APPENDIX A-6

Source ID# 089-00382

Indiana Harbor Coke Company

NOx RACT Study

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From: CLEMONS, STEPHANIE L <SLCLEMONS@SUNCOKE.COM>
Sent: Thursday, August 29, 2024 12:29 PM
To: Logan, Douglas A
Cc: BATTEN, KATIE M; BROWN, STEPHEN B.; TILLER, BRADLEY D.
Subject: SunCoke IHCC - Lake County site-specific RACT
Attachments: 2022_06_21 SunCoke Energy Good Neigbor Ozone Rule Comments.pdf

Dear Doug,

It was a pleasure speaking with you today and thanks again for your patience with this matter. I sincerely apologize for our delay in responding to your correspondence about this. The good news is that we have done considerable legwork on these issues that effectively includes all of the information found in a RACT analysis, and can therefore provide you with ample justification for our proposal, even with the very tight timeframe involved in your work.

To provide a brief overview, Indiana Harbor Coke Company (IHCC), like other SunCoke Energy plants, are unique in that they are considered "heat recovery," also known as "non-recovery," coke plants. This means we destroy the volatile components in the coal to maintain heat in the coke ovens, in contrast to traditional "byproduct" coke plants that seek to recover the chemical constituents of coal for further processing. One of the key distinctions in achieving these objectives is that IHCC operates under negative pressure at higher temperatures, and the coking process is essentially a self-sustaining reaction (subject to limited instances when supplementary natural gas is used through "lances" attached to the doors). Byproduct plants operate at lower temperatures under positive pressure, and therefore require the use of coke oven gas, and sometimes natural gas too, as a fuel source for their underfiring systems.

As you may know, EPA released a proposed Cross-State ("Good Neighbor") Ozone Rule in 2022 with industry-specific restrictions on a variety of different sources that would have been applicable in dozens of states. SunCoke prepared the attached comments on EPA's proposal for coke ovens, which provides a very detailed explanation of our process (pp. 14-16), distinctions from traditional byproduct coke plants (pp.17-19), how our process inherently minimizes NOx emissions through staged combustion and not continuously requiring an external heat source (pp.19-21), how even our pushing and charging operations minimize NOx formation (pp. 21-23), and the technological feasibility constraints precluding the use of add-on NOx controls such as SCR or SNCR at our coke plants (pp.24-35). In response to these comments, EPA removed all of the requirements they had originally proposed for our coke plants under the final rule. See 88 Fed. Reg. 36654 (June 5, 2023).

Given the above, there are a few edits necessary to the language you proposed below. Of critical importance, we do not use coke oven gas as a fuel source in the underfiring system; coke oven gas is effectively destroyed under negative pressure as part of our process.

Each coke oven battery shall comply with the following:
1. The units shall operate using only natural gas as fuel when supplementary heating is necessary.
2. The source shall operate and maintain the units in accordance with the manufacturer's specifications and good operating practices for the control of NOx emissions, including through the inherent staged-combustion design of its coke ovens.

Regarding the RACT analysis being incorporated into the preliminary rule, we would propose that you simply reference our comments on EPA's proposed ozone rule as our RACT analysis. It is a public document in the docket for the aforementioned rulemaking with a Document ID of EPA-HQ-OAR-2021-0668-0523.

Can you please just clarify for us what prompted this review by IDEM? We know that there was a multi-year litigation matter involving the status of East Chicago under the 2015 ozone NAAQS. Was that finally resolved in a manner that triggered a formal non-attainment designation?

Thank you again for your assistance and patience with this matter and if you have any questions or need additional information, please do not hesitate to contact me.

Kind Regards,

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June 21, 2022

Via Regulations.gov

Ms. Elizabeth Selbst
Air Quality Policy Division
Office of Air Quality Planning and Standards (C539–01)
U.S. Environmental Protection Agency
109 TW Alexander Drive
Research Triangle Park, NC 27711

RE: Docket ID No. EPA–HQ–OAR–2021–0668
Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standard

Dear Ms. Selbst:

SunCoke Energy, Inc. ("SunCoke") is an independent producer of high-quality metallurgical coke using an efficient "non-recovery" or "heat recovery"[1] coke manufacturing process that is unique in the United States to our company. We appreciate the opportunity to submit comments to the U.S. Environmental Protection Agency ("EPA" or the "Agency") on its proposed Federal Implementation Plan ("FIP") Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standard, published at 87 Fed. Reg. 20036 (Apr. 6, 2022) (the "Proposed Rule").

The Proposed Rule includes limits for nitrogen oxides ("NO_x") from various emissions units in the Iron and Steel Mills and Ferroalloy Manufacturing industries, including emissions limits from operations associated with traditional "byproduct" coke ovens. Based on the background documents accompanying the Proposed Rule, including modeling and other technical documents and spreadsheets, **we believe that EPA did not intend to regulate non-recovery/heat-recovery coke ovens, which are used exclusively at SunCoke's facilities**.

This exclusion of non-recovery/heat-recovery coke ovens is a reasonable decision by the Agency, as **SunCoke's unique cokemaking process emits less than 5% of the concentration of NO_x compared with the waste gas stream of byproduct coke plants**. We outperform European Best Available Techniques ("BAT") NO_x standards for coke plants by a wide margin. However, the Proposed Rule does not provide a clear exemption for SunCoke's type of coke plant, and actually references a SunCoke plant in the rule preamble and certain equipment unique to our plants in the proposed regulatory text. The current proposal lends itself to confusion for state regulatory agencies when

[1] In general, we use the terms "non-recovery" and "heat-recovery" interchangeably throughout these comments when there is no difference between the two types of plants for purposes of the issues we address. All of our facilities are considered "non-recovery" coke plants because we do not recover volatile materials from the coal. Most of our facilities are also known as "heat recovery" coke plants, which use the waste heat from the coking process to generate steam or electricity.

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implementing the FIP as to whether these rules were intended to apply to SunCoke's operations.

Accordingly, SunCoke respectfully requests that EPA clarify the following issues in the final rule:

1. **The final regulatory text at 40 C.F.R. § 52.43 should state clearly that the rule does not apply to non-recovery and heat-recovery coke plants.**
2. **Alternatively, but preferably in addition to Request No. 1, the final regulatory text should clarify that the Iron and Steel Mills and Ferroalloy Manufacturing rules at 40 C.F.R. § 52.43 only apply to North American Industry Classification System ("NAICS") code 3311 (just as the rule explicitly states in proposed 40 C.F.R. § 52.45(b) that industrial boiler requirements for Tier 2 sources only apply to specified NAICS codes).**
3. **To further eliminate any ambiguity, EPA should also delete the reference to "pushing-charging machines" in the regulation proposed at 40 C.F.R. § 52.43(c) because these units are present only at SunCoke's non-recovery/heat-recovery coke plants.**

As SunCoke explains in more detail below, the requested clarifications are necessary because several aspects of the Proposed Rule show that EPA does not intend the rule to apply to non-recovery/heat-recovery coke plants. To begin, EPA did not model current emissions or potential emissions reductions from SunCoke's non-recovery/heat-recovery coke plants, nor did the Agency conduct a technological and economic feasibility analysis with respect to such facilities. Moreover, the Proposed Rule assumes the use of technology that is not cost-effective or feasible for SunCoke's facilities, there would be insufficient time under the Proposed Rule for SunCoke to comply with its requirements, and there are inconsistencies and ambiguities in the emissions limits that provide additional evidence SunCoke's coke plants were meant to be excluded.

Had EPA undertaken an analysis of SunCoke's coke plants, it would have found that application of the rule to non-recovery/heat-recovery coke plants is unnecessary. The flue gas stream of a non-recovery/heat-recovery coke plant contains only a small fraction of the NO_x concentrations compared to a byproduct plant's flue gas because of our three-stage combustion process, flue gas recirculation, and lower flame temperatures. Unlike byproduct coke ovens where heat is provided by burners in combustion chambers adjacent to the oven using natural gas or processed coke oven gas, our cokemaking process does not require burners or a separate combustion chamber. As a result, SunCoke's current NO_x concentrations are already less than the concentrations the Proposed Rule seeks to achieve from traditional byproduct coke oven batteries through installation of add-on NO_x controls.

Consequently, failure to provide the requested clarifications would make the rule unlawful in numerous respects. First, the evidence before the Agency plainly

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demonstrates it would exceed EPA's authority under the Clean Air Act ("CAA"), as it would over-control sources in the states in which SunCoke's plants are located. EPA already has determined that regulation of sources other than non-recovery/heat-recovery coke ovens is adequate to allow downwind states to achieve air quality standards. Second, the rule would be arbitrary and capricious in violation of section 307(d) of the CAA. EPA did not conduct a technical and economic feasibility analysis for non-recovery/heat-recovery coke facilities, and such an analysis would show that further NO_x reductions at these facilities are technologically and economically infeasible. Failure to clarify that the rule does not apply to non-recovery/heat-recovery coke plants would result in a rule that is contrary to the evidence before the Agency.

If EPA not only declines to make the requested clarifications but changes the Proposed Rule to explicitly cover SunCoke's unique coke plants, the rule would run into additional legal problems. EPA will have failed to provide sufficient notice and opportunity to comment because the final rule would not be a logical outgrowth of the Proposed Rule. The Proposed Rule provides no clear indication that EPA is considering regulating SunCoke's coke facilities so as to alert commenter to provide comments on the possibility of such a rule. EPA would also be required to consider the significant reliance interests of cokemaking facilities upset by EPA's change in policy to regulate facilities that have never been regulated under the Cross-State Air Pollution Rule ("CSAPR").

Our comments are organized as follows:

- In Section I, we demonstrate that EPA did not intend to regulate non-recovery/heat-recovery coke plants when developing the Proposed Rule based on the absence of any modeling or analysis of emissions or costs of controlling emissions from such plants. We also explain that it would exceed EPA's statutory authority if the rule were to regulate non-recovery/heat recovery coke plants anyway despite these issues, making it important for EPA to clarify its intent.
- In Section II of these comments, we explain that it is also important for EPA to clarify that the rule is not intended to apply to heat-recovery/non-recovery coke plants because otherwise the rule would result in a number of ambiguities and infeasible compliance timeframes.
- In Section III, we provide a step-by-step overview of SunCoke's operations, followed by a detailed explanation of key differences between non-recovery/heat-recovery coke plants and byproduct coke plants—particularly as they relate to minimizing NO_x emissions.
- In Section IV, we demonstrate that the Proposed Rule assumes the use of add-on NO_x controls that are not technologically or economically feasible for, and have never been installed at, non-recovery/heat-recovery coke plants (in part due to the extremely low NO_x concentrations). We also explain how SunCoke plants already implement all other relevant controls identified by the Agency for minimizing the formation of NO_x.

I. EPA did not Analyze Non-Recovery Coke Plant Emissions or Costs when Developing the Proposed Rule, so Regulating them would Exceed the Agency's Authority and Violate Administrative Rulemaking Requirements.

The background documents of the Proposed Rule demonstrate that EPA did not analyze the emissions from non-recovery/heat recovery coke oven batteries, the impact of those emissions on downwind receptors in nonattainment areas, or the costs of potentially controlling those emissions. This indicates that EPA did not intend to regulate SunCoke's coke plants because it never determined that such facilities significantly contribute to downwind nonattainment. As explained below, if EPA does not make the necessary clarifications or nevertheless decides to apply the rule to SunCoke, the Agency will have exceeded its statutory authority and the rule would be arbitrary and capricious.

Once the Agency determines the industries that it must regulate in upwind states to achieve attainment with National Ambient Air Quality Standards ("NAAQS") in downwind states, it cannot subsequently regulate additional industries that it did not analyze—such as non-recovery/heat-recovery coke plants. The Good Neighbor provision (CAA §110(a)(2)(D)(i)(I)) only permits EPA to control upwind emissions to the extent necessary to achieve NAAQS compliance in downwind states; if EPA controls emissions beyond what is necessary to achieve NAAQS compliance, it constitutes impermissible "over-control." After-the-fact regulation would also result in dissonance between the evidence before the Agency when promulgating the rule and EPA's explanation for its rule, making the rule arbitrary and capricious. EPA should therefore clarify that the Proposed Rule does not apply to SunCoke.

A. When Analyzing the Iron and Steel Mills and Ferroalloy Category, EPA did not Study the Emissions or Costs Associated with Non-Recovery Plants, or Determine that Such Plants Significantly Contribute to Downwind Non-Attainment.

The background documents of the Proposed Rule are lacking any analysis of emissions from, or the rule's impact on, SunCoke's non-recovery/heat-recovery coke plants. When EPA conducted its assessment of emissions from non-electric generating units ("non-EGUs"), it aggregated emissions inventory data into industries defined by 4-digit NAICS codes. *See* 87 Fed. Reg. at 20083-84; EPA, Regulatory Impact Analysis for Proposed Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standard (EPA-452/D-22-001) (Feb. 2022) ("Regulatory Impact Analysis"), at 4-23. In a two-step process, EPA determined that a number of sources within NAICS code 3311 for the Iron and Steel Mills and Ferroalloy Manufacturing category, including certain coke oven batteries, should be regulated because they significantly contribute to downwind nonattainment and can reduce emissions within the Agency's marginal cost threshold. *See* Regulatory Impact Analysis at 4-23.

However, SunCoke's facilities are classified under NAICS code 324199,[2] not 3311. In EPA's spreadsheet used for modeling inputs, all SunCoke plants are correctly identified as NAICS code 324199, not 3311. *See* EPA, Summaries of Point Source Emissions Used in Air Quality Modeling (Regulations.gov, Document ID EPA-HQ-OAR-2021-0668-0105). As a result of this classification, EPA never modeled potential emissions reductions or studied costs for SunCoke's plants when developing its analyses for the Proposed Rule. EPA never determined that non-recovery/heat-recovery coke oven batteries significantly contribute to ozone nonattainment in downwind states.

The Regulatory Impact Analysis also says virtually nothing about any type of coke oven batteries. It merely indicates that the rule is proposing emissions limits within the Iron and Steel Mills and Ferroalloy Manufacturing industries based on lb/ton coal charged and lb/ton coal pushed due to the categorization of certain operations, presumably coke ovens, as "boilers and furnaces" emissions units. *See* Regulatory Impact Analysis at ES-11 (Table ES-3) and 4-4 (Table 4-1). However, SunCoke's coke ovens are not classified as "boilers" or "furnaces" in any existing state or federal rule, particularly in the non-recovery/heat-recovery coke industry where there is no external heat source applied to the ovens. This "boiler and furnace" categorization would be even more misguided in the context of SunCoke's pushing and charging operations—seemingly the primary target of the Proposed Rule for coke plants—because limited to no combustion takes place in SunCoke's hot cars and pushing charging machines ("PCMs"), as explained in greater detail in Section III.B.3.

The Regulatory Impact Analysis further provides a summary of 2019 ozone emissions for non-EGUs in the states subject to the Proposed Rule, along with estimated emissions reductions under the proposal based on a non-EGU screening assessment. *See id*. at ES-11 and ES-12. Here too, EPA did not account for non-recovery/heat-recovery coke oven batteries in tables showing the industries, number and type of emissions units expected to install controls, and the total estimated emissions reductions based on the screening assessment. *See id*. at ES-13 (Table ES-5) and 4-45 (Table 4-18). Non-recovery/heat-recovery coke oven batteries could not have been included in the Iron and Steel Mills and Ferroalloy category within the 25 "boilers" figure or the 15 "industrial" units figure. *See id*. Based on SunCoke's knowledge of its own operations, the rest of the cokemaking industry, and the steel industry, neither of these figures could possibly account for non-recovery/heat-recovery coke oven batteries in the relevant states.

The screening assessment itself provides additional evidence that non-recovery/heat-recovery coke oven batteries are not intended to be covered by the

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[2] NAICS code 3241xx for Petroleum and Coal Products Manufacturing is regulated under the Proposed Rule as a Tier 2 category in which certain large boilers are regulated. *See* 87 Fed. Reg. at 20083-84 and 20148. However, SunCoke's facilities do not include any boilers at all, as explained in Section III.B.2.ii. This is evident in EPA's spreadsheet entitled "Transport Proposal – Tier 2 Boiler Analysis 0 03-16-2022; All NAICS Units – 2023 Industry Identification Analysis" (Regulations.gov, Document ID EPA-HQ-OAR-2021-0668-0225), which does not identify any SunCoke plants with boilers. Moreover, as discussed later in this section, none of SunCoke's facilities appear in EPA's "Transport Proposal - Screening Assessment Non-EGU Facility and Emissions Unit Lists - 03-18-2022" (Regulations.gov, Document ID EPA-HQ-OAR-2021-0668-0191).

Proposed Rule. The only reference to coke ovens in the screening assessment appears to be under the Emissions Source Group "Industrial Processes - General; Industrial Processes – Coke Oven or Blast Furnace,"[3] identifying only one such unit with its ozone season emissions reductions and annual total cost. *See* EPA, Technical Memorandum, Screening Assessment of Potential Emissions Reductions, Air Quality Impacts, and Costs from Non-EGU Emissions Units for 2026 (Feb. 2022) ("Screening Assessment"), at 17 (Table 6). SunCoke has more than one non-recovery/heat-recovery coke oven battery in the states covered by the Proposed Rule. Moreover, the controls assessed for this one unit are flue gas recirculation, which is inherent to all SunCoke coke ovens as described below in Section IV.B, and low NO_x burners, which are irrelevant because SunCoke's coke ovens do not require burners, as explained in Section III.B.2.ii. *See id*.[4] Finally, none of SunCoke's facilities appear in EPA's screening assessment spreadsheet entitled "Transport Proposal - Screening Assessment Non-EGU Facility and Emissions Unit Lists - 03-18-2022" (Regulations.gov, Document ID EPA-HQ-OAR-2021-0668-0191), the Agency's "list of facilities in 23 states that EPA evaluated in the Technical Memorandum: Screening Assessment of Potential Emissions Reductions, Air Quality Impacts, and Costs from Non-EGU Emissions Units for 2026," which "generally includes 250 facilities that have 489 emissions units with greater than 100 tons per year NO_x emissions." *See also* Screening Assessment at 8 ("There are 489 emissions units contributing to the total estimated reductions of 47,186 ozone season tons and total estimated ppb improvements of 5.16 ppb.").

Additional evidence, discussed in greater detail below, further supports the conclusion that EPA did not intend the Proposed Rule to apply to non-recovery/heat-recovery coke plants. This evidence includes ambiguity in the emissions limits that are proposed for coke plants, the fact that the Proposed Rule would provide insufficient time to comply if applied to non-recovery/heat-recovery coke plants, the fact that the Proposed Rule assumes use of technology that is not cost-effective or feasible for such coke plants, and the fact that NO_x emissions are already extremely well-controlled at these facilities. Indeed, EPA intentionally excluded a number of well-controlled sources like SunCoke's facilities, and instead focused on uncontrolled sources or sources that could be better controlled at a reasonable cost to ensure emissions reductions are achievable and would lead to air quality improvements. *See* 87 Fed. Reg. at 20083; Regulatory Impact Analysis at 4-24; Screening Assessment at 3.

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[3] The only remaining line items that are even remotely connected to cokemaking are for coke oven gas at boilers. *See* EPA, Technical Memorandum, Screening Assessment of Potential Emissions Reductions, Air Quality Impacts, and Costs from Non-EGU Emissions Units for 2026 (Feb. 2022), at 17 (Table 6). That is irrelevant to non-recovery/heat-recovery cokemaking because there are no boilers at our coke plants, nor is coke oven gas available as fuel because the volatile compounds within the coal are combusted during the non-recovery coking process, as explained in Sections III.A and III.B.2.ii

[4] EPA rightfully acknowledges "[t]his screening assessment is not intended to be, nor take the place of, a unit-specific detailed engineering analysis that fully evaluates the feasibility of retrofits for the emissions units, potential controls, and related costs." *Id.* at 7. However, we note that neither selective catalytic reduction nor selective non-catalytic reduction appear to have been evaluated at all for coke plants as part of the screening assessment, despite the fact that the agency assumes they will be necessary according to the Proposed Rule and its Technical Support Document, as explained in Section IV.A.

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In sum, there is no evidence in the Regulatory Impact Analysis, the screening assessment, or EPA's modeling spreadsheets for the Proposed Rule that emissions estimates, theoretical emissions reductions, and cost estimates for those reductions accounted for non-recovery/heat-recovery coke oven batteries. *See* Regulatory Impact Analysis at ES-14 (Table ES-6), 4-44 (Table 4-17), 4-46 (Table 4-20), and 4-47 (Table 4-21). The Proposed Rule simply never intended to regulate SunCoke's coke plants. We request that EPA clarify this fact by providing a clear exemption for non-recovery/heat-recovery coke plants in the final rule.

B. <u>The Proposed Rule's Failure to Study the Emissions and Costs Associated with Non-Recovery Coke Plants Means that it would Exceed EPA's Authority to Regulate these Plants under the Clean Air Act.</u>

Because EPA failed to consider emissions reductions and costs resulting from the regulation of non-recovery/heat-recovery coke plants, the Agency cannot regulate those emissions after the fact. The U.S. Supreme Court interprets the CAA's Good Neighbor provision to require that any upwind emissions must both (1) contribute "one percent or more of a NAAQS in [a] downwind state," and (2) be able to "be eliminated cost effectively." *See EPA v. EME Homer City Generation, L.P*, 572 U.S. 489, 502-503 (2014). EPA proposes to regulate non-EGUs for the first time under the CSAPR and engaged in modeling to determine which industrial source category contributions are significant and should be subject to regulation. *See* 87 Fed. Reg. at 20039, 20043, and 20055. There is no evidence in the record, however, that EPA modeled the emissions contributions of non-recovery/heat-recovery coke plants to determine whether they were significant, or whether installation of additional control technology would be feasible or cost effective. That lack of analysis, by definition, fails to comply with *EME Homer City*'s requirements for controlling upwind sources, as there is no basis for the Agency to conclude whether the rule applied to SunCoke's facilities would be cost-effective. As explained below in Section IV, mandating, selective catalytic reduction ("SCR") or selective non-catalytic reduction ("SNCR") would be unprecedented, infeasible, and cost prohibitive at non-recovery/heat-recovery coke plants. Thus, if SunCoke's facilities were included in any final rule, it would exceed EPA's statutory authority.[5]

A FIP addressing interstate transport of pollutants must also involve an appropriate degree of control – sufficient controls to address the state's contribution to downwind nonattainment, but no more control than is necessary to meet that requirement.

[5] Additionally, EPA has proposed non-EGU emission standards which, the Agency asserts, are "achievable across the entire [industry] segment." 87 Fed. Reg. at 20140. EPA recognizes, however, that not all non-EGU sources in the targeted segments will be able to achieve compliance with the standards. For example, EPA concedes that the standards for kilns are only "generally feasible," *id*. at 20144, and that "most [industrial] facilities" (not *all* such facilities) will be able to "retrofit … equipment that will enable them to meet" the industrial boiler emission limits. *Id*. at 20149. In past CSAPR rules, EPA has handled the issue of feasibility through an allowance trading program (i.e., a source that could not achieve compliance with the budgets through emission reductions could purchase allowances), but there is no trading program for non-EGUs in the Proposed Rule where compliance is not cost-effective. If EPA desires to promulgate standards that apply to each source in an industrial segment, the standard articulated in *EME Homer City* requires it to at minimum provide a safety value for sources like SunCoke's facilities for which installation of controls is not cost-effective.

See 572 U.S. at 523. Over-control of upwind states occurs when EPA requires emissions reductions beyond those necessary to achieve attainment in downwind states. *See EME Homer City Generation, L.P v. EPA*, 795 F.3d 118, 126 (D.C. Cir. 2015). In such cases, "the Agency will have overstepped its authority, under the Good Neighbor Provision, to eliminate those amounts that contribute to nonattainment." 572 U.S. at 521; *see also* 795 F.3d at 130 ("The Supreme Court made crystal clear in *EME Homer* that over-attainment in downwind locations is impermissible when that excess attainment is 'unnecessary.'" (internal citation omitted)).

Regardless of SunCoke-specific considerations, EPA's one-size-fits-all approach to the non-EGU provisions of the Proposed Rule presents significant questions whether it exceeds the Agency's authority under the Good Neighbor provision of the Clean Air Act.[6] Regulation of several industries across a region is fundamentally more complex than establishing a region-wide emissions trading program for a single industry. With a trading program, such as the CSAPR, it is comparatively easy to confirm that the reductions required by an individual state are proportionate to its contribution to downwind nonattainment. It is far more challenging to impose region-wide emissions control requirements across a number of different industries while ensuring that each state bears its fair share – and only its fair share – of the burden.[7]

In any case, if the Proposed Rule were to regulate SunCoke as a mere afterthought, it would *necessarily* result in over-control. EPA is required to strike a careful balance to ensure that it eliminates significant contribution to non-attainment while avoiding over-control. The rule asserts that "EPA's over-control analysis . . . shows that the proposed control stringencies for EGU and non-EGU sources do not over-control upwind states' emissions either with respect to the downwind air quality problems to which they are linked or with respect to the 1 percent of the NAAQS contribution threshold[.]" 87 Fed. Reg. at 20043-44. If the Agency neglects to study the proposed

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[6] In addition to cost-effectiveness and over-control issues, even in the context of a FIP, EPA likely does not have authority to impose such specific control measures on a state. *See Virginia v. EPA*, 108 F.3d 1397, 1408 (D.C. Cir. 1997) ("To be sure, if EPA rejected a State Plan because it would not achieve or maintain ambient air quality standards, EPA could promulgate a federal implementation plan. But even then, as EPA admitted in confessing error in the Supreme Court, section 110 did not permit the agency to require the state to pass legislation or issue regulations containing control measures of EPA's choosing."); *see also Michigan v. EPA*, 213 F.3d 663, 688 (D.C. Cir. 2000) (upholding EPA's NO_x budget program because it "leaves the control measure selection decision to the states" and "does not mandate a 'specific, source-by-source emission limitation.'" (internal citation omitted)).

[7] The Proposed Rule effectively establishes a suite of region-wide obligations, regardless of (a) any individual state's contribution to nonattainment, (b) the presence of identified non-EGU source categories within that state, or (c) the degree to which the selected targets of the rule will result in a degree of control within each state that is proportional to that state's contribution to downwind nonattainment. EPA calculates the emissions reductions projected to result from the Proposed Rule in each state in its Regulatory Impact Analysis, as well as the change in ozone levels at various downwind receptors projected to result from the rule. However, it is not clear that EPA specifically establishes that the emissions reductions in each upwind state resulting from the Proposed Rule's combined EGU and non-EGU measures are the minimum amount necessary to achieve attainment at each downwind receptor to which the upwind state is linked. *See generally* Regulatory Impact Analysis, appx. 3B; *see also* EPA, Ozone Transport Policy Analysis Proposed Rule TSD (Feb. 2022).

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emissions reductions from a particular industry, but then anyway regulates that industry—or even one facility within that industry—it would upset this careful balance and result in more emissions reductions than calculated. As a result, the FIP would exceed EPA's authority in every state where such facilities are located for over-controlling emissions from those states. *See North Carolina v. E.P.A.*, 531 F.3d 896, 929–30 (D.C. Cir. 2008) ("EPA's approach—regionwide caps with no state-specific quantitative contribution determinations or emissions requirements—is fundamentally flawed. . . . The trading program is unlawful, because it does not connect states' emissions reductions to any measure of their own significant contributions.").

This is precisely what would happen if the Proposed Rule were finalized to regulate non-recovery/heat-recovery coke plants, or if EPA failed to clarify that non-recovery/heat-recovery coke ovens are excluded. As explained in Section I.A, there is no evidence in the Proposed Rule's underlying spreadsheets, the Regulatory Impact Analysis, or the screening assessment that EPA accounted for current emissions estimates, proposed emissions reductions, or cost estimates for additional NO_x controls at non-recovery/heat-recovery coke oven batteries. If EPA were to regulate additional sources such as non-recovery/heat recovery coke ovens after the fact, it would upset the careful balance EPA must strike between addressing significant contribution from upwind states without over-controlling those emissions. It would also be arbitrary and capricious because the rule would "rel[y] on factors which Congress has not intended it to consider," namely unnecessary over-attainment in downwind states. *See Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983). We again respectfully urge EPA to clarify in the final rule's regulatory text that non-recovery/heat-recovery coke plants are not subject to this program. This would eliminate any ambiguity and avoid finalizing a rule that is arbitrary and capricious and exceeds EPA's statutory authority.

C. <u>It would be Arbitrary and Capricious to Regulate Non-Recovery Coke Plants for Failure to Follow EPA's Stated Process in this Rule and General Rulemaking Requirements.</u>

It would be arbitrary and capricious for EPA to regulate non-recovery/heat-recovery coke plants despite EPA's decision to not evaluate the industry's underlying emissions and the costs associated with regulating those emissions. As part of EPA's process in developing the Proposed Rule, the Agency identified industries for which potentially controllable emissions would have the greatest impact on downwind air quality, and determined which of these industries and emissions units had emissions reductions available to make meaningful air quality improvements at EPA's marginal cost threshold by 2023 and 2026. *See* 87 Fed. Reg. at 20055 and 20083-84. The premise was to "focus . . . on uncontrolled sources or sources that could be better controlled at a reasonable cost . . . [that] are more likely to be achievable[.]" *Id*. at 20083.

At no time in developing the Proposed Rule did the Agency evaluate potentially controllable emissions from non-recovery/heat-recovery coke plants, where they are located, and their potential impact on downwind air quality. EPA also did not evaluate theoretical emissions reductions from non-recovery coke plants against the Agency's marginal cost threshold of $7,500/ton. As explained below in Sections III and IV, non-recovery/heat-recovery coke plants are already well-controlled and do not have any available NO_x reductions given that they emit less than 5% of the NO_x concentrations emitted by traditional byproduct coke plants.

As explained in detail later in these comments, it is unnecessary to regulate non-recovery/heat-recovery coke plants beyond their existing permit limits for NO_x. The concentrations of NO_x in the flue gas stream from our coke plants are less than 5% of the NO_x levels at a traditional byproduct coke oven battery. **Even with new controls that have a 90% removal efficiency, a very aggressive assumption, most byproduct coke oven batteries would fail to achieve SunCoke's current NO_x concentrations.** It is particularly unnecessary to regulate NO_x from pushing and charging operations at our plants, which appear to be the primary intent of the ambiguous emissions limits described in Section II.A, given the fact that little to no combustion occurs in these processes. As explained in Section III.B.3, charging is a negligible source of NO_x with no AP-42 emissions factor for non-recovery coke plants, while pushing emits less than 10 ppm NO_x at our plants. We are not aware of any feasible technology to reduce NO_x levels below current permitted limits at our non-recovery/heat-recovery coke plants.

If the final rule were to apply to SunCoke's facilities despite these facts, it would be arbitrary and capricious for being contrary to the evidence that was before EPA when promulgating this rule. *See State Farm*, 463 U.S. at 43 ("[T]he agency must examine the relevant data and articulate a satisfactory explanation for its action including a "rational connection between the facts found and the choice made.'" (internal citation omitted)); *see also Dep't of Commerce v. New York*, 139 S. Ct. 2551, 2575 (2019) (affirming district court remand to the agency where "an explanation for agency action [was] incongruent with what the record reveals about the agency's priorities and decisionmaking process."). Accordingly, it is vital that EPA clarify its regulation does not apply to non-recovery and heat-recovery coke plants.

Moreover, were EPA to go further and finalize a rule that applies to SunCoke's facilities, it likely would run afoul of the requirements for notice-and-comment rulemaking. In order for an agency to provide adequate notice and opportunity to comment, the final rule must be a "logical outgrowth" of the proposal. *Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d 506, 547 (D.C. Cir. 1983). The "notice must describe the range of alternatives being considered with reasonable specificity" such that interested parties will "know what to comment on" and the agency's decisionmaking can be "better-informed." *Id.* at 549. "[V]ague and conflicting signals" are insufficient to provide reasonable notice. *Michigan v. EPA*, 213 F.3d 663, 692 (D.C. Cir. 2000). Here, EPA has made, at most, some vague references that could indicate it intends to regulate non-recovery/heat-recovery coke plants, but those references are insufficient to alert interested parties that they should comment on the full range of questions involved in regulating such facilities.

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II. The Proposed Rule Cannot Apply to Non-Recovery Coke Plants because it would Result in Numerous Substantive Problems with the Rule and would Therefore be Arbitrary and Capricious.

EPA did not intend to regulate SunCoke's non-recovery and heat-recovery coke plants under the Proposed Rule because it failed to consider our coke plants in the emissions projections or cost estimates for the rule, as explained above. In addition, the Proposed Rule cannot regulate non-recovery/heat recovery coke plants because the rule would contain contradictory and ambiguous emissions limits and an infeasible timeframe for compliance, at least in the context of SunCoke's plants, which would make the rule arbitrary and capricious. We therefore request a clear exemption for "non-recovery" and "heat-recovery" coke oven batteries in the applicability section of the final rule. We also request the removal of the reference to "pushing charging machines" in the text of the final rule because it is equipment that is unique to our operations.

A. The Emissions Limits for Coke Plants in the Proposed Rule are Contradictory and Ambiguous if Applied to Non-Recovery Plants.

The Proposed Rule did not intend to regulate non-recovery/heat-recovery coke plants based on the absence of any underlying analyses of such facilities. Nonetheless, if EPA were to apply the rule to non-recovery/heat-recovery coke plants, it is not even clear what emissions limits would apply and which operations would be regulated. There are a number of ambiguities and contradictions in the Proposed Rule regarding these limits in the context of our plants.[8] As a result, SunCoke does not have a meaningful opportunity to comment on the feasibility of the proposed emissions limits.

In the preamble to the Proposed Rule, EPA identifies the proposed emissions limits as "0.6 lb/ton of coal charged" from "Coke ovens (charging and coking)" and "0.015 lb/ton of coal pushed" from "Coke ovens (pushing)." 87 Fed. Reg. at 20046 (Table I.B-4). These limits are consistent with the Agency's "Summary of Proposed NO_x Emissions Limits for Iron and Steel and Ferroalloy Emissions Units" on its website. *See Summary of Proposed NO_x Emission Limits for Industrial Sources*, EPA,

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[8] SunCoke also notes that the Proposed Rule implies these emissions limits are already applicable at existing coke plants. The preamble to the rule states "[i]n developing the emissions limits for the Iron and Steel and Ferroalloy Manufacturing industry, the EPA reviewed RACT NO_x rules, NESHAP rules, air permits and related emissions tests, technical support documents, and consent decrees . . . Based on the available information for this industry, applicable federal and state rules, and active air permits or enforceable orders issued to affected facilities in the iron and steel and ferroalloy manufacturing industry, the EPA proposes the following emissions limits: . . ." 87 Fed. Reg. at 20145.

As described in this section of our comments, it is very challenging for SunCoke to understand what emissions limits are being proposed, but we can say generally that the proposed emissions limits would be unprecedented if they were applied to non-recovery coke plants. Moreover, none of the control measures cited in the Proposed Rule's Technical Support Document from various state NO_x RACT requirements appear to apply to any coke plants, but we are certain that they are not referring to any non-recovery coke plants. *See* EPA, Technical Support Document (TSD) for the Proposed Rule, Non-EGU Sectors TSD, Docket ID No. EPA-HQ-OAR-2021-0668 (Dec. 2021), at 36-42.

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https://www.epa.gov/csapr/summary-proposed-no-emission-limits-industrial-sources (last visited June 18, 2022). However, there are a number of ambiguities with these limits if they were applied to a non-recovery plant. It is not clear whether the 0.6 lbs/ton limit would apply to the flue gas stream from the coke ovens as indicated by the reference to "coke ovens" and "coking," whether it would apply to the pusher charger machine ("PCM") given the reference to "charging," or both. The pushing emissions limit is also problematic as it references "lb/ton of coal pushed" and only coke is pushed from the ovens, not coal. The quantity of coal charged into our ovens is different from the quantity of coke pushed out of the ovens. It is also unclear whether any hypothetical charging emissions limit or pushing emissions limit would be from the stack of the PCM or hot car, respectively, or whether these limits would somehow apply to fugitive emissions from the coke ovens during such operations given the reference in both cases to "coke ovens."

These ambiguities are not clarified by subsequent discussions of the coke oven emissions limits in the Proposed Rule. In fact, the potential emissions limit from charging referenced above of 0.6 lbs/ton is contradicted by the next reference to a charging limit of "0.15 lb/ton of coal charged" from "Coke Ovens (charging)." *See* 87 Fed. Reg. at 20145 (Table VII.C-3). This time, there is no reference to an emissions limit from "coking," nor is there any reference to a limit of 0.6 lbs/ton from any operation. It also appears that in this instance the Agency intends to regulate charging operations with the 0.15 lb/ton limit, as the Additional Information column states "[a]ssume 50% reduction staged combustion and/or limited use SCR/SNCR during charging operations from AP–42 0.3 lb/ton emission factor." *See id*. (emphasis added). However, we have not found any evidence that this particular AP-42 emissions factor exists, even for byproduct coke plants. More importantly for SunCoke's purposes, there is no AP-42 emissions factor at all for NO_x from non-recovery charging operations because the NO_x emissions are negligible, as explained in Section III.B.3. As for the pushing emissions limit, the same questions apply here as those described above.

Finally, the proposed regulatory text at § 52.43(c) provides a limit of "0.15 lb/ton of coal charged" from "Coke Ovens (charging)," again omitting any reference to an emissions limit from "coking" or a 0.6 lbs/ton limit from any operation. *See* 87 Fed. Reg. at 20181 (Table 1). This time, however, the Proposed Rule provides a limit of "0.015 lb/ton of coal pushed" from "Coke Oven push cars and pushing-charging machines (pushing)." *See id*. The reference to "push cars" and "pushing charging machines" in the context of pushing emissions further muddies the waters for non-recovery facilities. SunCoke plants push coke into regular "hot cars" or "flat push hot cars," as explained in Section III.B.3. We do not have "push cars." Additionally, there are no emissions from the PCM stack during pushing operations. The PCM is located on the other side of the coke oven battery from where the coke is pushed. As explained in detail in Section III.B.3, the PCM is equipped with a ram that aligns with the coke oven door on one side of the battery (charge side) and pushes coke out of the door on the other side of the battery (coke side). The reference to "pushing charging machines" for the proposed pushing emissions limit leads to another problem; it stands in contrast to the absence of any reference to the PCM for the proposed charging emissions limit of 0.15 lb/ton of coal. This suggests that the Agency may have had something else in mind altogether, unrelated to the PCM, in proposing the 0.15 lbs/ton charging limit.

Again, for the reasons stated above, we believe that EPA did not intend to regulate non-recovery/heat-recovery coke plants based on the absence of any analysis of such plants in the development of the Proposed Rule. However, clarification is necessary given (a) the absence of a clear exemption for our plants; (b) the above reference to "pushing charging machines," which are unique to our operations; and (c) a reference in the rule preamble to a SunCoke facility as the basis for a pushing emissions limit at coke plants. *See id.* at 20145. Accordingly, **we respectfully request that the Agency provide a clear exemption for non-recovery and heat-recovery coke plants in the final rule, and delete any reference in the final regulatory text to a "pushing-charging machine."**

If EPA does not make clarifying changes to the Proposed Rule and instead finalizes the rule with these ambiguities, the rule would be arbitrary and capricious because it would be illogical and therefore irrational. An agency must provide a "rational connection between the facts found and the choice made." *State Farm*, 463 U.S. at 43. If EPA finalizes a rule that does not clearly identify which emissions limits would apply and which operations would be regulated, the rule would have no rational connection to the facts in the record, and thus would be arbitrary and capricious.

B. The Proposed Rule would not Provide Sufficient Time to Comply with Unprecedented Requirements if Applied to SunCoke's Plants.

The Proposed Rule also cannot apply to SunCoke's non-recovery/heat-recovery coke plants because the timeframe it proposes for compliance is infeasible. The proposed regulatory text at 40 C.F.R. § 52.43(c) requires compliance with the new emissions limits beginning in the 2026 ozone season. *See* 87 Fed. Reg. at 20181. Section 52.43(d)(1)(i)(A) requires "a work plan for each affected unit within 180 days of the effective date of this rule identifying how each affected unit will comply with the emissions limits" of the Proposed Rule. *Id.* at 20182. The work plan must include "identification of the control device selected and the phased construction timeframe by which you will design, install, and consistently operate the device." *Id.* Then, by March 30, 2026, affected facilities must "submit a final report certifying installation of each selected control device has completed [*sic*]" with "dates of final construction and relevant performance testing, where applicable, demonstrating compliance with limits" of the Proposed Rule. *Id.* at 20183 (proposed regulatory text of § 52.43(f)(2)).

As discussed in Section II.A, it is impossible for SunCoke to determine which operations the Proposed Rule would regulate if EPA improperly applied it to non-recovery/heat-recovery coke plants. However, the rule generally assumes that installation of new pollution control equipment will be necessary to achieve the proposed emissions limits, as evidenced by requirements to identify the control device selected and its construction schedule, and certify that control devices have been installed and tested. Accordingly, the proposed deadlines would be extremely aggressive even for technologies that have been demonstrated in the field in a particular industry. It would take far longer than 180 days to conduct a feasibility study of various potential controls to achieve new emissions limits, select a particular control technology to achieve those limits, solicit bids from vendors, and finalize a construction schedule. Moreover, as discussed in Section IV.A of these comments, the controls EPA assumes would be necessary for compliance with the Proposed Rule would be unprecedented at non-recovery/heat-recovery coke plants anywhere in the world. Therefore, these deadlines would be impossible to meet if incorrectly applied to SunCoke's plants.

Were EPA to finalize a rule that applies to non-recovery/heat-recovery coke ovens, it would also have to consider the significant reliance interests of regulating these coke facilities. "When an agency changes course, . . . it must 'be cognizant that longstanding policies may have engendered serious reliance interests that must be taken into account.'" *Dep't of Homeland Sec. v. Regents of the Univ. of California*, 140 S. Ct. 1891, 1913 (2020) (quoting *Encino Motorcars, LLC v. Navarro*, 136 S. Ct. 2117, 2126 (2016)). The agency must explain "whether there were reliance interests, determine whether they were significant, and weigh any such interests against existing policy concerns." *Id.* at 1915. Failure to do so renders a regulation arbitrary and capricious. *Id.* There are significant reliance interests here because non-recovery/heat-recovery coke plants have relied on the fact that EPA has never before regulated them, or for that matter any non-EGUs, under CSAPR before. This significant change in policy requires EPA to consider the reliance interests that its previous policy engendered.

III. SunCoke's Non-Recovery/Heat-Recovery Coke Plants are Unique and Emit Substantially Less NO_x than Traditional Byproduct Coke Plants.

EPA is correct for not imposing emissions limits on non-recovery/heat recovery coke plants due to significant differences compared with traditional byproduct cokemaking that require different regulatory treatment. SunCoke's non-recovery/heat recovery cokemaking process is unique and presents numerous environmental advantages, including minimizing emissions of hazardous air pollutants and, more importantly for purposes of the Proposed Rule, minimizing NO_x emissions. In fact, **the waste gas stream of a non-recovery coke plant contains less than 5% of the NO_x present in the waste gas of an average byproduct plant based on EPA data**. Other EPA rules differentiate between non-recovery/heat-recovery coke plants and byproduct coke plants, and the Agency would be correct for doing the same here by clearly exempting non-recovery/heat-recovery plants from regulation when finalizing the Proposed Rule. These factors provide further evidence that the Proposed Rule does not apply to SunCoke's facilities, and also demonstrates that if EPA were to finalize a rule that applies to such facilities, it would exceed EPA's authority and be arbitrary and capricious under *State Farm*.

A. Overview of SunCoke's Non-Recovery/Heat-Recovery Process

SunCoke manufactures coke by heating metallurgical coal in a refractory oven, utilizing a staged-combustion process to provide the heat required to release the volatile components in the coal and transform the coal into coke. SunCoke's first plant was built in 1962 in Vansant, Virginia based on the Jewell-Thompson oven design. For more than

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three decades, it was the only non-recovery coke plant in the United States. Unlike conventional "byproduct" coke plants that recover volatile material from coal, SunCoke's facilities use efficient, modern technology designed to combust the coal's volatile components without the use of burners or a separate heating chamber.[9]

In the non-recovery cokemaking process, a Pusher-Charger Machine ("PCM") charges a horizontal bed of coal into the side of a hot oven using a leveling conveyor. Immediately after charging, the coal absorbs heat from the surrounding refractory, driving volatile matter from the coal bed. Air is first introduced into the oven crown, combusting the volatile matter from the coal and transferring heat from combustion back into the refractory. Partial combustion of volatiles occurs in the oven crown above the bed. Gases are then drawn through downcomers into sole flues beneath the oven floor, where more air is introduced to further the combustion process. This permits carbonization from the top and bottom at equal rates. The gases are then drawn back up through uptakes into the common tunnel where any remaining uncombusted gases are oxidized. **This is a staged combustion design consisting of three stages—the oven crown, sole flues, and common tunnel. In addition, non-recovery/heat-recovery cokemaking does not require an external heat source such as burners to heat the ovens.** Figure 1 shows a cut-away drawing of a non-recovery oven.

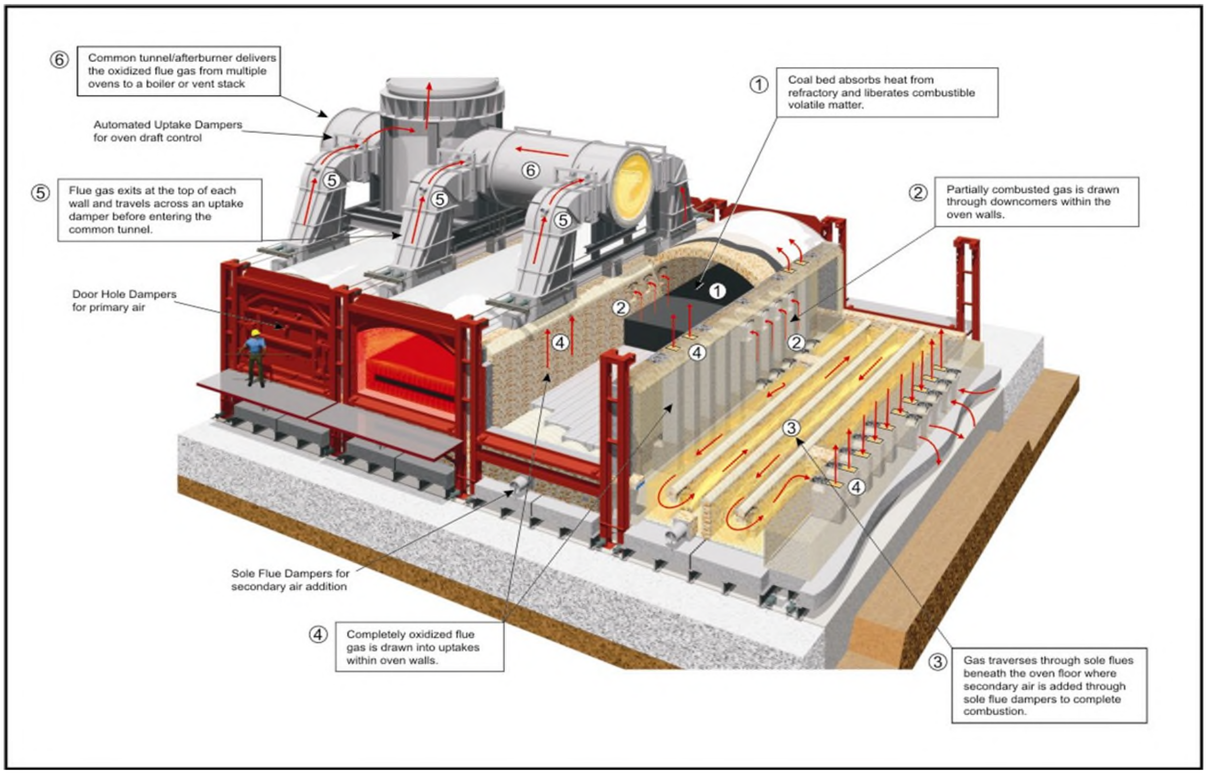

Figure 1. SunCoke Non-Recovery Oven Diagram

[9] As explained in footnote 1, all of our facilities are considered "non-recovery" coke plants because we do not recover these chemicals from the coal. Most of our facilities are also known as "heat recovery" coke plants, which use the resulting waste heat from the process to create steam or electricity.

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At most SunCoke facilities, the flue gases are then drawn into the crossover duct, which directs them into heat recovery steam generators (“HRSGs”) where the residual heat is extracted and steam is produced. At those facilities, the non-recovery process is called “heat-recovery” cokemaking. After passing through the HRSGs, the cooled flue gas is directed to a flue gas desulfurization system (“FGD”) that consists of a spray dry absorber (“SDA”) and a baghouse prior to being exhausted through a main stack. In the SDA, atomizers create a fine mist of droplets of lime slurry (aqueous calcium hydroxide or $Ca(OH)_2$). The SO_2 in the gas diffuses into the droplets and reacts to form $CaSO_4$. The droplets dry out in the SDA, leaving solid particles of $CaSO_4$ and unreacted lime. These particles are collected by the baghouse and sent off-site for disposal.

The coke ovens are maintained under negative pressure by induced draft fans located downstream of the FGD. The induced draft fans provide negative pressure at the ovens to keep the volatile matter and combustion gases inside the system. In addition, each HRSG is matched with a bypass vent stack, which remains closed during normal facility operations. During certain maintenance conditions that prevent flue gas transport to the main stack, the vent stack lid will open to allow the combusted flue gas from the associated ovens to exhaust through the vent stack while maintaining negative pressure in the ovens, which cannot be shut down.

It takes approximately 48 hours for the non-recovery coking process to be completed. At the end of the coking cycle, the hot coke is pushed out of the oven onto a “flat push hot car” equipped with a multiclone dust collector at some facilities or a hot car partially enclosed by a shed at other facilities. The coke is transported by the hot car, which operates on rails, to a quench tower where the incandescent coke is cooled, or quenched, with water. The cooled coke is then transferred via conveyor belt to a screening station. Figure 2 illustrates the heat-recovery cokemaking process.

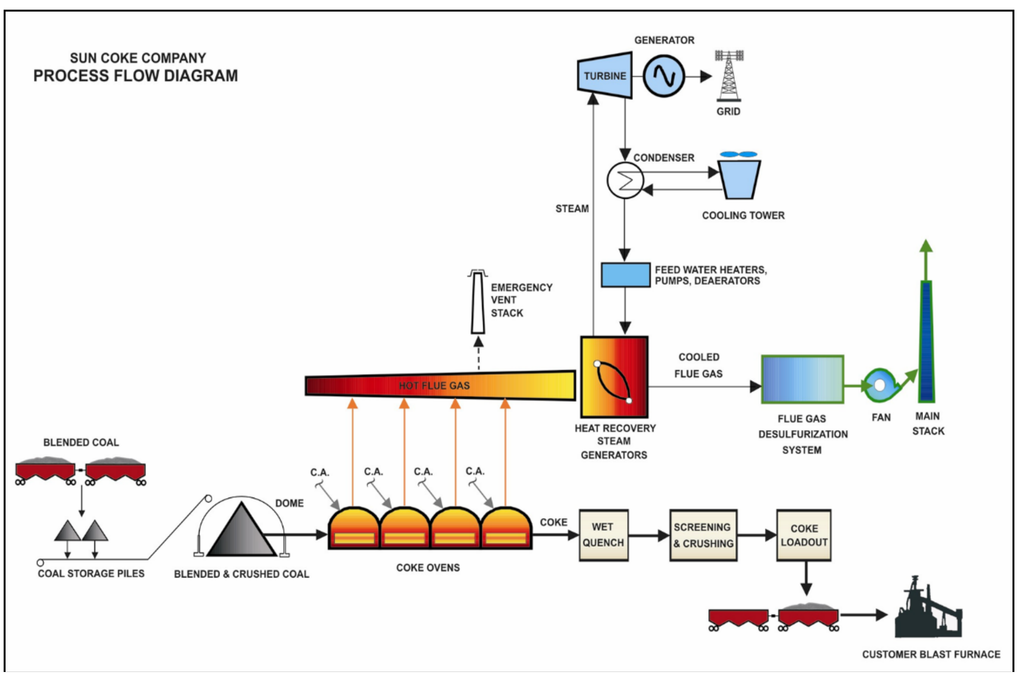

Figure 2. Heat Recovery Cokemaking Process Flow Diagram

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B. There are Many Significant Differences Between Non-Recovery Cokemaking and Byproduct Cokemaking.

1. One Key Difference between Non-Recovery and Byproduct Cokemaking is that Non-Recovery Coke Ovens Operate Under Negative Pressure and Minimize Coke Oven Leaks.

Non-recovery coke ovens operate under negative pressure and combust the coal volatiles, adding air from the outside to oxidize volatile matter and release the heat of combustion within the oven system. This has the benefit of virtually eliminating leaks from coke ovens to the atmosphere and minimizing emissions of volatile organic compounds and hazardous air pollutants ("HAPs"). Any leaks in the system will draw ambient air into the system. Accordingly, coke oven leaks are generally prohibited at non-recovery coke ovens under applicable Maximum Achievable Control Technology ("MACT") standards. *See* 40 C.F.R. § 63.303.

In contrast, the conventional cokemaking process at byproduct plants recovers the coal volatiles and combustion products downstream of the oven chamber and refines them in a separate part of the plant to produce chemicals such as light oil, tar, and ammonia. Byproduct plants also recover coke oven gas released in the coking process for use in oven underfiring and in other areas of the plant. In order to recover these components, byproduct ovens are maintained under positive pressure, and there is potential for small openings or cracks in byproduct ovens to allow raw coke oven gas and HAPs to leak into the atmosphere. Under the MACT standard, byproduct ovens are typically permitted to leak at a rate of 3-4% per battery, and leaks are also permitted from topside port lids and offtakes. *See id.* at § 63.302(a)(3).

Because of the environmental advantages of non-recovery cokemaking, new "greenfield" coke oven batteries have effectively been required to use non-recovery technology under the MACT standard since 1993. *See id.* at § 63.300(b) and § 63.302(b); *see also* 57 Fed. Reg. 57534, 57536 (Dec. 4, 1992) ("Visible emission limitations for a new by-product coke oven battery constructed at a new coke plant ('greenfield' construction) and the construction of a new battery at an existing coke plant if it results in an increase in the plant's coke capacity would be based on the emission control performance achieved by nonrecovery coke oven batteries, which are 0.0 percent leaking doors, topside port lids and offtake system(s)[.]").[10]

In addition, because of the vast differences between non-recovery coke plants and byproduct coke plants, there are significant differences in how the plants are regulated under applicable MACT standards. Besides the different requirements for coke oven

[10] Another environmental advantage for non-recovery coke plants is that they are subject to a zero-discharge limit for process wastewater pollutants under applicable effluent limit guidelines. *See* 40 C.F.R. § 420.12(c). Water from the quenching process is recycled until evaporation, and discharges are limited to stormwater runoff and non-process wastewater streams, such as HRSG blowdown water. In contrast, byproduct plants require a wastewater treatment facility to facilitate the various chemical production processes.

door leaks described above, there are different standards for charging the ovens. *Compare* 40 C.F.R. § 63.302(a)(3)(v) *with* § 63.303(d). At byproduct plants, there are standards for bypass/bleeder stack flare systems as well as collecting mains, whereas there are no such units at non-recovery plants. *See id*. at §§ 63.307 and 63.308. There are different standards for pushing emissions from byproduct plants and non-recovery plants. *See id*. at §§ 63.7291-63.7293.[11] Finally, unlike non-recovery plants, there are unique MACT requirements for soaking emissions and from battery stacks at byproduct plants. *See id*. at §§ 63.7294 and 63.7296. Non-recovery coke plants and byproduct coke plants are effectively different industries for regulatory purposes.

2. Non-Recovery Coke Oven Flue Gas Contains a Small Fraction of the NO_x Present in the Flue Gas from Byproduct Plants.

The non-recovery cokemaking process also provides significant advantages in minimizing formation of NO_x emissions. Fundamental differences in the design and operation of non-recovery and byproduct coke plants result in **our plants containing less than 5% of the concentration of NO_x in the flue gas compared with a byproduct plant**. The average SunCoke flue gas NO_x concentration is only 37.82 ppm based on the most recent stack test at each of our plants, as shown in Table 1 below.

Table 1: NO_x concentration in SunCoke plant flue gas

Facility	Test Date	Average NO_x Concentration (ppm)	NO_x Concentration Range (ppm)
Middletown Coke Company	June 2020	37.3	32.4 - 40.5
Haverhill Coke Company (Phase I)	March 2022	26	24.9 - 28.2
Haverhill Coke Company (Phase II)	March 2022	44.8	43.6 - 45.7
Gateway Energy & Coke Company	May 2012	49.72	45.46 - 53.78
Indiana Harbor Coke Company	Nov. 2019	34.9	32.5 - 37.1
Jewell Coke Company	Feb. 2021	34.2	25 - 43.9
Average Test Results:		37.82	33.98 - 41.53

[11] *See also* 66 Fed. Reg. 35326, 35333-36 (July 3, 2001) ("Coke oven emissions occur during pushing from incomplete coking, which results in a 'green' push. Green pushes can be caused by overcharging an oven, cold flues due to plugging or poor combustion, non-uniform heating, and cold spots on the ends of ovens . . . Green pushes generate voluminous plumes of emissions that can overwhelm the capture systems which are used to control the comparatively small amounts of PM emissions during ordinary operation . . . The principal difference operationally is that the non-recovery batteries are maintained at all times under negative pressure rather than positive pressure. This results in the virtual elimination of door leaks and, relative to limiting pushing emissions, allows for the visual inspection of the coke mass throughout the coking cycle including just prior to pushing. If the coal is not fully coked, the coking time can be extended to avoid a green push . . . We believe that this pollution prevention control measure provides the most effective demonstrated approach to reducing, if not virtually eliminating green pushes.").

In contrast, according to EPA's technical support document for the Proposed Rule, uncontrolled NO_x emissions from **byproduct coke plants range from 254 to 1452 ppm, with an average value of 802 ppm**. *See* EPA, Technical Support Document (TSD) for the Proposed Rule, Non-EGU Sectors TSD, Docket ID No. EPA-HQ-OAR-2021-0668 (Dec. 2021) ("Technical Support Document"), at 29-30. Even if byproduct coke plants successfully reduced NO_x emissions by 90%, this represents final emissions of 25 to 145 ppm, with an average of 80 ppm—well over SunCoke's current 37.82 ppm average performance. The European Union ("EU") has established Best Available Techniques ("BAT") levels for NO_x at 350-500 mg/Nm^3 for new or substantially revamped plants (less than 10 years old) and 500-650 mg/Nm^3 for older plants with well-maintained batteries incorporating low-NO_x techniques. *See id*. at 34.[12] These BAT levels are substantially higher than the current performance of SunCoke's non-recovery/heat recovery coke plants.

i. Non-Recovery Coke Ovens Minimize NO_x Formation because they Incorporate Staged Combustion.

One reason SunCoke's process generates such a minimal quantity of NO_x is because **staged combustion is inherent to the non-recovery cokemaking process**. Staged combustion controls NO_x by limiting the oxygen present to control and suppress peak temperatures where NO_x formation primarily occurs. Non-recovery coke ovens use three discrete regions for staged combustion of the coal volatiles—the crown, the sole flues, and the waste heat common tunnel. After coal is charged into the oven, the crown is the first stage of air addition. This operates in a reducing atmosphere where minimal oxygen is present for NO_x formation. The sole flues receive secondary air and operate in a reducing or oxidizing atmosphere as dictated by the oven gas rates. NO_x formation is minimized in the sole flues by controlling the temperatures. The final stage is the common tunnel afterburner, which is always operated in an oxidizing mode. NO_x formation is limited in this region through the introduction of tertiary air to cool the gases below temperatures where NO_x is formed.

Our non-recovery oven combustion process controls peak flame temperatures, minimizing the formation of NO_x. The process is equivalent to air staging in low NO_x burners for a boiler, whereby combustion air is separated into primary and secondary flow sections, which controls air and fuel mixing at each burner to reduce the peak flame temperature, forming significantly less NO_x from nitrogen gas (N_2). *See* J.L. Sundholm, *et al., Manufacture of Metallurgical Coke and Recovery of Coal Chemicals*, at 543 (The AISE Steel Foundation, Ch. 7, 1999) ("With this unique heating system with nine downcomers per oven and staged combustion air supply, a uniform temperature profile is achieved . . . In addition, the multi-staged heating system with air introduced at different levels leads to the formation of lower NO_x levels in the waste gas."). Figure 3 depicts the basic design differences between a non-recovery/heat recovery coke oven and a

[12] Citing Official Journal of European Union Commission, Best Available Techniques (BAT) Conclusions Under Directive 2010/75/EU of the European Parliament and of the Council on Industrial Emissions for Iron and Steel Production (Feb. 2012), at Section 1.4.49.

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byproduct coke oven, including the three points where air is introduced at a non-recovery/heat-recovery coke oven.

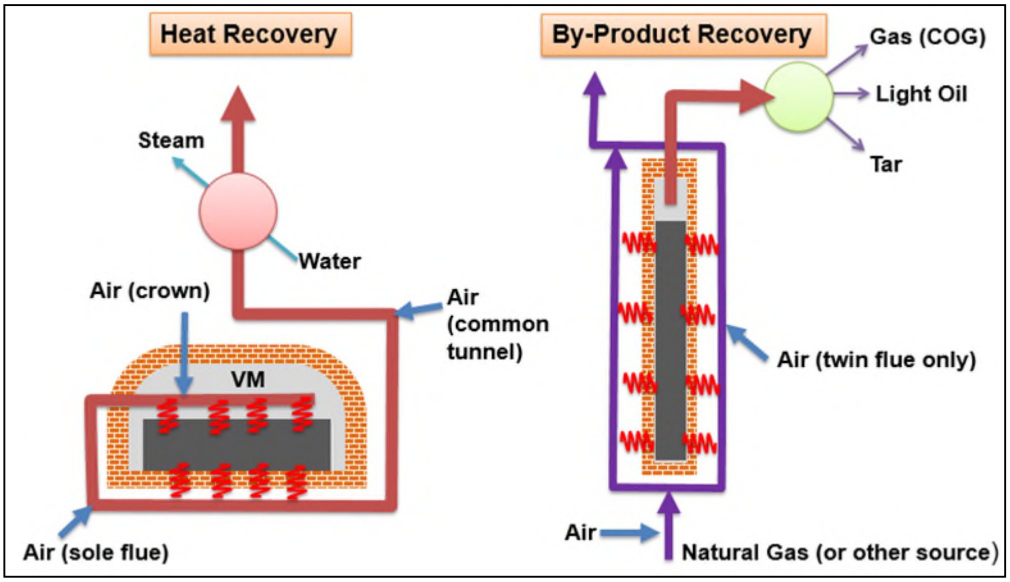

Figure 3. Basic Design Differences Between Heat Recovery and Byproduct Coke Ovens

ii. Non-Recovery Coke Ovens Minimize NO_x Formation because they do not Require an External Source of Heat.

Another reason for the low levels of NO_x at non-recovery/heat-recovery coke plants is that **nonrecovery ovens do not require an externally-fueled heat source such as burners**. The Agency acknowledges this important difference with byproduct plants in the Proposed Rule's supporting documents. *See* Technical Support Document at 24 ("In facilities using the non-recovery coking process, the ovens are heated differently from recovery coking operations such that no external heat source is required[.]"). In a non-recovery coke oven, the volatile fraction of the coal migrates from the coal bed, and the coal bed is converted to a coke bed over the coking cycle. There is no external fuel. The coal undergoing the coking process supplies all of the heat necessary for cokemaking.[13]

Unlike non-recovery ovens, byproduct coke ovens have a distinct combustion chamber in between—and separate from—each coke oven. Burners are located in these combustion chambers and use coke oven gas and/or natural gas to heat the walls of the coke oven. This results in a considerably higher concentration of NO_x compared with the nonrecovery process. Figure 4 provides a more detailed diagram of a byproduct coke oven, including its combustion flues and fuel gas system.

[13] Note that a gas lance can be applied externally to a non-recovery coke oven during maintenance and similar conditions in order to keep the oven walls sufficiently hot. This is important to prevent thermal spalling, which would compromise the integrity of the oven structure and its negative pressure design.

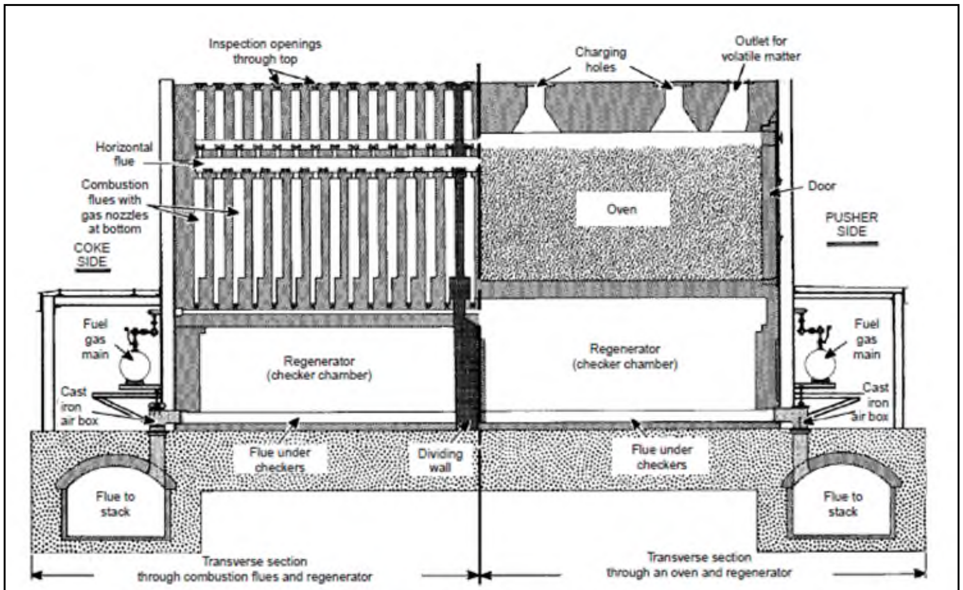

Fig. 7.59 Transverse sections of Koppers regenerative single-divided by product coke oven battery. Section at left is through combustion chambers (flues), that at right is through oven chamber.

Figure 4. Cross-Section of a Byproduct Coke Oven, Including Combustion Flues and Fuel Gas System.[14]

3. The Unique Charging and Pushing Processes at Non-Recovery Coke Plants Virtually Eliminate NO_x Emissions from those Operations.

At a non-recovery coke plant, charging is a negligible source of NO_x, as indicated by the absence of an AP-42 emission factor for NO_x emissions from nonrecovery plant charging operations. *See* EPA, Compilation of Air Pollutant Emission Factors, AP-42, at 12.2-32 (Table 12.2-21) (Vol. I, Ch. 12, Sec. 12.2, 5th ed. 2008). During charging, the PCM charges a horizontal bed of coal into the side of the oven, which is being operated at negative pressure, using a leveling conveyor. Each PCM is equipped with a traveling hood/baghouse system that controls fugitive particulate from the coal as it is charged into the ovens. No combustion takes place in the PCM. To the best of SunCoke's knowledge, the PCM baghouse stack has never been tested for NO_x, nor has any environmental agency even considered regulating NO_x emissions from non-recovery plant charging operations. Emissions control is only necessary for the fugitive dust generated by charging significant volumes of coal.

In contrast, a byproduct coke plant charges coal into the top of the oven battery—not the side—using a different piece of equipment, called a larry car. Because the ovens operate under positive pressure, standpipes can open due to overpressure, which emit NO_x into the air from combustion during charging. Jumpers and an advanced seal system

[14] Diagram from J.L. Sundholm, *et al., Manufacture of Metallurgical Coke and Recovery of Coal Chemicals*, at 450 (The AISE Steel Foundation, Ch. 7, 1999), https://usa1lib.org/book/3036842/18e080.

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are available to mitigate these charging emissions, but they are not required at all plants. In addition, byproduct coke plants have battery stacks which release combustion emissions from the oven's fuel system. If there are internal oven wall cracks, the battery stacks will emit more NO_x due to poorly-combusted additional nitrogen-bearing fuel leaking into the combustion chamber from the coal undergoing the coking process. Figure 5 shows the difference between charging operations at a nonrecovery coke plant and a byproduct plant.

Figure 5. Nonrecovery Plant PCM Charging Operations (left) and Byproduct Plant Larry Car Charging Operations (and Coke Oven Gas Removal) (right)

To push a heat-recovery oven at the conclusion of the coking cycle, the PCM removes the oven door on the coal side of the battery and aligns the pusher ram with the negative-pressure oven. On the coke side, the door machine removes the oven door. The PCM then rams the coke through the oven into the hot car. A "flat push hot car" is equipped with a multiclone that captures and controls fugitive particulate emissions, while other hot cars are enclosed within a shed system to control fugitive particulate matter.

Because the coke loaf is pushed intact at a heat-recovery plant, and the coking process is completed within the oven before the loaf is pushed, there are minimal combustion emissions from this process. Accordingly, NO_x concentrations in pushing emissions at non-recovery/heat recovery plants are extremely dilute (less than 10 ppm) and intermittent. Table 2 below demonstrates the minimal NO_x emissions, an average of 6 ppm, at SunCoke plants with flat push hot cars that allow for direct measurement of pushing emissions.

Table 2: NO_x concentrations in SunCoke Flat Push Hot Car Stack Tests

Facility	Test Date	Average NO_x Concentration (ppm)	NO_x Concentration Range (ppm)
Haverhill Coke Company (Phase I)	Jan. 2006	4.8	3.9 - 5.6
Haverhill Coke Company (Phase II)	Apr. 2009	7.74	6.58 - 9.45
Gateway Energy & Coke Company	May 2010	6.6	5.8 - 7.9
Middletown Coke Company	June 2020	4.9	4.3-5.4
Average Test Results		6.01	5.15 – 7.09

Pursuant to SunCoke's permits, NO_x emissions from pushing are minimized in this manner by complying with work practices specified in 40 C.F.R. § 63.7293(a). That regulation requires a visual inspection of each oven prior to pushing by opening the door damper and observing the bed of coke to confirm that there is no smoke in the open space above the coke bed, and that there is an unobstructed view of the door on the opposite side of the oven. These procedures ensure that the coking cycle is complete, minimizing any emissions from additional combustion.

During pushing operations at a byproduct plant, the oven doors are removed from each end, and the ram of the pusher pushes incandescent coke out of the oven, through the coke guide, and into the quench car below the oven. The dust generated during pushing is typically collected with a shed and/or hood system. The coke loaf is broken up when pushed into a quench car due to the greater height from which it is pushed, allowing for greater NO_x emissions compared with a non-recovery plant's hot car system. *See* 66 Fed. Reg. 35326, 35336 (July 3, 2001) ("PM emissions are lower from non-recovery ovens because the height of fall of the coke mass is about 50 percent less than that of by-product ovens.").[15] As with charging, standpipes can open during byproduct plant pushing operations, releasing additional NO_x to the atmosphere. Figure 6 shows the difference between pushing operations at a nonrecovery coke plant and a byproduct plant.

[15] This statement predates SunCoke facilities with flat push hot cars, which eliminates any fall of the coke loaf, and further reduces NO_x emissions from pushing.

Figure 6. Nonrecovery Coke Plant Flat Push Hot Car during Sampling (left) and Byproduct Coke Plant Pushing Operations (right)

IV. <u>There are Significant Technological Constraints in Further Reducing NO_x or Adding Unproven Controls at a Non-Recovery Coke Plant.</u>

SunCoke's non-recovery/heat-recovery coke plants already integrate several techniques identified by EPA to minimize the formation of NO_x emissions, but cannot install add-on NO_x controls such as selective catalytic reduction. As explained in Section III.B.2, the concentration of NO_x in the flue gas at a nonrecovery plant is a small fraction of the NO_x found in the waste gas at a byproduct plant. A nonrecovery coke plant operates at levels that are well-below EU BAT requirements without any add-on NO_x control devices. Therefore, EPA was correct for not regulating non-recovery/heat-recovery coke plants in developing the Proposed Rule. If the Proposed Rule fails to explicitly clarify this exemption or EPA were to regulate non-recovery/heat-recovery plants, it would be making flawed assumptions regarding the types of controls that are in use within the industry and that are technologically and economically achievable.

This would result in a rule that exceeds EPA's statutory authority and is arbitrary and capricious as unsupported by the evidence. Agency action is arbitrary and capricious if the agency has "offered an explanation for its decision that runs counter to the evidence before the agency." *State Farm*, 463 U.S. at 43. The evidence shows that the types of controls EPA proposes are not technologically and economically achievable for SunCoke's non-recovery/heat-recovery coke plants. If EPA were nevertheless to conclude that the controls are achievable for non-recovery/heat-recovery coke plants and finalize a rule that includes these plants, the rule would be contrary to the evidence, and thus, arbitrary and capricious.

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A. <u>The Proposed Rule Assumes the Use of Selective Catalytic Reduction, which has never been Implemented at a Non-Recovery Coke Plant.</u>

The Proposed Rule imposes new emissions limits for coke plants that are based on the use of add-on pollution controls that have never been installed at a non-recovery/heat-recovery coke plant—particularly selective catalytic reduction ("SCR") and selective non-catalytic reduction ("SNCR"). EPA proposes a limit of 0.15 lbs/ton of coal charged from "Coke Ovens (charging)" and notes in the "Additional Information" column "[a]ssume 50% reduction staged combustion and/or limited use SCR/SNCR during charging operations from AP–42 0.3 lb/ton emission factor."[16] 87 Fed. Reg. at 20145. EPA then provides a limit of 0.015 lbs/ton of "coal pushed" from "Coke Ovens (pushing)" and notes in the "Additional Information" column "SunCoke Middletown[17] limit is 0.02 lb/ton of coal. Assume 25% reduction by SCR." *Id*. There would be numerous problems with these limits and statements if they were applied to non-recovery/heat-recovery plants, such as the absence of *any* AP-42 factor for NO_x emissions from non-recovery charging operations and other issues explained above in Section II. In any case, the Agency is assuming the feasibility of SCR and/or SNCR in order to achieve the proposed emissions limits, which has never been done at a non-recovery/heat-recovery coke plant.

Neither SCR nor SNCR have been installed at a non-recovery or heat-recovery coke plant in the United States or, to the best of SunCoke's knowledge, anywhere in the world. EPA's supporting documents acknowledge that "coke ovens with [add-on] NO_x controls in the United States have not been found. [The Agency's 1994 Alternative Control Techniques Document for NO_x Emissions from Iron and Steel] instead cites the Japan Iron and Steel Federation's report of installation of SCR units on coke ovens." Technical Support Document at 35. Thus, the Agency cites only one reference for the use of SCR at a coke plant in a document that is nearly 30 years old, which merely cites another report discussing a Japanese coke plant. The Technical Support document also omits the important caveat from EPA's own document that "[t]he Japanese acknowledge that **there are many limitations and difficulties associated with applying these controls and some may be applicable only to new ovens**." *See* EPA, Alternative Control Techniques Document -- NO_x Emissions from Iron and Steel Mills (EPA-453/R-94-065) (Sept. 1994), at 5-19 (emphasis added).

Based on SunCoke's review, SCR was installed at three byproduct coke oven batteries at Kawasaki Steel Chiba Works, Japan to treat the waste gas from coke oven firing. *See* Rainer Remus, *et al.*, Joint Research Centre of the European Commission, Best Available Techniques (BAT) Reference Document for Iron and Steel Production, Industrial Emissions Directive 2010/75/EU (2013), at 259 (publications.jrc.ec.europa.eu).

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[16] SunCoke is unable to locate this AP-42 emission factor of 0.3 lb/ton NO_x from charging (even for byproduct plant charging) and believes it may be an error.

[17] The Proposed Rule's reference to this SunCoke plant as a basis for the newly proposed emissions limit is a critical reason why SunCoke requests a clear exemption in the final rule that the rule is not applicable to non-recovery/heat-recovery coke plants.

This system was only in operation between 1976 and 1992. *See id*. Since that time, "[a]ll SCR installations have been shut down" and "**currently no SCR installation is in operation at coke oven batteries worldwide**." *Id*. (emphasis added). The EU concluded that "there is not much experience in the sustainability regarding use in coke oven plants." *Id*. Moreover, SCR was *never* done as a retrofit application, as the EU determined that "**SCR is only applicable to new plants**." *See id*. (emphasis added).

The fact that SCR was installed at this Japanese byproduct coke plant to treat the waste gas from coke oven firing (i.e., from burners in the combustion chamber) is a critical factor in explaining its irrelevance to SunCoke's plants. Among the many differences that prevent direct comparison between non-recovery plants and byproduct plants are that non-recovery plants do not have combustion chambers and emit very low NO_x concentrations. At one of the Japanese batteries, NO_x was reduced from 290-390 ppm to 30-90 ppm. *See* Ralf Neuwirth, *et al.*, *Potentials and Limitations with Respect to NO_x Reduction of Coke Plants*, at 4 (2014), https://d2zo35mdb530wx.cloudfront.net/_legacy/UCPthyssenkruppBAIS/assets.files/download_1/coke_plant/12th_china_congress_zhengzhou_2014_tkis-text_for_proceeding.pdf. In other words, **the controlled NO_x levels achieved through the use of SCR at this plant were generally higher than SunCoke's plant average of 37.82 ppm achieved without SCR.** As discussed below in Section IV.C.1, SCR performance depends greatly on higher NO_x concentrations. Therefore, even if this Japanese plant achieved some meaningful NO_x reductions, it was only due to the higher starting concentrations, and this NO_x removal efficiency would not translate to a non-recovery plant where the starting NO_x concentrations are already exceedingly low.[18] Ultimately, given the fundamental differences between non-recovery/heat-recovery and byproduct coke plants, especially in the design of the coke ovens and concentrations of NO_x in the flue gas, the installation of SCR at a new Japanese byproduct plant that closed 30 years ago is meaningless for non-recovery plants.

B. SunCoke Plants Already Implement all other Relevant Controls cited by EPA to Minimize NO_x Emissions.

The Proposed Rule's background documents cite control measures other than SCR to minimize NO_x emissions from coke plants. All of these measures are inherent to SunCoke's non-recovery/heat-recovery process to the extent they are relevant. The Technical Support Document cites an EU report identifying flame temperature reduction, waste gas recirculation, and staged air combustion as being among the most effective ways of reducing NO_x formation. *See* Technical Support Document at 35.[19] The

[18] For SCR, "higher uncontrolled NO_x inlet concentrations result in higher NO_x removal efficiencies due to reaction kinetics[,]" whereas "[l]ow NO_x inlet levels result in decreased NO_x removal efficiencies because the reaction rates are slower, particularly in the last layer of catalyst." *See* EPA, EPA Air Pollution Cost Control Manual (EPA/452/B-02-001), at Sec. 4.2, Ch. 2, 2-13 (6th ed. 2002).

[19] Citing Rainer Remus, *et al.*, Joint Research Centre of the European Commission, Best Available Techniques (BAT) Reference Document for Iron and Steel Production, Industrial Emissions Directive 2010/75/EU (2013), at 257.

aforementioned Japan Iron and Steel Federation report similarly identifies low-air-ratio combustion and flue gas recirculation as NO_x control techniques for coke ovens. *See id.*

Three-stage air combustion and controlling peak flame temperatures are inherent to the non-recovery cokemaking process, as explained above in Section III.B.2.i. Similarly, flue gas recirculation is inherent to our non-recovery/heat-recovery coke plants through (1) the oven's internal gas distribution systems utilizing the downcomers to direct gas from the crown to the sole flues; (2) the uptakes then directing the gas to the common tunnel which stages the burn of the flue gas with differing oxygen levels; and (3) the final mingling of flue gas in the common tunnel with different levels of oxygen from different ovens at different stages of the coking cycle.

The only coke plant controls cited in the Technical Support Document that are not and cannot be implemented at a non-recovery/heat-recovery coke plant are (a) SCR and (b) using thinner bricks in the oven heating chamber. We explain the reasons SCR is not feasible below in Section IV.C.1. A non-recovery coke plant also cannot make "structural changes . . . to the heating chamber to improve thermal conductivity, such as using thinner bricks." *See id.* There is no distinct heating chamber in a non-recovery coke oven, as explained in Section III.B.2.ii. The entire purpose of using thinner bricks at byproduct coke ovens with heating chambers is to "decreas[e] the temperature gradient over the refractory brick wall from the heating chamber side to the coke oven chamber side," and "can only be applied in new plants." *See* Rainer Remus, *et al.*, Joint Research Centre of the European Commission, Best Available Techniques (BAT) Reference Document for Iron and Steel Production, Industrial Emissions Directive 2010/75/EU (2013), at 257-58. In addition, thinner bricks would increase the likelihood of oven wall and floor cracks (or even collapse) that would compromise the ovens' negative pressure design—negating the qualities that make non-recovery cokemaking preferred by the Agency under the MACT standard.

The Technical Support Document states elsewhere that:

> EPA based the emission limit of 0.15 lb/ton for charging and 0.015 lb/ton for pushing on projected reduction efficiency of 40-50% based on current permit emission limits and production-based push/charge cycles. EPA projects minimally 40% NO_x reduction efficiency is achievable by use of low-NO_x practices, staged pushing and hood configurations, and potential use of add-on NO_x control technology at larry cars and pushing/charging machines, including potential use of low-NO_x burners, flue gas recirculation, and/or the addition of selective catalytic reduction to mobile hoods and particulate matter control devices.

Technical Support Document at 44. It is unclear what the Agency is referring to when it uses the term "staged pushing," there are no "hood configurations" for pushing, charging, or any other operation that would reduce NO_x below current levels at a non-recovery plant, and, unlike byproduct coke plants, we do not use any burners in our normal operations such that low NO_x burners would be necessary or helpful. Because non-recovery plants inherently integrate low-NO_x practices such as staged combustion, reduced flame temperature, and flue gas recirculation, and because SCR/SNCR are not feasible, SunCoke's plants are already implementing every available measure cited by EPA's sources to control and minimize NO_x emissions at a coke plant. We emit only a small fraction of the NO_x concentrations emitted from byproduct coke plants or identified by the EU as BAT. *See id.* at 34.[20] Therefore, non-recovery/heat recovery coke plants do not have any options to further reduce NO_x emissions.

C. There are Specific Reasons why SCR and SNCR are not Technically or Economically Feasible and have Never been Installed at Non-Recovery Coke Plants.

1. SCR is not Feasible for Non-Recovery Coke Plants.

There are important technical constraints that prevent the installation of SCR at non-recovery coke plants. SCR is a post-combustion technique that involves injecting ammonia into flue gas in the presence of a metal-based catalyst to convert NO_x emissions to elemental nitrogen and water. The catalyst allows SCR systems to operate at much lower temperatures compared with SNCR; typical temperatures for SCR are 500–800°F, compared with 1600–2200°F for SNCR. The optimum temperature range for SCR is 700–750°F. *See* EPA, EPA Air Pollution Control Cost Manual, at Sec. 4, Ch. 2, Figure 2.2 (7th ed. 2019).

When installed at coal-fired boilers, SCRs have mainly been applied to electric utilities and large industrial boilers ranging in size from 1,300 to 8,000 MMBtu/hour. In these applications, SCRs are usually installed between the economizer and air heater because boiler outlet temperatures are usually much cooler than 700°F. This ensures that the gases entering the SCR reactor are in the appropriate temperature range. An economizer bypass can be used to divert part of the hot flue gas around the economizer to bring the temperature into the optimum range. The temperature of the gas stream is cooled in the air heater, downstream of the SCR reactor, to the desired outlet temperature. Figure 7 is a schematic of a typical SCR system in a boiler.

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[20] Citing Official Journal of European Union Commission, Best Available Techniques (BAT) Conclusions Under Directive 2010/75/EU of the European Parliament and of the Council on Industrial Emissions for Iron and Steel Production, at Section 1.4.49 (Feb. 2012).

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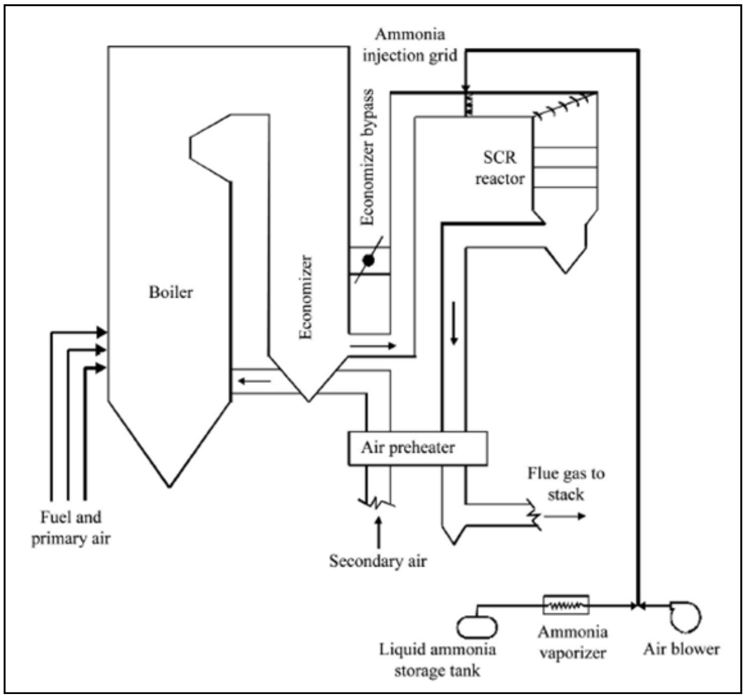

Figure 7: Schematic of an SCR Application in a Boiler.

In contrast to a typical coal-fired boiler at an electric utility, no combustion takes place in the heat recovery steam generators at SunCoke's heat recovery coke plants. The HRSGs are also fairly simple and compact, consisting of only three sections: a superheater, evaporator, and economizer. The economizer in these HRSGs is designed to cool the flue gases to 350-400°F, compared to the typical large boiler or heater with economizer outlet temperatures closer to the 650–750°F range. At 350-400°F, the gas temperature is outside the range where SCR is effective. SunCoke's HRSGs are also relatively small units in size and duty (100 MMBtu/hour), designed to produce steam from waste heat. Unlike utility boilers, they do not contain sections within the unit where the temperature is in the effective range of SCR.

Another problem with the use of SCR at a heat recovery coke oven battery is the unique flue gas containing inherently fouling ash, in contrast to the light fly ash of a coal-fired boiler. The particulate loading in heat-recovery coke oven flue gas is low due to the inherently excellent combustion, but with little alkaline fly ash to adsorb HCl, sulfates and chloride salts form in air pollution control devices, including but not limited to sodium, ammonium, and potassium salts. Coal fly ash at a utility boiler is light and remains suspended, whereas these sulfate and chloride salts are sticky and easily form deposits.

Because of these unique flue gas properties, SunCoke's heat recovery coke ovens must be operated to minimize deposition of sulfate and chloride salts. Despite installation of special soot blowers to address this issue, regular maintenance of the HRSGs is necessary in order to remove the deposits of material and prevent corrosion and plugging of these systems. During these maintenance periods, the flue gas generally must be routed to vent stacks that bypass the HRSGs and FGD because coke ovens cannot be shut down without causing catastrophic damage to the ovens. As a result, proper operation and maintenance of the system to limit the deposition of sulfate and chloride salts and periodically remove such deposits is critical to minimize HRSG and FGD downtime and resulting emissions. This is not the case with utility boilers, which are routinely shut down if problems develop in the air pollution control system.

Given these unique flue gas characteristics, if SCR were applied to a heat recovery coke oven battery, the ash would plug or poison (i.e., deactivate) the SCR catalyst. Moreover, using SCR would result in the formation of ammonium sulfates and bisulfates that would cause plugging of downstream equipment and would result in additional fouling. *See* J. Menasha *et al*., *Ammonium Bisulfate Formation Temperature in a Bench-Scale Single-Channel Air Preheater*, 90 Fuel 2445 (July 2011). This would result in the need for even more cleaning and HRSG maintenance, which would increase emissions because of additional time that the FGD system would be bypassed.

In addition to more HRSG maintenance and downtime, the increased deposits and plugging of downstream equipment would increase pressure drop across the system, which would adversely impact the negative pressure design of the ovens. If the ovens were not operating under negative pressure, HAPs may be emitted to the atmosphere instead of being combusted, as is the case at byproduct coke plants operating under positive pressure. This would also adversely impact the staged combustion process, temperature control, and flue gas recirculation within the oven system, which could result in more NO_x formation within the ovens and, theoretically, fugitive NO_x being emitted from leaking ovens. In other words, the pressure drop added by the SCR as well as increased fouling problems resulting from SCR likely would defeat the purpose of installing SCR in the first place. There would also be a safety issue if ovens began to operate under positive pressure, as flames would emerge from dampers and other openings that are intended to introduce air into the system. As a result, retrofitting SCR at a heat recovery coke plant would further require increased power for the induced draft fans, as well as a revamp of the existing FGD system to handle the higher draft requirements.

The low NO_x concentrations in the flue gas at a non-recovery coke plant present another significant hurdle for SCR to achieve cost-effective NO_x removal. For SCR, "higher uncontrolled NO_x inlet concentrations result in higher NO_x removal efficiencies due to reaction kinetics[,]" whereas "[l]ow NO_x inlet levels result in decreased NO_x removal efficiencies because the reaction rates are slower, particularly in the last layer of catalyst." *See* EPA, EPA Air Pollution Cost Control Manual (EPA/452/B-02-001), at Sec. 4.2, Ch. 2, 2-13 (6th ed. 2002). As a result, even if installing SCR were technically feasible, we would expect very low removal efficiency at a non-recovery coke plant.

For these reasons, SCR is not feasible at a non-recovery/heat-recovery coke plant. It is impossible to quantify the hypothetical cost of a system that is not technically feasible, particularly in the limited period of time for submitting these comments. However, if the costs of such a system were quantified without regard for infeasibility, SunCoke is confident it would substantially exceed $7,500 per ton NO_x removed, even

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for a new coke plant. Under the Proposed Rule, EPA's analytical framework of non-EGU sources that would be subject to control requirements was subject to a marginal cost threshold of up to $7,500 per ton. *See* 87 Fed. Reg. at 20083; Regulatory Impact Analysis at 4-9. The costs would be even higher for a retrofit design due to the pressure drop issues identified above and redesign of the FGD. In sum, SCR has never been applied to the heat recovery cokemaking process because of the absence of a zone with appropriate temperatures to install SCR in these relatively small and simple HRSGs, as well as the increased likelihood of HRSG fouling that would result in more overall emissions. It is not technically or economically feasible.

2. SNCR is not Feasible for Non-Recovery Coke Plants.

SNCR is similarly infeasible at a non-recovery coke plant and has never been used with this process. SNCR is a post-combustion technique that involves injecting ammonia or urea into specific temperature zones in the upper furnace or connective pass of a boiler, as shown in Figure 8. The ammonia or urea reacts with NO_x in the gas to produce nitrogen and water. Multiple injection locations are required within several different zones of the boiler to respond to variations in the boiler operating conditions. The effectiveness of SNCR depends on the temperature where reagents are injected, mixing of the reagent in the gas, residence time of the reagent within the required temperature window, ratio of reagent to NO_x, and the presence of sulfur compounds in the flue gases (ammonia reacts with SO_2 and SO_3 to form ammonium sulfates and bisulfates). As with SCR, there is an increased likelihood for HRSG fouling with SNCR, which would increase overall emissions, and there is no appropriate injection location at a non-recovery coke plant.

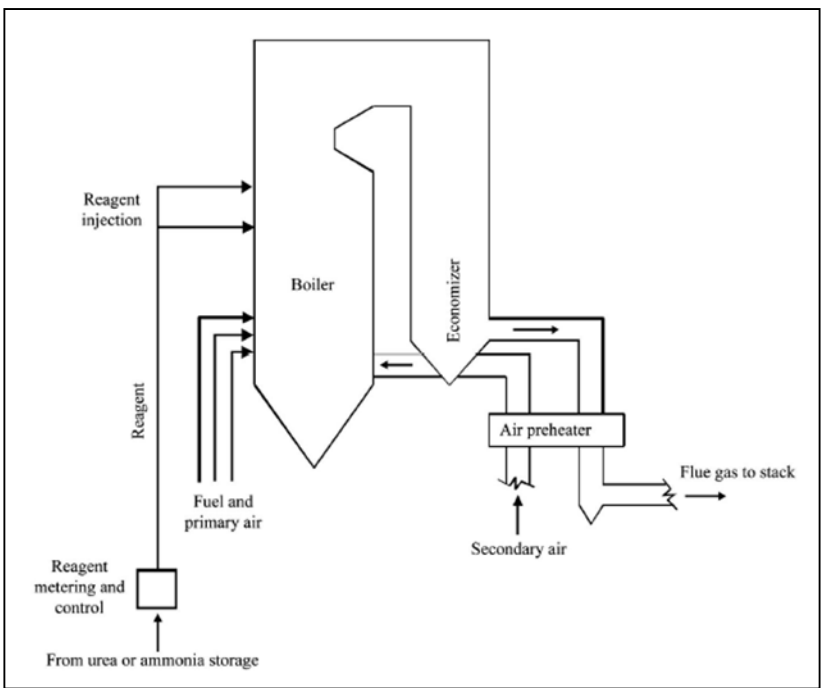

Figure 8: Schematic of a SNCR Application at a Boiler

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As explained above, heat recovery coke oven flue gas does not contain the light coal fly ash of a coal-fired boiler. The particulate material in the heat recovery flue gas is acidic and contains sulfates and chloride salts, including but not limited to sodium, ammonium, and potassium salts, with a demonstrated tendency to cause fouling. One problem with SNCR at a heat recovery coke plant is the formation of ammonium sulfates and bisulfates that cause additional fouling and would result in plugging of downstream equipment. As described above for SCR, this would lead to a need for even more HRSG cleaning and maintenance, which would increase emissions because of additional time that the FGD is bypassed. In addition, it would increase pressure drop throughout the system, which could result in an overall increase in both NO_x and HAPs by compromising the negative pressure design of the ovens. In a retrofit application, this likely would require a redesign of the FGD and increased power consumption by the induced draft fans.

The second major obstacle to the use of SNCR at a non-recovery plant is the need for a specific temperature range and residence time. Figure 8 shows how a boiler could be configured with multiple injection locations so that ammonia or urea can be added at an appropriate temperature. Because of the large space in a normal boiler, there can be adequate residence time at the ideal temperature. The required temperature window is 1,600–2,200°F, with the most effective range being 1,800–2,100°F. Above these temperatures, more NO_x will be formed from nitrogen in the reagent, while no reaction will occur below these temperatures.

At a non-recovery coke plant, the oven crown and sole flue would not be appropriate locations to add ammonia or urea because the temperatures are generally higher than this range. The temperature in the common tunnel and hot duct to the HRSG varies from 1,800°F to 2,400°F each day and is permitted to drop down as low as 1200°F to 1400°F, depending on the plant. The continuous batch nature of the non-recovery/heat-recovery coking process results in fluctuations in the flue gas flow rate, composition, and temperature from 15-20% below average to 15-20% above average, which results in a very broad operating range. Therefore, any hypothetical SNCR system for heat recovery coke ovens would have to be instrumented with a system that could monitor the changing temperatures throughout the 2,000 ft of common tunnel and hot ductwork for the HRSGs, with many injection locations so that reagent could be injected where needed, which has never been proven to be feasible. This contrasts with an SNCR application at a boiler where the injection locations would be close together and temperatures in those locations are more uniform.

A third significant obstacle for SNCR is that even with multiple injection points in the correct locations, a hypothetical SNCR system would achieve a very low removal efficiency due to inherently low NO_x concentrations well below 100 ppm. *See* EPA, EPA Air Pollution Cost Control Manual (EPA/452/B-02-001), at Sec. 4.2, Ch. 1, 1-10 (Figure 1.5) (6th ed. 2002) (demonstrating that for a 70 ppm initial NO_x level, less than 25% reduction is expected at 2000°F); G. Quartucy *et al.*, *The Effect of Initial NO_x Levels on Selective Non-Catalytic NO_x Reduction Performance*, Am. Chem. Soc'y, Div. Flue

Chem. 38 (2), 699-707 (1993). Figure 9 below illustrates the reduced effectiveness of SNCR at lower concentrations of NO_x.

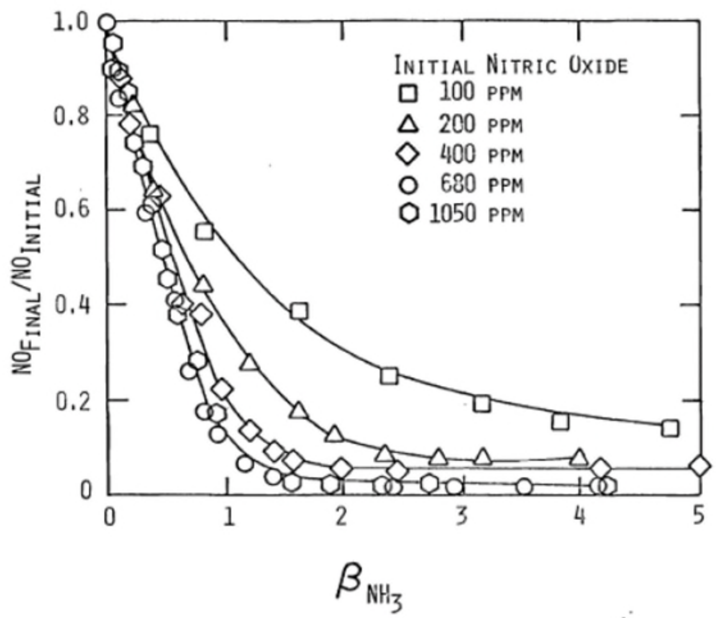

Figure 9. Effect of Initial NO level with NH_3 Injection (1760°F, 2% Excess Oxygen)

Consequently, besides the fact that SNCR has never been demonstrated at a non-recovery/heat-recovery coke plant, it is well-established that it is not feasible to achieve a reasonable removal efficiency at such low concentrations of NO_x. As is the case with SCR, it is not possible to quantify the hypothetical cost of a SNCR system that is not technically feasible, particularly in the limited period of time for submitting these comments. However, if the costs of such a system were quantified without regard for infeasibility, SunCoke is confident it would substantially exceed $7,500 per ton NO_x removed even for a new coke plant, above EPA's marginal cost threshold for non-EGU sources. *See* 87 Fed. Reg. at 20083; Regulatory Impact Analysis at 4-9. The costs would be even higher for a retrofit design. SNCR is not technically or economically feasible for non-recovery/heat-recovery coke plants.

3. <u>Tail-End SCR is not Feasible for Non-Recovery Coke Plants.</u>

SunCoke has also evaluated the hypothetical installation of a "tail-end" SCR system ("TESCR") located after the FGD for heat-recovery plants. Even if designed for a new plant, there are several issues that make such a system infeasible. TESCR would still cause equipment corrosion and fouling problems from chloride salts and ammonium sulfate and bisulfate formation. This would result in the same pressure drop and negative pressure problems described above for a standard SCR or SNCR system. Additionally, because of the low NO_x concentrations in the flue gas, the removal efficiency of a TESCR system would be extremely low.

Temperature presents an even greater challenge in this case compared with a typical SCR installation. The low temperatures at the end of a typical heat-recovery coke

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plant main stack range from 150-235°F, which would require reheating the gas stream. Reheating the gas stream would result in additional power consumption and associated costs and emissions. For a new heat-recovery coke plant, we estimate that a hypothetical TESCR system would result in increased emissions of greenhouse gases (21,068 tpy CO_2), sulfuric acid mist (13 tpy), and ammonia (50 tpy), and would consume significantly more energy (239,525 MMBtu/yr) due to reheat requirements and pressure drop across the unit. These issues would be exponentially greater for a tail-end SNCR system given the substantially higher temperature at which it must operate.

Therefore, a TESCR system even at a new heat-recovery plant is not technically feasible for many of the same reasons a more typical SCR or SNCR design is not feasible. Again, it is not possible to quantify the hypothetical cost of a system that is not technically feasible, particularly during the short comment period for the Proposed Rule. However, if the costs of such a system were quantified without regard for infeasibility, it would substantially exceed $7,500 per ton NO_x removed for a new coke plant. Under the Proposed Rule, EPA's analytical framework of non-EGU sources that would be subject to control requirements was subject to a marginal cost threshold of up to $7,500 per ton. *See* 87 Fed. Reg. at 20083; Regulatory Impact Analysis at 4-9. The costs and technical problems would be exacerbated for a retrofit application. In sum, there are no feasible post-combustion controls for non-recovery/heat-recovery cokemaking technology, nor are any such controls necessary given the extremely low levels of NO_x.

4. <u>The Technical and Economic Feasibility Issues for New NO_x Controls would be Amplified at the PCM and Hot Car.</u>

The technical and economic feasibility issues are generally described above in the context of a hypothetical SCR or SNCR system controlling the flue gas stream from the ovens at a heat recovery coke plant. As discussed in Section II.A above, it is unclear whether the Proposed Rule purports to even regulate the primary flue gas stream of a coke plant, or whether the rule instead proposes emissions limits only from charging emissions and pushing emissions. A complete evaluation of technical and economic feasibility of any new pollution control system at any part of a heat recovery coke plant cannot reasonably be done within the timeframe for commenting on the Proposed Rule, particularly for a retrofit design. However, the issues explained above for the flue gas stream from the coke ovens would, in general, be magnified if we attempted to install these technologies at the PCM or hot car.

First, as explained in Section III.B.3, charging is a negligible source of NO_x at a non-recovery plant as evidenced by the complete absence of an AP-42 emission factor for non-recovery plant charging operations. No combustion takes place in a PCM. NO_x concentrations in pushing emissions are also extremely dilute at less than 10 ppm and intermittent. The transformation to coke is complete by this stage, ovens must be inspected before pushing to ensure there is no smoke in the oven space above the coke bed, and the coke loaf is pushed essentially intact, limiting the opportunity for additional flames or combustion.

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Because of these non-existent to minimal NO_x emissions, SCR and SNCR would not be effective. We explain above that for SCR, "higher uncontrolled NO_x inlet concentrations result in higher NO_x removal efficiencies due to reaction kinetics[,]" while "[l]ow NO_x inlet levels result in decreased NO_x removal efficiencies because the reaction rates are slower, particularly in the last layer of catalyst." *See* EPA, EPA Air Pollution Cost Control Manual (EPA/452/B-02-001), at Sec. 4.2, Ch. 2, 2-13 (6th ed. 2002). Similarly, SNCR is of limited effectiveness at NO_x concentrations below 100 ppm, and the effectiveness is even more limited at concentrations below 30 ppm. *See id.* at Sec. 4.2, Ch. 1, 1-10 (Figure 1.5) (demonstrating that for a 30 ppm initial NO_x level, the control efficiency ranges from approximately 20% to 0% between 1600°F and 1950°F). Accordingly, neither SCR nor SNCR would meaningfully reduce NO_x emissions from SunCoke's pushing or charging operations.

Additionally, the operating temperature issues we describe above for SCR and SNCR would be substantially more problematic at the PCM and hot car. SCR must operate between 500–800°F, with an optimum temperature range between 700–750°F. For SNCR, the required temperature window is 1,600–2,200°F, with the most effective range between 1,800–2,100°F. However, the PCM baghouse stack normal operating temperature is approximately 150°F or less, well below these temperatures. In fact, the PCMs contain an automatic cooling system that cools the gas directed to the baghouse with air as temperatures approach 180-200 degrees, and in emergency conditions cool the gas with water if temperatures approach 250 degrees. This is necessary to prevent the PCM baghouse from burning bags or catching fire.

Similarly, the hot car temperature range is from 300-400°F, which is still 300 degrees below the optimum temperature range for SCR. Reheating the stack gas for the sole purpose of bringing it into the effective operating range would not be effective either for many of the same reasons described in Section IV.C.3 for tail-end SCR, along with additional issues unique to these units. Reheating the air would risk burning the PCM baghouse, and the stack for the hot car cannot be lengthened for a reheating system in order to remain sufficiently low to pass under stationary equipment. One of the biggest hurdles to any additional control device applied to a mobile piece of machinery at a SunCoke plant is limitations to power supply. Our PCMs and hot cars also already tax the existing rail systems, and adding further weight for controls would push the cost envelope even higher and raise additional feasibility problems.

To the best of our knowledge, no regulator has ever requested that add-on NO_x controls even be evaluated for these operations. The cost-per-ton for a hypothetical system that would remove NO_x from either of these units would be astronomical. Again, such a system would not be technically feasible, but the removal efficiency at these low concentrations of NO_x would be non-existent or hardly measurable. The hypothetical cost of such a system would substantially exceed the $7,500 per ton marginal cost threshold EPA is using under the Proposed Rule. *See* 87 Fed. Reg. at 20083; Regulatory Impact Analysis at 4-9.

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5. <u>There would also be Technical Feasibility Problems for CEMS Installation at SunCoke's PCMs and Hot Cars.</u>

Although EPA does not intend to regulate SunCoke's plants under the Proposed Rule, we would like to address feasibility problems associated with the hypothetical use of a NO_x continuous emissions monitoring system ("CEMS") for certain equipment at our plants. The proposed regulatory text at 40 C.F.R. § 52.43(d)(2) requires the installation of a NO_x CEMS to monitor compliance with the emissions limits of the Proposed Rule. *See* 87 Fed. Reg. at 20182. First, it would be unreasonable to require a CEMS to measure NO_x from a PCM or hot car because there is little to no NO_x present to begin with at these operations. Moreover, the minimal to non-existent levels of NO_x are attributable to the inherent nature of these operations, as opposed to the potentially fluctuating performance of an add-on pollution control device.

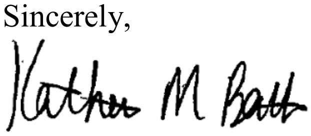
In addition, the PCM and hot car are mobile equipment operating in extreme, heavy-duty conditions. There is significant movement and vibration at these units as they traverse along rail lines at a non-recovery coke facility. Even when they are not in motion, there is significant vibration of the units as coal is loaded into the charging ram on the PCM from a conveyor system and charged from the PCM into the ovens, and as coke is pushed out of the ovens by the PCM into the hot car. Significant daily maintenance is required for these units to keep them operational because of the nature of these heavy-duty applications. These conditions alone would make a CEMS infeasible.

Gas stream conditions are also a problem for a CEMS at these sources. The continuous batch nature of SunCoke's process would make it challenging to obtain an accurate and reliable flow rate. Both stacks are too short for CEMS installation, which prevents the fully developed gas flow required for accurate measurements. The hot car stack must be short in order to pass below stationary equipment. In the case of SunCoke's hot cars, the presence of 2,000°F coke and hot steam would further interfere with CEMS operation. Even previous stack tests for other pollutants at the PCM and hot car have been performed using bag samples instead of a CEMS due to these harsh and unique operating conditions. A CEMS would not be feasible at the PCM or hot car.

* * *

Thank you for considering these detailed comments on the Proposed Rule. Please do not hesitate to contact me at kmbatten@suncoke.com or (740) 370-8710 with any questions.

Sincerely,



Katie Batten
Director of Health, Safety and Environmental
SunCoke Energy, Inc.

(J) RACT studies for stationary sources.

(1) For any affected source of NOx emissions at an affected facility that is not subject to the emissions limitations specified in paragraphs (A) to (G) of this rule and is not exempt under paragraph (K) of this rule, or that is subject to the emissions limitations specified in paragraphs (A) to (G) of this rule but the owner or operator claims that an applicable emissions limitation is technically infeasible or economically unreasonable (not cost-effective) to achieve, the owner or operator shall conduct a detailed engineering study to determine the technical and economic feasibility of reducing the NOx emissions and to define RACT for the source. The detailed engineering study shall be conducted by an engineering consulting firm or other person or persons experienced in the field of air pollution control, and provide the following information:

(a) *The complete facility name, ~~Ohio EPA air program facility~~* ***Indiana source*** *identification number, and address.*

Indiana Harbor Coke Company
Permit No. 089-41059-00382
3210 Watling Street, MC2-990
East Chicago, IN 46312

(b) The name, title, address and telephone number of the owner or operator's representative within the company who is the contact person for this facility regarding the engineering study and affected sources.

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slclemons@suncoke.com
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(c) The name, title, address and telephone number of the official who is responsible for approval of the engineering study.

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3210 Watling Street, MC2-990
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slclemons@suncoke.com
219-378-3903

(d) The standard industrial classification code and source classification code numbers which are applicable to the facility's operation.

SIC 3312 and NAICS Code 331110

(e) The following general information for each affected source:

(i) ~~Ohio environmental protection agency application number~~ **Current Indiana operating permit number or the most recent amendment or permit modification, as appropriate**.

Indiana Harbor Coke Company

Permit No. 089-41059-00382

(ii) Company identification and ~~Ohio EPA~~ **permit** emissions unit identification number. *Note: these might reasonably be expected to be the same*

Indiana Harbor Coke Company
Permit No. 089-41059-00382

(iii) Source description.

IHCC is located at 3210 Watling Street in East Chicago, Indiana. IHCC is located in Lake County, which has been designated as nonattainment for the 2015 8-hour ozone standard and attainment or unclassifiable for all other criteria pollutants.[1]

IHCC is an existing major source under the Prevention of Significant Deterioration (PSD) permitting program and a major source of hazardous air pollutants (HAP). IHCC is one of the 28 major stationary source categories specified in 326 IAC 2-2-1(ff)(1).

IHCC consists of four non-recovery batteries each with 67 coke ovens (total of 268 ovens) designed based on the Jewell-Thompson heat recovery principles (see **Error! Reference source not found.**). In the non-recovery process, the cycle begins with ovens being charged with coal, which then start to absorb heat from the hot refractory (i.e., the oven floor and walls). The coal is then carbonized by combusting the volatile matter. Air and partially combusted gases pass into a sole flue system beneath the oven floor where additional combustion takes place. The oxidized flue gas then passes through the oven walls and enters an afterburner tunnel where any remaining uncombusted gases are oxidized. The afterburner tunnel system (common tunnel) routes the hot gases to the Heat Recovery Steam Generators (HRSGs).

The coal enters the Lake Terminal facility by railcar. The coal cars are heated using coal thaw sheds equipped with natural gas-fired heaters during the cold months, as necessary. The coal is stored in an open storage area equipped with a watering system to minimize particulate matter (PM) emissions.

The charging machine captures PM emissions using a mobile hood which are then routed to a baghouse system. The HRSGs recover heat from the oven waste gases to generate steam and to protect the downstream pollution control devices by reducing the waste gas temperature. The HRSGs are operated by Cokenergy LLC, which is an independent company (i.e., not affiliated with IHCC). Cokenergy LLC also operates a lime spray dryer/baghouse system to remove PM and SO_2 from the oven gases. Pushing emissions are captured using a cokeside shed which are then routed to a baghouse system. Quenching is performed in two quench towers.

Paved and unpaved roads around the facility are watered, as necessary, to reduce PM emissions.

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[1] 326 IAC 1-4-46

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Coal and coke are transferred throughout the facility via a network of conveyors and transfer points operated in accordance with IHCC's fugitive dust control plan to minimize emissions of fugitive dust. The coke is permitted to be stored in an open storage area.

(iv) Month and year installed.

March 1998

(v) Normal operating schedule (hours per day, days per week, and weeks per year).

365 days/year, 24/7

(vi) Annual production rates for each of the three full calendar years preceding ~~the effective date of this rule~~ **this submission**.

Annual Production rate of

Year	Annual (tons)	Annual (lbs)
2023	1,257,250 tons;	2,433,214,000 lbs.
2022	1,206,771 tons;	2,413,542,000 lbs.
2021	1,216,607 tons;	2,514,500,000 lbs.

(vii) Average and maximum daily production rates for each of the three full calendar years preceding ~~the effective date of this rule~~ **this submission**.

Year	Average Daily (tons)	Average Daily (lbs)	Maximum (tons)	Maximum (lbs)
2023	3,333.17	6,666,340	3,342.47	6,684,940
2022	3,306.22	6,612,440	3,342.47	6,684,940
2021	3,444.52	6,889,040	3,342.47	6,684,940

(viii) The type of control equipment employed and the date installed.

There are no add-on NOx controls , NOx is minimized through the inherent staged combustion design of the coke ovens

(f) A plot plan which shows the general layout of the facility and the affected source.

See attached

(g) The following emissions data for each affected source:

(i) Average daily NOx emissions (pounds per day of operation) based upon the highest average daily production rate for each of the three full calendar years preceding ~~the effective date of this rule~~ **this submission** or any other year that may be representative of the highest average daily emissions.

2023	0.000516 lbs/day operation

2022	0.000501 lbs/day operation
2021	0.000484 lbs/day operation

[Comment: The average daily production rate for a calendar year may be calculated in the following manner:
Average daily production rate = [(total production rate during the calendar year) / (number of days production occurred during the calendar year)]

Repeat the calculation for each of the three calendar years preceding ~~the effective date of this rule~~ **this submission**. The highest value of these three years is the representative value used to calculate the average daily NOx emissions per year.]

(ii) Maximum daily NOx emissions (pounds per day of operation) based upon the highest maximum daily production rate for each of the three full calendar years preceding ~~the effective date of this rule~~ **this submission** or any year that may be more representative of the highest maximum daily emissions.

(iii) Annual NOx emissions (tons per year) based upon the highest annual production rate for each of the three full calendar years preceding ~~the effective date of this rule~~ **this submission** or any year period that may be more representative of the annual production rate.

(iv) Documentation of the efficiency of the existing control equipment.
As described in SunCoke's June 21st, 2022 comments letter on EPA's proposed Good Neighbor Ozone rule, SunCoke's plant operates in a manner that results in < 5% of the concentration of NOx in the flue gas compared with traditional by-product coke plants. Specifically, Indiana Harbor operates at a level where the average NOx concentrations is 34.9 ppm based on testing in November 2019.

(v) Documentation of any emissions testing which has been performed.

See attached

(h) A detailed discussion of the technical feasibility of employing each of the following types of control measures for each affected source (or combination of sources):

(i) Low-NOx burners.

(ii) Close coupled or separated over-fire ports.

(iii) Flue gas recirculation.

(iv) Low NOx burners with external flue gas recirculation.

(v) Burners out of service.

(vi) Steam/water injection.

(vii) Dry low-NOx burners.

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(viii) Ignition timing retard.

(ix) Separate circuit after-cooling.

(x) Fuel emulsification.

(xi) Selective noncatalytic reduction.

(xii) Nonselective catalytic reduction.

(xiii) Selective catalytic reduction using urea ammonia and methane as reducing agents.

(xiv) Incineration (for sources other than boilers).

(xv) Scrubbing (for sources other than boilers).

(xvi) Process modification.

(xvii) Fuel switching.

(xviii) Adjustment of air/fuel ratio (for internal combustion engines only).

(xix) Low excess air.

(xx) Mid-kiln firing.

(xxi) Mid-kiln air injection.

(xxii) Gaseous fuels reburn.

(xxiii) Any other such RACT alternatives not listed in paragraph (J)(1)(h) of this rule that may be applicable to an affected source, or as are proposed by the owner or operator.

A detailed engineering discussion is not required for those control measures which are not applicable to a particular source.

(i) For each type of control measure that is determined to be technically feasible, an estimate of the control efficiency that can be achieved.

(j) For each control measure that is determined to be technically feasible, an estimate of the capital cost, annualized cost (including capital and operating costs), and the cost-effectiveness (annual dollars per ton of NOx removed annually).

(k) A comparison and discussion of the advantages and disadvantages of the control options that are determined to be technically feasible.

(l) A recommended definition of RACT for the source, including one or more of the following:

(i) Enforceable production limitations.

(ii) Emissions limitations.

(iii) Control efficiencies.

(iv) Operating requirements.

(m) An expeditious schedule for implementing the recommended definition of RACT, including milestones for awarding contracts, initiating construction, completing construction, and performing emissions testing, if necessary, to demonstrate compliance with the approved definition of RACT.

Because NOx is minimized through the inherent design of the coke oven, no schedule for construction is needed. Emission testing will continue to be performed in accordance with IHCC TV permit.

(n) Clean and detailed documentation of all calculations of the NOx emissions, including all assumptions made.

See responses above

(o) Capital and operating costs and the cost-effectiveness estimates calculated in a manner consistent with the most recent edition of the "United States environmental protection agency air pollution control cost manual."

To the extent that this is requesting cost effectiveness determinations for add-on pollution controls, please see SunCoke's June 21, 2022 comments letter on EPA's Good Neighbor Ozone rule.

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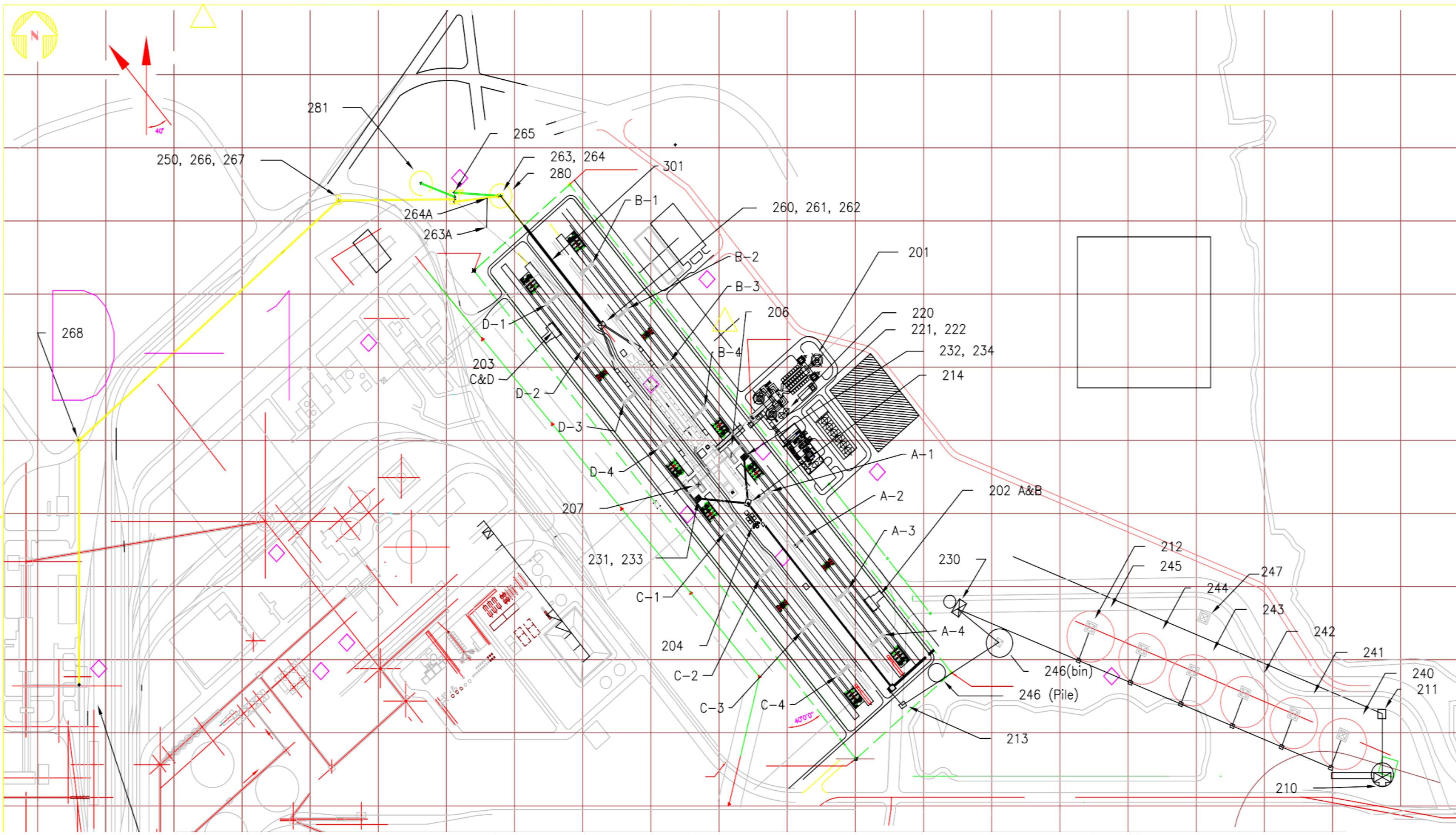

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