STEEL MANUFACTURERS ASSOCIATION

SPECIALTY STEEL INDUSTRY OF NORTH AMERICA

June 21, 2022

<u>Via Regulations.gov Portal</u>

The Honorable Michael Regan
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Re: Comments from the Steel Manufacturers Association and the Specialty Steel Industry of North American on EPA's Proposed "Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Primary Ozone National Ambient Air Quality Standard," Docket No. EPA-HQ-OAR-2021-0668

Dear Administrator Regan:

The Steel Manufacturers Association ("SMA") and the Specialty Steel Industry of North America ("SSINA") (collectively, the "Electric Arc Furnace ("EAF") Steel Associations") appreciate the opportunity to submit these comments in response to the U.S. Environmental Protection Agency's ("EPA's" or "the Agency's") Proposed Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Primary Ozone National Ambient Air Quality Standard ("Proposed FIP").[1] As explained in the more detailed discussion that follows, while the EAF Steel Associations recognize and support efforts to address interstate transport of ozone precursors and facilitate more widespread attainment with the 2015 Ozone National Ambient Air Quality Standard ("2015 Ozone NAAQS"), we have significant concerns with the Agency's Proposed FIP – particularly as it relates to the iron and steel sector, and especially the EAF steelmakers that are a distinct and readily distinguishable subset of that sector.[2]

As these comments will highlight, EPA's own data demonstrate that steel industry NO_X emissions do not contribute significantly to downwind nonattainment or interfere with maintenance. The screening analysis through which the Agency determined that the iron and steel sector should be included in the Proposed FIP identified only a handful of steel manufacturing facilities, including just two EAF steel facilities, that EPA assessed <u>collectively emit</u> modest levels of NO_X which, based on EPA's modeling, then <u>collectively contribute</u> only incredibly miniscule levels of additional ozone at a handful of downwind monitors. Regardless of whether they are assessed individually or as a group, the NO_X emissions and downwind contributions that EPA modeled for EAF steel producers can, at most, be considered *de minimis* and trivial.

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[1] 87 Fed. Reg. 20,036 (Apr. 6, 2022).
[2] In addition to these comments, the EAF Steel Associations participate in and joined the comments submitted by the Air Stewardship Coalition ("ASC") and the Midwest Ozone Group ("MOG"). SMA and SSINA each also provided testimony at EPA's April 21 hearing on the Proposed FIP.

Nearly all the iron and steel sector facilities (and sources within these facilities) that EPA linked, via modeling, to downwind monitors are integrated steel facilities that produce steel from iron ore using blast and basic oxygen furnaces – and not EAF steelmaking facilities, which produce steel from scrap metal using electrical energy. EAF steel producers and integrated iron and steel facilities have completely different processes, characteristics, equipment, emissions profiles, Clean Air Act ("CAA") regulations, and feasible control strategies for much of their production of molten steel. Ultimately, the Agency's Proposed FIP, based on shockingly deficient current knowledge[3] of the steel industry, and especially the EAF steelmaking process, seeks to impose technically unachievable and cost-ineffective new NO_X limits across the EAF steelmaking industry in 23 states. The unprecedented breadth of regulatory requirements that EPA seeks to impose on EAF steel producers based on such deficient data is all the more egregious given EPA's erroneous and internally inconsistent linkage presumptions for just three sources at two EAF steel plants.

In the detailed comments that follow, the EAF Steel Associations explain how EPA's contribution assumptions about even these two facilities are deeply flawed, and in fact, completely indeterminable due to irreconcilably inconsistent data and analysis in the administrative record. These comments also provide a detailed and data-driven analysis demonstrating how the Proposed FIP misconstrues the nature of EAF steel producers' NO_X emissions and profoundly overstates the extent to which these relatively small and largely ground-level emissions might contribute to downwind ozone nonattainment through interstate transport.

Further, many of the misconceptions that seemingly caused EPA's screening analysis to erroneously identify the iron and steel sector as a significant contributor of ozone to downwind monitors appear to be based on: (1) conspicuous underestimations of the extent to which EAF steel producers already control precursor NO_X emissions from the types of emissions units described in the Proposed FIP; (2) overstated and flatly unsupported (and unsupportable) assumptions about the remarkable extent to which emissions can be reduced using the control technology(ies) identified in the Proposed FIP; and (3) completely erroneous estimates of the costs at which EPA surmises these emissions reductions can be achieved. Indeed, EPA's assumptions about available NO_X control strategies at EAF steel producers and in the iron and steel sector more broadly are not only speculative, they are demonstrably incorrect.

Indeed, in many instances, it is impossible to discern from the administrative record how EPA derived its assumptions and/or which of the widely divergent data points in the administrative record EPA relied on to reach its conclusions. Moreover, in multiple instances where EPA cited the sources the Agency considered in developing its analysis, those sources actually contradict the Agency's conclusions. And when assessing control efficiencies and other important aspects of the Proposed FIP, EPA ignored data in the Agency's own records or readily available to the Agency.

[3] Almost all of EPA's analysis of the emissions and air pollution controls is drawn from or can be traced to a single 1994 Alternative Control Techniques ("ACT") document that is so outdated as to be completely irrelevant. Even so, to the extent this document does discuss fundamental technical limitations regarding emission controls, EPA disregards or simply omits those considerations in its proposed rule-making. To the extent that EPA relies on sources besides this document, for inexplicable reasons, EPA references combustion equipment from other industries such as coal-fired power plants as support for its suggested air pollution controls, such as Selective Catalytic Reduction ("SCR"), with no awareness or discussion of the fundamental technical differences between such sources.

Regardless whether it was the inevitable consequence of a rushed promulgation effort or simple ignorance, the fact remains that for some of the most fundamental elements of this Proposed FIP, EPA appears to have conducted no meaningful analysis at all. EPA's assessment of the feasibility and efficacy of controls at emissions units at EAF steel producers plainly ignored data in EPA's own records or readily available to the Agency. Even the most cursory consideration of the Agency's RACT/BACT/LAER Clearinghouse ("RBLC")[4] would have demonstrated to EPA that many of the emissions limits it proposed for units in the iron and steel sector are far lower than the most stringent limits ever imposed on even the most modern EAF facilities and, as a practical matter, wholly unrealistic and unworkable. Similarly, a brief review of any of the dozens of steel industry BACT determination conducted over the past 20 years would have revealed that the primary NO_X control technology (SCR) that EPA proposes for EAFs is fundamentally technologically incompatible with such sources and cost prohibitive. SCR has never been determined to be a viable NO_X control for many sources, including EAFs.

To be sure, it is not uncommon for regulated industries to dispute the Agency's justifications for proposed new regulations. SMA and SSINA have certainly disagreed with certain EPA rulemaking proposals over the years, but never before in our decades of rulemaking engagement with EPA have we encountered a proposal that based such extensive regulatory program on such little data and such a profound mischaracterization of our industry, our emissions profile, and our emissions reduction potential. We recognize and appreciate the difficulty inherent in identifying controllable NO_X emissions across multiple industries under a short timeframe, but deadlines cannot unburden EPA of its obligation to reasonably explain and record support for its analyses and conclusions. As applied to the iron and steel sector, and EAF steel producers in particular, the Proposed FIP is speculative, unsupported, and unlawful.

For these reasons and those more fully explained in the detailed comments that follow, SMA and SSINA strongly urge EPA to reconsider its very inclusion of the iron and steel sector in the Proposed FIP. Iron and steel sector NO_X emissions, much less those from the EAF steel producers that are a distinct subset of the sector, do not contribute other than in the most trivial and *de minimis* manner to downwind ozone nonattainment or interfere with ozone maintenance. EPA therefore has no obligation – or authority - under the CAA to impose unrealistic, unproven, infeasible, impractical, and costly controls on the iron and steel sector, and particularly EAF steel producers, in order to facilitate attainment with the 2015 Ozone NAAQS. To the contrary, the arbitrary and capricious imposition of unsupported and unattainable emissions limits on EAF steel producers will only serve to undermine the validity and legal defensibility of the Proposed FIP.

SMA and SSINA appreciate the opportunity to provide these comments. As we have previously stated, we sincerely wish to engage cooperatively with EPA on this important issue. If you have any questions about these comments or would like to discuss them with the EAF Steel Associations, please do not hesitate to contact the association representatives identified below.

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[4] Reasonably Available Control Technology ("RACT"); Best Available Control Technology ("BACT"); Lowest Achievable Emissions Rate ("LAER").

DETAILED COMMENTS FROM THE STEEL MANUFACTURERS ASSOCIATION AND THE SPECIALTY STEEL INDUSTRY OF NORTH AMERICA

PROPOSED "FEDERAL IMPLEMENTATION PLAN ADDRESSING REGIONAL OZONE TRANSPORT FOR THE 2015 PRIMARY OZONE NATIONAL AMBIENT AIR QUALITY STANDARD"

DOCKET NO. EPA-HQ-OAR-2021-0668

JUNE 21, 2021

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I. INTRODUCTION

In the detailed comments that follow, the Steel Manufacturers Association ("SMA") and the Specialty Steel Industry of North America ("SSINA") (collectively, the "Electric Arc Furnace ("EAF") Steel Associations") describe as comprehensively as possible under the impermissibly compressed comment period, the deeply deficient analyses and shocking absence of factual support that renders the U.S. Environmental Protection Agency's ("EPA's" or "the Agency's") Proposed Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Primary Ozone National Ambient Air Quality Standard ("Proposed FIP") wholly unsupported and impermissible.[5] While EPA's analytical infirmities and inattention to the accuracy of the Agency's information pervade the entirety of the Proposed FIP, EPA's most heedless disregard for factual support is unmistakably displayed in the utterly irrational analyses and unexplained conclusions upon which EPA proposed to impose FIP requirements on the iron and steel sector, and especially the EAF steelmakers that are a distinct and readily distinguishable subset of the sector. The Agency's record simply cannot sustain EPA's arbitrary and capricious conclusion that the steel industry, least of all the distinct subset of the sector that are EAF steelmakers, have "significant contributions" of NO_X that can be feasibly and cost-effectively controlled.

Indeed, while the EAF Steel Associations joined and herein expressly support the comments submitted by the Air Stewardship Coalition ("ASC") and the Midwest Ozone Group ("MOG"), we are submitting these separate comments in the hope that we will be able to focus EPA on the deeply flawed legal and analytical underpinnings for the Agency's inclusion of EAF steelmakers in the Proposed FIP, as well as the resultant proposed imposition of unsupported and unattainable emissions limits on EAF steel producers. As such, the EAF Steel Associations' responses to the state linkages assessed under Steps 1 and 2 of EPA's "4-step interstate transport framework"[6] are largely encompassed by the comments we submitted as part of MOG and ASC. The EAF Steel Associations' comments, on the other hand, focus almost entirely on Steps 3 and 4 as those steps were applied to the iron and steel industry, and in particular, the EAF steel producers that are distinct and readily segregable subset of the overall steel sector.[7]

As these comments explain in detail, the screening analysis through which the Agency determined that the iron and steel sector should be included in the Proposed FIP identified only a handful of steel manufacturing facilities, including just two EAF steel facilities, that EPA assessed <u>collectively emit</u> modest levels of NO_X which, based on EPA's modeling, then <u>collectively contribute</u> only incredibly miniscule levels of additional ozone at a handful of downwind monitors. Regardless of whether they are assessed individually or as a group, the NO_X emissions and downwind contributions that EPA modeled for EAF steel producers can, at most, be considered *de minimis* and trivial.

Nearly all the iron and steel sector facilities (and sources within these facilities) that EPA linked to downwind monitors are integrated steel facilities that produce steel from iron ore using blast and basic oxygen furnaces – and not EAF steelmaking facilities, which produce steel from scrap

[5] 87 Fed. Reg. 20,036 (Apr. 6, 2022).
[6] 87 Fed. Reg. at 20,036/20,041.
[7] While we do not believe that EAF Steel Associations' comments are in any way inconsistent with the comments submitted by ASC or MOG, to the extent EPA identifies any inconsistencies between those comments, the EAF Steel Associations' positions should be construed as those described in this comment letter.

metal using electrical energy. As explained in Section III, every steel industry air regulation that EPA has promulgated since the CAA was enacted decades ago reflects that EAF steel producers and integrated iron and steel facilities have completely different processes, characteristics, equipment, emissions profiles, and feasible control strategies for much of their production.

Notwithstanding EPA's longstanding recognition of the important distinctions between EAF steel producers and integrated iron and steel facilities, and the additional requirement that emissions limits under the CAA's good neighbor provisions be imposed according to "type of emissions activity," EPA impermissibly grouped EAF steel producers with wholly dissimilar integrated iron and steel facilities that have NO_X emissions intensities 33.5 times higher than EAF steelmakers.[8]

After conflating facilities in a manner wholly inconsistent with the CAA and decades of EPA's implementation of the Act, EPA attempted to identify which of its Agency-constructed industry groupings "have large, meaningful air quality impacts from potentially controllable emissions."[9] Inexplicably, illogically, and inconsistently with the screening analysis EPA conducted just last year, EPA concluded that sources with greater than 100 tpy of NO_X emissions were "uncontrolled sources or sources that could be better controlled at a reasonable cost."[10]

Then, after impermissibly grouping the steel sector and inexplicably assuming that steel facilities with units emitting NO_X above 100 tpy were uncontrolled/under-controlled, EPA determined that a handful of steel facilities (and only two EAF steel producers) "significantly contribute to downwind nonattainment or interfere with downwind maintenance of the NAAQS"[11] based on modeling contributions to downwind receptors of as little as 0.01 ppb (0.014%). This amount is several orders of magnitude lower than that which can be measured at any of EPA's designated ozone monitors and far lower than the values EPA's own guidance would deem to be insignificant, trivial, or *de minimis*.[12]

In the final step in EPA's Step 3 analysis, EPA arbitrarily established a $7,500 per ton threshold for assessing the feasibility and cost-effectiveness of NO_X controls, and predictably determined that steelmakers could achieve unprecedentedly stringent NO_X limits at incredibly modest cost. Upon this analysis, and the shocking deficient knowledge of the steel industry (and particularly EAF steel producers) reflected therein, EPA proposes to impose technically unachievable and cost-ineffective new NO_X limits across the EAF steelmaking industry in 23 states.

The unprecedented breadth of regulatory requirements that EPA seeks to impose on EAF steel producers based on such deficient data is all the more egregious given EPA's erroneous and internally inconsistent linkage presumptions for just three sources at two EAF steel plants. Moreover, EPA's record does not even allow these emissions units to be identified. The various spreadsheets and analyses EPA placed in the docket provide irreconcilably contradictory

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[8] Mukhtar, U. A., El-jummah, A. M., & Mohammad, M. D. (2017). NO_X Emission in Iron and Steel Production: A Review of Control Measures for Safe and Eco-Friendly Environment. *Arid Zone Journal of Engineering, Technology and Environment*, 13 (6), 848 (Mukhtar (2017)).
[9] Non-EGU Screening Assessment at 2.
[10] Non-EGU Screening Assessment at 3.
[11] 87 Fed. Reg. at 20,041 – 20,042 (emphasis added)
[12] P. Tsirigotis Memo, Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program at 15-16 (Apr. 17, 2018).

descriptions of information as fundamental as the type of emissions emits, the states where the units are located, their NO_X emissions, baseline controls, potential NO_X control strategies, and their NO_X emissions reduction potentials. These wholly divergent descriptions and assessments render EPA's entire screening assessment of the iron and steel sector entirely incomprehensible, and therefore arbitrary and capricious.

EPA's conclusions about technical feasibility and cost-effectiveness were not based on any outreach to industry or any discussions with pollution control equipment vendors. Nor were the conclusions based on any sector-specific analysis of technological feasibility or costs. Thus, many of the misconceptions that seemingly caused EPA's screening analysis to erroneously identify the iron and steel sector as a significant contributor of ozone to downwind monitors appear to be based on: (1) conspicuous underestimations of the extent to which EAF steel producers already control precursor NO_X emissions from the types of emissions units described in the Proposed FIP; (2) overstated and flatly unsupported (and unsupportable) assumptions about the remarkable extent to which emissions can be reduced using the control technology(ies) identified in the Proposed FIP; and (3) completely erroneous estimates of the costs at which EPA surmises these emissions reductions can be achieved. Indeed, EPA's assumptions about available NO_X control strategies at EAF steel producers and in the iron and steel sector more broadly are not only speculative, they are demonstrably incorrect.

Regardless whether it was the inevitable consequence of a rushed promulgation effort or simple ignorance, the fact remains that for some of the most fundamental elements of this Proposed FIP, EPA appears to have conducted no meaningful analysis at all. EPA's assessment of the feasibility and efficacy of controls at emissions units at EAF steel producers plainly ignored data in EPA's own records or readily available to the Agency. Even the most cursory consideration of the Agency's RACT/BACT/LAER Clearinghouse ("RBLC")[13] would have demonstrated to EPA that many of the emissions limits it proposed for units in the iron and steel sector are far lower than the most stringent limits ever imposed on even the most modern EAF facilities and, as a practical matter, are wholly unrealistic and unworkable.

Similarly, even the most perfunctory examination of emissions units in the steel industry could have remedied EPA's (albeit inconsistent) conclusion that low-NO_X burners ("LNB") are an effective NO_X control option for ladle metallurgy stations ("LMS") because LMS do not have burners that can be replaced with LNB. Likewise, a brief review of any of the dozens of steel industry BACT determination conducted over the past 20 years would have revealed that the primary NO_X control technology (SCR) that EPA proposes for EAFs is fundamentally technologically incompatible with such sources and cost prohibitive. SCR has never been determined to be a viable NO_X control for many sources, including EAFs.

These are just a few of several examples of conclusions about technological and cost feasibility that reflect no actual knowledge of, or even curiosity about, EAF steel industry NO_X emissions or control options. These examples are in addition to multiple other instances wherein EPA cited the sources the Agency considered in developing its analysis, but those sources actually contradict the Agency's conclusions. And any many of the agencies other assessments of control efficiencies

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[13] Reasonably Available Control Technology ("RACT"); Best Available Control Technology ("BACT"); Lowest Achievable Emissions Rate ("LAER").

and other important aspects of the Proposed FIP, EPA ignored data in the Agency's own records or readily available to the Agency.

Moreover, for many seemingly fundamental aspects of EPA's analyses, it is impossible to even discern from the administrative record how EPA derived its assumptions and/or which of the widely divergent data points in the administrative record EPA relied on to reach its conclusions. Indeed, *for every EAF steel facility emissions unit* potentially subject to the Proposed FIP, EPA's preamble and Technical Support Document ("TSD") agree (to the hundredth percentile) about the precise emissions limit that can be achieved, but somehow reach those precise conclusions through widely different and wholly irreconcilable analyses and data (*e.g.*, level of uncontrolled emissions assumed, presumed baseline controls, add-on controls EPA believes can be effective, and the reduction potential for those suggested controls). This is the very hallmark of a conclusion-driven analysis, and it is impermissible under the CAA.

In fact, the Proposed FIP is the product of an impermissibly flawed process overall. In its rush to impose a FIP for the 2015 Ozone National Ambient Air Quality Standard ("2015 Ozone NAAQS"), EPA is simultaneously pursuing the essential prerequisite for the FIP by proposing to disapprove at least 19 state implementation plans ("SIPs") with good neighbor provisions duly enacted by states pursuant to EPA's express guidance. As relevant to the EAF Steel Associations and these comments, none of those SIPs linked steel manufacturing facilities to downwind nonattainment/maintenance areas, and therefore none of those SIPs sought to impose on the steel industry, much less the EAF steelmaking subsector, the unprecedented and unworkable NO_X limits that EPA has proposed.

The Proposed FIP also contravenes the CAA's requirement that EPA establish a rulemaking docket "[n]ot later than the date of proposal,"[14] and if finalized, will violate EPA's prohibition on finalizing rules "based (in part or whole) on any information or data which has not been placed in the docket."[15] As these comments explain, some of the data that is most fundamental to the analysis EPA employed in developing the Proposed FIP and is therefore most essential to the EAF Steel Associations' ability fully evaluate EPA's assessments was omitted from the docket, and remains missing irrespective of the EAF Steel Associations' requests.

Even if EPA's docket satisfied the CAA's procedural requirements, the Agency's comment period did not. EPA's Proposed FIP is unparalleled in terms of geographic scale, the scope of covered industry sectors, the number of potentially impacted emissions units, and the remarkable extent to which the Agency assumes emissions from those units can be abated using what EPA believes to be widely available and cost-effective controls. Regardless of whether stakeholders could reasonably review EPA's 180-page proposal or voluminous docket materials and present cogent comments within the time allotted, as explained by ASC, EPA's compressed comment period did not even allow stakeholders sufficient time to run the data-rich modeling files necessary to understand and comment on EPA's source apportionment modeling.

Indeed, every aspect of Agency's approach to promulgating this proposal indicates that the FIP EPA proposed is the FIP EPA intends to finalize. Nothing suggests that EPA is genuinely

[14] 42 U.S.C. §7607(d)(2).
[15] 42 U.S.C. § 7607(d)(6)(B).

interested in obtaining useful criticism or data, or that the Agency is willing to share the data necessary to meaningfully engender public participation.[16] The Proposed FIP rests on data that is shockingly incomplete, missing, or obviously flawed; analyses that are completely incoherent and plainly unsound; and conclusions that are wholly unexplained or heedlessly irrational.

For these reasons and those more fully explained in the detailed comments that follow, SMA and SSINA strongly urge EPA to reconsider its very inclusion of the iron and steel sector in the Proposed FIP. Iron and steel sector NO_X emissions, much less those from the EAF steel producers that are a distinct subset of the sector, do not contribute other than in the most trivial and *de minimis* manner to downwind ozone nonattainment or interfere with ozone maintenance. EPA therefore has no obligation – or authority - under the CAA to impose unrealistic, unproven, infeasible, impractical, and costly controls on the iron and steel sector, and particularly EAF steel producers, in order to facilitate attainment with the 2015 Ozone NAAQS. To the contrary, the arbitrary and capricious imposition of unsupported and unattainable emissions limits on EAF steel producers will only serve to undermine the validity and legal defensibility of the Proposed FIP.

II. THE EAF STEEL PRODUCERS AND THEIR INTERESTS

SMA is the largest steel trade association in North America, in terms of membership, and the primary trade association of EAF steel producers, often referred to as "minimills," that make various steel products, including carbon, alloy, and stainless steels, from a feedstock of nearly 100 percent steel scrap. SMA's member companies account for over 70 percent of total domestic steelmaking capacity.

SSINA is a national trade association representing the majority of North American production of specialty metals, including stainless, electric, tool, magnetic, and other steel and specialty metal alloys. SSINA members produce high grade stainless and other specialty metal products by using electricity to melt scrap metal and other raw materials in an electric arc furnace (EAF)..

SMA and SSINA's EAF steel producing members are located throughout the United States, including within the 23 states in which EPA is proposing to impose significant new NO_X control requirements. EPA's Proposed FIP is therefore highly consequential to SMA and the EAF steel industry as a whole.

SMA and SSINA are proud to represent an industry that directly employs over 150,000 people and has created over two million jobs in supporting industries. We are also proud that our members' EAF steelmaking facilities produce the cleanest, greenest, and most sustainable steel in the world.

Indeed, domestic EAF steelmaking facilities produce twice as much carbon steel as integrated iron and steel facilities, but with 75 percent less greenhouse gas emissions.[17] EAF steel producers emit substantially lower levels of other pollutants as well – as compared to integrated steel production using blast furnaces (BFs) and Basic Oxygen Furnaces ("BOFs"), an EAF's emissions intensity is 7.7 times lower for particulate matter ("PM"), 2.6 times lower for sulfur dioxide ("SO_2"), and 12

[16] *See, e.g., Conn. Light & Power Co. v. Nuclear Regulatory Comm'n*, 673 F.2d 525, 530 (D.C. Cir. 1982);
[17] https://steelnet.org/sustainability/.

times lower for carbon monoxide ("CO").[18] And as particularly relevant to these comments, EAFs produce steel with a NO_X emissions intensity that is 33.5 times lower than steel produced in integrated BF/BOF facilities.[19]

SMA and SSINA members' reliance on scrap metal to produce new steel products is environmentally beneficial as well. For one, steel that is sustainably produced from scrap metal reduces the mining of virgin ores and avoids the need to utilize higher-emitting and more energy intensive processes required to make steel from ores. Moreover, absent SMA and SSINA members' capacity to beneficially reuse millions of tons of scrap metal every year, much of that material would be discarded and/or diverted to landfills. End-of-life products and other materials that are presently collected and diverted into the recycling system based on the value of their metal content would increasingly be abandoned thereby saddling overburdened communities with another source of blight.

SMA and SSINA represent an industry that is not only environmentally beneficial, but highly regulated as well. EAF steel manufacturers in the United States are subject to some of the most stringent environmental standards in the world, employ the most advance pollution control technology, and protect their workforces and neighboring communities better than any their overseas competitors. America's green infrastructure future can and will be sustainably built with steel recycled by these SMA and SSINA members.

III. OVERVIEW OF STEELMAKING PROCESSES

EPA's Proposed FIP analyzed, and proposes to impose NO_X emissions limits on, industry sectors "as defined by 4-digit NAICS."[20] For the "Iron and Steel Mills and Ferroalloy Manufacturing" sector, EPA analyzed NAICS 3311, which encompasses establishments primarily engaged in one or more of the following: (1) direct reduction of iron ore; (2) manufacturing pig iron in molten or solid form; (3) converting pig iron into steel; (4) manufacturing ferroalloys; (5) making steel; (6) making steel and manufacturing shapes (*e.g.*, bar, plate, rod, sheet, strip, wire); and, (7) making steel and forming pipe and tube. Given the widely divergent manufacturing processes (and emissions profiles) encompassed within this highly-aggregated NAICS category, the EAF Steel Associations herein provide an overview of the EAF steelmaking process and the many significant ways EAF steelmaking is wholly distinct from the steelmaking processes at integrated iron and steel industries.[21]

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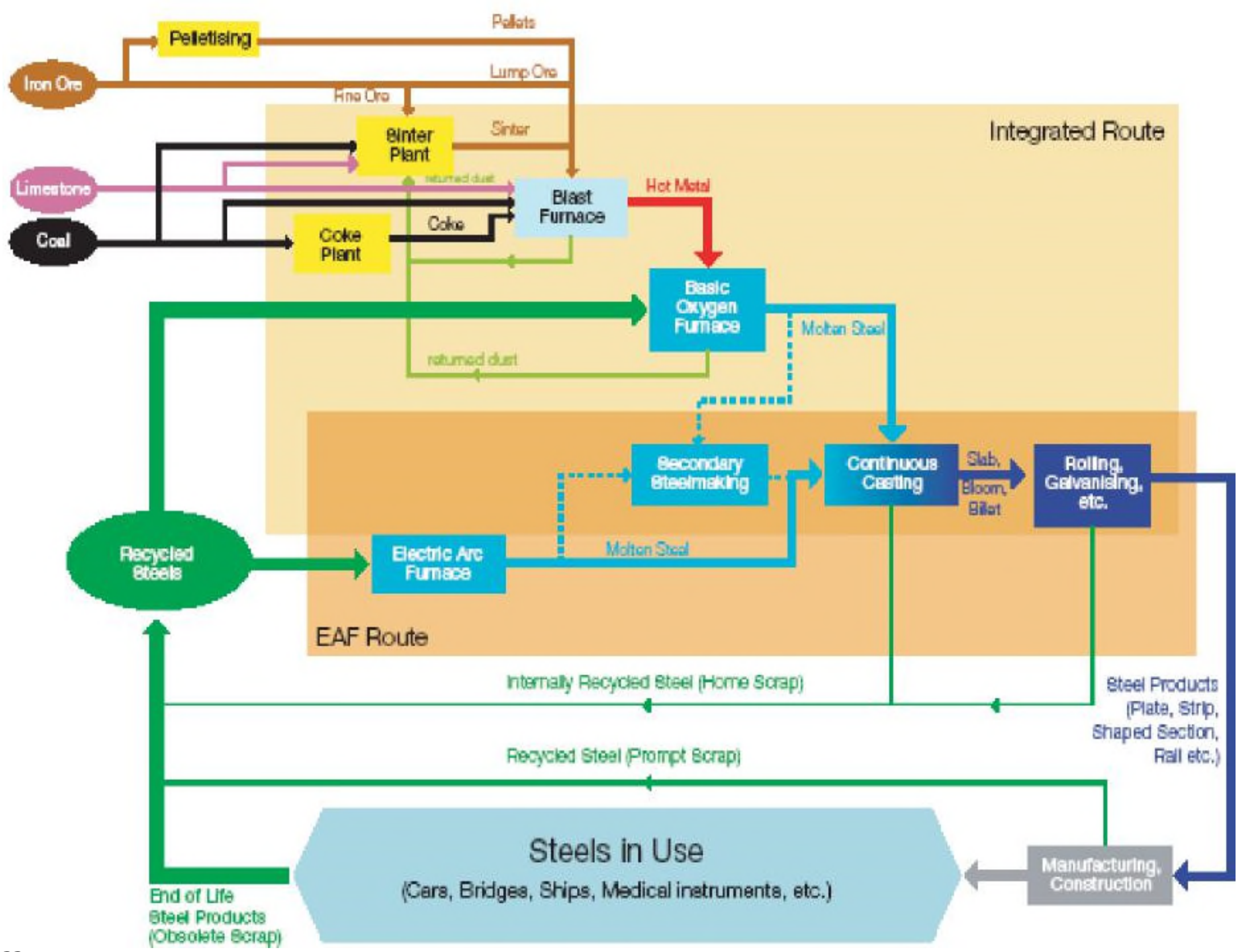
[18] Mukhtar, U. A., El-jummah, A. M., & Mohammad, M. D. (2017). NO_X Emission in Iron and Steel Production: A Review of Control Measures for Safe and Eco-Friendly Environment. *Arid Zone Journal of Engineering, Technology and Environment*, 13 (6), 848 (Mukhtar (2017)).

[19] Mukhtar (2017). Section III below describes the differences between the BF/BOF and EAF steelmaking processes that may account for this starkly different emissions profile. Section VI(a) then describes how EPA's examination of NO_X, emissions across the broad four-digit NAICS Code for "Iron and Steel Mills and Ferro-Alloy Manufacturing" (3311) caused the Agency to misconstrue EAF steel producers' NO_x emissions, presumed linkages to downwind receptors, and control opportunities.

[20] 87 Fed. Reg. at 20,083.

[21] The process descriptions below are intended to illustrate the differences between integrated iron and steel making and EAF steelmaking because it does not appear that the Proposed FIP adequately recognized the difference between these two distinct processes for producing steel. The EAF Steel Associations did not similarly distinguish the differences between EAF steel producers and ferroalloy manufacturers or other sectors within NAICS 3311 because

Steelmaking Routes: Integrated Route and Electric Arc Furnace Route



[22]

a. Integrated Iron and Steel Production

As the term "Integrated Iron and Steel" connotes, steel produced through this process first uses a blast furnace ("BF") to produce molten iron from iron ore and then uses a basic oxygen furnace ("BOF") to produce steel using molten, "pig iron" from the BF as well as some additional scrap steel. The processes through which molten pig iron is produced from iron-bearing ores and then subsequently steel is produced from pig iron necessarily involves multiple emissions-generating processes that are not required in EAF steel production. As explained by "EPA's Alternative Control Techniques Document – NO_X Emissions from Iron and Steel Mills:"

we believed that EPA already fully recognized those distinctions. In addition, the above description focuses on the EAF carbon steel subsector (given EPA's inclusion of two EAF carbon facilities in the applicability analysis of the FIP) in contrast to the EAF specialty steel sector which employs similar processes with some operational distinctions (such as longer heats times and smaller production tonnages). No EAF specialty steel mills have been identified as contributing to downwind ozone nonattainment.

[22] Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Iron and Steel Industry (EPA, Sept. 2012) Figure 1 at p. 2.

> Integrated iron and steel mills produce steel by reducing iron ore to iron in a blast furnace and, subsequently, removing excess carbon and other impurities from the iron in a basic oxygen furnace. Other processes involve beneficiating iron ore (e.g., pelletizing), recycling of iron-bearing materials (e.g., sintering), coke-making, and steel finishing processes such as shaping, annealing, and galvanizing. All of these are high temperature processes, usually involving the combustion of fossil fuels, and all are potential sources of NO_X emissions.[23]

"In coke making, coal is destructively distilled in coke ovens" that are typically fired with a mixture of coke oven gas, natural gas, and/or blast furnace gas." [24] "Coke oven underfiring is a high-temperature process and NO_X emissions from coke making are appreciable."[25]

"In the sinter plant, iron ore fines, coke fines, other iron-bearing materials, and (often) flux are well-mixed and spread uniformly on a traveling grate and ignited, typically with [natural-gas.]"[26] This process "creates a sinter suitable for use in the blast furnace."[27]

"In the blast furnace, iron ore is reduced to molten iron (also called pig iron or hot metal). The blast furnace is a closed system with no atmospheric emissions."[28] The furnace effluent, which is called "blast furnace gas" is used to preheat the air entering the three or four associated stoves that supply air blast to the BF. At this point in the integrated iron and steel process, the facility has produced molten iron. This molten iron must then be transferred to a BOF to produce molten steel.

BOFs "are large, open-mouthed, pear-shaped vessels lined with a basic (as opposed to acidic) refractory material that refines molten iron from the blast furnace and ferrous scrap into steel by injecting a jet of high-purity oxygen to remove carbon as CO and CO_2."[29] Molten iron from the blast furnace and scrap steel are charged into the BOF, which applies high-purity oxygen to the molten bath in order to oxidize undesired elements in the bath into to create the desired grade of molten steel that will then be shaped into slabs, billets, or blooms.[30]

b. <u>EAF Steel Production</u>

Rather than utilizing the integrated BF/BOF process:

> [m]ini mills and specialty producers process steel through some subset of the full range of processes found in integrated iron and steel mills. Typically, they enter the

[23] EPA's Alternative Control Techniques Document – NO_X Emissions from Iron and Steel Mills ("Steel Mill NOx ACT") a 2-1.
[24] Steel Mill NO_X ACT at 2-1.
[25] Steel Mill NO_X ACT at 2-1.
[26] Steel Mill NO_X ACT at 2-1.
[27] Steel Mill NO_X ACT at 2-1.
[28] Steel Mill NO_X ACT at 2-1.
[29] Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Iron and Steel Industry (EPA, Sept. 2012) at 4.
[30] Steel Mill NO_X ACT at 2-4.

> process by melting scrap steel in an electric arc furnace, bypassing the iron-making process and attendant support activities such as sintering and coke making.[31]

An EAF is a "cylindrical, refractory-lined" container "equipped with carbon electrodes that can be raised and lowered through openings in the furnace roof."[32] With electrodes retracted, the furnace roof can be rotated aside to permit scrap metal to be placed ("charged") into the EAF by overhead crane.[33] Some furnaces are charged through a shaft or continuously charged from a conveyor without the removal of the furnace roof. Electric current generates heat between the electrodes and through the scrap to melt the scrap.

"The production of steel in an EAF is a batch process."[34] Stages include charging, melting, refining, slagging, and tapping. During the charging stage, scrap metal is introduced into the EAF. The charge can also include carbon and lime, which is a fluxing agent. While scrap metal is always the primary feedstock in EAF steel production, direct reduced iron ("DRI") or other iron-bearing material may supplement the scrap metal feedstock in some cases.

After the charging stage, the next step is the melting phase, during which electrical energy from the electrodes is applied to the scrap metal or molten bath. As relevant here, "[t]he use of electricity for steel melting transfers the generation of NO_X from the iron and steel mill to a utility generating plant."[35] Although the EAF steelmaking process transfers much of the NO_X generation to the EGUs supplying electricity to EAFs, oxy-fuel (natural gas burners, some additional carbon, and oxygen lances are almost universally used to add supplemental chemical energy to the melting process. Unlike the integrated iron and steel production process, which relies exclusively on fossil fuel combustion and chemical energy inputs, these supplemental inputs represent only modest a portion of the melting energy in EAFs.

In EAF steel production, refining of the molten steel occurs via melting of the scrap and other material inputs. During the subsequent refining process, undesirable elements in the molten bath are separated out into a layer of slag that floats on top of the molten metal. Chemically, the slag layer consists primarily of oxides of calcium, iron, silicon, phosphorus, sulfur, aluminum, magnesium, and manganese in complexes of calcium silicates, aluminosilicates and aluminoferrite, and its composition depends on the grade(s) of steel that are made. The slag is typically removed by tipping the furnace backwards and pouring the molten slag out through a slag door, at which point the slag is further processed (*i.e.*, cooled, cured, and sized) into a product.

After completion of the batch, the EAF tap hole is opened, and the molten steel is poured from the EAF into a ladle for transfer to the next operation. Often (but not always), molten steel produced in the EAF is further refined in a ladle metallurgy station ("LMS"). There are numerous ladle metallurgy processes including ladle temperature control, composition control, deoxidation, degassing, cleanliness control, and others. Alloys are added to the molten steel to produce the desired metallurgy. Electric arc heating is generally used in this refining process as well. Thus,

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[31] Steel Mill NO_X ACT at 2-1.
[32] EPA's Proposed NSPS for EAF/AOD; 87 Fed. Reg. at 29,713 (May 16, 2022).
[33] EPA's Proposed NSPS for EAF/AOD; 87 Fed. Reg. at 29,713 (May 16, 2022).
[34] EPA's Proposed NSPS for EAF/AOD; 87 Fed. Reg. at 29,713 (May 16, 2022).
[35] Steel Mill NO_X ACT at 2-4.

like the EAF steelmaking process, a significant portion of the NO_X emissions occur when electricity is generated separate from the EAF steel producing facility – and not in the steel refining process itself.

After producing molten steel in an EAF, certain facilities (primarily stainless and specialty steel producers) utilize argon oxygen decarburization ("AOD") to further refine the steel outside the EAF. In the AOD process, steel from the EAF is transferred into an AOD vessel and gaseous mixtures containing argon and oxygen or nitrogen are blown into the vessel to reduce the carbon content of the steel. "Use of AOD vessels also reduce EAF heat times, improve quality control, and increase daily steel production."[36]

Once the molten steel has achieved the desired metallurgy it is typically transferred to a continuous caster, where it flows into a reservoir (called a tundish) and then into the molds of the continuous casting machine. Various caster designs shape the steel as it continues to flow until the steel is shaped into semi-finished products known as blooms, billets, or slabs.

The semi-finished blooms, billets, and slabs are then further processed by a number of different steps, such as annealing, hot-forming, cold rolling, pickling, galvanizing, coating, or painting to the final desired products. Some of these steps require additional heating or reheating of the steel intermediate products. The additional heating or reheating is accomplished using furnaces almost universally fired with natural gas. The furnaces are custom designed for the type of steel, the dimensions of the semi-finished steel pieces, and the desired temperature.

While the process used to produce the molten steel at integrated steelmaking facilities is starkly different than the EAF steel production process, the casting and finishing processes employed by integrated steel facilities and EAF steel producers are far more similar. Indeed, many of these "finishing processes" are conducted by "finishing" facilities that do not have equipment to produce molten steel, but instead produce finished steel products from the cast blooms, billets, or slabs purchased from integrated steelmaking facilities or EAF steel producers. However, as relevant here, the highest NO_X-producing processes that has caused EPA to indiscriminately include the entire steel manufacturing sector in the Proposed FIP are present only at integrated iron and steel facilities.

c. <u>Recognition of Distinctions Between EAF and BF/BOF Steelmaking</u>

Given the significant differences between the integrated iron and steelmaking process and the EAF steel production process, it is not surprising that EPA and states have long recognized these distinctions in regulations promulgated under the CAA. Indeed, as early as 1973, when EPA first proposed to identify integrated iron and steel plants as among the categories of stationary sources that cause or significantly contribute to "air pollution which may reasonably be anticipated to endanger public health and welfare," it based this finding and the resulting new source performance standards ("NSPS") only on emissions from BOFs.[37] In the ensuing decades and

[36] EPA's Proposed NSPS for EAF/AOD; 87 Fed. Reg. at 29,713 (May 16, 2022).
[37] 38 Fed. Reg. 15,406 (June 11, 1973) (citing CAA Sec. 111(b)(1)(A)).

through multiple NSPS reviews,[38] EPA has continued to delineate the iron and steel source category based on utilization of BOFs.[39]

EPA's recognition that steelmaking facilities utilizing EAFs and AODs represented a distinct category of sources, separate from BOFs, under Section 111 of the CAA is similarly longstanding. Steel manufacturers using EAFs were first designated as a source category in 1975,[40] and manufacturers using AODs were added in 1984.[41] EPA recognized that BOFs and EAFs were very different types of emissions sources and therefore regulated them separately.

After Congress enacted the 1990 CAA Amendments, EPA was required to develop technology-based standards for source categories that emit hazardous air pollutants ("HAPs"). As with EPA's longstanding delineation of the steel manufacturing sector under the Agency's NSPS regulations, EPA's National Emissions Standards for Hazardous Air Pollutants ("NESHAP") recognized that integrated steelmaking facilities and EAF steel producers have different material inputs, different emission units, different emissions profiles, and different emission control opportunities.

For nearly two decades, the Integrated Iron and Steel NESHAP has imposed HAP emission limitations on "new and existing sinter plants, blast furnaces, and basic oxygen process furnace (BOPF) shops."[42] And since 2007, EPA has delineated and separately regulated under Subpart YYYYY those EAF steelmaking facilities that are area sources of HAPs.[43] This longstanding delineation is based on EPA's interpretation that a "category" of sources for purposes of Section 112 "is a group of sources having some common features suggesting they should be regulated in the same way and on the same schedule."[44]

While CAA Sections 111 and 112 subject categories of sources to regulations for different reasons, the basis for categorizing those sources according to type of emissions activity is essentially the same. Under NSPS, EPA identifies categories of stationary sources based on whether those categories of sources cause or significantly contribute to pollution. Under EPA's rules implementing the NESHAP program, the Agency groups sources based on their level of HAP emissions and their capacity to control those emissions. These data-driven rationales are equally applicable to the screening analysis EPA utilized in the Proposed FIP.

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[38] 39 Fed. Reg. 9308 (Mar. 8, 1974); 43 Fed. Reg. 15,600 (Apr. 13, 1978); 51 Fed. Reg. 150 (Jan. 2, 1980).

[39] BOFs are regulated under the NSPS for Basic Oxygen Process Furnace (BOPF) Primary Emissions, codified at 40 CFR Part 60 Subpart N, and secondary BOF emissions are regulated under 40 CFR Part 60 Subpart Na.

[40] 40 Fed. Reg. at 43,850 (Sept. 23, 1975).

[41] 49 Fed. Reg. 43,838 (Oct. 31, 1984).

[42] https://www.epa.gov/stationary-sources-air-pollution/integrated-iron-and-steel-manufacturing-national-emission. *See also* 68 Fed. Reg. 27,646 *May 20, 2003); 71 Fed. Reg. 39,579 (July 13, 2006); 85 Fed. Reg. 42,074 (July 13, 2020). EPA delineated Coke Ovens, Iron and Steel Foundries, Taconite Production Kilns, and Ferroalloy Producers under separate source categories as well. *See* https://www.epa.gov/stationary-sources-air-pollution/national-emission-standards-hazardous-air-pollutants-neshap-8.

[43] 72 Fed. Reg. at 74,088 (Dec. 28, 2007). EPA has delineated Coke Ovens, Iron and Steel Foundries, Taconite Production Kilns, and Ferroalloy Producers under separate source categories as well. *See* https://www.epa.gov/stationary-sources-air-pollution/national-emission-standards-hazardous-air-pollutants-neshap-8.

[44] 57 Fed. Reg. 31,576 at 31,578 (July 16, 1992).

Indeed, the administrative record for the Proposed FIP clearly reflects that integrated steelmaking facilities operate wholly distinct emissions units that are far larger than EAFs and result in 33.5 times greater NO_X emission intensity than EAFs.[45] But by grouping multiple diverse segments of the steel manufacturing sector based upon their collective inclusion in a 4-digit NAICS category (which is only relevant as a business and economic accounting construct) rather than their type of emissions activity, NO_X emissions intensity, and potential emissions control opportunities, the Proposed FIP's screening analysis simply ignored those important distinctions and erroneously identified EAF steel producers as significant contributors of NO_X to downwind receptors. Had the Agency's Proposed FIP abided Congress' directive to impose SIP and FIP requirements based on "type of emissions activity,"[46] and followed the emissions-based categorization that EPA utilized for decades in the relevant steel industry NSPS and NESHAP rules, it would have recognized that **EAF production facilities cannot be linked to downwind receptors in the same manner as integrated iron and steel facilities because EAF's utilization of electricity to produce molten steel eliminates the largest NO_X-emitting operations from the steelmaking process at its source.**

IV. THE PROPOSED FIP IS THE PRODUCT OF AN IMPERMISSIBLY FLAWED PROCESS

a. Relevant CAA Procedures and Requirements

"The Clean Air Act regulates air quality through a federal-state collaboration."[47] Under the first step of this cooperative federalism framework, EPA establishes air quality standards known as NAAQS.[48] As relevant to this rulemaking, on October 1, 2015, EPA lowered the primary and secondary ozone standards to 70 ppb as an 8-hour average.[49] Then, EPA identifies areas within the states that have not attained those NAAQS.[50] For the 2015 Ozone NAAQS, EPA identified 53 areas in 22 states and the District of Columbia as either "nonattainment" or maintenance areas.[51]

"Next, the baton is passed to the States, which have the first opportunity to enact plans that provide for the 'implementation, maintenance, and enforcement' of the NAAQS."[52] States must enact and submit these plans - called State Implementation Plans or SIPs - within three years of any new or revised NAAQS.[53] If a state declines to submit a SIP, or it is disapproved by EPA, the Agency promulgates a Federal Implementation Plan, or FIP, in its stead.[54]

[45] Mukhtar (2017).
[46] 42 U.S.C. § 7410(a)(1).
[47] *EME Homer City Generation, LP v. EPA*, 795 F. 3d 118 at 124 (D.C. Cir. 2015).
[48] *See* 42 U.S.C. § 7409(a).
[49] 80 Fed. Reg. 65,291 (Oct. 1, 2015).
[50] *See* 42 U.S.C. § 7407(d).
[51] https://www3.epa.gov/airquality/greenbook/jbtc.html.
[52] *EME Homer City Generation, LP v. EPA*, 795 F. 3d 118 at 124 (D.C. Cir. 2015) (quoting 42 U.S.C. § 7410(a)(1)).
[53] 42 U.S.C. § 7410(a)(1).
[54] 42 U.S.C. § 7410(c)(1).

As this Proposed FIP correctly notes, "CAA section 110(a)(2)(D)(i)(I), also known as the 'good neighbor' provision, provides the primary basis for this proposed rule."[55] Under the CAA's good neighbor provision, each state must timely develop a SIP that contains:

> adequate provisions . . . prohibiting, consistent with the provisions of this subchapter, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will . . . contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any [NAAQS].[56]

b. <u>EPA did not follow the CAA's procedures in promulgating this Proposed FIP</u>

Consistent with this statutory requirement, 19 states timely submitted to EPA good neighbor SIPs to address their state's significant contributions to nonattainment/maintenance interference in downwind states.[57] Each of these 19 SIPs were developed in accordance with guidance documents developed by EPA's Office of Air Quality Planning and Standards ("OAQPS Guidance") for the precise purpose of instructing states on the submission of good neighbor SIPs for the 2015 Ozone NAAQS.[58] And as relevant to the EAF Steel Associations, none of these 19 good neighbor SIPs linked steel manufacturing facilities in any of these states to downwind nonattainment/maintenance areas and therefore none of these 19 good neighbor SIP submissions sought to impose new NO_X limits on any sources in the iron and steel sector, much less on that distinct subset of sources producing steel using EAFs with even lower NO_X emissions.

Concurrent with this Proposed FIP, EPA is proposing to disapprove each of these 19 good neighbor SIP submissions.[59] On December 5, 2019, EPA also published a rule finding that seven states failed to submit or otherwise make complete submissions that incorporate good neighbor provisions for the 2015 Ozone NAAQS.[60]

Notwithstanding that the majority of the SIPs EPA is poised to disapprove were submitted by states dutifully applying the OAQPS guidance EPA itself provided, this Proposed FIP would wrest from

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[55] 87 Fed. Reg. at 20,051

[56] 42 U.S.C. 7410(a)(2)(D)(i)(I).

[57] 87 Fed. Reg. at 20,057. (Alabama, Arkansas, Illinois, Indiana, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, New Jersey, New York, Ohio, Oklahoma, Tennessee, Texas, West Virginia, Wisconsin).

[58] Memo from Peter Tsirigotis: "Information on Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air Quality Standards Under Clean Air Act Section 110(a)(2)(D)(i)(I)," *March 27, 2018); Memo from Peter Tsirigotis: "Analysis of Contribution Thresholds for Use in Clean Air Act Section 110(a)(2)(D)(i)(I) Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air Quality Standards," (August 13, 2018); and Memo from Peter Tsirigotis: "Considerations for Identifying Maintenance Receptors for Use in Clean Air Act Section 11 0(a)(2)(D)(i)(I) Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air Quality Standards," (October 19, 2018).

[59] *See* 87 Fed. Reg. 9463 (Feb. 22, 2022) (Maryland); 87 Fed. Reg. 9484 (Feb. 22, 2022) (New Jersey, New York); 87 Fed. Reg. 9498 (Feb. 22, 2022) (Kentucky); 87 Fed. Reg. 9516 (Feb. 22, 2022) (West Virginia); 87 Fed. Reg. 9533 (Feb. 22, 2022) (Missouri); 87 Fed. Reg. 9545 (Feb. 22, 2022) (Alabama, Mississippi, Tennessee); 87 Fed. Reg. 9798 (Feb. 22, 2022) (Arkansas, Louisiana, Oklahoma, Texas); 87 Fed. Reg. 9838 (Feb. 22, 2022) (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin).

[60] 84 Fed. Reg. 66,612 (Feb. 22, 2022) (Maine, New Mexico, Pennsylvania, Rhode Island, South Dakota, Utah, and Virginia).

26 states the primary air pollution control authority that Congress preserved for all states in CAA Section 110. For the EAF Steel Associations, EPA's abrupt policy change means that EAF steelmakers in 23 states may be suddenly thrust into an unprecedented and infeasible new regulatory scheme deemed unnecessary and unworkable by 19 states and, quite recently, EPA itself.[61] Indeed, if finalized, the Proposed FIP would attempt to institute the most far-reaching, stringent, and simply unworkable NO_X emission requirements ever imposed on the iron and steel sector.

c. **EPA's approach to developing this Proposed FIP was arbitrary and impermissible**

The EAF Steel Associations acknowledge that agencies are permitted to change policy positions and adopt new regulatory interpretations, but EPA cannot do so in the manner the Agency is proposing.[62] New and changed policy positions are subject to the same Administrative Procedures Act ("APA") standards[63] under which "a reviewing court shall . . . hold unlawful and set aside agency action, findings, and conclusions found to be . . . arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law."[64]

This standard requires agencies to "examine the relevant data and articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made.'"[65] Courts will invalidate agency decisions as "arbitrary and capricious" if:

> the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.[66]

Thus, while "agency action representing a policy change" need not be "justified by reasons more substantial than those required to adopt a policy in the first instance," it remains bounded by "the requirement that an agency provide a reasoned explanation for its action."[67] Importantly, this

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[61] *See* Revised Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS, 86 Fed. Reg. 23,054 (Apr. 30, 2021).
[62] *F.C.C. v. Fox Television Stations, Inc.*, 556 U.S. 502 (2009).
[63] *F.C.C. v. Fox Television Stations,* 556 U.S. at 515 ("The [APA] makes no distinction . . . between initial agency action and subsequent agency action undoing or revising that action.").
[64] 5 U.S.C. § 706(2)(A). If finalized, EPA's Proposed FIP would actually be reviewed under the CAA's judicial review provisions at 42 U.S.C. § 7607(d)(9). However, because the CAA's judicial review provision utilize the same standards as the APA, the U.S. Supreme Court and D.C. Circuit have both determined that "the standard we apply (*i.e.*, whether the EPA's actions were in excess of statutory authority or arbitrary and capricious) is the same under" the CAA and the APA). *See Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43, 103 S.Ct. 2856, 77 L.Ed.2d 443 (1983); *See also Motor Vehicle Mfrs. Ass'n. v. EPA*, 768 F.2d 385, 389 n. 6 (D.C.Cir. 1985). As such, the EAF Steel Producers use the APA and CAA judicial review provisions interchangeably throughout these comments.
[65] *State Farm*, 463 U.S. at 43 (quoting *Burlington Truck Lines v. United States*, 371 U.S. 156, 168, (1962)).
[66] *State Farm*, 463 U.S. at 43.
[67] *F.C.C. v. Fox Television Stations*, 556 U.S. at 514-15 .

obligation applies regardless of whether the agency policy was set forth in a duly promulgated rule or, as here, in agency guidance documents.

While agencies may not use guidance documents to impose binding regulation-like requirements on regulated entities, parties are permitted to rely on agency guidelines that, like the OAQPS Guidance, articulate the statutory and regulatory interpretations on which the agencies will rely in implementing and exercising their statutory authority.[68] Agencies cannot "simply disregard" their existing guidance and invalidate actions conducted pursuant to that guidance.[69] But that is exactly what EPA is doing in proposing to disapprove 19 good neighbor SIPs and concurrently proposing a FIP that is predicated on those disapprovals.

Moreover, separate and aside from the hasty and legally deficient manner through which EPA decided to develop this Proposed FIP, as currently constructed, EPA's Proposed FIP is an exemplar of arbitrary and capricious decision-making. The MOG and ASC comments that the EAF Steel Associations joined broadly address our overall concerns with the deficient technical foundation and dubious legality of the Proposed FIP, and need not be repeated here. Instead, the EAF Steel Associations herein describe the deeply flawed legal and analytical underpinnings for EPA's proposed inclusion of EAF steelmakers in the FIP.

V. EPA'S ANALYTICAL APPROACH IS ARBITRARY AND CAPRICIOUS

EPA developed the Proposed FIP using a "4-step interstate transport framework" that the Agency believes reasonably identifies the NO_X emissions reductions necessary to address upwind states' significant contribution to, or interference with maintenance, of" the 2015 Ozone NAAQS.[70] EPA's 4-step framework is as follows:

> (1) Identifying downwind receptors that are expected to have problems attaining or maintaining the NAAQS; (2) determining which upwind states contribute to these identified problems in amounts sufficient to ''link'' them to the downwind air quality problems (*i.e.*, in this proposed rule, a contribution threshold of 1 percent of the NAAQS); (3) for states linked to downwind air quality problems, identifying upwind emissions that significantly contribute to downwind nonattainment or interfere with downwind maintenance of the NAAQS; and (4) for states that are found to have emissions that significantly contribute to nonattainment or interfere with maintenance of the NAAQS in downwind areas, implementing the necessary emissions reductions through enforceable measures.[71]

The preamble to the Proposed FIP accurately disclaims that EPA utilized this same framework in developing previous ozone transport rules;[72] however, the Proposed FIP represents the first time EPA has utilized this approach to propose emissions limits for non-electric generating units ("EGU") sources. While the EAF Steel Associations have significant concerns with EPA's

[68] *Perez v. Mortg. Bankers Ass'n,* 575 U.S. 92, 96–97 (2015).
[69] *Hoosier Env't Council v. Nat. Prairie Indiana Farmland Holdings, LLC,* No. 4:19-CV-71 DRL-JEM, 2021 WL 4477152, at **13, 16 (N.D. Ind. Sept. 29, 2021).
[70] 87 Fed. Reg. at 20,036/20,041.
[71] 87 Fed. Reg. at 20,041 – 20,042.
[72] 87 Fed. Reg. at 20,041.

analysis and technical support in Step 1 and Step 2 of this framework, those concerns are not specific to non-EGU sources and, as previously noted, are already discussed in detail in the comments submitted by MOG and ASC.

In contrast, Steps 3 and 4 demonstrate that EPA's 4-step framework is ill-suited to, and fundamentally unworkable for, non-EGU sources - particularly EAF steel producers.

VI. EPA'S STEP 3 ANALYSIS OF NON-EGU SOURCES IS ARBITRARY AND CAPRICIOUS

EPA's ''significant contribution'' analysis at Step 3 of the 4-step framework purports to include "a comprehensive evaluation of major stationary source non-EGU industries in the linked upwind states."[73] According to the Proposed FIP, this so-called "comprehensive evaluation" allowed EPA:

> to find that emissions from certain non-EGU sources in the upwind states significantly contribute to downwind air quality problems for the 2015 ozone NAAQS, and that cost-effective emissions reductions from these sources are required to eliminate significant contribution under the interstate transport provision.[74]

This is not accurate. The screening analysis EPA employed for non-EGU sources was, at best, a cursory review that relied on unexplained assumptions and unsupported speculation to the preclusion of critical information in EPA's own docket or readily available to the Agency.

To identify "non-EGU sources in the upwind states [that] significantly contribute to downwind air quality problems for the 2015 ozone NAAQS"[75] EPA developed:

> [t]he analytical framework using inputs from the air quality modeling for the Revised CSAPR Update (RCU) for 2023, as well as the projected 2023 annual emissions inventory from the 2016v2 emissions platform that was used for the air quality modeling for the proposed rule.[76]

As EPA disclaimed in a footnote to the Non-EGU Screening Assessment, "We used the RCU air quality modeling for this screening assessment because the air quality modeling for the proposed rule was not completed in time to support this assessment."[77] As EPA is well aware, for modeling results to have any meaning, they must use a consistent set of accurate assumptions regarding, at a minimum, sources, their release characteristics, and emissions. Since EPA has not previously included non-EGU sources in its prior transport rules, the vetting of these parameters for non-EGU sources assumes even greater significance. We have grave doubts, as substantiated by our comments later, that EPA conducted even the most cursory quality assurance for its modeling

[73] 87 Fed. Reg. at 20,055.
[74] 87 Fed. Reg. at 20,055.
[75] 87 Fed. Reg. at 20,055.
[76] Screening Assessment of Potential Emissions Reductions, Air Quality Impacts, and Costs from Non-EGU Emissions Units for 2026 (Feb. 28, 2022) (updated March 29, 2022) (Non-EGU Screening Assessment") at 2.
[77] Non-EGU Screening Assessment at 2, FN2.

inputs. The fact that modeling was "not completed in time" shows that EPA simply rushed its analysis, sacrificing any semblance of quality. This is not proper nor rational.

a. **EPA's aggregation of dissimilar industries to assess "significant contributions" is unreasonable, unsupported, and unexplained**

As the first step in the Agency's Non-EGU Screening Assessment, EPA "aggregated the underlying projected 2023 emissions inventory data into industries defined by 4-digit NAICS."[78] Such an approach is impermissible under the CAA's good neighbor mandate, which requires that NAAQS implementation plans contain "adequate provisions" prohibiting "any source or other *type of emissions activity* within the State from emitting any air pollutant in amounts which will . . . contribute significantly to nonattainment in, or interfere with maintenance by, any other State."[79]

As this provision of the Act reflects, SIPs and FIPs can only limit emissions to address significant contribution from either: (1) individual sources; or (2) types of emissions activity. Accordingly, while the CAA's good neighbor provision allows EPA and the states to group sources for the purpose of imposing emissions limits, the Act requires that sources be grouped by "type of emissions activity." The North American Industry Classification System does not categorize businesses based on their "type of emissions activity."

According to the U.S. Census Bureau,

> [t]he North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.[80]

A "type" is "a number of things or persons sharing a particular characteristic, or set of characteristics, that causes them to be regarded as a group."[81] Thus, the phrase "type of emissions activity" is properly construed as referring to sources that operate the same emissions units, exhibit similar emissions profiles, and share similar emissions control opportunities. NAICS categorization does not account for any of these shared emissions characteristics.

EPA's decision to define industries by 4-digit NAICS code rather than "type of emissions activity" without first establishing why the 4-digit NAICS code is relevant to distinguish and discern between the "type of emission activity" therefore directly contradicts the express text of the CAA. This is an arbitrary and capricious abuse of discretion. EPA's decision to group facilities according to 4-digit NAICS code is also wholly unexplained. EPA's Non-EGU Screening Analysis disclaims only that this manner of grouping was utilized; it never explains why it was utilized.

EPA's unexplained reliance on a NAICS categorization system that omits consideration of emissions units, emissions profiles, or feasibility of air pollution controls is not a harmless departure from the CAA's requirements. As one example, EPA's categorization by 4-digit NAICS

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[78] Non-EGU Screening Assessment at 2.
[79] 42 U.S.C. 7410(a)(2)(D)(i)(I) (emphasis added).
[80] https://www.census.gov/naics/.
[81] https://www.dictionary.com/browse/type.

code caused the Agency's Non-EGU Screening Assessment to irrationally conflate EAF steelmaking facilities with highly dissimilar (from an emissions activity standpoint) integrated iron and steelmakers, ferroalloy manufacturers, and even foundries.[82] These industry sectors may fall within the same 4-digit NAICS code for economic accounting purposes, but they do not have or share the same "type of emissions activity."

In fact, EPA's aggregation of industries by 4-digit NAICS code for purposes of analyzing which "non-EGU sources in the upwind states significantly contribute to downwind air quality problems for the 2015 ozone NAAQS"[83] would allow the Agency to similarly group disparate emitting activities such as printing ink producers with explosives manufacturers (NAICS 3259); bicycle makers with tank manufacturers (NAICS 3369); and denture manufacturers with eyeglass makers (NAICS 3391).

Congress' directive that SIPs and FIPs group sources by "type of emissions activity" is explicit and purposeful. It ensures that the emissions reductions required in upwind states remain focused on those emissions sources that significantly contribute to downwind nonattainment. If EPA were permitted to ignore the CAA's requirement to categorize by "type of emissions activity," it would be free to adopt a categorization scheme that admits of no stopping point. Indeed, if EPA could not sufficiently establish that iron and steel industry emissions significantly contribute to downwind receptors at the 4-digit NAICS code level, what would stop the Agency from categorizing sources by the even-more-general 2-digit NAICS code and finding the requisite significance based on emissions from all manufacturers?[84] Congress precluded this absurd approach by using the phrase "type of emissions activity" to describe the necessary unifying emissions relationship between sources. EPA has no authority to depart from the text of the statute. EPA's obligation is to apply the CAA as written, not try to improve upon it.[85]

Even if EPA were free to disregard the express text of the CAA (which it is not), the Agency's 4-digit NAICS categorization scheme remains plainly unreasonable because EPA's regulations already categorize industries by "type of emissions activity." In contrast to NAICS categorization, which does not account for the dissimilarity of emissions units, emissions profiles, or feasibility of air pollution controls, EPA could have relied on its well-established regulations under the CAA. Had EPA looked to the NSPS and NESHAP standards that the Agency has been promulgating and implementing for a half a century, EPA would have recognized that EAF steel producers and integrated iron and steel facilities have different scales, different emission units, different control opportunities, different emissions profiles, different NO_X intensity, and therefore very different potential impacts on downwind receptors. And by failing to acknowledge the industry distinctions the Agency has properly recognized for decades, EPA's Proposed FIP ensnared EAF steel producers in 23 states based on erroneously modeled emissions from just two EAF facilities that do not satisfy any of EPA's stated screening criteria.

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[82] *See* Section III above for a discussion of the dissimilarities between these processes.
[83] 87 Fed. Reg. at 20,055.
[84] NAICS Code 33.
[85] *See Pavelic & LeFlore v. Marvel Entertainment Group, Div. of Cadence Industries Corp.*, 493 US 120 at 126 (1989).

b. EPA's framework for assessing whether industries have "potentially controllable" NO_X emissions is irrational and inconsistent

After conflating facilities in a manner wholly inconsistent with the CAA and decades of EPA's implementation of the Act, EPA attempted to identify which of these 4-digit NAICS amalgamations "have large, meaningful air quality impacts from potentially controllable emissions."[86] According to EPA's Non-EGU Screening Assessment, if an emissions unit emits ">100 tpy of NO_X," that emissions unit has "potentially controllable emissions."[87] The Non-EGU Screening Assessment then further suggests that,

> [b]y limiting the focus to potentially controllable emissions, well-controlled sources that still emit > 100 tpy are excluded from consideration. Instead, the focus is on uncontrolled sources or sources that could be better controlled at a reasonable cost. As a result, reductions from any industry identified by this process are more likely to be achievable and to lead to air quality improvements.[88]

Stated differently, EPA's Non-EGU Screening Assessment purports to delineate well-controlled sources from uncontrolled/under-controlled sources as follows:

>100 tpy of NO_X	=	"uncontrolled sources or sources that could be better controlled at a reasonable cost"
$\leq$ 100 tpy of NO_X	=	"well-controlled sources."

To be clear, this wholly unexplained and plainly arbitrary assumption represents the entire basis by which the Non-EGU Screening Assessment delineated uncontrolled/under-controlled NO_X emissions units from well-controlled NO_X emissions units. EPA never considered whether well-controlled emissions units might still emit NO_X greater than 100 tpy and never considered whether sources with emissions under 100 tpy might be entirely uncontrolled. While EPA's reasoning in this respect is far from clear, it is plainly unreasonable.

EPA's Non-EGU Screening Assessment also fails to explain why the Agency declined to use, in the Proposed FIP, the ">150 tpy" threshold it utilized for "Assessing Non-EGU Emission Reduction Potential" for the CSAPR Rule Update.[89] In this earlier assessment – published just one year ago – EPA explained that it "included units with pre-control NO_X emissions >150 tpy" because it was "an emissions threshold comparable to 25 MW for EGUs used in prior interstate transport rulemakings"[90]

The 2021 Non-EGU Screening Assessment also explained why it was important to establish that Non-EGU sources with NO_X emissions were comparable to a 25 MW EGU: "The CSAPR trading

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[86] Non-EGU Screening Assessment at 2.
[87] Non-EGU Screening Assessment at 3.
[88] Non-EGU Screening Assessment at 3.
[89] Assessing Non-EGU Emission Reduction Potential – Updated for Final Rule (Feb. 19, 2021) (https://www.regulations.gov/document/EPA-HQ-OAR-2020-0272-0014) ("2021 Non-EGU Screening Assessment").
[90] 2021 Non-EGU Screening Assessment at 8.

program is currently restricted to EGU sources greater than 25 MW electric generating capacity in the regulation."[91] This, at least rational, explanation is equally applicable here - under the Proposed FIP, since EPA's trading program would *still* be restricted to EGU sources greater than 25 MW electric generating capacity. As such, EPA's current switch to a >100 tpy threshold is even more inexplicable and unreasonable.[92]

Indeed, the preamble to the Proposed FIP asserts that EPA's Step 3 analysis is intended to ensure that "[t]he available reductions and cost-levels for the non-EGU stringency is generally commensurate with the control strategy for EGUs."[93] If so, why would EPA's current Non-EGU Screening Assessment reject the very-recent 2021 Non-EGU Screening Assessment's ">150 tpy" threshold and replace it with a ">100 tpy" that plainly has nothing to do with ensuring parity with EGU controls?

As previously noted, while "agency action representing a policy change" need not be "justified by reasons more substantial than those required to adopt a policy in the first instance," "the requirement that an agency provide a reasoned explanation for its action would ordinarily demand that it display awareness that it *is* changing position."[94]

Nowhere in the Proposed FIP or the Non-EGU Screening Assessment does EPA even acknowledge that it ceased using its prior non-EGU screening threshold to ensure control consistency with EGUs or that the Agency simply lowered and reimagined the threshold as a means to determine whether emissions were controllable. Nor does EPA explain how the Agency's purported interest in setting non-EGU control stringency commensurate with controls

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[91] 2021 Non-EGU Screening Assessment at 8.

[92] In contrast with EPA's current Non-EGU Screening Assessment, which never explains how EPA selected the 100 tpy value as its threshold, EPA's 2021 Non-EGU Screening Assessment provides a detailed explanation of the derivation of the 150 tpy threshold:

"To derive this emissions threshold, we used emissions expected from an average 25 MW EGU unit operating at a median heat rate, emission rate, and capacity factor for a coal-fired unit. . . . This estimate represents a generic 25 MW EGU and relied on assumptions of three factors: heat rate, capacity factor, and NOx emissions rate. To develop an estimate for each of these factors, we evaluated EGUs ranging from 25 MW – 30 MW, which represent the smallest EGUs currently included in the CSAPR trading program. This sample included nine units from the following six plants (ORIS codes): 50931, 2790, 50611, 50835, 57046, 2935. We excluded one outlier unit with a NO_X rate that was nearly three times higher than the next highest NO_X rate. We calculated the median and average heat rate and NO_X rate based on the assumptions included in NEEDS v6 rev: 3-26-2020. We calculated the median and average annual capacity factor based on Air Markets Program data reported to EPA in 2019. These values are summarized below.

	Median	**Average**
Heat Rate (Btu/kWh)	12,140	12,291
NOx Rate (lbs/MMBtu)	0.18	0.23
Capacity Factor (%)	61%	61%

The estimated annual emissions from a typical 25 MW unit based on the assumptions above ranges from about 141 annual tons (median values) to 188 annual tons (average values). Given the small sample sizes, we believe the median values are more representative than average values. Therefore, we estimated that 150 tons per year is a reasonable approximation of the annual NO_X emissions at a typical 25 MW EGU. Since non-EGUs sources are not universally rated in MW electric generating capacity, we believe that NO_X emissions of 150 tons per year is an equivalent threshold for use in this assessment." (2021 Non-EGU Screening Assessment at 8-9).

[93] 87 Fed. Reg. at 20,055.

[94] *F.C.C. v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (emphasis in original).

for EGUs[95] is furthered by abandoning a screening threshold designed for that precise purpose. Declaring, without support, that NO_X emissions below 100 tpy are "well-controlled" and NO_X emissions above 100 tpy are uncontrolled is substantively baseless – and, in fact, says nothing about the efficiency of controls at sources with total emissions above and below this arbitrary threshold – and certainly not a "satisfactory explanation for its action."[96]

c. <u>EPA impermissibly included non-EGUs in the Proposed FIP based on contributions that cannot reasonably be construed as significant</u>

The Agency's impermissible grouping of "types of emissions activity" by 4-digit NAICS codes, and untenable and inexplicable *assumption* that those sources with units emitting NO_X above 100 tpy were "uncontrolled sources or sources that could be better controlled at a reasonable cost" resulted in EPA initially identifying 41 industries for further review.[97] EPA then "estimated contributions from each of [the] 41 industries to each downwind nonattainment and maintenance receptor in 2023."[98]

Industries with modeled contributions of at least 0.01 ppb to a downwind receptor were deemed "impactful industries."[99] EPA then ranked the modeled contributions of the "impactful industries" based on magnitude and geographic scope. Those sectors that EPA modeled as: (1) having a maximum contribution to any one receptor of >0.10 ppb; and (2) contributions of ≥0.01 ppb to at least 10 receptors were deemed "Tier 1" industries.[100] These "Tier 1" industries included the 4-digit NAICS categories for: (1) Pipeline Transportation of Natural Gas; (2) Cement and Concrete Product Manufacturing; (3) Iron and Steel Mills and Ferroalloy Manufacturing; and, (4) Glass and Glass Product Manufacturing.[101]

EPA's Non-EGU Screening Assessment also identified "Tier 2" industries that EPA modeled as having either: (1) a maximum contribution to any one receptor ≥0.10 ppb but contribute ≥0.01 ppb to fewer than 10 receptors; or (2) a maximum contribution ≥0.01 ppb to at least 10 receptors.[102] The five "Tier 2" industries included the 4-digit NAICS categories for: (1) Basic Chemical Manufacturing; (2) Petroleum and Coal Products Manufacturing; (3) Metal Ore Mining; (4) Lime and Gypsum Product Manufacturing; and, (5) Pulp, Paper, and Paperboard Mills.[103]

Based on this analysis:

> EPA proposes to find that NO_X emissions from non-EGU sources are significantly contributing to nonattainment or interfering with maintenance of the 2015 ozone NAAQS and that cost-effective controls for NO_X emissions reductions are available

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[95] 87 Fed. Reg. 20,055.
[96] *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) (quoting *Burlington Truck Lines v. United States*, 371 U.S. 156, 168, (1962)).
[97] Non-EGU Screening Assessment at 22 (Appendix A).
[98] Non-EGU Screening Assessment at 22 (Appendix A).
[99] 87 Fed. Reg. at 20,084 (FN 164).
[100] Non-EGU Screening Assessment at 3.
[101] Non-EGU Screening Assessment at 3.
[102] Non-EGU Screening Assessment at 3.
[103] Non-EGU Screening Assessment at 3.

in [the "Tier 1" and "Tier 2" categories] that would result in meaningful air quality improvements in downwind receptors."[104]

Setting aside EPA's failure to explain or support the breakpoints it used to identify the "Tier 1" and "Tier 2" sectors, it bears noting that at this point in the Non-EGU Screening Assessment, EPA appears to have lost sight of the standard under which it is proposing to include Non-EGUs in the Proposed FIP.

Recall that in Step 3 of EPA's 4-Step analysis, EPA purports to identify within upwind states linked under Step 2, those emissions from "sources or types of emissions activity" that "significantly contribute to downwind nonattainment or interfere with downwind maintenance of the NAAQS."[105] But after proceeding through each step of the Non-EGU Screening Assessment's "comprehensive evaluation of major stationary source non-EGU industries in the linked upwind states,"[106] EPA concludes only that "meaningful air quality improvements in downwind receptors" are potentially available from emissions reductions from "impactful" "Tier 1" and "Tier 2" industries.[107]

EPA repeats these references to "meaningful" impacts throughout the Proposed FIP,[108] but never explains what they mean. What is clear, however, is that EPA's Proposed FIP never actually analyzed whether non-EGUs "significantly contribute to downwind nonattainment or interfere with downwind maintenance of the NAAQS."[109] EPA's Step 3 analysis, and the Non-EGU Screening Assessment it deployed in support of that analysis, setting aside its other flaws, simply answered a different question than the Agency was supposed to ask.

Thus, even if every assumption underlying the Agency's Step 3 analysis was unimpeachable, EPA can still only conclude that reducing NO_X from certain upwind non-EGUs may lead to meaningful air quality improvements at downwind receptors. EPA cannot include non-EGUs in a FIP based on this agency-constructed and entirely unexplained standard.

Although the CAA fails to prescribe precisely how to establish the "significance level" applicable to interstate transport rules, the Act plainly does limit imposition of those rules to "any source or other type of emissions activity . . . which will contribute significantly to nonattainment in, or interfere with maintenance by, any other State."[110] Thus, while EPA "possesses a measure of latitude in defining which upwind contribution "amounts" count as "significant" and thus must be abated,"[111] at minimum, EPA must at least define the upwind contributions that it counts as significant. In the Proposed FIP, EPA did not, and seemingly cannot, define upwind non-EGU emissions as significant contributors to downwind receptors.

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[104] 87 Fed. Reg. at 20,039.
[105] 87 Fed. Reg. at 20,041 – 20,042 (emphasis added)
[106] 87 Fed. Reg. at 20,055.
[107] 87 Fed. Reg. at 20,043 (emphasis added).
[108] *See* 87 Fed. Reg. at 20,039, 20,040, 20,043, 20,053, 20,077.
[109] 87 Fed. Reg. at 20,041 – 20,042 (emphasis added).
[110] CAA Section 110(a)(2)(d).
[111] *EME Homer II*, 572 U.S. at 514-16.

EPA's Proposed FIP correctly notes that multiple prior interstate transport rules used 1% of the NAAQS as the threshold for determining the significance of an upwind state's collective contribution to a downwind receptor,[112] but fails to contend with the practical consequence of continuing to utilize a percentage-based threshold to establish linkages to significantly lower standards. Now that EPA has reduced the ozone NAAQS to 70 ppb, a 1% state-wide contribution is vanishingly small. In fact, this level of contribution (0.70 ppb) cannot be reliably measured at current ambient ozone air monitors – none of which have reliable detection levels of 1 ppb or greater.[113] Thus, it is far from clear how EPA can reasonably conclude, as the D.C. Circuit instructed, that a 1% contribution reflects a "measurable contribution" to downwind nonattainment and maintenance problems.[114]

Nonetheless, even if 1% continued to provide an appropriate screening threshold for state-wide contributions under Step 2, EPA's Step 3 analysis must credibly determine that each "type of emissions activity" emits NO_X at levels that will "contribute significantly" to downwind nonattainment before EPA can impose limits and other conditions in Step 4 of the analysis.[115] The 0.01 ppb threshold through which EPA identified these Tier 1 and Tier 2 industries for inclusion in the Proposed FIP does not allow for such a determination.

The 0.01 ppb threshold at a receptor (or monitor) represents a contribution level of 0.014% of the 70 ppb 2015 Ozone NAAQS, which is several orders of magnitude lower than that which can actually be reliably measured (if measured at all), at any of EPA's designated ozone monitors. The CAA's Good Neighbor provision allows EPA and the states to prohibit "any source or type of emissions activity . . . from emitting any air pollutants in amounts . . . which will contribute significantly to nonattainment . . . or interfere with maintenance"[116] The 4-digit NAICS groupings proposed for regulation based on their presumed collective (and undetectable) 0.014% contributions to downwind receptors are certainly not credibly construed as NO_X contributors that are "significant," "meaningful," or "measureable."

Indeed, rather than invent a new screening threshold based on "impactful" and "meaningful," but entirely unmeasurable contributions of as little 0.01 ppb, EPA should have based its Step 3 non-EGU screening threshold on the Agency's existing "Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration ("PSD") Permitting Program" ("2018 SIL Guidance").[117] While the 2018 SIL Guidance is designed for source-specific PSD permitting decisions, for purposes of demonstrating that "emissions from construction or operation of such facility will not cause, or contribute to, air pollution in excess of any" NAAQS or PSD increment,[118] EPA has long interpreted the phrase "cause, or contribute to" to mean that a proposed source will have a "significant impact" on air pollutant concentrations that violate the

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[112] 87 Fed. Reg. at 20,073.

[113] *See* EPA's recent (December 2021) List of Designated Reference and Equivalent Methods available at https://www.epa.gov/system/files/documents/2021-12/designated-referene-and-equivalent-methods-12152021.pdf.

[114] *Michigan*, 213 F.3d at 684 (". . . *EPA must first establish that there is a measurable [air quality] contribution*. Interstate contributions cannot be assumed out of thin air.") (Emphasis in original).

[115] 42 U.S.C. 7410(a)(2)(D)(i)(I).

[116] 42 U.S.C. 7410(a)(2)(D)(i)(I).

[117] P. Tsirigotis Memo, Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program at 15-16 (Apr. 17, 2018).

[118] 42 U.S.C. 7475(a)(3).

NAAQS.[119] Thus, as relevant to EPA's Step 3 Non-EGU Screening Assessment, the 2018 SIL Guidance describes the "technical analysis and information" on which to assess whether emissions significantly impact NAAQS attainment.

In developing the recommended SIL for ozone, EPA:

> assessed the variability in pollutant concentrations, as determined by the national monitoring network, from the design value at each monitor (*i.e.*, baseline value). The technical analysis uses traditional statistical techniques based on statistical significance testing to characterize the variability in air quality. The conceptual underpinnings of the analysis are an application of the concept of 'statistical significance' to inform a policy decision regarding what represents an insignificant impact and, therefore, may serve as the basis for developing a SIL for use in the air quality impact analyses required for PSD permitting. More specifically, traditional statistics is based on the concept of identifying what constitutes a statistically significant change from a baseline value where the 'baseline' is the statistic of interest, such as the mean or, in this case, the design value. Rather than focusing on statistically significant changes, the purpose of the analysis was to calculate changes in the design values that, once precautionary choices are applied, may be considered not significant or meaningful. To identify recommended SILs for the desired application in the PSD program, the EPA determined that the findings of the statistical analysis can be used to identify a change in the design value (*i.e.*, an air quality impact) below which a permitting authority may reasonably conclude that the impact does not cause or contribute to a violation of a NAAQS.[120]

Thus, in the PSD context, the term "insignificant" describes a degree of impact that is "trivial" or "*de minimis*" in nature.[121] "Conversely, in this context, the EPA has described an impact that is greater than 'trivial' or '*de minimis*' as a 'significant impact.'"[122]

The SIL value EPA's 2018 SIL Guidance recommended for the 2015 Ozone NAAQS is 1.0 ppb.[123] Therefore, applying the descriptions EPA used in the 2018 SIL Guidance, emissions that contribute less than 1.0 ppb toward the 2015 Ozone NAAQS are considered "insignificant," "*de minimis*," or "trivial."

Notably, this 1.0 ppb SIL value (1.4% of the 70 ppb 2015 Ozone NAAQS) is used by EPA and the states to screen out the "trivial" emissions impacts at a level as small as single sources. In contrast, EPA's Non-EGU Screening Assessment purports to identify entire non-EGU industry sectors with dozens of emissions units as "significant contributors" to downwind receptors based on collective contributions of one-tenth to one-hundredth of the threshold that the 2018 SIL Guidance recommends for single sources.

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[119] *See In re: Prairie State Generating Co.*, 13 E.A.D. 1, 105 (EAB 2006).
[120] 2018 SIL Guidance at 12.
[121] 2018 SIL Guidance at 10.
[122] 2018 SIL Guidance at 10.
[123] 2018 SIL Guidance at 15. "This value is based on the annual 4th highest daily maximum 8-hour concentration averaged over 3 years."

Unlike the 2018 SIL Guidance, which describes the scientific, technical, and statistical basis for its value in great detail, EPA's Non-EGU Screening Assessment never explains how it derived the 0.01/0.1 ppb thresholds it used for non-EGUs at Step 3 and never identifies the data on which these thresholds were based. Nor does EPA explain anywhere in the administrative record why it never even considered using the value in the 2018 SIL Guidance as a basis to screen for the significance of sector-wide emissions contributions. Such an unexplained and illogical approach appears all the more arbitrary given that, four months after EPA published the 2018 SIL Guidance, EPA determined that "a threshold of 1 ppb may be appropriate for states to use to develop SIP revisions addressing the good neighbor provision for the 2015 ozone NAAQS."[124]

EPA never explains why it disregarded these guidelines in favor of its unexplained 0.01/0.1 ppb thresholds, and thus cannot articulate a "rational connection between the facts found and the choice made."[125] The 0.01/0.1 ppb thresholds are therefore an arbitrary and impermissible exercise of EPA's authority under the "Good Neighbor" provisions of the CAA.

d. <u>EPA utilized an unsupported $7,500 per ton cost threshold to assess ozone season NO_X reduction potential</u>

For the next step in EPA's Non-EGU Screening Assessment, EPA prepared a listing of potential control measures and costs "to identify an annual cost threshold for evaluating potential emissions reductions in the Tier 1 and Tier 2 industries."[126] EPA used CoST, CMBD, and a projected 2023 emissions inventory to develop its cost analyses. There are innumerable problems in EPA's analysis. We note two of them.

First, EPA does not support with any data, the baseline (or "uncontrolled") NO_X emissions that are the basis of the 2019/2023 inventory for EAF sources. By simply *assuming* that these sources are uncontrolled (when, in fact, many are controlled such as by the use of low-NO_X or ultra-low-NO_X burners), EPA arbitrarily applies large (and technically infeasible) control efficiencies to these baseline emissions using technologies such as SCR or FGR that, in many cases, are simply technically infeasible or incompatible, to arrive at algebraic on-paper large "reductions" of annual NO_X emissions from sources. These large and wholly unrealistic "reductions" in the denominator then served to drive down EPA's calculated cost-effectiveness determinations.

Second, as to the capital and operating costs in the numerator, EPA made no attempt (in the record at least) to contact any vendors of its purported NO_X reduction technologies, such as SCR, FGR, or others and to elicit realistic costs, taking into account retrofit costs, even in cases when a control approach may be technically feasible. Moreover, the cost assessment EPA used in the Proposed FIP were simply not developed with any consideration of the types of NO_X sources in the EAF steelmaking subsector – such as EAFs themselves, reheat furnaces (of many and varied designs), annealing furnaces, *etc*.

Using these flawed inputs and assumptions, the Non-EGU Screening Assessment "plotted curves for Tier 1 industries, Tier 2 industries, Tier 1 and 2 industries, and all industries at $500 per ton

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[124] Memorandum from Peter Tsirigotis, Directors of Air Quality Planning and Standards to Regional Air Division Directors, Regions 1-10, EPA, at 3 (Aug. 31, 2018).
[125] *Burlington Truck Lines, Inc. v. U.S.*, 371 U.S. 156, 168 (1962).
[126] 87 Fed. Reg. at 20,083.

increments."[127] EPA then examined the curves it had plotted for each of these industry groupings and identified "a 'knee in the curve' at approximately $7,500 per ton."[128] According to the Non-EGU Screening Assessment, this "knee in the curve" represents the point at which potential NO_X emission reductions significantly increase relative to estimated control costs.[129] Thus, "EPA used this marginal cost threshold to further assess potential control strategies, estimated emissions reductions, air quality improvements, and costs from the potentially impactful industries."[130]

There are two significant additional errors with this manner of establishing $7,500 per ton as the marginal acceptable cost threshold for non-EGUs. First, by using this approach, EPA divorced the marginal cost threshold it applied to non-EGUs from the cost threshold it used for EGUs. Notwithstanding the Proposed FIP's assertion that EPA attempted to ensure that "available reductions and cost-levels for the non-EGU stringency is generally commensurate with the control strategy for EGUs,"[131] the Non-EGU Screening Assessment's $7,500 per ton marginal cost threshold is not based on any consideration of, and bears no relationship to, the significantly *lower* marginal cost threshold EPA proposes to apply to EGUs.[132] The Non-EGU Screening Assessment's $7,500 per ton marginal cost threshold merely represents the point that EPA believes that non-EGU NO_X emissions reductions increase the most relative to control costs.

Critically, EPA's decision to establish the cost-per-ton ("CPT") threshold in this manner represents a significant departure from the manner in which EPA set the CPT threshold in the 2021 Non-EGU Screening Assessment just last year.[133] Like the current Non-EGU Screening Assessment, the 2021 Non-EGU Screening Assessment plotted potential NO_X reductions associated with specified control cost increments and examined the plotted data for breakpoints in the control cost curve.[134] Unlike the current Non-EGU Screening Assessment, however, the 2021 Non-EGU Screening Assessment selected for further analysis a $2,000 breakpoint in the control cost curve that was roughly aligned with the $1,800 CPT threshold EPA had utilized for EGUs.[135]

In 2021, EPA attempted to align the non-EGU CPT threshold with the EGU CPT threshold in order to determine whether similarly priced NO_X controls on non-EGUs could result in substantial additional NO_X contributions to downwind receptors. In contrast, the current Non-EGU Screening Assessment works back from a predetermined conclusion that EPA will impose NO_X controls on non-EGU sources, and therefore EPA used the CPT threshold solely as a means to justify the imposition of significantly higher control costs.

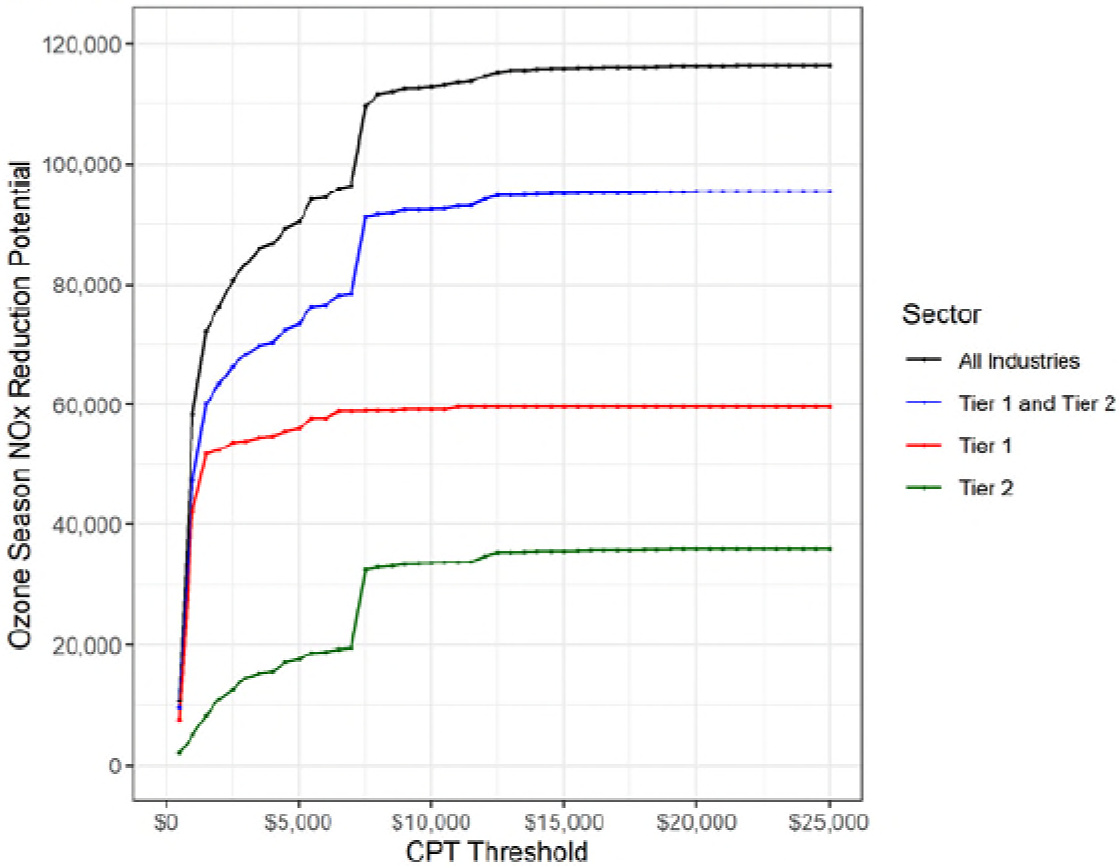
This is a fundamental change with real and obvious consequences. EPA's current Non-EGU Screening Assessment represents the Agency's abandonment of any sense of the cost-effectiveness parity that was a central consideration in prior good neighbor FIPs and endorsed by the Supreme

[127] 87 Fed. Reg. at 20,083.
[128] 87 Fed. Reg. at 20,083.
[129] Non-EGU Screening Assessment at 4.
[130] 87 Fed. Reg. at 20,083.
[131] 87 Fed. Reg. at 20,055.
[132] *See* 87 Fed. Reg. at 20,077 - 20,082.
[133] *See* 2021 Non-EGU Screening Assessment.
[134] 2021 Non-EGU Screening Assessment at 4.
[135] 2021 Non-EGU Screening Assessment at 4.

Court in *EME Homer City*.[136] Moreover, this fundamental change is neither explained or even acknowledged by EPA. On that basis alone it is an arbitrary and capricious abuse of agency discretion.[137]

The second significant error in the Agency's selection of the $7,500 per ton marginal cost threshold for non-EGUs is that this threshold bears no relationship to EPA's marginal cost estimates for Tier 1 industries. As plainly indicated by the marginal cost curves EPA plotted in the Non-EGU Screening Assessment (reproduced below), there is no "knee in the curve" for Tier 1 industries at or near the $7,500 CPT threshold.

Figure 1. Ozone Season NOx Reductions and Costs per Ton (CPT) for Tier 1, Tier 2 Industries, and Other Industries



To the extent a "knee" can be identified for Tier 1 industries, it is at $1,000. Of the nearly 60,000 tons of potential ozone season NO_X reductions EPA attributes to Tier 1 industries, approximately 43,000 tons of the potential reductions occur at the $1,000 CPT threshold. EPA estimates approximately 10,000 tons of additional NO_X reduction potential at the $1,500 CPT threshold for

[136] 572 U.S. at 520.

[137] While "agency action representing a policy change" need not be "justified by reasons more substantial than those required to adopt a policy in the first instance," "the requirement that an agency provide a reasoned explanation for its action would ordinarily demand that it display awareness that it *is* changing position." *F.C.C. v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (emphasis in original).

a total of nearly 53,000 tons of potential NO_X reductions. Above the $1,500 CPT threshold, the cost curve for Tier 1 industries plainly flattens. According to EPA's table, increasing control costs on Tier 1 industries from $1,500 to $5,500 will only result in approximately 5,000 additional tons of potential NO_X reductions. The remaining 2,000-3,000 tons of potential ozone season NO_X reductions EPA attributes to Tier 1 industries appear to come at the $6,500 CPT threshold; EPA seemingly identifies no additional Tier 1 industry NO_X emission reduction potential for control costs above $6,500.

EPA's imagined "knee in the curve" at the $7,500 CPT threshold appears to be based exclusively on EPA's estimates for Tier 2 industries. While the sharp increase at the $7,500 CPT level can still be observed when EPA combines the Tier 2 costs with costs for Tier 1 industries and "all industries," the "knee" at $7,500 CPT remains plainly attributable to Tier 2 industries alone. Thus, if EPA's intent in identifying the "knee in the curve" was to select the point at which NO_X emission reduction potential increases the most relative to control costs, the $7,500 CPT threshold is plainly incorrect for Tier 1 non-EGU industries, including the iron and steel sector and the EAF steel subsector.

EPA's selection of $7,500 CPT as the marginal cost threshold for Tier 1 industries is therefore arbitrary and capricious. Particularly so, given that EPA's analytical framework provided the Agency the ability to distinguish the marginal control costs between Tier 1 and Tier 2 industries. Indeed, EPA's decision to combine and conflate these marginal control cost estimates after they had been separately derived for Tier 1 and Tier 2 industries, while entirely unexplained, is readily discernable.

The result of this artificial conflation allowed EPA to avoid finding that any of the Tier 1 industries it identified in the preceding steps of the Non-EGU Screening Assessment could be "screened out" for lack of cost-effective NO_X controls. In other words, by applying to Tier 1 industries the $7,500 CPT threshold that EPA derived from Tier 2 industry data, EPA ensured that each Tier 1 industry it identified in the Non-EGU Screening Assessment could be assigned control requirements several thousand dollars above what could otherwise be considered cost-effective on a CPT basis for Tier 1 alone.

In the final step in the Agency's Step 3 "significant contribution" assessment, EPA used this inflated $7,500 CPT threshold as the key input in its Control Strategy Tool (CoST) and predictably determined that the Tier 1 and Tier 2 "impactful" non-EGU industries could feasibly and cost effectively eliminate the their significant contributions of NO_X to downwind receptors. As the EAF Steel Associations discussed in the preceding subsections, each aspect of this Step 3 analysis for non-EGU appears to have been designed to reach this precise pre-determined conclusion.

Declining to categorize sources by "type of emissions activity" freed EPA to construct and analyze assessment groups of any size or type. Utilizing the 100 tpy threshold to delineate well-controlled sources from uncontrolled/under-controlled sources allowed EPA to delink the cost-effectiveness thresholds for non-EGUs from the thresholds EPA used for EGUs. Screening "impactful industries" based on contributions of as little as 0.01 ppb unburdened EPA of any obligation to demonstrate that contributions from EPA's groupings were "significant" or even measurable. And using Tier 2 data to inflate the control cost threshold for all Non-EGUs ensured that EPA would ultimately conclude that its agency-constructed non-EGU industry groups could avoid "meaningfully impacting" downwind receptors by using cost-effective controls.

This conclusion-driven approach is wholly inconsistent with EPA's FIP authority under the CAA. The Agency's assessment of non-EGUs is unsupported, unexplained, and with the exception of those aspects that plainly evince predetermined conclusions, is largely incomprehensible. EPA's conclusions about the significance of contributions from non-EGUs are not rationally connected to the facts before the Agency or accepted scientific methodologies. The EAF Steel Associations therefore respectfully urge EPA to rescind this Proposed FIP.

VII. EPA's SCREENING ANALYSIS IMPROPERLY CONCLUDES THAT STEEL SECTOR FACILITIES "CONTRIBUTE SIGNIFICANTLY" TO DOWNWIND NONATTAINMENT OR INTERFERE WITH MAINTENANCE

While the previous section describes the ways in which EPA's Non-EGU Screening Assessment erred in assessing the significance of contributions from non-EGUs generally, this section describes how EPA's Non-EGU Screening Assessment incorrectly and arbitrarily concluded that the iron and steel sector, and in particular, EAF steel producers' NO_X emissions contribute to downwind nonattainment or interfere with maintenance.

We illustrate this via a series of Exhibits created from the spreadsheets provided in the docket. Exhibit A1 below shows the specific Iron and Steel facilities that EPA identified as part of the Tier 1 facilities and the number of individual sources (called units, in the second column from the left) as well as their ozone season emissions in tons (from 2019 data, assumed to be the same as 2023) in the third column from the left, followed by the ozone season emissions reductions and EPA's cost estimate to achieve those reductions. We note the following: (i) that of the facilities identified in the sector, just two of them, highlighted in yellow, are EAF mills – the rest are integrated iron and steel mills. For these two sources, EPA identified one unit with just 19 tons of ozone season NO_X at one mill ("Nucor-Blytheville") and just two units at the second EAF mill ("Chaparral-Virginia"). Thus, EPA's own analysis as summarized in this exhibit shows that that EAF subsector has been pulled into the Proposed FIP as a result of EPA's estimated 267 tons of ozone season NO_X emissions from three sources/units at two mills.

EXHIBIT A1 - EPA-HQ-OAR-2021-0668-0191_attachment_1
Tab = "Tier 1 Facilities"

FACILITY_ID	Number of Uni	emissions	os_emis_reduction	annual_cost	state	county	site_name
1008911	1	19	6	9,432	AR	Mississippi	NUCOR-YAMATO STEEL COMPANY
3986511	11	2,671	786	6,720,447	IN	Lake	ARCELORMITTAL USA LLC
3986611	1	484	172	1,712,133	IN	Lake	ArcelorMittal USA LLC
7376511	9	2,688	871	7,601,867	IN	Porter	ArcelorMittal Burns Harbor LLC
8483711	1	100	38	379,116	MI	Wayne	AK STEEL - DEARBORN WORKS
8008811	4	1,215	457	4,998,195	OH	Butler	AK Steel Corporation (1409010006)
7937411	3	649	135	1,185,727	OH	Cuyahoga	ArcelorMittal Cleveland LLC (1318001613)
8115611	2	704	255	1,464,643	OH	Trumbull	ArcelorMittal Warren (0278000648)
8204511	5	1,176	438	6,124,540	PA	Allegheny	USS/CLAIRTON WORKS
6742911	2	246	92	963,157	VA	Dinwiddie	Chaparral Virginia Incorporated

Exhibit A2 below provides EPA's descriptions of the three sources at the two mills. The Nucor source is generically noted as "Industrial Processes – Other Not Classified." For the Chaparral mill, one source is identified as "Industrial Processes – Blast Furnace…." and the other as a "Boiler…". We are not aware of either type of source at this mill. By definition, this EAF does not have a Blast Furnace, since it produces steel from scrap using an EAF. And, we are not aware of any boiler of this size at this plant. A quick review of the Chaparral plant's Title V permit, publicly available, confirms this.

EXHIBIT A2 - EPA-HQ-OAR-2021-0668-0191_attachment_1

State	County	Company/Site Name	Emissions Source Group	Annual NOx Emissions	Existing Control	Selected Control Technology	Annual NOx Emissions Reduction	OS NOx Emissions Reduction	Annual Cost
AR	Mississippi	Nucor Corporation NA (51%); Yamato Kygyo (49%) Japan; Nucor-Yamato Steel Company	Industrial Processes - Other Not Classified	19	None Specified	Low NOx Burner and Flue Gas Recirculation (77%)	15	6	$9,432
VA	Dinwiddie	Chaparral Virginia Incorporated	Industrial Processes - Blast Furnace: Casting/Tapping: Local Evacuation	102	None Specified	Selective Catalytic Reduction (90%)	91	38	$383,607
VA	Dinwiddie	Chaparral Virginia Incorporated	Boilers - > 100 Million BTU/hr	144	None Specified	Selective Catalytic Reduction (90%)	130	54	$579,550

Tab = "Emission Units"

Next, we show in Exhibit B below[138], the manner in which the actual modeling that EPA conducted characterized the various sources relevant to the EAF steel industry.

EXHIBIT B – MOG Model Input
Tab = "Iron and Steel 2023, Control"

fips	facility_n	emis_reduc	os_emissio	os_emis_re	stkhgt	stkdiam	stktemp	stkflow	stkvel	control_te	control_ef	source_gro	state_name
01097	SSAB Alabama Inc	158.64	85.84	66.10	150	10	1420	4509	57.44	Low NOx Burner and Flue Gas Recirculation	77	Iron and Steel Production; Blast Heating or Reheating	Alabama
05093	NUCOR-YAMATO STEEL COMPANY	11.61	6.28	4.84	155	6.5	186	3079	92.8	Low NOx Burner and Flue Gas Recirculation	77	Iron and Steel Production; Blast Heating or Reheating	Arkansas
05093	NUCOR-YAMATO STEEL COMPANY	12.67	6.85	5.28	150	6.5	187	3086	93	Low NOx Burner and Flue Gas Recirculation	77	Iron and Steel Production; Blast Heating or Reheating	Arkansas
18089	ARCELORMITTAL USA LLC	162.30	75.14	67.62	160	12	230	7341	64.9	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Indiana
18089	ARCELORMITTAL USA LLC	56.76	52.55	23.65	183	8.7	1200	167	2.8	Selective Non-Catalytic Reduction	45	Industrial Incinerators, Municipal Waste Combustors	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	48.06	22.25	20.03	38	22	138	3307	8.7	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	87.44	40.48	36.43	82	19.76	125	5673	18.5	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	47.52	25.72	19.80	138	7.95	200	1668	33.6	Low NOx Burner and Flue Gas Recirculation	77	Iron and Steel Production; Blast Heating or Reheating	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	51.25	27.73	21.36	168	10.18	200	3337	41	Low NOx Burner and Flue Gas Recirculation	77	Iron and Steel Production; Blast Heating or Reheating	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	721.91	334.22	300.80	79	17	114	10396	45.8	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	31.30	14.49	13.04	62	5.13	500	1666	80.6	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	131.31	99.47	54.71	201	11.43	475	5336	52	Low NOx Burner and Flue Gas Recirculation	55	Fuel Fired Equip; Process Htrs; Pro Gas	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	48.01	36.37	20.00	201	11.43	475	5336	52	Low NOx Burner and Flue Gas Recirculation	55	Fuel Fired Equip; Process Htrs; Pro Gas	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	51.33	38.89	21.39	201	11.79	475	5339	48.9	Low NOx Burner and Flue Gas Recirculation	55	Fuel Fired Equip; Process Htrs; Pro Gas	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	31.83	14.74	13.26	62	5.13	500	1666	80.6	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Indiana
19139	SSAB IOWA, INC - MUSCATINE	196.82	106.51	82.01	111.8	9.83	875	12996	0	Low NOx Burner and Flue Gas Recirculation	77	Iron and Steel Production; Blast Heating or Reheating	Iowa
39017	AK Steel Corporation (1409010006)	316.03	144.70	131.68	171.9	11	550	7443	0	Ultra Low NOx Burner and Selective Catalytic Reduction	91	ICI Boilers - Gas	Ohio
39017	AK Steel Corporation (1409010006)	474.10	217.08	197.54	171.9	11	550	7443	0	Ultra Low NOx Burner and Selective Catalytic Reduction	91	ICI Boilers - Gas	Ohio
39017	AK Steel Corporation (1409010006)	300.68	137.67	125.28	171.9	11	550	7443	0	Ultra Low NOx Burner and Selective Catalytic Reduction	91	ICI Boilers - Gas	Ohio
39035	ArcelorMittal Cleveland LLC (1318001613)	20.90	15.84	8.71	175.9	11	500	2096	0	Low NOx Burner and Flue Gas Recirculation	55	In-Proc;Process Gas;Coke Oven/Blast Furn	Ohio
39035	ArcelorMittal Cleveland LLC (1318001613)	18.31	8.48	7.63	0	0	0	0	0	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Ohio
39035	ArcelorMittal Cleveland LLC (1318001613)	20.90	15.84	8.71	1	1	1300	1667	0	Low NOx Burner and Flue Gas Recirculation	55	In-Proc;Process Gas;Coke Oven/Blast Furn	Ohio
39155	ArcelorMittal Warren (0278000648)	462.71	211.86	192.80	225	10	1300	43	0	Ultra Low NOx Burner and Selective Catalytic Reduction	91	ICI Boilers - Gas	Ohio
42003	USS/CLAIRTON WORKS	172.98	79.21	72.08	322	12	446	2070	18.308	Ultra Low NOx Burner and Selective Catalytic Reduction	91	ICI Boilers - Gas	Pennsylvania
42003	USS/CLAIRTON WORKS	165.51	75.78	68.96	190	7	303	2771	71.964	Ultra Low NOx Burner and Selective Catalytic Reduction	91	ICI Boilers - Gas	Pennsylvania
42003	USS/CLAIRTON WORKS	409.13	187.33	170.47	190	8.8	364	5835	95.903	Ultra Low NOx Burner and Selective Catalytic Reduction	91	ICI Boilers - Gas	Pennsylvania
51053	Chaparral Virginia Incorporated	109.25	50.58	45.52	98	50	164	0	12.5	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Virginia

[138] Courtesy of Mr. Greg Stella, a modeler with Alpine Geophysics who is working with MOG.

As the table in Exhibit B makes clear, the EPA modeling seems to have used two sources at the Nucor mill and one at the Chaparral mill –the opposite number of sources (one at Nucor and two at Chaparral) reported by EPA as shown in Exhibits A1 and A2 number of sources. While the actual sources at these mills are not identified and we are unable to identify the sources based on the information EPA has made available, we are not aware of or able to identify any sources at Chaparral with a stack diameter of 50 (feet) as noted. Perhaps EPA has attempted to depict, for modeling purposes, a specific source, like the baghouse through which the EAF exhausts emissions into the atmosphere, with a pseudo-diameter. But no details are available in the record that confirm or provide any basis for this number. In fact, we could not find the source of any of the modeling parameters like stack height, temperature, velocity, *etc*. in the record. Accordingly, we cannot confirm that the source characteristics are accurately depicted in EPA's model. Stack velocity is particularly important since it provides momentum for the dispersion of the exhausts. It is unclear, for example, how EPA arrived at a stack velocity of 12.5 (feet per second) for the Chaparral source when the stack flow is shown as zero.

Next, we turn to EPA's summary of the impacts of the NO_X emissions sources from various sectors and sources, as modeled, on downwind ozone receptors/monitors. Exhibit C, below, shows, for selected monitors,[139] the average and maximum ozone ppb required for attainment, followed by how much ozone at a monitor is ascribed to three broad categories of sources: (1) home state; (2) all Tier 1 sources; and, (3) all Tier 2 sources. We note that the combined contribution of all sources in all of the Tier 1 sectors at any monitor highlighted in yellow does not exceed even 0.5 ppb. We reiterate that none of these monitors has the capability to accurately assess this level of ozone, as discussed elsewhere in these comments.

[139] Monitors relevant to the EAF industry are in yellow highlighting.

EXHIBIT C1 - EPA-HQ-OAR-2021-0668-0150_attachment_2(5)
Tab = "Table 2"

Receptor ID	State	Receptor Name	Average/Max PPB Improvement Needed to Attain	Home State PPB Contribution	Tier 1	Tier 2
40278011	AZ	Yuma	-/0.9	2.8	0.027	0.001
80350004	CO	Denver/Chatfield	-/0.2	15.6	0.055	0.001
80590006	CO	Rocky Flats	0.8/1.4	17.3	0.042	0.000
80590011	CO	Denver/NREL	1.7/2.4	17.6	0.044	0.001
90010017	CT	Greenwich	0.6/1.3	9.3	0.231	0.016
90013007	CT	Stratford	1.9/2.8	4.1	0.332	0.024
90019003	CT	Westport	3.7/3.9	2.9	0.314	0.022
90099002	CT	Madison	-/1.5	3.9	0.323	0.023
170310001	IL	Chicago/Alsip	-/1.6	19.4	0.196	0.065
170310032	IL	Chicago/South	-/0.8	16.6	0.299	0.076
170310076	IL	Chicago/ComEd	-/0.4	18.7	0.229	0.060
170314201	IL	Chicago/Northbrook	-/1.5	21.4	0.262	0.069
170317002	IL	Chicago/Evanston	-/1.1	18.9	0.307	0.049
480391004	TX	Houston/Brazoria	-/0.3	29.3	0.302	0.169
482010024	TX	Houston/Aldine	3.3/4.8	29.7	0.186	0.098
490110004	UT	SLC/Bountiful	0.8/3	8	0.037	0.002
490353006	UT	SLC/Hawthorne	1.6/3.2	8.3	0.036	0.002
490353013	UT	SLC/Herriman	2.6/3.1	8.9	0.018	0.001
490570002	UT	SLC/Ogden	-/0.8	6.1	0.034	0.001
550590019	WI	Kenosha/Water Tower	0.8/1.7	5.8	0.325	0.035
550590025	WI	Kenosha/Chiwaukee	-/0.2	2.6	0.392	0.051
551010020	WI	Racine/Racine	-/1.2	10.8	0.353	0.044
60070007	CA	Butte	-/-0.8	23.5	0.000	0.000
60170010	CA	El Dorado #1	4.1/6.5	26.7	0.000	0.000
60170020	CA	El Dorado #2	2.3/4.1	28.7	0.000	0.000
60190007	CA	Fresno #1	8.6/10.4	29.1	0.001	0.000
60190011	CA	Fresno #2	11/11.9	31.1	0.002	0.000
60195001	CA	Fresno #3	11.8/14.5	30.2	0.002	0.000
60570005	CA	Nevada	6.3/9.6	25.4	0.000	0.000
60610003	CA	Placer #1	5/7.7	29.8	0.000	0.000
60610004	CA	Placer #2	0/5.1	24	0.000	0.000
60670012	CA	Sacramento	2.7/3.4	30.8	0.000	0.000
60990005	CA	Stanislaus	3.8/4.7	29.2	0.001	0.000

Before we continue further with our review of contributions to ozone by EAF sources, we note (since they are derived from the same parent reference as Exhibit C1 above), a couple of additional data points for the EAF sources in Exhibits C2 and C3 below. Setting aside all of the other important and significant flaws in EPA's analysis, Exhibit C2 confirms that the combined NO_X emissions reduction that EPA estimates from the EAF sources is just 3% of even the Iron and Steel sector sources. Of course, this would be far smaller if compared to the total Tier 1 reductions, or the combined reductions from all sources in the Proposed FIP. This confirms, even at the NO_X reduction level, the insignificant NO_X reductions that EPA has identified (and erroneously noted as being cost-effectively realizable) from the EAF sources combined.

EXHIBIT C2 - EPA-HQ-OAR-2021-0668-0150_attachment_2(5)
Tab = "Table 3"

State	Industry	Tier 1	
		Ozone Season Emissions Reductions	Annual Total Cost (million $) (Avg Annual Cost per Ton)
AR	Iron and Steel Mills and Ferroalloy Manufacturing	6	$0.0 ($631)
IN	Iron and Steel Mills and Ferroalloy Manufacturing	1,829	$16.0 ($3,653)
MI	Iron and Steel Mills and Ferroalloy Manufacturing	38	$0.4 ($4,194)
OH	Iron and Steel Mills and Ferroalloy Manufacturing	847	$7.6 ($3,763)
PA	Iron and Steel Mills and Ferroalloy Manufacturing	438	$6.1 ($5,823)
VA	Iron and Steel Mills and Ferroalloy Manufacturing	92	$1.0 ($4,357)
	Total	3,250	
	Subtotal from the two EAF Mini-mills	3.0%	

Exhibit C3 below reflects EPA's determination that, to the extent ozone improvements as a result of including all iron and steel sector sources can be modeled at all, those modeled changes would only occur at monitors in the East. Moreover, the total sum of ozone impacts at all East monitors modeled (a metric that has no relevance to attainment, since "contribution" is a monitor-specific determination, or an area-specific determination, considering all monitors in a given area, not the entire Eastern U.S.) is slightly more than 1 ppb, with the maximum at any one monitor being 0.175 ppb – again, from all sources in the entire iron and steel sector, of which, as noted, the EAF mills contribute a miniscule amount of NO_X. Again, 0.175 ppb of ozone is not measurable with any reliability at any monitor.

EXHIBIT C3 - EPA-HQ-OAR-2021-0668-0150_attachment_2(5)
Tab = "Table 4"

Industry	Region	Number of Units by Type			Ozone Season Emissions Reductions (tons) by Type of Unit			Total PPB Improvement Across Downwind Receptors (Max Improvement At Receptor)		Annual Total Cost (million $) (Avg Annual Cost per Ton)
		Boilers	Internal Combustion Engines	Industrial Processes	Boilers	Internal Combustion Engines	Industrial Processes	East	West	
Glass and Glass Product Manufacturing	East	-	-	41	-	-	6,367	0.6962 (0.0865)	0.0015 (0.0004)	$23.2 ($1,520)
	West	-	-	3	-	-	299	0.0009 (0.0001)	0.0332 (0.0066)	$0.9 ($1,293)
Cement and Concrete Product Manufacturing	East	1	-	39	16	-	5,948	0.6382 (0.0707)	0.0018 (0.0006)	$22.4 ($1,566)
	West	-	-	8	-	-	2,128	0.0151 (0.0019)	0.1996 (0.0332)	$6.5 ($1,279)
Iron and Steel Mills and Ferroalloy Manufacturing	East	25	-	15	2,044	-	1,207	1.1556 (0.1750)	0.0000 (0.0000)	$31.2 ($3,995)
Pipeline Transportation of Natural Gas	East	-	296	-	-	22,390	-	1.5373 (0.2815)	0.0057 (0.0020)	$263.2 ($4,898)
	West	-	11	-	-	754	-	0.0086 (0.0010)	0.0586 (0.0170)	$9.1 ($5,037)
Basic Chemical Manufacturing	East	17	-	-	1,698	-	-	0.1655 (0.0107)	0.0002 (0.0000)	$16.3 ($3,999)
Petroleum and Coal Products Manufacturing	East	9	-	-	962	-	-	0.2677 (0.0258)	0.0000 (0.0000)	$7.3 ($3,176)
	West	1	-	-	68	-	-	0.0002 (0.0000)	0.0075 (0.0015)	$0.4 ($2,349)
Pulp, Paper, and Paperboard Mills	East	25	-	-	3,305	-	-	0.3678 (0.0117)	0.0002 (0.0000)	$30.2 ($3,807)
Blue highlights reflect western states information.										
Orange highlights reflect Tier 2 industries with impactful										

Next, in Exhibit D1 below, we show the specific ozone impacts EPA modeled at individual downwind state monitors from all sources in the iron and steel sector. These data represent the basis on which EPA included the iron and steel sector in its Tier 1 category, since EPA has determined that there were 11 monitors with ozone levels of greater than 0.01 ppb and just one monitor with an ozone level greater than 0.1 ppb. The monitor with an ozone level greater than

0.1 ppb is the Sheboygan, WI monitor as noted in the table, with a total steel industry contribution of 0.1292 ppb. Highlighted in yellow are the four monitors (three in CT and one in TX) where EPA has indicated impacts from the two EAF mills, Nucor and Chaparral, discussed prior in addition to impacts from all other sources at these monitors. The combined contribution at any of these 4 monitors from all of the iron and steel sector sources does not exceed 0.035 ppb. Again, this level of ozone is not discernable by any measurement at these monitors.

EXHIBIT D1 – Contributions Summary Tables – 03-17-2022 – NAICS4 – 2023 Inventories – 100 tpy units,
Tab = "Receptor Analysis – Contrib."

Site	Home State	Receptor	3311 - Iron and Steel Mills and Ferroalloy Manufacturing
90010017	CT	Greenwich	**0.0190**
90013007	CT	Stratford	**0.0297**
90019003	CT	Westport	**0.0257**
90099002	CT	New Haven	**0.0349**
420170012	PA	Philly-Bristol	**0.0227**
170310001	IL	Chicago/Alsip	**0.0668**
170314201	IL	Chicago/Northbrook	**0.0524**
550590019	WI	Kenosha	**0.0907**
551010020	WI	Racine	**0.0936**
551170006	WI	Sheboygan	**0.1292**
481671034	TX	Galveston	**0.0116**
482010024	TX	Houston/Aldine	0.0006
80350004	CO	Denver/Chatfield	0.0000
80590006	CO	Denver/Rocky Flats	0.0000
80590011	CO	Denver/NREL	0.0000
80690011	CO	Denver/ Ft Collins	0.0000
490110004	UT	Salt Lake City/Bountiful	0.0000
490353006	UT	Salt Lake City/Hawthorne	0.0000
490353013	UT	Salt Lake/Herriman	0.0000
40278011	AZ	Yuma	0.0000
		Max Downwind Impact =>	**0.129**
		# Receptors in each Range	
		>=.005 to <0.01	0
		>=.01 to <0.05	**6**
		>=.05 to <0.1	**4**
		>=.1	**1**
		# Receptors in each Range >=.01	**11**

And, finally, Exhibit D2 below, shows EPA's estimated ozone contribution from specific plants or mills (but not the actual sources within these mills). As the four yellow highlighted rows make clear, the range of ozone levels from NO_X emissions at the two EAF mini-mills modeled (*i.e.*, the ones with the highest ozone level impacts based on EPA's analysis) range from 0.0001 ppb (at the Galveston, TX monitor, from Nucor) to 0.0012 ppb (at the New Haven, CT monitor, from Chaparral). While we are aware that models can "predict" any non-zero value of impact when fed any non-zero emissions inputs, and setting aside all of the modeling issues as highlighted by others including MOG, it is obvious that these predicted levels of ozone are not only incapable of being measured by any means with any level of accuracy, but that they are plainly not significant, by any measure.

EXHIBIT D2 – Contributions Summary Tables – 03-17-2022 – NAICS4 – 2023 Inventories – 100 tpy units,
Tab = "Raw Data Reductions"

site	home_state	Receptor	upwind_state	Upwind to Receptor	os_emissions	os_emis_reduction	ppb_contrib	
40278011	AZ	Yuma	AL		130	106	0.0000	
40278011	AZ	Yuma	AR		13	10	0.0000	
40278011	AZ	Yuma	IA		107	82	0.0000	
40278011	AZ	Yuma	IN		2,591	2,242	0.0000	
40278011	AZ	Yuma	MI		372	334	0.0000	
40278011	AZ	Yuma	OH		904	811	0.0000	
40278011	AZ	Yuma	PA		359	327	0.0000	
40278011	AZ	Yuma	TN		48	44	0.0000	
40278011	AZ	Yuma	VA		99	85	0.0000	
80350004	CO	Denver/Chatfield	AL		130	106	0.0000	
80350004	CO	Denver/Chatfield	AR		13	10	0.0000	
80350004	CO	Denver/Chatfield	IA		107	82	0.0000	
80350004	CO	Denver/Chatfield	IN		2,591	2,242	0.0000	
80350004	CO	Denver/Chatfield	MI		372	334	0.0000	
80350004	CO	Denver/Chatfield	OH		904	811	0.0000	
80350004	CO	Denver/Chatfield	PA		359	327	0.0000	
80350004	CO	Denver/Chatfield	TN		48	44	0.0000	
80350004	CO	Denver/Chatfield	VA		99	85	0.0000	
80590006	CO	Denver/Rocky Flats	AL		130	106	0.0000	
80590006	CO	Denver/Rocky Flats	AR		13	10	0.0000	
80590006	CO	Denver/Rocky Flats	IA		107	82	0.0000	
80590006	CO	Denver/Rocky Flats	IN		2,591	2,242	0.0000	
80590006	CO	Denver/Rocky Flats	MI		372	334	0.0000	
80590006	CO	Denver/Rocky Flats	OH		904	811	0.0000	
80590006	CO	Denver/Rocky Flats	PA		359	327	0.0000	
80590006	CO	Denver/Rocky Flats	TN		48	44	0.0000	
80590006	CO	Denver/Rocky Flats	VA		99	85	0.0000	
80590011	CO	Denver/NREL	AL		130	106	0.0000	
80590011	CO	Denver/NREL	AR		13	10	0.0000	
80590011	CO	Denver/NREL	IA		107	82	0.0000	
80590011	CO	Denver/NREL	IN		2,591	2,242	0.0000	
80590011	CO	Denver/NREL	MI		372	334	0.0000	
80590011	CO	Denver/NREL	OH		904	811	0.0000	
90013007	CT	Stratford	AL		130	106	0.0001	
90013007	CT	Stratford	AR		13	10	0.0000	
90013007	CT	Stratford	IA		107	82	0.0001	
90013007	CT	Stratford	IN	*	2,591	2,242	0.0113	
90013007	CT	Stratford	MI	*	372	334	0.0018	
90013007	CT	Stratford	OH	*	904	811	0.0078	
90013007	CT	Stratford	PA	*	359	327	0.0078	
90013007	CT	Stratford	TN		48	44	0.0001	
90013007	CT	Stratford	VA	*	99	85	0.0008	
90019003	CT	Westport	AL		130	106	0.0001	
90019003	CT	Westport	AR		13	10	0.0000	
90019003	CT	Westport	IA		107	82	0.0001	

90019003	CT	Westport	IN	*	2,591	2,242	0.0107	
90019003	CT	Westport	MI	*	372	334	0.0020	
90019003	CT	Westport	OH	*	904	811	0.0063	
90019003	CT	Westport	PA	*	359	327	0.0059	
90019003	CT	Westport	TN		48	44	0.0001	
90019003	CT	Westport	VA	*	99	85	0.0006	
90099002	CT	New Haven	AL		130	106	0.0001	
90099002	CT	New Haven	AR		13	10	0.0000	
90099002	CT	New Haven	IA		107	82	0.0002	
90099002	CT	New Haven	IN	*	2,591	2,242	0.0141	
90099002	CT	New Haven	MI	*	372	334	0.0028	
90099002	CT	New Haven	OH	*	904	811	0.0089	
90099002	CT	New Haven	PA	*	359	327	0.0075	
90099002	CT	New Haven	TN		48	44	0.0001	
90099002	CT	New Haven	VA	*	99	85	0.0012	
481671034	TX	Galveston	AL	*	130	106	0.0010	
481671034	TX	Galveston	AR	*	13	10	0.0001	
481671034	TX	Galveston	IA		107	82	0.0001	
481671034	TX	Galveston	IN		2,591	2,242	0.0074	
481671034	TX	Galveston	MI		372	334	0.0005	
481671034	TX	Galveston	OH		904	811	0.0022	
481671034	TX	Galveston	PA		359	327	0.0000	
481671034	TX	Galveston	TN	*	48	44	0.0003	
481671034	TX	Galveston	VA		99	85	0.0000	
551170006	WI	Sheboygan	AL		130	106	0.0000	
551170006	WI	Sheboygan	AR		13	10	0.0000	
551170006	WI	Sheboygan	IA		107	82	0.0003	
551170006	WI	Sheboygan	IN	*	2,591	2,242	0.1166	0.1288
551170006	WI	Sheboygan	MI	*	372	334	0.0033	
551170006	WI	Sheboygan	OH	*	904	811	0.0081	
551170006	WI	Sheboygan	PA	*	359	327	0.0008	
551170006	WI	Sheboygan	TN		48	44	0.0000	
551170006	WI	Sheboygan	VA		99	85	0.0001	

a. <u>Steel industry emissions do not "contribute significantly" to downwind nonattainment</u>

In summary, as discussed above, as specifically applied to the steel industry, and more specifically to EAF steel producers, it is clear that EPA's own modeling confirms that steel industry sources and EAF sources simply do not contribute significantly to any downwind non-attainment in any state.

EPA cannot credibly support its decision to include the entire steel industry in its Tier 1 analysis based on a modeled 0.1292 ppb impact at the single Sheboygan monitor, and EPA certainly cannot include highly differentiated EAF steel producers in the Proposed FIP based on a maximum contribution from these sources of 0.0012 ppb (from Chaparral at the New Haven CT monitor), a trivial contribution by any standard.

Moreover, had EPA retained its prior 150 tpy threshold, none of the EAF sources would have been included in the Proposed FIP.

1. <u>Steel industry/EAF emissions do not transport like EGU emissions</u>

Numerous factors impact the propensity of pollutants, including NO_X, to transport between states and contribute to downwind attainment issues. The most widely-recognized factors in the transportability of NO_X and other pollutants, however, are the height and the velocity that the pollutants are released in the air column.[140] The height that pollutants are released in the air column is also influenced by numerous variables, but is most influenced by the height of the stack from which the pollutants are released, the velocity at which the pollutants are released, and the amount of pollutants emitted from the stack.[141] Each of these factors distinguishes iron and steel industry emissions, and particularly emissions from EAF steel producers, from the more widely transported EGU emissions.

The vast majority of tall stacks (defined as those exceeding 500 feet) are in use at EGUs.[142] Indeed, per Exhibit B above, the input files EPA used to model potential NO_X transport from the iron and steel sector reflects that only a single steel manufacturing facility operates stacks in excess of 250 feet (a U.S. Steel coke plant).

fips	facility_n	emis_reduc	os_emissio	os_emis_re	stkhgt	stkdiam	stktemp	stkflow	stkvel	control_te	control_ef	source_gro	state_name
01097	SSAB Alabama Inc	158.64	85.84	68.10	150	10	1420	4509	57.44	Low NOx Burner and Flue Gas Recirculation	77	Iron and Steel Production; Blast Heating or Reheating	Alabama
05093	NUCOR-YAMATO STEEL COMPANY	11.61	6.28	4.04	155	6.5	186	3079	92.8	Low NOx Burner and Flue Gas Recirculation	77	Iron and Steel Production; Blast Heating or Reheating	Arkansas
05093	NUCOR-YAMATO STEEL COMPANY	12.67	6.85	5.29	150	6.5	187	3086	93	Low NOx Burner and Flue Gas Recirculation	77	Iron and Steel Production; Blast Heating or Reheating	Arkansas
18089	ARCELORMITTAL USA LLC	162.30	75.14	67.62	180	12	230	7341	64.9	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Indiana
18089	ARCELORMITTAL USA LLC	56.76	52.55	23.65	183	8.7	1200	187	2.6	Selective Non Catalytic Reduction	45	Industrial Incinerators, Municipal Waste Combustors	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	46.06	22.25	20.03	38	22	138	3307	8.7	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	87.44	40.46	35.43	82	19.76	125	5673	18.5	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	47.52	25.72	19.80	138	7.95	200	1666	33.6	Low NOx Burner and Flue Gas Recirculation	77	Iron and Steel Production; Blast Heating or Reheating	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	51.25	27.73	21.36	188	10.16	200	3337	41	Low NOx Burner and Flue Gas Recirculation	77	Iron and Steel Production; Blast Heating or Reheating	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	721.91	334.22	300.80	79	17	114	10096	45.6	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	31.30	14.49	13.04	82	5.13	500	1686	80.6	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	131.31	99.47	54.71	201	11.43	475	5336	52	Low NOx Burner and Flue Gas Recirculation	55	Fuel Fired Equip; Process Htrs; Pro Gas	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	46.01	36.37	20.00	201	11.43	475	5336	52	Low NOx Burner and Flue Gas Recirculation	55	Fuel Fired Equip; Process Htrs; Pro Gas	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	51.33	38.89	21.39	201	11.79	475	5339	48.9	Low NOx Burner and Flue Gas Recirculation	55	Fuel Fired Equip; Process Htrs; Pro Gas	Indiana
18127	ARCELORMITTAL BURNS HARBOR LLC	31.83	14.74	13.26	82	5.13	500	1666	80.6	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Indiana
19139	SSAB IOWA, INC - MUSCATINE	196.82	106.51	82.01	111.8	9.83	875	12996	0	Low NOx Burner and Flue Gas Recirculation	77	Iron and Steel Production; Blast Heating or Reheating	Iowa
39017	AK Steel Corporation (1409010006)	316.03	144.70	131.68	171.9	11	550	7443	0	Ultra Low NOx Burner and Selective Catalytic Reduction	91	ICI Boilers - Gas	Ohio
39017	AK Steel Corporation (1409010006)	474.10	217.06	197.54	171.9	11	550	7443	0	Ultra Low NOx Burner and Selective Catalytic Reduction	91	ICI Boilers - Gas	Ohio
39017	AK Steel Corporation (1409010006)	300.68	137.67	125.28	171.9	11	550	7443	0	Ultra Low NOx Burner and Selective Catalytic Reduction	91	ICI Boilers - Gas	Ohio
39035	ArcelorMittal Cleveland LLC (1318001613)	20.90	15.64	8.71	175.9	11	500	2096	0	Low NOx Burner and Flue Gas Recirculation	55	In-Proc;Process Gas;Coke Oven/Blast Fum	Ohio
39035	ArcelorMittal Cleveland LLC (1318001613)	18.31	8.46	7.60	0	0	0	0	0	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Ohio
39035	ArcelorMittal Cleveland LLC (1318001613)	20.90	15.64	8.71	1	1	1300	1667	0	Low NOx Burner and Flue Gas Recirculation	55	In-Proc;Process Gas;Coke Oven/Blast Fum	Ohio
39155	ArcelorMittal Warren (0278000648)	462.71	211.86	192.80	225	10	1300	43	0	Ultra Low NOx Burner and Selective Catalytic Reduction	91	ICI Boilers - Gas	Ohio
42003	USS/CLAIRTON WORKS	172.98	79.21	72.08	322	12	446	2070	18.308	Ultra Low NOx Burner and Selective Catalytic Reduction	91	ICI Boilers - Gas	Pennsylvania
42003	USS/CLAIRTON WORKS	165.51	75.78	68.96	190	7	303	2771	71.964	Ultra Low NOx Burner and Selective Catalytic Reduction	91	ICI Boilers - Gas	Pennsylvania
42003	USS/CLAIRTON WORKS	409.13	187.33	170.47	190	8.8	364	5835	95.903	Ultra Low NOx Burner and Selective Catalytic Reduction	91	ICI Boilers - Gas	Pennsylvania
51053	Chaparral Virginia Incorporated	109.25	50.58	45.62	98	50	164	0	12.5	Selective Catalytic Reduction	90	Iron & Steel - In-Process Combustion - Bituminous Coal	Virginia

To the extent EAF steel producers utilize stacks, those stacks rarely exceed 200 feet and only for certain sources such as reheat furnaces. Further, most EAF steel producers do not emit pollutants through stacks at all from many of their sources. For example, emissions captured from EAFs and/or other emissions units in the meltshop such as the LMS are most often ducted to baghouses which, after capturing particulate matter, emit the exhausts at low velocities with little momentum through monitor vents that generally extend the length of the baghouse. As such, the "stack height" for such sources reflects the height of the baghouse itself, which is typically less than 100 feet.

In addition, given the large areas at the exhausts of the baghouses, effective "diameters" of the rectangular exhaust are tens of feet. Further, in order to avoid replacing bags prematurely, companies maintain exhaust temperatures at very low levels, which results in low-buoyancy emissions. In short, the low velocity, low temperature, low-height emissions from baghouses at EAF meltshops bear little resemblance to tall-stack exhausts such as those used at EGUs. In

[140] Air Quality: Information on Tall Smokestakes and Their Contribution to Interstate Transport of Air Pollution; Government Accountability Office, GAO-11-473 (May 2011) ("GAO Report").
[141] 87 Fed. Reg. at 20, 085; GAO Report at 15.
[142] GAO Report at 11.

addition, smaller furnaces, such as those used for annealing, often lack stacks; and when they do, they are very low-level.

In many cases, emissions units at EAF steel producers are considered ground-level emissions because they are not ducted to or captured by baghouses. For instance, NO_X from reheat and annealing furnaces are often emitted at ground level because those emissions units are housed in structures that are not controlled by the main baghouses. Even for NO_X emissions from those smaller sources (like ladle/tundish preheaters) that may be controlled by the baghouse by virtue of their presence in the meltshop, these emissions are more accurately construed as ground-level emissions. As EPA has routinely recognized, these low-velocity ground-level sources are not the types of NO_X emissions sources that tend to transport and contribute significantly to receptors in distant, downwind states.

These emissions units also emit NO_X at much lower levels relative to EGUs and other non-EGU sectors. According to the GAO and EPA sources consulted by the GAO, "total emissions is a key contributor to interstate transport of air pollution. . ."[143] Because of the comparatively small NO_X emissions from these sources, there is less NO_X available in the atmosphere to form ozone that can ultimately be transported downwind.

The Proposed FIP is designed to address NO_X emissions that significantly contribute to downwind nonattainment. Key to addressing the issue of NO_X and ozone transport is the identification of sources with emissions that are likely to transport significant distances in significant amounts. EAF steel producing facilities are not such sources. NO_X emissions from emissions units at EAF steel mills are less amenable to transport because they are emitted at lower volumes, lower heights, lower temperatures, and lower velocities than EGUs and other non-EGUs. These facilities are not significant contributors to the interstate transport of NO_X and therefore should not be included within the Proposed FIP.

b. EPA's assessment of NO_X emission reduction potential from allegedly "known controls" at EAF steel producers is erroneous and unsupported

After misapplying the $7,500 CPT marginal cost threshold to Tier 1 industries, in the final step in the Agency's Non-EGU Screening Assessment, EPA purported to identify the specific controls and related emissions reductions available up to the $7,500 CPT threshold.[144] To do this, "EPA used its Control Strategy Tool (CoST) to identify potential emissions units and control measures and to estimate emissions reductions and associated compliance costs associated with application of non-EGU emissions control measures."[145]

Although EPA processed the CoST run data to identify NO_X emissions reductions available through "known controls," this parameter does not consider whether the controls are known to be used in any particular industry sector or for any specific emissions unit. Rather, "[k]nown controls are well-demonstrated control devices and methods that are currently used in practice in many

[143] GAO Report at 17.
[144] Non-EGU Screening Assessment at 5.
[145] Technical Memorandum Describing Relationship between Proposed Applicability Criteria for Non-EGU Emissions Units Subject to the Proposed Rule and EPA's "Screening Assessment of Potential Emissions Reductions, Air Quality Impacts, and Costs from Non-EGU Emissions Units for 2026" at 3.

industries."[146] Therefore, of the 13 "known controls" EPA identified as broadly available for the Tier 1 industries, EPA determined only five could be used in the Iron and Steel industry, as defined by 4-digit NAICS code.[147]

The Non-EGU Screening Assessment does not explain how EPA identified the five control strategies it believed could be used in the iron and steel sector, but EPA nonetheless concluded that these five control strategies could reduce ozone season NO_X emissions from 39 emissions units at "iron and steel" facilities in the upwind states for up to $7,500 CPT.[148] Of the 39 greater than 100 tpy emissions units in the "iron and steel" sector that EPA linked to downwind receptors, EPA identified only three units at EAF steel producers for which there were NO_X controls at or below the $7,500 CPT threshold as we have noted in Exhibits A1 and A2 prior.[149]

The spreadsheet accompanying EPA's Non-EGU Screening Assessment identifies a single 19 tpy emissions unit at Nucor's facility in Blytheville, Arkansas (identified as "Industrial Processes – Other Not Classified.").[150] Given this vague description, we have no way of identifying this emissions unit or knowing how EPA determined that use of "Low NO_X Burners and Flue Gas Recirculation" would allow this supposed 19 tpy source to reduce its ozone season emissions by six tpy.[151] Indeed, the Title V permit for Nucor Blytheville does not identify any 19 tpy NO_X sources.[152] And if the unit EPA identified as "Industrial Processes – Other Not Classified" refers to any of the various furnaces identified in the Nucor Blytheville permit, the NO_X emission reduction potential is misstated because each furnace already utilizes low NO_X burners.[153]

The remaining two emissions units that EPA's Non-EGU Screening Assessment spreadsheet identified as operated by an EAF steel producer also appear to be misidentified. The Non-EGU Screening Assessment identifies both of these emissions units as operated by Chaparral Virginia Incorporated ("Chaparral") in Dinwiddie, Virginia.[154] EPA identifies one of these emissions units as "Industrial Processes - Blast Furnace: Casting/Tapping: Local Evacuation" despite the facility operating an EAF, and not a blast furnace.[155] EPA identifies the remaining Chaparral emissions

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[146] 87 Fed. Reg. at 20,083 (FN 168).
[147] Non-EGU Screening Assessment (comparing Table 6 and Table 8) (controls EPA identified as available in the Iron and Steel sector are underlined): (1) Adjust Air to Fuel Ratio and Ignition Retard; (2) Layered Combustion; (3) Low NO_X Burner; (4) Low NO_X Burner and Flue Gas Recirculation; (5) Non-Selective Catalytic Reduction; (6) Non-Selective Catalytic Reduction or Layered Combustion; (7) Oxygen Enriched Air Staging; (8) SCR + DLN Combustion; (9) Selective Catalytic Reduction; (10) Selective Catalytic Reduction and Steam Injection; (11) Selective Non-Catalytic Reduction; (12) Ultra Low NO_X Burner; and, (13) Ultra Low NO_X Burner and Selective Catalytic Reduction.
[148] Non-EGU Screening Assessment at 17, Table 6.
[149] EPA-HQ-OAR-2021-0668-0191_attachment_1(6).
[150] EPA-HQ-OAR-2021-0668-0191_attachment_1(6).
[151] EPA-HQ-OAR-2021-0668-0191_attachment_1(6). Nor is it clear why EPA's Non-EGU Screening Assessment identified an emissions unit with such low NO_X emissions/emission reduction potential.
[152] *See* ADEQ Operating Air Permit No. 1139-AOP-R6.
[153] *See* ADEQ Operating Air Permit No. 1139-AOP-R6.
[154] EPA-HQ-OAR-2021-0668-0191_attachment_1(6).
[155] EPA-HQ-OAR-2021-0668-0191_attachment_1(6).

unit only as “Boilers - > 100 Million BTU/hr.”[156] EPA believes NO_X from both of these emissions units can be reduced by 90% using SCR.[157]

As such, at least one of these emissions units is misidentified as a blast furnace, and to the extent either of these emissions units refers to Chaparral’s EAF, EPA misidentified SCR as an available NO_X emission control strategy – SCR has never been used on an EAF and for many fundamental reasons cannot be feasibly used to control NO_X emissions from an EAF (as described in Section VIII(a)(1) below). Indeed, even if SCR were technologically feasible for either of the two emissions units EPA identified at the Chaparral facility, as discussed in Section VIII(b) below, it is unrealistic to conclude that SCR could reduce NO_X emissions from these sources by 90% for less than $7,500 per ton.

Indeed, according to EPA’s modeling files, NO_X reductions from the currently unidentifiable emissions unit at Chaparral that EPA only vaguely describes as “Boilers - > 100 Million BTU/hr” will cost more than $10,000 per ton. [158] While the EAF Steel Associations believe this value likely underestimates control costs significantly, we note that this emissions unit is one of only three EAF facility emissions units identified in the Non-EGU Screening Assessment through which EPA applied a $7,500 CPT marginal cost threshold. In other words, 1/3 of EAF facility emissions units in EPA’s Non-EGU Screening Assessment are presumed to have NO_X control costs far in excess of the $7,500 CPT threshold.

Compounding the unclear and erroneous identification of EAF steel industry emissions units in the Non-EGU Screening Assessment spreadsheet, the input files EPA used to model sources in the “iron and steel” sector also appear to misidentify the emissions units and recommended control strategies at EAF steel producers, but does so inconsistently with the Non-EGU Screening Assessment Spreadsheet. Like EPA’s Non-EGU Screening Assessment, EPA modeling input files identified only three emissions units at two EAF steel producers (Nucor Blytheville and Chaparral). Unlike EPA’s Non-EGU Screening Assessment, however, EPA’s input files place two of the emissions units at the Nucor Blytheville facility and only one at the Chaparral facility.

EPA vaguely identifies both of the emissions units at the Nucor facility as “Iron and Steel Production; Blast Heating or Reheating,” and assumes both can be controlled with “Low NO_X Burners and Flue Gas Recirculation.” The annual NO_X emissions EPA attributes to these two sources continues to be quite low (15.08 tpy and 16.45 tpy) but neither value corresponds to the values EPA used in the Non-EGU Screening Analysis (19 tpy) or to any limits identified in the facility’s Title V permit.

EPA’s assessment of the Chaparral facility is similarly incongruous. Whereas EPA’s Non-EGU Screening Assessment purported to identify cost-effective NO_X control opportunities for an erroneously identified blast furnace and large boiler,[159] EPA’s modeling input files identify a single emissions unit at Chaparral vaguely described as “Iron & Steel - In-Process Combustion - Bituminous Coal.” As the Chaparral facility’s Title V permit reflects, the coal combustion source described in EPA’s model input files does not exist. Nor do EPA’s modeled annual NO_X emissions

[156] EPA-HQ-OAR-2021-0668-0191_attachment_1(6).
[157] EPA-HQ-OAR-2021-0668-0191_attachment_1(6).
[158] EPA-HQ-OAR-2021-0668-0191_attachment_1(6).
[159] EPA-HQ-OAR-2021-0668-0191_attachment_1(6).

correspond to any limit in the Title V permit or the values EPA used in the Non-EGU Screening Analysis.

In short, EPA misconstrued every single emissions unit attributed to an EAF steel producer. The data set EPA utilized in determining that EAF steel producers in 23 states should be subject to unprecedented NO_X limits is shockingly small (3 units at 2 facilities) and 100% incorrect. EPA cannot, and should not, base any findings or regulatory requirements on such scant, erroneous, and inconsistent data.

VIII. EAF STEEL PRODUCERS DO NOT HAVE SIGNIFICANT CONTRIBUTIONS OF NO_X THAT CAN BE CONTROLLED ON A FEASIBLE AND COST-EFFECTIVE BASIS

In the fourth and final step of the process the Agency employed in developing the Proposed FIP, "EPA is proposing that the FIPs for 23 of the states covered in this proposed rule will include new emissions limitations on emissions units in seven non-EGU industries that EPA finds . . . to be significantly contributing to nonattainment or interfering with maintenance in other states."[160] Among those "seven non-EGU industries" is the iron and steel sector, and the distinct subset of manufacturers that produce steel from a scrap metal feedstock in EAFs. Thus, EAF steel producers are subject to the Proposed FIP and the emissions limitations described herein as a direct consequence of analytical errors that: (1) aggregated industry by four-digit NAICS code rather than "type of emissions activity;" (2) presumed NO_X emissions >100 tpy were uncontrolled/under-controlled; (3) identified as "significant" contributions that cannot be detected by ozone monitors; (4) assessed control cost-effectiveness using an arbitrarily inflated $7,500 CPT screening threshold; and (5) inexplicably and inconsistently identified "significant contributions" and emissions reduction opportunities at just three emissions units at two EAF steel producers. The NO_X emissions limits EPA is herein proposing for the iron and steel sector would be the most stringent ever imposed and broadly applied to facilities throughout 23 states; and for EAF steel producers, these unprecedented and infeasible limits are based on three erroneously identified emissions units at two facilities.

Moreover, the emissions limits EPA is proposing to impose in this final step of the FIP development process are not just the consequence of the deeply flawed analysis EPA employed in preceding steps, they are the continuation of that same erroneous analysis. Notwithstanding EPA's disclaimer that the control strategies it identified at Step 3 were mere "proxies" for potential controls and emissions reductions "to be used for illustrative control strategy analyses (*e.g.*, NAAQS regulatory impact analyses) and not for unit-specific, detailed engineering analyses,"[161] at Step 4, EPA based "[a]ll non-EGU emissions limits" on the control strategy "proxies" EPA identified for "illustrative" purposes at Step 3.[162]

As a result, the emissions limits EPA is proposing for sources at EAF facilities bear no relation to emissions levels achieved by the best performing units in the sector. Indeed, these proposed limits are based on application of control technologies that EPA's own record identifies as unworkable,

[160] 87 Fed. Reg. at 20,141.
[161] 87 Fed. Reg. at 20,089.
[162] Non-EGU TSD at 3.

unsupported expectations of incredible control efficacy, and implausibly modest cost estimates. These deficiencies are discussed in the subsections below.

a. EPA's NOx control assumptions for EAF facilities are unsupported, highly speculative, and directly controverted by the administrative record as well as other information

As noted in the previous subsection, the control strategies EPA identified as mere "proxies" in Step 3 of the Agency's multi-step analysis became the control strategies it assumed would apply "across all units of the same type" in Step 4 of the Agency's analysis.[163] To estimate the precise emissions limits that the Agency deemed to be achievable through the Step 3 control strategies, however, "EPA reviewed RACT NO_X rules, NESHAP rules, air permits and related emissions tests, technical support documents, and consent decrees."[164] The EAF Steel Associations reviewed this same information as well as substantial additional information available in the administrative record for the Proposed FIP or readily available to the Agency. This record plainly reveals that the emissions limits EPA proposed to impose on emissions units at EAF steel producers are entirely baseless.

To begin, many of the federal rules that the Proposed FIP cited in support of the NO_X limits EPA proposes to impose on emissions units at EAF facilities do not apply to EAF operations or emissions units.[165] Moreover, no Ozone Transport Commission rules for EAF operations have been adopted or, insofar as we can tell, even recommended for EAF facility operations. To the contrary, the precise data sources EPA cited in support of its proposed emissions limits demonstrates that the limits are wholly contrived and unworkable.

The table below provides the emissions limits EPA is proposing for the six types of emissions units that may be found at EAF steel production facilities. The table also provides the emissions limits identified in the sources EPA claims to have consulted in developing these limits, as well as all applicable limits identified in EPA's RACT/BACT/LAER Clearinghouse ("RBLC"). The RBLC is EPA's "central data base of air pollution technology information (including past RACT, BACT, and LAER decisions contained in NSR permits) to promote the sharing of information among permitting agencies and to aid in future case-by-case determinations."[166]

As such, while EPA's data review purports to be limited to those emissions limits achievable through application of "Reasonably Available Control Technology" ("RACT"), the EAF Steel Associations' review also considered emissions limits that may be achieved through the more stringent "Best Available Control Technology" ("BACT") standard as well as the "Lowest Achievable Emissions Rate" ("LAER"), which is "the most stringent emission limitation which is

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[163] 87 Fed. Reg. at 20,145.
[164] 87 Fed. Reg. at 20,145.
[165] *See* 87 Fed. Reg. at 20,145. ("In determining the averaging times for the limits, EPA initially reviewed the NESHAP for Iron and Steel Foundries codified at 40 CFR part 63 subpart EEEEE, the NESHAP for Integrated Iron and Steel manufacturing facilities codified at 40 CFR part 63 subpart FFFFF, the NESHAP for Ferroalloys Production: Ferromanganese and Silicomanganese codified at 40 CFR part 63 subpart XXX, and the NESHAP for Ferroalloys Production Facilities codified at 40 CFR part 63 subpart YYYYYY.") None of these rules apply to EAF steel manufacturing facilities.
[166] https://www.epa.gov/catc/ractbactlaer-clearinghouse-rblc-basic-information#intro.

contained in the implementation plan of any State for such class or category of source."[167] As the table below reflects, EPA's proposed limits for the six types of emissions units at EAF steel producers are universally lower than the most stringent classes of emissions limits identified under the CAA.

Emissions Unit	Proposed Limit	Technological basis for EPA's proposed limit	Emissions limits cited by EPA	RBLC Results
EAF	0.15 lb/t	SCR (in preamble); SCR + LNB (in Non-EGU TSD).	0.2 lb/t[168]; 0.54 lb/t;[169]	0.2 lb/t;[170] 0.27 lb/t;[171] 0.27 lb/t;[172] 0.28 lb/t;[173] 0.3 lb/t;[174] 0.3 lb/t;[175] 0.35 lb/t;[176] 0.35 lb/t;[177] 0.35 lb/t;[178] 0.38 lb/t;[179] 0.42 lb/t;[180] 0.42 lb/t;[181] 0.42 lb/t;[182] 0.5 lb/t;[183] 0.5 lb/t;[184] 0.58 lb/t;[185]

[167] CAA Section 171(d)(A).
[168] EPA refers to this as an "example limit," but does not cite sources. (87 Fed. Reg. at 20,145).
[169] Average NO_X emissions from EAF with Concurrent Oxy-Fuel Firing (Non-EGU TSD at 30, citing "Alternative Control Techniques Document – NO_X emissions from Iron and Steel Mills (EPA-453/R-94-065 (Sept. 1994).
[170] The RBLC lists two facilities (Timken Faircrest and Timken Harrison) with EAFs subject to a 0.2 lb/t limit, but notes that the compliance status is unverified. (RBLC ID: OH-0339 and OH-0342). The permit limits appear to be based on performance test conducted in 2006.
[171] Gerdau Macsteel LAER permit using "Real time process optimization (RTPO) combustion controls and oxy-fuel burners) (RBLC ID: MI-0438).
[172] Nucor Auburn LAER permit (RBLC ID: NY-0099).
[173] BACT limit for Evraz (30-day rolling average) (RBLC ID: CO-0066).
[174] Big River Steel (RBLC ID: AR-0140) using "scrap management plan and good operating practices" (RBLC ID: AR-0173).
[175] Mid-American Steel BACT Permit (RBLC ID: OK-0128).
[176] Nucor BACT limit (RBLC ID: AL-0319).
[177] Nucor Darlington BACT limit for non-resulfurized steel identifying BACT as oxy-fuel burners for scrap metal preheating and scrap management plan (RBLC ID: SC-0127).
[178] Thyssenkrupp Steel BACT permit describing BACT as LNB (RBLC ID: AL-0230).
[179] Nucor Yamato BACT permit identifying BACT as LNB (RBLC ID: AR-0096).
[180] Nucor BACT limit for EAF with "oxy-fuel burners") (RBLC ID: AL-0309).
[181] Nucor BACT limit (RBLC ID: AL-0327).
[182] Nucor BACT limit (RBLC ID: NE-0063). This emissions unit was permitted for a 0.28 lb/t in 2012 (Permit No. 12-027, but was not able to achieve the limit, which led to the revised limit in the table.
[183] Republic Steel (RBLC ID: OH-0350).
[184] Nucor BACT limit for EAF with "oxy-fuel burners") (RBLC ID: AR-0171).
[185] Optimus Steel BACT Permit describing control at "Good combustion practices.") (RBLC ID: TX-0867).

				0.9 lb/t;[186]
Ladle/Tundish Preheaters	0.06 lb/mmBtu	SCR (in preamble); LNB or LNB + SCR (in Non-EGU TSD).	0.1 lb/mmBtu[187]	0.08 lb/mmBtu;[188] 0.097 lb/mmBtu;[189] 0.095 lb/mmBtu;[190] 0.1 lb/mmBtu;[191] 0.1 lb/mmbtu;[192] 0.1 lb/mmBtu;[193]
Reheat Furnace	0.05 lb/mmBtu	SCR (in preamble); LNB (in Non-EGU TSD). FGR/LNB (elsewhere in Non-EGU TSD).	0.07 lb/mmbtu;[194] 0.073 lb/mmBtu;[195] 0.08 lb/mmBtu;[196] 0.09 lb/mmBtu;[197] 0.11 lb/mmBtu;[198] 0.068 – 0.15 lb/mmBtu;[199] 0.226 lb/mmBtu;[200] 0.08 lb/MMBtu[201]	
Annealing Furnace	0.06 lb/mmBtu	SCR (in preamble);	0.11 lb/mmBtu;[202]	0.1 lb/mmBtu;[205]

186 Nucor BACT limit for EAF with "oxy fired burners") (RBLC ID: TX-0651).
187 Nucor Kankakee BACT permit issued January 2021 (87 Fed. Reg. at 20,145); Ohio RACT Rules for Cleveland-Cliffs (Non-EGU TSD at 42).
188 Gerdau Macsteel LAER permit describing controls as "low NO_X burners, use of NG fuel, and good combustion practices." (RBLC ID: MI-0438).
189 Big River Steel BACT Permit for "Ladle Preheaters" describing controls as "Low NO_X burners Combustion of clean fuel, Good Combustion Practices" (RBLC ID: AR-0173).
190 Big River Steel BACT Permit for "Tundish Preheaters" describing controls as "Low NO_X burners Combustion of clean fuel, Good Combustion Practices" (RBLC ID: AR-0173).
191 Nucor Kankakee BACT permit describing control as "good combustion practice" (RBLC ID: IL-0132).
192 Nucor BACT permit describing control for ladle and tundish preheaters as "good combustion practices) (RBLC ID: FL-0368).
193 Steel Dynamics Southwest BACT permit describing controls as "good combustion practices, clean fuel") (RBLC ID: TX-0882).
194 Gerdau-Macsteel BACT Permit describing controls as ULNB + good combustion practices (RBLC ID: MI-0404).
195 Sterling Steel issued in 2019 (87 Fed. Reg. at 20,145).
196 Gerdau Jacksonville BACT Permit describing BACT as the firing of natural gas burners (RBLC ID: FL-0283).
197 Ohio RACT limit (87 Fed. Reg. at 20,145).
198 "Charter Steel" permit (Non-EGU TSD at 42).
199 US Steel Lorain Tubular Operation NO_X limits from Ohio RACT (Non-EGU TSD at 42).
200 Average NO_X emissions from Reheat Furnaces (Non-EGU TSD at 30, citing "Alternative Control Techniques Document – NO_X emissions from Iron and Steel Mills (EPA-453/R-94-065 (Sept. 1994).
201 Wisconsin NR 428.22(1)(c)(Subchapter IV); (Non-EGU TSD at 42).
202 Big River Steel BACT permit issued 2018 (87 Fed. Reg. at 20,145).
205 Big River Steel BACT Permit describing controls as "Low NO_X burners Combustion of clean fuel, Good Combustion Practices" (RBLC ID: AR-0173).

		LNB + SCR and/or FGR (in Non-EGU TSD).	0.09 lb/mmBtu;[203] 0.08 lb/MMBtu[204]	0.11 lb/mmBtu;[206]
Vacuum Degasser	0.03 lb/mmBtu	SCR (in preamble); SCR + LNB (in Non-EGU TSD).	0.05 lb/mmBtu[207]	0.068 lb/mmBtu;[208]
LMS	0.1 lb/t	SCR (in preamble); SCR + LNB (in Non-EGU TSD).	None cited	0.35 lb/t;[209]

Seemingly cognizant that the emissions limits that EPA proposed for EAF steel producers bear no resemblance to the limits identified in the data sources on which the Agency purported to base those limits, the preamble to the Proposed FIP ultimately disclaimed that "most of the emissions limits in this proposed rule are based on examples of permitted emissions and estimated reduction potential from the identified control technology."[210] In other words, the emissions limits that EPA proposed for EAF steel producers are not actually based on the "Best Available Control Technology" ever used in practice or the "Lowest Achievable Emissions Rate" ever demonstrated for these emissions units, but upon EPA's "assumed reductions of 20 to 50 percent from current permitted limits and emissions tests,"[211] using the control strategy "proxies" EPA identified for merely "illustrative" purposes in the Non-EGU Screening Assessment for Step 3.[212]

Thus, each of the emissions limits that EPA proposed for EAF steel producers is based on the assumptions the Agency's CoST tool generated based on control strategies in entirely different industries without any regard for the technical feasibility of applying these control strategies to the specific types of sources in the EAF steel subsector. This approach caused EPA to propose emissions limits that are fully untethered from limits that any EAF steel facility achieves or could achieve in practice, through the application of control strategies that have been routinely dismissed as altogether unworkable and/or unrealistic in every relevant BACT analysis as well as EPA's own analysis of NO_X control opportunities for sources in the iron and steel industry.

Moreover, by proposing NO_X emission limits that are far more stringent that the RACT limits imposed by states, the Proposed FIP thoroughly undermines EPA's stated intent:

203 "Nucor AR" (87 Fed. Reg. at 20,145).
204 Wisconsin NR 428.22(1)(c)(Subchapter IV); (Non-EGU TSD at 42).
206 Benteler Steel/Tube Manufacturing Corporation BACT limit identifying controls at "LNB+FGR) (RBLC ID: LA-0350)
207 Permits for Nucor in Darlington, SC and Tuscaloosa, AL (87 Fed. Reg. at 20,145).
208 Steel Dynamics Southwest BACT permit describing controls as "good combustion design & practices, clean fuel) (RBLC ID: TX-0882).
209 Steel Dynamics Southwest BACT permit limit for EAF & LMS describing controls as "good combustion practices, clean fuel") (RBLC ID: TX-0882).
210 87 Fed. Reg. at 20,146.
211 87 Fed. Reg. at 20,146.
212 Non-EGU TSD at 3.

> to be consistent with the scope and stringency of RACT requirements for existing major sources of NO_X in downwind Moderate nonattainment areas and some upwind areas, which many states have already implemented in their SIPs.[213]

As a result of EPA abandoning its goal to align stringency of the Proposed FIP's limits on emissions units at EAF facilities with downwind RACT requirements for the same sources, EPA is expressly and impermissibly proposing to over-control upwind emissions units.

1. EAF/LMS

To derive the proposed 0.015 lb/t NO_X limit for EAFs, the Proposed FIP used as a baseline the 0.2 lb/ton "example permit limits," which as described above, do not reflect any actual NO_X permit limits for EAFs, and "assume[d] 25% reduction by SCR."[214] In contrast, in the Non-EGU TSD:

> EPA considered a range of baseline emission data and permit limits from mini mills, integrated iron and steel facilities, and ferroalloy facilities ranging from 0.20 lb/ton to 0.35 lb/ton. EPA projects minimally 40% NOx reduction efficiency is achievable by use of low-NOx technology, including potential use of low-NOx burners and selective catalytic reduction.[215]

Thus, while the preamble to the Proposed FIP and the Non-EGU TSD both agree on the precise NO_X limit achievable for EAFs (0.015 lb/t), they claim that EPA derived that proposed limit in two completely and irreconcilable ways. The preamble to the Proposed FIP and the Non-EGU TSD each assert that EPA used a different baseline (0.2 lb/ton v. a range of 0.20 - 0.35 lb/ton), each assumes a different emission reduction efficiency (25% v. 40%), and each identifies different NO_X controls as capable of achieving these emissions reductions (SCR v. LNB + SCR). Moreover, the non-EGU TSD purports to base its NO_X emission baseline on "emission data and permit limits from mini mills, integrated iron and steel facilities, and ferroalloy facilities." But only one of the types of facilities (mini mills) uses EAFs.

EPA simply could not have credibly arrived at the precise same proposed emissions limit using these two wholly distinct and irreconcilable assumptions. This suggests that EPA's analysis started with the emissions limit the Agency wished to impose first and then manipulated the assumptions and data sources necessary to reach its predetermined emissions limit. This is the very definition of arbitrary and capricious decision-making, and notably, EPA does this *for every single EAF facility emissions unit subject to the Proposed FIP*. In its rush to publish the Proposed FIP, EPA consistently retained the proposed emissions limits but seemingly forgot to align all the various justifications EPA would say it used to derive those limits.

Indeed, to derive the proposed 0.1 lb/t NO_X limit for LMSs, EPA's Non-EGU TSD considered a wholly unidentified "range of baseline emission data and current permit limits from 0.20 lb/ton to 0.35 lb/ton, and project[ed] minimally 40% NOx reduction efficiency is achievable by use of low-

[213] 87 Fed. Reg. at 20,102.
[214] 87 Fed. Reg. at 20,145.
[215] Non-EGU TSD at 43.

NOx technology, including potential use of low-NOx burners and selective catalytic reduction."[216] On the contrary, the preamble to the Proposed FIP "assume[d] 40% reduction by SCR" alone without estimating a baseline.[217]

At no point in the preamble to the Proposed FIP, the Non-EGU TSD, or anywhere else in the administrative record does EPA explain how it determined that companies could reduce NO_X emissions from EAFs and LMSs using SCR (which, as discussed, is technically infeasible) or how these fantastic emission reduction efficiencies could be achieved. Rather, the entirety of EPA's technical feasibility analysis appears to rely on information from its 1994 ACT document, little of which is relevant today and much of which is simply wrong. Indeed, in an *amicus* brief filed with the Environmental Appeals Board ("EAB"), EPA subsequently supported the Indiana Department of Environmental Management's determination that SCR was technologically infeasible for EAFs.[218]

Moreover, as relevant here, nothing in the 1994 ACT aligns with the dueling justifications EPA deployed in the preamble to the Proposed FIP and in the Non-EGU TSD, and in fact, multiple aspects of the 1994 ACT directly contradict EPA's (albeit inconsistent) conclusions about technological feasibility of using SCR for controlling NO_X from EAFs or LMSs.[219]

We begin, in Exhibit E below, with a description of EAFs as discussed in the 1994 ACT.

EXHIBIT E - EPA-453/R-94-065, Alternative Control Techniques Document – NOx Emissions from Iron and Steel Mills, Final Report, September 1994.

> 4.2.6 Electric-Arc Furnace
>
> The electric arc furnace largely transfers the generation of NOx emissions from the steel melting facility to a utility plant where it is easier to control. The only use of fossil fuels in the electric arc facility is for scrap preheating, which may or may not be practiced. However, some EAFs also fire oxy-fuel burners in addition to electric arcs during meltdown. The available NOx emissions data, presented in Appendix A and summarized below, suggest that concurrent oxy-fuel firing during meltdown does increase NOx emissions above the emissions from electric-arc melting alone

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[216] Non-EGU TSD at 43. As another example of EPA's profoundly deficient understanding of EAF steelmaking processes, EPA's suggestion in the Non-EGU TSD that NO_X from LMSs can be controlled through "use of low-NOx technology, including potential use of low-NOx burners" misunderstands that ***LMSs have no burners***.

[217] 87 Fed. Reg. at 20,145.

[218] *See In re Steel Dynamics, Inc*. PSD Appeal Nos. 99-4 & 99-5, Vol. 9, pp. 192-195. (Available at https://yosemite.epa.gov/OA/eab_web_docket.nsf/All%20By%20Appeal%20Number/6CDA931078DD0F35852570 69005F7CE9/$File/steeldyn.pdf).

[219] Moreover, while the discussion of iron and steel facilities in the Non-EGU TSD and preamble contain cites to other sources, none of them suggest that SCR can be used on EAFs. For instance, EPA included within its docket a European Union ("EU") report on "Best Available Techniques (BAT) Reference Document for Iron and Steel Production." Industrial Emissions Directive 2010/75/EU Integrated Pollution Prevention and Control, Authors: Rainer Remus, Miguel A. Aguado-Monsonet, Serge Roudier, Luis Delgado Sancho 2013, EUR 25521 EN. The EU report discusses SCR for blast furnaces and coke oven operations, but not for EAFs.

as NOx increased from 12 to 98 ppm. The range of NOx emissions is narrow from 0.5 - 0.6 lb/ton and 83 - 100 lb/heat.[220]

As EPA states, based on limited testing available prior to 1994, that NOx emissions ranged from 12 – 98 ppm. In fact, the data shown by EPA in the excerpted table from the 1994 ACT shows a range of 80 – 110 ppm for EAFs with oxy-fuel firing.

EAF With Concurrent Oxy-fuel Firing

	ppm (avg.)	lb/ton	lb/heat
n(No. Samples)	6	6	6
Min. Value	80.	0.50	83
Max. Value	110.	0.60	100
Avg. Value	98.	0.54	89
Std. Dev.	10.	0.05	8.2

Since almost all EAFs in the current industry use oxyfuel firing, it is useful to compare the 80-110 ppm noted by EPA with current data. We reproduce measured NOx levels obtained from CEMS for a typical EAF in Exhibit F below. These are hourly values. As the table shows, average hourly NOx levels, in current EAFs are far smaller than 80 - 110 ppm. In fact they are generally less than 10 ppm, and often lower. And even the hourly maximums are less than 50 ppm. CEMS data confirm that such maximums last only a few minutes in a typical heat.

EXHIBIT F – EAF NOx CEMS DATA

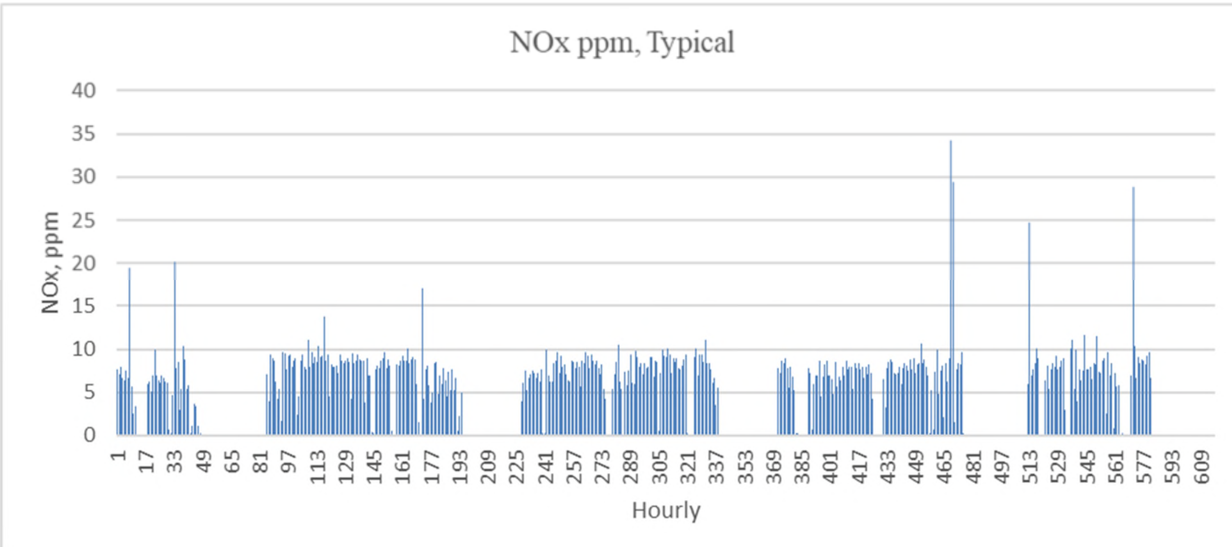
Month	Year	Hourly NOx, ppm	
		Average	Maximum
January	2018	7.2	19.8
February	2018	6.0	24.5
March	2018	7.5	34.4
April	2018	7.0	16.0
May	2018	6.7	20.1
June	2018	7.1	34.2
Source: Gerdau Petersberg CEMS Data for EAF			

These differences are significant for pollution control purposes. First, EPA's base assumption about the NOx levels from the 1994 ACT are simply not reflected in NOx measurements from current EAFs. And, importantly, actual hourly NOx levels are so low – *i.e.*, 10 ppm or less – with occasional short-duration spikes that may be a few tens of ppm – that it has significant adverse ramifications for add-on NOx controls such as SCR. In fact, even the 1994 ACT confirms that no

[220] 1994 ACT at p. 4-13.

add-on NO_X controls are feasible for EAFs: "There is no information that NOx emissions controls have been installed on EAFs or that suitable controls are available."[221]

The chart below shows the hourly NOx ppm data, obtained from CEMS from an EAF. The data cover a period of one month. Included are time periods when the EAF was not operating. The data confirm that even the hourly average data are mostly below 10 ppm with a few spikes occasionally. The minute by minute data are even more variable, with spikes lasting for very short durations. The key point is that, even with oxy-fuel firing, NOx concentrations from current EAFs in the gases exhausting the EAF are very low.



As EPA is well aware, for SCRs to work several conditions are critical: first, the catalyst has to be located in the gas path within a certain temperature range. This is not a trivial matter when the gas temperature changes (and therefore varies at any fixed duct location) making optimal catalyst placement impossible; second, since the SCR reduction reaction relies on the proper quantity (*i.e.*, so that so-called ammonia "slip" is kept to a minimum) of ammonia that needs to be injected prior to the mix of the ammonia and the exhaust gases reach the catalyst, an accurate measurement of the inlet NOx concentration is crucial. Unfortunately, in the case of EAF exhausts (as well as exhausts from the LMS) the NOx generation rate at the furnace is highly variable even during a batch cycle or heat, with only few spikes of a few tens of ppm lasting minutes and levels generally below 10 ppm (and often substantially below even that) at other times (as shown in the chart above). Given this and the extremely large flow rates (and consequent large duct velocities and low residence times), it is impractical to anticipate or detect the spikes of NOx, (*i.e.*, the inlet NOx), and therefore to properly inject the proper quantity of ammonia to "catch" the spike and mix with it – all within milliseconds, so that the SCR catalyst can then act on this NOx/ammonia mix. Without a proper measurement of the inlet NOx and a feedback mechanism to inject the proportional quantity of ammonia at the right time/place in the duct to ensure good mixing prior to the catalyst, either excess ammonia will be released, adversely affecting the baghouse downflow or not enough ammonia will be injecting inhibiting the NOx reduction in the catalyst. In addition to these two fatal (from a design and operation standpoint) factors, SCR catalysts are also prone to

221 1994 ACT, Section 5.3.5

certain metal poisons as well as pluggage from dust. The levels of dust in the inlet to the baghouse, where SCRs may potentially be located due to temperature window considerations are substantially greater that dust levels in coal-fired boilers for example. Both extremely high dust levels and potential poisons are present in the typical "high dust" SCR placement location where the required temperature window is potentially viable (although not static in time and place). While SCR catalysts have been optimized to work with various coal ashes, we are not aware of any SCR catalyst that has been developed for the EAF steel market. Simply plugging-in available catalysts is not a viable option without considerable further research and development.

We stress that for the vast majority of times in a heat cycle, CEMS data confirm that NOx levels from EAFs are well below 10 ppm. These very low inlet NOx concentrations, compared for example, to several hundred ppm in the inlet of a coal-fired boiler, for example, makes the SCR efficiency, even if the problems noted above could be solved, very low. For all these reasons SCRs are not technically feasible for EAF (and LMS) NOx reduction.[222]

While there are a few applications of so-called "tail-end SCRs," in other industries, where the SCR catalyst is installed at the end of the exhaust gas control train, the temperatures at such a location at an EAF mill (*i.e.*, after the baghouse in the case of EAF meltshops with EAFs and LMSs) are so low (around 200 F or lower) that the entire volume of exhaust gases, typically close to a million standard cubic feet per minute or more in most EAF mills, would need to be reheated to the minimum temperatures for the tail-end SCR to be effective (which can be around 300 to 350 F). The additional fuel use (and NOx generation) alone would make this simply impractical and clearly cost-ineffective, at any reasonable cost-effectiveness cut-off, much less at $7,500 per ton of NOx reduced. Of course, there would be substantial additional adverse environmental impacts from installing and operating SCR, including increases in $PM_{2.5}$, CO, and VOC emissions. GHG emissions would also increase due to the added fuel use necessary to reheat the exhaust gases to the proper SCR temperature.

2. Reheat Furnace

To derive the proposed 0.05 lb/mmBtu NO_X limit for reheat furnaces, the Proposed FIP used as a baseline the 0.073 lb/mmBtu limit determined to be achievable using Low-NO_X burners in Sterling Steel's 2019 permit, and "assume[d] 40% reduction."[223] Here again, the preamble to the Proposed FIP and the Non-EGU TSD disagree about the types of controls EPA presumes can achieve the surmised 40% NO_X reduction from reheat furnaces. The preamble "assume[s] 40% reduction by SCR,"[224] while the Non-EGU TSD "projects minimally 40% NO_X reduction efficiency is achievable by use of low-NO_X burner technology, including potential use of new generation of low-NO_X burners or optimization of existing burners."[225] As such, both of these records presume the exact same remarkable emission reduction potential, but for entirely different reasons. Moreover, the Non-EGU TSD based its presumption that companies could reduce NO_X emissions from reheat furnaces to 40% of the 0.073 lb/mmBtu from the 2019 Sterling Steel permit by the

[222] While we understand that technical difficulties can often be overcome with cost, that is not the case of SCRs/EAFs given the fundamental incompatibilities. In any case any attempt to overcome such insurmountable technical mismatch would be so expensive as to render this cost-ineffective at the presumed $7,500 per ton of NOx reduced.
[223] 87 Fed. Reg. at 20,145.
[224] 87 Fed. Reg. at 20,145.
[225] Non-EGU TSD at 43.

"use of low-NO_X burner technology," that EPA's preamble recognized to be already in use in Sterling Steel's reheat furnace.

Given the divergent technologies on which EPA based the same 40% NO_X emission reduction potential, it is thoroughly unclear how EPA selected the 40% value. Elsewhere in the Non-EGU TSD, EPA identifies NO_X reduction potential of up to 77%.[226] This reduction percentage is taken directly from Section 5.3.6 of the 1994 ACT, reproduced below.

> at 3 percent O_2 (0.174 lb NO_x/MMBtu). The corresponding NO_x reduction is 0.026 lb NO_x/MMBtu. For regenerative furnaces, controlled emissions are 560 ppm at 3% O_2 and 0.689 lb/MMBtu. For cold-air fired reheat furnaces, LEA lowers emissions to 96 ppm at 3%O_2 and 0.117 lb/MMBtu.
>
> LNB or FGR may require major modifications to furnace structures and refractories to install alternate burners. These combustion modifications do not necessarily reduce efficiency and capacity. The addition of LNB to a recuperative-fired furnace is not likely to affect either capacity or fuel requirements. The addition of FGR to a recuperative-fired furnace with or without LNBs will likely involve derating the furnace. The addition of LNB plus FGR to a regenerative fired furnace will not likely reduce capacity.[22]
>
> Average controlled NO_x emissions from two reheat furnaces (regenerative-firing) with LNB plus FGR controls are 150 ppm at 3 percent O_2 (0.18 lb NO_x/MMBtu).[10,11] Thus, the control efficiency is 77 percent and the NO_x removed is 0.61 lb NO_x/MMBtu. This efficiency is also used for recuperative and cold air firing.

However, it is clear from the above that the baseline NO_X levels in the few reheat furnaces tested in the 1990s as noted above were very high – *i.e.*, 0.689 lb/MMBtu for regenerative furnaces. While low NO_X burners and FGR reduced this to 0.18 lb/MMBtu, resulting in around 74% NO_X reduction,[227] this is because of the high baseline. Thus, this unexplained alternate NO_X emission reduction presumption fails to recognize that most of the reheat furnaces in operation today in the steel industry have considerably lower NO_X emissions levels than 0.689 lb/MMBtu. In fact, most of the current furnaces have baseline emissions levels that are closer to or even lower than the 0.18 lb/MMBtu controlled NO_X level noted in the 1994 ACT because such furnaces already use LNB or ultra-LNB as we show in further discussion below. Of course, obtaining 77% (or 74%) NO_X reduction using LNB+FGR is not feasible when the starting point already includes LNB or ultra-LNB. Thus, EPA's fundamental premise for further NO_X reductions from reheat furnaces is not grounded in fact with regards to the current baseline NO_X levels from such furnaces.

Finally, EPA's proposed FIP fails to recognize that many EAF steel facilities' reheat furnaces move within the facilities and do so in a way that significantly limits the options for add-on controls. "Tunnel" or "shuttle" furnaces are designed and operated to roll back and forth between the caster and the start of the rolling operation to allow for more continuous casting and eliminate duplicate rolling operations. These types of reheat furnaces are usually vented through monovents and are not routed to stacks because of their mobile nature. Application of add-on controls such as

[226] Non-EGU TSD at 41.

[227] Given the numbers stated in the 1994 ACT discussion we obtain 74% and not 77% NOx reduction using LNB+FGR.

SCR or SNCR to an existing mobile furnace would be technically difficult, if not wholly infeasible, due to space constraints and other technical details.

3. Preheaters, Annealing Furnace, Vacuum Degasser

To derive the proposed 0.05 lb/mmBtu NO_X limit for ladle and tundish preheaters, annealing furnaces, and vacuum degassers, the preamble to the Proposed FIP "assume[d] 40% reduction [from baseline emissions limits established in permits] by SCR."[228] The Non-EGU TSD, on the other hand, presumed that 40% NO_X reductions were only achievable though the application of LNB technology *and* SCR for ladle and tundish preheaters and vacuum degassers; and LNB technology, SCR, *and* FGR for annealing furnaces.[229] Here again, EPA's preamble and Non-EGU TSD are in perfect agreement as to the precise percentage of NO_X emissions that can be feasibly reduced, but are completely inconsistent in their identification of the controls that EPA presumes will achieve those reductions. And once again, the Non-EGU TSD bases its projection of 40% NO_X emission reduction potential at least in part on use of LNB, which are already in widespread use on preheaters and annealing furnaces – while vacuum degassers may utilize steam from boilers to remove atmosphere from around the ladle, we are not aware of any that further heat the molten material using burners capable of being replaced with LNB technology.

As with EAFs, LMSs, and reheat furnaces, EPA's Non-EGU TSD cites to limits in the 1994 NO_X ACT in support of its NO_X reduction presumptions. In Section 5.3.8 of the 1994 NO_X ACT, EPA correctly notes that "…annealing and galvanizing are accomplished at moderate temperatures usually below 540 C (1,000 F) . . . Because of these much lower temperatures, NO_X emissions from these processes should be lower…" meaning that they should be lower than NO_X emission levels from reheat furnaces where process temperatures are higher than 1,000 F. Recall that EPA had noted that uncontrolled NO_X levels in regenerative reheat furnaces (which are expected to have higher NO_X emissions due to the use of hot combustion air, for thermal efficiency reasons) were 560 ppm at 3% oxygen. Yet, in Section 5.3.8.1 of the 1994 NO_X ACT, EPA comes up with an uncontrolled NO_X level for annealing furnaces of 1,000 ppm, which is greater than the uncontrolled NO_X level for a reheat furnace.

In that section, EPA cites to Table 4-4 in the 1994 NO_X ACT and admits that "[T]here are no uncontrolled emissions data available…Uncontrolled NO_X emissions from two annealing furnaces are reported to be 1,000 ppm at 3 percent O2…" Examination of this table shows that the 1,000 ppm was the upper-most range of NO_X reported for annealing furnaces, with no citation details as to how this was developed or from where EPA obtained this uncontrolled value. This is important because the rest of EPA's Section 5.3.8.1 discussion uses the 1,000 ppm uncontrolled NO_X level to deduce control efficiencies for various schemes, such as 97% reduction via LNB+SCR and even assuming that 85% control efficiency should be possible. It then proceeds to simply use these high levels of control efficiency forgetting about the 1,000 ppm uncontrolled NO_X level assumed in deriving these efficiencies to begin with. The fact is that uncontrolled NO_X levels from annealing and galvanizing furnaces should not be greater than uncontrolled NO_X levels from reheat furnaces. And, like reheat furnaces, current annealing furnaces, in most cases, already use LNB. So, baseline NO_X emissions are nowhere near 1,000 ppm. In fact, they are lower than 0.2 lb/MMBtu. As a

[228] 87 Fed. Reg. at 20,145.
[229] Non-EGU TSD at 43 - 44.

result EPA's presumed control efficiencies, resulting NO_X reduction levels, and cost-effectiveness determinations for these smaller furnaces, are not properly supported and are, in fact, fundamentally flawed.

Adding to the problems noted above, we also note that annealing (and tempering) furnaces can be of various sizes and are design as specialty furnaces in order to accomplish the annealing (or tempering) actions specific to particular products and batch sizes. As one example, for "bell annealing" furnaces, a crane is required to physically list the furnace and place it over the "bell" containing the coils to be treated. This crane-operated lifting process renders commonly used "bell annealing" furnaces incompatible with add-on emissions controls.

Thus, one-size fits all solutions are not feasible. And, in many instances, such furnaces may be located within larger shops with no stacks making add-on controls even more problematic because any additional pressure drop in the exhaust will alter the pressure profile of the furnace. We see no indication in the record that EPA considered any of these aspects either in its technical analysis and/or its cost analysis for these furnaces.

b. EPA's Control Cost Assumptions are Unreasonable

EPA's control cost assumptions are unsupported and unreasonable in many different respects. First and foremost, as noted in Section VIII(a) above, EPA has failed to consistently and conclusively identify the emissions control strategy on which it based its technological feasibility *for every single EAF facility emissions unit subject to the Proposed FIP*. The preamble to the Proposed FIP and the Non-EGU TSD identify completely different control strategies for each EAF facility emissions unit.[230] It goes without saying that EPA must first identify an emissions control technology before it can reasonably assess the cost-effectiveness of that technology. This is an indisputable and essential prerequisite to any credible cost assessment. If EPA cannot conclusively identify the technology to be applied, it cannot conclude that the technology is cost-effective. And the fact that EPA is proposing to find that EAF facilities can cost-effectively control NO_X from their emissions units without first conclusively establishing the technology to be employed renders EPA's analysis arbitrary and capricious.

Indeed, EPA's inability to conclusively and consistently identify technologies that it believes will allow EAF facility emissions units to meet unprecedented NO_X emissions limits is yet another

[230] To derive the proposed NO_X limit for LMSs, EPA's Non-EGU TSD considered a wholly unidentified "range of baseline emission data and current permit limits from 0.20 lb/ton to 0.35 lb/ton," and project[ed] minimally 40% NOx reduction efficiency is achievable by use of low-NOx technology, including potential use of low-NOx burners and selective catalytic reduction." On the contrary, the preamble to the Proposed FIP based the proposed NO_X limits for the LMS on an "assume[d] 40% reduction by SCR" alone without estimating a baseline. To achieve the speculative 40% reduction of NO_X emissions from reheat furnaces, the preamble to the Proposed FIP presumes companies would need to install and operate SCR, while the Non-EGU TSD presumes use of "low-NO_X burner technology, including potential use of new generation of now-NO_X burners or optimization of existing burners." Similarly, to achieve EPA's surmised 40% reductions in NO_X emissions from ladle and tundish preheaters, annealing furnaces, and vacuum degassers, the preamble to the Proposed FIP presumed companies would be required to utilize SCR. The Non-EGU TSD, on the other hand, presumed that 40% NO_X reductions were only achievable though the application of LNB technology *and* SCR for ladle and tundish preheaters and vacuum degassers; and LNB technology, SCR, *and* FGR for annealing furnaces.

inevitable outcome of EPA's failure to conduct the engineering analysis necessary to support the Proposed FIP. The emissions and control inventories on which EPA relied are a demonstrably insufficient substitute for conducting actual engineering analysis of non-EGU sources, particularly emissions units at EAF facilities.

To begin, the sources EPA utilized rely on state emissions inventories which are most often based on sources reporting annual actual NO_X emissions on a facility-wide basis rather than a per-unit basis. Moreover, even if these inventory data are reasonably current and accurate, it provides only the starting point for the type of analysis EPA claims to have conducted. This inventory does not include the more granular details necessary to identify technology strategies for installing or optimizing controls on specific units or even particular types of units. Information regarding the age of equipment, operational data, and spatial impediments to retrofit or control installation likely require input from facilities. As is evident from the deficiencies in EPA's analysis, EPA conducted no such outreach on a sector-wide basis, much less a facility-specific basis.

In developing its control cost assessment, EPA also failed to contact pollution control technology vendors. While vendors would likely have difficulty assessing the efficacy and cost of installing pollution control technologies on emission units that have never been controlled with these technologies, vendor estimates could at least provide a starting point for a more refined and reasonably considered assessment of control costs in the non-EGU sections, and particularly for emissions units at EAF facilities.

As noted throughout these comments, the limits the Proposed FIP would impose on EAF facility emissions units were not based on any actual permit limits, were lower than any limit recorded in the RBLC, and, according to the preamble to the Proposed FIP (but not the Non-EGU TSD), appear to be largely based on installation of control technology (SCR) EPA has no record of ever being used to control NO_X from EAF sector sources for good technical reasons, as we have noted earlier. Therefore, as specifically relevant to EPA's cost analysis, by declining to base the Proposed FIP's limits on even the most stringent limits found in actual Title V permit limits or in the RBLC database, EPA altogether disregarded and refused to consider a wealth of unit-specific cost-effectiveness determinations that would have allowed EPA to better understand which types of NO_X controls were already determined to be feasible/cost effective and which were not.

Indeed, had EPA reasonably consulted this readily available information, it would have recognized that SCR is not a feasible or cost-effective control for EAF facility emissions units. Therefore, to the extent EPA based its cost assessment of EAF facility emissions units on installation of SCR (which as noted, is far from clear), that cost estimate is based on assumptions developed for SCR installation on completely different and dissimilar emissions units (presumably EGUs). As such, even if SCR could be feasibly utilized on EAF facility sources (which has never been shown), EPA's assessment fails to recognize how different EGUs and EAF facility emission units are from a cost perspective.

EAFs do not have nearly the scale of EGUs and therefore the CPT for EAF emission reductions are not spread out over nearly as many tons as EGUs. Further, EAFs are "batch processes" with highly varied throughput and run-time depending on demand and other factors. Accordingly, EAFs and other batch processes necessarily have higher pollution reduction CPT than EGUs and certain "straight-line" manufacturing processes.

EPA's cost assessment also seemingly fails to consider the significant costs uniquely associated with force-fitting SCR at EAF facilities. These include costs associated with designing proper catalysts, gas conditioning to place catalysts in the proper temperature window (if possible), addressing high dust levels in the inlet gas, modifying fans to account for catalyst pressure drop, increasing energy demands, GHG generating and NO_X emissions from "tail-end" SCR, designing fast-feedback detection and injection technologies, hiring and training workers to operate a new technology using a toxic material like ammonia, and the inevitable delays and complications associated with deploying a control technology on emissions units for which it has never been used and may be completely infeasible.

The foregoing unique cost factors are just a few of the factors EPA's cost assessment failed to consider in the context of an EAF facility. Importantly, however, these factors presume that emission from the emissions unit are ducted to a stack – a critical aspect of the "tail-end" configuration. In reality, most EAF facility emissions units are not exhausted through a stack. The costs to capture emissions from each of the EAF facility emissions units identified in the Proposed FIP and direct them to one or more stacks would alone likely exceed the $7,500 CPT threshold.

Even when emissions from an EAF facility unit are controlled by a baghouse, it is likely to be a positive-pressure baghouse with a ridge vent, which does not allow an operator to efficiently reheat the emissions to the narrow temperature window needed for SCR. Therefore, for the type of baghouse most commonly used at EAF facilities, using SCR will require, at minimum, the construction of a new stack. As the American Iron and Steel Institute's representative explained in oral testimony "the cost to install a single discharge point for a ridge baghouse, including ducting costs and maintenance costs, would far exceed the $7,500 per ton reasonableness threshold."[231]

EPA's assessment of the cost-effectiveness of reducing NO_X using LNB is similarly deficient. Setting aside that EPA's various contradictory technological feasibility analysis make it impossible to discern whether or to what extent EPA based EAF facility emission units' limits on LNB installation, EPA's Non-EGU Screening Assessment reveals that the Agency does not even know whether LNB are already being used to control emissions at non-EGU sources.[232] EPA is only now requesting comment on LNB use,[233] which begs the question of how EPA was able to reasonably assess control costs before it even knows whether the controls were already in place.

To respond to EPA's information request, the EAF Steel Associations conducted an informal survey of its members and found that LNB and ULNB are already installed on all or nearly all EAF facility emissions units. The fact that LNB and ULNB are already controlling NO_X emissions from EAF emissions units means that the remaining reductions that EPA surmises may be achieved through complementary controls will be accomplished at a higher CPT (if the limits can be achieved at all).

When assessing costs for annealing furnaces, which, like every other EAF facility emissions unit, were analyzed under two contradictory technological feasibility analyses, EPA seemingly ignored the applicability limits in its Menu of Control Measures ("MCM"). Regardless of the combination of control technologies applied to annealing furnaces, the MCM disclaimed that the identified

[231] Transcript of EPA's April 21, 2022 hearing at 266.
[232] Non-EGU Screening Assessment at 21.
[233] Non-EGU Screening Assessment at 21.

controls are only "applicable to iron and steel annealing operations with uncontrolled NO_X emissions greater than 10 tons per year."[234] While some steel industry annealing furnaces may emit more than 10 tpy of NO_X, many if not most emit far less NO_X because they are only used for a subset of steel products and are therefore operated less frequently than most other EAF facility emissions units. Thus, according to EPA's own MCM, no combination of NO_X control technologies is cost-effective for annealing furnaces that have NO_X emissions of 10 tpy or less. Once again, EPA could have recognized and corrected this analytical error if the Agency conducted an engineering analysis and engaged with industry prior to publishing the Proposed FIP.

1. Illustrative example of deficient cost analysis

Previously we have discussed why the technical basis for the proposed EAF steel sources' NO_X emissions is fatally flawed, including not just the lack of any support for EPA's proposed technological feasibility conclusions, but also EPA's assumed control effectiveness for the controls it identified. In addition, this subsection provides an illustrative example which demonstrates that the cost estimates that EPA has used in its analysis of cost-effectiveness for controls are not only unsupported but also incomprehensible.

Exhibit G below is an excerpt from one of the spreadsheets EPA provided in support of the Proposed FIP in the administrative record. We have condensed this sheet to focus on what appears to be four sources at the two EAF facilities we have been discussing in these comments, namely the Chaparral, Virginia ("VA") and the Nucor, Arkansas ("AR") mills. Although in other EPA analyses, as noted above, there are three (and not four) sources attributed to these two plants, in this spreadsheet there are four units. It appears that one of the VA units (in the first row) was set aside because its cost effectiveness (reflected in the third column from the left, with the partial heading Marginal, was greater than $7,500 per ton reduced. We have highlighted in yellow, the control effectiveness EPA has assumed for NO_X controls from these sources as well as the Annual Operating and Maintenance Cost and the Total Capital Cost columns.

Since the total annual cost is the sum of the annual operating and maintenance costs plus the annualized value of the capital cost (using an applicable annual interest rate and years of useful life), we are confused by the lack of any capital costs for the VA units. We are not sure why EPA believes that SCR can be installed in the unit on the second row without any capital cost. The fact that the Total Annual Cost does not include any Capital Cost contributions is confirmed by comparing the second column from the left with the highlighted Annual Operating and Maintenance cost column. For the two Chaparral VA units, these are the same. That confirms that indeed EPA included no capital costs for SCR in its analysis for the two Chaparral units. Clearly, EPA's cost effectiveness analysis resulted in a profound underestimate based on this reason alone.

For the two Nucor units (in the third and fourth rows) we see that EPA believes that 77% reduction of NO_X can be achieved using low NO_X Burners and FGR. Setting aside the technical infeasibility of this assumed reduction which we have discussed prior, we focus instead on the cost assumptions made by EPA. From the table, EPA seems to have included a capital cost of around $30,000 to $33,000 for each of these units and, curious, slightly negative annual operating costs of between

[234] Non-EGU TSD at 38.

$50 and $60 dollars. We note that all of the numbers in the cost columns highlighted lack links to any other spreadsheets or calculations that could explain these calculations. Nor could we find any explanation for these values elsewhere in the docket for the Proposed FIP. And, none of these costs are attributed to any other specific calculations. Regardless, the plain implausibility of EPA's cost assumptions for the two Nucor units is apparent, even without any citations. Thus, EPA's calculated cost-effectiveness of a little over $600 per tons reduced for these two units cannot be relied upon.

EXHIBIT G – EPA-HQ-OAR-2021-0668-0225_attachment_1

EMIS_REDUCTION	ANNUAL_COST	MARGINAL	CM_ABBREV	CONTROL_EF	ANNUAL_OPER_MAINT_COST	TOTAL_CAPITAL_COST	CONTROL_TECHNOLOGY	SOURCE_GROUP	state_n
95.65136298	1891781.971	19777.88828	NLNSCRIBG	91	1891781.971		Ultra Low NOx Burner and Selective Catalytic Reduction	ICI Boilers - Gas	Virginia
109.2468151	458129.4391	4193.526727	NSCRISIPCC	90	458129.4391		Selective Catalytic Reduction	Iron & Steel - In-Process Combustion - Bituminous Coal	Virginia
11.60975311	7330.855711	631.439415	NLNBFISPBR	77	-53.28482355	30276.43409	Low NOx Burner and Flue Gas Recirculation	Iron and Steel Production; Blast Heating or Reheating	Arkansas
12.66518521	7997.297139	631.439415	NLNBFISPBR	77	-58.12889841	33028.83718	Low NOx Burner and Flue Gas Recirculation	Iron and Steel Production; Blast Heating or Reheating	Arkansas

We have also found some additional and different cost data in a different spreadsheet, also included in the record. We have excerpted relevant rows from that spreadsheet in the table below, as shown.

EXHIBIT G – EPA-HQ-OAR-2021-0668-0191_attachment_1

State	County	Company/Site Name	Emissions Source Group	Annual NOx Emissions	Existing Control	Selected Control Technology	Annual NOx Emissions Reduction	OS NOx Emissions Reduction	Annual Cost
AR	Mississippi	Nucor Corporation NA (51%); Yamato Kygyo (49%) Japan; Nucor-Yamato Steel Company	Industrial Processes - Other Not Classified	19	None Specified	Low NOx Burner and Flue Gas Recirculation (77%)	15	6	$9,432
VA	Dinwiddie	Chaparral Virginia Incorporated	Industrial Processes - Blast Furnace: Casting/Tapping: Local Evacuation	102	None Specified	Selective Catalytic Reduction (90%)	91	38	$383,607
VA	Dinwiddie	Chaparral Virginia Incorporated	Boilers - > 100 Million BTU/hr	144	None Specified	Selective Catalytic Reduction (90%)	130	54	$579,550

The last column shows some annual costs for a single Nucor unit and two Chaparral units. None of these costs in the last column match up with any of the costs in the previous table. These wholly unexplained and widely divergent cost estimates renders EPA's cost-effectiveness analysis utterly incomprehensible. But, even if these divergent values could be rectified, there is no doubt that EPA has underestimated capital costs and therefore estimated cost-effectiveness.

The profound flaws in EPA's conclusion regarding the cost-effectiveness of potential controls for steel industry sources is readily illustrated by an example. Consider reheat furnaces, which are present at EAF steel mills (and also in Integrated Iron and Steel plants). EPA presumes that these furnaces can meet a NO_X limit of 0.05 lb/MMBtu, as previously noted. As we have pointed out, all reheat furnaces in the industry today use low NO_X or ultra-low NO_X burners, consistent with their furnace design – *i.e.*, consistent with avoiding flame impingement and other operational issues.

Many of the reheat furnaces that we have surveyed have NO_X levels of around 0.1 lb/MMBtu or lower. Using a reasonable assumption of, say, 150 MMBtu/hr as the size of a furnace, the annual tons of NO_X reduction that can be obtained (using any add-on controls such as FGR or SCR, as EPA has assumed) under the scenario, assuming 8760 hours of operation at maximum firing conditions is (0.1 – 0.05) lb/MMBtu * 150 MMBtu/hr (8760 hrs/year / 2000 lb/ton = approximately 32.85 tons/year. Of course, actual, reduced hours and lower firing rates will lower this number. And there are numerous reheat furnaces that are smaller than the 150 MMBtu/hr used in this example, and others that have baseline emission rates that are well below 0.1 lb/MMBtu used in this example. Nonetheless, using 32.85 tpy as the NO_X annual reduction value and $7,500 per ton reduced as the cost-effectiveness threshold, the maximum annualized cost that would make this option cost effective is 32.85*7500 = $246,375 $/year. Assuming even minimal annual operating and maintenance costs of say, 30% of this value (to account for labor, parts, and all of the allowable annual costs in EPA's cost-effectiveness calculations), we are left with around $172,462 per year from annualized capital costs. Using a typical 7% annual interest rate and a 20 year life, and therefore a capital recovery factor of 0.094. Thus, the maximum capital cost (about which it would not be cost-effective) is $172,462/0.094 or around $1.83 million. We challenge EPA to find any vendor that can provide a SCR or FGR system for such a reheat furnace for this capital cost.

Frankly, in this example, had we completely eliminated any annual O/M cost, the maximum allowable capital cost at the limit of EPA's cost-effectiveness value would have been $246,375/0.094 or $2.62 million in this example. Even this is an extremely low capital cost for SCR or FGR for any furnace or combustion device, much less a 150 MMBtu/hr sized natural draft reheat furnace. In our experience actual capital costs are likely to be an order of magnitude or more.

Our conclusions would not change if the baseline emission rate and/or the furnace size is made larger, thereby increasing the annual NO_X reduced. This single example illustrates the unrealistic assumptions that underlie EPA's cost analyses for all EAF facility emission units. The fact that EPA's cost-effectiveness calculations are not credible is supported by at least two examples. Nucor, of SMA's member companies has had to install SCR on two of its large (over 500 MMBtu/hr) California reheat furnaces. One furnace achieves NOx reductions of around 56% at a cost-effectiveness of over $40,000 per ton of NOx removed while the second furnace is expected to achieve NOx reductions of around 80% at a cost-effectiveness of around $14,500 per ton of NOx reduced. These are, of course, substantially greater than EPA's assumed $7,500 per ton threshold in the Proposed FIP.

Further confirming the lack of cost-effectiveness of SCR on reheat furnaces, we also note that this was an issue that Steel Dynamics, another SMA member company, had to address when permitting one of its mills around 2001. An EPA EAB decision relating to this matter[235] confirms the economic infeasibility of SCR on a reheat furnace at estimated cost-effectiveness values ranging

[235] https://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/PSD%20Permit%20Appeals%20(CAA)/8BB8A3D22232ACEA85257069005F7D4E/$File/steeldyn2.pdf

from \$14,044 - \$17,338 per ton of NOx reduced, assuming 80% NOx reduction starting from a baseline of 0.11 lb/MMBtu NOx. Current estimates, given equipment price escalations since 2001 and lower baseline NOx levels today would, of course, make these calculated NOx cost-effectiveness values even greater.

2. EPA cannot finalize the Proposed FIP without reassessing cost-effectiveness and allowing for additional public comment

Considering the foregoing, it is unsurprising that in the 2021 Non-EGU TSD, EPA estimated that "there is an accuracy range of +/-30% for non-EGU point sources control cost estimates."[236] From an engineering perspective even this +/-30% is implausibly narrow given that the mean value is likely off by an order or magnitude or more.

Moreover, EPA cannot reasonably expect stakeholders to engage venders and consultants to examine the cost effectiveness of NO_X controls that EPA has not yet consistently identified. Far from providing a basis on which to finalize the Proposed FIP, EPA's cost assessment is too deficient to even allow for comments. Therefore, EPA must not only update its conclusions regarding technological feasibility and cost-effectiveness, it must publish those updated analyses and allow for additional public comment.

As EPA reconsiders its cost assessment, the EAF Steel Associations believe EPA must take at least two additional steps to address underestimates applicable to all emissions units:

1. Consider current economic conditions – EPA presented its estimated costs of controls in 2016 dollars, which is not representative of current purchasing power.[237] EPA's cost assessment must account for an inflation rate that is now the highest since 1981.[238] Given the significant increase in interest rates,[239] EPA's cost assessment must also account for higher borrowing costs for capital projects like NO_X controls.

2. Include CEMS in cost calculations – CEMS are costly to purchase, install, and operate, and given the number of emissions units EPA proposes to regulate under the Proposed FIP, many facilities will need to operate multiple CEMS. Use of CEMS is intertwined with EPA's assessment of control technologies[240] as well as the averaging times EPA used in setting its proposed NO_X Limits. EPA therefore has no basis to segregate these real and meaningful costs[241] from EPA's overall assessment of the cost effectiveness of controls.

[236] 2021 Non-EGU TSD at 21.
[237] 87 Fed. Reg. at 20,091.
[238] https://www.cnbc.com/2022/06/10/consumer-price-index-may-2022.html.
[239] https://www.cnbc.com/2022/06/15/fed-hikes-its-benchmark-interest-rate-by-three-quarters-of-a-point-the-biggest-increase-since-1994.html.
[240] For instance, for units without existing ductwork, there is no practical way to install a CEMS. This is the case for most ladle and tundish preheaters, bell annealing furnaces, and mobile reheat furnaces. By proposing to require CEMS in these instances, EPA is in reality requiring that these types of emissions units be replaced altogether.
[241] Based on the experience of members of the EAF Steel Associations, we believe it is reasonable to assume that NO_X CEMS will cost approximately \$500,000 to purchase, install, program, and certify. Ongoing operation, maintenance, and calibration testing likely exceed \$150,000 per year. And if a facility were required to operate multiple CEMS, it

c. EPA Miscalculated how Quickly New Controls Could be Deployed at EAF Facilities

EPA proposes to require that the non-EGU controls it identified in Step 4 of its multi-step analysis "be installed and operational by the 2026 ozone season and to find that any earlier date is not possible."[242] While the EAF Steel Associations concur with EPA's proposed determination that it is not possible for non-EGU sources to install and operate the control technologies any earlier than 2026, we do not believe that EPA has any record basis to conclude that any non-EGU sources, and particularly those in the iron and steel industry, can install and operate the emissions controls EPA identified in Step 4.

To begin, EPA's Proposed FIP does not even clearly identify the control strategy the Agency expects to be utilized to control NO_X from emissions units typically present at EAF steel facilities. To derive the proposed NO_X limit for LMSs, EPA's Non-EGU TSD considered a wholly unidentified "range of baseline emission data and current permit limits from 0.20 lb/ton to 0.35 lb/ton," and project[ed] minimally 40% NO_X reduction efficiency is achievable by use of low-NO_X technology, including potential use of low-NO_X burners and selective catalytic reduction." [243] On the contrary, the preamble to the Proposed FIP based the proposed NO_X limits for the LMS on an "assume[d] 40% reduction by SCR" alone without estimating a baseline.[244] To achieve the speculative 40% reduction of NO_X emissions from reheat furnaces, the preamble to the Proposed FIP presumes companies would need to install and operate SCR,[245] while the Non-EGU TSD presumes use of "low-NO_X burner technology, including potential use of new generation of now-NO_X burners or optimization of existing burners."[246] Similarly, to achieve EPA's surmised 40% reductions in NO_X emissions from ladle and tundish preheaters, annealing furnaces, and vacuum degassers, the preamble to the Proposed FIP presumed companies would be required to utilize SCR.[247] The Non-EGU TSD, on the other hand, presumed that 40% NO_X reductions were only achievable though the application of LNB technology *and* SCR for ladle and tundish preheaters and vacuum degassers; and LNB technology, SCR, *and* FGR for annealing furnaces.[248]

Given EPA's inability to consistently and conclusively identify the emissions control strategy on which it based its technological feasibility and cost effectiveness conclusions for steel industry emissions units, the Agency plainly has no basis to speculate as to the time necessary to design, purchase, install, and operate these indeterminate control strategies. For similar reasons, it is also premature for EPA to request comment on the timing for installation of controls. Unless and until EPA conclusively identifies the control strategy to be installed, potentially impacted stakeholders have no premise on which to base engineering analyses; design, construction, and permitting schedules, or vender surveys. Indeed, the EAF Steel Associations' ability to meaningfully comment on the Proposed FIP, which is already inhibited by the woefully insufficient time EPA

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is likely that there would be significant additional costs associated with the need to hire at least one additional employee.

[242] Non-EGU TSD at 87.
[243] Non-EGU TSD at 43.
[244] 87 Fed. Reg. at 20,145.
[245] 87 Fed. Reg. at 20,145.
[246] Non-EGU TSD at 43.
[247] 87 Fed. Reg. at 20,145.
[248] Non-EGU TSD at 43 - 44.

allowed for comments, is altogether precluded by EPA's failure to even consistently identify the NO_X emission control strategies that the Agency analyzed. Our industry cannot be expected to hire a consultant to fully assess the technological feasibility, cost-effectiveness, and installation timing of controls that EPA has not yet conclusively identified. As such, if EPA corrects its inconsistent control assumptions for emissions units at EAF steel facilities, the Agency must not only update its conclusions regarding technological feasibility, cost-effectiveness, and installation timing, it must publish those updated analyses and allow for additional public comment.

Moreover, the 1998 NO_X SIP Call represents the last time EPA "considered the installation timing needs for NO_X controls . . . at both EGU and non-EGU sources."[249] In the intervening 24 years EPA has not conducted any further analysis of installation timelines for NO_X controls at non-EGU sources.[250] Thus, EPA's assumption that NO_X controls can be installed and operated at non-EGU sources within three years is based entirely on the 1998 NO_X SIP Call's analysis.

In addition to being extremely dated, the 1998 NO_X SIP Call's analysis of control installation timelines was based on a much smaller universe of non-EGU sources that were required to install NO_X controls.[251] Accordingly, EPA's 1998 NO_X SIP Call's analysis assuredly underestimates the delay to be expected from a far larger number of Non-EGU sources simultaneously engineering, purchasing, constructing, permitting, and installing the same few types of NO_X control technologies.

Moreover, even if EPA's analysis of control installation timelines were not decades old, it still fails to consider recent and unprecedented disruptions in relevant supply chains, transportation constraints, and employee shortages related to the Russian invasion of Ukraine and the enduring effects of the COVID-19 pandemic. EPA cannot reasonably rely on its 1998 NO_X SIP Call's analysis without updating it to account for these widely recognized and indisputably relevant supply disruptions.

EPA's analysis of control installation timelines also failed to consider delays caused by permitting. Installation of certain NO_X controls may require construction permitting and/or a Title V permit modification. And, if there are potential emissions increases attributable to the modification, the preconstruction permitting can become quite protracted. This is relevant because many NO_X reduction strategies can result in increased emissions of carbon monoxide (CO), ozone precursors like volatile organic compounds (VOCs), or other hazardous air pollutants due to incomplete combustions. Similarly, many NO_X controls can result in other environmental impacts such as emissions from ammonia slip when using SCR or GHG emissions that are directly emitted from controls or the result of increased energy use. This permitting process, which for some EAF Steel Association members has spanned multiple years, must be considered in EPA's analysis of control installation timelines.

Finally, given EPA's (albeit inconsistent and unexplained) expectation that EAF steel facility NO_X reductions will require SCR, the EAF Steel Associations herein specifically note that EPA has no

[249] Non-EGU TSD at 87. Control installation timelines were estimated for a subset of non-EGU sources in 2016, but the only source relevant to EAF steel producers was a reheat furnace, the control for which EPA alternatingly identifies as either SCR or LNB + FGR.
[250] Non-EGU TSD at 87.
[251] Non-EGU TSD at 88.

basis to estimate timelines for SCR at emissions units at EAF facilities. EPA never assessed SCR installation timelines for any of these units. Indeed, EPA has no record basis to conclude that SCR has ever been installed at any EAF facility emissions unit. EPA's proposed conclusion that controls can be installed and operating effectively to control NO_X within three years represents a generic and unsupported assumption that EPA applied "across the affected industries in the 23 states that remain linked in 2026."[252] Further the first SCRs on EGUs were installed in the United States after almost a decade of development, and this was well after such SCRs had already been used in Japan and Germany. We are not aware of SCRs in use on EAFs anywhere in the world.

This estimate of SCR installation timing was derived from EPA's more extensive analysis of SCR installation times necessary in the EGU industry. But SCR is a far more common control at EGUs, and EGU operators have decades of experience installing, calibrating, and operating SCR. Nonetheless, as reflected in MOG's comments, EPA's proposed three-year SCR installation timeline appears to significantly underestimate the time necessary to install SCR even on EGUs. Thus, as applied to the types of emissions units at EAF steel facilities for which SCR has never been used as a NO_X control, EPA's three-year installation estimate is plainly unreasonable and wholly speculative.

IX. EPA'S PROPOSED FIP VIOLATES THE PROCEDURAL PROTECTIONS IN CAA SEC. 307(d)

Section 307(d) of the CAA provides that "[a]ll data, information, and documents . . . on which the proposed rule relies shall be included in the docket on the date of publication of the proposed rule." This is a critical requirement that Congress mandated generally through the APA and, given the complex scientific issues involved" specifically mandated for CAA rules.[253]

Notwithstanding this requirement, EPA did not provide stakeholders certain key information until well after publication of the Proposed FIP. For instance, EPA did not provide the 2023 Industry Identification Analysis until April 27[254] – three weeks after the Proposed FIP was published in the *Federal Register*. The 2023 Industry Identification Analysis is critical to understanding this rulemaking because it identifies the inventory of the facilities EPA considered in its modeling and screening analysis, the controls EPA believed could be utilized at each facility, the cost of those controls, and the NO_X emissions reduction potential EPA believes can be achieved through use of such controls. This 2023 Industry Identification Analysis provided the first facility-specific data on which the EAF Steel Associations could begin to discern how EPA reached its conclusion that EAF steel manufacturers contribute significant levels of controllable NO_X emissions to downwind receptors.

EPA's three-week delay in providing the 2023 Industry Identification Analysis is somewhat inexplicable given that this data must have been generated by the Agency and available at the time the Proposed FIP was published in the *Federal Register*. Additionally, regardless of why EPA withheld release of this information, EPA's three-week delay in providing 2023 Industry

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[252] 87 Fed. Reg. 20,104.

[253] *E.g., Small Ref. Lead Phase-Down Task Force v. EPA,* 705 F. 2d 506, 518 (D.C. Cir. 1983); *See also Kennecott Corp. v. EPA,* 684 F. 2d 1007, 1018 (CAA § 307(d)(3) requires EPA to place in the docket "the factual data on which the proposed regulations are based").

[254] *See* EPA-HQ-OAR-2021-0668-0225 (Attachment 1).

Identification Analysis impeded the EAF Steel Associations' ability to meaningfully analyze and comment on this fundamental data. The mere two-week extension of the public comment period does not sufficiently remedy EPA's three-week delay in providing the critical assumptions on which it based its Proposed FIP (particularly given that EPA's justification for not granting a longer extension of the minimal original 60-day comment period was based in large part on the fact that EPA made a pre-publication copy of the proposed rule available in advance: of course, the critical 2023 Industry Identification Analysis was not available at that point either).

Moreover, while EPA unreasonably delayed release of the 2023 Industry Identification Analysis, in other key respects, EPA failed to provide critical information altogether.

For instance, the Agency's Screening Assessment of Potential Emissions Reductions, Air Quality Impacts, and Costs from Non-EGU Emissions Units for 2026 ("Non-EGU Screening Assessment") cites extensively to model inputs, codes and Control Strategy Tool ("CoST") run data that is only available upon request.[255] These data are essential in order to fully evaluate EPA's assessments of Non-EGU emissions, control costs, and air quality impacts. As such, on April 20, 2022, the EAF Steel Associations requested the following data from the Non-EGU Screening Assessment[256]:

1. The air quality contribution data that EPA used to identify potentially impactful industries in 2023 and the R code that processed these data;[257]

2. The CoST run results and the R code that generated the curves EPA used for identifying a cost threshold to evaluate emissions reductions in potentially impactful industries in 2023;[258]

3. The maximum emission reduction CoST run results that EPA used to assess Non-EGU emission reduction potential and estimated air quality impacts in potentially impactful industries in 2023;[259]

4. The 2023 state-receptor specific Revised CSAPR Update ("RCU") ppb/ton values, the RCU calibration factors used in the air quality assessment tool ("AQAT") for control analyses in 2023, the R code that processed the CoST run results using the maximum emission reduction algorithm, and the summaries of the air quality improvements;[260]

5. The 2023 state-receptor specific RCU ppb/ton values, the RCU calibration factors used in the AQAT for ozone for control analyses in 2023, and the R code that processed the CoST run results that EPA used for its impactful boiler assessment;[261]

[255] EPA-HQ-OAR-2021-0668-0150.
[256] EPA-HQ-OAR-2021-0668-0208/EPA-HQ-OAR-2021-0668-0210.
[257] Non-EGU Screening Assessment at 3, FN9.
[258] *Id* at 4, FN12.
[259] *Id* at 5, FN14.
[260] *Id* at 5, FN16.
[261] *Id* at 6, FN20.

6. The R code that processed the CoST run results, the sector-specific (non-EGU-specific) ppb/ton values, and the 2026 AQAT calibration factors used to prepare the Non-EGU Screening Assessment tables on estimated emissions reductions, maximum PPB improvements, and costs.[262]

Notwithstanding the specificity of this request, none of this information was posted in the rulemaking docket or provided to us. This is a clear violation of CAA Section 307(d).

The D.C. Circuit makes clear that when an agency relies on data that is critical to its decision-making process, that data must be disclosed in order to provide the public an opportunity to meaningfully comment on the agency's rulemaking rationale.[263] Indeed, the D.C. Circuit has consistently maintained that "[i]n order to allow for useful criticism it is especially important for the agency to identify and make available *technical studies and data* that it has employed in reaching the decisions to propose particular rules."[264]

Further, with respect to the CAA in particular, if "documents of central importance upon which EPA intended to rely had been entered in the docket too late for any meaningful public comment prior to promulgation, then both the structure and spirit of section 307 would have been violated."[265] "The Congressional drafters, after all, intended to provide 'thorough and careful procedural safeguards . . . [to] insure an effective opportunity for public participation in the rulemaking process.'"[266]

Even if EPA had timely provided all of the documents of central importance upon which it relied in drafting the Proposed FIP, the public comment period EPA provided remains woefully insufficient. EPA's Proposed FIP is unparalleled in terms of geographic scale, the scope of covered industry sectors, the number of potentially impacted emissions units, and the remarkable extent to which the Agency assumes emissions from those units can be abated using what EPA believes to be widely available and cost-effective controls. In the iron and steel sector alone, EPA is proposing to require at least fifteen different types of emissions units to achieve unprecedented NO_X emission reductions using control technologies that have never been used and cannot be used on certain units.

The unprecedented breadth and complexity of this proposal is plainly evident. The Proposed FIP comprises over 180 pages of the *Federal Register.* The rulemaking docket on regulations.gov includes 197 groups of records, many of which include dozens of documents and spreadsheets. As voluminous as the regulations.gov docket may be, it is only part of the administrative record

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[262] *Id* at 6, FN20.

[263] *See, e.g., Conn. Light & Power Co. v. Nuclear Regulatory Comm'n,* 673 F.2d 525, 530 (D.C. Cir. 1982); *Chamber of Commerce v. SEC,* 443 F.3d 890, 899 (D.C. Cir. 2006); *Am. Radio Relay League, Inc. v. FCC,* 524 F.3d 227, 236-37 (D.C. Cir. 2008).

[264] *Conn. Light & Power Co.,* 673 F.2d at 530 (emphasis added); *See also Am. Radio Relay League, Inc.,* 524 F.3d at 237 ("It would appear to be a fairly obvious proposition that studies upon which an agency relies in promulgating a rule must be made available during the rulemaking in order to afford interested persons meaningful notice and an opportunity for comment.").

[265] *Sierra Club v. Costle*, 657 F.2d 298 at 398 (D.C. Cir.1981); *See also Kennecott Corp. v. EPA*, 684 F.2d 1007, 1019 (D.C.Cir.1982) (EPA improperly placed economic forecast data in the record only one week before issuing its final regulations).

[266] *Sierra Club v. Costle,* 657 F.2d 298 at 398 (citing H.R.Rep.No.95-294, 95th Cong., 1st Sess. 188 at 319 (1977)).

on which EPA purports to have relied in drafting its proposal. The Proposed FIP directs commenters to consult the dockets for EPA's several prior good neighbor rules, a large collection of SIPs and Agency SIP reviews, a litany of court cases, and numerous other extra-record sources.

It is not reasonable for EPA to expect stakeholders to consider this voluminous and widely dispersed record in responding to the Agency's request for comments on at least 53 distinct elements of the Proposed FIP and, more broadly, "all aspects of the proposal."[267] This level of analysis and response plainly cannot be accomplished thoroughly in the time EPA has allotted.

Indeed, neither EPA's original 60-day comment period nor the Agency's minimal two-week extension reflect the serious effort to promote public engagement that the CAA compels. As such, to more fully promote the legality of the FIP EPA ultimately promulgates, the EAF Steel Associations strongly urge EPA to provide all "documents of central importance" upon which EPA relied in drafting the Proposed FIP and allow stakeholders substantial additional time to review and comment on a legally sufficient docket.

X. NECESSARY CLARIFICATIONS

The EAF Steel Associations strongly urge EPA to reconsider its inclusion of the iron and steel sector in the Proposed FIP. Iron and steel sector NO_X emissions, much less those from the EAF steel producers that are a distinct subset of the sector, do not contribute significantly to downwind nonattainment or interfere with maintenance. EPA therefore has no obligation – or authority - under the CAA to impose unrealistic, unproven, and costly controls on the iron and steel sector, and particularly EAF steel producers, in order to facilitate attainment with the 2015 Ozone NAAQS. To the contrary, the arbitrary and capricious imposition of unsupported and unattainable emissions limits on EAF steel producers will only serve to undermine the validity and legal defensibility of the Proposed FIP.

Should EPA persist in including EAF steel producers in this Proposed FIP or in any subsequent FIP proposal, the EAF Steel Associations strongly urge EPA to clarify the applicability of FIP provisions in the following ways. Please note that these recommended clarifications on the applicability of FIP requirements, and in no way reflect the full universe of clarifications necessary to allow EPA to lawfully promulgate the Proposed FIP and its requirements for steel manufacturing facilities. As the EAF Steel Associations have noted throughout these comments, it is impossible to discern from the administrative record EPA's rationale for selecting the parameters that caused the Non-EGU Screening Assessment to target EAF steel producers for NO_X reductions, or the basis by which EPA surmised that EAF steel producers could achieve unprecedented NO_X reductions at extremely low cost.

<u>Applicability in proposed 40 C.F.R. 52.43</u> – Proposed section 52.43 provides the proposed FIP requirements for the "Iron and Steel Mills and Ferroalloy Manufacturing Industry."[268] The applicability of these proposed requirements to specific steel industry facilities is described in proposed section 42.43(b) as follows:

[267] 87 Fed. Reg. at 20,041.
[268] 87 Fed. Reg. at 20,181.

> The requirements of this section apply to each new or existing emissions unit at an iron and steel mill or ferroalloy manufacturing facility that directly emits or has the potential to emit 100 tons per year or more of NO_X, and to each BOF Shop containing two or more such units that collectively emit or have the potential to emit 100 tons per year or more of NO_X, and that is located within any of the States listed in § 52.40(a)(1)(ii), including Indian country located within the borders of any such State(s).[269]

The EAF Steel Associations recognize that the phrase "that directly emits or has the potential to emit 100 tons per year or more of NO_X," describes the emissions units that would be subject to the Proposed FIP, and not the "iron and steel mill or ferroalloy manufacturing facility." Thus, an individual emissions unit at an EAF steel mill could become subject to the Proposed FIP's limits if it had a PTE of 100 tpy or more of NOx, but the overall EAF steel mill (and all relevant emissions units therein) would not become subject to the Proposed FIP if the aggregated PTE of all of its emissions units exceeded 100 tpy. This interpretation of proposed section 42.43(b) is supported by the contrasting approach to applicability proposed for "each BOF shop" as well as explanations in the preamble to the Proposed FIP[270] and within the administrative record.[271]

Nonetheless, we are concerned that proposed section 42.43(b) could be misread as applying to each iron and steel mill or ferroalloy manufacturing facility that directly emits or has the potential to emit 100 tons per year or more of NO_X and that is located within any of the States listed in § 52.40(a)(1)(ii). Indeed, the EAF Steel Associations are aware of numerous instances in which permit writers and enforcement personnel in states and EPA regional offices have interpreted regulatory text in a manner inconsistent with the meaning ascribed by the EPA personal that drafted the regulatory text. As such, the EAF Steel Associations recommend that EPA redraft proposed section 42.43(b) as follows:

The requirements of this section apply to:

(1) each new or existing emissions unit that:

(A) directly emits or has the potential to emit 100 tons per year or more of NO_X; and

(B) is located within any of the States listed in § 52.40(a)(1)(ii), including Indian country located within the borders of any such State(s) (2) is located at an iron and steel mill or ferroalloy manufacturing facility.

(2) each BOF Shop containing two or more new or existing emissions unit that collectively emit or have the potential to emit 100 tons per year or more of NO_X, and that is located within any of the States listed in § 52.40(a)(1)(ii), including Indian country located within the borders of any such State(s).

[269] 87 Fed. Reg. at 20,181.
[270] *See* 87 Fed. Reg. at 20,145.
[271] *See* Technical Memorandum Describing Relationship between Proposed Applicability Criteria for Non-EGU Emissions Units Subject to the Proposed Rule and EPA's "Screening Assessment of Potential Emissions Reductions, Air Quality Impacts, and Costs from Non-EGU Emissions Units for 2026" (March 30, 2022).

"Potential to Emit" – EPA should amend the regulatory language to explicitly state that an owner/operator of a new or existing emissions unit can rely on federally enforceable permit conditions to ensure that the unit's PTE remains below 100 TPY, thus excluding the emissions unit from the Proposed FIP's applicability.

In response to a question during the Agency's Informational Stakeholder Webinars on March 29-31, 2022, EPA personnel noted that, while the Proposed FIP does not expressly state that owners/operators can manage PTE in this way, the ability to potentially use enforceable permit conditions was implied based on EPA's longstanding approach to PTE in other contexts. The EAF Steel Associations agree with this view and urge the Agency to provide regulatory text memorializing this approach if EPA ultimately promulgates the Proposed FIP or a similar regulatory action.

"Averaging Time" – Throughout the Preamble to the Proposed FIP and in each record cited in docket, EPA describes the limits applicable to Non-EGU emissions units generally and steel industry emissions units specifically as based on a "30-operating day rolling average period."[272] According to the Preamble to the Proposed FIP, for emissions units in the steel industry,

> EPA is proposing to require a 30-operating day rolling average period as the averaging time frame for this particular industry. The EPA finds that a 30-operating day rolling average period provides a reasonable balance between short term (hourly or daily) and long term (annual) averaging periods, while being flexible and responsive to fluctuations in operations and production.[273]

Notwithstanding that no other averaging times are discussed anywhere in EPA's preamble or docket materials, EPA's proposed section 52.43(c) provides that proposed emissions limits applicable to "Iron and Steel Mills and Ferroalloy Manufacturing Industry" "must be met on a 3-hour rolling average."[274] The EAF Steel Associations therefore presume this singular reference to a "3-hour rolling average" is a typographical error because it is fully inconsistent and irreconcilable with EPA's analysis in the Preamble to the Proposed FIP (excerpted above). It is also inconsistent with the entirely of EPA's technological feasibility analysis, the averaging times EPA is proposing to apply to other non-EGU sector sources, and even other portions of the regulations EPA proposed for the "Iron and Steel Mills and Ferroalloy Manufacturing Industry" in proposed section 52.43. Indeed, in EPA's proposed excess emissions reporting requirements in proposed section 52..43, EPA states that "[e]xcess emissions are defined as any calculated 30-day rolling average NO_X emissions rate . . . that exceeds that exceeds the applicable emission limit in paragraph (c) of this section."[275]

Given the unexplained inconsistency of the singular reference to a "3-hour rolling average" to the Preamble analyses, other regulatory text proposed for the steel industry, other Non-EGU averaging times, and the entirely of EPA's feasibility analysis, the EAF Steel Associations can only presume

[272] 87 Fed. Reg. at 20,046; 20,143- 20,145; 20,146 – 20,149; 20,179; 20,182-20,183; 20,185 – 20,187.
[273] 87 Fed. Reg. at 20,145.
[274] 87 Fed. Reg. at 20,181.
[275] 87 Fed. Reg. at 20,181 (the ellipses in the quitted text seemingly refer to a calculation in a proposed paragraph that does not exist ((c)(3)(iii)). We presume "(C)(3)(iii)" refers to a provision that EPA deleted prior to publication of the Proposed FIP, but we have no way of knowing, This error must also be corrected and clarified.

the phrase "3-hour rolling average" is a typographical error. We therefore respectfully request that EPA clarify this fact.

If, however, EPA intends to conclude that all "Iron and Steel Mills and Ferroalloy Manufacturing Industry" limits must be calculated on a "3-hour rolling average" and therefore that all of EPA's other analyses and proposed regulatory text are typographical errors, then EPA must, at minimum, publish a clarification and take additional comment on this unexplained new level of stringency. Indeed, if EPA truly intends that steel sector limits be met on a "3-hour rolling average," that decision is wholly unexplained, entirely unsupported, and completely unworkable.

XI. CONCLUSION

The EAF Steel Associations appreciate the opportunity to provide these comments in response to EPA's Proposed FIP. As noted throughout these comments, the EAF Steel Associations strongly urge EPA to reconsider its inclusion of the iron and steel sector in the Proposed FIP. Iron and steel sector NO_X emissions, much less those from the EAF steel producers that are a distinct subset of the sector, do not contribute significantly to downwind nonattainment or interfere with maintenance. EPA therefore has no obligation – or authority - under the CAA to impose unrealistic, unproven, and costly controls on the iron and steel sector, and particularly EAF steel producers, in order to facilitate attainment with the 2015 Ozone NAAQS. To the contrary, the arbitrary and capricious imposition of unsupported and unattainable emissions limits on EAF steel producers will only serve to undermine the validity and legal defensibility of the Proposed FIP.

If you have any questions or would like to discuss these comments, please contact the undersigned.

Respectfully submitted,

Eric Stuart
Steel Manufacturers Association
202.296.1515
stuart@steelnet.org

Joseph J. Green, Counsel
The Specialty Steel Industry of North America
202.342.8849
jgreen@kelleydrye.com