From the outset, Congress has understood and expected that the mission of EPA, in protecting both the public health and the environment, would be compatible with, and not in tension with, the goal of sound industrial development and the maintenance of a healthy, vibrant economy. This proposal runs counter to Congress's expectations and so should not be finalized in its current form.

The root of the problem is EPA's commitment to its view that, unless EPA can establish a "beyond the floor standard," it is precluded from considering costs when establishing a standard based on the floor for existing sources, and that it is authorized by the Clean Air Act to establish an existing source MACT standard without *ever* considering costs. As explained in section III.B which follows, EPA's commitment is misplaced, resting as it does on its misreading and a misunderstanding of the relevant statutory provisions. This, in turn, raises significant concerns, given that, as is explained elsewhere in these comments, if EPA were to finalize a mercury MACT standard for existing indurating furnaces in the proposed standard's current form, significant costs (contrary to Congress's intent) would be imposed, even as the final mercury MACT standard would achieve no meaningful reduction in risk to public health – which after all, is the entire point of Section 112. This alone should inform EPA that it is on the wrong track. Faced with this reality, EPA must consider whether its proposal is consistent with the fundamental congressional expectations that underpin the Clean Air Act and whether its interpretation – *i.e.*, that the statute ties the Agency's hands – withstands scrutiny. That is, it is incumbent on EPA to reevaluate its

[39] EPA has similarly failed to analyze or present information on whether children are currently being exposed to the mercury sources that EPA would be addressing here. This failure to analyze a critical question requires that the agency conduct an appropriate assessment of the health issues at the root of the rulemaking.

[40] Indeed, EPA might consider conducting an updated risk assessment prior to finalizing the rule to assess whether the proposed controls (ACI/venturi scrubber) would impact risk in a positive or negative fashion (e.g., because of the shift in Hg speciation out the stack with a potential increase in particulate/oxidized Hg vs a decrease in elemental Hg).

own, admittedly longstanding, views of how the standard-setting process under CAA Section 112(d) is supposed to work and just how much discretion EPA actually has in implementing the MACT program.

"Costs matter in regulation." *See Michigan v. EPA*, 576 U.S. 743, 785 (2015) (Kagan, J., dissenting). As Justice Kagan elaborated, in the case of EPA's original Mercury and Air Toxics Standards (MATS) rule, in making its original "appropriate and necessary" finding, "EPA knew that when it decided what a regulation would look like – what emissions standards the rule would actually set – the Agency would consider costs." *Id.* "Indeed," she observed, "EPA expressly promised to do so," and "it fulfilled that promise." *Id.* According to Justice Kagan, EPA "took account of costs in setting floor standards as well as in thinking about beyond-the-floor standards." *Id.* Why? Because, again, "costs matter in regulation."

An additional point Justice Kagan made bears importantly on the situation here: "[W]hen Congress does not say how to take costs into account, agencies have broad discretion to make that judgment." 576 U.S. at 785. The starting point for EPA to assess whether its proposal is consistent with Congress's expectation that regulation under the CAA should "promote the productive capacity" of the Nation, as it aims to protect the environment and public health, is for EPA to reconsider just what Congress has actually said about the scope of EPA's discretion under CAA Section 112(d) – *i.e.*, what EPA can do, what it cannot do, and, ultimately, what it must do in setting MACT standards.

Justice Kagan's observations in *Michigan* should give EPA pause. In light of the extreme consequences attendant to what it has proposed here, tremendous costs from which would be derived benefits that would be negligible at best, non-existent at worst, EPA would do well at this time to reconsider its path forward. EPA has already acknowledged, in assessing multipathway health risks, that mercury emissions, even when considered in combination with emissions of arsenic and cadmium from taconite processing facilities, had a "hazard index" of less than 1 (specifically, 0.02), which, as EPA concluded, presents "no significant potential for multipathway health effects."[41] In light of this reality – *i.e.*, that mercury emissions from indurating furnaces present no meaningful health risk whatsoever, one is left to question why EPA now thinks it necessary to impose tens of millions of dollars' worth of controls annually upon the taconite processing industry, when the result would be no measurable (much less meaningful) improvement in the protection given to public health or the environment.

For the reasons given elsewhere in these comments, EPA should withdraw the current proposal, after having fully taken into account the information that the Industry Commenters have previously

[41] *See* 875 Fed. Reg. 45,482 (July 28, 2020). Further, EPA recognized that the maximum chronic hazard index value of 0.2 was "driven by manganese compounds from fugitive dust and ore crushing sources" and not mercury emitted from indurating furnaces." *Id.* In the proposed rule here, EPA admits that, while its "linear scaling of the multipathway risks using a conservatively high estimate of the revised emissions" for mercury (*i.e.*, a "2.4 times increase in emissions") had increased the "noncancer hazard quotient for mercury" from 0.02 to "0.05," this negligible increase made no real-world difference at all. *See* 88 Fed. Reg. at 30,929. "The results of the . . . updated multipathway risk assessment indicates that the risk has increased slightly," EPA says, but "still remains well within the range of acceptability." *Id.* Certainly, EPA concludes, it has identified nothing that "would change the ample margin of safety analysis finalized in the 2020 RTR final rule." *Id.*

provided it, information that is critically important to the development of a final MACT standard that is reasonable, achievable, and supportable as a matter of law. Understandably, given that EPA is currently subject to a court order that directs it to promulgate a final rule by November 16, 2023,[42] the agency may feel that withdrawing its proposal is not a practical option. But no good purpose is to be served in finalizing a rule that is fatally flawed and thus subject to vacatur on judicial review. EPA's resources, not to mention those of regulated industry and the courts, would be better spent on developing a sound and legally defensible final rule. If EPA needs more time to accomplish this, then it should go to the court in *Blue Ridge Environmental Defense League* and ask for more time.

Finally, EPA must take seriously industry's concerns that, far from serving to "protect and enhance" the "productive capacity" of the Nation's population, the mercury MACT standard EPA is proposing poses an existential threat to much of this country's taconite mining and processing industry. And, as its basis for asserting that it has such extraordinary authority to wreak such harm while providing no meaningful benefit to either public health or the environment, EPA points to provisions of CAA Section 112 that the agency has chosen to construe as tying its own hands so that it cannot do otherwise. Not only does this run contrary to the cogent observations made by Justice Kagan in *Michigan*, it would seem also to run up against the Supreme Court's more recent decision in *West Virginia v. EPA*, 142 S. Ct. 2587 (2022). There, the Court spoke to situations – what it termed "certain extraordinary cases" – where both "separation of powers principles and a practical understanding of legislative intent" required that, to be sustained, an agency's claim of authority to act had to rest on "something more than a merely plausible textual basis." Rather, what an agency is required to do in such circumstances, the Court said, is "point to 'clear congressional authorization' for the power it claims." *Id.*, 142 S. Ct. at 2609, *citing Utility Air Regulatory Group v. EPA*, 573 U.S. 302, 324 (2014). Here, the extreme consequences of EPA's proposed mercury MACT standard make this an "extraordinary case." But EPA can point to nothing that authorizes it to take an action so contrary to any "practical understanding of legislative intent," much less anything on the face of the Clean Air Act that compels it to do so.[43]

[42] *See* Order issued April 15, 2021, in *Blue Ridge Environmental Defense League v. Regan*, No. 1:16-cv-00364-CRC (filed Feb. 14, 2016).

[43] *Cf. Biden v. Nebraska*, 600 U.S. __ (June 30, 2023), where Justice Barret, writing separately, explained the interaction between the "major questions" doctrine and basic principles of statutory interpretation in terms that described a situation where a reviewing court, rather than "'put[ting] on blinders' and confin[ing] [itself] to the four corners of the statute," instead "[takes] 'off those blinders,' 'view[s] the statute as a whole,' . . . and 'consider[s] context that would be important to a reasonable observer." *Nebraska*, slip op. at 45. "With the full picture in view," Justice Barrett continued, it then "[becomes] evident" when an "agency's assertion of 'highly consequential power'" has gone "'beyond what Congress could reasonably be understood to have granted.'" *Nebraska,* slip op. at 45-46. Here, in light of these observations, it is incumbent on EPA itself to "take off the blinders" and give serious consideration to whether it can reasonably be said that Congress, in enacting CAA Section 112(d), ever intended to give the agency the "highly consequential power" to wreak havoc on a vitally important American industry, while at the same accomplishing *nothing* that would protects either the public health or the environment. Put simply, how can EPA lay claim to such power?

B. EPA's proposed approach for establishing emission standards for mercury for existing indurating furnaces is contrary to the plain language of CAA Section 112(d).

At the outset of its proposed rule, EPA sets forth its methodology for establishing, under CAA Section 112(d)(3), emission standards for mercury emitted by existing indurating furnaces at taconite iron ore processing facilities. According to the preamble, "since there are fewer than 30 sources in the category," EPA is required to establish a so-called existing source "floor," defining an emission level that is achieved by the "best-performing" five sources in the category, which are furnaces that process ore with a low mercury content.[44] The proposal then uses this "floor" to develop "*minimum standards* for existing sources," without any consideration of the cost, non-air quality health or environmental effects, or energy requirements associated with achieving these "minimum standards."[45]

Applying this approach – *i.e.*, in "calculate[ing] the mercury MACT floor limits in units of pounds of mercury per long ton of taconite pellets produced (lb/LT) for existing sources based on the five best performing furnaces" – EPA has derived, and is now proposing, a "MACT floor limit of 1.4 $\times$ 10^{-5} lb/LT for existing sources."[46] By comparing this proposed MACT "floor limit" to the "mercury emission rates" data that EPA has gathered "for each existing indurating furnace," the proposal "estimate[s] that 11 existing indurating furnaces would require improved performance to comply" with the proposed mercury "floor limit," while "seven furnaces would not require improved performance."[47] Then, having figured that "activated carbon injection (ACI) with a high efficiency venturi scrubber would provide the level of mercury reduction required for the 11 existing furnaces to achieve compliance with the proposed MACT floor," EPA calculates that its proposed standard would "result in a combined estimated reduction of 462 pounds of mercury per year from these sources," with the "total capital investment to retrofit 11 existing furnaces with these controls" being estimated by the agency to amount to "$129 million."[48] The "total annual costs," EPA projects, will come in at "$71 million per year."[49]

Notably, nowhere does this proposal attempt to explain, much less justify, why a MACT standard that achieves a reduction in source category-wide mercury emissions in that amount, at that cost, is reasonable. According to the proposal, EPA need not do so when setting a "minimum standard" based on an existing source "MACT floor." Rather, the proposal asserts, only when considering whether to establish more stringent "beyond-the-floor" controls under CAA Section 112(d)(2) is EPA called upon to consider whether such controls would have "cost, non-air quality health and environmental, and/or energy impacts" that would be "reasonable" in light of the additional emission reductions the controls would achieve.[50]

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[44] 88 Fed. Reg. at 30,922.
[45] *Id.* (emphasis added).[46] *Id.* at 30,924.
[46] *Id.* at 30,924.
[47] *Id.*
[48] *Id.*
[49] *Id.*
[50] *Id.* at 30,923. Here, EPA has determined that the "most cost-effective beyond-the-floor option would be to set the MACT standard for existing furnaces at a level 30 percent more stringent than the MACT floor (*i.e.*, a MACT standard

As explained below, the approach proposed for establishing a mercury MACT standard for existing indurating furnaces is not legally permissible. Paragraph (d)(3) does not authorize, or require, EPA to establish "minimum standards" for existing sources based on the paragraph (d)(3) floors. Only paragraph (d)(2) authorizes the establishment of MACT standards, and, in establishing those standards for existing sources, costs must be considered. Additionally, basing an existing source floor under paragraph (d)(3) on the "average [actual emissions] performance" of the "best-performing" five furnaces in the source category is contrary to the plain language of CAA Section 112(d)(3), as a straightforward examination of that language reveals. In other words, EPA has been approaching existing source standard-setting backwards. It has started with the establishment of standards and entirely skipped the fundamental, *and initial,* obligation to assess costs and other factors to determine whether or not to establish those standards under Section 112(d)(2).

1. Neither paragraph (d)(2) nor paragraph (d)(3) authorizes, much less requires, the establishment of "minimum standards" for existing indurating furnaces without any consideration of cost or of the other factors identified in (d)(2) governing MACT standard-setting.

EPA is proposing to follow its past practice of promulgating "minimum standards" that reduce emissions from existing sources (in this case, indurating furnaces) to the "floor" level established for those sources, without "taking into consideration" the "cost of achieving such emission reduction" or of any of the other MACT standard setting factors identified in CAA Section 112(d)(2). Under this past practice, those factors come into play only when EPA considers establishing what it terms "beyond-the-floor" standards under paragraph (d)(2), standards that are more stringent than the "minimum" floor-based standards. But paragraph (d)(3) does not reference "minimum standards," and neither paragraph (d)(2) nor (d)(3) contains any language limiting the (d)(2) MACT standard-setting process for existing sources only to standards that require greater reductions than a floor-based "minimum standard."

The only authorization for MACT standard-setting under CAA Section 112(d) is CAA Section 112(d)(2). Similar to other so-called technology-based standard setting provisions,[51] paragraph (d)(2) requires the Administrator to begin by evaluating the removal capacities, costs, non-air quality health and environmental impacts, and energy requirements associated with available control measures to determine whether a control measure represents "the maximum degree of reduction in emissions . . . that the Administrator, taking into consideration the costs of achieving such reduction, and any non-air quality health and environmental impacts and energy requirements, determines is achievable" through the "application of measures, processes, methods, systems or techniques." CAA § 112(d)(2); 42 U.S.C. § 7412(d)(2). As a result, in order to

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of 8.4×10^{-6} lb/LT)." *Id.* at 30,923. "Under this approach," the Agency continues, "we estimate a total reduction of 621 pounds of mercury per year from the source category at an estimated incremental cost-effectiveness of about $46,000 per pound of mercury to go beyond the MACT floor." *Id.* This, EPA allows, is "above the $/pound of mercury reduced that we have historically found to be reasonable and cost-effective when considering beyond-the-floor options for regulating mercury emissions." *Id.* For that reason, EPA says, "[w]e propose to conclude that requiring new or existing indurating furnaces to meet beyond-the-floor limits is not reasonable based on the estimated capital and operating costs and cost-effectiveness." *Id.*

[51] *See*, *e.g.*, CAA § 111; 42 U.S.C. § 7411; CAA § 165; 42 U.S.C. § 7475.

establish a lawful MACT standard for existing sources under CAA Section 112(d)(2), the Administrator must consider, among other factors, the "cost of achieving such emission reduction" and reject control options that achieve reductions at unreasonable cost. For the Administrator to fail *entirely* to consider costs in setting a standard for existing furnaces under CAA Section 112(d)(2) would be contrary to the plain language of the statute.[52] In view of the foregoing, how does paragraph (3) fits into subsection (d)(2) standard-setting?

For new sources, paragraph (d)(3) provides that the "*maximum degree of reduction in emissions that is deemed achievable* for new sources . . . shall not be less stringent than the emission control that is achieved in practice by the best controlled similar source." CAA § 112(d)(3); 42 U.S.C. § 7412(d)(3) (emphasis added). In other words, (d)(3) requires EPA to promulgate a new source standard under (d)(2) at least as stringent as reductions that have been "achieved in practice" by the "best controlled similar source." This new source "floor" language requires EPA to bypass consideration of cost and impose these "best controlled" reductions as the "maximum reduction achievable." Congress likely viewed this short-circuiting of the (d)(2) processes reasonable because the new source minimum standards would be based on existing source controls that have proven to be economically achievable. Moreover, unlike existing sources that must reduce emissions through costly retrofits, new sources can be designed to incorporate the required controls at much lower cost.[53] Finally, companies may evaluate cost in determining whether to invest in a new facility, and, if the costs, including the control costs, of the new source are not reasonable, the company is free to choose not to construct the facility. Existing sources do not have this option.

With respect to existing sources, paragraph (d)(3) uses very different language from that governing new source floors, language that does not override the cost factor in determining the "maximum degree of reduction achievable" for existing sources under (d)(2). The "maximum degree of reduction deemed achievable" language that requires the promulgation of minimum new source (d)(2) standards is not used in the (d)(3) existing source floor provision. Instead, as relevant here, that provision requires that "*emission standards promulgated under this subsection* for existing sources . . . shall not be less stringent" than the "average emission limitation achieved" by the "best performing" existing sources within the category or subcategory at issue. CAA § 112(d)(3); 42

[52] As discussed above, EPA has been down this road before, and it should make the right turn this time, instead of the wrong one. *See Utility Air Reg. Group v. EPA.* Indeed, even if the statutory language were not so clear, it would be an abuse of discretion on EPA's part were it to fail to adopt what is obviously a *permissible* interpretation of that language, an interpretation that would enable EPA to avoid establishing a mercury MACT standard producing extreme, if not altogether absurd, results. What EPA cannot do here is take refuge in its unfounded belief that the language of CAA Section 112(d)(3) somehow operates to preclude EPA from taking account of costs in establishing MACT standards for existing sources under CAA Section 112(d)(2). In those cases where the statutory language at issue can be plausibly read as affording an agency discretion, it is "incumbent upon the agency not to rest simply on its parsing of the statutory language" but, rather, to "bring its experience and expertise to bear in light of competing interests at stake." *See PDK Laboratories, Inc. v. DEA*, 362 F.3d 786, 797-98 (D.C. Cir. 2004). What this means in this case, at a minimum, is that EPA is compelled, in a reasonable exercise of its discretion – *i.e.*, "bring[ing] its experience and expertise to bear" – to consider all options available to it (*e.g.*, setting the existing source floor on a facility-by-facility basis, appropriate subcategorization, etc.) to avoid adopting a standard that would have potentially catastrophic consequences for the taconite processing industry.

[53] In addition, proposed new sources can sometimes be sited in a location that takes account of the characteristics of the raw material inputs (*e.g.*, clay, in the case of brick kilns) on which they might rely, where those inputs drive a source's emissions profile.

U.S.C. § 7412(d)(3) (emphasis added). Unlike the floor for new sources, therefore, this language does not *mandate adoption* of (d)(3) "minimum" standards, but instead *precludes promulgation* of any standard under (d)(2) that is less stringent than the (d)(3) existing source floor. The effect of the (d)(3) existing source floors is to limit the control options that may be evaluated by EPA in determining the "maximum degree of reduction" that, considering cost and other factors, is "achievable." In other words, only control options with reductions at, or greater than, the reduction levels required to achieve the floor levels are candidates for standards under (d)(2), candidates that must pass the "reasonable cost" test to become "maximum degree of reduction" standards. The different language used in, and different legal effect given to, existing source floors simply reflects the fact that achievable new source floor-based controls can be designed into new sources, whereas existing source retrofit costs may make floor-based standards unachievable.

In summary, EPA proposes to establish the existing source floor based on actual emissions from the five lowest emitting furnaces. The low mercury emissions from these units resulted from the level of mercury present in the iron ore from mines supplying these furnaces, which is not within any company's control and is dependent on location. In the proposal, EPA has recognized that furnaces processing higher mercury content ore cannot shift to lower mercury ore but must retrofit activated carbon injection (ACI) with new high efficiency venturi scrubbers to achieve the floor levels. For EPA to establish a MACT standard for furnaces processing higher mercury content ore, it must evaluate whether ACI plus venturi scrubber technology can be found to provide the "maximum degree of reduction . . . achievable" *considering the cost of achieving those reductions*. As discussed in Section VI, the cost of reductions achieved through the use of ACI plus venturi scrubber technology vastly exceeds the dollars per pound cost that EPA "historically [has] found to be reasonable and cost effective,"[54] requiring its rejection as MACT.

Admittedly, it has long been thought that EPA is precluded from considering costs in deriving both new *and* existing source floors under CAA Section 112(d)(3). This well-worn belief is one of those "unexamined certainties" that not only EPA but also the D.C. Circuit has reiterated over the past two decades.[55] *But is it true*? Where, as would be the case with what it is proposing here,

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[54] 88 Fed. Reg. at 30,925.

[55] *See*, *e.g.*, *Nat'l Lime Ass'n v. EPA*, 233 F.3d 625, 629 (D.C. Cir. 2000) ("In addition to this general guidance, the statute includes minimum stringency requirements for emission standards that apply without regard to either costs or the other factors and methods listed in section 7412(d)(2)."); *Cement Kiln Recycling Coalition v. EPA*, 255 F.3d 855, 857-858 (D.C. Cir. 2001) ("Supplementing this general guidance, Congress imposed minimum stringency requirements – EPA calls them 'emission floors' – which 'apply without regard to either costs or the other factors and methods listed in section 7412(d)(2)," *quoting Nat'l Lime Ass'n*, 233 F.3d at 629); *Sierra Club v. EPA*, 353 F.3d 976, 980 (D.C. Cir. 2004) ("*Once* EPA has set the MACT floor, it may *then* impose stricter standards – so-called 'beyond-the-floor' limits – if the Administrator determines them to be achievable after 'taking into consideration the cost ... and any non-air quality health and environmental impacts and energy requirements,'" *quoting Cement Kiln Recycling Coalition*, 255 F.3d at 858 (emphases added)); *Northeast Maryland Waste Disposal Authority v. EPA*, 358 F.3d 936, 950 (D.C. Cir. 2004) ("The Agency did respond to those complaints, explaining that the Clean Air Act does not permit it to take cost into account in setting MACT floors, and that (in its view) the beyond-the-floor standards strike the correct balance between cost and emissions reductions."); *Sierra Club v. EPA*, 479 F.3d 875, 877 (D.C. Cir. 2007) ("Supplementing this general guidance, Congress imposed minimum stringency requirements – EPA calls them 'emission floors' – which 'apply without regard to either costs or the other factors and methods listed in section 7412(d)(2),'" *quoting Nat'l Lime Ass'n v. EPA*, 233 F.3d at 629); *NRDC v. EPA*, 489 F.3d 1364, 1376 (D.C. Cir. 2007) ("But cost is not a factor that EPA may permissibly consider in setting a MACT floor," *citing Nat'l Lime Ass'n,* 233 F.3d at 640); *NRDC v. EPA*, 529 F.3d 1077, 1084 (D.C. Cir. 2008) ("That could be thought in tension with our cases

EPA refuses to consider costs in establishing a floor under paragraph (d)(3), and then, after having declined to go "beyond the floor," EPA promulgates a final MACT standard for existing sources that reflects the floor derived under paragraph (d)(3), the agency will have established under paragraph (d)(2) an emission standard that "require[s] the maximum degree of reduction in emissions" without the Administrator having "tak[en] into consideration the cost of achieving such emission reduction," nor "any non-air quality health and environmental impacts and energy requirements." Given the plain language of CAA Section 112(d)(2), how could that possibly be lawful? The answer is that it is not.

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holding that EPA may not consider costs in setting the maximum achievable control technology 'floors,' but only in determining whether to require 'beyond the floor' reductions in emissions," *citing Nat'l Lime Ass'n,* 233 F.3d at 640; *NRDC* 489 F.3d at 1375-76); *Portland Cement Ass'n v. EPA*, 665 F.3d 177, 183 (D.C. Cir. 2011) ("EPA may go 'beyond-the-floor' and set a more stringent standard if, taking cost and other factors into account, it determines that such a standard would be 'achievable.'. . . *see also Cement Kiln Recycling Coalition v. EPA,* 255 F.3d 855, 857-58 (D.C.Cir.2001) (describing the two-step regulatory framework and noting that 'floors' apply 'without regard to either costs or ... other factors.'"); *Ass'n of Battery Recyclers v. EPA*, 673 F.3d 667, 673 (D.C. Cir. 2013) ("But the statute only bars cost consideration in setting MACT floors under section 112(d)(3), *see National Lime,* 233 F.3d at 640; section 112(d)(2) in contrast expressly *directs* EPA to consider costs when setting beyond-the-floor standards" (emphasis in original)); *NRDC v. EPA*, 749 F.3d 1055, 1057 (D.C. Cir. 2014) ("EPA uses a two-step process for establishing MACT standards. The agency begins by setting a minimum stringency level, or 'floor,' based on the results achieved by the best-performing similar sources. . . . *Once* EPA sets the statutory floor, it *then* determines, considering cost and the other factors listed in Section 112(d)(2), whether a more restrictive standard is 'achievable,' and if so then adopts that standard," *citing Sierra Club v. EPA,* 479 F.3d at 877); *White Stallion Energy Center v. EPA*, 748 F.3d 1227, 1230 (D.C. Cir 2014) ("For existing sources, these 'maximum achievable control technology' . . . standards may not be less stringent – regardless of cost or other considerations – 'than [] the average emission limitation achieved by the best performing [] sources' in the relevant category or subcategory," *citing Nat'l Lime Ass'n v. EPA,* 233 F.3d at 629): *U.S. Sugar Corp. v. EPA*, 830 F.3d 579, 594 ("When setting the MACT floor, the EPA considers *only* the performance of the cleanest sources in a category or subcategory; it does not take into account other factors, including the cost of putting a source in line with its better-performing counterparts," *citing Cement Kiln,* 255 F.3d at 857-58; *Nat'l Lime Ass'n*, 233 F.3d at 629 (emphasis in original); *Louisiana Envt'l Action Network v. EPA*, 955 F.3d 1088, 1093 (D.C. Cir. 2020) ("That baseline emissions limit is referred to as the . . . 'MACT floor.' *Sierra Club v. EPA,* 895 F.3d 1, 7-8 (D.C. Cir. 2018). EPA must *then* determine, considering cost, health, and environmental effects, whether a more stringent limit is 'achievable.'").

A survey of these decisions reveals that what initially began as little more than an observation on the part of the D.C. Circuit – *i.e.,* an unchallenged and thus untested characterization, expressed in such early cases as *Nat'l Lime Ass'n* and *Cement Kiln Recycling Coalition* – of how CAA Section 112(d), as it had been initially construed by EPA to work when the agency was first implementing it, somehow became over time to be considered, first, the court's "holding" and then, later, the court's actual settled interpretation of the statutory language. Yet, the only thing that has actually been happening over the past 20+ years is that *the court has just been repeating itself*, *without thinking*, drawing on what was never more than a passing observation – *dicta*, in other words, and in no way any sort of actual "holding" – until, at this point, the notion that EPA "cannot consider costs" in deriving floor-based standards for existing sources is received as some form of juridical dogma, even though the contention itself appears to have never really been scrutinized, much less put to the test of a careful interpretive challenge. Indeed, by the time it had occasion to consider the question of "cost" under a wholly different provision of CAA Section 112 (*i.e.*, subsection (n)(1)(A)) in *Michigan v. EPA*, the Supreme Court itself accepted – albeit in passing, and without Court's actually questioning – the longstanding assumption that, "once the Agency decides to regulate power plants, it must promulgate certain minimum or floor standards no matter the cost," and that EPA "may consider cost only when imposing regulations beyond these minimum standards." *Michigan*, 576 U.S. at 756. As suggested here, however, the plain language of CAA Section 112(d)(3) indicates that this assumption, with respect to existing floor-based standards, lacks a statutory foundation.

In *Sierra Club v. EPA*, 479 F.3d 875 (D.C. Cir. 2007), Senior Judge Williams, concurring separately in what was a *per curiam* opinion, took note of what he characterized as a "paradox in the relationship between two key provisions of § 112 of the Clean Air Act," specifically paragraphs (d)(2) and (d)(3). *Id.* at 884. After observing that the "'achievable' standards" established by EPA under paragraph (d)(2) had "come to be known as the 'beyond-the-floor' standards . . . meaning, obviously, ones more stringent than the 'floors' established under § 112(d)(3)," Judge Williams correctly pointed out that the "language thus embodies an assumption that standards based on achievability will be more stringent than ones based merely on past achievement." *Id.*

Judge Williams then raised a salient question: "What if meeting the 'floors' is extremely or even prohibitively costly for particular plants because of conditions specific to those plants (*e.g.*, adoption of the necessary technology requires very costly retrofitting, or the required technology cannot, given local inputs whose use is essential, achieve the 'floor)?" 479 F.3d at 884. "For these plants," Judge Williams pointed out, "it would seem that what has been 'achieved' under § 112(d)(3) would not be 'achievable' under § 112(d)(2) in light of the latter's mandate to EPA to consider cost." *Id.* "In other words," he continued, "as applied to some sources, the floor compelled by the statutory language appears to be more stringent than 'beyond-the-floor.'" *Id.* at 884-885.

Judge Williams concluded: "If this were all, we might be talking of a statute whose literal words produced a result so 'demonstrably at odds with the intentions of its drafters' as to justify judicial surgery." 479 F.3d at 885, *quoting United States v. Ron Pair Enterprises, Inc.,* 489 U.S. 235, 242 (1989). "Happily," Judge Williams decided, "§ 112 is not such a statute." *Id.* at 885. This was because, as he put it, "Section 112(d)(1) authorizes the Administrator to 'distinguish among classes, types and sizes of sources within a category or subcategory,' and the language of subsections 112(d)(2) and (3) pervasively refers to standards for sources in each '*category or subcategory.*'" *Id.* And, while there was "not necessarily any guarantee that, even with suitable subcategorization, every source will be able to achieve standards that meet a lawful application of § 112(d)(3) to reasonably defined subcategories," Judge Williams added, it was nonetheless the case that "one legitimate basis for creating additional subcategories must be the interest in keeping the relation between 'achieved' and 'achievable' in accord with common sense and the reasonable meaning of the statute." *Id.*

Judge Williams' observations are well taken, although his focus in this instance on the availability of subcategorization appears to have deflected his attention away from an even more direct way of resolving the seeming "paradox" to which, he correctly perceived, EPA's historic approach to establishing MACT standards gives rise – namely, that EPA's position that it is precluded from taking account of costs in conjunction with promulgating emission standards based on existing source floors under paragraph (d)(2) is based on a flawed interpretation of the statute.[56] Writing

[56] At the same time, insofar as subcategorization will invariably involve consideration by EPA of the very same factors identified in CAA Section 112(d)(2) – *i.e.*, cost, non-air quality health and environmental impacts, and energy requirements – in taking account of the important role subcategorization can play in allowing EPA to avoid adopting a MACT standard that fails to account for the distinction Congress sought to draw between "achievable" beyond-the-floor standards and standards reflecting a floor established by EPA on the basis of what existing sources have "achieved" in practice, Judge Williams was acknowledging that consideration of those factors are of central importance to the MACT setting process under CAA Section 112(d)(2). Reasoned decision-making requires their

some four years later in *Portland Cement Ass'n v. EPA*, 665 F.3d 177 (D.C. Cir. 2011), Judge Brown took note of the "paradox" earlier identified by Judge Williams in the *Sierra Club* case, but she concluded that, rather than something that was dictated by the statutory text, the anomalous outcome postulated by Judge Williams was simply the result of a "self-inflicted wound" on the part of the D.C. Circuit itself, the "result of a series of interpretive leaps" that, Judge Brown confessed, she "simply [could not] follow." *Portland Cement*, 665 F.3d at 196 (Brown, J. concurring).

Reflecting on the "self-inflected wound" occasioned by the D.C. Circuit's earlier *Sierra Club* decision, Judge Brown opined – using language that would appear to bear significantly on the present rulemaking – that "it was *our decision, not Congress's*, to demand that EPA ignore input variability when it sets emissions floors." 665 F.3d at 195 (emphasis added). "It was *our decision*," she continued, to "not only permit but to require EPA to ignore the costs of achieving those floors – to enact them, in other words, even if some kilns would never be able to meet them." *Id.* (emphasis added). Because of "*our decision*" – *i.e.*, not Congress's – Judge Brown emphasized, the "'maximum achievable control technology' floors" that were at issue in *Sierra Club* and which were blessed by the D.C. Circuit ended up having "little to do with achievability, controls, or technology, even though, as Senator Domenici stated during the consideration of this law, the 'initial level of tight controls . . . is [to be] determined strictly on the basis of the availability of technology.' 136 Cong. Rec. S17,120-24 (daily ed. Oct. 26, 1990) (statement of Sen. Pete Domenici)." *Id.* (emphasis added).

Judge Brown went on to point out – again, using language not without significance to the present rulemaking – that, "[i]n contrast to our interpretation," the "Congress that enacted the current NESHAP program in 1990 was quite concerned about the costs of regulation – and those costs presumably included the economic impact of putting going concerns out of business." 665 F.3d at 196. According to Judge Brown, the "straightforward text and structure of the floor-setting provisions convey as much." *Id.* "Moreover," she noted, "Congress included a specific requirement in the 1990 Amendments that EPA prepare a 'comprehensive analysis' of the 'costs, benefits and other effects associated with compliance' with, among other things, NESHAP standards." *Id.*, *citing* CAA § 312(a); 42 U.S.C. § 7412(a). "Speaking in support of this provision and of cost-benefit analysis more generally," Judge Brown continued, "Senator Moynihan described the Amendments as 'the first environmental legislation in history to require extended and intensive cost benefit analysis.'" *Id.*, *citing* 136 Cong. Rec. S16,895-97 (daily ed. Oct. 27, 1990) (statement of Sen. Daniel Patrick Moynihan). "It would be strange indeed," Judge Brown observed, "if a Congress so attuned to the importance of cost-benefit analysis *intended EPA to set emissions floors regardless of the cost*." *Id.* (emphasis added). Judge Brown concluded: "I regret that we have ignored Congress's wishes and made life more difficult – for industry and its employees, for EPA, and for ourselves." *Id.*

Today's rulemaking presents the very "paradox" that Judge Williams identified nearly a quarter of a century ago, an anomaly driven, in Judge Brown's view, *not* by anything in the language of

consideration in each and every instance. *Cf. Motor Vehicle Mfrs. Ass'n. v. State Farm Mut. Automobile Ins. Co.*, 463 U.S. 29, 43 (1983) ("Normally, an agency rule would be arbitrary and capricious if the agency has . . . entirely failed to consider an important aspect of the problem.").

CAA Section 112(d) but, rather, by the D.C. Circuit's inaccurate characterization of the legal effect that the existing source floors have on (d)(2) standard setting.

We submit that EPA's hands are not tied in the manner that it perceives they are. While the D.C. Circuit has described in cases EPA's position that standards based on the existing source floor must be imposed ignoring cost, and while the court has later characterized that approach as being part of its case law, an examination of the cases indicates that is not so. These statements are simply dicta, which EPA may choose not to apply in a situation that is far afield factually from the cases that gave rise to such unfortunate assumptions. This rulemaking is the ideal case for correcting EPA's course in this regard – risk is well below acceptable thresholds, the reductions to be achieved are minimal, and the cost of achieving such minimal reductions is beyond what has been imposed in any other context. On these facts, EPA should revisit its assumed interpretations and decline to take this step that is inconsistent with congressional directives.

2. Emission floors for existing sources cannot be based on actual emissions from best performers.

As was previously explained, under CAA Section 112(d)(3), new sources and existing sources are treated differently. But those differences extend beyond what was described above. Specifically, for new sources, paragraph (d)(3) provides that the "maximum degree of reduction in emissions that is deemed achievable" – *i.e.*, "achievable" within the meaning of paragraph (d)(2) of CAA Section 112(d) – "shall not be less stringent than the *emission control* that is achieved in practice by the best controlled similar source, as determined by the Administrator." *See* CAA § 112(d)(3); 42 U.S.C. § 7412(d)(3) (emphases added). For existing sources, paragraph (d)(3) provides, as is relevant here, that "[e]mission standards promulgated under this subsection . . . shall not be less stringent, and may be more stringent than – . . . (B) the average *emission limitation* achieved by the best performing 5 sources (for which the Administrator has or could reasonably obtain emissions information) in the category or subcategory with fewer than 30 sources." *See* CAA § 112(d)(3)(B); 42 U.S.C. § 7412(d)(3) (emphasis added).[57] Notwithstanding this language, the proposal is to derive the "floor" standards for existing indurating furnaces *not* from the "average emission limitation" of the best performing five sources but, rather, on what the Agency describes as the "average *performance* of the best-performing" five indurating furnaces in the source category – *i.e.*, those existing furnaces' *actual* emissions.[58] As explained below, the proposed approach is impermissible.

[57] The provisions of subparagraph (A) of paragraph (d)(3), while similar to subparagraph (d)(3)(B) in pertinent part, are not directly relevant here because they apply only where there are at least 30 sources in the source category at issue, which, as has been noted, is not the case with respect to the taconite iron ore processing plant source category. Subparagraph (d)(3)(A) provides, in part, that "[e]mission standards promulgated under this subsection for existing sources in a category or subcategory . . . shall not be less stringent than – (A) the average *emission limitation* achieved by the best performing 12 percent of the existing sources . . . in the category or subcategory for categories and subcategories with 30 or more sources . . . ." CAA § 112(d)(3)(A); 42 U.S.C. § 7412(d)(3)(A) (emphasis added).

[58] *See* 88 Fed. Reg. at 30,922.

a. The proposed approach is contrary to the plain language of the statute.

The distinction CAA Section 112(d)(3) draws with its use of the phrase "emission control that is achieved in practice" by the "best controlled" existing source in the category (with respect to new sources) and the phrase "average emission limitation achieved by the best performing five sources" (with respect to existing sources) is significant. It is a distinction tied to the fact that new sources can always be designed and constructed to "achieve" whatever the best controlled existing source has achieved. Because existing sources lack that flexibility, however, the existing source "floor" is tied to achieving a level of control defined by an average "emission limitation" established by EPA or a state for "best performers" in a category – *i.e.*, a level of control already being achieved by those existing sources subject to an "emission limitation." EPA's approach to setting a floor for existing indurating furnaces ignores the statutory language and, instead, bases the floor on the "average [actual emission] performance" of the best performing five indurating furnaces whose actual emissions data EPA has evaluated.

The statutory language could not be clearer. Paragraph (3) of CAA Section 112(d) specifies that a MACT standard for existing sources promulgated under CAA Section 112(d)(2) cannot be "less stringent" than the "average *emission limitation* achieved by the best performing 5 sources." In turn, "emission limitation" is a ***defined term under the Clean Air Act***. Specifically, CAA Section 302(k) defines "emission limitation" to mean a "requirement established by the State or the Administrator which limits the quantity, rate, or concentration of emissions of air pollutants on a continuous basis, including any requirement relating to the operation or maintenance of a source to assure continuous emission reduction, and any design, equipment, work practice or operational standard promulgated under this Act." *See* CAA § 302(k); 42 U.S.C. § 7602(k).

EPA's proposal to substitute an average of actual emission data for an emission floor derived from an average "emission limitation" is contrary to plain language of the CAA. In the case of this rulemaking, where EPA apparently has no information pertaining to any previously established "requirement . . . which limits the quantity, rate, or concentration of emissions" of mercury from any existing indurating furnaces, the provisions of paragraph (3) of CAA Section 112(d) addressing floors for existing sources have no application. As far as existing indurating furnaces are concerned, EPA's task is to propose under CAA Section 112(d)(2) a MACT standard that reflects the "maximum degree of reduction" that is "achievable," "taking into consideration the cost of achieving such emission reduction" and, as well, "any non-air quality health and environmental impacts and energy requirements." As EPA has failed to put forth such a proposal, the agency should use the information provided in these comments to develop a rule consistent with the Clean Air Act.

b. EPA's past practice does not override the plain language of the CAA.

Contrary to this plain reading of CAA Section 112(d)(3), EPA for years now has been setting "MACT floors" for existing sources using actual emissions data, rather than basing the MACT floor on the control level defined by an "average emission limitation" achieved by the best performing sources (*i.e.*, the best performing 12 percent of the existing sources, where there are at least 30 sources within the source category, and the best performing five sources in a source

category with fewer than 30 sources). But the statutory language says what it says, and the term at issue – "emission limitation" – is used throughout the CAA to refer to regulatory control requirements. Consistent with that usage, "emission limitation" is defined in CAA Section 302(k) to "mean a requirement established by the State or the Administrator which limits the quantity … of emissions on a continuous basis…." *See* CAA § 302(k).[59]

For that reason, there is no basis for arguing, on the face of CAA Section 112, that "emission limitation" should be understood to read as anything other than as the defined term that is found in CAA Section 302(k).[60] When the current hazardous air pollutant statutory program was enacted in 1990, Congress provided in subsection (a) of CAA Section 112 definitions for a number of terms, definitions that were to apply specifically for purposes of CAA Section 112. This list includes at least two terms – *i.e.*, "major source" and "stationary source" – definitions for which are also to be found under CAA Section 302(k). This shows that, if Congress had intended that the term "emission limitation" as used in paragraph CAA Section 112(d)(3) be understood to mean something other than how the term is defined in CAA Section 302(k) and otherwise used throughout the CAA, it certainly had means at its disposal to make its intentions clear, means that Congress did employ in CAA Section 112(a) with respect to other terms.

Second, there is evidence on the face of CAA Section 112 itself that the term "emission limitation" is to be understood precisely as it is defined in CAA Section 302(k). For instance, CAA Section 112(d)(7) provides that "[n]o emission standard or other requirement promulgated under this section shall be interpreted, construed or applied to diminish or replace the requirements of a more stringent *emission limitation* or other applicable requirement established pursuant to section 7411, part C or D, or other authority of this Act or a standard issued under State authority." CAA § 112(d)(7); 42 U.S.C. § 7412(d)(7) (emphasis added). In this context, there can be no question that the term "emission limitation" is to be understood to mean what it is defined to mean in CAA Section 302(k).

So, too, in CAA Section 112(g), where the statute provides that, "[a]fter the effective date of a permit program under title V in any State, no person may modify a major source of hazardous air pollutants in such State, unless the Administrator (or the State) determines that the maximum achievable control technology *emission limitation* under this section for existing sources will be met." *See* CAA § 112(g)(2)(A); 42 U.S.C. § 7412(g)(2)(A) (emphasis added); *see also id.* § 112(g)(2)(B). In this case, a MACT standard promulgated under CAA Section 112(d)(2) and

[59] Specifically, subsection (k) defines both "emission limitation" and "emission standard" jointly, using these terms.

[60] It would appear that this same point has previously been made, in some manner of means, to the U.S. Court of Appeals, but the court on those prior occasions declined to resolve the matter. *See*, *e.g.*, *Sierra Club v. EPA*, 167 F.3d 658, 661 (D.C. Cir. 1999) ("The parties beckon us into a labyrinth, but in this case . . . we are not compelled to enter, as the "permissibility of EPA's approach does not turn on the applicability of § 7602(k), but on whether using the state regulatory data is a reasonable means of estimating the performance of the top 12 percent of MWIs in each subcategory.'"); *Cement Kiln Recycling Coalition v. EPA*, 255 F.3d. 855, 860 (D.C. Cir. 2001) ("Although EPA disputes this reading of the statute . . . the Agency argues that we may not even consider petitioners' argument because they failed to present it to the Agency during the rulemaking. . . . Having reviewed each page of the record petitioners cite to demonstrate that they presented their interpretation of section 7412(d)(3)(A) during the rulemaking, we agree with EPA.").

applicable to a given existing source is *itself* termed an "emission limitation," consistent with the definition found at CAA Section 302(k).

Nor does it help to argue that its use of "emission limitation" in CAA Section 112(d)(3) was some sort of mistake or oversight on Congress's part, that Congress simply did not consider the fact that "emission limitation" was a preexisting defined term in CAA Section 302(k) when it incorporated the term in then-new CAA §112 in 1990. Even assuming that such a suggestion could possibly overcome a plain reading of the statute, it makes for a particularly poor argument in the context of Section 112(d)(3). A definition of the two interrelated terms "emission limitation" and "emission standard" was added to what is now CAA Section 302 as part of the Clean Air Act Amendments of 1977. Congress then specifically amended that definition as part of the 1990 CAA Amendments to add the additional words ". . . and any design, equipment, work practice or operational standard promulgated under this Act" to the very end of the definition. Why this amendment? Because, as part of the 1990 Amendments, Congress was also adding then-new subsection (d)(2) of CAA Section 112 to the Act, which included a reference in (d)(2)(D) to "measures processes, methods, systems or techniques" for the "reduction in emissions" of HAP that would include "(D) . . . design, equipment, work practice, or operational standards . . . ."). *See* CAA § 112(d)(2)(D); 42 U.S.C. § 7412(d)(2)(D); *see also* CAA § 111(h); 42 U.S.C. § 7411(h). This is proof positive that Congress had the provisions of CAA Section 302(k) squarely in view when it enacted CAA Section 112(d)(2) in 1990.[61] A congressional "mistake" theory is simply not plausible.

Finally, not only is the language of CAA Section 112(d)(3) clear on its face, but also in context using average "emission limitations" in deriving a "floor" standard for existing sources makes good sense. As EPA well knows, in order for a source to be in compliance with an "emission limitation" at all times, the source subject to that limitation will have to have *actual* emissions *lower* than the *allowable* level in the emission limitation. Moreover, where emission limitations had been established prior to the 1990 CAA Amendments, they would be expected to address the higher emitting sources of HAP in a category, not the lowest emitting sources in a category. However, in this case, not only does EPA's use of actual emissions produce a more stringent "floor" than the one that would be derived from an "emission limitation," but also EPA's use of actual emissions from the "best performing" existing furnaces mandates control levels that are only achievable by the lowest emitting furnaces that process low-mercury-content ore.[62] Congress knew the difference between achieving reductions based on the actual emission performance that new sources could incorporate into their design, and requiring reductions based on an average

[61] The phrase ". . . design, equipment, work practice, or operational standard . . . ." finds its antecedents in the provisions of subsection (h) of CAA Section ***111***, which subsection was added to Section 111 by the Clean Air Act Amendments of 1977. And there can be little doubt that Congress was tracking CAA Section 111's use of this phrase from 1977 when it adopted it into CAA Section 112(d)(2)(D) in 1990. Notably, however, Congress had *not* originally included the words ". . . design, equipment, work practice, or operational standard . . ." as part of the definition of "emission limitation"/"emission standard" when it first enacted that definition (*i.e.*, as subsection (k) of CAA § 302) in 1977. This serves to establish that Congress could have *only* had then-new CAA § 112 in mind when it made the corresponding amendment to the language of subsection (k) of CAA Section 302 in 1990. Not only are these same words to be found in paragraph (d)(2) of CAA Section 112, but, at the same time, Congress was adding in 1990 a corresponding subsection (h), entitled "Work practice standards and other requirements," to CAA Section 112, in order to ensure that, where properly established, a "design, equipment, work practice, or operational standard" would be deemed to be a CAA Section 112 "emission standard."

[62] *See* 88 Fed. Reg. at 30,922.

"emission limitation" that would define a control level higher than the actual emissions from sources subject to the "emission limitation." Congress explicitly made this distinction plain on the face of CAA Section 112 itself by using distinctly different language in two sentences located back-to-back in the very same paragraph (3) of CAA Section 112(d).

IV. Because the Proposed Mercury Limits for Indurating Furnaces Are Flawed (Even Based on EPA's View of the Law), They Should Not Be Adopted.

A. EPA relied on erroneous data to support the proposed MACT.

1. Industry advised EPA of errors in dataset in March 2023.

As detailed below, EPA sent a table summarizing the results of mercury stack testing at taconite indurating furnaces to AISI and U. S. Steel on February 23, 2023. This February 23, 2023, table is virtually identical to Table 3.3 titled "Mercury Emissions Data for Stack Tests Completed Between 2014 and 2022" in EPA's February 2023 memorandum "Emissions Data Collected in 2022 for Indurating Furnaces Located at Taconite Iron Ore Processing Plants" (February 2023 Emissions Data Memorandum).[63] After reviewing and analyzing the data provided by EPA, industry submitted information to EPA on March 13, 2023, identifying several errors and also explaining what corrections needed to be made.[64] EPA never corrected those errors, and as noted in the May 15, 2023 preamble to the proposed rulemaking, EPA continues to rely upon its flawed February 2023 memorandum to support its proposed MACT standard. While EPA acknowledged receipt of industry's corrections, the preamble stated that the information was not reviewed due to insufficient time. Because at least one of these corrections has significant consequential effects on EPA's support for the proposed MACT standard, industry is providing the corrected information in context so EPA can readily assess the error's impacts on this rulemaking. If EPA moves forward with this rulemaking without taking account of, and correcting, the errors which have been brought to its attention, any final MACT standard that it may promulgate, based on this flawed data, would be arbitrary and capricious, unreasonable, and an abuse of discretion. EPA must therefore re-assess whether and how to proceed in light of the rather significant implications which are explained in more detail in Section VI.

[63] Memorandum from David Putney, EPA, Office of Air Quality Planning and Standards, to Docket ID No. EPA-HQ-OAR-2017-0664, *Emissions Data Collected in 2022 for Indurating Furnaces Located at Taconite Iron Ore Processing Plants* (Feb. 2023), EPA-HQ-OAR-2017-0664-0256.

[64] Email from Paul Balserak, AISI, to Steve Fruh, David Putney, & Chuck French, *Proposed Corrections to EPA's Mercury Stack Test Data* (Mar. 13, 2023), EPA-HQ-OAR-2017-0064-0223; AISI and U. S. Steel, *Proposed Corrections to Mercury Stack Test Data* (Mar. 13, 2023), EPA-HQ-OAR-2017-0064-0223_attachment_1; Excel workbook with Proposed Corrections and Corrected Dataset worksheets, EPA-HQ-OAR-2017-0064-0223_attachment_2.

2. The docket reflects erroneous short-term average emission rates for certain indurating furnaces.

The following table lists each taconite furnace along with the original short-term emission rate that EPA calculated from individual stack test runs and that was presented in both the February 23, 2023 table sent directly to industry and Table 3.3 from EPA's February 2023 Emissions Data Memorandum. The third column of the table provides the corrected average from the stack test data for each unit. Several of the changes are small, possibly due to a rounding error. The most significant error industry noted is for the Keetac furnace where EPA's table identified an emission rate of 6.43E-05 pounds per long ton (lb/LT). The correct figure is 2.34E-05 lb/LT. In its March 13, 2023, submittal to EPA, industry explained that EPA's dataset included what appeared to be typographical errors in the Run 1 and Run 2 results for Keetac's 2017 stack testing. Instead of 1.95E-**04** and 2132.13.E-**04**, the results were in fact 1.95E-**05** lb/LT and 2.13E-**05** lb/LT, respectively.

Table IV.1 Corrections to Short-Term Mercury Emission Rates

Corrections to Average Mercury Emission Rates Based on Industry's March 13, 2023, Data Corrections (Pounds of mercury per Long Ton of Production)				
Unit	**EPA's Original rate**	**Corrected rate**	**Changed?**	**Note**
UTAC Line 1	2.62E-05	2.62E-05	N/A – No Change	NA
UTAC Line 2	2.22E-05	2.21E-05	Yes	NA
Minorca	1.91E-05	1.92E-05	Yes	NA
HTC Line 1	1.85E-05	1.97E-05	Yes	NA
HTC Line 2	2.63E-05	2.63E-05	N/A – No Change	NA
HTC Line 3	2.51E-05	2.50E-05	Yes	NA
NSM Furnace 12	8.57E-07	8.57E-07	N/A – No Change	NA
NSM Furnace 5	8.57E-07	8.57E-07	N/A – No Change	Assumed equal to NSM Furnace 12
NSM Furnace 6	8.57E-07	8.57E-07	N/A – No Change	Assumed equal to NSM Furnace 12
NSM Furnace 11	8.57E-07	8.57E-07	N/A – No Change	Assumed equal to NSM Furnace 12
Tilden Kiln 1	4.67E-06	4.17E-06	Yes	NA
Tilden Kiln 2	4.67E-06	4.17E-06	Yes	Assumed equal to Tilden Kiln 1
Keetac	**6.43E-05**	**2.34E-05**	Yes	NA

Table IV.1 Corrections to Short-Term Mercury Emission Rates

Corrections to Average Mercury Emission Rates Based on Industry's March 13, 2023, Data Corrections (Pounds of mercury per Long Ton of Production)				
Unit	**EPA's Original rate**	**Corrected rate**	**Changed?**	**Note**
Minntac Line 3	9.43E-06	9.44E-06	Yes	NA
Minntac Line 4	1.62E-05	1.15E-05	Yes	NA
Minntac Line 5	1.62E-05	1.14E-05	Yes	NA
Minntac Line 6	1.62E-05	1.23E-05	Yes	NA
Minntac Line 7	1.62E-05	1.62E-05	Yes	NA

Given that EPA failed to utilize the corrected stack test run data as requested by Industry Commenters, the average emission rate that EPA calculated for the Keetac furnace was wrong, and egregiously so.

3. Use of erroneous short-term data led to incorrect annual baseline emission rates.

EPA used the average short-term rates in units of lb/LT to calculate each furnace's annual baseline mercury emission rates in pounds per year. As noted above, some of the average short-term rates that EPA used to make these calculations were incorrect. When a unit's average short-term rate is corrected, as reflected in Table IV.1 above, subsequent corrections would need to be made to the projected annual baseline emissions for each of those units. The corrected baseline rates are provided in Table IV.2 below. Most of the changes are relatively minor except for the Keetac furnace. In the case of the Keetac furnace, the annual baseline rate, as corrected, goes from 342.2 pounds per year to 121.8 pounds per year – *i.e.*, reflecting a 64 percent lower rate and a reduction of 220 pounds per year. The change is so significant that it materially affects the baseline rate for all of the furnaces combined. With all of the corrections taken into account, the calculations reflected in Table IV.2 demonstrate that EPA overstated the mercury baseline emissions by almost 200 pounds. Instead of a baseline of 1,010 pounds per year, the baseline should have been estimated at 816 pounds per year.

Table IV.2 Corrections to Mercury Baseline Data

Corrections to Mercury Baseline Data Based on Industry's March 13, 2023, Data Corrections (lbs. Hg/year)			
Unit	**EPA's Original rate**	**Corrected rate**	**Note**
UTAC Line 1	53	51.7	Corrected
UTAC Line 2	101.5	98.8	Corrected
Minorca	57.9	56.6	Corrected
HTC Line 1	57.3	59.5	Corrected
HTC Line 2	93.9	91.7	Corrected
HTC Line 3	69.4	67.5	Corrected

Table IV.2 Corrections to Mercury Baseline Data

Corrections to Mercury Baseline Data Based on Industry's March 13, 2023, Data Corrections (lbs. Hg/year)			
NSM Furnace 12	1.7	1.7	N/A - No Change
NSM Furnace 5	0.7	0.7	N/A - No Change
NSM Furnace 6	0.7	0.7	N/A - No Change
NSM Furnace 11	1.7	1.6	Corrected
Tilden Kiln1	21.3	18.6	Corrected
Tilden Kiln2	20.9	18.3	Corrected
Keetac	**342.2**	**121.8**	**Corrected (difference of 220.4 pounds)**
Minntac Line 3	17.9	17.5	Corrected
Minntac Line 4	38.2	52.4	Corrected
Minntac Line 5	37.4	51.8	Corrected
Minntac Line 6	40.3	52.0	Corrected
Minntac Line 7	54.5	53.2	Corrected
Total	**1,011**	**816**	**NA**

EPA cannot proceed with the proposed mercury limit given the magnitude of this error.

4. Use of erroneous baseline data led to overstated mercury removal rates.

EPA used the baseline pound-per-year mercury rates for each furnace to estimate how much mercury would be reduced at each furnace if industry added pollution control equipment to meet the proposed MACT limit. Because EPA's estimated removal rates were based on the baseline rates, and because several of the furnaces' baseline rates had been incorrectly calculated, the removal rates for those furnaces are also incorrect. EPA's removal rates should be revised based on appropriate corrections in the underlying data. Industry has used corrected data to estimate the total quantity of mercury expected to be removed on a unit-specific basis as follows. While most of the corrections are insignificant, the Keetac furnace is projected to reduce its mercury emissions by only 49 pounds per year instead of 268 pounds per year, as EPA's flawed data had indicated. This is an enormous overestimation for the Keetac furnace, and it affects the total removal rate. EPA had estimated a total removal rate of 462 pounds per year. The estimate using corrected data is only 242 pounds per year, about half of the original estimate. This information is presented in Table IV.3 below.

Table IV.3 Corrections to Mercury Removal Rates

Corrections to Mercury Removal Rates Based on Industry's March 13, 2023, Corrected Data (Pounds of mercury per year)		
Unit	EPA's Original rate	Corrected rate
UTAC Line 1	25	24
UTAC Line 2	37	36
Minorca	16	15
HTC Line 1	14	17
HTC Line 2	44	43
HTC Line 3	31	30
NSM Furnace 12	0	0
NSM Furnace 5	0	0
NSM Furnace 6	0	0
NSM Furnace 11	0	0
Tilden Kiln1	0	0
Tilden Kiln2	0	0
Keetac	**268**	**49**
Minntac Line 3	0	0
Minntac Line 4	7	7
Minntac Line 5	7	7
Minntac Line 6	7	7
Minntac Line 7	7	7
Total	**462**	**242**

Because EPA's cost-effectiveness rates are based on these annual emission reduction rates, EPA must address the impact of these errors on its rulemaking before proceeding.

B. EPA's MACT floor analysis is flawed because it was not based on *performance* and did not take into account what actually drives emissions

EPA used emissions data alone to establish the proposed mercury MACT floor.[65] Specifically, EPA relied on stack test data from 2014 through 2022 for 14 out the 18 existing furnaces to establish an average emission rate for each furnace.[66] EPA then ranked the furnaces based on those

[65] Memorandum from David Putney, EPA Office of Air Quality Planning and Standards, to Docket ID No. EPA-HQ-OAR-2017-0664, *Maximum Achievable Control Technology (MACT) Analysis for Proposed Mercury Standards for Taconite Iron Ore Indurating Furnaces* (Apr. 4, 2023), EPA-HQ-OAR-2017-0664-0258 (April 4, 2023 OAQPS Memorandum).

[66] April 4, 2023 OAQPS Memorandum at 11.

average emission rates from lowest to highest. From that ranking, EPA produced the following table, copied from the memorandum, included as Figure IV.1.[67]

Figure IV.1 EPA MACT Floor Ranking by Furnace

Table 4.1-2. Induration Furnaces – Mercury Emissions Ranking from IR Test Data

Facility	Mercury (lb/LT of pellets produced)	Rank	Used in MACT Floor?
Northshore Mining Company, MN	8.57E-07	1	Yes
Tilden Mining Company L.C., MI	4.67E-06	2	Yes
Minntac, MN, Line 3	9.43E-06	3	Yes
Minntac, MN, Line 5	1.14E-05	4	Yes
Minntac, MN, Line 4	1.15E-05	5	Yes
Minntac, MN, Line 6	1.22E-05	6	No
Minntac, MN, Line 7	1.62E-05	7	No
Hibbing, MN, Line 1	1.85E-05	8	No
Minorca, MN	1.91E-05	9	No
UTAC, MN, Line 2	2.22E-05	10	No
Hibbing, MN, Line 3	2.51E-05	11	No
UTAC, MN, Line 1	2.62E-05	12	No
Hibbing, MN, Line 2	2.63E-05	13	No
Keetac, MN	6.43E-05	14	No

EPA selected the top five as "the best performing indurating furnaces" for purposes of the MACT floor pool.[68] The floor pool included one of the four furnaces located at the Northshore Mining Company facility (specifically, the furnace designated Furnace 12), one of the two furnaces located at the Tilden Mining Company facility (specifically, the furnace designated EUKILN1), and three of the five furnaces located at the Minntac facility (specifically, the furnaces designated Line 3, Line 5, and Line 4).[69] EPA then determined the distribution of the MACT pool dataset by applying two different statistical tests before calculating the upper prediction level (UPL). EPA compared the UPL to a number equal to the representative detection limit multiplied by three to account for variability to come up with the UPL-based MACT floor of 1.4×10^{-5} lb/LT of pellets produced. EPA proposed this emission limit as the MACT standard for existing furnaces.

By relying on stack test data alone, EPA did not undertake an appropriate analysis as to *performance* of the units, which is required under Section 112. The preamble concedes that the proposal lacks basis in any technology or control that is being applied to achieve the purported emission performance levels. EPA did not consider whether one unit "performed" better than another. None of the furnaces has installed air pollution control equipment designed to reduce

[67] *Id.* at 12.
[68] *Id.*
[69] *See id.* at 9 (Tbl. 3.1), 10 (Tbl. 3.2).

mercury emissions, and in fact there are no technologies proven to be technically or economically feasible to control mercury emissions from taconite indurating furnaces (refer to Sections V and VI for details).

When determining the best performers, EPA failed to take into account two key facts: (1) that the mercury content of the raw materials being treated in the indurating furnaces is *the* driver of mercury emissions; and (2) that the mercury content of those raw materials varies significantly among mines, with rates being lower for mines located in the east and much higher for mines located in the west. EPA did not take this critical information into account even though these are the raw materials (the ore) that are essential to the production of the taconite iron ore pellets that the facilities process. By relying only on emissions data from stack tests for individual furnaces, EPA did not actually rank the facilities based on *performance*. Instead, EPA's ranking reflects nothing more than *raw material inputs*.

That is, taconite facilities with higher mercury emission rates happen to be located in regions where the taconite ore contains a higher mercury content.[70] At the same time, each of the five so-called *best performing* indurating furnaces has low emissions simply because it "happens to be blessed with good inputs, not because [the particular furnace] is using a superior control technology."[71] As applied in the context of the taconite iron ore processing industry, EPA's approach of basing the best performers on the "lowest emission levels" is impermissible. The D.C. Circuit has explained that:

> [N]othing in the statute requires EPA to use the MACT approach. Section 7412(d)(3) requires only that EPA set floors at the emission level achieved by the best-performing sources. If EPA cannot meet this requirement using the MACT methodology, *it must devise a different approach capable of producing floors that satisfy the Clean Air Act.*[72]

When responding to comments more than two decades ago, EPA realized this limitation on this approach to identifying best performers when it stated:

> Based on these facts, EPA cannot accept the comment that it must establish a floor standard by averaging the lowest mercury emission values of the *so-called best performing 12 percent of sources*. In the next performance test, all of these mercury values could be higher (no matter what method would be used to establish *"best performing*"), because there are no means of controlling ore concentrations or feasibly using fuel substitution. Such a standard simply could not be achieved by any source. Not only is this not the intent of a technology-based standard, but it

[70] For more information, please see Email from Paul Balserak, AISI, to Steve Fruh, David Putney, & Chuck French, *Proposed Corrections to EPA's Mercury Stack Test Data* (Mar. 13, 2023), EPA-HQ-OAR-2017-0064-0223; AISI and U. S. Steel, *Proposed Corrections to Mercury Stack Test Data* (Mar. 13, 2023), EPA-HQ-OAR-2017-0064-0223_attachment_1; Excel workbook with Proposed Corrections and Corrected Dataset worksheets, EPA-HQ-OAR-2017-0064-0223_attachment_2. In addition, this dataset is further explained in Section VII herein.
[71] *Cf. Portland Cement Ass'n v. EPA*, 665 F.3d 177, 194 (D.C. Cir. 2011) (Brown, J. concurring).
[72] *Sierra Club v. EPA* 479 F.3d 875, 882 (D.C. Cir. 2007) (per curiam) (quoting *Cement Kiln Recycling Coal. v. EPA*, 255 F.3d 885, 864-65 (D.C. Cir. 2001) (emphasis added).

> would result in sources being out-of-compliance and, thus, possibly shutting them down. This is not how MACT was intended to function. "MACT is not intended … to drive sources to the brink of shutdown . . ." (H.R. Rep. No. 101-490, 101st Cong. 2d sess. 328).[73]

EPA has since taken an impermissibly pinched view of standard-setting that has led to a floor that even "best-performing" units for this source category cannot guarantee consistent achievement with because it fails to account for known variability in mercury content of the feed inputs for indurating furnaces and other industry constraints. In other words, the limit is in fact not being "achieved" by the best performing existing sources. Section 112(d)(3) plainly states that any MACT limit for existing sources must be one that is at least achieved by sources in the source category, since it is "the average emission limitation achieved by the best performing 5 sources […] in the category or subcategory for categories or subcategories with fewer than 30 sources."[74]Unachievable standards could force the unnecessary shutdown of otherwise efficient and high performing American facilities—clearly not what Congress intended. In addition, this is consistent with EPA's position as discussed in the Taconite Iron Ore Processing NESHAP promulgated in 2003. There, EPA stated: "There is no way to set a floor standard for mercury that is 'achievable,' as required by CAA section 112(d)(2), because there is no standard that can be duplicated by different sources or replicable by the same source."[75]

For facilities processing iron ore with higher levels of mercury, EPA asserts that activated carbon injection (ACI) with high efficiency venturi scrubbers is available to control mercury emissions from the indurating furnaces, presumably indicating that the proposed mercury standards are achievable because of this technology—a technology that is not in place at *any* taconite facility that would be subject to the proposed regulation. EPA's reliance on unproven technological controls is not a solution to the achievability issue, nor is it appropriate in the face of the high cost and retrofitting overhauls that ACI would require.

The taconite iron ore processing industry is depended upon by the steel industry in the United States. Potential shutdown of taconite facilities could result in limits on the availability of domestic taconite pellets to domestic integrated steel producers and ultimately could shift steel production outside the United States, both increasing emissions elsewhere (with potentially less regulatory restriction on air emission) and creating a safety issue if regulations were to render uneconomical the production or procurement of the high-class of iron and steel produced within the United States, which is necessary for the safe transportation, construction, infrastructure, and national defense that the country relies upon.

Because EPA did not properly establish the MACT floor by determining the best performers, and because even the best performers may not be able to achieve the proposed MACT limit, EPA cannot proceed with the proposed mercury standards for indurating furnaces.

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[73] EPA, *National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing*, Final Rule, 68 Fed. Reg. 61,878, 61,879 (Oct. 30, 2003) (emphases added).
[74] CAA § 112(d)(3), 42 U.S.C. § 7412(d)(3).
[75] 68 Fed. Reg. at 61,878.

C. The proposed MACT floor is flawed because the five best performing sources cannot necessarily meet the limit "every day and under all operating conditions."

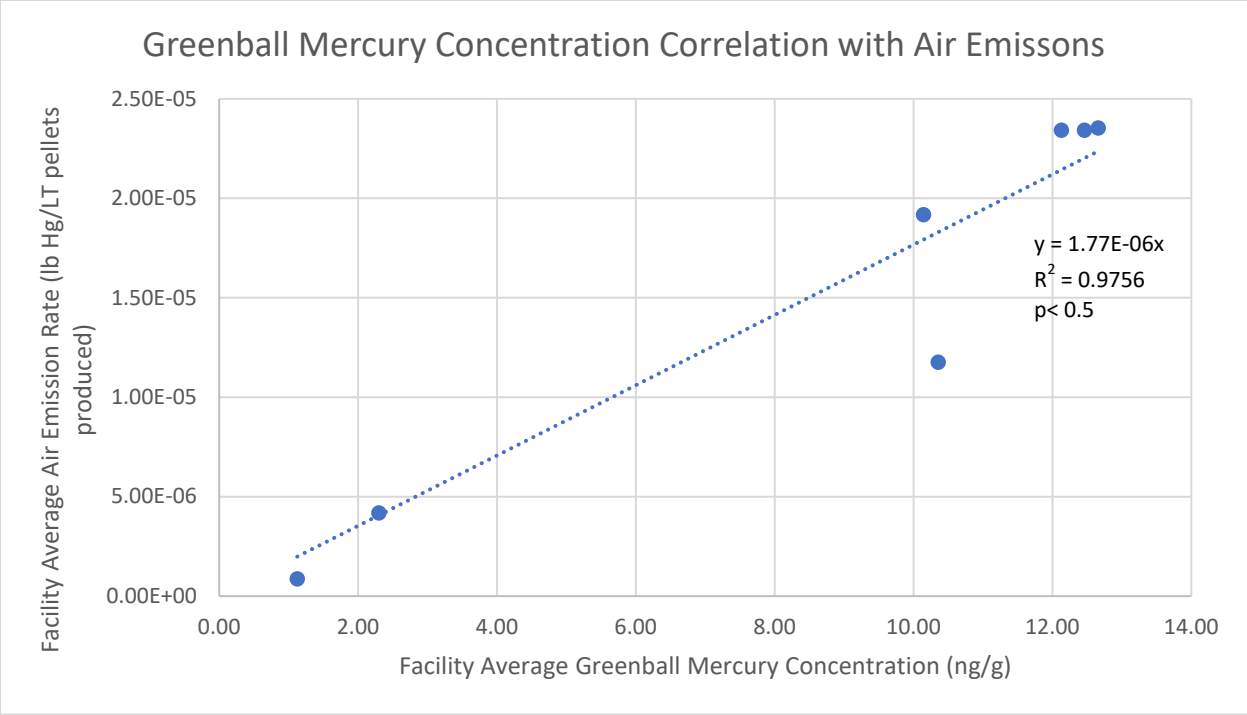
EPA has predicted that the five top performers would not need to install pollution controls to meet the proposed MACT limit. This is an incorrect assumption. Even the five "best performers" may not always be able to meet the standard because EPA based the floor on stack test data alone and failed to take into account the mercury content variability in the raw material input to the furnaces, known as greenballs. Because the MACT floor must be set at a level that the best-performing sources "can expect to meet every day and under all operating conditions,"[76] and because the mercury content variability prevents this, EPA must revise its proposed standard taking into account this variability.

EPA has admittedly not taken into account the data that industry provided on February 14, 2023, which included not only mercury concentration data for greenballs but also an analysis confirming a direct and statistically significant correlation between greenball[77] mercury concentrations and indurating furnace air emissions, which is reflected in Figure IV.2 below.

[76] EPA, *National Emission Standards for Hazardous Air Pollutants: Manufacture of Amino/Phenolic Resins*, Proposed Rule, 82 Fed. Reg. 40,103, 40,108 (Aug. 24, 2017) (citing *Mossville Environmental Action Now* v. *EPA,* 370 F.3d 1232, (D.C. Cir. 2004)).

[77] EPA has interpreted "raw materials" fairly broadly to include processed feed. For example, in the development of standards for lime kilns, EPA found that kiln feed data was "more representative of the variability" than quarry sample data because it was "more homogenized" and "more representative of the raw material fed to the lime kiln." EPA, *National Emission Standards for Hazardous Air Pollutants: Lime Manufacturing Plants Amendments*, Proposed Rule, 88 Fed. Reg. 805, 812 (Jan. 5, 2023).

Figure IV.2 - Correlation of Greenball Mercury Concentration and Mercury Air Emission Factor



EPA should have taken this correlation into account when developing the proposed MACT standard. Using this correlation, EPA could make a "reasonable estimate" of emissions for the best performing indurating furnaces under operating conditions that are not reflected in the existing stack test data but are nonetheless anticipated to occur based on historical greenball concentration data. This data indicates that some of the units in the floor would exceed the limit on occasion, which is reflected in the table below. Because EPA has failed to take into account the greenball mercury content data or otherwise provided for variability in the raw material inputs, allowing the best performers to exceed the standard, EPA must not issue this unreasonable standard and must take this variability into account to allow the best performers to meet the MACT floor during "all operating conditions."[78]

[78] EPA, *National Emission Standards for Hazardous Air Pollutants: Manufacture of Amino/Phenolic Resins*, Proposed Rule, 82 Fed. Reg. 40,103, 40,108 (Aug. 24, 2017) (citing *Mossville Environmental Action Now* v. *EPA,* 370 F.3d 1232, (D.C. Cir. 2004)).

Table IV.4 Greenball Data and Projected Mercury Emission Rates

Facility	No. of Greenball Samples	Average Greenball Hg. Conc. (ng/g)	Maximum Greenball Hg Conc. (ng/g)	Greenball - Air Emission Correlation (lb/LT)/(ng/g)	Predicted Hg Emissions from Greenballs with Maximum Hg Conc. (lb/LT pellets produced)	EPA Proposed MACT Limit for Existing Sources	Met or Exceeded?
NSM	3	1.1	1.4	1.77E-06	2.5E-06	1.4E-05	Met
Tilden	35	2.3	15	1.77E-06	2.7E-05	1.4E-05	Exceeded
Minntac	37	10.4	25	1.77E-06	4.4E-05	1.4E-05	Exceeded

D. ACI with High Efficiency Venturi Scrubbers May Create Adverse Environmental Impacts.

ACI may not be effective in reducing mercury impairments in lakes and rivers in northern Minnesota nor mitigate any health risks. EPA appears to assume in its proposal that the health risks associated with elemental mercury within this area would decrease under its proposed rule, but this has not been demonstrated. While ACI may reduce a portion of the elemental mercury emitted from taconite indurating furnaces, existing literature suggests that the mercury within the northern Minnesota airshed and associated health risks are not from local emission sources. According to the Minnesota Pollution Control Agency, "about 90% of the mercury that is deposited on Minnesota originates as air emissions from sources outside of the state."[79] This reality follows from the fact that elemental mercury that is being emitted from a taconite facility is *not* depositing locally. Elemental mercury has an atmospheric lifetime of several months to a year and is transported great distances. Elemental mercury, when emitted to the atmosphere, can readily travel for hundreds to thousands of miles before deposition occurs.[80]

Currently, elemental mercury accounts for approximately 90% of the baseline mercury emissions from taconite indurating furnaces.[81] The application of ACI technology, however, would result in a higher percentage of particulate bound mercury emissions (i.e., mercury adsorbed to activated

[79] Minnesota Pollution Control Agency, *Implementation Plan for Minnesota's Statewide Mercury Total Maximum Daily Load* at 19 (Oct. 2009), https://www.pca.state.mn.us/sites/default/files/wq-iw4-01p.pdf.

[80] State of Florida, Florida Department of Environmental Protection, Division of Environmental Assessment and Restoration, *Final Report, Mercury TMDL for the State of Florida* at 120 (Oct. 24, 2013), https://floridadep.gov/sites/default/files/Mercury-TMDL.pdf; *see also*, Technical Memorandum from Cliff Twaroski, Barr Engineering and Environmental Consultants, to Minnesota Taconite Industry, *Summary of Emissions Speciation Change on Potential Mercury Loading to Northeast Minnesota* (Dec. 14, 2018), provided in the appendices to these comments; Letter from U. S. Steel and Cleveland-Cliffs to Hassan Boucharedb, Minnesota Pollution Control Agency, *Taconite Industry Mercury Reduction Plans: Response to MPCA comments on to mercury emissions speciation, speciation changes affecting local deposition (loading), and relevance to the Statewide Mercury TMDL* (Dec. 16, 2020), included in the appendices to these comments.

[81] *See* 88 Fed. Reg. at 30,922.

carbon that is not captured by the particulate control device). Such emissions would, in turn, be expected to deposit locally, resulting in potentially greater degradation of northern Minnesota watersheds. EPA gives no indication that it has taken this anomalous result into account. Indeed, EPA apparently fails to appreciate that this result could happen even if there was a reduction in overall mercury emissions. Applying a control technology that results in some reduction in total mercury air emissions, but which would increase the amount of oxidized and/or particle-bound mercury air emissions—with a corresponding increase in deposition to nearby waterbodies—would of course be contrary to the state and federal goals of reducing water impairments and health risks. It would also mean that EPA's mercury MACT standard, rather than serving to protect human health and the environment, could very well serve to make things worse. EPA's apparent failure to have anticipated that its proposal could have such a counterproductive outcome is not only ironic, it underscores that final promulgation of the mercury MACT standard, as it has been proposed, would be arbitrary and capricious, and wholly unreasonable, agency action *per se*.

A December 2018 Technical Memorandum[82] prepared on behalf of the Minnesota Taconite Industry and submitted to the Minnesota Pollution Control Agency outlined the unacceptable environmental impacts (*i.e*., increased local deposition) with a shift towards more particle-bound mercury emissions from ACI. Specifically, available literature indicates that an increase in local mercury deposition (loading) results in an increase in fish tissue mercury concentrations, which contradicts the goals and intent of the Section 112 of the CAA and the Minnesota Statewide Mercury TMDL (total maximum daily load) program. Dr. David Grigal (Professor Emeritus, University of Minnesota) and Dr. Edward Nater (Professor, University of Minnesota) performed a critical review of the 2018 Technical Memorandum. Dr. Nater summed up the overall peer review findings as follows:

> While we all agree it would be beneficial to reduce or eliminate mercury emissions, reducing gaseous elemental mercury emissions while simultaneously increasing oxidized mercury (reactive mercury) and/or particulate mercury emissions is not a desirable outcome.[83]

It is unknown if EPA's proposed mercury controls of ACI with a high efficiency venturi scrubber would be able to sufficiently capture carbon particles to acceptable levels preventing increases in particle-bound mercury emissions and creating a net benefit to the areas surrounding the taconite iron ore facilities. Therefore, ACI with high efficiency venturi scrubbers may increase local mercury deposition, while resulting in waste disposal issues that would adversely impact communities in surrounding areas. EPA's proposed ACI with high efficiency venturi scrubbers would generate spent activated carbon waste in significant quantities. Disposal and waste-handling requirements for spent activated carbon are unclear and would require further testing, investigation, and consultation and direction from local and state authorities. Local disposal could have the potential to adversely impact surrounding areas. There is no discussion in the rule about

[82] Technical Memorandum from Cliff Twaroski, Barr Engineering and Environmental Consultants, to Minnesota Taconite Industry, *Summary of Emissions Speciation Change on Potential Mercury Loading to Northeast Minnesota* (Dec. 14, 2018), provided in the appendices to these comments.

[83] Doctors David Grigal, Professor Emeritus at the University of Minnesota, and Edward Nater, Professor at the University of Minnesota, performed a critical review of the 2018 memorandum.

the water impacts of a high efficiency venturi scrubber. If the scrubber results in better sulfur dioxide removal, that in turn creates additional sulfate loading to plant water systems. Sulfate is a contaminant of concern in water within the state of Minnesota and the ability to permit a new system is unclear.

V. The Proposed Mercury Emission Limitations Present a Host of Technical Feasibility Concerns.

To meet the proposed mercury MACT limit, indurating furnaces would need to be equipped with add-on mercury control technology. None of the 18 indurating furnaces in the United States has ever installed or operated mercury controls and none are available. EPA has suggested that technology could be transferred from other industry sectors to indurating furnaces, but the taconite iron ore processing facilities are unique, and the technology is not necessarily transferrable—especially given that EPA is recommending a combination of not only activated carbon injection controls, which would be challenging enough for a new application, but also high efficiency venturi scrubbers. Even if the controls are installed and function as intended, industry still has no certainties as to the level of mercury removal achievable. With unproven technology and no guarantees as to removal efficiencies, industry is concerned both about compliance and costs. EPA should not force industry's hand by establishing a limit that may not be achievable and which could turn out to be much more costly than currently anticipated. Congress certainly never intended for EPA to set limits that would require companies to "just figure it out" at significant cost. Before proceeding, EPA should take into account industry's concerns regarding the technological feasibility of mercury controls and reconsider its proposal accordingly.

A. The use of add-on control technology to reduce mercury emissions, on indurating furnaces is unproven and uncertain.

EPA's proposal relies on the future installation of ACI with high efficiency venturi scrubbers as a technically feasible mercury emissions reduction technology in the taconite iron ore processing industry. However, no add-on mercury emission reduction technologies are currently in use or proven in the taconite industry. To date, only limited, very short-term testing has been completed with various mercury reduction technologies. In addition, there are significant technical hurdles posed by ACI with high efficiency venturi scrubbers and other mercury emission reduction technologies, such as ACI with a baghouse, ACI with dry electrostatic precipitators (ESPs), GORE, and fixed carbon beds, and therefore, those technologies are not considered as technically feasible mercury emission reduction technologies for taconite indurating furnaces. Further detail is included in the *Technical Feasibility Evaluation of Mercury Controls* technical memorandum included as Appendix 3. Any new particulate controls required to accommodate the technologies would need to replace the existing particulate controls. A summary of the major technical concerns associated with each of these technologies is summarized in Table V.1 below.

Table V.1 Technical Concerns with Mercury Emissions Reduction Technologies

Mercury Emissions Reduction Technology	Technical Feasibility Concerns
ACI with a Baghouse (Replacement of Existing Particulate Controls)	• Requires new acid gas controls in conflict with EPA's proposed HCl/HF limits. Currently, Minnesota taconite indurating furnace emissions data suggest that baseline emission levels are below the proposed HCl/HF limits. However, Minnesota taconite indurating furnaces that would be required to install new mercury controls due to the proposed rule, would likely not be able to comply with the proposed HCl/HF limits with a dry particulate control device such as a baghouse. • Moisture from pellet drying may impede baghouse operation and performance. • Changed pressure drop compared to existing conditions. • No known successful baghouse installations on indurating furnaces. Mag Pellet LLC (only indurating furnace that operated with a baghouse) failed to meet several emission limits. • It is not well understood what level of mercury reduction could be consistently achieved. • Waste disposal difficulty. • Impacts to facility water balance.
ACI with a Dry ESP (Replacement of Existing Particulate Controls)	• Requires new acid gas controls in conflict with EPA's proposed HCl/HF limits. Currently, Minnesota taconite indurating furnace emissions data suggest that baseline emission levels are below the proposed HCl/HF limits. However, Minnesota taconite indurating furnaces that would be required to install new mercury controls due to the proposed rule, would likely not be able to comply with the proposed HCl/HF limits with a dry particulate control device such as a dry ESP. • Powdered activated carbon (PAC) is likely to slip through the dry ESP due to low carbon particle resistivity compounded by moisture creating a local mercury deposition problem. • It is not well understood what level of mercury reduction could be consistently achieved. • Waste disposal difficulty. • Impacts to facility water balance. • Large footprint relative to other controls.
ACI with a High Efficiency Wet Scrubber (HEWS) (Replacement of Existing Particulate Controls)	• EPA agreed previously that ACI with existing scrubbers has not been demonstrated to be effective at removing mercury.[84] • Carbon slip is expected to remain an issue even with improved PM capture creating a local mercury deposition problem. • It is not well understood what level of mercury reduction could be consistently achieved. • Waste disposal difficulty. • It may not be feasible to separate captured PAC from scrubber water with existing process equipment. • Impacts to facility water balance and increased sulfate water loading.

[84] EPA, *Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Sewage Sludge Incineration Units,* Final Rule, 72 Fed. Reg. 15,372, 15,393 (Mar. 21, 2011).

Mercury Emissions Reduction Technology	Technical Feasibility Concerns
GORE	• Wash water mercury and sulfate loading creates an unacceptable environmental impact contrary to other regulatory programs. • Mercury reductions are unpredictable and unreliable, especially at low SO_2 concentrations. • Particulate plugging. • Short module life. • Sulfuric acid erosion of module casing. • Water condensation blocking adsorption sites.
Fixed Carbon Beds with Baghouse (Replacement of Existing Particulate Controls)	• Requires new acid gas controls in conflict with EPA's proposed HCl/HF limits. Currently, Minnesota taconite indurating furnace emissions data suggest that baseline emission levels are below the proposed HCl/HF limits. However, Minnesota taconite indurating furnaces that would be required to install new mercury controls due to the proposed rule, would likely not be able to comply with the proposed HCl/HF limits with a dry particulate control device such as a baghouse. • Not demonstrated for airflows on the magnitude of indurating furnaces. • Moisture blocking adsorption sites. • Particulate plugging. • Possibility of premature carbon fouling. • Waste disposal quantities and requirements. • Massive footprint.

Additional technical concerns regarding ACI with high efficiency wet scrubbers and fixed carbon beds is discussed further below.

B. ACI with high efficiency wet scrubbers and other mercury emissions reduction technologies are not considered technically feasible.

EPA's proposal relies on the future installation of ACI with high efficiency venturi scrubbers as a technically feasible mercury emissions reduction technology in the taconite industry; however, Industry Commenters are not aware of any application of ACI with high efficiency venturi scrubbers in *any* industry, nor is it considered as accepted engineering practice. Installing ACI with high efficiency venturi scrubbers on taconite indurating furnaces is therefore an undemonstrated, novel application.

Moreover, ACI technology with high efficiency venturi scrubbers would not achieve the same estimated removal efficiency associated with ACI applications in other industries, such as the utility industry, as it is not well understood what mercury removal efficiency could reasonably and consistently be achieved in practice, accounting for the unpredictable variation of the mercury content entering the process with the ore (refer to Section VI for additional discussion). In addition, ACI testing with existing wet scrubbers on taconite indurating furnaces showed that the existing scrubbers (not high efficiency venturi scrubbers) could not adequately control the increased carbon loading while maintaining compliance with existing NESHAP particulate emission limits. Further, carbon with captured mercury may slip through the scrubbers, depositing

the mercury close to the emission source. The Minnesota DNR noted in their review of ACI testing reports with the existing wet scrubbers:

> [T]he reports do provide relatively strong evidence that re-emission of particulate-bound mercury is a pervasive issue that must be solved before brominated activated carbon injection methods can be considered suitable for the taconite industry. This potential issue was also identified previously in Phase 1….[85]

Additional discussion can be found under Section IV regarding the potential for increased local mercury deposition. Because of the significant technical hurdles posed by ACI with high efficiency venturi scrubbers as new particulate controls, ACI should not be considered to be a technically feasible mercury emissions reduction technology for taconite indurating furnaces.

C. Fixed Carbon Beds.

Industry Commenters do not agree that fixed carbon beds are suitable for controlling mercury from the taconite iron ore processing industry. EPA states that "[i]n a carbon bed absorber, the flue gas passes through a bed of carbon, where the mercury is absorbed onto the surface of the carbon and is disposed when the carbon bed is replaced. Although they can achieve mercury reductions of greater than 90%, they are not suitable for all waste gas streams."[86] Fixed carbon beds are not suitable or feasible for any of the indurating furnace waste gas streams.

More information regarding the feasibility of mercury controls for indurating furnaces is included in Appendix 3.

[85] Letter from Michael E. Berndt, Minnesota Department of Natural Resources, to Hongming Jiang, Pollution Control Agency, *Review of Phase II Hg Control Reports* at 2 (Oct. 31, 2014), included as Appendix 4.

[86] Memorandum from David Putney, EPA Office of Planning and Air Quality Planning and Standards, to Docket ID No. EPA-HQ-OAR-2017-0664, *Development of Impacts for the Proposed Amendments to the NESHAP for Taconite Iron Ore Processing* at 7, EPA-HQ-OAR-2017-0664-0257 (Mar. 21, 2023) (EPA Proposed Rule Impacts Memorandum).

VI. EPA Severely Overstates Mercury Reductions While Also Understating the Costs to Control Mercury, Resulting in an Unprecedented Cost-Effectiveness Rate.

As explained in more detail below, EPA's cost estimates are severely flawed for a number of reasons, including a miscalculation of baseline emissions, a compounded miscalculation of how much mercury would be reduced, the use of outdated and generic cost information, and an unsupportable and unreasonable cost-effectiveness rate that cannot stand. Industry Commenters have provided more accurate and more credible emissions data and cost estimates in this section and in the supporting documentation reference. EPA should reconsider its estimates and take into account the information being provided by Industry Commenters.

In 2020, EPA determined that no mercury controls were warranted based on a robust, multi-tiered, multi-pathway health risk assessment. In the 2020 preamble, EPA recognized that industry had undertaken some pilot scale mercury control testing on taconite indurating furnaces and that "these control technologies remain unproven at commercial scale and the amount of mercury reduction achieved by them remain uncertain."[87] Despite this determination under Section 112(f) that human health was protected with an ample margin of safety (AMOS determination) and the lack of technological developments between 2020 and 2023, EPA now proposes a MACT floor determination for mercury emissions from indurating furnaces requiring that unproven technology to be used--citing to the *LEAN* decision as the basis for the rulemaking. As explained in Section V, the record does not include information sufficient to support this reversal in position regarding technical feasibility.

First, EPA's data inputs are wrong and the errors in the inputs – one in particular – significantly affected the results of the analysis, so much so that re-proposal is warranted. In undertaking this rulemaking and as revealed in the following discussion, EPA has miscalculated the emission reductions that could be realized, overstating the only claimed benefit: reducing the quantity of mercury emitted (though as discussed in Sections II and IV, there is no corollary to risk benefits provided). To its credit, on February 23, 2023, EPA sent the companies that had conducted testing in response to the information request the stack test data the agency was intending to use in its calculations, which Industry Commenters understood to be for the purpose of ensuring that the data used for decision-making was correct. The industry went through the results and responded with several corrections and discrepancies on March 13, 2023.[88]

Thus, even though EPA was alerted by Industry Commenters to a significant error in its emissions values for one of the furnaces two months before it released the proposal, a decision was made to proceed with the incorrect data, which resulted in a mathematically incorrect statement of the baseline mercury emissions levels. Also, this error is one that a review of the inputs EPA was

[87] EPA, *National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing Residual Risk and Technology Review,* 85 Fed. Reg. 45,476, 45,485 (July 28, 2020).
[88] *See* Email from Balserak, P. to Putney D., French, C., Fruh, S. with attachments, Mar. 13, 2023, EPA-HQ-OAR-2017-0664-223.

using would have revealed as problematic or a "red flag" to investigate (which EPA does routinely in its review of data to avoid errors).[89] The data, summarized below, is instructive.

This factual mathematical error propagates throughout EPA's analysis, leading to more than a 50 percent error in the expected emission reductions and consequently the cost effectiveness. EPA has also significantly underestimated the total capital and annualized costs for compliance and has not properly taken other environmental impacts into account. While even EPA's flawed cost estimates reflect significant capital and annual expenditures to reduce the small quantity of elemental mercury (which has not been shown to deposit locally near the emission source as discussed in Section IV), the industry has estimated the capital costs to actually be ***six times higher*** at approximately $750 to $800 million with $170 to $180 million in annualized costs for the industry.[90] In addition to these monetary costs, other impacts from the use of the emission controls include increased water use, increased electricity use (which results in increased emissions of several criteria pollutants as well as greenhouse gas emissions from utility providers, along with associated environmental impacts), increased waste production and disposal, and increased transportation activity (which also results in an increase in air emissions).[91]

Why does this matter? By overstating the emission reductions and under-estimating the costs, EPA seriously mis-judged by a ***factor of five*** the cost-effectiveness rate which is higher than industry has identified for any other source category for a MACT floor, and certainly for any beyond-the-floor MACT.

Second, EPA attempts to avoid a serious discussion about the reasonableness of the proposed standard by citing the *LEAN* decision. Given the extreme financial costs to reduce a relatively small quantity of mercury—and smaller than EPA estimated--the unreasonableness of the proposal cannot be ignored, however. For the reduction of 0.121 tons of elemental mercury per year (in truth, some 242 pounds and not the 462 pounds that EPA, based on its own data error, is claiming), across the entire industry EPA is proposing that industry spend $129 million in total capital costs and $71 million in annualized costs to achieve this reduction without any meaningful change in health benefits. As noted in Section II, EPA already determined that human health was sufficiently protected with an ample margin of safety based on existing levels of emissions and EPA has not fully investigated whether the use of ACI with high efficiency venture scrubbers could result in increased bioavailable particle-bound mercury that is deposited locally. The resulting cost-effectiveness rate, even using EPA's otherwise flawed approach to estimating control costs would

[89] For example, the baseline for the Keetac site, which has only one furnace, was threefold the baseline for any other unit at any other facility, and Minntac, which has five furnaces, had lower baseline emissions than Keetac, which has only one. These issues alone should have alerted EPA to the fact that it had an error in the inputs, even without seeking validation from the industry. When the industry raised the issue, and given the discrepancy, EPA should have put correction of this error as a top priority given its magnitude, rather than moving forward with grossly inaccurate data.
[9090] Industry Commenters appreciate that EPA has taken the position that Minntac Line 3 would not need to be controlled. Industry Commenters are still investigating whether controls would be appropriate or not and have therefore calculated costs with and without Minntac Line 3 included. The costs remain very high regardless.
[91] Technical Memorandum from Dane Jensen, Barr, to Jason Aagenes (Cleveland-Cliffs) and Christopher Hardin (U. S. Steel), *Technical Feasibility Evaluation of Mercury Controls* (June 9, 2023), included as Appendix 3 to this submittal

double to nearly $300,000 per *pound* of mercury removed.[92] Based on more accurate, facility-specific cost estimates of around $750 to 800 million in total capital costs and $170 to 180 million in annualized costs, industry estimates a cost-effectiveness rate of nearly $700,000 to $750,000 per pound. EPA claims that it has no discretion to alleviate these costs, but it does. Indeed, it has an obligation to do so.

The following section discusses in greater detail the significance of EPA's overstatement of elemental mercury reductions and resulting implications, and also provides relevant insights on EPA's under-estimation of compliance costs and why industry's estimates are more accurate and representative of costs likely to be incurred to meet the proposed MACT limit.

A. Mercury Reductions Expected.

EPA states that industry's compliance with the MACT floor limit will result in a reduction of 0.25 tons (or 462 pounds) of mercury on an annual basis. These reduction rates are significantly overstated based on several factors, including a typographical error that was brought to the Agency's attention before proposal but that, relying on time constraints, the Agency declined to correct. Industry Commenters have identified needed corrections for two assumptions that EPA apparently used in developing its 462 pound-per-year estimate for the quantity of mercury to be removed, which affect the accuracy of the estimate.

- **Overstated hours of operation.**

EPA's baseline emissions dataset – an assumption, the basis for which EPA has notably failed to provide any explanation or justification whatsoever[93] -- that each of the units will operate 8,400 hours per year. This bare assumption on EPA's part differs from current operations, expected operations going forward, and information in the 2018 mercury reduction plans provided to the Minnesota Pollution Control Agency. EPA needs to use the facility-specific annual operating hours provided in the 2018 mercury reduction plans, which ranged from approximately 7,700 to 8,200,[94] and which are consistent with expected operating hours in the future. Because EPA's

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[92] As discussed in Section VII of these comments, EPA has options available to avoid this outcome, if it would consider them. That Congress clearly did not intend for half of an industry to be hamstrung with such exorbitant costs, for no health benefit, is a clear signal that EPA is on an incorrect interpretive path and that a course correction is, not only appropriate, but required under judicial precedent. *See, e.g., Motor Vehicle Mfrs. Assn. of United States, Inc. v. State Farm Mut. Automobile Ins. Co.,* 463 U.S. 29, 43 (1983) (agency must consider relevant factors); *Util. Air Reg. Grp. v. EPA*, 573 U.S. 302 (2014) (outcome that dramatically swells the cost of a program from its historical costs a signal that EPA took a "wrong interpretive turn"); *Mova Pharm. Corp. v. Shalala*, 140 F.3d 1060, 1068 (D.C. Cir. 1998) (interpretation that produces "absurd results"—*i.e.*, consequences that are "inconsistent with the clear intentions of the statute's drafters," cannot be the compelled reading of a statute and EPA cannot adopt such a reading if other interpretive or practical options avoid the absurd result); *see also Griffin v. Oceanic Contractors, Inc.*, 458 U.S. 564, 575 (1982); *Ala. Power Co. v. Costle*, 636 F.2d 323, 360 (D.C. Cir. 1980).

[93] Memorandum from David Putney, EPA Office of Planning and Standards, to Docket ID No. EPA-HQ-OAR-2018-0664, *Development of Impacts for the Proposed Amendments to the NESHAP for Taconite Iron Ore Processing* (Mar. 21, 2023) at 5 ("We calculated the baseline emissions for each furnace by multiplying the emission rate by the production rate and by 8400 operating hours per year."). EPA provided no explanation for how this "8400 operating hours per year" was derived in this memorandum or in the May 15, 2023 *Federal Register* notice.

[94] EPA-HQ-OAR-2017-064-206 (Minntac); EPA-HQ-OAR-2017-064-205 (United Taconite); EPA-HQ-OAR-2017-064-0203 (Hibbing); EPA-HQ-OAR-2017-064-0207 (Northshore); EPA-HQ-OAR-2017-064-0204 (Keetac). While

assumption of 8,400 annual operating hours overstates both the baseline emission rates and the mercury reduction rates, EPA needs to recalculate these rates based on the more appropriate and accurate facility-specific estimates.

- **Inaccurate Emissions Inputs for the Keetac Facility.**

EPA calculated short-term emission rates for each of the units based on stack test data as explained and summarized in EPA's February 2023 Memorandum, "Emissions Data Collected in 2022 for Indurating Furnaces Located at Taconite Iron Ore Processing Plants."[95] The proposal concedes that it does not incorporate and that EPA did not review the information provided, even though it revealed a fundamental factual error and even though EPA was bypassing Executive Order 12866 review because it represented to the Office of Management and Budget (OMB) that the rule would not have a significant cost impact and did not otherwise implicate the criteria for OMB review.

EPA apparently used its February 2023 dataset to calculate annual baseline emission rates and mercury removal rates expected for the units to comply with the MACT floor limit. For the Keetac furnace, EPA's February 2023 memorandum reflects the calculation of short-term lb/LT and lb/hour rates for mercury based on three separate stack tests that occurred in 2017, 2021, and 2022 and, more specifically, the average of the nine individual test runs. EPA calculated a lb/LT rate of 6.43E-05, which is reflected in Table 3.3 of the memorandum and excerpted here as Figure VI.1.

Figure VI.1 EPA Mercury Emissions Data for Stack Tests Between 2014 and 2022

Facility	Kiln ID	Stack Test Year	Test Method	Run	Run (lb/LT)	Run (lb/hour)	Average (lb/LT)	Average (lb/hour)
Keetac	EU030 (Incorrect)	2017	EPA Method 29	1	1.95E-04	1.20E-02	6.43E-05	1.48E-02
				2	2.13E-04	1.30E-02		
				3	2.02E-05	1.10E-02		
		2021	EPA Method 29	4	2.63E-05	1.70E-02	6.43E-05	1.48E-02 (Correct)
				5	2.65E-05	1.80E-02		
				6	2.22E-05	1.50E-02		
		2022	EPA Method 29	7	2.40E-05	1.50E-02		
				8	2.54E-05	1.59E-02		
				9	2.54E-05	1.61E-02		

not in the EPA docket, the previous owner of the Minorca Mine submitted a mercury reduction plan to MPCA in December 2018, and it is available on MPCA's website: https://tinyurl.com/zetad86d. More complete copies of each of the mercury reduction plans can be accessed on the MPCA's website: https://tinyurl.com/ycktbve9.

[95] Memorandum from David Putney, EPA Office of Air Quality Planning and Standards, to Docket ID No. EPA-HQ-OAR-2017-0664, Emissions Data Collected in 2022 for Indurating Furnaces Located at Taconite Iron Ore Processing Plants (Feb. 2023), Docket No. EPA-HQ-OAR-2017-0664-0256.

Figure VI.2 Keetac 2017 Stack Testing

Table 1
Barr 2017 Mercury Testing - EPA Method 29

Line	HgT	
	lb/Lton	lb/hr
1	1.98E-05	1.20E-02

[1] HgT = Hg measured in the front half (HgP) and backhalf (HgG) of the EPA Method 29 stack test performed on 4/5/2017.

Data

As Industry Commenters pointed out in a March 13, 2023 submittal to EPA, the lb/LT rates that EPA listed for the first two runs from the 2017 stack test for the Keetac furnace are incorrect and instead of 1.95E-**04** lb/LT and 2.13E-**04** lb/LT, the rates were actually 1.95E-**05** lb/LT and 2.14E-**05** lb/LT. Even if EPA had not had two months to review and address the March 2013 information submitted by Industry Commenters that alerted EPA to the emission rate error for Keetac, other information in the docket, such as the 2018 mercury reduction plan for Keetac, included the following information about this particular stack test,[96] showing an average lb/LT rate of 1.98E-**05** (see insert, Figure VI.2).

Figure VI.3 Keetac Annual Mercury Emissions

Table 2
Summary of Annual HgT Emissions From Furnace

Annual Hg Emissions		
Year	Annual Pellet Production Capable of Accommodating	Hg Emission Rate Based on Pellet Production Capable of Accomodating [1]
	Lt/yr	lb/yr
2008	4,945,232	98
2009	4,945,232	98
2010	4,945,232	98
2011	4,847,411	96
2012	5,491,768	109
2013	5,612,207	111
2014	6,036,216	120
2015	6,036,216	120
2016	6,036,216	120
2017	5,795,232	115

[1] A mercury emissions factor in lb Hg / Lton pellet is calculated using stack test data and the pellet throughput data collected during the test. The Hg emissions factor is multiplied by the maximum annual furnace throughput capable of accommodating.

Taking the other stack tests into account, the appropriate short-term rate for EPA to use, as noted in industry's March 13, 2023 submittal, is 2.34E-05 lb/LT. Nevertheless, and relying on its incorrect short-term rate of 6.43E-05 lb/LT, EPA forged ahead stating that the Keetac furnace would emit 342.2 pounds per year without the proposed controls. This was another missed red flag for EPA because the next highest annual emission rate it calculated for any of the other furnaces was 98.8 pounds. EPA could have also calculated the annual rate by multiplying the hourly mass rate of 1.48E-02 by 8,400 hours per year to confirm that the annual baseline rate could not have been higher than 124.3 pounds per year.[97] If the correct information had been used for the 2017 stack test, EPA would have calculated a baseline rate of 121.8 pounds per year. A rate in this range is also consistent with 17 other annual emission rates for Keetac included in the 2018 mercury reduction plan—not three times higher--as reflected in the table copied from the plan (see insert).

By assuming an annual baseline rate of 342.2 pounds instead of 121.8, EPA's error led it to overstate Keetac's baseline rate by 220.4 pounds per year. EPA then used its overstated baseline rate for Keetac to establish an overall annual baseline rate for all of

[96] Appendix C from Keetac 2018 Mercury Reduction Plan, EPA-HQ-OAR-2017-064-0204.

[97] EPA also could have compared its February 2023 dataset to its March 25, 2020 dataset used for the Risk and Technology Review Rulemaking. In that dataset, EPA estimated mercury emissions from the Keetac furnace at 5.16E-05 tons per year, which equates to 103.2 pounds. Memorandum from David Putney, EPA, to Taconite Iron Ore Processing Docket (Docket ID No. EPA-HQ-OAR-2017-0664-0161_content) Table 7, page 10 (Mar. 25, 2020).

the furnaces at 1,010 pounds. This calculation is reflected in EPA's March 21, 2023 Memorandum, "*Development of Impacts for the Proposed Amendments to the NESHAP for Taconite Iron Ore Processing*."[98] The following is a copy of Appendix A of that Memorandum noting the Keetac and facility-wide mercury emission rates, Figure VI.4.

Figure VI.4 EPA's Baseline Annual Emissions Calculation Spreadsheet

Appendix A
Baseline Emissions Factors and Production Rates for Taconite Indurating Furnaces

Facility	Furnace ID	Hg Emissions Rate (lb/LT)	HCl Emissions Rate (lb/LT)	HF Emissions Rate (lb/LT)	Annual Production Rate (LT/hour)	Baseline Annual Hg Emissions (lbs/Year)	Baseline Annual HCl Emissions (Tons/Year)	Baseline Annual HF Emissions (Tons/Year)
Northshore, MN	Furnace 12	8.57E-07	4.68E-03	3.54E-03	237	1.7	4.65	3.52
Northshore, MN	Furnace 5	8.57E-07	4.68E-03	3.54E-03	99	0.7	1.94	1.47
Northshore, MN	Furnace 6	8.57E-07	4.68E-03	3.54E-03	99	0.7	1.94	1.47
Northshore, MN	Furnace 11	8.57E-07	4.68E-03	3.54E-03	232	1.7	4.56	3.45
Tilden, MI	EUKILN1	4.67E-06	2.12E-01	1.01E-02	544	21.3	484	23.1
Tilden, MI	EUKILN2	4.67E-06	2.12E-01	1.01E-02	534	20.9	475	22.6
Minntac, MN	Line 3	9.43E-06	1.41E-03	4.76E-05	226	17.9	1.34	0.045
Minntac, MN	Line 4	1.15E-05	1.41E-03	4.76E-05	395	38.2	2.34	0.079
Minntac, MN	Line 5	1.14E-05	1.41E-03	4.76E-05	391	37.4	2.32	0.078
Minntac, MN	Line 6	1.22E-05	1.45E-03	4.22E-03	392	40.3	2.39	6.94
Minntac, MN	Line 7	1.62E-05	1.45E-03	4.22E-03	401	54.5	2.44	7.10
Keetac, MN	EU030	6.43E-05	1.21E-04	5.12E-05	634	342.2	0.32	0.136
UTAC, MN	Line 1	2.62E-05	3.69E-03	1.42E-04	241	53.0	3.73	0.144
UTAC, MN	Line 2	2.22E-05	3.69E-03	1.42E-04	545	101.5	8.44	0.326
Minorca, MN	EU026	1.91E-05	1.57E-02	4.84E-03	360	57.9	23.8	7.32
Hibbing, MN	Line 1	1.85E-05	5.64E-03	1.19E-02	368	57.3	8.71	18.4
Hibbing, MN	Line 3	2.63E-05	5.64E-03	1.19E-02	425	93.9	10.06	21.3
Hibbing, MN	Line 2	2.51E-05	5.64E-03	1.19E-02	329	69.4	7.79	16.5
Estimated Baseline Emissions (Assumes 8400 operating hours per year) =						**1,010**	**1,047**	**134**

If the overstated amount of 220.4 pounds per year is removed from EPA's estimated total of 1,010 pounds, the baseline rate would be 790 pounds per year. If EPA had corrected *all* of its data, as industry requested, and had used the more appropriate assumptions regarding annual operating hours, the total would have been slightly higher at 816 pounds per year. Even at 816 pounds per year, EPA is overestimating annual baseline emission rates based on recent data collected by the State of Minnesota indicating a range of between 527 and 696 between 2017 and 2020 for all of the Minnesota indurating furnaces combined. For more accurate annual baseline data, EPA could

[98] Memorandum from David Putney, EPA Office of Planning and Standards, to Docket ID No. EPA-HQ-OAR-2017-0664, *Development of Impacts for the Proposed Amendments to the NESHAP for Taconite Iron Ore Processing* (Mar. 21, 2023).

either rely on Minnesota's data or calculate a more realistic rate by using the annual average pellet production rates rather than hourly production rates.[99]

Despite EPA's estimated 342.2 pound annual rate for Keetac being more than three times higher than any other furnace and ignoring both the 2018 mercury reduction plan and industry's March 13, 2023 submittal (and also ignoring the accurate lb/hour rate), EPA relied on its mis-calculated, overstated 342.2 pound-per-year baseline emission rate to determine the annual mercury ***reduction*** rate for Keetac based on the proposed MACT limit. EPA then projected an extraordinarily high removal rate of ***268 pounds per year***. Based on a more accurate baseline rate of 121.8 pounds per year, the annual mercury removal rate needed to meet EPA's proposed MACT limit would be only ***49 pounds***. This 49-pound rate is consistent with the next highest annual removal rate that EPA estimated: 44 pounds per year. Again, EPA's estimated removal rate of 268 pounds per year compared to the next highest rate of 43 pounds was a missed a red flag. EPA overstated the removal rate for the Keetac unit alone by 225 pounds. EPA used its overstated removal rate of 268 pounds per year for Keetac to calculate the total amount of mercury to be removed from all of the furnaces combined: 462 pounds per year. If EPA had relied on the much more accurate and appropriate removal rate of 49 pounds per year for Keetac, the overall total annual industry mercury removal rate would have been 225 pounds *lower* at 237 pounds per year—cutting the rate of mercury reduction by half. With other corrections and more appropriate assumptions taken into account for other units, the total removal rate would be 242 pounds per year (compared to EPA's nearly doubly high rate of 462 pounds per year).

The typographical errors for the first two runs of the Keetac 2017 stack tests have had an extraordinary *domino effect* that, giving EPA the benefit of the doubt, appears simply to have gone unnoticed by the Agency, the result of which is a proposal that is fundamentally flawed at its core. Table VI.2 later in this section highlights the cascading effect caused by a difference in a single decimal point error. EPA must correct its data and calculations of emission rates, and then it must reconsider a MACT standard in light of the much lower reductions in mercury that can be expected. Rather than EPA's estimated reduction from 1,010 pounds of emissions per year to 548 pounds of emissions per year—a reduction of 54 percent, the more accurate estimate (based primarily on the typographical error correction) is a reduction from 816 pounds per year to 574 pounds per year—a reduction of only *30 percent*. The already low removal rate of one-quarter of a ton of mercury is actually much lower at less than only one-eighth of a ton, or 0.121 tons.

[99] See https://www.pca.state.mn.us/air-water-land-climate/reducing-mercury-releases

As explained in the next subsection, EPA used its inaccurate and severely over-inflated annual removal rates to determine Keetac-specific and overall cost-effectiveness rates. This over-statement of removal rates results in an *extreme* understatement of the cost-effectiveness rates, bringing into the light of day an inconsistent, unsupportable, and arbitrary and capricious result.

B. Cost-Effectiveness Rates

1. EPA's cost-effectiveness estimates.

For EPA's incorrectly assumed 462 pounds of mercury removed annually, EPA estimated annualized costs for the units to meet the limit at $71,163,308. This translates to a cost-effectiveness rate of $153,893 per pound of mercury removed. If the corrected annual removal rate of 242 pounds per year is used instead of 462 pounds per year (which, as explained is clearly based on EPA's own error, the cost-effectiveness rate is a remarkable and unprecedented $293,460 per pound of mercury removed. As explained in Subsection D below, EPA's costs estimates are inaccurate and not reflective of what costs would actually be incurred by industry.

Regardless, however, EPA's corrected $293,460 cost-effectiveness rate would vastly exceed the cost-effectiveness rate for any other MACT floor established in the past for mercury emissions we could find, including the MATS rule for electric generating units (which was calculated at $240,000 per pound of mercury removed). Moreover, EPA estimates the highest per-pound cost for a single taconite furnace at $685,770 ($687,737 without corrected removal rates), which is multiple times more expensive than for any other MACT costs. Even with EPA's proposed alternative allowing emissions averaging within facilities, resulting in an estimated 10 percent greater mercury removal requirement and less control equipment being added, the cost-per-pound rate is still exorbitant at $196,881 *per pound* based on the corrected data that EPA had but did not use.[100]

Remarkably, the proposed rule preamble does not even mention these per-pound costs. This is a failure of notice and a failure to consider relevant factors and important aspects of the problem. Indeed, *LEAN* does not compel this result, as it only required that standards be established—not that they had to be established under Section 112(d)(2) and (3), and without regard to costs. EPA cannot completely ignore costs and financial impacts when establishing gap-filling MACT standards.

While the proposal failed to even speak to the costs of its inaccurately calculated floor limit, the proposal did calculate and discuss the cost for a beyond-the-floor MACT and determined that a cost-effectiveness rate of $46,000 per pound of mercury was above what it had "historically found to be reasonable." EPA is correct—this rate is higher than what EPA has previously determined

[100] This calculated cost-effectiveness rate assumes a reduction of 242 pounds per year plus an additional 10%, equaling 266.2 pounds per year. The total annualized costs of $52,409,617 divided by 266.2 pounds equals $196,881 per pound of mercury removed. This information is provided only for purposes of highlighting that even EPA's lowest cost option has a very high cost-effectiveness rate. As explained in this section, because most facilities would add control technology on all or nearly all of their units, EPA underestimates the total capital costs and total annual costs so this is not a realistic scenario.

to be reasonable. For example, EPA found that a beyond-the-floor MACT for gold mining at $44,000 per pound of mercury removed was unreasonable,[101] and also a beyond-the-floor MACT for lime kilns at $46,000 to be unreasonable.[102] Certainly costs ranging from $293,460 (based on corrected mercury removal rates and EPA's own annualized cost estimates) to $745,975 per pound of mercury removed (based on industry's annualized cost estimates) are unreasonable and inconsistent with previously accepted cost-effectiveness rates—whether for a MACT floor or a beyond-the-MACT floor. Industry explains its concerns with EPA's cost estimates and why its estimates that are multiple times higher are more appropriate in subsections D, E, and F below.[103]

2. Industry cost-effectiveness estimates.

While EPA's initial estimate for mercury removal costs was high and unreasonable at $153,893 per pound, if the correct emission rates were used, the cost-effectiveness rate would be almost double that at $293,460 per pound. Industry's more accurate estimates show that the cost is much higher at $745,975 per pound, with some individual furnaces facing removal costs of $2 million to $2.6 million per pound. In any case—whether $153,893 per pound or up to $2.6 million per pound, the cost-effectiveness rate remains exorbitantly expensive to remove a total of 0.121 tons per year. Yet these rates might still be an underestimation if the equipment does not perform as expected, which is a possibility since no taconite indurating furnace has ever operated with the proposed pollution control equipment (i.e., ACI with a high efficiency venturi scrubber). Only two years ago, EPA recognized that the only application of mercury controls at taconite processing facilities has been based on pilot scale studies. EPA admitted that "these control technologies remain unproven at commercial scale and the amount of mercury reduction achieved by them remain uncertain."[104] This cost-effectiveness rate coupled with significant uncertainty and unproven technology is unprecedented—as reflected with the following comparisons for perspective.

C. Taconite MACT cost-effectiveness rate for mercury removal compared to other source categories.

1. Taconite.

EPA's proposed MACT floor results in a cost-effectiveness rate multiple times higher than any regulation promulgated for other source categories subject to similar mercury standards, making it not only inconsistent but also unfair and arbitrary. As discussed above, EPA estimates a cost-effectiveness rate of $153,893 per *pound* of mercury removed, assuming an annualized cost of $71,163,308 and a reduction of 462 pounds of mercury per year. If corrected emission rates are used, the removal changes to 242 pounds per year, for a cost-effectiveness rate of $293,460 per

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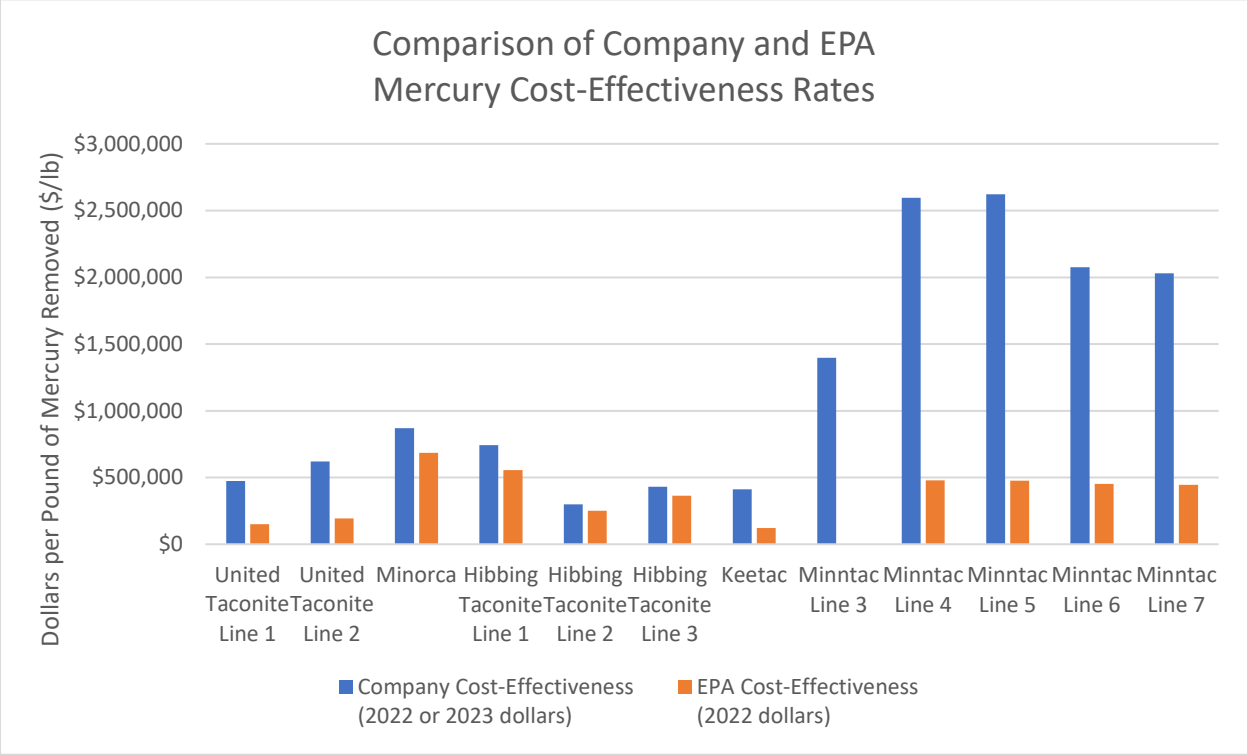
[101] EPA, *National Emission Standards for Hazardous Air Pollutants: Gold Mine Ore Processing and Production Area Source Category; and Addition to Source Category List for Standards*, 76 Fed. Reg. 9450, 9466 (Feb. 17, 2011).
[102] EPA, *National Emission Standards for Hazardous Air Pollutants: Lime Manufacturing Plants Residual Risk and Technology Review*, 84 Fed. Reg. 48,708, 48,726 (Sept. 16, 2019).
[103] The baseline is calculated conservatively high, so the cost-effectiveness rate is conservatively low.
[104] EPA, *National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing Residual Risk and Technology Review*, 85 Fed. Reg. 45,476 (July 28, 2020).

pound of mercury removed. This cost-effectiveness rate is already higher than any other known mercury cost-effectiveness rates for any other source categories. Moreover, if industry's more accurate annualized cost of $180 million is used, the rate is $745,975 per *pound,* which is remarkably high in comparison. Figure VI.5 compares the cost-effectiveness of industry's estimates with EPA's estimates, reflecting some significant disparities.

Figure VI.5 Comparison of Taconite Indurating Furnace Cost-Effectiveness Rates



2. Status Quo.

While we appreciate EPA's need to address emissions based on the *LEAN* decision, we have identified a number of NESHAP for other source categories where EPA has addressed *LEAN* without establishing limits that require expensive add-on control technology. For example, when setting the MACT floor for clay refractories, EPA established emission limits for mercury but did not require any emission reductions.[105] EPA took the same approach for the primary copper smelter source category's MACT floor. Both facilities in this category were able to meet facility-wide mercury limits without making any changes.[106] EPA also set limits based on current emission

[105] EPA, *National Emission Standards for Hazardous Air Pollutants: Refractory Products Manufacturing Residual Risk and Technology Review*, 86 Fed. Reg. 66045 (Nov. 19, 2021); EPA, *National Emission Standards for Hazardous Air Pollutants: Refractory Products Manufacturing Residual Risk and Technology Review*, 86 Fed. Reg. 3079 (Jan. 14, 2021).

[106] EPA, *National Emission Standards for Hazardous Air Pollutants: Primary Copper Smelting Residual Risk and Technology Review and Primary Copper Smelting Area Source Technology Review*, 87 Fed. Reg. 1616, 1636 (Jan. 11, 2022).

rates without requiring any emission reductions for hydrogen chloride and chlorine emissions for the primary magnesium and flexible polyurethane foam source categories.[107] For the carbon black, cyanide, primary magnesium, and the synthetic organic chemical manufacturing industry source categories, EPA engaged in a risk assessment to determine potential health and welfare impacts from their mercury emissions yet set no mercury limits in response to *LEAN*.[108] If it had not been for two facilities that benefit from taconite ore deposits that are naturally low in mercury, indurating furnaces may have had a similar experience with the floor being set at status quo—leading to a much different type of MACT floor.

3. Beyond-the-Floor.

When EPA considered whether a "beyond-the-floor" MACT cost-effectiveness rate was appropriate for the clay refractory kiln source category in 2021, it determined that $160,500 per pound of mercury removed was *too expensive*. For those kilns, there were no existing controls or MACT floor limits in place—similar to the situation for this current rulemaking. The estimated total capital cost for the clay refractory kiln controls was $1.84 million, with an annualized cost of $740,000, and the total amount of mercury to be removed was 4.6 pounds per year.[109] This low level of mercury removal for the clay refractory kiln source category is not dissimilar to EPA's proposal for Minntac's four indurating furnaces for Lines 4-7, which will be required to install add-on pollution control technology to remove 7 pounds of mercury per furnace per year (for a total of 28 pounds per year)—except that the cost-effectiveness for the taconite source category furnaces would be vastly more expensive, ranging from $120,597 to $685,770 per pound based on EPA's estimate and between $298,450 and $2.6 million *per pound* based on industry's estimate (compared to $160,500 per pound of mercury for the clay category). EPA has found cost-effectiveness rates as low as $46,000 per pound of mercury removed to be too expensive—such as with the beyond-the-floor MACT for indurating furnaces. Indeed, for the lime kiln source category, EPA determined that this cost-effective rate to reduce 2.3 to 3 pounds of mercury per

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[107] EPA, *National Emission Standards for Hazardous Air Pollutants: Primary Magnesium Refining Residual Risk and Technology Review*, 86 Fed. Reg. 1390 (Jan. 8, 2021); EPA, *National Emission Standards for Hazardous Air Pollutants: Flexible Polyurethane Foam Fabrication Operations Residual Risk and Technology Review and Flexible Polyurethane Foam Production and Fabrication Area Source Technology Review*, 86 Fed. Reg. 64,385 (Nov. 18, 2021).

[108] EPA, *National Emission Standards for Hazardous Air Pollutants: Carbon Black Production and Cyanide Chemicals Manufacturing Residual Risk and Technology Reviews, and Carbon Black Production Area Source Technology Review*, 86 Fed. Reg. 66,096 (Nov. 19, 2021); EPA*, National Emission Standards for Hazardous Air Pollutants: Cyanide Chemicals Manufacturing Residual Risk and Technology Review*, 86 Fed. Reg. 3906 (Jan. 15, 2021); EPA, *National Emission Standards for Hazardous Air Pollutants: Primary Magnesium Refining Residual Risk and Technology Review*, 86 Fed. Reg. 1390 (Jan. 8, 2021); EPA, *New Source Performance Standards for the Synthetic Organic Chemical Manufacturing Industry and National Emission Standards for Hazardous Air Pollutants for the Synthetic Organic Chemical Manufacturing Industry and Group I & II Polymers and Resins Industry*, 88 Fed. Reg. 25080 (April 25, 2023).

[109] EPA, *National Emission Standards for Hazardous Air Pollutants: Refractory Products Manufacturing Residual Risk and Technology Review*, 86 Fed. Reg. 66045 (Nov. 19, 2021); EPA, *National Emission Standards for Hazardous Air Pollutants: Refractory Products Manufacturing Residual Risk and Technology Review*, 86 Fed. Reg. 3079 (Jan. 14, 2021); Memorandum from RTI International to Paula Hirtz, EPA, Office of Air Quality Planning and Standards, *Development of Proposed Standards and Impacts for the Refractory Products Manufacturing NESHAP* (Dec. 4, 2020).

year per kiln at an annualized cost of $137,000 was not reasonable.[110] Even when EPA was proposing the original taconite NESHAP, it stated in response to public comments that $14,000 to $127,000 per pound of mercury removed was a high cost, especially when it was preventing only 30 pounds of mercury reductions and was therefore not reasonable for a beyond-the-floor MACT.[111] As discussed above, where adherence to a perceived statutory command produces such absurd results, reasoned decision making *demands* that EPA reexamine its assumption that the result is compelled in the first instance, and EPA is required to adopt other statutory interpretations that avoid such results when available, which, as we explain in these comments, are indeed at hand.

4. Floors/Add-on Controls.

After the *LEAN* decision, EPA's MACT floor determinations to fill gaps have typically been either status quo, as described earlier, or have led to controls with cost-effectiveness values in a relatively reasonable range. For example, EPA determined that a cost-effectiveness rate of $21,500 per pound for the last remaining mercury cell chlor-alkali facility to convert to a non-mercury process was reasonable. The facility's annualized cost was $2.7 million to eliminate 125 pounds of mercury to the atmosphere, plus the avoidance of another 900 pounds of mercury going to a landfill.[112] Similarly, when EPA was establishing a MACT standard requiring add-on control technology for the primary copper smelter source category, it proposed to regulate only one of the two facilities that had a combined total mercury emission rate of 55 pounds per year. EPA determined that a cost-effectiveness rate of $28,300 was appropriate based on a total capital cost of $1.4 million and a total annualized cost of $736,000 to reduce 26 pounds of mercury.[113]

Earlier this year, EPA proposed MACT floor limits for the lime kiln source category, finding that a cost-effectiveness rate of $39,000 per pound of mercury removed was not too expensive, nor was a rate of $16,969 per pound for the dolomite subcategory. In the lime kiln source category, mercury emissions from 75 kilns would be reduced by 0.25 tons of mercury per year (489 pounds), which is ***double*** the rate of removal for the 11 indurating furnaces at 0.121 tons of mercury per year (242 pounds). The lime kiln cost-effectiveness rate is based on a total capital cost of $7.3 million and an annualized cost of $18.9 million.[114] While the two industry sectors would be removing essentially the same quantity of mercury, the total capital cost for the taconite industry is $129 million (~$11.7M per furnace) based on EPA's estimate and over $800 million (~$73M per furnace) based on the industry's estimate—compared to the lime kiln's $7.3 million (~$97K

[110] EPA, *National Emission Standards for Hazardous Air Pollutants: Lime Manufacturing Plants Residual Risk and Technology Review*, 84 Fed. Reg. 48,708, 48,726 (Sept. 16, 2019).
[111] EPA, *National Emission Standards for Hazardous Air Pollutants: Taconite Ore Processing Final Rule,* 68 Fed. Reg. 61,868, 61,878-61,880 (Oct. 30, 2003).
[112] EPA, *National Emission Standards for Hazardous Air Pollutants: Mercury Cell Chlor-Alkali Plants Residual Risk and Technology Review*, 87 Fed. Reg. 27,002, 27,009, 27,016 (May 6, 2022).
[113] EPA, *National Emission Standards for Hazardous Air Pollutants: Primary Copper Smelting Residual Risk and Technology Review and Primary Copper Smelting Area Source Technology Review*, 87 Fed. Reg. 1616, 1636 (Jan. 11, 2022); Memorandum from Chuck French, EPA, Office of Air Quality Planning and Standards, to Primary Copper Smelting RTR Docket, E*stimated Costs for Beyond-the-floor Controls for Mercury Emissions from Primary Copper Smelting Facilities* (Mar. 19, 2021).
[114] EPA, *National Emission Standards for Hazardous Air Pollutants: Lime Manufacturing Plants Amendments,* 88 Fed. Reg. 805, 812 (Jan. 5, 2023).

per kiln). Similarly, the annualized cost for Taconite is $71 million based on EPA's estimate (~$16.8M per furnace) and $180 million based on industry's estimate—compared to the lime kiln's $18.9 million (~250K per kiln).

5. Other examples.

When addressing the largest, by far, source category contributing the most mercury to the atmosphere in the United States—electric utilities—EPA set ambitious limits in 2011 with an estimated annualized cost of $9.6 billion to reduce 20 tons of mercury (from 26.6 tons-per-year to 6.6 tons per year). This equated to a cost-effectiveness rate of $240,000 per pound. In 2019, with hindsight, EPA determined that actual emissions were in fact further reduced by additional 4 tons—so instead of reducing by 20 tons, the reduction was actually 25 tons per year. EPA also said it overestimated the costs by $2.2 to $4.4 billion, which would mean that the costs were actually in the range of $7.4 to $5.2 billion. The cost-effectiveness rate was therefore closer to the range of $148,000 to $104,000 per pound.[115] Regardless, and in stark contrast, in the proposed taconite rulemaking, EPA is targeting a 0.121 ton-per-year reduction (compared to 20 to 25 tons per year) at a cost-effectiveness rate of nearly $300,000 to $750,000 per pound (based on EPA and industry estimates, respectively). Placing EPA's proposal in context for one of the smallest source categories with known mercury emissions to the very largest source category for mercury emissions produces helpful context and a startling contrast.

6. Perspective.

To put this quantity of mercury reductions in context, only 30 percent of global mercury emissions come from anthropogenic sources. Electric utility generating units comprise the largest source category for mercury contributions to the atmosphere. EPA established the Mercury and Air Toxics (MATS) rule in 2012 to address these emissions. EPA expected that 20 tons (40,000 pounds) of mercury would be reduced at a cost-effectiveness rate of $240,000 per pound of mercury removed and has since noted a reduction of 25 tons (50,000 pounds) from the source category. In comparison, in 2021 Minnesota estimated total mercury emissions in the state at 1,400 pounds, with mining contributing 682 pounds (about 0.34 tons/year).[116]

While EPA suggested that the taconite furnace MACT would reduce emissions by 46 percent, from 1,010 pounds to 548 pounds, the proposed rule, after corrections, would reduce emissions by only 30 percent, from 816 pounds to 574 pounds per year (and, given Minnesota's estimated 682 lb/year baseline, a reduction of ONLY 108 pounds (equating to 0.05 tons/year)). As explained in more detail below, EPA touted multi-billion dollar "net" benefits from implementation of the MATS rule—yet has identified only a numerical reduction in mercury emissions associated with the taconite furnace MACT--with no co-benefits identified to date and not insignificant associated environmental impacts from the use of the pollution control equipment, including water use, generation of solid waste, increased power usage, and increased transportation use and

[115]EPA, *National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units—Revocation of the 2020 Reconsideration and Affirmation of the Appropriate and Necessary Supplemental Finding*, 88 Fed. Reg. 13956, 13,962-13,963 (Mar. 6, 2023).
[116] The Air We Breathe, The State of Minnesota's Air Quality in 2021, Report to the Legislature at 14 (Jan. 2023).

emissions.[117] Simply stated, a reduction of 242 pounds (0.121 tons) (or 0.05 tons based on Minnesota's estimated baseline from 2021) will not significantly or meaningfully affect global, national, or state-wide levels of mercury—but the minimal reduction will come at a high cost affecting all consumers of steel (i.e., all consumers) and will also have a significant impact on the domestic steel industry, which is competing against global steel manufacturing.

7. EPA must exercise its discretion to prevent an arbitrary and capricious result.

Because of the flexibility and discretion that EPA has when establishing MACT floors and beyond-the-MACT floors, which cannot be exercised in an arbitrary or capricious manner, EPA must explain huge disparities in the costs being imposed on different industrial sectors—especially when cost-effective rates are being compared. EPA recently highlighted its ability to exercise its discretion when it determined that it was too expensive for a primary magnesium facility to reduce its chlorine emissions by 300 tons per year at a cost-effective rate of $4,657 to $8,152 per ton because of "substantial uncertainties" and other issues, including the lack of health and environmental impacts.[118] EPA has made no effort to explain the high costs or the discrepancies industry has identified when comparing the costs to comply with the proposed MACT floor compared to what EPA estimated for other industrial sectors that remove much higher levels of mercury. In fact, the mercury levels are so low for the taconite ore processing facility source category that EPA admits an increase in emissions would not materially affect its prior determination regarding health risks. Perhaps based on EPA's erroneous baseline emissions calculations and mercury removal rates, but without explanation, EPA determined that even if the mercury emissions increased by a factor of 2.4 and the noncancer hazardous quotient for mercury increased slightly, it did not change its prior decision regarding "risk acceptability or ample margin of safety that were made under CAA section 112(f) in the July 28, 2020, Taconite Iron Processing RTR final rule (85 FR 45476)."[119] With no demonstrable benefits and extreme costs that are significantly different in terms of cost-effectiveness for the removal of mercury compared to any prior known precedent, EPA's actions can only be assessed as arbitrary and capricious.

To help highlight the disparities among the various mercury removal cost-effectiveness rates, we have prepared the following chart, Figure VI.6, reflecting the rates that EPA has determined to be acceptable, those it has determined not to be acceptable, and the currently proposed taconite indurating furnace control rates, including industry's estimated rate. The taconite proposal rates leap off the page as both extraordinary and unprecedented in comparison, under EPA's estimates (which are inaccurate) and even more so when utilizing industry's more accurate, facility-specific cost estimates that are accurate.

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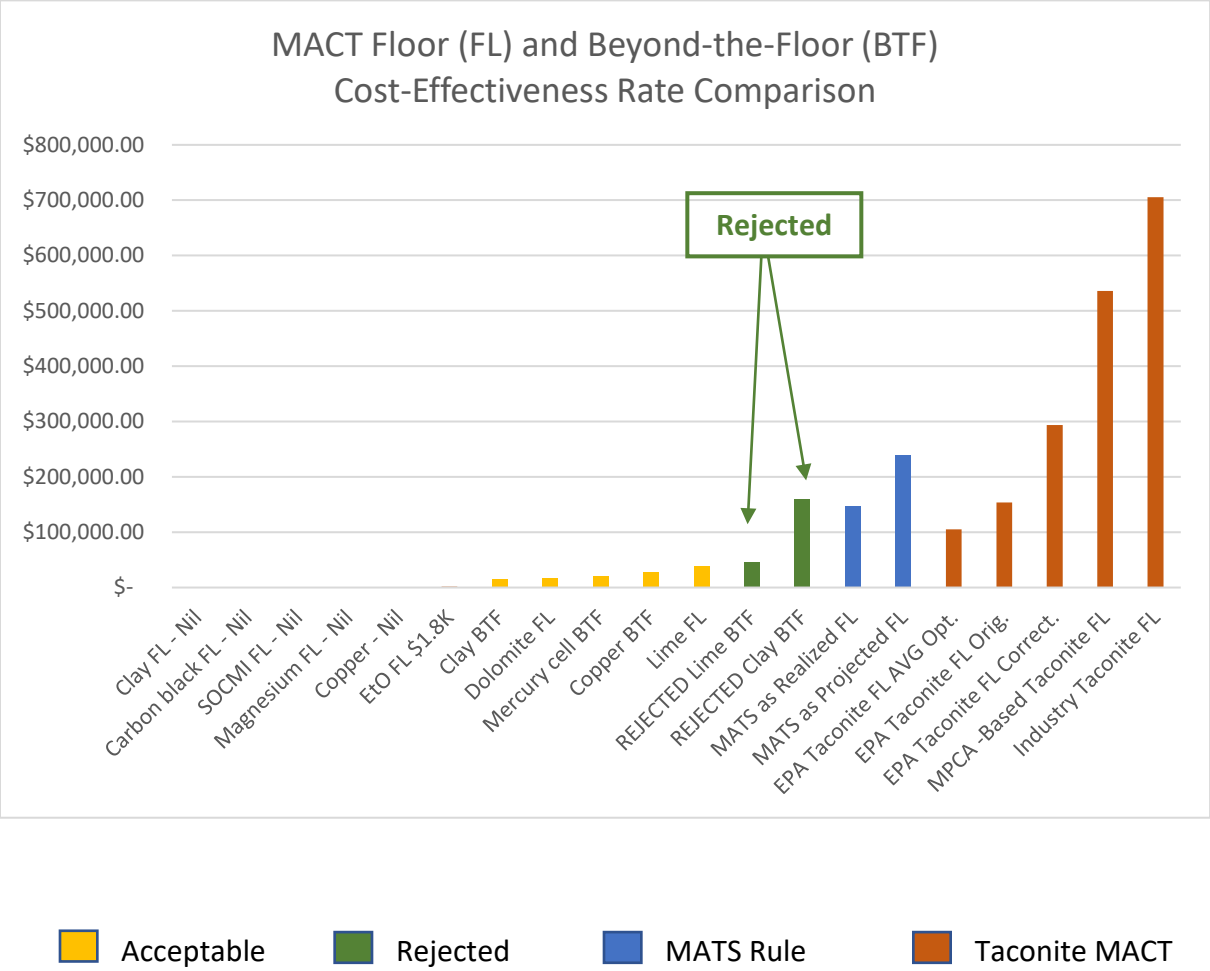
[117] See Technical Memorandum from Dane Jensen, Barr Engineering Co., to Jason Aagenes (Cleveland-Cliffs) and Christopher Hardin (U. S. Steel), *Technical Feasibility Evaluation of Mercury Controls* (June 9, 2023), included as Appendix 3 to this submittal.

[118] EPA, *National Emission Standards for Hazardous Air Pollutants: Primary Magnesium Refining Residual Risk and Technology Review*, 86 Fed. Reg. 1390 (Jan. 8, 2021).

[119] 88 Fed. Reg. at 30929.

Figure VI.6 Cost-Effectiveness Rate Comparison for NESHAPs



D. EPA's Proposed MACT Floor Capital and Annualized Costs.

Despite having confirmed in 2020 that there was no proven technology to reduce mercury emissions from taconite indurating furnaces, EPA moved forward to propose a MACT floor limit that it incorrectly estimates would result in total capital costs of $129 million and annualized costs of $71 million. EPA presented information on how it estimated emission reduction and costs in a March 21, 2023, memorandum on "Development of Impacts for the Proposed Amendments to the NESHAP for Taconite Iron Ore Processing," and Table B-1 in Appendix B provides a summary. The following is a copy of that table, Figure VI.7.

Figure VI.7, EPA's Table B-1 from March 21, 2023 Development of Impacts Memorandum

Appendix B
Summary of Total Capital Investment and Total Annual Costs Per Furnace for Mercury Standards

Table B-1. Estimated Costs for Option 1 (2022$)

Facility	Unit ID	Average Hg Emissions (lb./LT)	Average Emission for Furnace (lb/hour)	Total Capital Cost	Total Annual Cost	Proposed APCD	Required Control Efficiency Limit	After Controls Emission Rate (lb/LT)	Hg Removed (lbs/year)	CE ($/lb)
Hibbing, MN	Line1	1.85E-05	6.81E-03	$18,773,779	$9,566,696	ACI w/Venturi Scrubber	24	1.40E-05	14	$687,737
Hibbing, MN	Line 3	2.63E-05	1.12E-02	$20,244,664	$10,775,925	ACI w/Venturi Scrubber	47	1.40E-05	44	$245,404
Hibbing, MN	Line 2	2.51E-05	8.26E-03	$20,383,508	$10,821,760	ACI w/Venturi Scrubber	44	1.40E-05	31	$352,777
Keetac, MN	EU030	6.43E-05	4.07E-02	$7,868,972	$5,907,339	ACI w/Venturi Scrubber	78	1.40E-05	268	$22,074
Minntac, MN	Line 7	1.62E-05	6.48E-03	$5,767,783	$3,167,755	ACI w/Venturi Scrubber	13	1.40E-05	7	$434,046
Minntac, MN*	Line 6	1.62E-05	6.34E-03	$5,768,840	$3,152,433	ACI w/Venturi Scrubber	13	1.40E-05	7	$441,864
Minntac, MN*	Line 4	1.62E-05	6.39E-03	$6,000,141	$3,363,388	ACI w/Venturi Scrubber	13	1.40E-05	7	$467,852
Minntac, MN*	Line 5	1.62E-05	6.32E-03	$5,911,911	$3,303,256	ACI w/Venturi Scrubber	13	1.40E-05	7	$464,188
Minntac, MN	Line 3	9.43E-06	2.13E-03	$0	$0	None	0	9.43E-06	0	$0
Minorca, MN	EU026	1.91E-05	6.89E-03	$20,551,982	$10,459,360	ACI w/Venturi Scrubber	27	1.40E-05	16	$672,592
UTAC, MN	Line 1	2.62E-05	6.31E-03	$6,103,076	$3,615,768	ACI w/Venturi Scrubber	46	1.40E-05	25	$146,851
UTAC, MN	Line 2	2.22E-05	1.21E-02	$12,085,612	$7,029,629	ACI w/Venturi Scrubber	37	1.40E-05	37	$187,961
				$129,460,268	$71,163,308				462	$153,893

*Assumes a worst-case scenario where emissions from Minntac's Lines 4, 5 and 6 are the same as Line 7.

Industry has identified a number of problems with how EPA estimated the total capital and annualized costs of activated carbon injection systems combined with new high efficiency venturi scrubbers to control mercury. Specifically, and as explained in more detail below, EPA's cost estimates are unrealistic and much lower than the cost information being provided by industry as part of this submittal. Overall, EPA's estimates underestimate capital costs by a factor of six ($129 million compared to industry's estimate of over $800 million). To the extent that the total capitalized costs and annualized costs are underestimated, the cost-effectiveness rate is also underestimated. For EPA to appreciate the true costs and financial impacts to the industry as well as consumers of steel, EPA must reconsider its cost estimates.

In an attempt to help minimize costs, EPA came up with an alternative method of determining compliance that would allow some indurating furnaces to avoid controls, while one or more other furnaces at the same facility controlled mercury to a higher degree. To use this option, a plant would need to reduce its emissions by an additional 10 percent beyond what would otherwise be required under the MACT floor. Under this scenario, EPA estimated that the total capital cost would be reduced from $129 million to $90 million and the total annualized cost would be reduced from $71 million to $52 million. Because Industry Commenters are likely to install controls on more units than EPA anticipated in its estimates to ensure maximum operational flexibility, these cost estimates are too low and not appropriate for taking into account more realistic cost impacts.

To help demonstrate its position regarding costs, and in addition to the narrative comments provided below, industry developed its own a table included on the next page titled "Industry, MPCA, and EPA Capital Cost and Annualized Cost Estimates and Related Cost-Effectiveness Rates" (referred to herein as "Table VI.1 Table of Costs"). Industry kept the same general format as EPA's Table B.1 above (Figure VI.7) and adds industry's site-specific total capital and annualized costs, and the Minnesota Pollution Control Agency's cost estimates updated to 2022 dollars.[120] EPA's total capital cost and annualized cost estimates remain unchanged. The column identifying the quantity of mercury removed has been revised to reflect the corrected rates (which is especially important for the Keetac furnace and the overall reduction rate). The table also includes cost-effectiveness rates, which are calculated based on annualized costs and mercury removal rates. Keeping EPA's annualized costs the same, the table includes new cost-effectiveness rates for EPA based on the corrected mercury reduction rates, which are in sharp contrast to the rates for industry and MPCA. Industry relies on this table to support a number of its comments, and it used the data from the table to generate some of the graphic charts included below. Most importantly, the table allows an easy comparison between facility-specific cost estimates among EPA, industry, and MPCA, and also how relatively closely aligned industry and MPCA are with their estimates compared to EPA.

While this subsection focuses on EPA's cost estimates as listed below, the Table VI.1 Table of Costs reflects the disparities in costs between EPA's estimates and industries and may therefore be a helpful point of reference. Industry comments on EPA's cost analysis are summarized below.

[120] A copy of this workbook named "Reduction Options Cost Summary (2021-10-19)" and prepared by the Minnesota Pollution Control Agency is included as Appendix 5 to this submittal.

Table VI.1 Table of Costs

Facility	Company Site-Specific Cost Estimates (2022 or 2023 dollars)[a]		MPCA Costs with Facility Specific Retrofit Factor (2022 dollars)[b]		EPA Costs (2022 dollars) Option 1 (no averaging)		Hg Removed (lbs/year) [based on Corrected EPA stack test data]	Company Site-Specific ($/lb) (2022/2023 dollars)	MPCA ($/lb) (2022 dollars)	EPA ($/lb) (2022 dollars)
	Total Capital Cost	Annualized Cost	Total Capital Cost	Annualized Cost	Total Capital Cost	Annualized Cost				
United Taconite Line 1	$44,388,074	$11,427,483	$38,792,865	$8,352,735	$6,103,076	$3,615,768	24	$473,980	$346,448	$149,972
United Taconite Line 2	$85,771,151	$22,438,058	$75,179,662	$16,342,398	$12,085,612	$7,029,629	36	$619,245	$451,017	$194,004
Minorca	$61,518,306	$13,276,100	$53,395,468	$9,925,224	$20,551,982	$10,459,360	15	$870,450	$650,749	$685,770
Hibbing Taconite Line 1	$69,496,815	$12,793,189	$61,376,815	$9,490,458	$18,773,779	$9,566,696	17	$742,403	$550,742	$555,166
Hibbing Taconite Line 2	$69,496,815	$12,793,189	$61,376,815	$9,490,458	$20,244,664	$10,775,925	43	$298,450	$221,401	$251,389
Hibbing Taconite Line 3	$69,496,815	$12,793,189	$61,376,815	$9,490,458	$20,383,508	$10,821,760	30	$429,796	$318,838	$363,564
Keetac	$84,072,547	$20,204,382	$78,647,184	$17,769,927	$7,868,972	$5,907,339	49	$412,467	$362,768	$120,597
Minntac Line 3	$50,484,415	$9,812,373	$48,547,682	$8,867,659	$0	$0	See note (a)	$1,398,206	$1,263,589	$0
Minntac Line 4	$67,650,202	$18,216,854	$53,276,447	$12,874,901	$6,000,141	$3,363,388	7	$2,595,795	$1,834,598	$479,263
Minntac Line 5	$67,650,202	$18,216,854	$51,626,769	$12,567,832	$5,911,911	$3,303,256	7	$2,622,350	$1,809,163	$475,510
Minntac Line 6	$65,446,517	$14,462,675	$50,865,948	$11,769,082	$5,768,840	$3,152,433	7	$2,076,618	$1,689,859	$452,641
Minntac Line 7	$65,446,517	$14,462,675	$50,585,064	$11,931,660	$5,767,783	$3,167,755	7	$2,030,011	$1,674,752	$444,633
Total	**$800,918,373**	**$180,897,020**	**$685,047,536**	**$138,872,790**	**$129,460,268**	**$71,163,308**	**242**	**$745,975**	**$572,678**	**$293,460**
Total Excluding Minntac Line 3 Controls	**$750,433,958**	**$171,084,647**	**$636,499,854**	**$130,005,132**	**$129,460,268**	**$71,163,308**	**242**	**$705,511**	**$536,110**	**$293,460**

Note: The template for this table is similar to EPA's Table B-1 included as Figure VI.7 above. The following narrative describes the information provided in each of the columns

Facility

The far left columns list each of the 12 units that would need to install controls to meet EPA's proposed MACT limit. This list is the same as EPA's list.

Company Site-Specific Cost Estimates

The "Company Site-Specific Cost Estimates" columns provide estimates that Industry Commenters developed a few years ago for a different purpose and updated to current dollars. These estimates are facility-specific and take into account unique features of each taconite iron ore processing facility.

Note a: United Taconite, Hibbing Taconite, and Minorca updated 2018 capital costs that had been included in mercury reduction plans submitted to MPCA to 2022 dollars using the

Chemical Engineering Plant Cost Index (CEPCI). Keetac and Minntac capital costs have been updated with 2023 vendor quotes. Operating costs for all sites have been updated with new 2023 costs or adjusted for inflation as appropriate. Costs have been adjusted to reflect control efficiencies required to comply with the proposed mercury limit and site-specific activated carbon injection rates have been applied based on historical testing. The estimates assumed Minntac would install controls on all lines to maintain operational flexibility even though baseline testing has been below the proposed limit. However, the data set is limited, and it is unknown how future mercury emission rates would change when processing different ore types. Printouts of these costs are included in Appendix 10.

MPCA Costs with Facility Specific Retrofit Factor (Note b)
The Minnesota Pollution Control Agency (MPCA) did its own cost estimates in 2018. These two columns reflect those costs, scaled to 2022 dollars using CEPCI. Annualized costs are based on the assumed mercury control efficiencies in the 2018 mercury reduction plans submitted to MPCA. Keetac and Minntac Line 3 did not include ACI with high efficiency venturi scrubber costs in the 2018 mercury reduction plans. The MPCA costs shown here represent Keetac and Minntac Line 3 ACI with an electrostatic precipitator as a surrogate for comparison. In addition, the industry does not consider ACI with an electrostatic precipitator to be technically feasible for taconite iron ore indurating furnaces. Refer to Section V for additional detail. More information about MPCA's cost estimates and the scaling to 2022 dollars is available in Appendix 10.

Note c: Hibbing Taconite did not evaluate control costs for ACI with high efficiency venturi scrubbers in the 2018 mercury reduction plans submitted to MPCA. Therefore, the costs for ACI with a baghouse are included as a surrogate. In addition, the industry does not consider baghouses to be technically feasible particulate controls for taconite iron ore indurating furnaces. Refer to Section V for additional detail.

EPA Costs
The information in these two columns has been copied from EPA's Table B-1 included earlier as Figure VI.7.

Hg Removed (lbs/year)
The amount of mercury estimated to be reduced from each listed furnace is included in this column based in part on EPA's original information from its Table B-1 included as Figure VI.7 above, with corrections made and described earlier in this section, to provide more accurate information.

Company Site-Specific, MPCA, and EPA $/lb
These three columns reflect the cost-effectiveness rates for each of the three sets of costs. The annualized cost for each facility for each of the three estimates (Company, MPCA, and EPA) was divided by the lbs-per-year of mercury expected to be removed. The result is a "cost-effectiveness" rate that shows the amount of money that it will take on an annual basis to remove a single pound of mercury. These are costs that would be incurred by each of the facilities to achieve the quantity of reduction shown in the Hg Removed column.

Industry Commenters analyzed EPA's costs, both total capital costs and annualized costs, and their conclusions are summarized as follows:

1. Control efficiencies not well understood.

Table 5-2 in the EPA memorandum titled "Development of Impacts for the Proposed Amendments to the NESHAP for Taconite Iron Ore Processing" and dated March 21, 2023 includes maximum expected control efficiencies for ACI with high efficiency venturi scrubbers at 85 percent. EPA has no basis for this estimate and in fact determined in 2020 that the technology was unproven and not technically feasible, noting that short-term testing was insufficient to demonstrate otherwise.

The limited testing undertaken by industry was to assess the ability of active carbon to adsorb elemental mercury present in a gaseous phase.[121] The testing took place over a short period of time (1 to 3 weeks for U. S. Steel) and did not represent the total mercury reductions at the stack as activated carbon was slipping through the existing wet scrubbers. The testing reflected a wide variation in gas-phase mercury removal efficiencies (from 48 to 82% depending on the location, injection rate, etc.). As reflected in this wide range of removal rates during testing, there can be variability. Regardless of the rate ultimately needed for compliance, Industry Commenters remain concerned about being able to achieve a consistent removal rate due to the continuing uncertainties regarding control efficiencies. The limited testing represented a snapshot of what may be achieved in the short term. However, the removal efficiencies are not representative of the total stack mercury reduction as industry testing showed that activated carbon slips through the existing wet scrubbers and that reemission of particulate bound mercury (i.e., mercury adsorbed to activated carbon) is a pervasive issue, resulting in increased local mercury deposition. Please see the discussion in Section IV for additional detail. The efficiency that could reasonably and consistently be achieved in practice accounting for the unpredictable variation of the mercury content entering the process with the ore is unknown and undemonstrated.

While ACI may be a proven technology, the use of ACI followed by a high efficiency venturi scrubber for use on a taconite indurating furnace is unproven. Because the efficiency that could reasonably and consistently be achieved in practice accounting for the unpredictable variation of the mercury content entering the process with the ore, is unknown, EPA's estimated control efficiencies for ACI with wet scrubbers are therefore not valid. EPA made a prior determination in 2020 that the technology was unproven and had never been used on a taconite indurating furnace.[122] Because no developments have occurred since 2020, EPA has no basis to change its 2020 determination.

EPA's overstated expected mercury control removal efficiencies from ACI systems with high efficiency venturi scrubbers may, in turn, underestimate the costs of control. EPA must use

[121] EPA-HQ-OAR-2017-064-206 (Minntac); EPA-HQ-OAR-2017-064-205 (United Taconite); EPA-HQ-OAR-2017-064-0203 (Hibbing); EPA-HQ-OAR-2017-064-0207 (Northshore); EPA-HQ-OAR-2017-064-0204 (Keetac). More complete versions of these mercury reduction plans are available on the MPCA website here: https://tinyurl.com/ycktbve9.

[122] EPA, *National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing Residual Risk and Technology Review*, 85 Fed. Reg. 45,476, 45,485 (July 28, 2020)

realistic, predictable removal efficiencies when estimating its costs accordingly—ideally in collaboration with the individual companies because each facility is unique.

2. Unit-Specific Costs from Vendors.

EPA calculated equipment costs for new particulate controls (a new high-efficiency venturi scrubber) based on the 2002 EPA Control Cost Manual correlations. The best cost information, however, comes directly from vendors and is based on individual furnaces, which is particularly important when retrofitting existing units. The 2018 mercury reduction plans that industry developed and submitted to the Minnesota Pollution Control Agency, and that EPA included in the docket for this rulemaking, relied on vendor quotes. Some facilities followed-up with vendors this year to confirm and update these costs. Industry included not only the primary wet scrubber equipment, but also ancillary equipment costs required for the installation including new fans, motors, stack, etc. By relying on the Cost Control Manual rather than vendor quotes and site-specific information, EPA has severely underestimated the actual costs for new high-efficiency venturi scrubbers that must be used in conjunction with ACI equipment. EPA must recalculate its costs and should use vendor quotes and site-specific information or rely on the information provided by industry in this comment letter.

3. Inflation adjustment.

EPA calculated the purchased equipment costs based on the 2002 EPA Control Cost Manual Correlations, adjusted for inflation using EPA's GDP (Gross Domestic Product) cost escalation methodology. EPA's method of inflation adjustment (GDP scaling) does not appropriately estimate the impact of inflation for capital costs, and it does not appropriately address operating costs. EPA needs to use well-known and established indices such as the Chemical Engineering Magazine Plant Cost Index (CEPCI) to account for inflation related to equipment costs. By using GDP scaling rather than an index like CEPCI, EPA has not properly adjusted its costs to account for inflation. Further, EPA should seek current utility, reagent, labor, and other rates to reflect annual operating costs more accurately. EPA must recalculate its costs considering a more appropriate inflation factor for both capital and operating costs.

4. Retrofit factor.

EPA used a retrofit factor of 1.2. In the 2018 mercury reduction plans submitted to MPCA. Industry included a 1.5 or 1.6 factor including spacing considerations for individual furnaces. The higher factor is appropriate to account for the difficulties of retrofit installations. Retrofit installations have increased difficulty in equipment handling and erection for many reasons. Access for transportation, laydown space, etc. for new equipment are significantly impeded or restricted. This is because the spaces surrounding the furnaces are congested, or the areas surrounding the building support frequent mobile equipment traffic or crane access for maintenance. The structural design of the existing buildings would not support additional equipment on the roof. Additionally, the evaluated technologies are very complex due to all the ancillary equipment requirements, piping, structural, electrical, demolition, etc. Therefore, these cost estimates include additional construction expenses due to the expected additional handling

and erection difficulty to accommodate new equipment at each facility. Using a 1.6 or a 1.5 retrofit factor based on specific furnaces is also warranted based on prior industry experience for other retrofit projects. When industry was evaluating sulfur dioxide (SO_2) controls for the BART program (Best Available Retrofit Technology) to address regional haze in 2006, industry used a furnace-dependent 1.6 or 1.5 retrofit factor in the cost analysis. The evaluated technologies for mercury control have a similar level of complexity. Therefore, this 1.6 or 1.5 retrofit factor is still appropriate. Finally, the EPA Control Cost Manual notes that retrofit installation costs are somewhat subjective because the plant designers may not have had the foresight to include additional floor space and room between components for new equipment. Retrofits can impose additional costs to "shoehorn" equipment in existing plant space, which is true for all the taconite facilities. By using a retrofit factor of 1.2 instead of 1.6 or 1.5, EPA has significantly underestimated the costs of adding ACI and new, larger, high-efficiency venturi scrubbers. EPA must revise its cost estimates based on a more appropriate retrofit factors, such as those used by industry.

5. Contingency.

EPA has assumed a 3% contingency fee. The contingency assumption is based on the cost estimate level of accuracy. The cost estimates most closely resemble a "Class 4" estimate according to the AACE International Recommended Practice No. 18R-97, 2020., with expected accuracy ranging from -30% to +50%, to account for unknowns without detailed engineering; especially for first-of-its-kind installations in the taconite industry. As a project progresses through the design process, the estimates for the project costs become progressively more accurate. For a feasibility/conceptual design phase where fewer project details have been defined, as is the case with ACI with high-efficiency venturi scrubbers for an indurating furnace, a 30% contingency is appropriate, which is what industry has applied for its facility-specific cost estimates. EPA's 3% contingency factor significantly underestimates the current uncertainties. EPA must revise its costs using a more appropriate contingency factor of 30% based on what costs the industry might reasonably incur if new mercury controls are required for their indurating furnaces to comply with the proposed mercury limits.

6. Interest rate.

EPA calculated the total annualized costs for pollution control equipment. Total annualized costs include direct annual costs (e.g., utilities, labor, reagents, waste disposal, etc.) and indirect annual costs (e.g., overhead, insurance and *capital recovery*). Capital costs are converted to an annualized capital recovery cost based on an expected amortization period and interest rate. EPA typically uses the default prime bank rate for estimating capital recovery costs.[123] EPA's cost estimates assumed an interest rate of 7.27%, but recently this has risen to 8.25%.[124] Therefore, EPA's cost estimates underestimate capital recovery factor and the annualized capital costs. EPA must recalculate the annualized capital costs using a more realistic interest rate.

7. PAC costs.

[123] https://tinyurl.com/bdhksdnk.
[124] See, e.g., Bank of America, Prime Rate Information, https://tinyurl.com/2p966ujc.

EPA used a cost of $1.02 per pound of brominated powdered activated carbon (PAC). Industry sought updated costs from PAC vendors in 2023 and was provided a cost estimate of $1.90 per pound—nearly double EPA's assumed rate. EPA must recalculate its estimates with more accurate cost information. While facility costs will vary, industry expects that correcting the PAC per-pound expense would increase total annualized operating costs by more than $6.5 million.

In addition, EPA's use of a single stack test exhaust flow rate as the basis for equipment design is not appropriate. EPA should haven instead used a flow rate that represents worst-case conditions to accurately reflect costs that a facility may incur at maximum production. EPA must revise its assumptions accordingly and recalculate the PAC usage rates and the total annualized costs.

8. PAC injection rate.

EPA assumes that a PAC injection rate of 5 lb/MMacf is sufficient to achieve an 85% total mercury reduction. EPA linearly adjusted injection rates for each facility in its cost estimates based on the level of reduction required to meet the proposed mercury limit. As noted previously under VI.A.1., EPA's estimated control efficiencies for ACI are unproven because it is not well understood what efficiency could reasonably and consistently be achieved in practice, when both the unpredictable variation of the mercury content entering the process with the ore and the pervasive issue of carbon slipping through wet scrubbers are taken into account. For example, linearly interpolating U. S. Steel site-specific short-term testing shows that Keetac and Minntac are expected to require injection rates ranging from 7-10 lb/Mmacf to achieve an 85% mercury reduction (assuming all mercury adsorbed to carbon can be captured).[125] Each site would require a more thorough evaluation to confirm required injection rates due to site-specific variations in duct configurations, residence time, and mixing. The efficacy of transportation, receiving, storing, and handling the required volume of ACI has not been evaluated. Regardless, this example shows that EPA is underestimating the PAC injection rate and associated costs (7-10 lb/MMacf vs. 5 lbs/MMacf). EPA must use more realistic PAC injection rates and adjust its estimated costs accordingly in collaboration with the individual facilities as each indurating furnace is unique to account for the unproven nature of the ACI with high-efficiency venturi scrubbers.

9. Incremental electrical costs.

EPA used a generic hp-per-acfm (horsepower per actual cubic feet per minute) requirement to calculate incremental electrical requirements. However, industry expects this to be an underestimate of incremental power increases. The cost estimates developed in the Section VI.F Table of Costs below include more realistic incremental electrical requirements based on the expected change in scrubber pressure drop and estimated pump horsepower requirements from equipment vendors. Because EPA's annualized electrical costs are likely underestimated, it must re-calculate these costs which affect the total annualized cost figures.

10. Increased water usage.

EPA's calculated incremental water requirements may be too low and fail to consider increased process dust capture from higher efficiencies. Facilities may need to increase wet scrubber blow down flow rates to avoid particulate carry-over and re-emission. It is difficult to quantify the expected change given the complexity and variation of wet scrubber systems in the industry, but further study is warranted. Industry water demand and costs included in the estimates provided in the Section VI.F Table of Costs consider vendor input and site-specific configurations.

11. Waste disposal cost and disposal quantities.

EPA used a waste disposal cost of $34.38 per ton and estimated a total of 4,180 tons per year in additional waste impacts. EPA adjusted the basis year costs (2017 dollars) to 2022 costs using EPA's inflationary GDP scaling methodology. However, it is unclear if this methodology appropriately represents the impact on solid waste costs over time. A more appropriate inflationary adjustment would be to use the Producer Price Index by Industry: Solid Waste Collection. Scaling the 2017 EPA basis with current indices shows that a price of approximately $40 per ton is more realistic. Industry recommends that EPA either scale the site-specific waste disposal costs included in its 2018 mercury reduction plans control cost attachments to 2023 dollars or request the information from sites individually for appropriate representations. In addition, waste disposal must include captured iron dust with captured PAC since there can be no carbon recycled back to the process for pellet quality reasons. Further, industry may not be able to readily separate PAC and iron dust to prevent mercury or PAC recycle and reemission.

12. Operating labor (supervisory, operating, maintenance).

EPA assumes only 0.25 hours of additional operator labor per 8-hour shift associated with the ACI and high efficiency venturi scrubbers, at a rate of $24 per hour. According to the EPA Control Cost Manual,[126] this is too low and even below the lowest value of the acceptable operating labor range. A more reasonable estimate would be at least 5 hours of operator labor per 8-hour shift, which represents the mid-range provided by the EPA Control Cost Manual, especially for ACI and scrubbers of the magnitude and size needed for the indurating furnaces. It would also be more reasonable to assume union labor rates in the goods-producing industries per the U.S. Bureau of Labor Statistics, which as of March 2023 is $54.13 per hour. EPA must revise its cost estimates taking into account more reasonable and realistic labor expenses.

13. EPA comments regarding a polishing baghouse at Keetac.

EPA suggested that the Keetac unit could add a polishing baghouse following the existing wet scrubber. This may not be technically feasible or demonstrated in practice. EPA states that "the furnace located at Keetac required emission reductions of 87 percent to meet the limit that could not be achieved using ACI with a wet venturi scrubber. For Keetac's furnace, industry determined that a polishing baghouse installed after the existing Venturi scrubber would achieve the required

[126] https://fred.stlouisfed.org/series/PCU562111562111

level of reduction."[127] Even if Keetac was not required to reduce at that rate, EPA is incorrect to assume that it is technically feasible to install a baghouse following a wet scrubber. Waste gas saturated with moisture following the existing scrubbers would quickly result in blinded bags as condensation cannot occur during baghouse operation. In addition, baghouses are not considered to be technically feasible for existing indurating furnaces as described in the Barr Technical Feasibility Memorandum included as Appendix 3.[128] Therefore, EPA is significantly misrepresenting costs and feasibility for the "Option 5: 40% Beyond-the-floor" option. New particulate matter controls would be needed, although the level of mercury reduction required for Option 5 is unknown and may therefore not be technically achievable or feasible. While EPA did not propose this option as a beyond-the-floor MACT, industry wanted to clarify for the record that a polishing baghouse at Keetac is not feasible.

E. Minnesota Pollution Control Agency's Estimated Capital and Annualized Costs

Industry provided mercury control cost analyses to MPCA as part of their 2018 mercury reductions plans. The MPCA conducted a review of these costs (in 2018 dollars) and made revisions in an Excel workbook being included with this submittal.[129] Industry reviewed MPCA's revisions and found a few items requiring correction for current purposes for clarity and accuracy. When the corrections identified below are made, the total capital costs and annualized costs of mercury controls align even more closely with industry's most recent control cost estimates provided in the Table VI.1 Table of Costs.[130] In addition, this relatively close correlation between MPCA's estimates and industry's estimates and the disparity with EPA's estimates demonstrates that EPA is greatly underestimating the annualized costs that industry would incur to comply with the proposed rule.

1. MPCA's use of the retrofit factor is wrong.

According to the EPA Control Cost Manual,[131] the retrofit factor "is calculated as a multiplier applied to the TCI (total capital investment)." However, MPCA removed the purchased equipment cost from the TCI when calculating the retrofit factor add-on cost. This is incorrect, and MPCA's estimate is underestimating the TCI and associated annualized costs. The retrofit factor must also be applied to the purchased equipment cost to account for "the cost of re-engineering and refabrication; and the cost of correcting design errors" as noted in the EPA Control Cost Manual.[132] MPCA's estimates with two different retrofit factors reflected costs that were nearly 20% lower

[127] Memorandum from David Putney, EPA Office of Planning and Standards, to Docket ID No. EPA-HQ-OAR-2018-0664, *Development of Impacts for the Proposed Amendments to the NESHAP for Taconite Iron Ore Processing* (Mar. 21, 2023) at 8.
[128] Technical Memorandum from Dane Jensen, Barr, to Jason Aagenes (Cleveland-Cliffs) and Christopher Hardin (U. S. Steel), *Technical Feasibility Evaluation of Mercury Controls* (June 9, 2023), included as Appendix 3 to this submittal.
[129] A copy of this workbook named "Reduction Options Cost Summary (2021-10-19)" and prepared by the Minnesota Pollution Control Agency is included as Appendix 5 to this submittal.
[130] Table VI.1 Table of Costs included in Section VI.D herein.
[131] https://tinyurl.com/bdhksdnk.
[132] *Id.*

than industry estimates, highlighting the significance of utilizing the most appropriate retrofit factor and the impact on total capital and annualized costs.

2. Interest rate.

Total annual costs for pollution control equipment cost evaluations include direct annual costs (e.g., utilities, labor, reagents, waste disposal, etc.) and indirect annual costs (e.g., overhead, insurance, and capital recovery). Capital costs are converted to an annualized capital recovery cost based on an expected amortization period and interest rate. While industry assumed a 7% interest rate in 2018, MPCA changed the interest rate assumption to the 2018 default prime bank rate of 5.25%. This underestimates annual capital recovery costs as the current prime rate (June 29, 2023) is 8.25%.[133]

3. MPCA failed to account for inflationary trends.

The MPCA workbook is dated 2021.[134] However, the MPCA failed to include any inflationary adjustments or updates to account for the time value of money. It is no surprise that national inflationary trends have greatly increased costs for both consumers and industry. For example, the Chemical Engineering Plant Cost Index increased from 603.1 to 816 between 2018 and 2022 respectively representing a 35% increase in expected equipment costs. Therefore, for current purposes, industry has adjusted MPCA's costs as close to present day dollars as possible because 2018 costs are no longer representative of what pollution controls would cost today.

In addition, industry updated the costs for Keetac and Minntac shown in the Section VI.D Table of Costs to 2023 dollars based on new equipment quotes and appropriate adjustments for inflation. Industry scaled the Hibbing Taconite, United Taconite, and Minorca costs to 2022 or 2023 dollars using the Chemical Engineering Plant Cost Index or appropriate inflationary adjustments for operating expenses because these facilities have not updated associated capital and operating costs since 2018.

4. Control efficiencies and corresponding PAC injection rates may not be achievable.

The level of mercury control that could be consistently achieved using ACI with new particulate controls for indurating furnaces is not well known, especially given the varying mercury concentrations in the greenballs entering the process. Industry therefore made several assumptions about expected control efficiencies and associated PAC injection rates during the development of their 2018 mercury reduction plans. In comparison, EPA has assumed that an ACI injection rate of 5 lb/MMacf is sufficient to achieve an 85% total mercury reduction based on scaling. EPA linearly adjusted injection rates for each facility in its cost estimates based on the level of reduction required to meet the proposed mercury limit. As noted previously under Section VI.D.1, EPA's estimated control efficiencies for ACI are unproven because it is not well-understood what efficiency could reasonably and consistently be achieved in practice accounting for the

[133] Wall Street Journal, Markets, Money Rates, Prime Rates, https://www.wsj.com/market-data/bonds/moneyrates.
[134] A copy of this workbook named "Reduction Options Cost Summary (2021-10-19)" and prepared by the Minnesota Pollution Control Agency is included as Appendix 5 to this submittal.

unpredictable variation of the mercury content entering the process with the ore and the pervasive issue of carbon slipping through wet scrubbers. For example, and as noted previously, linearly interpolating U. S. Steel site-specific testing shows that Keetac and Minntac are expected to require injection rates ranging from 7-10 lb/MMacf to achieve an 85% mercury reduction (assuming all mercury adsorbed to carbon can be captured).[135] Each site would require a more thorough evaluation to estimate the injection rates required due to site-specific variations in duct configurations, residence time, and mixing. Regardless, this shows that even the 2018 industry and MPCA costs are overestimating the expected control efficiencies and underestimating the ACI injection rate and associated costs.

F. EPA's limited analysis of cost and revenue is flawed and insufficient.

EPA provides a limited discussion of total annualized costs and total capital investment relative to sales. The National Tribal Air Association (NTAA) similarly recommends that EPA look at the ratio of revenue to cost per pound reduction of mercury. These approaches are flawed and insufficient. EPA has overlooked important elements in their incomplete analysis including:

- A revenue-only analysis fails to consider the benefits of the required emissions controls.
- Revenue alone says nothing about a company's ability to accommodate the costs of emissions controls.
- A company may have multiple business units and overall revenue cannot provide a picture of whether or not a particular business unit is able to remain profitable if its costs increase significantly. An evaluation of revenue is only a small part of a company's overall economics.
- Companies may have high revenues but may still be unprofitable or have small profit margins due to the costs of operation.
- A company with small revenues may be very profitable if it has low costs.

Had EPA conducted a more robust analysis to consider the lack of benefits that would be gained from the proposed emissions standard, it would be clear that the proposed rule does not produce benefits anywhere close to commensurate with the costs. Even if EPA's revenue analysis was not flawed and incomplete, it would not provide EPA with a license to overregulate facilities and emissions where there is no corresponding benefit, especially where EPA has made an affirmative finding that an ample margin of safety already exists to protect public health.

G. Industry's Estimated MACT Floor Capital and Annualized Costs.

Industry Commenters have developed unit-specific cost information for the control of mercury for ACI/high efficiency venturi scrubber systems, which is much higher than the per-unit costs estimated by EPA and more representative of what could be reasonably incurred for mercury

[135]Industry Commenters utilized the cost information provided to MPCA in 2018 as part of the mercury reduction plans for these units and interpolated an appropriate injection rate to achieve a higher mercury reduction rate. Industry Commenters expect a similar or higher injection rate for other indurating furnaces to achieve an 85% mercury reduction rate. More complete copies of the mercury reduction plans are available on MPCA's website: https://tinyurl.com/ycktbve9.

controls for compliance with the proposed mercury limit. The differences in costs are reflected in the Section VI.1 Table of Costs.[136] In developing costs, industry analyzed economic impacts using the procedures found in the EPA Control Cost Manual (CCM). Industry used the most up-to-date CCM sections as well as vendor cost estimates when available. If vendors did not respond to bid requests, industry used capital costs factors available through a literature review or data from other projects with adjustments for inflation and size. Industry estimates include additional site-work and construction costs to accommodate new equipment within each facility. In addition, a site-specific estimates of site preparation, buildings, and ductwork were added to arrive at the total installed cost. Based on the scale of the proposed equipment installations, industry expects that it would take 14 additional days beyond a typical annual outage to tie in the new equipment and resume normal operations and so lost production costs are included.

As required by the Minnesota Pollution Control Agency (MPCA) and as recognized by EPA in its preamble statements and in the docket, in 2018 the industry analyzed emission control technologies that could potentially be utilized to reduce mercury emissions from the indurating furnaces. The industry memorialized its efforts in mercury reduction reports provided to MPCA and that are part of the docket for this rulemaking.[137] In developing these reports, the companies worked with equipment vendors to confirm sizing and estimated costs which were specific to each of the indurating furnaces. U. S. Steel has since updated the cost estimates provided to MPCA in 2018 with new vendor quotes in 2023 to the extent available and current material pricing to reflect the impacts of inflation. These cost estimates reflect the best information available for the purpose of determining the potential impacts on the industry. Cleveland-Cliffs sites used inflationary indices and best practices to adjust 2018 costs to 2022 or 2023 dollars as available.

While EPA's cost estimates for mercury controls are high, industry's cost estimates, which are more accurate, more current, and based in part on actual vendor quotes, are ***six times higher*** than EPA's. Industry's estimated total capital costs for adding pollution control equipment to 11 furnaces would be approximately $750 million. New mercury controls would require each facility to spend $44 million to $86 million per furnace in total capital costs. To achieve mercury reductions to be compliant with the proposed mercury limits, industry estimates that the total annualized costs for that equipment would be $170 to 180 million, and between $10 million to $22.7 million *per year per furnace*. The following two charts, based on information provided in the subsection VI.D Table of Costs (Table VI.1), graphically reflect a comparison among EPA's, MPCA's, and industry's estimates for total capital costs and for total annualized costs.

[136] USS costs are updated based on recent vendor quotes (2023). Cliffs costs were scaled to 2022 dollars using the chemical engineering plant cost index. Further, please note that the industry does not consider ACI with baghouse to be technically feasible since Hibbing Taconite costs are based on the 2018 mercury reduction plans.

[137] EPA-HQ-OAR-2017-064-206 (Minntac); EPA-HQ-OAR-2017-064-205 (United Taconite); EPA-HQ-OAR-2017-064-0203 (Hibbing); EPA-HQ-OAR-2017-064-0207 (Northshore); EPA-HQ-OAR-2017-064-0204 (Keetac). While not in the EPA docket, the previous owner of the Minorca Mine submitted a mercury reduction plan to MPCA in December 2018, and it is available on MPCA's website: https://tinyurl.com/zetad86d. More complete copies of the mercury reduction plans are available on the MPCA website: https://tinyurl.com/ycktbve9.

Figure VI.8 Comparison of Total Capital Investment Estimates

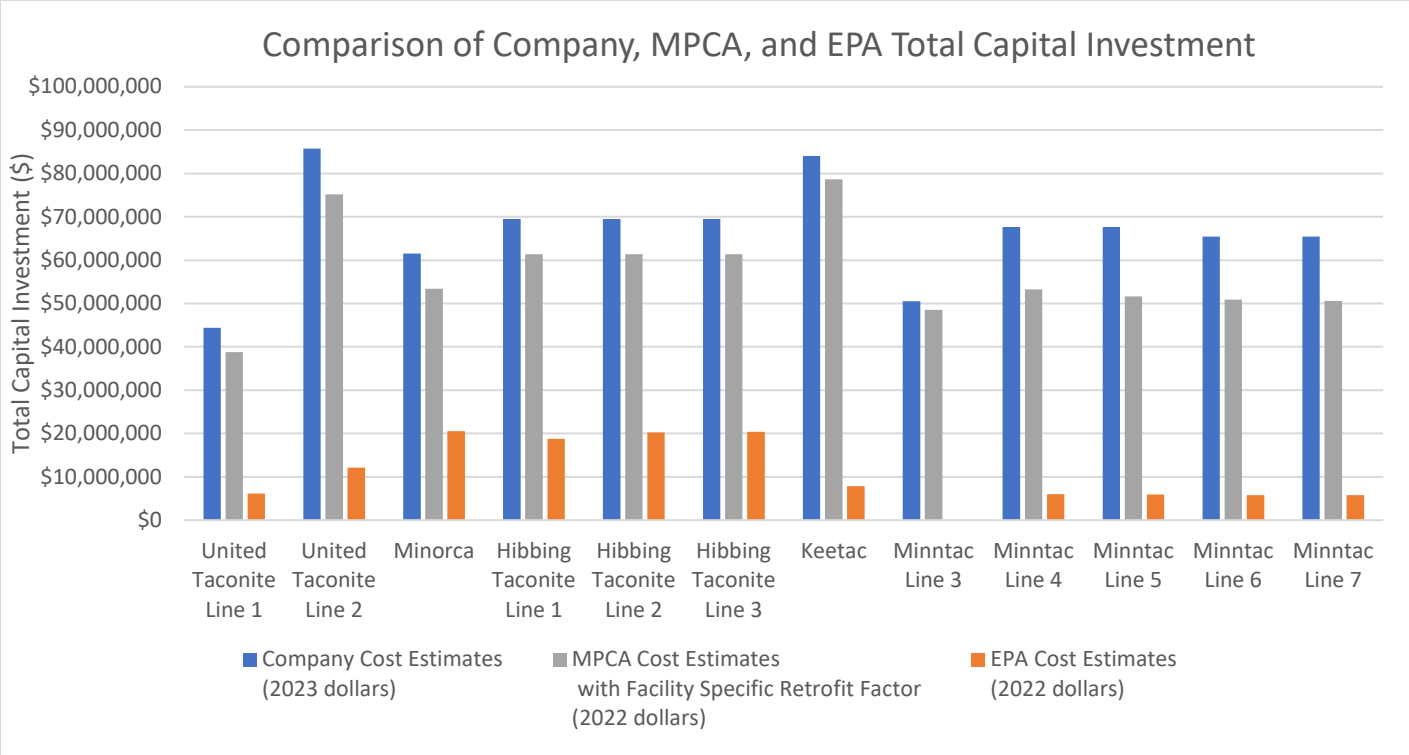
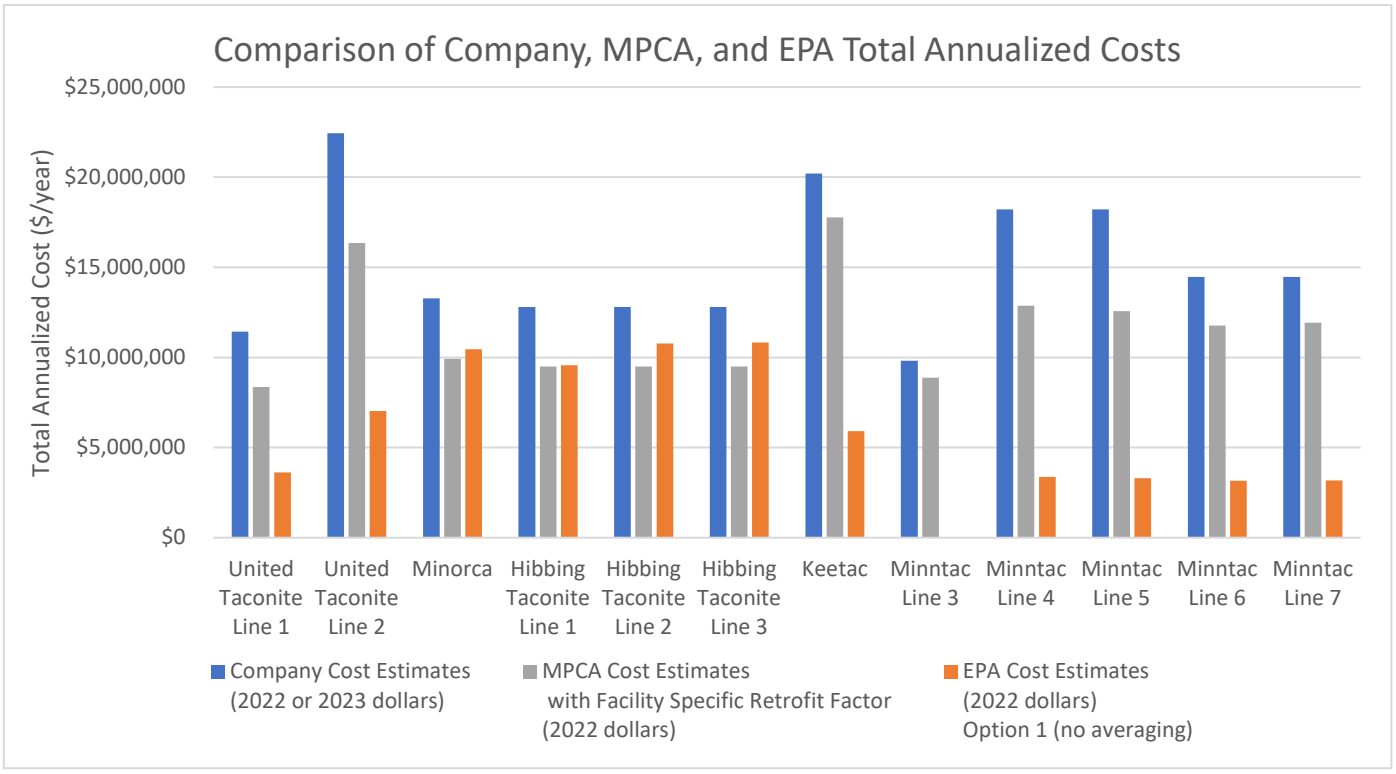


Figure VI.9 Comparison of Total Annualized Cost Estimates



Even if industry were to spend the money and install activated carbon injection (ACI) systems and new high efficiency venturi scrubbers, this technology is not currently installed on any indurating furnace, so it remains unproven and the removal efficiencies unknown. For additional information regarding these uncertainties, please see the Section VI.D.1 for additional information. **Industry could spend hundreds of millions of dollars and the equipment may or may not work as expected—so the costs could be even higher to meet the MACT, or the MACT standard might in fact be unachievable.** Only two years ago EPA admitted that "these control technologies remain unproven at commercial scale and the amount of mercury reduction achieved by them remain uncertain."[138] Nothing has changed in the past two years, and these control technologies remain unproven and uncertain. Without any developments in technology, EPA should not change its finding as to whether the technology is certain to achieve the mercury reductions needed to meet the proposed MACT limits.

The combined effect of EPA's baseline calculation error and resulting error in overstating the quantity of mercury that would be reduced through its proposed MACT standard, coupled with the significant underestimation in costs has resulted in an unreasonable and unsupportable proposal. EPA supported its proposed mercury MACT based on flawed data, which apparently started with a calculation or scrivener's error and ultimately led to a significant overstatement of the reductions and significant understatement of the cost-effectiveness. The following table, Table VI.2, tracks the impacts of that error from its apparent origin to its ultimate impact on EPA's cost-effectiveness rate. Because the supporting information for its proposal is so flawed and led to such inaccurate presumptions, EPA must take this into account when finalizing any MACT for indurating furnaces.

[138] EPA, *National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing Residual Risk and Technology Review*, 85 Fed. Reg, 45,476, 45,485 (July 28, 2020).

Table VI.2 -- EPA's Calculation Errors Leading to Overstated Cost-Effectiveness *"The Domino Effect"*		
Notes	**EPA – In the proposal**	**Corrected per EPA typos and operating hours adjustment**
EPA shared a table with industry on 2/23/2023; industry informed EPA of the errors on 3/13/2023	EPA had a table identifying the incorrect lb/LT stack-test-based emission rates for the first two one-hour runs at Keetac for 2017	Instead of 1.95E-**04** and 2.13E-**04**, the numbers should have been 1.95E-**05** and 2.13-**05**
EPA's February 2023 official dataset used for the rulemaking includes these errors	EPA proceeded to use these lb/LT rates to calculate an average rate for Keetac at 6.43E-05	The average lb/LT rate for Keetac should have been 2.34-05
The first Domino: Keetac Hg baseline	**342.2 pounds/year:** EPA used that average to calculate a baseline for Keetac at 342.2 pounds/year (using 6.43E-05, an assumed hourly production rate, and 8400 hours/year)	**121.8 pounds/year:** The corrected rate, and based on 8200 hours/year should have been 121.8 pounds/year (a difference of 220.4 lbs) *EPA could have confirmed the 342.2 rate was not consistent with lb/hour rate, permitted PTE for unit, mercury reduction report, comparison to other units (3 times higher), etc.*
Hg Baseline for all 7 Facilities	1,010 pounds/year	816 pounds/year
Hg reduction from Keetac to meet proposed MACT	268 pounds/year	49 pounds/year
Hg reduction for all Facilities combined to meet proposed MACT, and new baseline	462 pounds/year reduced, so emissions become 548 pounds/year	242 pounds/year reduced, so emissions become 574 pounds/year
Total Annualized cost	$71,163,308	EPA annualized costs remained at $71,163,308 Company site-specific annualized cost estimates with corrected inputs = $171,084,647 to $180,897,020 MPCA site-specific cost estimates with corrected inputs = $138,872,790
Cost-effectiveness	$153,893 per pound removed	EPA annualized costs but with corrected removal of 242 pounds: $293,460 per pound of mercury removed Company site-specific estimates with corrected inputs = $705,511 to $745,975 MPCA = $572,678
Beyond-the-floor cost-effectiveness	EPA determined that a cost-effectiveness rate of $46,000 per pound of mercury was above what it had "historically found to be reasonable."	The $46,000 per-pound cost-effectiveness rate for the beyond-the-floor MACT does not change with the corrections to the annual removal rates.

H. The proposed emissions averaging alternative compliance approach, while helpful for compliance purposes, overestimates the cost benefits to industry.

EPA has proposed an emissions averaging alternative compliance approach on the theory that it would allow some furnaces at a facility to avoid controls which controlling others to a larger degree so that the overall emissions are below the MACT floor by 10 percent.[139]

This alternative should be improved in any final rule because it is punitive and impractical because of the potential for uncontrolled mercury emissions during process upsets and unplanned outages and because some furnaces are associated with particular product lines and therefore not interchangeable.

EPA's assertion that controlling only select furnaces for facilities with multiple furnaces using the proposed emissions averaging provision is inappropriate and impractical. Any facility with multiple indurating furnaces that must reduce mercury to meet the mercury limit is likely to install controls on all lines to account for varying production, unplanned malfunctions, or extended maintenance so that compliance can be achieved under any operating scenario. In addition, this assumption significantly underestimates the capital and operating costs that would be incurred to achieve compliance with the draft mercury limit. For example, applying the provision to Hibbing Taconite, EPA calculated costs for mercury controls for only Line 2 and Line 3. EPA's assumption is incorrect because the company would likely install controls on all three units to accommodate unexpected outages or extended downtime of Lines 2 or 3 that would result in operating time while the uncontrolled Line 1 mercury emission rate would contribute more to the facility average, potentially resulting in an exceedance of the mercury limit. For this reason, industry's analysis is based on all units installing control equipment.[140]

EPA's assertion that controlling select furnaces for facilities with multiple furnaces using the proposed emissions averaging provision is inappropriate and impractical. In addition, this significantly underestimates the capital and operating costs to achieve compliance with the draft mercury limit. For example, applying the provision to Hibbing Taconite, EPA calculated costs for mercury controls for only Line 2 and Line 3. This is a fatal flaw because unexpected outages or extended downtime of Lines 2 or 3 would result in operating time where more of the uncontrolled Line 1 mercury emission rate would contribute more to the facility average, likely resulting in an exceedance of the mercury limit. Any facility with multiple indurating furnaces that must reduce mercury to meet the mercury limit is likely to install controls on all lines to account for varying production, unplanned malfunctions, or extended maintenance so that compliance can be achieved under any operating scenario. EPA's facility capital and annual costs under the emissions averaging approach are underestimated for the entire industry.

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[139] *See* 88 Fed. Reg. at 30,925-30,926.

[140] To ensure a comparable analysis of costs estimated by EPA and industry, industry has included information in the Table VI.1 Table of Costs to reflect the lack of controls on one unit.

I. Cost Impact Analysis.

EPA did not attempt to justify its MACT floor rates as being reasonable or consistent with prior MACT floor determinations for mercury emissions. EPA's only effort to put the MACT floor costs into any kind of context is in relation to the total revenues of the two parent companies—Cleveland-Cliffs and U.S. Steel—which has no relevance to this particular MACT standard; EPA noted that it would be less than one percent of annual sales revenue per owner. A comparison of costs to annual sales revenue for a parent company is not a regulatory standard, nor would that be appropriate. Moreover, revenues vary significantly from year to year. This analysis is essentially meaningless. This rule will have significant costs on a per-facility basis and will have an effect, as EPA noted in its own economic analysis, on the entire American steel industry. EPA also noted that all consumers of steel would be "unambiguously worse off."[141] EPA acted arbitrarily and capriciously in setting costly standards without sufficient justification and no recognizable or identifiable monetized benefits.

When Congress enacted the NESHAP program in 1990, it was very concerned about the costs of regulation, especially in the context of the MACT floor-setting provisions, and required that EPA prepare a comprehensive analysis of the costs and benefits and other effects associated with compliance.[142] When speaking in favor of this requirement to take costs of compliance into account, Senator Daniel Patrick Moynihan explained that "[i]t would be strange indeed of a Congress so attuned to the importance of cost-benefit analysis intended EPA to set emissions floors regardless of the cost."[143] Because this attention to costs was so important when the decision was made to develop technology-forcing requirements, EPA cannot now, more than 30 years later, take a position that a consideration of costs is not appropriate is simply wrong. For EPA to say that it took costs into account when considering financial impacts in terms of gross revenues of large conglomerate corporations fails to abide by the intent of the statutory requirement to consider the costs of compliance when setting MACT floors. EPA must reconsider this particular proposed MACT in light of the unprecedented costs being imposed to reduce 242 pounds of mercury—and not merely in the context of the parent companies' revenue.

J. Failure to Include a Benefits Analysis.

EPA never identified a single benefit from the reduction of 462 pounds of elemental mercury per year (which is actually 242 pounds per year based on corrected emission rates associated with typographical errors)—other than an *assumed* health benefit for children,[144] and even that was not substantiated or measured and was not based on a study or assessment of any kind. It was simply a very generalized statement made in passing.

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[141] EPA, *Economic Impact Analysis for the Proposed National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing Amendments* at 4-11 (Apr. 2023).
[142] 42 U.S.C. § 7612(a).
[143] 136 Cong. Rec. S16,895–97 (daily ed. Oct. 27, 1990), quoted in Portland Cement Ass'n v. EPA, 665 Fed 177 (D.C. Cir. 2011).
[144] 88 Fed. Reg. at 30,933.

Because this is significant rulemaking under applicable executive orders, EPA must analyze benefits and EPA must ensure that those benefits outweigh the costs. As EPA has recently reflected, this analysis is important, citing to the U.S. Supreme Court in *Michigan v. EPA*:

> One would not say that it is rational, never mind "appropriate," to impose billions of dollars in economic costs in return for a few dollars in health or environmental benefits.
>
> No regulation is "appropriate" if it does more harm than good.[145]

EPA has recently embraced considering a "totality-of-the-circumstances" approach in lieu of a more typical cost-benefit analysis in the context of determining whether it was reasonable and necessary to regulate mercury emissions from electric utilities.[146] When EPA initially grappled with the regulation of mercury emissions from the electric utility generating sector, it identified extremely high annualized costs at $9.6 billion for the largest contributing sector—coupled with a cost-effectiveness rate of $240,000 per pound of mercury removed. EPA countered those high costs with monetized ***net benefits*** (in 2007 dollars) of between $37 billion to $90 billion.[147] As noted, here, EPA has identified no material benefit.[148]

When looking at potential impacts and benefits, EPA must take also into account not only the financial costs directly attributable to installing new pollution control equipment, but also impacts on the environment due to increased water usage, increase waste generation and disposal, transportation (which causes secondary air emission impacts from fossil fuel use), increased production costs due to lost iron units for facilities that would otherwise recover and recycle scrubber solids, and increased electrical use (which also causes secondary air emission impacts of not only NAAQS-related pollutants but also greenhouse gas emissions). The Technical Feasibility Evaluation of Mercury Controls memorandum discussed in Section V provides additional information on this topic.[149]

As reflected in the simple graphic below (Figure VI.10)—the known benefits seem slight in comparison to the identified costs, especially when EPA confirmed that its prior health risk assessment remained valid and that human health was adequately protected with an ample margin of safety based on current, status quo emission levels.

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[145] EPA, *National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units—Revocation of the 2020 Reconsideration and Affirmation of the Appropriate and Necessary Supplemental Finding,* 88 Fed. Reg. 13,962, 13,998 (Mar. 6, 2023).

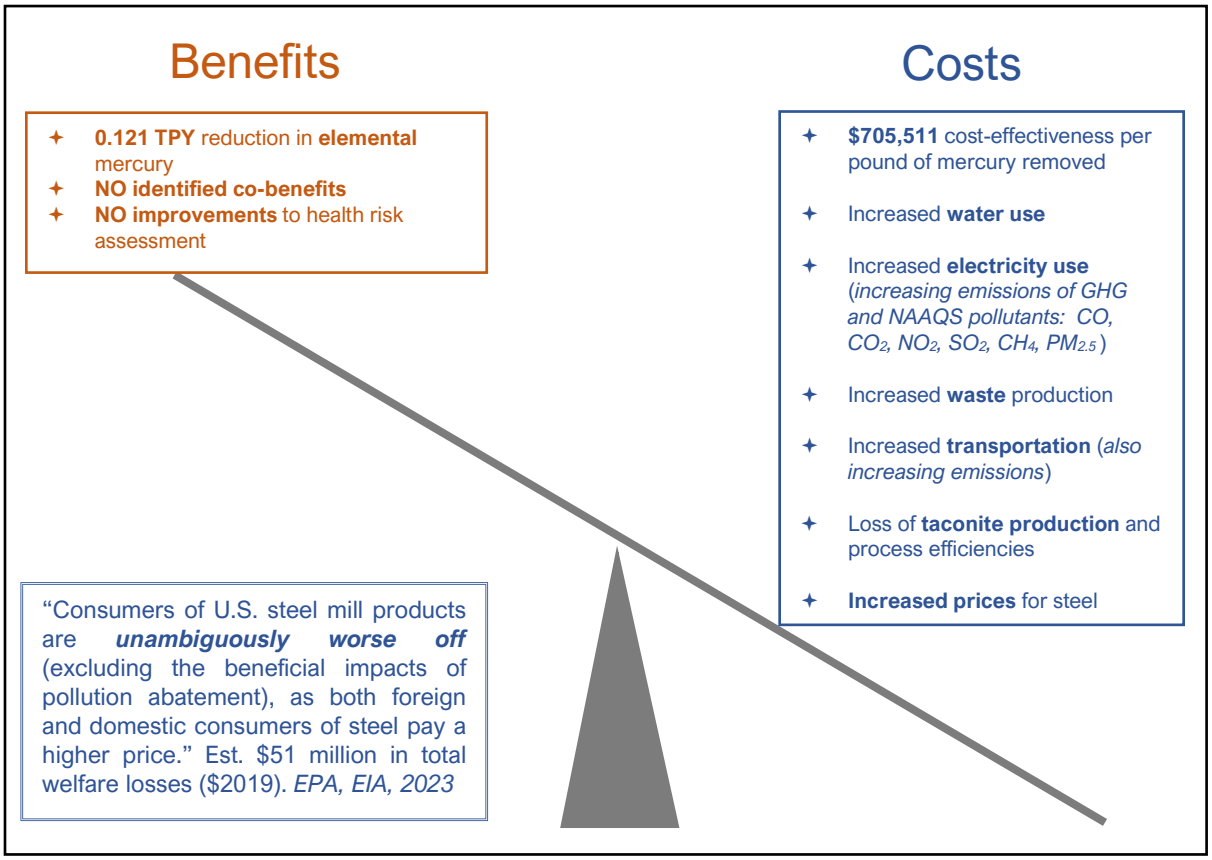
[146] 88 Fed. Reg. at 13,998.

[147] 88 Fed. Reg. at 13,963.

[148] Industry notes that some level of sulfur dioxide control through the use of an ACI coupled with a new high efficiency venturi scrubber could occur, although it is still investigating this.

[149] Technical Memorandum from Dane Jensen, Barr, to Jason Aagenes (Cleveland-Cliffs) and Christopher Hardin (U. S. Steel), *Technical Feasibility Evaluation of Mercury Controls* (June 9, 2023), included as Appendix 3 to this submittal. Industry also notes that if the Agency were to push for an ACI with a baghouse, some of the environmental impacts could be minimized, although there are other environmental disbenefits such as increases in acid gas emissions.

Figure VI.10[150] Cost-Benefit Comparison



EPA states in the preamble that it did not undertake this analysis because the rulemaking was not significant—but that would have based on an annualized cost of $71 million. If EPA were to use more reasonable and accurate cost information, as explained previously, the annualized cost would be closer to industry's estimate of $170 to 180 million—which is well above the $100 million/year threshold to trigger an appropriate regulatory review and cost-benefit analysis under Executive Order No. 12866.[151] EPA needs to reconsider the true cost to industry for this rulemaking and ensure that it undertakes the appropriate review and analyses before moving forward.

K. New Units.

The proposed standard may prevent new indurating furnaces from being constructed in the United States because the standard for new sources is very low, and the cost to control emissions would likely be very high. In addition, the mercury inputs to a new indurating furnace may be so high that it would not be technically feasible to meet the standard for new furnaces with an appropriately

[150] The $51 million welfare impact identified by EPA and quoted in this figure is outdated by relying on 2019 costs and underestimates the true impact on consumers.
[151] See Table VI.1 Table of Costs.

designed control technology. The proposed standard for new furnaces may also not be technically feasible depending on where the ore body is located. For example, mercury content in ore typically increases further west along the Minnesota taconite ore formation. This limit may prohibit the construction of any future new taconite indurating furnace. To help avoid the cost and feasibility concerns, EPA needs to take into account a raw material variability factor as described in Section VII when calculating the UPL-based MACT limit for new units.

L. EPA should not penalize facilities using emissions averaging for compliance by requiring an additional 10 percent reduction in emissions.

In addition to the traditional mercury MACT floor and a requirement for unit-by-unit compliance, EPA proposed an alternative that would allow emissions averaging for compliance. As proposed, a taconite processing facility could average the emissions from existing indurating furnaces to demonstrate compliance with the mercury MACT limit. This approach is, in general, appropriate, supportable, and consistent with other NESHAPs authorizing certain categories and subcategories of affected sources to demonstrate compliance with MACT limits through emissions averaging—at least for sources in the same subcategory and sometimes facility-wide.

As set forth in more detail in Section VII below, we are proposing that the MACT floor for mercury be established based on plantwide emission averages for all existing indurating furnaces. This emissions averaging approach, whether to establish the MACT floor or to determine compliance with the MACT limit for mercury, takes into account the variability in emissions that can occur due to the range of mercury concentrations in the greenballs fed to the furnaces. For these reasons, Industry Commenters are supportive of an emissions averaging approach for compliance.

EPA already allows other subcategories within taconite processing facilities to average their emissions for compliance purposes. The ore crushing and handling sources and finished pellet handling sources demonstrate compliance with the particulate matter MACT limit based an overall, flow-weighted average particulate matter concentration for all emission units within each of these two affected sources.[152] When adopting this approach for ore crushing and handling and finished pellet handling, EPA explained that the averaging procedure would account for variability among units, operations, and performance. EPA had established the MACT based on average emissions from all units within those subcategories, and subsequent compliance was, consistently, based on the same approach. EPA has allowed a number of other source categories to demonstrate compliance with MACT limits through emissions averaging.[153]

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[152] EPA, *National Emission Standards for Hazardous Air Pollutants: Taconite Ore Processing*, 68 Fed. Reg. 61,868, 61878-61879 (Oct. 30, 2003).

[153] *See, e.g.,* EPA, *National Emission Standards for Hazardous Air Pollutants: Synthetic Organic Chemical Manufacturing Industry*, 59 Fed. Reg. 19,402 (Apr. 22, 1994) (codified at 40 C.F.R. part 63, subparts F, G, H, I); EPA, *National Emission Standards for Hazardous Air Pollutants: Petroleum Refineries*, 60 Fed. Reg. 43,244 (Aug. 18, 1995) (codified at 40 C.F.R. part 63, subpart CC, § 63.652); EPA, *National Emission Standards for Hazardous Air Pollutants; Final Standards for Hazardous Air Pollutant Emissions from Wood Furniture Manufacturing Operations,* 61 Fed. Reg. 50,586 (Proposed Sept. 26, 1996) (codified at 40 C.F.R. part 63, subpart JJ, § 63.804); EPA, *National Emission Standards for Hazardous Air Pollutants; Final Standards for Hazardous Air Pollutant Emissions from the Printing and Publishing Industry*, 61 Fed. Reg. 27,132 (May 30, 1996) (codified at 40 C.F.R. part 63, subpart KK); *National Emission Standards for Hazardous Air Pollutant Emissions: Group I Polymers and Resins*, 61 Fed. Reg.

1. Adjustment Factor

EPA's proposed alternative allowing the use of emissions averaging to demonstrate compliance with the MACT limit for mercury came with strings attached, unfortunately. Any taconite processing facilities that take advantage of the emissions averaging alternative for demonstrating compliance must meet an emission limit that includes a 10 percent "adjustment factor" – meaning that the limit is *10 percent lower* than the MACT floor limit applicable if the emissions averaging alternative is not utilized. Instead of each individual unit meeting a limit of 1.4×10^{-5}, the units at a facility using emissions average collectively would need to meet, a lower limit of 1.26×10^{-5} based on an average of their emissions. EPA fully anticipates greater emission reductions if companies use the emissions averaging approach. EPA predicts that the 10 percent adjustment factor will result in an increase in mercury reductions by a corresponding 10 percent. Instead of a reduction of 462 pounds per year based on unit-by-unit compliance, EPA anticipates that emissions will be reduced by an additional 35 pounds per year, for a total of 497 pounds, if companies take advantage of the emissions averaging opportunity being offered. EPA has failed to justify any need this adjustment factor, and its presumption leading to expected benefits are incorrect.

2. Identified benefits

EPA's entire rationale for imposing the lower emission limit of 1.26×10^{-5} lb/long ton of pellets produced if emissions averaging is used to demonstrate compliance instead of on a unit-by-unit basis (with no averaging) appears to be focused on reducing emissions even further and cost savings for the facility owners and operators. Specifically, EPA says it is proposing this alternative compliance approach "because" of the following:

1. Averaging will provide a "less costly alternative to controlling mercury emissions from the source category" (including energy savings);

2. EPA expects "a greater level of mercury reduction" than would otherwise be achieved with unit-by-unit compliance;

3. The "per pound of mercury removed" cost-effectiveness rate would be "lower" with the averaging approach than with the unit-by-unit approach for demonstrating compliance;

4. EPA is providing owners and operators with "compliance flexibility."[154]

EPA has projected lower costs, greater annual reductions in mercury, and improved cost-effectiveness because it *assumes that three of the five facilities with furnaces needing add-on controls to comply would take advantage of the emissions averaging alternative and would not install the controls on all units*. Specifically, EPA projected that only 6 out of 18 furnaces would

46,906 (Sept. 5, 1996) (codified at 40 C.F.R. part 63, subpart U); EPA, *National Emission Standards for Hazardous Air Pollutants for Primary Aluminum Reduction Plan*ts, 62 Fed. Reg. 52,384 (Oct. 7, 1997) (codified at 40 C.F.R. part 63, subpart LL, § 63.846).

[154] 88 Fed. Reg. at 30,925.

need to install add-on pollution control equipment instead of 11 out of 18 furnaces that would be forced to install add-on controls with unit-by-unit compliance. EPA's prediction is incorrect for the following reasons.

3. Assumptions Incorrect, Leading to Fewer Benefits: One key reason that taconite processing facilities have installed multiple furnaces is to ensure redundancy and sufficient capacity should one or more furnaces become nonoperational at any given time. Because shutdowns and curtailments like this occur at times without predictability, the processing facilities would have no way to select a single unit for installation of the control equipment, and then to ensure that furnace remains operational at all times. If the controlled furnace or its control equipment experiences an operational interruption or simply operates at a lower capacity or for fewer hours in a year, the facility's ability to demonstrate that all of its furnaces are compliant would be jeopardized. Thus, facilities would need to install equipment on each furnace subject to the MACT, even if there is emissions averaging available and most certainly if a 10 percent pay-to-play penalty is applied as EPA proposes. As a result, there is no cost saving with the emissions averaging approach. Indeed, because of the 10 percent penalty and lower mercury limit associated with the emissions averaging alternative, the facilities would be spending *more money* – not less -- to reduce emissions by 10 percent more—for a combined source-category-wide total of 35 pounds. This makes no sense. EPA has already determined that these additional costs associated with 35 pounds of incremental mercury removal are not reasonable and not cost-effective. If EPA finalizes the proposed MACT limit, with or without an emissions averaging alternative, companies would need to install mercury control equipment on all 11 furnaces, not on 6 as EPA suggests. The emissions averaging alternative, therefore, does not result in any significant cost savings to industry. To be clear, this is only an alternative, and does not mean that industry would even engage the option. Therefore, it was entirely premature for EPA to say that companies would utilize the alterative.

4. Adjustment Factors Not Routinely Required and the Proposed Factor Arbitrarily Selected: EPA often allows emissions averaging for compliance with NESHAP standards without having imposed any type of adjustment factor, and when it has used an adjustment factor, it has identified a reasonable justification for the particular factor used. For example, EPA allows the ore crushing and handling and pellet handling operations at taconite processing facility to use emissions averaging without any type of adjustment factor. Similarly, when EPA finalized the initial Mercury and Air Toxics (MATS) rule for electric utility generating units, it specifically authorized existing units located the same facility and within the same subcategory to demonstrate compliance by emissions averaging.[155] EPA stated that is policy was to encourage "the use of flexible compliance approaches," including emissions averaging, which represents an equivalent alternative. EPA went on to explain that emissions averaging "can provide sources the flexibility to comply in the least costly manner while still maintaining a regulation that is workable and enforceable." With emissions averaging, some units could be above the limit and others below, and as long as the average is less than the limit, compliance is demonstrated. Rather than attempting to reduce emissions further and claim an additional benefit, EPA was more concerned with ensuring that the MACT floor limits would not somehow be less stringent with emissions

[155] MATS Final Rule, 77 FR 9304 (Feb. 16, 2012).

averaging than if compliance were determined on a unit-by-unit basis, while also providing "flexibility in compliance, cost and energy savings to owners and operators." EPA has not explained why the reasoning in the MATS rule would not apply here.

As another example, EPA established facility-wide emissions averaging for petroleum refineries to "allow[] the owner and operator to find the optimal control strategy for their particular situation" and to provide them with "flexibility to reduce emissions in the most cost-effective manner." EPA reiterated its "stated goal of increasing flexibility in rulemakings," which is particularly important for broad source categories, includes providing "more opportunities to average." While EPA wanted to ensure that the emissions averaging approach did not lessen environmental protection, it did not deem it legally necessary to impose any type of discount or adjustment factor. EPA allowed similar facility-wide emission averaging for printing and publishing, EPA authorized facility-wide averaging with no reduction factor and determined that averaging would have a negligible if any impact on hazardous air pollutant emissions. EPA was focused on providing the most cost-effective path for affected sources to comply and allowing the sources to determine where the more significant reductions could be made. EPA estimated a cost saving of $2 million with facility-wide emissions averaging. Here, EPA simply indicates that a 10 percent penalty is appropriate (and provides no analysis as to why a 1 percent or 2 percent penalty would not be appropriate).

On a few occasions, EPA has applied what it calls a discount factor—when it considered it necessary to address a particular issue such as accuracy. When EPA established the MACT limits for various subcategories within the polymers and resins source category, EPA allowed emissions averaging with all subcategories and applied a 10 percent discount factor *only* for batch front-end process vents. EPA explained that a factor was appropriate for these process vents because EPA's earlier concerns about accuracy and consistency when using emissions averaging could be met with the adjustment factor. EPA applies a slight reduction factor to the limits when emissions averaging is used within the primary aluminum source category. EPA allows for emissions averaging not only for units within a source category but among different source categories. statistical discounts" were "derived and applied to account for the variability in emissions by the sources to be averaged." The discount is based on the number of units within the pool to be averaged and well below ten percent. EPA noted that it was allowing emissions averaging across affected sources because it was neither expressly permitted nor expressly precluded by the CAA, and it also promoted economic efficiency with no adverse environmental consequences. Given the breadth of that category, the industry might not have had a concern with a 10 percent penalty. Here, it is of significant concern.

The 10% penalty should be eliminated in any final rule.

VII. EPA Has Options Under the Clean Air Act to Correct its MACT Determination for Mercury and Produce a Reasonable, Legally Permissible MACT Floor.

As described in preceding Sections, EPA's proposed MACT floor for mercury emissions from existing indurating furnaces is not proper and is inconsistent with the statute. As we have explained, the proposal, if finalized, would pose an existential risk to the continued viability of large portions of the American taconite mining and processing industry itself. As EPA has agreed, Congress did not intend for MACT standards to "drive sources to the brink of shutdown."[156] Moreover, EPA should not proceed with the proposed standards where risk is well below acceptable thresholds, the reductions to be achieved are minimal, and the cost of achieving such minimal reductions is beyond what has been imposed in any other context. EPA can avoid those outcomes and move forward to promulgate a reasonable, legally permissible MACT standard by taking advantage of the tools that EPA is afforded under the Clean Air Act to produce an acceptable rule, consistent with Congress' intentions, as described in more detail below.[157]

A. EPA can establish a more reasonable and defensible MACT floor by using facility average emissions to identify the best performing sources, then calculate the UPL incorporating a raw material variability factor based on greenball concentration data from the top-five-ranked facilities.

As noted earlier, EPA ranked individual indurating furnaces in developing the MACT floor based on stack test data. Each furnace within a facility is virtually identical to the other furnaces—without any distinction that would lead to statistically different emission rates. The mercury emissions measured during the stack tests, and used to set the MACT, are the direct result of the mercury concentration in the greenballs fed to the furnaces. The mercury concentrations in the greenballs vary significantly from day to day, and certainly from year to year for the same mine, and there is even more variation from mine to mine. By ranking each furnace to establish the floor, rather than ranking by facility, and by failing to apply some type of variability factor, such as an intraquarry or raw material variability factor, EPA has derived a floor that is not based on performance but, rather, based on happenstance – *i.e.*, that certain processing facilities are located near taconite ore deposits that have lower concentrations of mercury than others. This mercury variation is not related to any "performance" or "control" among individual furnaces. Therefore, it is inappropriate to base any MACT floor determination on a specific furnace. EPA could have avoided the problematic MACT floor, which skews the floor based on location, by instead using a plantwide average approach for the indurating furnaces, where all of the furnaces at an individual plant are averaged, the facilities then being ranked according to those averages, coupled with use

[156] EPA, *National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing*, 68 Fed. Reg. 61,868, 61,879 (Oct. 30, 2003) (quoting H.R. Rep. No. 101-490, 101st Cong. 2d sess. 328).

[157] EPA is apparently proceeding under the assumption that, in establishing under CAA § 112(d)(2) a mercury MACT standard for the existing indurating furnaces at issue here, it may base that standard on the existing source floor and otherwise decline to take into account costs (or any of the specified factors in subsection (d)(2)). As discussed in Section III above, that assumption lacks a statutory foundation. In any event, EPA is unquestionably afforded the discretion, in taking final action in this matter, to employ the tools that are described here. In the specific circumstances of this rulemaking EPA's *failure* to do so would constitute an *abuse* of discretion, rendering any final rule arbitrary and capricious and legally indefensible. EPA cannot proceed to promulgate a final standard that, for all practical purposes, could not be met by several of the best performing facilities in this source category, and thereby impose severe harm on the industry, and justify its action on the baseless grounds that its hands were tied.

of a raw material variability factor. The following discussion will explain how consideration of the collection of furnaces at each facility and the variability of raw material feed input work together for a more reasonable and appropriate reflection of the best performers and an appropriate MACT floor.

1. EPA should determine the best performers by evaluating and ranking based on facility-wide average indurating furnace emissions for each taconite iron ore processing facility.

In its recent preamble statements, EPA did not indicate whether the Agency had considered any alternative approaches for its MACT floor rankings, such as ranking by facility. Ranking by facility is unquestionably within EPA's discretion. It is certainly most appropriate for this source category; and, in fact, failure to do so is an abuse of discretion. Indeed, in 2002, when EPA was first establishing MACT standards for taconite indurating furnaces, it had intended, as its *first option*, to use a plantwide average to set the MACT floor. Ultimately, EPA failed to adopt that option, but *only* because it had no data for some of the plants and was therefore unable to establish averages or rank them.[158] EPA stated that its "usual practice" in developing MACT standards was to organize available information for similar HAP-emitting equipment into related groups for the purpose of determining MACT floors.[159] EPA explained that because it was not able to rank based on plantwide averages, it used an "alternative" approach and set the floor based on individual furnaces.

In this same 2002 rulemaking for the taconite iron ore processing source category, EPA used plantwide averaging to set MACT floors for two other subcategories--ore crushing and handling and finished pellet handling. EPA described the facility-wide averaging process for establishing a MACT floor for these two subcategories, where emissions from two subcategories of sources were averaged together per-plant for ranking by facility, as follows:

> The first step in the MACT floor analysis was to calculate a flow-weighted mean PM concentration value (in gr/dscf) for each of the five plants [for which it had data] using the available PM emissions data for the ore crushing and handling and finished pellet handling units at each plant. For each unit with a PM emissions test, the total grains of PM emitted during the test was calculated by multiplying the test

[158] EPA, *National Emission Standards for Hazardous Air Pollutants for Taconite Iron Ore Processing*, 67 Fed. Reg. 77,562, 77,573 (Dec. 18, 2002). EPA had plantwide values for three of the five grate kiln designs and two of the three straight grate designs. Because EPA had subcategorized the plants (based grate type and ore type) and because it therefore did not have enough data to establish a "top 5" for each subcategory (or at least the top three for straight grate kilns), it did not move forward with its first choice, which was based on plantwide averages. Otherwise, EPA was prepared to use a plantwide approach to determine the MACT floor for indurating furnaces (which would have been based on the average of all five of the grate kilns values to set a limit for this subcategory, and the average of all three straight grate kilns to set the limit for this other subcategory).

[159] "Although ore crushing handling and finished pellet handling are defined as separate affected sources, we combined the available test data on both sources for the MACT floor and MACT analyses. This is consistent with our usual practice in developing MACT standards in organizing, as appropriate, the available information for similar HAP-emitting equipment into related groups for the purpose of determining MACT floors and MACT; yet, as appropriate, maintaining separate affected source definitions for the purpose of defining the applicability of relevant standards." 57 Fed. Reg. 31,576 (July 16, 1992).

> average in gr/ dscf by the test average flow rate in dscf. Then, for each plant, the grains of PM emitted by all the tested units at that plant were totaled. The total grains emitted were then divided by the total air flow for the tested units (in dscf) to obtain the flow-weighted mean PM concentration in gr/dscf. The flow-weighted mean PM concentration values (in gr/dscf) for each of the five plants were 0.0047, 0.0050, 0.0059, 0.0114 and 0.0116. The resulting MACT floor for the ore crushing and handling and finished pellet handling affected sources as determined using the flow-weighted mean PM concentration for the five plants is 0.008 gr/dscf.[160]

What EPA did in 2002 with the two subcategories of ore crushing and handling and pellet handing is essentially what is required for the indurating furnaces in 2023—*i.e.*, use plantwide averages of indurating furnace emissions for ranking each taconite processing facility, starting with the lowest rate, and to set the floor pool based on the top five facilities' plantwide averages. Failure to utilize this approach for ranking best performers for this source category would be an abuse of discretion. Because of the limited dataset available and the variability of the mercury concentrations, a UPL would be applied rather than relying solely on an average of the test data, consistent with how EPA calculated its currently proposed MACT for existing sources.

As it is, there is no reason to expect meaningful differences in the performance among furnaces at the same facility when the mercury concentration in the ore processed relatively the same, in that each furnace at a given facility is of similar design, each processes the same ore as the others, produces similar pellets, and each are fed the same greenballs. Any mercury variation in the mercury at each furnace is simply a product of the mercury variation in the ore itself, unrelated to the furnace or any processing. Put simply, all of the furnaces at a given facility are "similar units." The same ore is processed by all furnaces throughout a facility on a given day because the taconite iron ore is concentrated and separated in a uniform fashion throughout the facility. A greenball from the batch of processed ore could be fed into one furnace at the plant just as easily as it could end up in another furnace at the same plant. In addition, the types of control equipment employed at each facility are consistent across the different furnaces—and would be for new mercury controls as well.

Given all this, given that the mercury emissions from indurating furnaces are driven exclusively by the geographical characteristics of the taconite ore from an associated mine, and given that the collection of indurating furnaces at a given plant do not have different emission characteristics, processes, control device use, or opportunities for pollution prevention, there is no *meaningful* distinction between the indurating furnaces at a given plant. That is, one furnace is not doing anything different with regard to operating or engineering design and controls. For instance, variation between furnaces at a single facility tested on different days demonstrates the variation experienced by all furnaces on that day (*i.e.*, facility-wide performance) rather than that of a single furnace. As an example, the Hibbing furnaces are identical and process the same ore, yet due to the different mercury concentrations in the greenballs processed on the testing days, they each had different emission rates and were ranked 8th, 11th, and 13th. This ranking was due only to the mercury concentration in the ore and did not reflect the performance of any individual unit.

[160] 67 Fed. Reg. at 77,572.

Establishing the MACT floor based on emissions of *individual* furnaces located at the *same* plant, where all the indurating furnaces at that plant are identical and receive the same raw material inputs on a given day, is contrary to congressional intent. Section 112(d)(3) directs that the MACT floor for existing sources reflect "the *average* emissions limitation achieved by *best performers*." The very reason for averaging the best performing sources, as CAA § 112(d)(3) specifies for existing sources, is to account for the expected degree of variability from facility to facility, across the industry.

In this instance, however, EPA has chosen to calculate the floor based on data derived from testing undertaken from multiple units at the same plant, even though the units are identical, even though they receive the same raw material inputs on a given day, and even though it is those raw material inputs that drive the rate of mercury emissions. This approach does not, and cannot, reflect appropriate variation among the plants, contrary to the express intent of CAA § 112(d)(3). Accordingly, EPA's approach is inconsistent with the CAA and should not have been used to derive an existing source floor. Instead, an emissions averaging approach, where ranking is done *by facility* to establish the floor pool, should have been employed. Doing so is most appropriate and well within EPA's discretion because "EPA has the discretion to determine what metric to use in defining the 'best' source, so long as it is reasonable."[161]

In not treating all the indurating furnaces at a single facility as equal, EPA erred. Because there is no meaningful difference between the efficacy of controls at indurating furnaces at a facility processing the same batch of iron ore (after it is concentrated into greenballs), "EPA [can] reasonably considered all units with the same technology equally 'well-controlled,' so that each unit with the best technology is a 'best-controlled unit' even if such units vary widely in performance."[162] When comparisons between sources are impossible, and emission variations are not related to technological performance, the D.C. Circuit has upheld EPA's discretion to use alternative means to the selection the best five sources.[163] Because the taconite furnaces are not at a particular facility, EPA can consider alternatives for estimating the five best five performing sources. As the D.C. Circuit has said, "considering all units with the same technology is justifiable because the best way to predict the worst reasonably foreseeable performance of the best unit with the available data is to look at other units' performance."[164]

While it may be the case that each indurating furnace has been defined by EPA to be a separate "affected source,"[165] this in no way precludes the use of a plantwide averaging approach for

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[161] *Cf. Mossville Env. Action Now v. EPA*, 370 F.3d 1232, 1241 (D.C. Cir. 2004).

[162] *Sierra Club v. EPA*, 167 F.3d 658, 665 (D.C. Cir. 1999).

[163] *Mossville Env't Action Now v. EPA*, 370 F.3d 1232, 1240 (D.C. Cir. 2004) (upholding EPA's reliance on existing emissions limitations as the MACT floor when comparison between sources is impossible: "The EPA argues that in this case, *determining the best five sources was impossible.* This is because of the great variability in [] emissions, and the fact that that variability is a result of the type of resin being produced, *not the technology or processes applied to control emission. . . . With comparisons between plants impossible, and emission variations not related to technological performance, the EPA claims it was unable to select the best five sources*. Therefore, *after considering other alternatives*, it determined that since all twenty-eight PVC plants were subject to the Part 61 NESHAP, those standards estimated the best five performing sources.")

[164] *Sierra Club v. EPA*, 167 F.3d 658, 665 (D.C. Cir. 1999).

[165] EPA would be acting within its discretion to define the affected source as the *group* of indurating furnaces at a given facility. We understand that EPA is concerned it may have to redo the analyses for all of the emission limits if

establishing MACT floor pools. EPA's primary purpose in 2002 for defining each indurating furnace as a separate affected source within the taconite ore processing source category was not related to MACT floors; it was focused on determining the applicability of relevant standards.[166] Because of the precedent EPA set with ore crushing and handling and with pellet handling (where the emissions from two different types of affected sources were all combined and averaged for ranking by facility to set the MACT floor), EPA's usual practice for grouping similar units within a facility, and its original plan in 2002 to use plantwide values to set the MACT floor for indurating furnaces, EPA has acknowledged that it could do the same here. To establish a MACT floor for existing indurating furnace mercury emissions consistent with Congress' intent for reasons explained above, EPA needs to utilize a plantwide averaging approach with a ranking by facility.

While EPA proposed plantwide emissions averaging for compliance with the taconite furnace MACT, it did not do so for establishing the mercury MACT floor. EPA should have provided for averaging for the mercury MACT floor as well as for compliance demonstrations. Moreover, EPA has not explained why it would not treat the mercury standard for furnaces different from the way it treated taconite ore crushing and handling and taconite pellet handling. There is no valid basis to deny this flexibility to sources, particularly given the uncertainty around the technology being proposed here. As noted above, EPA used plantwide averaging and ranking by facility to set the MACT floor for these two subcategories, and then allowed plantwide averaging to demonstrate compliance:

> To demonstrate initial compliance with the PM emission limit for the ore crushing and handling affected source, the flow-weighted mean concentration of PM emissions of all units within the affected source must not exceed the applicable PM emission limit. Similarly, for the finished pellet handling affected source, the flow-weighted mean concentration of PM emissions of all units within the affected source must not exceed the applicable PM emission limit.[167]

EPA proposed the same emissions averaging approach for compliance demonstrations in 2023 for the indurating furnace MACT standard—allowing compliance with mercury emission limits to be based on emissions averaging. While EPA proposed that compliance be based on emissions

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it proceeds in this fashion, but we do not see why that would be true. EPA has long acknowledged that it has discretion in defining the affected source. We know that under Section 111 and Section 112, EPA has taken a range of approaches to doing so. There is no legal principle that should preclude EPA from including regulatory language that states that *for the purposes of the mercury emission limitations in Section [Fill in], the affected source is the collection of indurating furnaces at a given Taconite Iron Ore Processing Facility.* After all, the source category is Taconite Iron Ore Processing. And Congress has not provided in the CAA that an affected source must be defined identically for each pollutant regulated. Indeed, in Section 112(d)(3), EPA is explicitly permitted to distinguish among classes, types, and sizes of sources within a category or subcategory in establishing such standards on a per-pollutant basis. The only limitation on EPA's authority in this regard is that EPA may not delay the compliance date for any standard applicable to the source. Nowhere in the statute does it indicate that EPA's definition of affected source needs to be the same for each and every pollutant.

[166] *Id.* at 77,571-77,572. For example, with a relatively broad source category like taconite iron ore processing, which covers the a large portion of the processing facility, we understand that EPA will often establish separate "affected sources" so that if a large component like an indurating furnace undergoes a major overhaul, it would constitute reconstruction and trigger new-source MACT standards based on 50 percent of the cost of a new furnace rather than an entirely new processing facility.

[167] *Id.* at 77,575; 40 C.F.R. §§ 63.9623(a)(1), (3); 63.9620(a), (c); 63.9621(b).

averaging, EPA inconsistently proposed a *floor pool* for mercury emissions based on individual indurating furnaces rather than emission averages—creating a disconnect between the MACT floor and compliance. As noted earlier, the indurating furnaces within each facility are similar and process similar ore and greenballs and are subject to the same variability in emissions as a result of the variability of the mercury content of the ore and greenballs. A more logical, consistent, and reasonable approach would be to use emissions averaging based on those groupings to both establish the MACT and demonstrate compliance.

Furthermore, unlike in 2002 when EPA proposed the initial MACT standards for indurating furnaces, EPA now has sufficient data to establish plantwide averages for all of the taconite processing facilities. EPA can then rank by facility based on those plantwide averages to identify the top five lowest emission rates for the MACT floor pool.

Based on this approach, and using the best available emissions data for the seven operating facilities, including data corrections noted in industry's March 27, 2023 submittal to EPA, we have identified the MACT floor pool as follows in Table VII.1:

Table VII.1 MACT Ranking by Taconite Iron Ore Processing Facility

Induration Furnaces – Mercury Emissions Ranking from Best Data Available			
Facility	**Plantwide Average Mercury Rate (lb/LT of pellets produced)**	**Rank**	**Used in MACT Floor?**
Northshore Mining	8.57E-07	1	Yes
Tilden Mine	4.17E-06	2	Yes
Minntac	1.17E-05	3	Yes
Minorca Mine	1.92E-05	4	Yes
Hibbing Taconite	2.34E-05	5	Yes
Keetac	2.34E-05	6	No
United Taconite	2.35E-05	7	No

Based on this ranking, the top five facilities' average emission rates would constitute the MACT floor pool. When applying the UPL approach outlined in EPA's April 4, 2023, OAQPS Memorandum to set the MACT floor based on the pool, EPA should include a raw material variability factor. A raw material variability factor is needed because the mercury concentration in the furnace feed varies significantly across the region, as well as within a single mine. Industry has provided more detailed support for this raw material variability factor in the next subsection

as well as through its February 14, 2023 submittal to EPA[168] and the Supporting Workbook included as Appendix 12.

2. EPA's MACT floor analysis must also include a raw material variability factor because the available stack test data does not reflect the full range of operating conditions known to occur or the expected level of variability based on the variability of mercury present in raw materials processed in indurating furnaces when applying the upper prediction limit.

EPA conducted its MACT floor assessment without including an intraquarry variability (IQV) or other raw material variability adjustment in the UPL to address the mercury concentration variability present in the iron ore at taconite mines providing material inputs to the furnaces identified as the top five best-performing sources. EPA has data showing that the mercury content of taconite iron ore varies by location across the region and varies within a given mine due to geological processes, described in the Barr Geology Memorandum included as Appendix 6. EPA also has data showing that it is the mercury content of taconite iron ore (that is processed and fed into indurating furnaces as greenballs) that drives emissions of mercury from indurating furnaces. To account for this variability in the primary raw material that is necessary for continued operations of taconite iron ore processing facilities, and understanding the considerable uncertainty related to the mercury content of iron ore the facilities may need to process in the future, EPA should use raw material variability information received from the industry to establish an IQV or other variability factor and adjust its proposed mercury MACT floor calculations, like it has done when setting other MACT limits.[169]

EPA's decision to go forward with its proposal, without having taken into consideration information provided by industry on February 14, 2023, information that would have informed EPA of the errors in its emission rates and supported the need for raw material variability factor, was unfortunate. It was incumbent on EPA to have considered these "important aspect[s] of the problem,"[170] and because it did not, its action is arbitrary and capricious. EPA should not move forward with finalizing a MACT standard for existing indurating furnaces until this is corrected.

The proposed MACT floor for mercury is, in essence, based on the existence of a more favorable distribution of mercury at some mines compared to others at the time stack testing was conducted. Yet, as discussed, the companies cannot guarantee the mercury content of iron ore from a given mine, and raw material substitution is infeasible on engineering and logistical levels, and would threaten the taconite industry and, in turn, the steel industry, adversely affecting the American economy when EPA has found the health risk from the industry to be very low already. EPA must use the MACT-setting tools available to develop a MACT floor that makes sense for this industry. In its proposal, EPA did not take this "whole picture" into account when it based its proposed mercury MACT floor on emissions alone, knowing that when it is raw materials alone that drive

[168] Memorandum from AISI and U. S. Steel to EPA, *Greenball Mercury Content Data and Information for Use in the Reconsideration of the National Emissions Standards for Hazardous Air Pollutants for the Taconite Iron Ore Processing* (Feb. 14, 2023), EPA-HQ-OAR-2017-0664-0222.
[169] Cite Brick and Portland cement industries.
[170] *Motor Vehicle Mfrs. Assn. of United States, Inc. v. State Farm Mut. Automobile Ins. Co.*, 463 U.S. 29, 43 (1983).

mercury emissions from indurating furnaces in this industry. EPA has also acknowledged that substitution of raw materials is not a sustainable or feasible option,[171] and would be considered a beyond-the-floor requirement which must be economically justified.[172] Because EPA is not appropriately accounting for raw materials in the standard setting, EPA is impermissibly setting a large portion of the taconite industry up to fail. It is not reasonable to establish a mercury standard that is potentially unachievable by even the "best performers" based on unpredictable factors outside of the source's control. EPA must use the MACT-setting tools available and within its discretion to develop a MACT floor that makes sense for this industry.

As described, in Section IV.B, it is possible to reasonably estimate the emission rates the "best performers" would achieve under a full range of operating conditions using a correlation between greenball mercury concentrations and air emissions. The variability represented in mercury stack test data for EPA's list of best performers does not reflect the level of variability that would be expected to occur over the full range of operating conditions *for those sources and that must be considered in establishing any MACT floor.*

The table below, Table VII.3, compares the estimated emissions from indurating furnaces in EPA's dataset to the anticipated emissions that would be expected if the furnaces were processing greenballs with the maximum measured mercury concentrations for that facility, as reflected in the dataset industry provided to EPA on February 14, 2023. These emission estimates still do not necessarily reflect the maximum mercury emissions that could occur at each facility because of the limited number of greenball samples for some facilities and uncertainty regarding future mercury concentrations in iron ore and greenballs. The table indicates that the in all cases the anticipated emissions based on the maximum greenball mercury concentrations are higher than the stack test data used to establish the proposed MACT floor limits.

[171] *See* 68 Fed. Reg. 61,879 (2003).

[172] *See* 42 U.S.C. § 7412(d)(2); *Portland Cement Ass'n v. EPA*, 665 F.3d 177, 194-95 (D.C. Cir. 2011) (Brown concurrence) ("[T]he quality of inputs should not be permitted to affect the calculation of floors: the "substitution of materials"—in other words, the degree to which EPA can require kilns to switch inputs in order to comply with a standard—is listed as a factor to be considered in the second, *beyond-the-floor* determination, not in the antecedent floor-setting determination.")]

Table VII.2 Comparison of Greenball Concentrations to Air Emissions								
ID Facility-Furnace	**Furnace Average (lb/LT)**	**Rank**	**Facility Average Hg Air Emissions (lb/LT)**	**Average Greenball Hg Conc. (ng/g)**	**Facility Average Hg Air Emissions per Average Greenball Hg Conc. (lb/LT)/(ng/g)**	**Max. Greenball Hg Conc. (ng/g)**	**Anticipated Indurating Furnace Hg Emission Rate Processing Greenballs at Maximum Hg Conc. (lb/LT)**	**Number of Greenball Hg Conc. Datapoints**
NSM-Furnace 12	8.57E-07	1	8.57E-07	1.1	7.63E-07	1.4	1.10E-06	3
Tilden-EUKILN1	**4.17E-06**	**2**	**4.17E-06**	**2.3**	**1.81E-06**	**15**	**2.72E-05**	**35**
Minntac-Line 3	**9.44E-06**	**3**	**1.17E-05**	**10**	**1.13E-06**	**25**	**2.84E-05**	**37**
Minntac-Line 5	**1.14E-05**	**4**	**1.17E-05**	**10**	**1.13E-06**	**25**	**2.84E-05**	**37**
Minntac-Line 4	**1.15E-05**	**5**	**1.17E-05**	**10**	**1.13E-06**	**25**	**2.84E-05**	**37**
Minntac-Line 6	1.23E-05	6	1.17E-05	10	1.13E-06	25	2.84E-05	37
Minntac-Line 7	1.62E-05	7	1.17E-05	10	1.13E-06	25	2.84E-05	37
Minorca-EU026	1.92E-05	8	1.92E-05	10	1.89E-06	36	6.80E-05	126
HTC-Line 1	1.97E-05	9	2.34E-05	12	1.88E-06	21	3.95E-05	50
UTAC-Line 2	2.21E-05	10	2.35E-05	13	1.86E-06	37	6.88E-05	948
Keetac-EU30	2.34E-05	11	2.34E-05	12	1.93E-06	25	4.83E-05	16
HTC-Line 3	2.50E-05	12	2.34E-05	12	1.88E-06	21	3.95E-05	50
UTAC-Line 1	2.62E-05	13	2.35E-05	13	1.86E-06	37	6.88E-05	948
HTC-Line 2	2.63E-05	14	2.34E-05	12	1.88E-06	21	3.95E-05	50

[1] The facility-specific correlation in the sixth column [Average Facility Hg Air Emissions per Average Greenball Hg Conc. (lb/LT)/(ng/g)] is calculated taking the [Facility Average Hg Air Emissions (lb/LT)] in the fourth column and dividing by the facility's [Average Greenball Hg Conc. (ng/g)]. This facility-specific correlation is then used to estimate the emissions from furnaces when processing greenballs with the maximum mercury concentration measured at that facility in the dataset industry provided to EPA on February 14, 2023; which is shown in the eighth column as [Anticipated Indurating Furnace Hg Emission Rate Processing Greenballs at Maximum Hg Conc. (lb/LT)].

Calculations indicate that four of the five best performing furnaces would not be able to meet the proposed mercury MACT standard for existing sources of 1.4E-05 lb Hg/LT pellets produced under all operating conditions based on the anticipated emission rate when processing greenballs at mercury concentrations known to have occurred in the past at that specific taconite iron ore mine and its respective indurating furnace, as shown in bold font in the table above. Only Furnace 12 at the Northshore facility has an anticipated maximum mercury emission rate lower than the proposed mercury MACT limit, but this may be due to the limited number of greenball samples available at

this facility. Furnace 12 would likely exceed the proposed mercury MACT limit if it processed greenballs with a mercury concentration greater than 16.5 ng/g.

It seems possible that four of the five furnaces that EPA has identified as the "best performing" would not to be able to meet the proposed mercury MACT limit under all expected operating conditions. The stack tests for these furnaces were conducted over a very short period of time and would not be capable of reflecting the variability of expected mercury concentrations that an indurating furnace could experience on a regular basis. EPA should therefore include a raw material variability adjustment in the UPL calculation to account for the wide variability in mercury concentrations in the iron ore and greenballs that are known to drive air emissions at these sources.

a. Mercury concentrations in the taconite ore deposits, which are directly correlated to mercury air emissions, vary widely within and among mines based on geology and geography, which in turn affect mercury emissions.

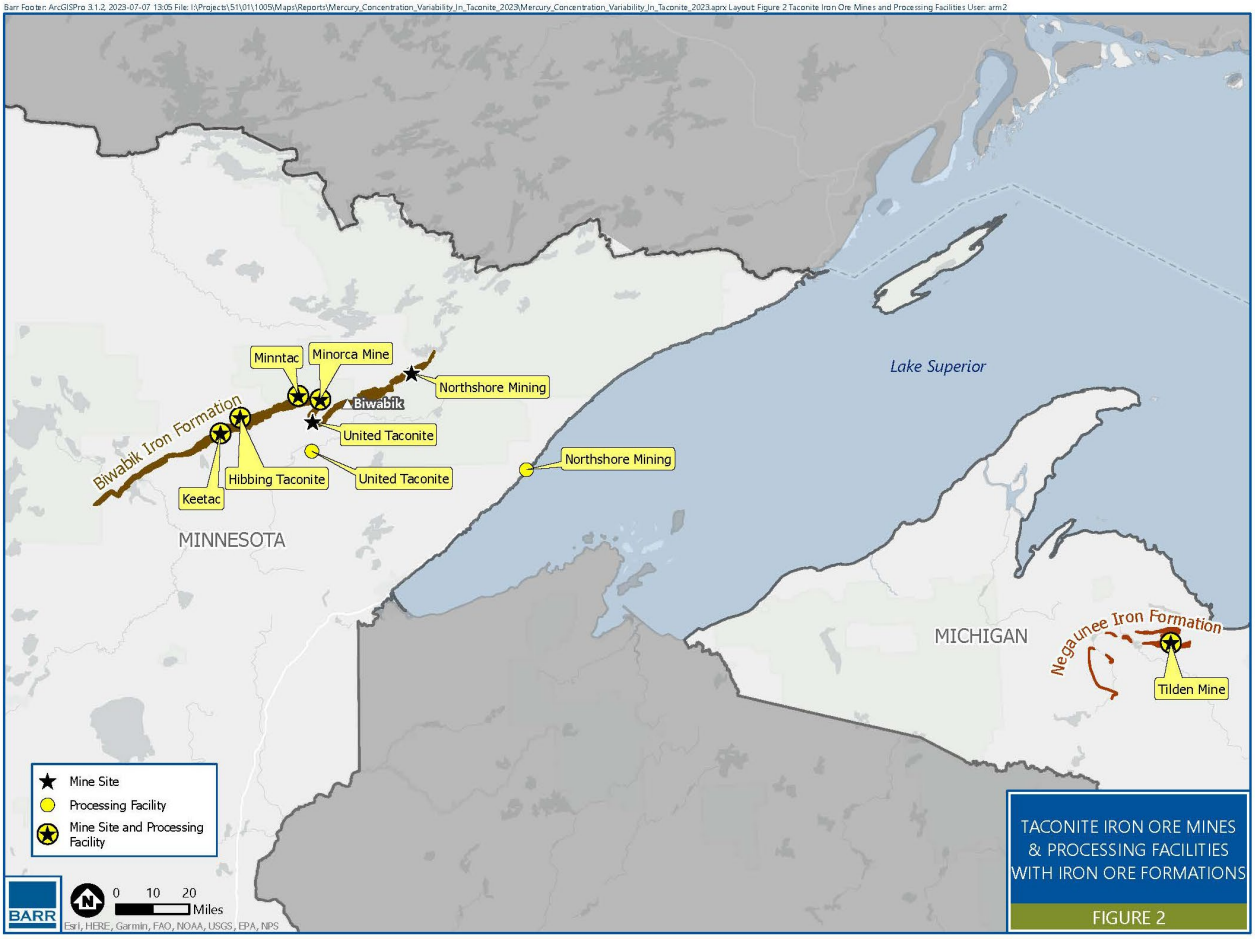
EPA has known for more than two decades that the mercury content in the taconite ore deposits vary widely for mines in the east compared to mines in the west based on the geology of the areas and the impact that the mercury content has on mercury emissions as reflected in the following text from the 2003 preamble for the initial NESHAP standards for this source category:

> A study by the Coleraine Minerals Research Laboratory in 1997 stated that "the mercury volatilized during pellet induration is not the same for every taconite operation. There is a correlation between the amount of mercury volatilized during induration and the location of the taconite operation. The taconite operations that are located on the west end of the Mesabi Iron Range volatilize more mercury during pellet induration than those on the east end of the range." This correlation was confirmed in a report by the Minnesota Department of Natural Resources (Berndt, 2002) with the mercury concentrations present in the ore varying from 21 parts per billion (ppb) at the west end of the range to 0.6 ppb for facilities located on the east end of the range.[173]

The pre-existing and naturally occurring mercury is not uniformly distributed in the iron ore; and the mercury content of iron ore can vary greatly within a single mine, even from one shovel to the next. The locations of the seven mines are reflected on the geological map below included as Figure VII.1 (Figure 2 in the Barr Geology Memorandum).

[173] National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing, 68 Fed. Reg. 61,868, 61,879 (Oct. 30, 2003).

Figure VII.1 Taconite Iron Ore Mines and Processing Facilities

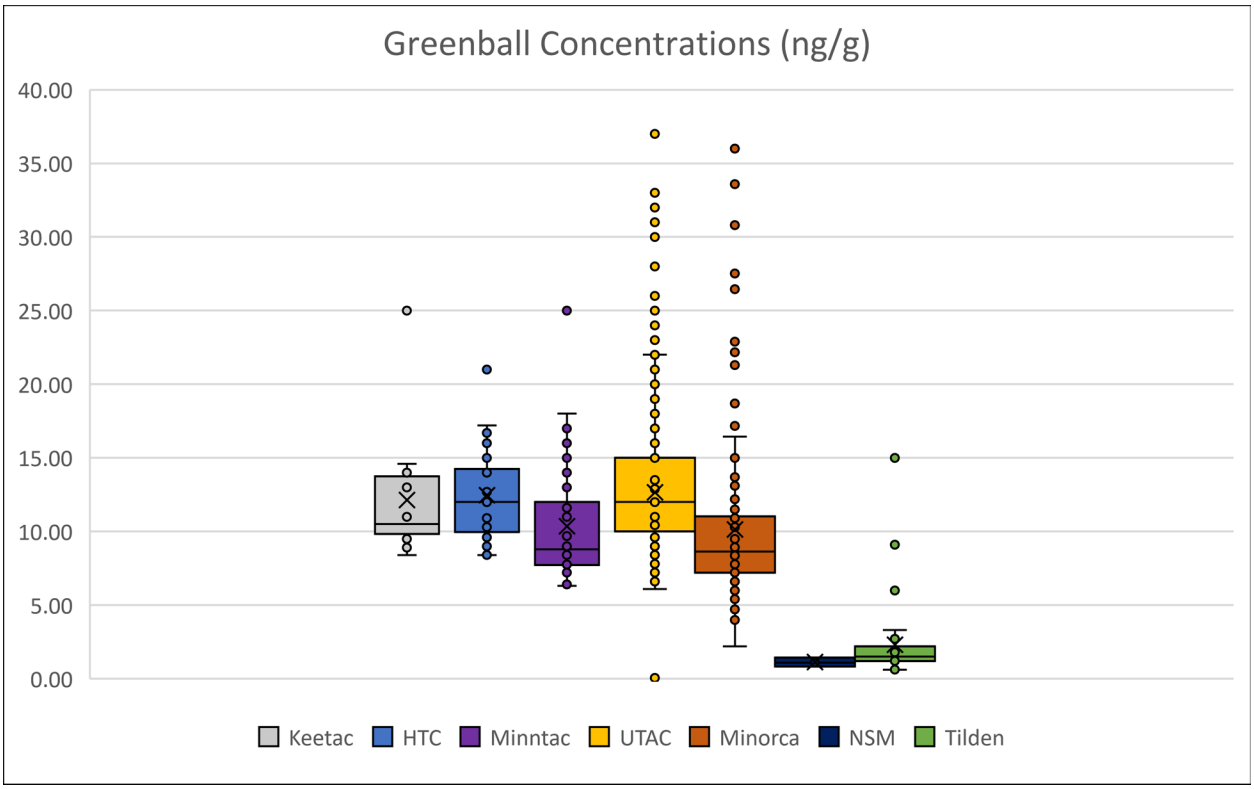


Changes in the oxygen composition of the ancient atmosphere caused the iron precipitation events, along with precipitation of interbedded layers of silica and carbonates; deposition of the material through the water column took place over a span of approximately 200 million years.

During this period, effusive volcanism took place and contributed to atmospheric changes. The volcanic activity caused atmospheric deposition of trace amounts of mercury and other elements, as volcanism is known to do today. This mercury became entrained in the sediments that form the taconite orebodies; the chemical composition of the iron formation is interbedded at all scales from sub-millimeter to meters thick. This explains why there is a high level of variability in the mercury concentration within a given mine's ore and greenballs. Portions of the Biwabik Iron Formation that were more proximate to volcanic activity may have accumulated higher amounts of mercury, perhaps explaining the high mercury variability apparent in greenball data from the United Taconite and Minorca operations; as well as the quantity of mercury samples with concentrations higher than the maximum seen at other facilities.

Approximately 800 million years later, after the iron formation had become entirely lithified, the Duluth Complex layered mafic instruction and associated North Shore Volcanic Group were emplaced adjacent and through the easternmost end of the Biwabik Iron Formation. This large sequence of hundreds of hot (2200 degrees Fahrenheit) magma layers and lavas caused thermal metamorphism of the adjacent rocks, volatilizing mercury from the rocks. This explains why eastern mines, like Northshore and Tilden, have much lower average mercury concentrations in their ore and greenballs. This distinct variation in mercury concentrations is reflected in the following chart, Figure VII.2.

Figure VII.2 Greenball Concentration Variability



AISI and U. S. Steel provided information regarding the variability of mercury concentrations and the resultant impact of mercury concentrations on February 14, 2023. EPA failed to analyze or evaluate, or even discuss, a well-known and documented distinction relevant to mercury emissions from taconite furnaces in the current rulemaking, citing lack of time. AISI and U. S. Steel provided a second memorandum to EPA on April 23, 2023,[174] asking EPA to specifically solicit comment on approaches for setting the MACT floor when the mercury content of the raw material is driving mercury emissions and the content is variable. For its part, EPA acknowledges in the preamble to its proposed rule that it received both the February 14 Data Memorandum and the April 23 Comment Solicitation Memorandum. EPA represents, however, that it "did not have sufficient

[174] *See* Memorandum to EPA titled "Taconite Iron Ore Processing NESHAP – Requested Comment Solicitations," EPA-HQ-OAR-2017-0266 (hereinafter, "April 23 Comment Solicitation Memorandum").

time prior to issuing this proposal to fully assess the information submitted"[175] or to consider the information in the development of the proposed mercury MACT standards. To its credit, EPA has made both documents available in the rulemaking docket, and now "request[s] comment on the submittals in general" and on the "data on the variation of mercury content in taconite ore and whether and to what extent this variation should be considered in the development of the MACT standards for mercury from indurating furnaces."[176] It is in this spirit, we are offering additional commentary for EPA's careful consideration.

AISI and U. S. Steel are supplementing their earlier submittals with the following additional resources as further support regarding the variability in the mercury concentrations in iron ore in Minnesota and Michigan:

i. Minnesota Department of Natural Resources, Mercury and Mining in Minnesota, Minerals Coordinating Committee, Final Report (Rev. Oct. 15, 2003), Appendix 7, which explains iron ore processing and includes an account of the geological formation of Minnesota's taconite deposits. It also correlates the geographic location of taconite deposits with mercury content.

ii. "Barr Geology Memorandum"—Technical Memorandum from Ryan Siats, Mehgan Blair, Jon Aspie, Barr Engineering and Environmental Consulting, to Paul Balserak, American Iron and Steel Institute, Mercury Variability in the Mesabi and Marquette Iron Ranges (June 30, 2023), included as Appendix 6.

iii. Hongming Jiang, Chun Yi Wu, and Todd Biewen, Minnesota Pollution Control Agency, Metals Emissions from Taconite Ore Processing Facilities in Minnesota (approx. 1998), included as Appendix 8.

v. Mark J. Severson, John J. Heine, and Marsha Meinders Patelke, Plate II, Hung Stratigraphy of the Biwabik Iron Formation showing distribution of internal submembers at the various taconite mines on the Mesabi Range of Minnesota University of Minnesota Duluth, Natural Resources Research Institute, for Report NNRI/TR-2009/09 (2009), included as Appendix 9.

As another resource, please see Mark J. Severson, John J. Heine, and Marsha Meinders Patelke, Geologic and Stratigraphic Controls of the Biwabik Iron Formation and the Aggregate Potential of The Mesabi Iron Range, Minnesota, University of Minnesota Duluth, Natural Resources Research Institute, Technical Report NRRI/TR-2009/09 (Aug. 2009). ©2009 by the Regents of the University of Minnesota; currently available at: https://conservancy.umn.edu/handle/11299/187163; persistent link: https://hdl.handle.net/11299/187163

EPA's decision to go forward and to issue the proposed rule without having first taken into account the data provided to it earlier in this rulemaking by Industry Commenters is unfortunate and could

[175] 88 Fed. Reg. 30,926.
[176] *Id.*

understandably be based upon time constraints. However, a more prudent and equitable course of action would have been to approach the court that had entered an order reflecting the schedule that EPA and the ENGOs had agreed upon and tell it that new data had been provided, which would be important to consider in developing the proposed action. Had that course been taken, a review of the information would have revealed that the proposed approach to setting the MACT floor for the existing indurating was fatally flawed, and that the mercury MACT standard now proposed, based on that floor, is not legally permissible. As described in more detail below, if EPA had taken this information into account, it could have established a more reasonable, appropriate MACT.

b. Greenball concentrations of mercury from processed taconite iron ore vary based on the associated mine's geography.

As reflected in AISI and U. S. Steel's February 14, 2023 submittal,[177] the primary source of mercury emissions from indurating furnaces is the furnace inputs, known as "greenballs." Fuel combustion that occurs within the furnaces is a far lower contributor and not a significant factor to mercury emissions.[178] The mercury content of greenballs fed to an indurating furnace is, in turn, directly related to the mercury content in the taconite ore being mined. The mercury content of taconite ore varies from mine to mine and within mines based on geographic location and geologic processes—resulting in substantial and statistically significant regional differences.[179]

As was previously discussed, the average greenball mercury concentration is 2.3 ng/g at Tilden and 1.0 ng/g at Northshore for a combined "eastern" facilities average of 2.1 ng/g. The remaining taconite facilities were broken out into "western" (Keetac, Hibbing Taconite) and "central" (Minntac, UTAC, and Minorca) geographic regions with average greenball mercury concentrations of 12.1 ng/g and 12.2 ng/g, respectively. Industry performed an Analysis of Variance (ANOVA) test to understand if the difference in means between the geographic groups was significantly different. The results of the ANOVA test concluded that a statistically significant difference exists between the groups. In order to understand which groups were statistically different from the rest, industry performed the Tukey Honestly Significant Difference (HSD) pairwise comparison test was performed[1]. The results of the Tukey HSD indicated that the eastern facilities (Tilden and Northshore) were significantly different from both the western and central facilities in greenball mercury concentrations. Therefore, this indicates that a geographic bias is inherent to greenball mercury concentrations.

The lower mercury content of the taconite ore in this eastern region where these facilities are located is well-known and supported by assessments of academic institutions and state agencies.

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[177] *See* Memorandum from AISA and U. S. Steel to EPA, *Greenball Mercury Content Data and Information for Use in the Reconsideration of the National Emissions Standards for Hazardous Air Pollutants for the Taconite Iron Ore Processing*, EPA-HQ-OAR-2017-0664-0222 (Feb. 14, 2023) (hereinafter, "February 14 Data Memorandum"). This information that had been provided to EPA some three months prior to the publication of the proposed rule but that EPA indicated it did not have time to evaluate before proposal.

[178] February 14 Data Memorandum at 1, *citing* Minnesota Department of Natural Resources, Minerals Coordinating Committee, *Mercury and Mining in Minnesota*, at 9 (Oct. 15, 2003). As previously mentioned, EPA would itself independently arrive at this same conclusion through its evaluation of stack testing data. *See* 88 Fed. Reg. at 30,924 ("The 2022 stack test data suggests that most of the mercury emissions arise from mercury released from the taconite ore during induration.").

[179] February 14 Data Memorandum at 1.

A study of mercury in the taconite industry conducted by the Minnesota Department of Natural Resources (MDNR) also correlates the mercury content in magnetite (the target mineral at operations in Minnesota) with greenball mercury content and indurating furnace mercury air emissions.[180]

Another factor affecting the concentration of mercury in greenballs is the distribution of mercury in the mined ore between the quality ore used to make the greenballs and the waste rock (also known as gangue material) that is discarded.[181] The mercury content of the greenballs is therefore based on the amount of mercury in the iron-rich targeted material and not on processing techniques.

Because the greenball mercury concentrations are important for understanding mercury emissions from indurating furnaces, AISI and U. S. Steel provided EPA with mercury concentration data for 1,224 samples collected from the seven taconite pellet producing facilities that are potentially subject to EPA's new mercury MACT standard.[182] The following Table VII.2 summarizes information provided to EPA as part of industry's February 14, 2023, submittal shows the differences in greenball mercury content among the facilities and the wide range of mercury concentrations occurring at each individual facility.[183]

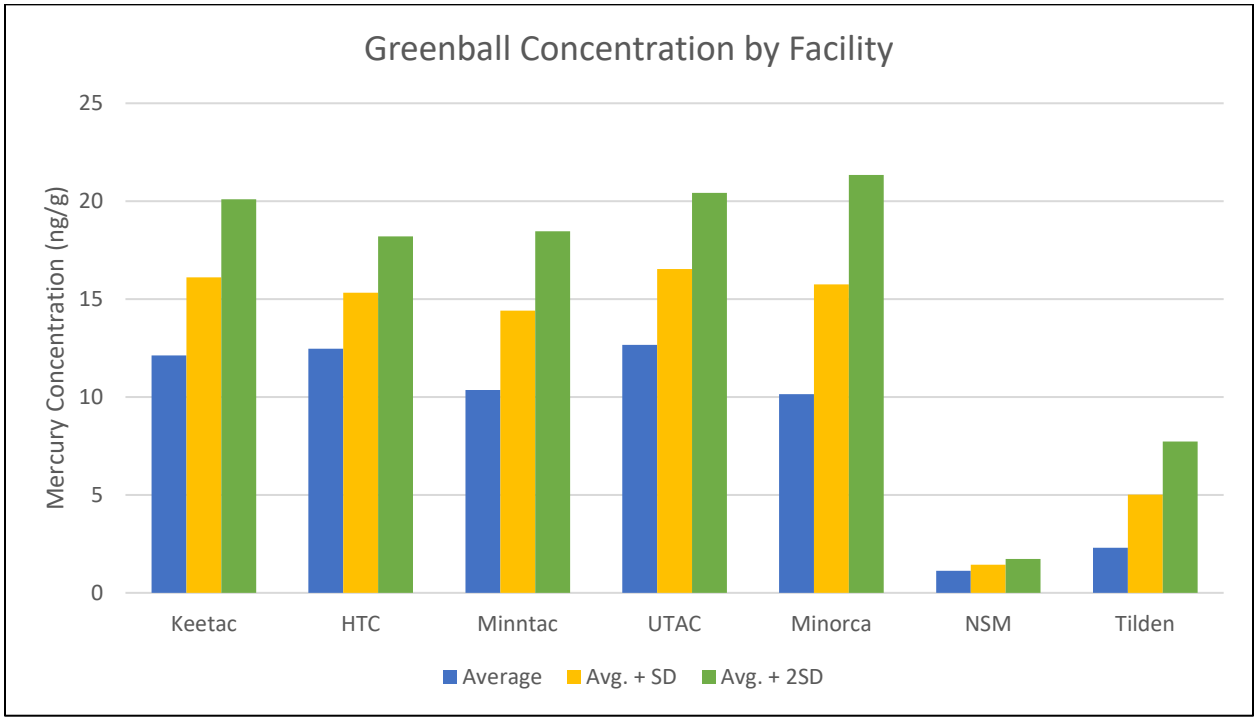
Table VII.3 Greenball Mercury Content by Facility

Greenball Mercury Concentration (ng/g)							
Location	**Keetac**	**HTC**	**Minntac**	**UTAC**	**Minorca**	**NSM**	**Tilden**
# of samples	16	50	37	948	126	3	35
Average	12.1	12.5	10.4	12.7	10.1	1.1	2.3
Min	8.4	8.4	6.3	0.1	2.2	0.8	0.6
Max	25	21	25	37	36	1.4	15
SD	4.0	2.9	4.1	3.9	5.6	0.3	2.7
Avg + SD	16.1	15.3	14.4	16.5	15.7	1.4	5.0
Avg + 2SD	20.1	18.2	18.5	20.4	21.3	1.7	7.7
RSD	0.33	0.23	0.39	0.31	0.55	0.27	1.18

[180] https://personal.utdallas.edu/~herve/abdi-HSD2010-pretty.pdf.
[181] *See* February 14, 2023 Data Memorandum, Table 1. This information had been provided to EPA some three months prior to the publication of the proposed rule, yet EPA indicated it did not have time to evaluate before proposal.
[182] *Id.* at 2.
[183] *Id.*

Note that the table lists these seven facilities, each with its own active, proprietary mine, in geographic order from west to east.[184] The following chart (Figure VII.3) generated based on data from the table reflects the seven facilities, each with its own active, proprietary mine, in geographic order from west to east with a slight increase in the middle of the range in the vicinity of United Taconite and Minorca associated with a geological feature known as the Virginia Horn, and illustrates the stark differences in greenball mercury concentrations based on geography.

Figure VII.3 Greenball Concentration Data Comparisons by Facility



Because the mercury content of the greenballs, which will affect mercury emissions, can vary from facility to facility, and certainly when comparing the indurating furnaces in the east against those in the west, EPA must take into account these geological and geographical differences when developing a proposed MACT limit, as explained more fully below.[185]

c. Greenball concentrations are tied directly to emission rates, which has been confirmed with a statistical correlation.

The mercury content of taconite iron ore and the resulting mercury content of the greenballs fed into the indurating furnace drive mercury air emissions. The mercury content of the iron ore from the associated proprietary mine varies sharply by mine location, and the mercury content of the

[184] *Id.*
[185] *Id.*

ore is determining the mercury content of the greenballs produced from the ore. The greenball mercury concentrations have a direct correlation to mercury emission rates from the indurating furnaces. EPA has a decades-long understanding that the:

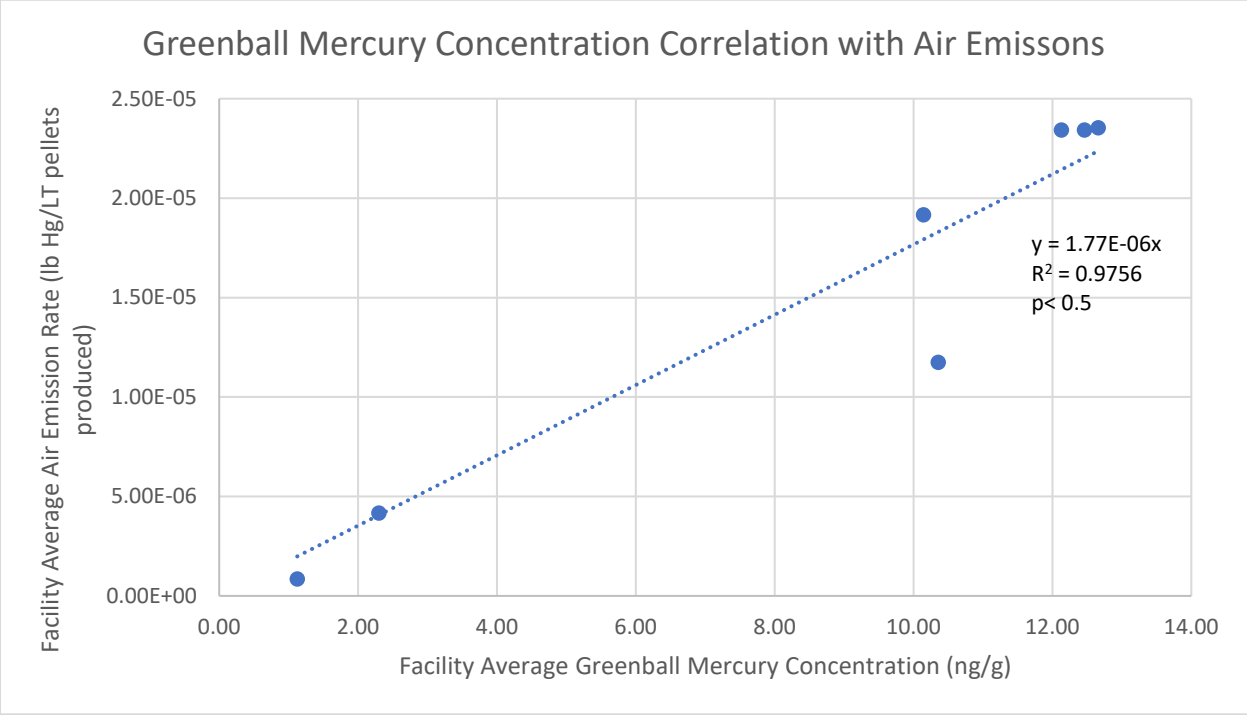
> Mercury emitted from taconite iron ore processing plants originates primarily from the ore itself and to a much lesser extent the fuels powering the process. None of the taconite iron ore processing plants control mercury emissions by using at-the-stack controls. Thus, any differences in mercury emissions from existing indurating furnaces reflect different mercury levels in raw materials or fossil fuels used at the individual plants."[186]

EPA has also acknowledged, and industry agrees, that fuels used (gas, coal, coke) do not drive (or have a meaningful impact on) indurating furnace mercury emissions.[187]

When greenballs are fed into the indurating furnace, the "mercury content within the greenballs can volatize and generate mercury air emissions in the indurating furnace exhaust."[188] A "clear relationship" exists between mercury emission rates and the mercury content of the greenballs being fed into a furnace, as illustrated in Figure VII.4 below, generated from data in the February 14, 2023, submittal.[189]

[186] 68 Fed. Reg. at 61,878 (2003) (emphasis added).
[187] *Id*.; 88 Fed. Reg. at 30,924 ("However, based on the 2022 stack testing described above, the contribution of mercury from coal combustion to the overall mercury emissions appears to be relatively small. The 2022 stack test data suggests that most of the mercury emissions arise from mercury released from the taconite ore during induration.")
[188] *Id.* at 3.
[189] *Id.* at 4.

Figure VII.4 Correlation of Greenball Mercury Concentration and Mercury Air Emission



As reflected in this chart, the mercury concentration in greenballs is strongly correlated with mercury air emission rates and the relationship is statistically significant.[190] The higher the mercury concentration in the greenballs, the higher the emission rate.

d. The best dataset available to develop a raw material variability factor is the greenball mercury concentration measured by taconite iron ore processing facilities.

As explained in the AISI/USS February 14, 2023, submittal, taconite iron ore samples are taken directly from the drill core of a mine pit. Thus, taconite iron ore mercury data is tied to a specific location (vertically and horizontally) within the individual facility's ore body, as opposed to actual feed to the furnace. Furthermore, the bulk ore mercury content includes the mercury in the gangue materials which are separated out and do not influence mercury air emissions from the indurating furnace because this material stream is not used in the greenballs or fed to the furnace. Therefore, the companies believe it is appropriate to consider the variability of greenball mercury concentration data instead of ore data. EPA has approved of this this approach in the development of other standards:

> The EPA believes that from the kiln feed data provided, and the quarry sample data provided, the kiln feed data is more representative of the variability. This is based primarily on the fact that the mined quarry stone is first stored in open storage piles,

[190] *Id.*

where it can then mix with stone collected from the quarry over time. Therefore, the kiln feed represents a more homogenized sample of the storage pile and is more representative of the raw material fed to the lime kiln." [191]

e. EPA can and should calculate a raw material variability factor for use in calculating a MACT floor standard by using greenball mercury concentration data.

EPA has accounted for raw material variability in other NESHAP regulations. For example, EPA developed a mercury raw material variability factor for the Brick and Structural Clay Products Manufacturing source category. EPA describes the steps taken to calculate the variability factor in a September 24, 2015 memo titled "Final Maximum Achievable Control Technology (MACT) Floor Analysis for Brick and Structural Clay Products Manufacturing"[192] (Brick MACT Floor Analysis), stating:

> As discussed in Mercury Content of Oklahoma and Ohio Shale Deposits Supplying the Brick Industry (Fairchild, 2015), the EPA reviewed the data to characterize the geological history of the clay deposits and determined that it is appropriate to use the raw material data from the two deposits in the development of the Hg raw material variability factor.
>
> For each deposit, a facility average of the raw material data was calculated, then the deposit average was calculated by averaging the facility averages. Next, the standard deviation of the facility averages was calculated. Then the relative standard deviation (RSD) was calculated for each deposit by dividing the deposit average by the deposit standard deviation for each deposit. The overall RSD is the Oklahoma RSD, as this was the higher of the two RSD values. … The overall RSD, or Hg Raw Material RSD, was then used to calculate the Hg Raw Material Variability factor, which was incorporated into each UPL template (Normal, Lognormal, and Skewed/Unknown) as described below.

As support for its position that a raw material variability factor is appropriate for the indurating furnace MACT standard, AISI and U. S. Steel have included a Technical Memorandum prepared by geologists with Barr Engineering Co., included as Appendix 6, which describes the geological history of the iron ore deposits mined in Minnesota and Michigan.[193] Further, as described earlier, Industry Commenters provided EPA with mercury concentration data for over 1,000 greenball samples collected from seven taconite pellet producing facilities in their "February 14 Data

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[192] Memorandum from Gabrielle Raymond and Kristin Sroka, RTI International, to Sharon Nizich, EPA Office of Air Quality Planning and Standards, *Final Maximum Achievable Control Technology (MACT) Floor Analysis for Brick and Structural Clay Products Manufacturing* (Sept. 24, 2015), EPA Docket EPA-HQ-OAR-2013-0291-0660.
EPA's Brick MACT Floor Analysis memo https://www.regulations.gov/document/EPA-HQ-OAR-2013-0291-0660 Explains how they calculated the RSD.

193 "Barr Geology Memorandum"—Technical Memorandum from Ryan Siats, Mehgan Blair, Jon Aspie, Barr Engineering and Environmental Consulting, to Paul Balserak, American Iron and Steel Institute, Mercury Variability in the Mesabi and Marquette Iron Ranges (June 30, 2023).

Memorandum." [194] Based on this data and the analysis below, AISI and U. S. Steel have followed an approach similar to what EPA described in the "Brick MACT Floor Analysis" to calculate a mercury raw material variability factor, and the calculations are provided in an Excel workbook included as Appendices 12 and 13.

AISI and U. S. Steel used the five best performing taconite iron ore processing facilities based on indurating furnace plantwide average emissions as identified in Table VII.1 above: Northshore, Tilden, Minntac, Minorca, and Hibbing. The indurating furnaces at each of these processing facilities each process greenballs made from iron ore mined from their respective associated proprietary mines located within the Biwabik and Negaunee Iron Formations.

Each of the top ranked facilities is listed in the table below, Table VII.4,. As noted above, industry has sampled a large number of greenballs in the past to determine the mercury concentrations, and use of the greenball data is appropriate for purposes of calculating a raw material variability factor because this data should be representative of the variability in mercury concentrations in the ore from the associated proprietary mine. This variability is explained on page 2 of industry's February 14, 2023, submittal and is also reflected in Figure VII.2 and Table VII.3 above. The number of mercury concentration sampling data available for each listed facility is noted in the last column. All of the Tilden samples are, for example, from greenballs produced at Tilden and heated in the Tilden furnace. The February 14, 2023, submittal includes the dates that each sample was analyzed, and industry is providing the associated laboratory reports to the extent they are available in Appendix 11. If there were duplicate tests performed on a single sample, only one result was used in the analysis below.

The 2nd column reflects the average of that data for each of the facilities, and the 3rd column notes the "standard deviation" based on those averages and the number of samples used to calculate the averages.

Table VII.4 Average Mercury Content of Greenballs by Facility

Mine and Processing Facility Name	Facility Average Mercury Concentration (ng/g)	Standard Deviation of Mercury Concentration	Number of Greenball Samples
Northshore Mining	1.1	0.3	3
Tilden Mine	2.3	2.7	35
Minntac	10.4	4.1	37
Minorca	10.1	5.6	126
Hibbing Taconite	12.5	2.9	50

The next table, Table VII.5, groups the facilities reflected in the MACT floor pool together. The second column shows the overall average mercury concentration, which is calculated based on the

[194] *See* Memorandum to EPA titled "Greenball Mercury Content Data and Information for Use in the Reconsideration of the National Emissions Standards for Hazardous Air Pollutants for the Taconite Iron Ore Processing," EPA-HQ-OAR-2017-0664-0222 (hereinafter, "February 14 Data Memorandum"). This information that had been provided to EPA some three months prior to the publication of the proposed rule but that EPA indicated it did not have time to evaluate before proposal.

average of the facility averages from Table VII.4 above. The third column identifies the standard deviation of the facility averages from Table VII.4 above. Industry then calculated the relative standard deviation (RSD) for the MACT floor pool by dividing the floor pool average by the standard deviation. The overall RSD, as reflected below, is 0.71.

Table VII.5 MACT Floor Pool Relative Standard Deviation Calculation

Mines and Processing Facilities	Floor Pool Average (Average of Facility Averages)	Standard Deviation (Standard Deviation of Facility Averages)	Relative Standard Deviation
Tilden, NSM, Minntac, Minorca, HTC	7.28	5.18	0.71

This RSD of 0.71, also referred to as the Hg Raw Material RSD, can then be used to calculate the Hg Raw Material Variability factor, which in turn is incorporated into the appropriate UPL calculation template to calculate the MACT floor limit.

As noted above, industry provided the greenball sampling data to EPA in its February 14, 2023, submittal. In response to a request by the Agency, AISI and U. S. Steel are providing copies of the greenball mercury concentration sampling lab analysis reports to the extent they are available in Appendix 11. Due to document retention policies and the age of some of the reports, industry has been unable to locate copies of reports for all sampling data. Industry's Excel workbook with the greenball data as well as the formulae, equations, and calculations relied upon and referenced in this submittal is included as Appendix 12.

3. As explained in subsection 1, EPA should determine the MACT floor by ranking the best performing facilities and then determine the most defensible MACT floor using the raw material variability factor as explained in subsection 2.

To produce a legally defensible mercury standard that reflects the reasonable exercise of the Agency's discretion, EPA needs to establish the floor based on plantwide averaging and ranking by facility, while also applying a raw material variability factor to account for the wide range in mercury concentrations in the raw material input to the furnaces. The MACT floor pool identified in Table VII.1 above reflects the top five performing facilities based on plantwide averaging of mercury emissions from each plant's indurating furnaces. To determine the appropriate MACT limit based on that pool, industry calculated an overall RSD of 0.71, shown in Table VII.5 above, that can be used along with other data to determine a raw material variability factor which becomes part of EPA's UPL calculation methodology. In general, the raw material variance equals (RSD x mean)^2 where x equals the mean of the raw data. The next step is to incorporate the raw material variance into pooled variance to adjust the variance of the floor pool. This adjusted variance is then incorporated into the UPL equation. **Based on these adjustments, the recalculated MACT Floor reflected in Appendix 13 would be 3.3 x 10^{-5} lb/LT, reflective of a more reasonable**

standard that would take into account the variability known to exist in mercury concentrations in the taconite iron ore mined in Minnesota and Michigan.[195]

The proposed mercury standard cannot be finalized. Instead, EPA must reevaluate the data and issue a standard that is consistent with these comments (i.e., take into account the top five performing facilities based on plantwide average emissions and also an appropriate raw material variability factor). As discussed below, EPA could implement this approach through a subcategorization pathway too; the key again is to take into account the top five performing facilities based on plantwide average emissions and incorporate an appropriate raw material variability factor.

B. EPA has other options available to take into account the unique aspects of the taconite iron ore processing facilities, such as subcategorizations.

As the foregoing explains, EPA's path to developing a reasonable, legally defensible mercury MACT standard is clear, with EPA's conducting a new floor analysis in which the "best performing 5 sources" under CAA Section 112(d)(3)(B) are ascertained by ranking by facility, rather than by individual indurating furnace. With this, EPA should incorporate a raw material variability factor.

Should EPA decline to take this most logical path, however, it cannot, consistent with its obligation to engage in reasoned decision making, ignore other options that are available by which it may still ultimately finalize a defensible rule. As explained below, the most obvious of those alternative options would be some form of subcategorization. That EPA is authorized to adopt subcategories in promulgating MACT standards under CAA Section 112(d)(2) is made plain on the face of paragraph (d)(1), which specifies that EPA "may distinguish among classes, types, and sizes of sources within a category or subcategory in establishing such standards."[196] To be sure, EPA's *authority* to subcategorize does not itself imply any sort of statutory *obligation* to do so. Rather, as a general matter, the decision whether or not to subcategorize rests within the Agency's discretion.[197]

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[195] Industry also calculated a raw material variability factor following EPA's guidance in the Brick MACT Memorandum by maintaining separate RSD values for each of the two formations/deposits. Memorandum from Gabrielle Raymond and Kristin Sroka, RTI International, to Sharon Nizich, EPA Office of Air Quality Planning and Standards, *Final Maximum Achievable Control Technology (MACT) Floor Analysis for Brick and Structural Clay Products Manufacturing* (Sept. 24, 2015), EPA Docket EPA-HQ-OAR-2013-0291-0660. EPA's approach would be to calculate separate "Deposit RSD" values using greenball data from facilities in the MACT Floor Pool that mine ore from each deposit separately. Taking this approach, one "Deposit RSD" would be 0.6, and the second "Deposit RSD" would be 1.2. Using the higher RSD of the two "Deposit RSD" values (at 1.2), as EPA did in the Brick MACT Analysis, would result in a MACT Floor limit of 4.1E-05 lb/LT. Industry is conservatively presenting a proposed MACT limit based on a raw material variability factor where all of the samples used in the calculation were taken from a single deposit. The calculations for each approach are reflected in Appendix 13.

[196] CAA § 112(d)(1); 42 U.S.C. § 7412(d)(1).

[197] *See*, *e.g.*, *White Stallion Energy Center v. EPA*, 748 F.3d 1222, 1249 (D.C. Cir. 2014) ("Contrary to industry petitioners' assertions, nothing in the Clean Air Act 'requires' EPA to create a . . . subcategory. Rather, the statute gives EPA substantial discretion in determining whether subcategorization is appropriate. *See* CAA § 112(d)(1), 42 U.S.C. § 7412(d)(1) (EPA "*may* distinguish among classes, types, and sizes of sources") (emphasis added)").

That said, while a matter of discretion, EPA's exercise of that discretion must itself be *reasonable*. And here, in light of the circumstances at hand (i.e., the minimal emissions reduction, high cost, and already low risk), for EPA to refuse to adopt at least one of the approaches that prevents the draconian result would be an abuse of that discretion. Subcategorization is among those potential approaches and refusing to even consider it would be impermissible. Again, the observations of Judge Williams, writing separately in *Sierra Club v. EPA*, 479 F.3d 875 (D.C. Cir. 2007),[198] bear consideration. Having noted what he perceived to be a "paradox" presented by the D.C. Circuit's view of the language of CAA Section 112(d)(2) and Section 112(d)(3) – *i.e.*, language that "embodies an assumption that standards based on achievability will be more stringent than ones based merely past achievement" – Judge Williams noted that, in those cases where "meeting the 'floors'" set under CAA Section 112(d)(3) proved to be "extremely or even prohibitively costly for particular plants because of conditions specific to those plants," it would "seem that what has been 'achieved' under § 112(d)(3) would not be 'achievable' under § 112(d)(2) in light of the latter's mandate to EPA to consider cost."[199] The "paradox," as Judge Williams viewed it, is that the "floor" allegedly "compelled by the statutory language" of CAA Section 112(d)(3) would prove to be "more stringent" than any "beyond-the-floor" standard that might be set under CAA Section 112(d)(2).[200]

Such an outcome, Judge Williams suggested, would imply a certain absurdity in the structure and language of paragraphs (d)(2) and (d)(3) of CAA Section 112 themselves, at least insofar as the D.C. Circuit had chosen to interpret those provisions.[201] But, "happily," Judge Williams found a way out of this seeming conundrum: subcategorization.[202] While the "authority to generate subcategories is obviously not unqualified," Judge Williams acknowledged, in that it must at least "be limited by the usual ideas of reasonableness," and that, "even with suitable subcategorization," there would be no "guaranteed" that "every source will be able to achieve standards that meet a lawful application of § 112(d)(3) to reasonably defined subcategories," it was nevertheless the case, as far as Judge Williams was concerned, that "one legitimate basis for creating additional subcategories" had to be the "interest in keeping the relation between 'achieved' and 'achievable' *in accord with common sense and the reasonable meaning of the statute*."[203]

These observations on Judge Williams' part in *Sierra Club* are well taken, and they should inform EPA's thinking on the need for subcategorization here as a potential option to produce a legally defensible rule that reflects the reasonable exercise of its discretion. In this regard, it is noteworthy that the very example imagined by Judge Williams of a situation where it would be "extremely or even prohibitively costly for particular plants" to meet a MACT standard "because of conditions specific to those plants" was one in which "adoption of the necessary technology requires very costly retrofitting, or the required technology cannot, given local inputs whose use is essential,

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[198] *See* Section III.B above.
[199] *Sierra Club v. EPA*, 479 F.3d at 884.
[200] *Id.*, 479 F.3d at 885.
[201] *Id.*, 479 F.3d at 885 ("[W]e might be talking of a statute whose literal words produced a result so 'demonstrably at odds with the intentions of its drafters' as to justify judicial surgery. See *United States v. Ron Pair Enterprises, Inc.,* 489 U.S. 235, 242, 109 S.Ct. 1026, 103 L.Ed.2d 290 (1989)").
[202] *Id.* 479 F.3d at 885.
[203] *Id.* 479 F.3d at 885 (emphasis added).

achieve the 'floor'."[204] Judge Williams' postulated example is the very situation faced by the taconite processing industry.[205]

1. The taconite ore processing facilities have several unique aspects which EPA did not take into account when undertaking its MACT floor determination.

When EPA set the MACT standard, it looked only at stack test data and emission rates. EPA did not consider any of the unique aspects of the processing facilities. Because of several unique features of these taconite ore processing facilities which are directly tied to mercury emissions, EPA was required to consider the extent to which the MACT determination should have taken these factors into account. By failing to take these factors into account, EPA has proposed a MACT standard that has not been demonstrated as applicable or achievable on the taconite sources and is exorbitantly expensive; and can only be met with technology that is not installed on any unit. EPA cannot base a MACT floor on a technology that remains unproven on the sources in the MACT category. These unique features of the taconite ore processing facilities are described in the following subsections.

a. Because each taconite ore processing facility's design is unique to the quality of ore associated with its mine and the needs of its customers, it is not feasible to process taconite ore at a different facility than the one designed for that specific mine.

The taconite iron ore processing process and vertical integration of these facilities is well-known by EPA. Taconite ore is drilled and blasted from mines dedicated to a facility that are either co-located with the mine or located nearby. Iron ore from the associated mine is concentrated into "greenballs"—consisting of little more than binder, fluxstone and ore—which are fed into the indurating furnaces at the facility. The processing steps and equipment at each taconite iron ore facility are uniquely designed to match the hardness and minerality of the ore being processed. Each taconite processing facility is designed to process the unique physical and chemical characteristics of ore from a particular location in the regional ore body.[206]

Because each processing facility is designed based on ore quality, which varies significantly from east to west, an ore processing facility in the west could not take ore from the east. For example, a mine designed for soft ore like is present in the west could not take hard ore and vice versa, which

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[204] *Id.* 479 F.3d at 884.

[205] *Cf. Portland Cement Ass'n v. EPA*, 665 F.3d 177, 195 (D.C. 2011) (Brown, J. concurring) (finding Judge Williams in *Sierra Club* to have been "quite right that ignoring input quality when determining the floors subverts the statutory scheme by allowing EPA to establish a floor that some kilns simply cannot meet.").

[206] This is consistent with EPA's 2003 determination for the initial NESHAP: "Each taconite iron ore processing plant is located directly proximate to its own mining source. Transportation costs of procuring raw materials from other locations are prohibitive. A plant has no access to the raw ore used by another plant and, consequently, could not duplicate the mercury emissions performance of the other plant. The ore processing operations at a given plant are dependent on the type of ore mined. The east range ores are typically finer and harder requiring different processing steps in crushing, grinding, and flotation. Because of the differences in processing for each type of ore, it is not feasible for any one facility to process different ores mined from multiple locations in the range." 68 Fed. Reg. at 61,879.

could make it virtually impossible for a western processing facility to accept and process eastern ore. The ore is also processed differently at each plant to meet customer specifications.[207] Even if a western facility could obtain eastern ore to process, major changes and new equipment would be needed to accommodate the requirements to process the different type of ore while meeting customer specifications.

b. The consequences of transporting large quantities of iron ore over long distances make it infeasible and prohibitively costly for western facilities to use eastern ore (even if we ignore each plant's equipment is designed for its own ore).

The complexity and costs that would come with transporting large quantities of iron ore required to produce iron pellets on the scale demanded to sustain a viable industry makes substitution of ore logistically and commercially infeasible for these facilities, and economically infeasible for maintaining the United States steel industry in the American economy, which supports the livelihoods of millions of Americans and their families. Taconite facilities and mines are vertically integrated commercial operations. The additional cost of consistently transporting iron ore or greenballs to these facilities instead of receiving ore from an associated mine would not be economically feasible, even if it were reasonable for EPA to expect competing taconite iron ore processing plants to share iron ore resources—which it is not. EPA agreed with this position as stated in the 2003 Taconite Iron Ore Processing NESHAP final rule publication:

> Each taconite iron ore processing plant is located directly proximate to its own mining source. Transportation costs of procuring raw materials from other locations are prohibitive. A plant has no access to the raw ore used by another plant and, consequently, could not duplicate the mercury emissions performance of. the other plant. The ore processing operations at a given plant are dependent on the type of ore mined. The east range ores are typically finer and harder requiring different processing steps in crushing, grinding, and flotation. Because of the differences in processing for each type of ore, it is not feasible for any one facility to process different ores mined from multiple locations in the range. Moreover, because iron ore deposits are variable in mercury content, there is no way to assure that even a source processing its own ore could replicate its own performance, since the next ore batch could contain higher concentrations of mercury. Based on the above justifications, we have determined that it is infeasible for taconite plants to reduce mercury emissions by switching to "cleaner" ores.

As EPA has acknowledged, the potential economic impacts are not limited to just the taconite facilities. Each mine goes through an extensive process to obtain leases and subsequently permits to mine in specific locations. Restricting ore processing from certain areas would have detrimental impacts to individual fee holders, the State of Minnesota, University Trust and Permanent School Trust which helps fund K-12 education throughout the state of Minnesota causing widespread social impacts.

[207] Note—this processing does not affect mercury emissions.

In addition, the transportation of ores from one area to another would generate adverse environmental impacts, such as significant increases in GHG emissions and increased fugitive dust emissions which have a negative health impact and health risk to surrounding communities.

Even if feasible, moving tens of millions of tons of crude ore by rail or ship for long distances is cost-prohibitive and would greatly impact the United States iron and steel industry and those dependent on it.[208] Transportation of ore for short distances might be feasible—but that does not help with substituting with a lower-mercury-content ore and shipping eastern ore to the western facilities. Shipping enough ore from Northshore or Tilden to supply Hibbing Taconite, United Taconite, Minorca, Minntac, and Keetac would result in increased greenhouse gas emissions as well as increased emissions of NAAQS pollutants.

c. Even if western facilities were to attempt to use eastern ore, the mercury content remains highly variable and may not allow for consistent and continuous compliance with the MACT standard.

Even if the substitution process was technologically, logistically, commercially, or economically feasible, surety of a sustainable supply of low-mercury content taconite ore is not possible because no facility can guarantee the mercury content of iron ore from a mine at a given time, even on a day-to-day basis. This is because the mercury content of the raw iron ore, and more importantly the amount of mercury contained in the iron-rich minerals, can vary significantly even within a single mine. The first of two charts below, Figure VII.5 demonstrates the variability of mercury concentrations based on how frequently they occur. The second chart, Figure VII.6 shows the range of mercury concentrations that one facility experienced over a two-year period.

[208] *Id.* EPA made this same point in the 2003 preamble for the initial NESHAP: "Transportation costs of procuring raw materials from other locations are prohibitive. A plant has no access to the raw ore used by another plant and, consequently, could not duplicate the mercury emissions performance of the other plant. The ore processing operations at a given plant are dependent on the type of ore mined. The east range ores are typically finer and harder requiring different processing steps in crushing, grinding, and flotation. Because of the differences in processing for each type of ore, it is not feasible for any one facility to process different ores mined from multiple locations in the range." 68 Fed. Reg. at 61,879.

Figure VII.5 Greenball Concentration Variability Range

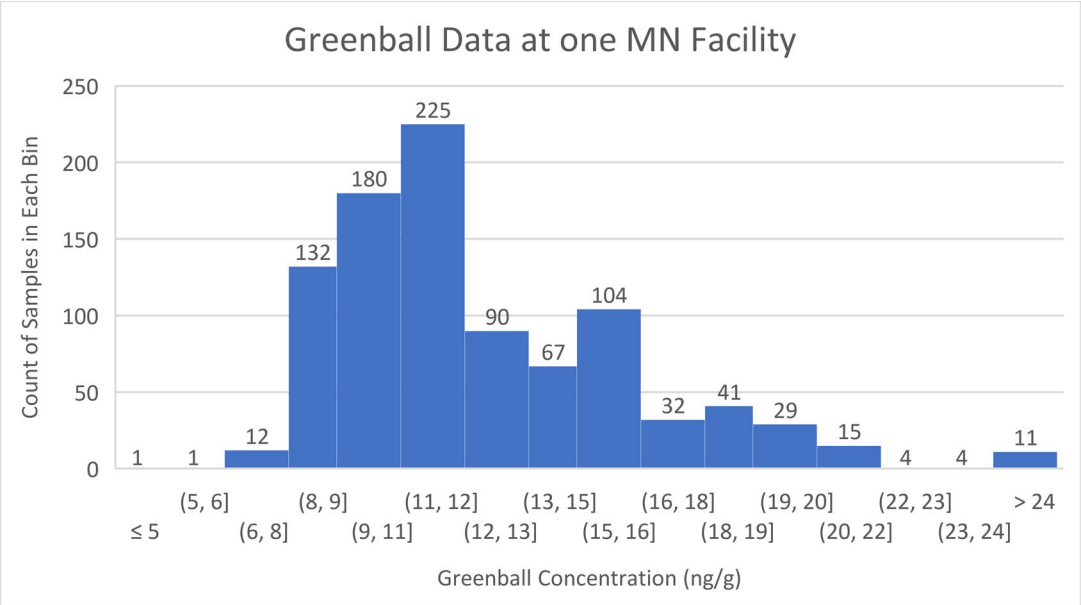
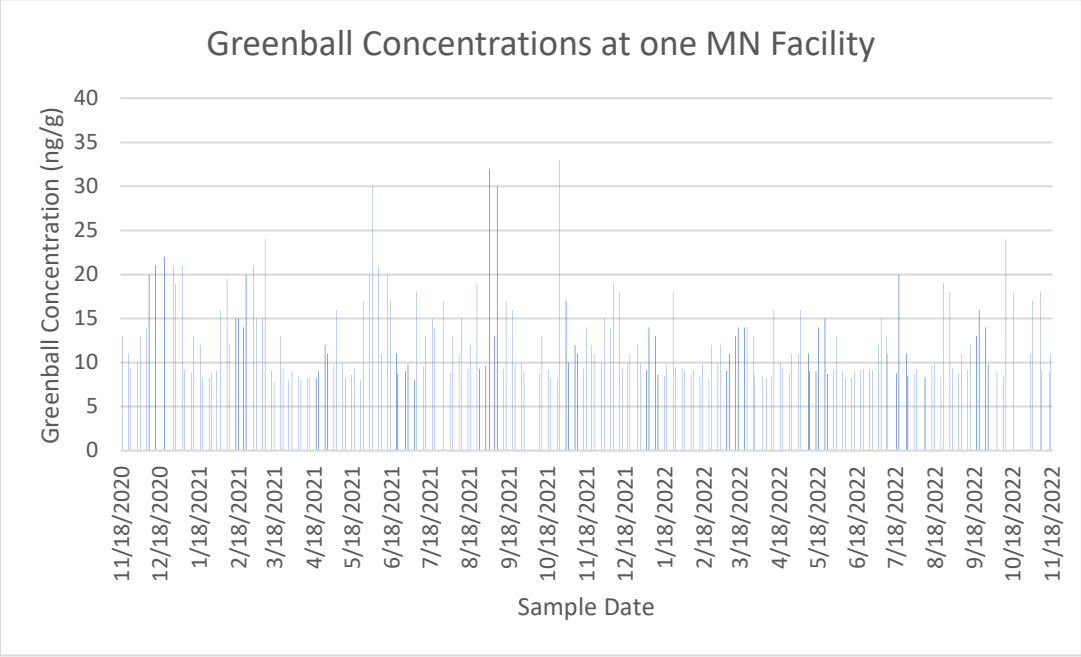


Figure VII.6 Greenball Concentration Ranges Over Two-Year Period



A comparison between mercury emissions from individual taconite indurating furnaces is inappropriate because each individual furnace at each facility represents all furnaces at a given facility at a given time period. This is because any emission variability in emission rates from

furnaces at a facility is a result of the ore being mined at an associated mine that serves the entire facility: it is not related to technological performance.

No company or facility can know with certainty what the mercury content of the iron ore in their mine will be in the future.[209] EPA recognizes that "because iron ore deposits are variable in mercury content, there is no way to assure that even a source processing its own ore could replicate its own performance since the next ore batch could contain higher concentrations of mercury."[210]

So, even the so-called "best performing" furnaces identified in the MACT floor analysis could have difficulty meeting the proposed emission standard in the future because they could come across taconite ore with more mercury than when the emission testing used to establish the MACT floor was performed. The means of control is not duplicable or even replicable because companies cannot guarantee their ore will consistently have mercury content low enough to meet the floor standard, even when processing ore from mines that have historically had the lowest mercury content.[211] As demonstrated in Section IV above, greenball concentration data from the eastern facilities, which is directly correlated to emission rates, indicates that furnaces subject to EPA's proposed MACT floor could violate the limit based on the random high mercury concentrations sometimes present in the taconite ore being mined. EPA has acknowledged this phenomenon for taconite indurating furnaces, stating that "raw material substitution (*i.e.*, ore substitution) . . . would lead to unachievable standards for all sources, because *this means of control is not duplicable or even replicable*."[212]

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[209] 68 Fed. Reg. 61,879 ("We note further that the mercury in the ore and the fuel is present in trace amounts. The Minnesota Department of Natural Resources stated that ''mercury present in taconite occurs as a trace element, and cannot be eliminated by simply using a different fuel source or by eliminating mercury-bearing components from material to be combusted.'' (Berndt, 2002) This supports the Agency's technical determinations that control via substitutions of feed or fuel is neither feasible nor likely to be effective since random variability in the feed will likely result in equal amounts of mercury being emitted in any case. Indeed, as stated above, it is not clear that even a single source could reliably duplicate its own performance for mercury emissions due to the small amounts emitted and random variabilities in the mercury content of the iron ore." Mercury and Mining in Minnesota, Minnesota Department of Natural Resources, Final Report (Revised October 15, 2003), EPA-HQ-OAR-2017-0664-0222_attachment_1.pdf, https://tinyurl.com/mrx4cckh. ("As discussed above, mercury present in taconite occurs as a trace element, and cannot be eliminated by simply using a different fuel source or by eliminating mercury-bearing components from material to be combusted.") This report was cited as (Berndt, 2002) in the 2003 Taconite NESHAP final rule (68 Fed. Reg. 31,879).

[210] 68 Fed. Reg. at 61,879.

[211] This is consistent with EPA's determination for the initial NESHAP in 2003: "[B]ecause iron ore deposits are variable in mercury content, there is no way to assure that even a source processing its own ore could replicate its own performance, since the next ore batch could contain higher concentrations of mercury. … This supports the Agency's technical determinations that control via substitutions of feed or fuel is neither feasible nor likely to be effective since random variability in the feed will likely result in equal amounts of mercury being emitted in any case. Indeed, as stated above, it is not clear that even a single source could reliably duplicate its own performance for mercury emissions due to the small amounts emitted and random variabilities in the mercury content of the iron ore." 68 Fed. Reg. at 61,789.

[212] 68 Fed. Reg. at 61,879.

e. While EPA could not have required raw materials substitution, it should have taken into account the fact that the raw materials were driving the mercury emissions when it set the floor.

EPA has not suggested that furnaces could achieve compliance with the proposed MACT standard through substituting raw materials, nor was its proposed MACT standard based on a premise that furnaces would seek alternative sources of taconite. This is consistent with the information provided in the prior subsection regarding the uniqueness of each mine and why facilities are limited in the ranges of ore they can process. This is also consistent with Congress's instructions to EPA when it is explained that for sources engaged in the processing of mined raw materials, such as taconite, "the Administrator shall not consider the substitution of, or other changes in, metal- or mineral-bearing raw materials that are used as feedstocks or materials inputs ... in setting emission standards, work practice standards, operating standards or other prohibition or requirements or limitations under this section."[213] EPA also did not propose raw material substitution as a beyond-the-floor determination, which is appropriate.[214] What EPA failed to do, however, is take into account the uniqueness of the mines and their inability to substitute with lower mercury content ores when it established the MACT based on the low mercury concentrations of the eastern mines. While EPA could not require or suggest material substitution, it does have an obligation to consider relevant factors in determining an appropriate and reasonable MACT standard—and one not tied to the serendipity of geologic formations. To ensure that the MACT standard is appropriately established, EPA must develop a more appropriate standard that takes into account the inability to substitute the raw materials processed.

2. Any subcategory option must also take into account the points in the above sections regarding (1) ranking best performers by *facility average* and (2) the use of a raw material variability factor.

EPA has previously acknowledged that it is authorized under CAA § 112(d) to "define subsets of similar emission sources within a source category if differences in emission characteristics, processes, control device use, or opportunities for pollution prevention exist within the source category."[215] Before calculating the MACT floor as proposed, EPA "evaluated the available data on the design and operating characteristics of indurating furnaces" in order to determine "whether

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[213] "For categories and subcategories of sources of hazardous air pollutants engaged in mining, extraction, beneficiation, and processing of nonferrous ores, concentrates, minerals, metals, and related in-process materials, the Administrator shall not consider the substitution of, or other changes in, metal- or mineral-bearing raw materials that are used as feedstocks or materials inputs, or metal- or mineral-bearing materials processed or derived from such feedstocks or materials in setting emission standards, work practice standards, operating standards or other prohibitions or requirements or limitations under this section for such categories and subcategories. Legislative history for the 1990 Clean Air Act Amendments, Conference Report, H. Rep. No. 101-952, 101 51 Cong. 2nd sess. At 339.

[214] *Portland Cement Ass'n v. EPA*, 655 F.3d 177, 194-95 (D.C. Cir. 2011). ("[T]he quality of inputs should not be permitted to affect the calculation of floors: the "substitution of materials"—in other words, the degree to which EPA can require kilns to switch inputs in order to comply with a standard—is listed as a factor to be considered in the second, *beyond-the-floor* determination, not in the antecedent floor-setting determination.").

[215] 67 Fed. Reg. 72,108 (June 20, 2002) (Refractory Products Manufacturing).

subcategorization was warranted" for mercury emissions.[216] In this regard, EPA said that, "[f]or each stack test," it had "collected information on the type of indurating furnace tested (grate kiln or straight grate indurating furnace)," on the "ore processed (magnetite or hematite)," on the "fuels burned," and on the "type and quantity of taconite pellets produced."[217] After considering all this information, EPA said that subcategorization was not appropriate for mercury emissions from indurating furnaces based on these particular subcategories.[218]

In the current rulemaking, EPA evaluated whether subcategorization was warranted based on the design of each furnace. EPA did not evaluate whether subcategorization was warranted based on the unique design and location of each particular taconite processing facility, which would have been more appropriate given the unique aspects of this industry described above. Because EPA has the discretion to establish subcategories based on emission rates and characteristics and because the design and location of each processing facility it what ultimately drives mercury emission rates, it is incumbent on EPA to subcategorize on this basis.[219] Application of a variability factor alone would not be sufficient to address the variation between eastern and western facilities. Accordingly, while it is true as a general matter that EPA is not statutorily compelled to subcategorize in a given situation, the Agency's failure to do so here, given the characteristics unique to the taconite processing industry, would be an abuse of discretion *per se*.

EPA has broad discretion to create a subcategory where the facts warrant – such as where the basis for subcategorizing is related to an effect on emission.[220] EPA has previously and appropriately considered subcategorization based on geography when it has an effect on emissions—such as the location of raw materials used, the mercury concentrations of those raw materials, and impacts on emissions.[221] Insofar as the greenball mercury concentrations drive mercury emissions from indurating furnaces, and the greenball mercury content is directly associated with the geographical location of the mined ore, EPA should establish subcategories based on the geographical location of the furnaces, their directly associated mines, and the unique features of each individual taconite processing facility based on the ore it processes and the products it makes.

VIII. Because Particulate Matter Remains an Appropriate Surrogate, EPA Should Not Establish Separate HCl And HF Limits, Which Would Require New Compliance Measures Yet Provide No Meaningful Benefit.

In 2003, EPA determined that particulate matter (PM) emissions could be used as a surrogate for acid gas emissions from taconite indurating furnaces and established standards for total PM as a surrogate pollutant for the acid gases hydrogen chloride (HCl) and hydrogen fluoride (HF)

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[216] 88 Fed. Reg. at 30,923. EPA has broad discretion to create a subcategory applicable to a single HAP, rather than to all HAP emitted by the source category, where the facts warrant – such as where the basis for subcategorizing is related to an effect on emission. *See* 42 U.S.C. 7412(d); 79 Fed. Reg. 75,650-51 (Dec. 18, 2014).
[217] *Id.*
[218] *Id.* at 30,924.
[219] "Section 112(d)(1) allows [EPA] to define subsets of similar emission sources within a source category if differences in emission characteristics, processes, control device use, or opportunities for pollution prevention exist within the source category."
[220] *See* 42 U.S.C. 7412(d); 79 Fed. Reg. 75,650-51 (Dec. 18, 2014).
[221] *Id.*

emissions.[222] EPA stated at the time that "[e]stablishing separate standards for acid gases would impose costly and significantly more-complex compliance and monitoring requirements" while achieving "little, if any" HAP reductions beyond what would be achieved using PM as a surrogate.[223] When EPA subsequently conducted its risk and technology review in 2020, it confirmed that approach of using PM as a surrogate for acid gas emissions, finding that there were no new developments and also that human health was sufficiently protected by an adequate margin of safety.[224] Twenty years after establishing the MACT and only three years after recently confirming the original MACT, EPA now proposes, pursuant to Section 112(d)(6), to regulate HCl and HF (acid gases) directly and no longer to rely on the valid PM surrogate. The basis for the proposed new approach is stated to be recent stack test data that EPA characterizes as a "development[] in practices, processes, and control technologies"[225] within the meaning of CAA Section 112(d)(6) because it shows that furnaces utilizing wet scrubbers and subject to the PM emission limit of 0.01 gr/dscf have lower acid gas emissions than the separately subcategorized, one-of-a-kind facility (known as Tilden) that utilizes grate kilns to process finer-grained magnetite and hematite ore into fluxed pellets, which are controlled via dry electrostatic precipitators (ESPs) and subject to a limit threefold higher – 0.03 gr/dscf.

As explained below, the data EPA received in response to its 2022 information collection request (ICR) under CAA Section 114 certainly do not constitute a "development" within the meaning of CAA Section 112(d)(6). First, the mere generation of data reflecting a potential change in emission rates does not necessarily constitute a "development" in control technology, processes, or practices, as subparagraph (d)(6) specifies. Second, in this particular case, it certainly does not. EPA based its 2003 MACT on similar data and received similar data during the 2020 RTR – data that (appropriately) did not prompt any changes to the standards. Thus, the most recent test data do not represent any sort of "development" because what the dataset reflects is in no way new. Moreover, the data merely supports the continued need for the subcategorization of the Tilden unit because, just as EPA suspected in 2002, the Tilden unit is prone to higher PM and acid gas emissions for a number of reasons, not solely because it does not happen to use a wet scrubber.

Accordingly, EPA is unable to point to anything that shows that the use of particulate matter as a surrogate is no longer appropriate for those indurating furnaces processing magnetite and using wet scrubbers or the grate kilns processing hematite and using dry ESPs, much less that it is now "necessary" for EPA to revise the HCl and HF standards. Thus, and given that EPA would unquestionably be acting within its reasoned discretion by continuing to use PM as a surrogate for acid gases (as it does for metal HAPs), and given that EPA has already determined that the risk associated with HCl and HF emissions is well below the threshold of acceptability under EPA's longstanding guidelines, establishing numeric HCl and HF emission limits is not only unnecessary but also unreasonable.[226] Imposing costly new compliance requirements that produce no

[222] EPA, *National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing*, Final Rule, 68 Fed. Reg. 61,868, 61,884 (Oct. 30, 2003).
[223] *Id.*
[224] 85 Fed. Reg. at 45,479.
[225] 88 Fed. Reg. at 30,920.
[226] CAA § 112(d)(6), 42 U.S.C. § 7412(d)(6) (mandating that the Administrator periodically review and "revise as necessary" emission standards).

meaningful benefit to public health when the statute does not compel that result is the epitome of arbitrary and

Absent sufficient data, any limits issued, should EPA nonetheless continue to pursue a path of establishing direct HCl and HF limits, must be (1) adjusted upward to account for this variability and (2) based on the original subcategorization that provided for appropriately higher limits for grate kilns processing hematite ore. EPA must also verify the level of emission reductions achievable using a dry sorbent injection approach because the technology is not likely to perform as expected, and the costs of switching to wet scrubbers would be unreasonably expensive. What EPA has proposed here is unacceptable and without lawful support. Because EPA is not under a time constraint to complete this discretionary action, as there is no "gap" to fill under *LEAN* with regard to acid gases, EPA should, at a minimum, withdraw and reconsider its proposal.

A. EPA states that it is exercising its discretionary authority under Section 112(d)(6) to revisit the limits applicable to acid gases, and thus the agency faces no time constraints or requirements under *LEAN v. EPA*.

Nothing compels EPA's proposed decision to abandon PM as an acid gas surrogate, much less to do so on the rushed schedule it is pursuing. As the proposal explains, the *LEAN* decision is limited to gap-filling efforts for unregulated pollutants:

> In the *Louisiana Environmental Action Network* v. *EPA* (*LEAN*) decision issued on April 21, 2020, the U.S. Court of Appeals for the District of Columbia Circuit (D.C. Circuit) held that the EPA has an obligation to address *unregulated* emissions from a major source category when the Agency conducts the 8-year technology review required by CAA section 112(d)(6).[227]

Because HCl and HF are regulated by using PM as a surrogate, and have been since 2003, and because EPA continues to recognize that PM is a proper HAP surrogate, there is no reason to rush to issue new limits, particularly when the dataset is inadequate (as discussed below). It appears EPA may feel compelled to rush this rulemaking in light of *LEAN*. But the deadline in *LEAN* is a negotiated deadline, driven not by what is the needed time to do a competent job, but rather by litigants in the *LEAN* case. The agency has not yet asked the court for the time needed to do this work, and it should go to the court and seek the time to do this job properly. At a minimum, EPA should not be adding to its burden non-*LEAN* elements. Because of the issues with the proposed acid gas limits, they should be withdrawn and not finalized with the *LEAN*-compelled rule revisions.

[227] 88 Fed. Reg. at 30,920; *see also LEAN v. EPA*, 955 F.3d 1088 (D.C. Cir. 2020).

B. Because EPA already regulated acid gas emissions via surrogacy and made no finding otherwise, regulating via PM surrogacy remains the best approach.

1. EPA appropriately analyzed the data in 2003 to determine that PM should be used as a surrogate to regulate HCl and HF.

When EPA promulgated the initial MACT standards in 2003, it explained that HCl and HF are formed in the indurating furnaces due to the presence of chlorides and fluorides in pellet additives, such as dolomite, bentonite, and limestone required to produce fluxed pellets, as well as in the ore bodies.[228] EPA recognized that, although industry had not installed pollution control equipment on indurating furnaces specifically to control acid gases, HCl and HF stack test reports indicated that emissions were nevertheless controlled by venturi scrubbers, dry ESPs, and wet ESPs. EPA noted that the HCl concentrations were "typically less than 3 ppm" on units with these devices and slightly higher on furnaces controlled with multicyclones, where the concentration averaged 8 ppm.[229]

EPA compared the HCl concentrations to PM emissions and determined based on the data that the stacks with lower PM emissions also had lower acid gas emissions. EPA relied on an engineering analysis confirming a correlation between HCl and PM emissions due to the "strong affinity of these acid gases for water."[230] This analysis concluded that PM controls that use water, such as wet scrubbers and wet ESPs, have the "capability of reducing [HCl] and [HF] emissions substantially."[231] Beyond wet controls, however, the engineering analysis also noted that "even dry control devices such as a dry ESP may achieve a certain degree of HCl and HF emissions reduction."[232] The data also showed a statistical correlation indicating that "stacks with higher PM emissions also have higher acid gas emissions, and likewise, stacks with lower PM emissions have lower acid gas emissions."[233] Based on this engineering analysis, EPA proposed that HCl and HF emissions would be regulated through PM as a surrogate, on the premise that, as long as PM was controlled sufficiently to meet the PM limits established in the MACT, then HCl and HF emissions would be similarly controlled.[234]

In its recently proposed amendments, EPA stated that it was proposing to change the way it regulated HCl and HF emissions "based on a development in the industry."[235] EPA did not, however, make a finding that the correlation identified in 2003 between HCl and PM emissions no

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[228] EPA, EPA 453/R-03-013, National Emission Standards for Hazardous Air Pollutants (NESHAP) for Taconite Iron Ore Processing Plants, Background Information for Promulgated Standards, at 2-76, 2-77 (Aug. 26, 2003) ("2003 EPA Background Information Document, Final Rule").
[229] *Id.*; *see also* Memorandum from Chris Sarsony, Alpha-Gamma Technologies, Inc., to Conrad Chin, EPA, regarding "Correlation of Acid Gas Emissions to PM Emissions for Taconite Indurating Furnaces," at 4, tbl. 1 (July 2003), EPA-HQ-OAR-2017-0664-0162 ("Sarsony July 2003 Mem.").
[230] EPA, *National Emission Standards for Hazardous Air Pollutants for Taconite Iron Ore Processing*, Proposed Rule, 67 Fed. Reg. 77,562, 77,572 (Dec. 18, 2002).
[231] *Id.* at 77,571.
[232] Sarsony July 2003 Mem., at 3.
[233] 2003 EPA Background Information Document, Final Rule, at 2-76, 2-77.
[234] *Id.*
[235] 88 Fed. Reg. at 30,926.

longer exists, nor is such a finding warranted, especially for furnaces using wet control technology for PM emissions. Rather, the purported "development" cited by EPA is related to limited stack testing performed on seven out of eighteen furnaces where EPA compared emissions from six furnaces processing magnetite ore and using wet scrubbers to control emissions from one of only two furnaces in the entire United States that processes hematite ore using a grate kiln design and dry electrostatic precipitators (ESPs) to control PM. In 2003, EPA specifically established a subcategory for the two grate kilns processing hematite with dry ESPs, both located at the Tilden facility in Michigan. EPA stated:

> We are establishing subcategories within the indurating furnace affected source to distinguish between the two types of furnace designs—grate kiln and straight grate. We have determined that grate kiln furnaces are higher emitting sources than straight grate furnaces due to physical and operational differences that affect emissions and the controllability of emissions.
>
> First, the grate kiln furnaces are larger than straight grate units with annual production rates approximately 30 percent higher than that of the straight grate furnaces. Second, the grate kiln furnaces are composed of two furnace sections, a continuous grate followed by a rotary kiln, while the straight grate furnaces include only a continuous grate.
>
> In the grate kiln, the pellets drop off a conveyor into the kiln and then tumble in the kiln as it rotates. As a result, there is substantially more disturbance of the pellets in the grate kiln furnace which contributes to an increase in pellet breakage and in the entrainment of particles in the air stream and causing higher PM loadings and HAP emissions. In addition, the average volume of air flowing through a grate kiln furnace is more than twice the average volume of air flowing through a straight grate furnace. The greater air flow in grate kilns causes more entrainment of particles in the air stream, causing higher exhaust gas PM loadings and HAP emissions. Available test data show that, when processing magnetite ore, PM loadings for grate kilns are twice that of straight grate furnaces. Because grate kiln furnaces and straight grate furnaces have unique physical and operational differences that affect emissions and the controllability of emissions, we have subcategorized based on furnace type.
>
> We have also concluded that, within the grate kiln furnace subcategory, higher PM emissions are observed when hematite ore is processed rather than magnetite ore. For example, PM emissions for one furnace were measured at 0.004 gr/dscf when the furnace was processing magnetite. When the same furnace was processing hematite, the PM emissions were measured at 0.018 gr/dscf. Contributing factors to the higher emissions include the fact that the hematite ore pellets are finer grained and subject to a higher breakage rate. As a result of the higher inlet PM loading, the controlled outlet PM emissions are higher when processing hematite than when processing magnetite. Therefore, to account for this difference in emissions, we are making a distinction on the basis of ore type within grate kilns. There are only two grate kiln furnaces that process hematite. Both of these indurating furnaces are

> located at the same plant in Michigan. These furnaces process hematite approximately eight months of the year and process magnetite the remainder of the year. There are no straight grate indurating furnaces processing hematite.[236]

Since EPA established subcategories in 2003, it cannot now conflate the categories to transfer the limit from one to another. Tilden is currently the *only* taconite iron ore processing facility in the United States using grate kilns and processing hematite ore, and that was also the case in 2003 when EPA appropriately established a separate subcategory limit for PM as a surrogate for HAP.

The recent stack test data collected in 2022 that EPA points to as a "development" actually confirms what EPA knew and explained in 2002-2003 – that PM and HCl emissions remain well controlled for furnaces using wet control devices and that grate kilns processing hematite and producing fluxed pellets have higher emissions for a number of reasons that led to their subcategorization. Because EPA has made no finding or demonstration that the correlation between PM and acid gas emissions no longer exists for wet-controlled units or for Tilden, and because EPA continues to utilize PM as a surrogate for hazardous air pollutants under the NESHAP program generally, there is no basis for changing the way it regulates HCl and HF emissions by relying on PM as a surrogate for wet-controlled indurating furnaces or for Tilden's grate kilns processing hematite to produce fluxed pellets.

2. During the 2019-2020 Section 112(d)(6) technology review, EPA confirmed that the current regulation of acid gases using PM as a surrogate is appropriate.

As required under Section 112(d)(6), EPA undertook a technology review of the 2003 MACT, including the HCl and HF standards, starting in 2017. Specifically, Section 112(d)(6) requires EPA to "review and revise as necessary (taking into account developments in practices, processes, and control technologies)" NESHAP emission standards every eight years.[237] EPA concluded this review in 2020.

In 2020, EPA specifically found *no* developments in practices, process, or control technologies for HCl and HF emissions and did *not* propose any changes to the use of PM as a surrogate for HCl and HF emissions. EPA did consider whether indurating furnaces should install wet ESPs in addition to the continued use of existing wet scrubbers to help control PM and metal HAP emissions. EPA ultimately concluded that use of wet ESPs would provide only a small incremental PM reduction and a small reduction in risk, while costs of such additional controls would be

[236] 67 Fed. Reg. at 77,570 (emphases added); *see also* EPA, EPA 453/R-02-015, *National Emission Standards for Hazardous Air Pollutants (NESHAP) for Taconite Iron Ore Processing Plants, Background Information for Proposed Standards* at 2-3 (Dec. 2002), EPA-HQ-OAR-2002-0039-0163 (Legacy II-A-1) ("2002 EPA Background Information Document, Proposed Rule") ("Tilden is the only taconite mine in the United States processing the non-magnetic hematite ore (Fe203). According to personnel at the Michigan plants, both the magnetite and hematite ores mined from the Marquette Range are more fine-grained than the magnetite ore mined in Minnesota. Furthermore, within the Marquette Range, the hematite ore is more fine-grained than the magnetite ore. The grain size of the ore can be a factor in particulate matter (PM) and hazardous air pollutant (HAP) emissions.").

[237] CAA § 112(d)(6), 42 U.S.C. § 7412(d)(6).

substantial. Based on that analysis, EPA did not propose any additional emission controls for PM or metal HAPs.[238]

As part of this same technology review, EPA also conducted the required Section 112(f) residual risk review. EPA found the risk from acid gas emissions as well as metal HAP emissions to be very low, providing an ample margin of safety. EPA conducted air quality modeling to determine HAP concentrations in the area surrounding eight taconite iron ore processing facilities. EPA requested updated emission rates from industry to use in its modeling, and, based on EPA's request, regulated facilities updated the rates in 2017-2018.

One such submittal included data for the Tilden and Empire facilities, which are located very close together in Michigan, along the Marquette range. Both facilities utilize grate kilns to process hematite and magnetite ore with dry ESPs to control for PM. While the Empire facility is no longer operating, the data it submitted for the 2020 risk and technology review remains relevant. Tilden had undergone stack testing in 1999 and again in 2017. In 1999, the HCl concentration was measured at an average of 1 ppm, 3.7 lbs/hour, and 0.008633 lb/LT. At that time, EPA estimated the annual HCl emissions from the Tilden facility's two furnaces to total 39 tons per year (TPY), and estimated the adjoining Empire facility's HCl emissions to be 0.006195 lb/LT and total 26 TPY.[239] More than fifteen years later, in 2017, and based on new stack test data, Tilden's HCl emissions were estimated at 288 TPY and Empire's HCl emissions were estimated at 233 TPY.[240] When EPA finalized its risk modeling dataset, it accounted for these higher emission rates and assumed that Tilden emitted 291 TPY of HCl and that Empire emitted 121 TPY of HCl. In comparison, other facilities' annual HCl emissions ranged from 6.5 to 38 TPY.[241] Indeed, only Tilden and Empire had grate kilns. And only Tilden and Empire had dry controls for PM. All of the other facilities were utilizing straight grate kilns with wet controls.

At that time, EPA did not:

- Identify any concerns with the higher HCl emission rates from Tilden or Empire.
- Note any new developments related to the HCl or HF emission rates.
- Propose any changes to the use of PM as a surrogate for acid gas emissions as part of the required technology review.

[238] EPA, *National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing Residual Risk and Technology Review*, Proposed Rule, 84 Fed. Reg. 50,660, 50,677 (Sept. 25, 2019).
[239] Memorandum from Chris Sarsony, Alpha-Gamma Technologies, Inc., to Conrad Chin, EPA, regarding *Revised Taconite Iron Ore Processing NESHAP Baseline Emissions and Emission Reductions for the Final Rule*, at A-16 to A-17, tbls. A-13 and A-14 (Aug. 2003), EPA-HQ-OAR-2002-0039-0054.
[240] MPCA 1999 Report and PTD Table ES-2 Comparison Spreadsheet, EPA-HQ-OAR-2017-0664-0069-Att. 2; *see also* Taconite Facilities Modeling File, EPA-HQ-OAR-2017-0664-0039-Att. 18.
[241] Memorandum from David Putney, EPA, to Taconite Iron Ore Processing RTR Docket (Docket ID No. EPA-HQ-OAR-2017-0664), *Development of the Residual Risk Review Emissions Dataset for the Taconite Iron Ore Processing Source Category*, at 10, tbl. 7 (Mar. 25, 2020), EPA-HQ-OAR-2017-0664-0161.

C. Because EPA has identified no "development," and because PM remains an appropriate surrogate for HCl and HF emissions, the proposal to issue separate limits for these compounds should be withdrawn.

Less than three years after completing its Section 112(d)(6) RTR, and notwithstanding being behind on numerous RTRs and MACTs to be reviewed, EPA is conducting a discretionary *new* 2023 technology review for this source category, something EPA is not required to do by the *LEAN* decision nor by the court order establishing the schedule under which this rulemaking is taking place. EPA states that it proposes to change "the way" it has regulated HCl and HF emissions "based on a *development* in the industry,"[242] though no such development has been identified by EPA. Congress authorizes and requires EPA to take into account "developments in practices, processes, and control technologies," which language describes a range of matters rather more circumscribed than an open-ended reference to developments "in the industry" without limitation. Based on what EPA considers to be a development "in the industry," EPA has proposed new numerical emission limits for HCl and HF using a MACT floor approach instead of continuing to use PM as a surrogate.[243] So, not only is EPA undertaking a *discretionary* review, it is conducting that review under provisions that do not apply. As explained below, EPA has, in fact, not identified any sort of "development" within the meaning of paragraph (d)(6). PM remains an appropriate surrogate for acid gases for units for the same reasons articulated in 2003.

1. EPA has not previously interpreted the statutory reference to "developments" under Section 112(d)(6) to cover new emissions data or developments in an industry—and has instead focused on emission controls and work practice standards, taking into account new cost information or improved efficiencies.

According to the proposal, a "development" under Section 112(d)(6), is:

- Any add-on control technology or other equipment *that was not identified and considered during development of the original MACT standards*;
- Any improvements in add-on control technology or other equipment (that were identified and considered during development of the original MACT standards) that could result in significant additional emissions reduction;
- Any work practice or operational procedure that was not identified or considered during development of the original MACT standards;
- Any process changes or pollution prevention alternatives that could be broadly applied to the industry and that were not identified or considered during development of the original MACT standards; and

[242] 88 Fed. Reg. at 30,926 (emphasis added).
[243] *Id.*

- Any significant changes in the cost (including cost effectiveness) of applying add-on control technology or other equipment to affected sources (including controls EPA considered during the development of the original MACT standards).[244]

Here, EPA has not described the development as any new or not previously considered control technology or equipment, improvements in technology or equipment that would result in better-than-expected emission, new work practices or operational procedures, a process change or pollution prevention alternative, or a significant change in cost or cost-effectiveness. Instead, the proposal describes the "development" that led to the current rulemaking as:

> [N]ew emissions data indicate that the furnaces using wet scrubbers to meet the PM NESHAP standards achieved lower acid gas emissions than the furnace using dry ESP. … The EPA is proposing the new emissions data showing further reductions in acid gas emissions is achievable represents a "development" under CAA Section 112(d)(6).[245]

To be clear, Industry Commenters interpret the proposal as saying that it is a *development* for stack testing data for six (out of a total of 16) furnaces equipped with wet scrubbers and processing magnetite ore to demonstrate lower emission rates compared to stack testing data for one of Tilden's grate kilns processing hematite to produce fluxed pellets with a dry ESP. But that's not *new*. Indeed, EPA has apparently failed to recognize its original findings from 2002 when it first proposed to subcategorize the Tilden facility due to its uniqueness when it comes to PM and HAP emissions.

In 2002, with the first proposed MACT standards for taconite iron ore processing indurating furnaces at taconite ore processing facilities, EPA identified three subcategories based on certain design features as well as the type of ore processed: (1) straight grate processing magnetite, (2) grate kiln processing magnetite, and (3) grate kiln processing hematite. EPA noted that the grate kilns were the next generation, and a more modern design, yet some of the design features caused higher emissions. With grate kilns, "the pellets drop off a conveyor into the kiln and then tumble in the kiln as it rotates" while a counterflow heat exchanger moves the pellets in a direction opposite of the gas flow.[246] The pellets remain in perpetual motion and eventually tumble down the rotating kiln. Because of this dropping and tumbling while the kiln rotates and continuous high air flow in a counter direction, EPA found that there was "substantially more disturbance of the

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[244] Memorandum from Mike Laney & Beatrix Jackson, RTI International, & David Putney, EPA, OAQPS, to US. EPA David Putney, U.S. Environmental Protection Agency (EPA),EPA, OAQPS regarding Draft Technology Review for the Taconite Iron Ore Processing Source Category (July 23, 2019), EPA-HQ-OAR-2017-0664-0103; *see also* EPA, *Petroleum Refinery Sector Risk and Technology Review and New Source Performance Standards*, Final Rule, 80 Fed. Reg. 75,178, 75,201 (Dec. 1, 2015) (Petroleum Refinery RTR).

[245] Memorandum from David Putney, Office of Air Quality Planning and Standards, U.S. EPA, to Docket ID No. EPA-HQ-OAR-2017-0664, regarding *Revised Technology Review of Acid Gas Controls for Indurating Furnaces in the Taconite Iron Ore Processing Source Category* (Mar. 21, 2023), EPA-HQ-OAR-2017-0664-0255 ("EPA RTR of Acid Gas Controls Mem.").

[246] 67 Fed. Reg. at 77,570.

pellets… which contributes to an increase in pellet breakage and in the entrainment of particles in the air stream and causing higher PM loadings and HAP emissions."[247]

EPA also explained in its 2002-2003 rulemaking that grate kilns would likely have higher emissions when processing hematite than when processing magnetite because hematite ore is more fine-grained and also subject to higher breakage rates, leading to a higher PM inlet loading to the pollution control equipment. Because hematite is not magnetic like magnetite, Tilden uses a different separation process that involves adding caustic soda and a dispersant in the grinding process. Tilden also produces fluxed pellets, which involves the addition of fluxstone – limestone or dolomite – which contains chlorine. These are significant differences in the process. EPA also noted that "the breakdown of fluxstone during the induration process often leads to increased emissions of hydrogen fluoride and hydrogen chloride. For these reasons, in comparison to the production of standard pellets, the production of fully fluxed pellets is a different type of process, which incidentally also results in somewhat higher emissions.[248]

All of these features led EPA to establish different limits for grate kilns processing hematite with a higher PM surrogate emission limit of 0.03 gr/dscf rather than the limit applicable to the other units at 0.01 gr/dscf. Despite the higher emission rate, based on a MACT floor Tilden helped establish, Tilden still spent more than $4 million for upgrades to its ESPs to meet the 0.03 gr/dscf PM limit. EPA estimated at the time that if it had set a beyond-the-floor (BTF) limit of 0.018 based on Tilden's stack test data, instead of 0.03 gr/dscf, the additional total capital costs would have been $26 million, with $5 million in annual costs. EPA appropriately determined that this BTF MACT was too expensive for the small reduction in HAPs that would have been achieved.

EPA has already determined that Tilden's grate kilns processing hematite to produce fluxed pellets with dry ESPs will have higher emissions due to design and operational features compared to kilns processing magnetite ore, making standard pellets, and using wet scrubbers—and nothing has changed since 2002 in that regard.[249] Based on direct HCl and HF stack testing data, EPA was well aware that "wet scrubbers and wet ESP have the capability of reducing HCl and HF emissions *substantially*" and, in contrast, "dry ESP *may* achieve a certain degree of HCl and HF emissions reduction" because "CI and F associates with the particulate and is recovered and might not be emitted as a gas."[250] Because this information about Tilden's emissions and the wet scrubber technology existed at the time of the original MACT, it is difficult to see how it could later be viewed to constitute a "development" for purposes of Section 112(d)(6).[251] The proposal claims

[247] *Id.*
[248] 2002 EPA Background Information Document, Proposed Rule at 2-4.
[249] *See* Sarsony July 2003 Mem., at 4-5, tbls. 1 and 2.
[250] *Id.*, at 3 ("Due to the strong affinity of acid gases for water, PM control equipment that use water, such as wet scrubbers and wet ESP, have the capability of reducing HCI and HF emissions substantially. Therefore, wet scrubbers and wet ESP control technologies used for the reduction of PM emissions from taconite indurating furnaces to achieve the MACT level of control for HAP metals are expected to achieve a reduction of acid gas emissions as well. There are preliminary indications from industry that even dry control devices such as a dry ESP may achieve *a certain degree* of HCI and HF emissions reduction. A recent letter from a taconite plant representative states 'other materials sampling and testing that has been conducted over the years indicates that much of the CI and F associates with the particulate and is recovered and *might not be* emitted as a gas.' Thus, Cl and F would be collected with the PM by a wet or dry emission control device.") (emphasis added).
[251] *See* Petroleum Refinery RTR, at 75,201.

that a limited new dataset and a "development in the industry" supports its proposed HCl and HF revisions. While EPA purports that new data that reflects efficacy that was not known before or an improved cost-effectiveness or efficacy of a potential control technology might be a development, a new dataset that is consistent with EPA's initial MACT development, including similar to data analyzed at the time of the original MACT and the subcategorization included in the original MACT based on process differences discussed above, does not seem to fit as a "development in the industry" and certainly does not fall within any of the above-listed categories of "developments" articulated by EPA. To our knowledge, CAA Section 112(d)(6) technology reviews have never before been based solely on data that reflect nothing new and unrelated to emission reductions.

2. A new "development" in control technology, processes, or practices under Section 112(d)(6) does not include a "development in the industry," especially when the development is in the form of data.

EPA bases its proposal to establish HCl and HF emission limits, rather than continuing to use PM as a surrogate, based on recent stack test data that EPA collected in 2022. This is what the agency considers to be a "development in the industry" that justifies its proposal. This expansive interpretation, where EPA is equating "development in the industry" to the language in Section 112(d)(6) that speaks of "developments in practices, processes, and control technologies," is a novel approach that is inconsistent with EPA's prior view of paragraph(d)(6).

With regard to control technologies, in 2020, EPA did not mention dry sorbent injection and instead only evaluated the use of a wet ESP, and only for units already using wet scrubbers.[252] EPA acknowledges that it had concluded in 2020 that "there were no developments in practices, processes, or control technologies that would warrant revisions to the standards."[253] Therefore, EPA explains, "no changes were made to the emissions standards as part of that action."[254] There have been no developments in technology since that 2020 final rule that would support a determination under Section 112(d)(6), nor has EPA identified any developments in practices, processes, or control technologies for indurating furnaces with regard to HCl or HF emissions.

To be sure, developments include "improvements in efficiency, reduced costs or other changes *that indicate that a previously considered option for reducing emissions may now be cost effective or technologically feasible*."[255] But, in this case, there have been no changes with regard to the types of controls available, including dry sorbent injection, wet ESPs, and wet scrubbers, nor in the removal efficiencies or costs. EPA does not seem to be saying that the limited dataset upon which it relies in its proposal is an "improvement in efficiency." Indeed, a new dataset is *not* "an improvement in efficiency," nor does it reflect implementation of any new operational work practice or maintenance activity. The new limited stack test dataset on which EPA relies certainly does not and is not capable of indicating that technology that EPA already considered is now more "cost effective or technologically feasible."

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[252] 84 Fed. Reg. at 50,677.
[253] 88 Fed. Reg. at 30,921.
[254] *Id.*
[255] *Nat'l Ass'n for Surface Finishing v. EPA*, 795 F.3d 1, 11 (D.C. Cir. 2015) (internal citations omitted).

EPA simply states without further explanation or support that the recent stack test data "indicate that the furnaces using wet scrubbers to meet the PM NESHAP standards achieved lower acid gas emissions than the furnace using dry ESP" and that this new data show that "further reductions in acid gas emissions is achievable."[256] But that is not the test. EPA states the unremarkable proposition that indurating furnaces processing magnetite and using wet scrubbers have lower PM and HAP emissions than the grate kiln furnace subcategory that processes finer-grained magnetite and hematite to produce fluxed pellets with dry ESP controls. What is not discussed, and which is an important aspect of the problem here, is why that transforms the earlier decision to subcategorize into a decision not to do so.[257] The plain language of the statute establishes that the floor applies on a subcategory basis. EPA cannot now ignore that it established this subcategory.

Moreover, EPA's solution is not tied to the premise of using wet control technology. The proposal suggests that Tilden should utilize dry sorbent injection (DSI) to reduce emissions. While DSI could potentially be used at Tilden, it is wrong to assume that it would achieve the 79 percent reduction rate EPA estimates or that it would do so without potential negative environmental impacts such as increased particulate matter loading. To reach the proposed ratcheted emission limit, Tilden would have to replace its dry ESPs with wet scrubbers. The cost of that replacement would be enormous and cannot be justified for the minor reduction in acid gas emissions that are already well controlled and sufficiently health protective. Given the disconnect between EPA's statements about what the data "shows" and how EPA is using the data to establish new lower HCl- and HF-specific limits, EPA has not identified any "development" under Section 112(d)(6) to support the revised limits.

3. More importantly, even if data could be considered a development, the information conveyed with this particular HCl and HF data is not *new* and therefore not a development.

As explained, to be a development, the equipment, process, or practice must be new. That is what makes something a "development" after all, as a simple matter of definition. Presuming that data could constitute a "development" for the purposes of Section 112(d)(6) – which it cannot – the information being conveyed through data would still need to be something that is "new."

True, EPA did receive "new" stack test data in 2022 in response to an information collection request. The information being conveyed, however, is not itself "new" and therefore could not be a "development." When EPA first promulgated this MACT, EPA came to understand, based on stack test data and engineering analyses available at the time, that wet scrubbers were expected to control HCl and HF emissions better than furnaces equipped with dry controls, and especially those furnaces using grate kilns processing hematite ore to produce fluxed pellets and equipped with dry controls. By the time it received the most recent stack test data in 2022, EPA had already reviewed comparable data from industry in 2017-2018 to support modeling that the agency would be undertaking for the residual risk assessment required under Section 112(f). Further, as detailed below, the very small dataset upon which EPA now relies is far too limited to demonstrate that

[256] EPA RTR of Acid Gas Control Controls Mem., at 2.

[257] *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.,* 463 U.S. 29 (1983) (explaining agency action is lawful only if it rests "on a consideration of the relevant factors").

anything has changed, much less anything that would warrant the dramatic proposed revisions to the HCl and the HF MACT limits.

In 2022, EPA received stack test reports for seven of the eighteen operating indurating furnaces. Six of the seven furnaces tested use wet scrubbers, and one uses a dry ESP (Tilden). Based on those reports, which happen to represent less than half of all of the affected units at issue here, EPA said that the data "showed that wet venturi scrubbers consistently achieved lower HCl emissions compared to the furnaces using dry ESPs."[258] EPA does not go on to explain its particular concern in any detail. EPA also does not explain why it was considering this information to be new. In fact, it is not new.

To the contrary, EPA had come to the same conclusion in 2003 when it promulgated the original MACT. As noted earlier, EPA has always understood that furnaces with wet controls on grate kilns would have lower acid gas emissions than those using dry controls, and EPA certainly knew that the Tilden grate kilns processing hematite to produce fluxed pellets and using dry ESPs would have higher emissions. That is why EPA established a subcategory specifically for Tilden and established separate surrogate PM limits as a surrogate for HAPs that are three times as high as the limits applicable to units processing magnetite ore regardless of furnace design. The information reflected in the 2022 dataset is also not new because, as mentioned earlier, EPA had received similar data in 2017 as part of the risk and technology review for use in its modeling, which showed higher annual HCl emission rates for the two grate kilns processing hematite ore and using dry ESP controls compared to the rates for all of the other units which were processing magnetite ore and using wet controls (288 TPY for the two dry-controlled units compared to 6.5-38 TPY for wet-controlled units). Because EPA has not identified anything *new,* there is no development, and it has no good reason for initiating this rulemaking to impose new emission standards. The current standards, which employ PM as a surrogate, remain adequate, and EPA has not shown otherwise.

For HF, EPA explained that the results were "less clear" but it still expected that "wet controls achieve better control of HF compared to dry controls because HF is quite soluble in water."[259] Again, EPA had similar HF emissions data during its earlier risk and technology review and has not explained how this results in a need to discontinue using PM as a surrogate.

Thus, it appears that EPA based its decision to add HCl and HF limits on more recent data that is actually consistent with historical data – and certainly does not constitute "developments in practices, processes, and control technologies" within the meaning of Section 112(d)(6).[260] Not only do the proposed revised standards lack grounding in anything that represents a "development," they are entirely *unnecessary*, as PM remains a viable, appropriate, and adequate surrogate for HCl and HF. EPA understood this to be the case in 2003 and again as recently 2020,[261] and it remains the case today. EPA has previously determined that PM is an adequate and appropriate surrogate for acid gas emissions and demonstrated in 2020 and again in 2023 that

[258] 88 Fed. Reg. at 30,926.
[259] *Id.*
[260] *See id.* at 30,923, 30,926-30,927.
[261] 84 Fed. Reg. at 50,664 ("The emission limits are in the form of PM limits, which are a surrogate for metal HAP emissions as well as for HCl and HF for indurating furnaces.").

the existing PM standards for the taconite industry provide an ample margin of safety.[262] This has not changed, and EPA provides no explanation for why a change in the use of PM as a surrogate would be necessary.

Because there have been no "developments" to warrant revision under Section 112(d)(6), EPA should not finalize the numerical limits proposed for acid gases. This is even more the case when, as with this source category, EPA has determined that the risk to human health is well below acceptable levels set by Congress and the current standards are protective of human health with an ample margin of safety. Even more, while the proposed standards would not reduce risks in any material way, compliance with the standards would impose a significant financial burden.

D. EPA has not met its burden of demonstrating that a revision of the standards is "necessary" under Section 112(d)(6).

When faced with a "development" within the meaning of Section 112(d)(6), EPA is called upon to revise emission standards "as necessary." Here, EPA has not established that a revision to emission standards is "necessary." Tellingly, while EPA asserts that its proposal is consistent with its authority under Section 112(d)(6) to take "developments in practices, processes, and control technologies into account to determine if it is 'necessary' to revise the MACT standards,"[263] the agency never goes on to explain *why* any such revision is "necessary." Indeed, EPA is completely silent on the issue – a classic example of arbitrary and capricious action for failing to consider an important aspect of the problem and a failure under Section 307(d) to explain the basis for EPA's decision in this regard. It does not even attempt to satisfy the *State Farm* standard.

In any event, EPA's actions in a Section 112(d)(6) rule revision of this nature should be limited to situations where the change will at least make a material difference to the environment and where the cost justifies that improvement to the environment. Here, however, EPA is proposing to abandon a two-decade-old practice of allowing PM to be used as a surrogate for acid gases which even the most current data reflect remains appropriate. EPA has known that grate kilns processing hematite ore to produce fluxed pellets with dry controls involve a different type of process (which would likely have higher acid gas emissions, as has been confirmed through data EPA already had for the last twenty years), and there has been no demonstration that a change to how HCl and HF are regulated is necessary now.

Even if EPA were to make the case that a change in course is necessary to address the grate kilns processing hematite ore and dry controls, EPA should target those units specifically, by analyzing (as the statute intends) the units *within the subcategory—which here, is Tilden.* EPA should not require the entire industry to face unnecessary compliance costs without commensurate benefits in terms of risk and emission reduction. EPA's own statements in the preamble reflect that it does not expect any of the other units except Tilden to add pollution control equipment to address HCl and HF emissions. The only EPA-expected reduction in emissions would come from the two Tilden units, yet all of the 16 other units will be required, under the proposal, to conduct stack testing at least twice every five years and also to continuously monitor and control the pH levels

[262] *See* 88 Fed. Reg. at 30,928.
[263] 88 Fed. Reg. at 30,926.

in the water used in the wet scrubber to demonstrate compliance, which is not a current practice at most indurating furnaces and could lead to unavoidable negative environmental impacts (not currently addressed by the proposal).

These are significant burdens and carry the potential for violations because of the very limited dataset used to establish the standards and because the known variability of chloride and fluoride content in the raw materials and ore used in the production of pellets can cause HCl or HF emissions to spike during a compliance test. EPA has not met its burden of demonstrating that there will be any meaningful risk reductions or that a change from using PM as a surrogate to individual HCl and HF emissions limits is "necessary." EPA must therefore withdraw and reconsider its proposed approach for addressing HCl and HF emissions from indurating furnaces.

E. EPA should ensure that the expected additional environmental benefit is worth the burdens of compliance when only one facility is expected to add new controls.

EPA provides no reasoned explanation for its proposed switch from using PM as a surrogate to specifying new numerical limits for these acid gases – which would require costly additional controls and testing – and certainly does not establish that this change would effectuate a health benefit not already being achieved through existing PM-based limits. The D.C. Circuit has made clear that EPA cannot "impose costly obligations on regulated entities" without regard to the extent to which public health and welfare would be protected and enhanced.[264]

The proposal identifies a potential reduction of 713 tons of HCl from the proposed new emission limits. It anticipates that this level of reduction would occur based on control technology added to the two Tilden units. This level of reduction is tied to baseline emissions calculated based on the 2022 HCl stack test from one of the two Tilden units and the proposed new emission limits for HCl and HF that are based on the six best-performing units in *other* source categories not applicable to the Tilden units. EPA has, in error, attempted to set a MACT standard for the grate kilns processing hematite ore and controlling with dry ESPs based on emission test results from units not within the same subcategory and with expected and known lower emissions because they process magnetite ore and utilize wet scrubbers. Even if those lower rates were achieved, however, EPA's own analysis demonstrates that no meaningful difference in health protection would be

[264] *Chem. Mfrs.' Ass'n v. EPA*, 217 F.3d 861, 866-67 (D.C. Cir. 2000) ("The Clean Air Act's purpose is '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,' 42 U.S.C. § 7401(b)(1), constrained of course by section 112(i)(3)'s explicit concern over practicability. . . . We think it unreasonable for the Agency to have interpreted the phrase 'compliance as expeditiously as practicable' as requiring it to impose costly obligations on regulated entities without regard to the Clean Air Act's purpose."). *See, e.g., U.S. Nat'l Bank of Oregon v. Independent Ins. Agents of Am., Inc.,* 508 U.S. 439, 455 (1993) ("Over and over we have stressed that '[i]n expounding a statute, we must not be guided by a single sentence or member of a sentence, but look to the provisions of the whole law, and to its object and policy.'") (*quoting United States v. Heirs of Boisdore,* 49 U.S. (8 How.) 113, 122 (1850)). As the Court said in *Continental Air Lines, Inc. v. DOT,* "the critical point is whether the agency has advanced what the *Chevron* Court called 'a reasonable explanation for its conclusion that the regulations serve the ... objectives [in question].'" 843 F.2d 1444, 1452 (D.C. Cir. 1988) (quoting *Chevron, U.S.A., Inc. v. Nat. Res. Def. Council, Inc.,* 467 U.S. 837, 863 (1984) (alteration in original). Here, EPA has failed to do so. *See also*, *e.g.*, *Dole v. United Steelworkers of Am.,* 494 U.S. 26, 37 (1990) (rejecting agency's interpretation of a statute where "none of Congress' enumerated purposes would be served").

achieved, especially given that the current standards have been found to be health-protective with an ample margin of safety.

Additionally, while imposing additional limits and compliance burdens on units processing magnetite ore and using wet scrubbers, EPA is not expecting any emission reductions or benefits from these units. The burden is exacerbated because EPA proposes to set the HCl and HF limits so low that units that have tested close to the new limits could need to expend funds to create a compliance margin because the proposed limits are largely attributable to the inappropriately *limited* dataset used to establish the proposed limits that fails to account for the wide variability in emissions that can occur based on the type of pellets being produced (*e.g.*, whether limestone, bentonite, or dolomite is added and what the chloride content level might be and also whether the unit is a straight grate or kiln grate, two existing, distinct subcategories that the proposal to date fails to acknowledge, much less address). EPA goes on at length in the proposal about whether it should subcategorize based on kiln type and fuel type. This is truly remarkable in that EPA never once acknowledges in the proposal that it *already has subcategorized* based on these very factors.[265] More than remarkable, EPA's reversal of course, without any explanation, is impermissible: "[W]hen, for example, [an agency's] new policy rests upon factual findings that contradict those which underlay its prior policy . . . [i]t would be arbitrary or capricious to ignore such matters. In such cases it is not that further justification is demanded by the mere fact of policy change; but that a reasoned explanation is needed for disregarding facts and circumstances that underlay or were engendered by the prior policy."[266]

In 2003, EPA determined that "[e]stablishing separate standards for acid gases would impose costly and significantly more-complex compliance and monitoring requirements" and EPA currently estimates that the cost to industry would be approximately $1 million per year – with no associated environmental benefit, and, as industry predicts, perhaps some adverse environmental impacts not yet taken into account by the agency.[267]

EPA cannot justify the burden it is attempting to impose on seven facilities when HCl and HF are well controlled and the associated health risks are insignificant.

F. If EPA nevertheless finds that there has been a development warranting revised standards, because EPA currently has insufficient data upon which to establish such standards, it must amend its proposed revised standards to account for known gaps in data.

1. The current dataset, limited to 2022 stack testing, is too small.

Any conclusion that a "new development" necessitates a significant revision of the HCl and HF standards would be legally flawed because it would be based on an impermissibly limited dataset.

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[265] 88 Fed. Reg. at 30,923; *see FCC v. Fox Television Stations, Inc.,* 556 U.S. 502, 514-15 (2009) ("To be sure, the requirement that an agency provide reasoned explanation for its action would ordinarily demand that it display awareness that it *is* changing position. An agency may not, for example, depart from a prior policy sub silentio . . .. And of course the agency must show that there are good reasons for the new policy.").

[266] *See FCC*, 556 U.S. at 515-16.

[267] 68 Fed. Reg. at 61,884; 88 Fed. Reg. at 30,927.

The dataset on which the proposal relies is so limited that it entirely fails to reflect expected operational and seasonal variability. The proposal also fails to consider the impact of raw materials inputs on the test results–*e.g.*, HCl and HF emissions from wet-controlled units may have been impacted by the lower fluoride and chloride content of the ore and other raw materials being fed into the indurating furnaces at the time of testing.

In addition, even if not otherwise flawed, EPA's conclusion that the limited dataset shows that "wet venturi scrubbers *consistently* achieved lower HCl emissions compared to the furnaces using dry ESPs" is not appropriate because there is only *one* stack test available for the indurating furnaces using dry ESPs.[268] Because there was data from only one stack test from one furnace using this dry ESP technology on a single day, EPA lacks a reasonable (or sufficient) level of certainty as to what level of HCl emissions indurating furnaces with dry ESPs actually are emitting on a *consistent basis, i.e.*, what the "top performers" are actually achieving. Moreover, while EPA seems focused on distinguishing between the two grate kilns that process hematite and produce fluxed pellets with dry ESP controls and all of the other units processing magnetite and utilizing wet scrubbers, it is setting limits that could be difficult even for the magnetite/wet scrubber units to meet because the dataset is so small and is an average, meaning that, even with the upper prediction limits (UPL) being used, some units using the specified controls will inevitably face compliance challenges. EPA should not move forward with HCl and HF limits based on such limited data that does not take into account these variables.

EPA has also not accounted for the fact that, if limits are needed, separate limits are appropriate for each type of kiln and its ore, which is why EPA established subcategories back in 2003. EPA should most certainly not be establishing limits for units within a subcategory based on the emission test results for non-similar units from another subcategory as it proposes to do here. EPA has long recognized the difference in process between units processing magnetite ore and grate kilns processing hematite ore. EPA has not demonstrated any need to change these subcategories – and indeed has failed to recognize that they exist at all. Such revisionist history as the basis for a new rulemaking is the quintessential example of arbitrary and capricious agency action. Given the limited dataset available, and given that EPA has failed to take into account existing subcategories when developing the proposed HCl and HF emission limits, EPA should withdraw its proposal and continue with the PM surrogate approach.

2. The analysis does not take into account raw material or seasonal or operational variability.

As EPA explains in the proposal, HCl and HF emissions are formed "when chlorine and fluorine compounds are released from the raw materials during the indurating process and combine with moisture in the exhaust stream."[269] Thus, the amount of chlorine or fluorine present in the raw materials entering the indurating furnace (rather than a difference in the effectiveness of wet versus dry control technology) could account for differences in acid gas emission from one unit to the next. But EPA does not appear to have considered an important aspect of the problem: whether other non-technology factors, such as differences in raw materials on a given day, might explain

[268] 88 Fed. Reg. at 30,926 (emphasis added).
[269] *Id.* at 30,921.

the difference in HCl emissions observed at the furnaces included in the 2022 ICR. To ascertain this, EPA would need to consider raw materials inputs *and* coinciding acid gas emissions – which it has not done.

When proposing these HCl and HF standards, EPA does not attempt to identify any unique characteristics of the Tilden facility other than to note it uses a dry ESP. The type of raw materials used and pellet types produced are also important considerations, yet they go unnoticed by EPA. The Minnesota Pollution Control Agency noted in a report prepared some years ago, which EPA relied upon in the initial MACT rulemaking, that units using fluxstone to produce fluxed pellets could have higher HCl and HF emissions due to different processes and raw material characteristics. MPCA stated the "breakdown of the fluxstone during the induration process often leads to increased emissions of hydrogen fluoride and hydrogen chloride."[270] EPA must take into account all of these variables before setting standards that may not be achievable even by the best performers that provided the data used to set the standard. EPA should finalize its *LEAN*-required rule provisions and withdraw this aspect of the proposal until it has an opportunity to gather and assess this type of information and use it to inform its decision-making when establishing HCl and HF emission rates if deemed necessary. EPA could also postpone issuing a final rule on this aspect of the proposal, but in any case, it would need to address the numerous flaws in the data analysis and dataset, to obtain public input, and to meet its Section 307(d) obligations.

In the same vein, all of the stack tests EPA used to set the acid gas standards were conducted in 2022 and cover only 16 days of operation for the entire source category, as shown in Table VIII.1, below. EPA has yet to explain how such a limited dataset could represent the emission rates achieved by the best-performing sources under the full range of operating conditions. Because this limited dataset is not representative of the factors influencing acid gas emissions and potential sources of variability, industry is concerned that even the "best-performing" units that use wet scrubbers may not be able to meet the proposed standards "every day and under all operating conditions" as the agency presumes.

Table VIII.1 Summary of 2022 ICR Stack Testing for Indurating Furnaces

Facility	# of Furnaces	# of Furnaces Tested for Acid Gas Emissions	Data points in MACT Floor Pool	Test Dates
Keetac	1	1	3	*EU030 has 1 stack* EU030 – SV051 – 5/3/22 and 5/4/22
Hibbing Taconite	3	1	3	*Line 1 has 4 stacks* Line 1 – SV022 & SV024 – 5/10/22 Line 1 – SV021 & SV023 – 5/11/22
Minntac	5	2	6	*Line 5 has 1 stack* Line 5 – SV127 – 5/17/22, 5/18/22 *Line 7 has 2 stacks* Line 7 – 1 stack – 5/19/22
United Taconite	2	1	6	*Line 2 has 2 stacks*

[270] 2002 Background Information Document, Proposed Rule at 2-4; *see also* Minnesota Pollution Control Agency, *Taconite Iron Ore Industry in the United States - A Background Information Report for MACT Determination, for EPA Order No. D-6226- NAGX* (Dec. 1999), EPA-HQ-OAR-2017-0664-0034.

				Line 2 – SV048 & SV049 – 3/15/22, 3/16/22 (fuel = coal/gas) Line 2 – SV048 & SV049 – 3/16/22, 3/17/22 (fuel = natural gas)
Minorca	1	1	3	*EU026 has 4 stacks* EU026 – SV015 & SV016 – 8/30/22, 8/31/22 EU026 – SV014 & SV017 – 9/2/22, 9/6/22
Northshore	4 (3 idle)	0	0	NA
Tilden	2 (1 idle)	1	0*	*EUKILN1 has 2 stacks* EUKILN1 – North & South stacks – 6/13/22

As reflected in the table above, the dataset is limited to stack tests conducted between March 15, 2022, and September 6, 2022, which is less than a full year of data for the furnaces with wet controls. EPA has explained that "it is important to account for seasonal variations and examine data covering *1 year or more* to account for variability due to differences in ventilation rates, weather conditions, and changes in the process over time."[271] Because it does not cover a reasonably long period of time, the underlying dataset does not represent or provide a basis to approximate the emissions over the *full expected range* of operating conditions experienced by the best-performing sources. Critical elements of the UPL approach such as the determination of the data distribution, t-statistic, variance, and mean are dependent on sample size.[272]

Yet EPA proceeded to calculate UPLs using this limited data, claiming that the UPL approach "accounts for the variability of the performance during testing conditions."[273] Applying the UPL to too limited of a dataset, while an improvement, still fails to account for the under-representation inherent in such a limited underlying dataset. In other words, the same UPL approach, when applied to an appropriately larger dataset that is more representative of actual performance variation and testing conditions would produce *different* numerical limits. For instance, when HCl and HF emissions are driven predominantly by the chloride or fluoride content in the iron ore, it seems very unlikely that the full range of variability in those inputs would be experienced at a given furnace during a single stack test with individual test runs conducted over the course of a couple of days.[274] Industry Commenters also note that geological variation would not be reflected in the data for an individual furnace because the three test runs for a single stack test are typically conducted on the same day or over the course of a couple of days if there are multiple stacks. With chloride and fluorine compounds impacting exhaust streams,[275] as explained in Barr Engineering's Geology Report included as Appendix 6 and in Section VII above, it is well recognized in the

[271] EPA, *National Emission Standards for Hazardous Air Pollutants: Integrated Iron and Steel Manufacturing, Final* Rule, 68 Fed. Reg. 27,646, 27,655 (May 20, 2003) (emphasis added).
[272] Memorandum from David Putney, Office of Air Quality Planning and Standards, U.S. EPA. to Docket ID No. EPA-HQ-OAR-2017-0664 regarding *Approach for Applying the Upper Prediction Limit to Limited Datasets*, at 2 (Feb. 2023), EPA-HQ-OAR-2017-0664-0264.
[273] *See* EPA RTR of Acid Gas Controls Mem., at 3.
[274] *See, e.g.*, 88 Fed. Reg. at 30,921 ("The acid gases include HCl and HF and are formed when chlorine and fluorine compounds are released from the raw materials during the indurating process and combine with moisture in the exhaust stream.").
[275] *See id.*

scientific community and by the agency that geological makeup can vary throughout a single mine, producing raw materials with different compositions and characteristics.

Thus, EPA should, in the proper exercise of its discretion, only propose limits that account for the potential variation that could reasonably be anticipated to be reflected in a more representative dataset over a reasonably long period of time to account for raw material as well as seasonal and operational variation. This is especially true for units that EPA does not anticipate would install new control technology yet may bump up against or even exceed the emission limit based on normal variabilities. Indeed, failing to do so would be improper and unsustainable. Because the proposed limits are based on a limited dataset, and EPA has not taken these variations and resulting fluctuations in emissions into account, new HCl and HF emission limits cannot legally be issued at this time. The current use of PM as a surrogate for acid gas emissions must continue.

G. EPA should not start from scratch and recalculate the MACT floor for HCl or HF because it has already established floors for the types/classes of units and determined MACT limits.

EPA does not state that it is starting from scratch to set a MACT floor for HCl and HF, but that is effectively what it proposes. The D.C. Circuit has addressed this issue on a number of occasions and has been very clear that in a Section 112(d)(6) technology review, EPA should not ignore existing limits or proceed as if it had never established MACT before. The current proposal for HCl and HF ignores existing classes and types of sources with separate emission limits that were well established and have been in place for more than 20 years. After disregarding those factors, EPA proposes to apply its usual formula for calculating an across-the-board MACT limit, although it references data from six instead of five units as its top performers—all of which process magnetite ore. EPA then proposes MACT limits for HCl and HF to apply across the board, including, and primarily intended to apply to, the grate kilns processing hematite ore.

As discussed previously, in 2002-2003, EPA established separate limits for grate kilns processing hematite, which also use dry controls, due to a number of factors including air flow direction and rates, the perpetual motion of the pellets inside the kiln, the fineness of the hematite, and the tendency for the pellets to break, as well as the production of fluxed pellets that use limestone/dolomite containing chloride. EPA has not recognized these prior actions in the current proposal, which itself is a failure of reasoned decisionmaking, much less has EPA explained why it is changing course. Whether a change in a particular EPA approach is permissible is an issue that courts will judge based on the explanation, but the failure to propose any explanation or even to acknowledge that a turn on the racetrack (such as conflating different types of kilns that have always been treated separately under the NESHAP) is occurring does not require judgment—it is simply not permissible under *State Farm*. Going forward, if standards are indeed "necessary," EPA should base the emission limits on emission rates of units of the type and class at issue. EPA must withdraw its proposal until it makes a determination, subject to an opportunity for comment, that the current classes and types of kilns that have long served as the basis for PM and acid gas limits are no longer valid or otherwise are inappropriate to utilize.

H. If EPA proceeds with separate HCl and HF standards, based on the limited available data, it should do so based on the existing classes and types of units with needed upward adjustments.

As explained above, based on data that EPA has had available to it since at least 2002-2003 and confirmed by more recent data that became available in 2017-2018 and in 2022, grate kilns processing hematite producing fluxed pellets using dry ESPs for control tend to have higher HCl emissions than those units processing magnetite and controlled with wet scrubbers. Because EPA has already seen fit to distinguish among the types of units in setting MACT, EPA should make independent determinations as to whether new standards are necessary for each type, and if so determined, it should base the standards on emission rates for units of that particular type.

EPA proposes limits intended to reduce emissions only from the grate kilns processing hematite, so EPA should, if deemed necessary, propose HCl and HF limits that would apply only to that type of unit and based only on emissions from those units—as it did for the 2003 PM limits. Any newly proposed limits applicable to grate kilns processing hematite should take into account the emission rates and characteristics of those units alone. Such limits should not be based on emission rates for units of other types utilizing other control technology, processing different types of ore, using different raw materials, and/or producing different types of pellets, as EPA has done in this rulemaking. Instead of considering emissions reflective of units processing magnetite, EPA must base the MACT standard specific to grate kilns processing hematite. Because EPA has not undertaken the appropriate emissions analysis on a class/type basis and has proposed HCl and HF limits that are not reasonable for grate kilns processing hematite, the HCl and HF limit proposals should be withdrawn at this time. EPA can still meet its *LEAN* obligations—these limits are not required to satisfy *LEAN*.

As noted earlier, EPA has long recognized that units processing magnetite and using wet scrubbers are well controlled for HCl and HF and has not attempted any justification for rejecting the current use of PM as a surrogate. Yet, EPA has proposed HCl and HF emission limits and has made it clear that it expects no emission reductions. Without emission reductions, EPA has failed to demonstrate that the standards would be "necessary" and is imposing significant costs for demonstrating compliance and continuously monitoring and controlling pH levels in its scrubber water – without any benefit to the environment. Because EPA has recognized that the units within this source category are well controlled for PM and acid gases and because of the significant compliance burden without any benefit, EPA should withdraw its proposal to establish HCl and HF emissions. If EPA were to move forward with its proposed limits applicable to units processing magnetite regardless of these sound reasons against doing so, EPA should make an adjustment to the limits for additional compliance flexibility, especially given the discretion EPA has under Section 112(d)(6), given the limited dataset upon which it has available, and given the variability in emissions that can result from the chloride and fluoride content of the ores and raw materials used and the types of pellets produced.

I. EPA inappropriately assumes dry sorbent injection is feasible by overestimating its control efficiency for units using a dry ESP, in turn resulting in significant understatement of compliance costs.

a) EPA overstates DSI's removal efficiency for HCl and HF from grate kilns processing hematite and already equipped with dry ESPs.

The preamble states that EPA expects that, in order to meet the proposed HCl limit, new add-on control technology will be needed for only two furnaces (out of the 18 total furnaces in the taconite iron ore processing source category), which are the two Tilden grate kilns processing hematite units. Of course, as discussed above, these units are in their own subcategory, so they are the best performers. EPA has failed to conduct an analysis for this subcategory under Section 112(d)(6). Section 112(d)(6) states that EPA is to review and revise as necessary the emission standards issued every 8 years. Here, the emission standards were issued based on the separate source subcategories, yet EPA reviews them as if there was a single category. This too is impermissible.

From a technical perspective, EPA has assumed that the Tilden facility could install a new DSI system as a retrofit that would complement the existing dry ESP to achieve a 79 percent reduction in emissions, which would be needed to meet the proposed HCl limit based on the 2022 stack test data for one of the two Tilden furnaces.[276] EPA's assumed 79 percent control efficiency for DSI retrofit technology is unrealistic and without technical basis. As explained in more detail below, the maximum reduction achievable may be only 60 percent, compared to the 79 percent that EPA has assumed. A 60 percent reduction would not allow the Tilden units to meet the proposed MACT limit. In addition, the use of DSI may not be technically feasible at Tilden in any event, as is also explained in more detail below.

The Energy Information Administration estimates that DSI technology used in conjunction with an ESP can achieve a 60 percent HCl removal.[277] Removal efficiencies are significantly lower for dry ESPs compared to fabric filters. With fabric filters, sorbent filter cake builds up on filter bags, maximizing gas/sorbent contact time and providing an additional opportunity for acid gas absorption. Because ESPs have no filter bags, there is no similar opportunity for maximizing gas-sorbent contact time.

Also, the removal efficiencies at Tilden are likely to be lower because the stack gas concentration of HCl starts at a relatively low value. While the Tilden furnaces have a higher HCl concentration than the other furnaces in the other two subcategories, its concentrations are very low in comparison to other source categories that apply DSI. When the concentrations are higher, the removal efficiency rates also tend to be higher because the HCl reaction kinetics will be much faster. When the concentrations are lower, the reaction kinetics are also slower. For example,

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[276] Memorandum from David Putney, Office of Air Quality Planning and Standards, U.S. EPA, to Docket ID No. EPA-HQ-OAR-2017-0664, regarding *Development of Impacts for the Proposed Amendments to the NESHAP for Taconite Ore Processing*, at 10, tbl. 5-4 (Mar. 21, 2023), EPA-HQ-OAR-2017-0664-0257 (EPA Development of Impacts Memo).

[277] U.S. Energy Information Administration, *Today in Energy: Dry sorbent injection may serve as a key pollution control technology at power plants* (Mar. 16, 2012), https://www.eia.gov/todayinenergy/detail.php?id=5430 (last visited July 7, 2023).

where medical waste incinerators use DSI with a fabric filter with HCl concentrations ranging from 575 to 1,250 ppm, EPA's assumption of achieving a 79 to 80 percent removal efficiency may be valid.[278] Similarly, a coal-fired power plant with HCl concentrations in the range of 200 ppm and using DSI with an ESP may also be able to achieve an efficiency in the 70 to 80 percent range.[279] In contrast, HCl concentrations from Tilden's indurating furnace exhaust were approximately 25 ppm during the 2022 stack test, orders of magnitude below what incinerators and coal plants experience. The associated removal efficiency would be similarly lower, and it is not known how effective DSI could be at such low HCl concentrations. As inlet pollutant concentrations decrease, the effectiveness of a control device will deteriorate accordingly. Thus, the use of DSI with dry scrubbers on the Tilden furnaces with their low HCl concentrations would not reasonably be expected to result in a control efficiency of much over 60 percent due to the slower reaction kinetics, which is significantly lower than EPA's assumed 79 percent. At this removal efficiency, the Tilden furnaces would not be capable of meeting the proposed HCl limit, at least based on the recent stack test results.

In addition to concerns with removal efficiencies, EPA has undertaken no evaluation to determine if a retrofit is possible at Tilden. EPA has not considered whether there are appropriate ducting lengths or suitable injection locations to provide sufficient residence time and mixing of the waste gas with the DSI sorbent at the Tilden facility.[280]

While EPA has assumed a 79 percent removal efficiency to ensure that the Tilden units would comply with the proposed HCl emission limit, a higher removal efficiency may actually be needed. The 79 percent removal rate is based on an assumption that emissions in the future will be similar to the emissions one of the two Tilden furnaces experienced during a single stack test within a three- or four-day period in 2022. Because the acid gas emissions from the Tilden furnaces may vary significantly based on a number of different factors including the chlorine content of the ore and other raw materials used to produce certain types of pellets and could therefore be higher during future stack tests, a control efficiency higher than 79 percent may be needed to ensure compliance with the proposed HCl emission limit. To achieve a removal rate of at least 79 percent and be certain to reach a higher removal rate, Tilden would need to replace its existing dry ESPs with wet scrubbers.[281] By replacing its existing control technology with completely new

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[278] *See, e.g.,* Gerald Hunt & Melissa Sewell, *Utilizing Dry Sorbent Injection Technology to Improve Acid Gas Control*, 34th International Conference on Thermal Treatment Technologies & Hazardous Waste Combustors, Houston, TX (Oct. 20-22, 2015), https://www.sorbacal.com/sites/default/files/downloadcenter/utilizing_dry_sorbent_injection_technology_to_improve_acid_gas_control.pdf.

[279] *See, e.g.*, Presentation of Howard Fitzgerald, LHoist North America, *Hydrated Lime DSI – Solution for Acid Gas Control (SO3, HCl, and HF)* (July 19, 2012), https://cdn.ymaws.com/www.icac.com/resource/resmgr/icac_regulatory_resources/lhoist_presentation_marama_w.pdf.

[280] Also remarkable here is that EPA proposes this requirement as redundant controls, even though it is not compelled by any case or statutory provision to make these changes and risk is well below acceptable levels. EPA's failure to explain its reasoning for forcing this requirement given the lack of any need to do so is also legally impermissible.

[281] As noted in the Mercury Removal Technical Memorandum included as Appendix 3, industry does not consider baghouses to be technically feasible for taconite iron ore indurating furnaces.

technology, Tilden would lose the value of its assets while also incurring an enormous expense, which EPA has entirely failed to take into account. This too is arbitrary and capricious.

b) Because a new wet scrubber would be needed for Tilden to meet the proposed HCl and HF standards, EPA underestimates the total capital and annualized costs and the cost-effectiveness for compliance with its proposed standards as well as associated environmental impacts.

When estimating the cost for the Tilden furnaces to comply with the proposed HCl emission limit, EPA assumes that the furnaces could use dry sorbent injection technology with the existing dry ESPs. EPA projected a total capital cost for installing add-on DSI controls at $1,070,207 and annual costs at $1,382,260.[282] Because DSI is not technically feasible to reduce acid gas emissions sufficiently to meet the proposed limit, as explained above, Tilden would likely need to replace its existing ESPs with wet scrubbers. Based on preliminary industry estimates, the total capital costs to replace the existing ESPs at Tilden with wet scrubbers would range from $88 to $172 million in total capital costs and $24 to $46 million in annual costs.[283] EPA must take into account these higher costs when determining the reasonableness of its proposal, which is particularly important given that EPA is revising the emission limit under Section 112(d)(6).[284]

With an estimated removal of 713 TPY of HCl through the use of new add-on air pollution control technology at Tilden, and an estimated annual cost of $1,382,260, EPA calculated a cost-effectiveness rate of $1,939 per ton of HCl reduced.[285] Because the Tilden units cannot be controlled with DSI as explained above and would need to replace current DSI units with entirely new, more expensive wet scrubber technology, the cost-effectiveness rate derived by EPA is not accurate. EPA must take into account the costs of replacing the existing ESP equipment with wet scrubber technology and recalculate its cost-effectiveness rate. If we assume industry's preliminary ranges of costs and the same removal rate of 713 TPY of HCl, the cost-effectiveness rate would range between $33,661 and $64,516 per ton of HCl removed. Because these cost-effectiveness rates are well above levels that EPA has found reasonable in the past for a beyond-the-floor or Section 112(d)(6) HCl MACT, EPA needs to withdraw its proposed amendments.

As one recent example, when EPA considered a beyond-the-floor MACT for additional HCl removal for lime kilns in January 2023, EPA found that a cost-effectiveness rate of $4,300 per ton reflecting the removal of 491 tons of HCl per year at a cost of $7,500,000 per year was not reasonable.[286] Certainly a cost that is nearly ten times higher should not be reasonable.

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[282] EPA Development of Impacts Memo at 10.
[283] This range assumes twofold increases in order to account for the multiple lines at the facility.
[284] *Ass'n of Battery Recyclers, Inc. v. EPA*, 716 F.3d 667, 673-74 (D.C. Cir. 2013) (per curiam) (explaining that EPA was permitted to consider cost in revising emissions standards for secondary lead smelting facilities under CAA § 112(d)(6)).
[285] EPA Development of Impacts Memo at 10.
[286] EPA, *National Emission Standards for Hazardous Air Pollutants: Lime Manufacturing Plants Amendments*, Proposed Rule, 88 Fed. Reg. 805, 811 (Jan. 5, 2023).

Industry also noted that, when EPA estimated the DSI-related costs, it made similar assumptions to those it made when estimating the costs of mercury controls. As explained in more detail in Section VI.A above, EPA made several inappropriate or incorrect assumptions in its mercury-related analysis that led to underestimations of costs, and it is making similar inappropriate or incorrect assumptions for the HCl-related analysis. For example, EPA used air flow rates recorded during stack tests to estimate capital costs rather than the maximum potential air flow rates, and the higher, maximum potential air flow rates could increase costs for the system. As another example, EPA underestimates labor costs, interest rates, and waste disposal costs. EPA's cost estimates are also low compared to vendor quotes which are more accurate in estimating costs and would reflect current reagent pricing (*e.g.*, hydrated lime can cost closer to $250 per ton rather than EPA's estimated cost of $150 per ton). To avoid underestimating costs that would be incurred by industry, EPA must make every effort to be as thorough and as accurate as possible, and this is particularly important if EPA moves forward with a proposal that would require Tilden (or any other facilities) to install new wet scrubbers.

In addition to taking costs into account, EPA should consider potential environmental impacts associated with any technologies that would be used. For example, EPA did not consider that the use of DSI technology in conjunction with existing dry ESPs at Tilden could result in incremental increased PM emissions. Similarly, EPA did not consider impacts from converting to wet scrubbers, such as increased water use and increased sulfate loading to nearby waterbodies.

Until EPA is able to fully assess the costs and environmental impacts associated with the use of wet scrubber technology, EPA must withdraw its current proposal related to HCl and HF emissions. If EPA's analysis confirms a cost-effectiveness rate similar to that estimated by industry, then the controls would not be cost effective, and EPA should not finalize the emission limits. EPA should instead maintain the use of PM emission limits as a surrogate for HAPs including HCl and HF.

J. If EPA moves forward with the HCl and HF limits as proposed instead of maintaining PM as a surrogate, it should nevertheless not impose unreasonable compliance burdens on facilities.

1. The proposed pH monitoring is not supported by data.

EPA proposes to add a requirement to maintain a daily average pH greater than or equal to the operating limits established in the most recent performance test for HCl and HF using a wet scrubber, including the wet scrubbers currently in use. There is, however, no established correlation between pH and acid gas emissions. There are no short-term pH data derived from any stack tests, nor any long-term data, establishing any correlation between pH of the scrubber water and actual acid gas emissions to be made. In addition, some furnaces do not have pH monitors, and, even if they did, there are no systems in place to control the pH. EPA should also take into account that there are adjustments to material inputs, pellet type (flux v. acid v. direct reduced (DR)), and other operational variability that may affect acid gas emissions where there is also no pH data to correlate to acid gas emissions.

At the same time that EPA is proposing that all facilities using wet scrubbers begin controlling the pH levels in their wet scrubber water, it also proposes that the facilities install ACI with high efficiency wet scrubbers to control mercury emissions. There is no technical information provided as to how EPA believes facilities would measure pH, let alone control pH. Because the current air emissions controls will be replaced, this provides even more uncertainty as to whether there is any correlation between pH and acid gas emissions because there is no data to support a correlation. This requirement should be stricken from the rule.

2. The pH meter calibration requirement is overly burdensome.

In its proposed 40 C.F.R. § 63.9632(g)(4), EPA added: "Check the pH meter's calibration on at least two points every 8 hours of process operation." If EPA finalizes a rule to monitor pH (despite the fact that EPA has not demonstrated a correlation between scrubber pH and acid emissions), EPA must recognize the calibration requirement is overly burdensome. First, EPA has not reviewed pH data from the industry, noting that some wet scrubbers do not even monitor pH, to determine what is an appropriate calibration frequency. Further, there are various types of pH monitors available to the industry and the manufacturers' recommendations should be followed rather than EPA's proposed every-8-hours-of-process-operation calibration requirement at a minimum of two points.

IX. Several Technical/Compliance Issues Need to be Addressed Before EPA Finalizes Any Regulatory Revisions.

The following comments address EPA's rule language and related preamble statements related to technical and compliance issues. They are intended to be helpful and to otherwise raise concerns with the proposal on these points. Providing these comments should not be interpreted as agreement with the proposed substantive emission limitations.

A. The maximum statutory period to achieve compliance is necessary.

The proposal states that the revised MACT limits for mercury, HCl, and HF that will require six out of the seven taconite iron ore processing facilities to install add-on retrofit control technology, affecting potentially fifteen different indurating furnaces. Companies will need *at least* the full three years to install and begin operating the new controls, all of which must be specifically designed for existing facilities. Indeed, the three years provided under Section 112(i)(3)(A) may not be sufficient, and the additional one-year extension available pursuant to Section 112(i)(3)(B) may also be sought in the future for the following reasons:[287]

[287] EPA should consider other mechanisms to provide for more time given the issues presented below, including an implementation structure similar to the Regional Haze Rule. 40 C.F.R. § 52.1235. There, due to the concerns noted above, for taconite facilities, EPA provided an alternative schedule for one furnace and two separate facilities to be installed each year, which allowed the limited resources to be used appropriately with lesser impact to the facility (due to over-stretched contractor abilities). The companies also reserve the right to seek a Presidential Exemption under Section 112(i)(4).

1. Due to the limited existing footprints of the indurating furnaces affected by these requirements, each facility will require significant engineering analyses and design work associated with long ducting and new building construction.

2. Due to the supply chain disruptions that have occurred for the past several years due to the pandemic, and which continue today, companies will unquestionably face long lead times to receive equipment once ordered. It is critical that the engineering analyses and design work be sufficiently complete before the work is commissioned, not merely because of the funds committed, but also because change orders will cause even further delay in the current supply chain-constrained environment.

3. The equipment that will be required to meet the standards is unique and there are a limited number of available technology providers to fulfill demand and provide the performance assurances to meet the standards. These providers will have demands from other customers (which have also faced supply chain delays for their own orders). EPA should reasonably expect that there will be a strain on capacity to provide timely delivery (as well as the design services) for each of the facilities needing new equipment.

4. The equipment is unproven technology that has not been installed on a taconite furnace. With these first installations, technology providers and the sites will need time to analyze the system performance, reliability, and compliance so future systems can be modified to better meet operational and regulatory requirements. This analysis will take time to observe all of the operating conditions including weather conditions and it should take place before the design and equipment purchase for other furnace lines to ensure that future installations will meet all requirements.

5. Installing the equipment will require shutdown of the equipment for at least some period of time. Installation work of this magnitude is typically aligned with major maintenance outages, which only occur 1-2 times annually. To meet the demand for taconite iron ore without disrupting the supply chain in the domestic economy for steel, the installation of controls will need to be staged with all other furnaces at the facility, and at other facilities within each company, to help maintain a stable supply to the market. The economic impact to companies that use the steel ultimately produced from taconite ore needs to be managed by avoiding multiple indurating furnaces experiencing downtime simultaneously.

6. Because (a) five facilities in Minnesota will all need to undertake installation of new control equipment in the same time period, (b) this work will coincide with already required routine maintenance that relies on outside skilled laborers, (c) there are a limited number of contractors and skilled laborers in the state, and (d) all of the facilities will be drawing from the same pool, the ability to obtain the skilled labor could lead to longer construction schedules. This is particularly so given the continuing impact of COVID-19 on the available workforce.

7. Major furnace maintenance outages routinely occur during the winter months, when pellet shipping via the Great Lakes is unavailable due to freeze up. Because shipping across the Great Lakes cannot occur during this time, pellet storage at the shipping docks becomes limited. Having to move these maintenance outages outside of these windows could result in downstream effects to the blast furnaces or put additional strain on already limited labor resources.

8. All of the taconite iron ore processing facilities are located in northern Minnesota and northern Michigan where the opportunity for construction activities is limited due to the harsh climate in the winter. The climate in this part of the country narrows the window when construction activities can reasonably occur, which also leads to more construction being undertaken during shorter time periods and potential gaps in construction and extended completion dates.

9. Obtaining required construction permits and operating permit revisions is time-consuming. Companies have found that permits become critical path items that often cause delays in the construction schedules. Permitting itself can take one to three years to complete, which when combined with the need to manage around the supply chain and weather issues, requires additional compliance time to be built into the process.

We are aware that EPA believes that the one-year extension under Section 112(i)(3)(B) is case-specific and therefore is not granted at the time a rule is finalized. Even so, we want to apprise EPA now that companies will need the additional year in order to complete installation of controls.

B. EPA should not impose unreasonable compliance burdens on facilities.

1. The proposed pH monitoring is not supported by data.

The proposal would require maintaining daily average pH at or above operating limits established in the most recent performance test for HCl and HF using a wet scrubber—including the wet scrubbers currently in use. But no established correlation between pH and acid gas emissions exists or demonstrated. There are no short-term pH data derived from any stack tests, nor any long-term data, that establish any correlation between pH of the scrubber water and actual acid gas emissions. In addition, some furnaces do not have pH monitors or pH control systems, so that facilities are not able to actively monitor or control the pH on those lines. Still other facilities utilize once-through scrubber water, which is not reasonably capable of pH control. Compliance requirements like this must be based on a direct correlation between the test conditions and emissions. A good example of this is temperature and destruction efficiency for a thermal oxidizer – the destruction of VOCs and temperature have a clear, proven, and direct correlation so using temperature as a compliance assurance mechanism is a frequent practice among regulators. Here, such a relationship has not been established and is not demonstrated in the rulemaking record. For this reason, this requirement should not be promulgated.[288]

[288] Moreover, it is important to take into account that there are adjustments to material inputs, pellet type (flux v. acid v. DR) and other operational variability that may affect acid gas emissions where there is also no pH data to correlate to acid gas emissions.

From a technical perspective, and even if pH were a correlatable compliance indicator, the proposed requirement to set the parametric limit at the lowest average pH of any of the three test runs is not reasonable. The outcome would be that facilities would need to "control" scrubber water to meet this arbitrary limit. Further, some facilities' scrubber water is part of their overall plant water system, so any chemical additions or pH control additions can affect a facility's entire water system. Therefore, any parametric requirement based on *water flow, which ensures solubility of acid gases, is sufficient.*[289]

At the same time that the proposal is to require all facilities using wet scrubbers to begin controlling the pH levels in their wet scrubber water, the facilities would be required to install ACI with high efficiency wet scrubbers to control Hg emissions. Because the current air emissions controls will be replaced, this further illustrates that EPA cannot be certain there will be any correlation between pH and acid gas emissions. For this reason as well, the proposed pH requirement should not be adopted.

2. The Method Detection Limit (MDL) should not be used for stack test results where the pollutant is reported as below the MDL.

Proposed 40 C.F.R. § 63.9621(d)(4) states:

> If any measurement result for any pollutant is reported as below the method detection limit, use the method detection limit as the measured emissions level for that pollutant when calculating the emission rate.

There is no basis for EPA to assume that emissions are at the detection limit simply because a below detection limit reading was obtained. EPA is aware that below detection limit (BDL) readings often mean that the compound is *simply not present*. EPA itself has adopted policies with BDL readings being assumed at *half* the MDL. At a minimum, EPA should adopt a half the MDL approach as a more reasonable method.

3. The pH Meter Calibration requirement is overly burdensome under proposed amendments to 40 C.F.R. § 63.6932(g)(4).

The proposed rule language in 40 C.F.R. § 63.9632(g)(4) would add the following text: "Check the pH meter's calibration on at least two points every 8 hours of process operation."

This requirement is of concern because, as discussed above, there is no demonstrated correlation between scrubber pH and acid emissions in the record and this calibration requirement would be overly burdensome. EPA has not reviewed taconite facility pH data, recognizing that some wet scrubbers do not even monitor pH, to determine an appropriate calibration frequency. Various types of pH monitors are available to industry, and manufacturer recommendations and engineering judgment should be available to determine the proper frequencies. Locking this type

[289] The proposal needs to have accounted for the need to address the entire water system in its cost estimates.

of burdensome requirement into rule language is inappropriate and fails to recognize that technology advancements could make the requirement obsolete as soon as the rule is issued. At a minimum this frequency requirement is arbitrary and unsupported by the record.

EPA should remove any proposed requirements for monitor for pH, and if retained, remove the calibration requirements in favor of a requirement for the company to establish a monitoring frequency in its procedures, which may be based on manufacturer recommendations or good engineering judgment. In the alternative, EPA could provide that sources could request alternative frequencies to be approved in a Title V permit, which may be granted by the permitting authority.[290]

4. Industry standards should be used to determine the mass of pellets.

In practice, pellet mass is measured prior to offsite shipment and later "trued-up" at the end of each month. The proposed rule language should be revised to clarify that measurements may be indirect and that pellet mass is calculated based on industry standards as shown below:

> **40 C.F.R. § 63.9621(d)(4):** During each stack test run, ~~measure~~ calculate the weight of taconite pellets produced and calculate the emissions rate of each pollutant in pounds of pollutant per long ton (lb/LT) of pellets produced for each test run.
>
> **40 C.F.R. § 63.9631(j):** If you elect to comply with the mercury limit in Table 2 to this subpart using emissions averaging in accordance with an implementation plan approved under the provisions in §63.9623(d), you must ~~measure~~ calculate and record the mass of taconite pellets produced each month by each furnace included in the emissions averaging group.

5. The approach to determining activated carbon injection rates needs to be revised because it is based on only limited stack testing.

The proposed rule language would require that activated carbon injection rate operating limits be based on injection rates at time of stack testing. First, this approach unreasonably ratchets the emission limitations because stack testing that demonstrates compliance always has emissions *below* the emission limitation in the rule. Where there is a correlation to the operating conditions during the performance test, by imposing those operating conditions as enforceable limitations, EPA would effectively be requiring a source to meet a more stringent standard than promulgated. For this reason, EPA should be using such conditions as indicators rather than limits, consistent with the approach in the Compliance Assurance Monitoring (CAM) rule, 40 C.F.R. Part 64.

Another concern is that such an approach does not take into account the need to adjust when production decreases. Industry would use less carbon during lower production, and compliance

[290] It is critical that such approvals not require separate EPA approval, given the time lag that would be involved. EPA can review any concerns during its 45-day review period for Title V permits.

with a daily average limit could become very problematic during days when a facility cut back on production or airflow for other operational reasons. The draft rule language would also require industry to maintain the daily "average carrier gas flow rate". The draft rule does not define what is meant by "carrier gas", whether it is the air used to inject the carbon or the process air flow rate before or after the scrubbers. The process air flow is based on the furnace operations to meet production and quality requirements. This air flow should not be limited. Both the injection air and the process air will contain high levels of carbon or particulate matter inhibiting operation of air flow monitors.

Alternatively, average activated carbon injection rate and average carrier flow rate could be proportioned based on taconite pellets produced during stack testing in order to provide the operational flexibility needed at lower production rates since the lower production volumes would generate lower mercury emissions.

6. Implementation plans for mercury emissions averaging should not require fuel information to be provided.

The draft rule language would require facilities to develop and submit an implementation plan if they wish to utilize mercury emission averaging to demonstrate compliance. The rules should not, however, require fuel information to be submitted as part of the implementation plan. This information on fuels is not needed. EPA has acknowledged that fuel usage is not a meaningful factor for mercury emissions and thus the record does not support including this as a requirement.

7. Several of the proposed stack testing requirements should be revised.

- The stack testing volumes (and related lengths) that would be required under the proposed rule language are excessive and unwarranted when normal stack testing volumes should be representative and sufficient. The final rule should keep runs to 60 minutes, which allows for less operational error to occur during testing.

- Performance testing for Hg/HF/HCl should be required every 5 years instead of every 2.5 years, especially if draft volume requirements are finalized, as this results in excessive run times that are not solely representative of performance.

- The proposal currently only allows for Method 29 or Ontario-Hydro for Hg stack testing. Method 30B should be included as another acceptable test method.

- The proposal would require that stack testing on all stacks be completed within 7 calendar days for furnaces with multiple stacks. A longer time to complete testing for multiple stacks is needed to accommodate process upsets as these may prevent completion within 7 days. At a minimum, the regulatory language should allow companies to notify the permitting authority that a longer time frame is needed, and companies should not be required to obtain approval/response, particularly given the time frames when testing has already begun. In other words, if testing takes longer, companies should not be at risk of

being required to retest nor should they need to submit a deviation report for "failing" to meet this unnecessary requirement.

C. EPA should provide alternative compliance mechanisms for the mercury standards.

As explained throughout these comments, EPA should not proceed with its current approach to the mercury standards for indurating furnaces. Even if EPA accepts these comments (as it should), the agency should maximize flexibility and minimize compliance costs, using concepts like emissions averaging (which were described in the proposal). Other concepts that could be incorporated to provide flexibility (particularly given that mercury is a persistent compound, rather than acute) that are consistent with the performance standard approach inherent to Section 112 include: (1) providing facilities an optional alternative to comply with the MACT standard via a total loading option (cap) which would allow a facility to manage production and meet MACT standards more cost-effectively and (2) provide that facilities under common control can over-control at a given facility and use those reductions to satisfy a portion of the compliance obligation for a sister facility. The second approach could be accompanied by a slight reduction in the limit in order to satisfy a court that MACT is still being achieved, whereas the compliance uncertainty associated with EPA's standards means that no such reduction is necessary under the first approach. As an example, in practical terms, a facility could calculate its mercury emission cap by multiplying the MACT mercury standard (lb of Hg/LT of pellets) by the facility's actual pellet production capability at the time of rule promulgation (long tons of pellets). This would result in an annual mass limit for the facility (based on a 12-month rolling sum) derived from the facility's actual operating levels, which is equivalent to MACT and would apply from that point forward. The facility's actual pellet production capability would be defined as the maximum 12-month production rate demonstrated anytime in the 10 years prior to rule promulgation.