Commonwealth of Kentucky
Division for Air Quality

STATEMENT OF BASIS / SUMMARY

Title V / Title I, Operating / Construction
Permit: V-20-001 R2

Nucor Steel Brandenburg
100 Ronnie Greenwell Commerce Rd.
Brandenburg, KY 40108

April 5, 2024
Babak Fakharpour and Amy K. Tempus-Doom, P.E., Reviewers

SOURCE ID:	21-163-00044
AGENCY INTEREST:	162861
ACTIVITY:	APE20240001

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SECTION 1 – SOURCE DESCRIPTION

SIC Code and description: 3312 - Steel Works, Blast Furnaces (Including Coke Ovens), and Rolling Mills (hot-rolling purchased steel)

Single Source Det. ☐ Yes ☒ No If Yes, Affiliated Source AI:

Source-wide Limit ☒ Yes ☐ No If Yes, See Section 4, Table A

28 Source Category ☒ Yes ☐ No If Yes, Category: Iron and steel mills

County: Meade
Nonattainment Area ☒ N/A ☐ PM_{10} ☐ $PM_{2.5}$ ☐ CO ☐ NO_X ☐ SO_2 ☐ Ozone ☐ Lead

PTE* greater than 100 tpy for any criteria air pollutant ☒ Yes ☐ No
If yes, for what pollutant(s)?
☒ PM_{10} ☒ $PM_{2.5}$ ☒ CO ☒ NO_X ☒ SO_2 ☒ VOC

PTE* greater than 250 tpy for any criteria air pollutant ☒ Yes ☐ No
If yes, for what pollutant(s)?
☒ PM_{10} ☒ $PM_{2.5}$ ☒ CO ☒ NO_X ☒ SO_2 ☐ VOC

PTE* greater than 10 tpy for any single hazardous air pollutant (HAP) ☐ Yes ☒ No
If yes, list which pollutant(s):
Note: Total potential to emit of Hexane is 9.34 tons per year.

PTE* greater than 25 tpy for combined HAP ☐ Yes ☒ No

*PTE does not include self-imposed emission limitations.

Description of Facility:
Nucor Steel Brandenburg, a division of Nucor (NSB, Nucor, or the facility), is a plate steel manufacturing plant in Brandenburg, Kentucky. The facility recycles scrap steel and scrap substitutes using the electric arc furnace (EAF) process to make light plates, heavy plates, and hot rolled steel coils. Scrap steel and scrap substitutes will be delivered to the facility by barge, rail, and truck. Scrap steel, scrap substitutes, and flux will be charged to the EAF and melted by applying electric current through the feed mixture. Molten metal will be tapped to a ladle and transferred to the ladle metallurgy furnace (LMF), where the chemistry and temperature of the steel will be adjusted to customer specifications. From the LMF, the molten metal may be transferred to a vacuum degasser prior to being cast as slabs. The slabs will be heated to a consistent temperature in a reheat furnace and car bottom furnaces, respectively, prior to being rolled and shaped to its final form as hot rolled plate coils, light plates, or heavy plates. The major equipment used for this process will include a single-shell alternating current (AC) EAF, twin-shell LMF, vacuum degasser, continuous caster, reheat furnace, single-stand roughing mill, Steckel mill, a continuous heat treat line, Continuous Heat Treat Line, heavy plate processing operations, and protective coating application. The plant also will operate several smaller process areas, storage piles, and material transfer equipment.

SECTION 2 – CURRENT APPLICATION AND EMISSION SUMMARY FORM

Permit Number: V-20-001 R2 Activities: APE20240001

Received: March 4, 2024 Application Complete Date(s): April 3, 2024

Permit Action: ☐ Initial ☐ Renewal ☒ Significant Rev ☐ Minor Rev ☐ Administrative

Construction/Modification Requested? ☒Yes ☐No NSR Applicable? ☒Yes ☐No

Previous 502(b)(10) or Off-Permit Changes incorporated with this permit action ☐Yes ☒No

Description of Action:
With this application, NSB seeks to revise the Permit V-20-001 R1 to incorporate changes to the project that have occurred since permit issuance.

The Division sent the initial application to the U.S. EPA, National Park Service, and the Federal Land Managers on March 15, 2024.

The air dispersion modeling was completed (made final) on March 6, 2024. The final air dispersion modeling files were sent via email to the U.S. EPA, National Park Service, and the Federal Land Managers on March 15, 2024.

This permit includes the following overall changes:

- Emission calculations were updated to reflect more recent emission data where it was available and appropriate.
- The following table identifies proposed additional emission points to be added to the permit:

Table 1 – Added Emission Points

EP#	Title	Max. Cap.	Control Equipment
03-10	Ingot Grinding	225 Tons/hr	Baghouse
03-11	Ingot Grinding Oxy-Fuel Torch	225 Tons/hr	None
10-10	G500-1 Emergency Generator	1,411 HP	None

The changes to the original project scope and BACT analysis consist of the following (these changes are outlined here, and are discussed in greater details in the relevant sections of this document):

- Update to the paved and unpaved roads – Unpaved road segments 20 and 21 will be paved, and the source is adding an additional paved road segment 23. The BACT determination made previously for the roads remains the same, and BACT will not be revisited here.
- Updates to the cooling tower circulating water rate and total dissolved solids (TDS) content (EP09-01 and EP 09-09). The following cooling tower changes were made:
    - Reevaluating BACT for Melt Shop ICW Cooling Tower System 100 (EP 09-01). NSB is requesting to change the circulation rate to 49,200 gal/min and TDS to 2,800 ppm for this cooling tower to reflect the final design.

  - Reevaluating BACT for Melt Shop DCW Cooling Tower System 200 (EP 09-02). NSB is requesting to change the circulation rate to 16,000 gal/min and TDS to 3,000 ppm for this cooling tower to reflect the final design.
  - Reevaluating BACT for Rolling Mill DCW Cooling Tower System 400 (EP 09-04). NSB is requesting to change the circulation rate to 55,000 gal/min and TDS to 3,000 ppm for this cooling tower to reflect the final design.
  - Reevaluating BACT for Rolling Mill ACC ICW Cooling Tower System 500 (EP 09-05). NSB is requesting to change the circulation rate to 35,000 gal/min and TDS to 2,800 ppm for this cooling tower to reflect the final design.
  - Reevaluating BACT for Heavy Plate Quench DCW Cooling Tower System 600 (EP 09-06). NSB is requesting to change the circulation rate to 10,100 gal/min and TDS to 3,000 ppm for this cooling tower to reflect the final design.
  - Reevaluating BACT for Quench & ACC Laminar DCW Cooling Tower System 700 (EP 09-07). NSB is requesting to change the circulation rate to 44,000 gal/min and TDS to 3,000 ppm for this cooling tower to reflect the final design.
  - Reevaluating BACT for Heat Treat Cooling Tower System 800 (EP 09-08). NSB is requesting to change the circulation rate to 30,900 gal/min, TDS to 3,000 ppm, and 8 cells for this cooling tower to reflect the final design.
  - Reevaluating BACT for Air Separation Plant Cooling Tower System 900 (EP 09-09). NSB is requesting to change the TDS to 2,800 ppm and the design to 4 cells for this cooling tower to reflect the final design.
- Reevaluating BACT for Emergency Generators >500 HP. The BACT analysis has been revisited for these units since a physical change to the emission unit has been included in the application. The final design include the following changes;
  - G100-2 Emergency Generator (EP 10-02). NSB is requesting a increase in the size of this generator from 2,682 HP to 2,937 HP.
  - G100-3 Emergency Generator (EP 10-03). NSB is requesting a decrease in the size of this generator from 2,682 HP to 2,937 HP.
- Changes to stack parameters for several sources and road design and reallocation of emissions to associated release points (EU01-MSFUG, EP 03-01, EP 06-01, EP 06-03, EP 06-05);
- Nucor submitted emissions calculations updates for Walking Beam Reheat Furnace (EP 03-01), Coil Sample Plasma Cutter (EP 03-06), Continuous Heat Treat Plasma Cutter (EP 04-04), Light Plate Burning Beds #1 and #2 (EP 17-01), Heavy Plate Burning Beds #1 - #3 (EP 05-03), and Slag Plant Oxy Fuel-Fired Torches (EP 12-04) to include uncaptured emissions in the potential to emit for each unit. The Division already accounted for these uncaptured emissions in previous evaluations of these units, so the emission inventory for these units does not change.
- Increased throughput for the Caster [Includes Melt Shop Fugitives (EU01-MSFUG), Caster Spray Vent (EP 01-05), Primary Caster Torch Cut Off (EP 01-06), Secondary Caster Torch Cut Off (EP 01-12), and Caster Quench Box (EP 01-11)] from 370 tons/hr to 420 tons/hr;
- Update to the compliance demonstration for the Melt Shop Baghouse (C0101) lb/ton emissions limitations; and
- Increased Best Available Control Technology (BACT) limit for volatile organic compounds (VOC) for the Caster Spray Vent (EP 01-05) from 0.40 lb/hr to 4.4 lb/hr.

V-20-001 R1 Emission Summary				
Pollutant	Actual (tpy)	Revised PTE V-20-001 R1 (tpy)	Change (tpy)	Revised PTE V-20-001 R1 (tpy)
CO	0	2159.06	+1.1	2160.16
NO_X	0	782.65	+4.54	787.19
PT	0	306.30	+5.22	311.52
PM_{10}	0	432.65	+3.56	436.21
$PM_{2.5}$	0	279.47	-3.59	275.88
SO_2	0	312.97	+0	312.97
VOC	0	143.66	+17.67	161.33
Lead	0	0.397	+0.047	0.444
Greenhouse Gases (GHGs)				
Carbon Dioxide	0	1,069,309	+802	1,070,111
Methane	0	26.68	+0.03	26.71
Nitrous Oxide	0	10.94	+0.01	10.95
CO_2 Equivalent (CO_{2e})	0	1,073,236	+805	1,074,041
Hazardous Air Pollutants (HAPs)				
Hexane	0	9.34	+0	9.34
Fluoride	0	2.08	+0	2.08
Chlorine	0	0.84	+0.01	0.85
Manganese	0	0.74	+0	0.74
Hydrogen Fluoride	0	0.62	+0	0.62
Formaldehyde	0	0.40	+0	0.40
Acetaldehyde	0	0.34	+0.01	0.35
Methylene Chloride	0	0.27	+0	0.27
Methanol	0	0.20	+0	0.20
Carbon Disulfide	0	0.17	+0	0.17
Acrolein	0	0.14	+0.01	0.15
Chromium	0	0.21	+0	0.21
Toluene	0	0.10	+0	0.10
Benzene	0	0.05	+0	0.05
Combined HAPs:	0	19.05	+0.03	19.08

I. Summary of Revisions to the PSD Project

In the revised project, the following changes have been made and are being revisited in this permitting action:

The following units have been revised from the initial project application:

- *EU 01 (C0101) – Melt Shop Baghouse Stack:*
  NSBB has encountered process variability during the ongoing startup of the Melt Shop and downstream Roll Mill processes. As a result of this variability and the low production rates, NSBB has been unable to achieve normal operation of the Melt Shop Baghouse (C0101) and consequently, challenges with continuous compliance with the production-based lb/ton BACT emissions limitations. To account for the variability in startup of a greenfield steel mill, and the operational challenges associated with this process, Nucor is proposing that the limits become effective once consistent, representative production rates can be demonstrated. Nucor is proposing that the lb/ton BACT limits shall become effective when three (3)

consecutive months of a representative production (100,000 tons steel produced per month) is achieved, not to exceed the current permit expiration, July 23, 2025. It is very important to note that while Nucor has issues meeting the lb/ton emission limit during the startup and commissioning process of this new facility due to the low amounts of tons of steel the facility has been able to produce thus far, Nucor does not have issues meeting the other limits for the meltshop (lb/hr, ton/yr). Because this allowance for startup and commissioning of the facility does not affect the ton/yr emissions or any other part of the BACT analysis, it is not revisited here.

- *Melt Shop Fugitives (EU01-MSFUG), EP 01-05 Caster Spray Vent, EP 01-06 Primary Caster Torch Cut Off, EP 01-12 Secondary Caster Torch Cut Off, and EP 01-11 Caster Quench Box:*
  The maximum steel processing rate through the continuous caster will be increased from 370 to 420 tons per hour. This increase in throughput will affect the throughput for the emission points listed above. However, the captured emissions from the Melt Shop Baghouse will be unaffected because the PM emissions are based on the grain loading of the baghouse and the flow rate is unaffected by this throughput increase and it is anticipated that the increase in steel processing rate through the continuous caster will have a negligible effect on the remaining pollutants from 370 tons/hr to 420 tons/hr. Accordingly, the BACT determinations have not been revisited here. The following table identifies any revised emission limits based on the small change.

Emission Point	**BACT**	**BACT limit for PM (filterable)**	**BACT limit for PM_{10}**	**BACT limit for $PM_{2.5}$**
01-06	Eqpt. Design; NG Use	43 lb/MMscf; 0.35 ton/yr	49 lb/MMscf; 0.40 ton/yr	49 lb/MMscf; 0.40 ton/yr

- *EP 01-05 Caster Spray Vent:*
  As a result of the increased maximum hourly steel processing rate of the Caster Spray Vent and analyses and engineering evaluations performed at Nucor, in order to address previously unaccounted for VOC emissions from Caster Spray Vent operations, the currently permitted VOC emission limit was reevaluated and compared to similar operations at other steel mills. VOCs have the potential to be emitted from caster operations due to the volatilization of oils and greases used in the high-temperature caster equipment and may become entrained in the Caster Spray Vent steam as cooling water is sprayed onto the casting area equipment and hot steel slabs. Nucor requested a BACT limit equal to the limit at Nucor Arkansas which Nucor maintains is the most similar source to Nucor Brandenburg.

- *EP 03-10 Ingot Grinding:*
  In this revision to the project, the source is proposing the addition of ingot grinding operations. The ingot grinding operations will include a traversing grinder and a stationary grinder contained within a partial enclosure. Emissions from the ingot grinding operations will include PM, PM_{10}, $PM_{2.5}$, and Metal HAPs. A travelling capture system will collect potential emissions that are vented to the baghouse (Ingot Grinding Baghouse) for control of PM, PM_{10}, and $PM_{2.5}$. The uncaptured emissions will be emitted within the building and discharged to atmosphere through the Rolling Mill building monovent. Refer to the BACT discussion below.

- *EP 03-11 Ingot Grinding Oxy-Fuel Cutting Torch:*
  In this revision to the project, the source is proposing the addition of an ingot grinding cutting torch. The ingot grinding oxy-fuel cutting torch will be employed for cutting ingots that are 5 to 36 inches thick. The oxy-fuel cutting torch will emit pollutants from natural gas combustion and PM, PM_{10}, and $PM_{2.5}$ and Metal HAPs from cutting. Emissions generated from the oxy-fuel torch cutting of ingots will be emitted within the building and discharged to atmosphere through the Rolling Mill building monovent. Refer to the BACT discussion below.

- *EP 10-10 G500-1 Emergency Generator:*
  In this revision to the project, the source is proposing the addition of a diesel-fired emergency generator with a maximum rating of 1,411 HP in the Rolling Mill area. The engine is a source of PM, PM_{10}, and $PM_{2.5}$ due to burning natural gas as fuel. Calculations are based on MMscf of natural gas consumed per hour and a conservative 500 hours of operation to account for emergencies. Potential PM, PM_{10}, and $PM_{2.5}$ emissions are well below one ton per year for the new engine. Emission factors come from engine design specifics and AP-42, Chapter 3.4.

- *EP 14-01 Paved Roads & EP 14-02 Unpaved Roads:*
  In this revision to the project, the source is paving roads previously expected to be unpaved, and adding an additional paved road. These changes do not change the work practice BACT determination and accordingly the initial BACT determination for the roads is not revisited here.

- *Cooling Towers (EU 09):* The revisions to the project includes the following eight (8) cooling towers and revised emission calculations based on changes to the potential recirculation rates and TDS. The BACT limits have been revised to reflect the changes:
  - *EP 09-01 Melt Shop ICW Cooling Tower System 100:* is 3-cell cooling tower and a source of PM, PM_{10}, and $PM_{2.5}$. Calculations using emission factors based in both design requirements (BACT) and the Reisman-Frisbie paper yield totals of 3.02 tpy for PM, 2.25 tpy for PM_{10} and 0.007 tpy for $PM_{2.5}$.
  - *EP 09-02: Melt Shop DCW Cooling Tower System 200:* is 2-cell cooling tower and a source of PM, PM_{10}, and $PM_{2.5}$. Calculations using emission factors based in both design requirements (BACT) and the Reisman-Frisbie paper yield totals of 1.05 tpy for PM, 0.76 tpy for PM_{10} and 0.002 tpy for $PM_{2.5}$.
  - *EP 09-04: Rolling Mill DCW Cooling Tower System 400:* is 3-cell cooling tower and a source of PM, PM_{10}, and $PM_{2.5}$. Calculations using emission factors based in both design requirements (BACT) and the Reisman-Frisbie paper yield totals of 3.62 tpy for PM, 2.49 tpy for PM_{10} and 0.0078 tpy for $PM_{2.5}$.
  - *EP 09-05: Rolling Mill ACC ICW Cooling Tower System 500:* is 2-cell cooling tower and a source of PM, PM_{10}, and $PM_{2.5}$. Calculations using emission factors based in both design requirements (BACT) and the Reisman-Frisbie paper yield totals of 2.15 tpy for PM, 1.48 tpy for PM_{10} and 0.005 tpy for $PM_{2.5}$.
  - *EP 09-06 Heavy Plate Quench DCW Cooling Tower System 600:* is 4-cell cooling tower and a source of PM, PM_{10}, and $PM_{2.5}$. Calculations using emission factors based in both design requirements (BACT) and the Reisman-Frisbie paper yield totals of 0.66 tpy for PM, 0.48 tpy for PM_{10} and 0.001 tpy for $PM_{2.5}$.
  - *EP 09-07 Quench & ACC Laminar DCW Cooling Tower System 700:* is 3-cell cooling tower and a source of PM, PM_{10}, and $PM_{2.5}$. Calculations using emission factors based in

both design requirements (BACT) and the Reisman-Frisbie paper yield totals of 2.89 tpy for PM, 2.10 tpy for PM_{10} and 0.006 tpy for $PM_{2.5}$.

- *EP 09-08 Heat Treat Cooling Tower System 800:* is 8-cell cooling tower and a source of PM, PM_{10}, and $PM_{2.5}$. Calculations using emission factors based in both design requirements (BACT) and the Reisman-Frisbie paper yield totals of 2.03 tpy for PM, 1.48 tpy for PM_{10} and 0.004 tpy for $PM_{2.5}$.
- *EP 09-09 Air Separation Plant Cooling Tower, System 900:* is 4-cell cooling tower and a source of PM, PM_{10}, and $PM_{2.5}$. Calculations using emission factors based in both design requirements (BACT) and the Reisman-Frisbie paper yield totals of 0.79 tpy for PM, 0.59 tpy for PM_{10} and 0.002 tpy for $PM_{2.5}$.

- *EP 10-02 G100-2 Emergency Generator & EP 10-03 G100-3 Emergency Generator*
  With this revision to the project, the rated HP of these engines has been updated to reflect the manufacturer's specification sheets for each engine. The engines are sources of PM, PM_{10}, and $PM_{2.5}$ due to burning diesel fuel. Calculations are based on gallons of diesel consumed per hour and a conservative 500 hours of operation to account for emergencies. Potential PM emissions are well below one ton per year for each of the new engines. Emission factors come from engine design specifics as based on federal NSPS requirements for CI ICE in 40 CFR 60, Subpart IIII.

- *EP 03-01 Walking Beam Reheat Furnace, EP 03-06 Coil Sample Plasma Cutter, EP 04-04 Continuous Heat Treat Entry Tagger, EP 05-03 Heavy Plate Burning Beds #1-#3, EP 12-04 Slag Plant Oxy Fuel-Fired Torches, EP 17-01 Light Plate Burning Beds #1-#3:*
  Nucor submitted emission calculations for these units to more accurately account for uncaptured emissions from these processes. The Division already accounted for these uncaptured emissions in previous evaluations of these units, so the emission inventory for these units does not change. The emission limits for all units listed above reflect only captured emissions, so these changes do not otherwise affect the BACT limits, but they were incorporated into the require refined air dispersion model performed (AERMOD). Additionally, for EP 03-01, Nucor has requested a lower BACT emission limit reflecting the emission factors from AP-42, Chapter 1.4 for Natural Gas Combustion. The following table identifies the revised emission limit for EP 03-01.

Emission Point	BACT	BACT limit for PM (filterable)	BACT limit for PM_{10}	BACT limit for $PM_{2.5}$
03-01	Eqpt. Design; NG Use	1.9 lb/MMscf; 3.02 ton/yr	7.6 lb/MMscf; 12.06 ton/yr	7.6 lb/MMscf; 12.06 ton/yr

- Several emission point stack parameters have been updated to align with their as-built conditions. The updated stack parameters have been incorporated into the required air dispersion modeling (AERMOD). Emission points with stack parameter updates are listed as follows:
  - EU01-MSFUG – Melt Shop Fugitives;
  - EP 01-11 – Caster Quench Box;
  - EP 03-01 – Walking Beam Reheat Furnace
  - EP 05-03 – Heavy Plate Burning Beds #1, #2, #3, and #1A;
  - EP 17-01 – Light Plate Burning Beds #1B, #2C, and #2D;
  - EP 06-01 – EAF Flux and Carbon Handling;

- EP 06-03 – LMF Flux and Carbon Handling
- EP 06-05 – LMF Alloy Handling;
- EP 09-06 – HP Quench DCW Cooling Tower, System 600, Cells 1 – 4;
- EP 09-09 – Heat Treat Cooling Tower, System 800, Cells 1 – 8 and Air Separation Plant Cooling Tower, Cells 1 – 4;
- EP 10-08 – G300-1 Emergency Generator;
- EP 11-02 – Admin Building Emergency Generator;
- EP 18-01 – B&P Line Preheater/Dryer Combustion;
- EP 18-02 – B&P Line Shot Blaster; and
- EP 18-03 – B&P Line Painting Operations/RTO.

The Regulatory Analysis section provided in the April 22, 2020 original Statement of Basis for the revised PSD Significant Revision application has not changed as a result of emission changes due to the application updates and design changes submitted on March 4, 2024 and is not repeated in this Statement of Basis. Any other previously addressed items that are unchanged from the original permitting action are not addressed here.

II. Revised PSD Project Emissions

The BACT determinations, air dispersion modeling analysis and narrative have not appreciably changed since the project was re-visited in V-20-001 R1. Only substantial changes or additions to the previously made determinations are discussed in this section.

The revised potential increases in emissions of regulated NSR pollutants due to the expansion, both new equipment and increase throughputs for existing equipment, have been calculated and are presented in the following table. All emission potentials are based on final construction or modification, and operation of all units of the project.

Revised PSD Project Emissions Increase

Pollutant	**Project Emission Increase** (in tpy)	**Significant Emission Rate (SER)** (in tpy)	**PSD Significant Emissions Increase?**
PM (filterable only)	311.52	25	Yes
PM_{10}	436.21	15	Yes
$PM_{2.5}$	275.88	10	Yes
Pb	0.444	0.6	No
NOx	787.19	40	Yes
CO	2,160.16	100	Yes
VOC	161.33	40	Yes
SO_2	312.97	40	Yes
Fluorides*	2.08	3	No
GHGs (CO_2e)	1,074,041	75,000	Yes

* Fluorides include only the particulate form of fluoride.

III. Best Available Control Technology (BACT) Analysis

A. Background

The Division reviewed the information submitted by NSB, the RACT/BACT/LAER

Clearinghouse (RBLC), and other sources in making BACT determinations for all the pollutants subject to PSD review. In light of the changes made in the application, the Division re-evaluated previously made BACT determinations for all pollutants as appropriate for each unit. Any previously made BACT determinations that have not changed will not be repeated here. NSB followed the same "top-down" process for the revised BACT as performed previously.

A summary of the updated BACT analyses and Division decisions are outlined below.

B. BACT for PM, PM_{10}, and $PM_{2.5}$

1. ***General Control Measures for PM, PM_{10}, and $PM_{2.5}$***

NSB submitted BACT analyses for PM, PM_{10}, and $PM_{2.5}$. Any reference to PM in this section refers only to filterable PM, whereas PM_{10} and $PM_{2.5}$ includes filterable and condensable components.

NSB also evaluated the particulate control technologies in light of the groups of equipment likely to be served by a single control device. As with the assignment of BACT limits, discussed above, the technology chosen to control a particular final emission point may serve as the BACT control for a diverse group of equipment.

Only the technologies relevant to emission points for which BACT is being reevaluated are listed here.

Technologies for Particulate Control: The technologies identified as possible BACT controls for the three types of particulate for the NSB project are the following:

Cyclones: These mechanical collectors work on the principal of inertial separation. The collectors use a rapid change in air direction and the property of inertia to separate mass (particulate) from the process gas stream. This type of control is often used when there is a high concentration of coarse particulate. A cyclone is a feasible control, but has a lower collection efficiency (about 70 %), over the range of possible particulate sizes and are most effective for particulate of >10 micron size. They are often used as pre-controls to reduce particle concentration in a gas stream before it enters a second control device.

Scrubbers: In a wet scrubber, the process gas stream is either sprayed with a liquid or forced into contact with a liquid in order to impact and remove particles entrained in the gas. The particles are captured in liquid droplets that are then collected from the gas stream in a mist eliminator. The resulting liquid is then treated to remove the particles and recycled or discharged. Wet scrubbers are especially useful when the particulate is sticky, combustive, corrosive or explosive. Dry scrubbers, which do not saturate the gas stream, are generally used to remove acids from waste gas and are not used for particulate control.

Electrostatic precipitators (ESPs): ESPs are another control technology often used to remove particulate from flue gases before they are released to atmosphere. In this technology, particulate entrained in a gas stream is given an electrical charge as the stream passes through a gaseous ion region (corona). The charged particles are then attracted to, and collected by, a neutral or oppositely charged collector plate. In a dry electrostatic precipitator (ESPs), the collector plate is subjected to intermittent mechanical or sonic percussion to knock the particles off the plate and into a hopper positioned under the plate. A wet ESP operates similarly to the dry ESP for removing PM from a gas stream, but the collecting surface is cleaned by water, either intermittently or continuously.

Cartridge Collectors: These devices use a nonwoven filtering media, as opposed to woven or felt bags used in baghouses (see below, Fabric Filters). The filter media (fabric) is supported by an inner and outer wire framework and is pleated to increase filtering surface area. As a gas stream passes through the filter, particle collects on the surface of the filtering media. Cartridge collectors can be single use or continuous duty designs. In single-use, the dirty cartridges are changed and collected dirt is removed while the collector is off. In the continuous duty design, the cartridges are cleaned by pulse-jet cleaning system where a high pressure blast of air is used to remove dust from the filter media by flexing the media, discharging the dust cake gathered on the surface.

Fabric Filters (baghouses): This type of control equipment consists of a series of bags (filters) contained in a shell structure, through which process gas or a dust laden air stream is passed. Baghouses function based on the fact that particles are larger than gas molecules. When a particulate-laden gas is passed through a membrane (fabric filter), the particulate is captured on the filter while the clean gas passes through. The bags can be of woven or felted cotton, synthetic, or glass-fiber material in either a tube or envelope shape. Fabric filters, and the materials from which they are made, can be chosen to effectively clean particulates based on the sizes, shapes, and textures of the particulate expected. Baghouses also have cleaning devices, such as pulse jet, shakers or rappers, reverse air capability, or sonic cleaners, that cause collected dust to fall into dust hoppers at the bottom of the shell structure. The particulate removal efficiency of a baghouse can be as high as 99.9 %. The bin vent filters used in the NSB project are in this category of control.

Enclosure: Placing operations within a building or enclosure protects surfaces from air currents and prevents dust from becoming airborne. Depending on the openings, such as vents, windows and doors, and fans used, buildings can provide up to 70% efficient reduction in particulates generated within the structure. Building enclosures around conveyors and material piles also provides protection against particles becoming airborne.

Good Housekeeping Practices: Work practices, such as sweeping floors or pavement, wiping off equipment, keeping doors and windows closed, and generally keeping dusts from gathering or escaping from a building is a good general way to cut down on dust generation and emission.

Good Work Practices: Work practices such as performing inspections and preventative maintenance, help keep equipment running in optimal ranges and prevent extra pollutant emissions caused by malfunction. Designing equipment for minimal emissions is also considered.

Wet Suppression and other Fugitive Controls: The use of wet suppression, keeping trucks covered and cleaned, paving roadways, etc. are general ways to minimize outdoor fugitives from the facility property.

Mist Eliminators: Mist eliminators are designed to control aerosols and fine or condensable particulate. Fiber bed mats are often sprayed with scrubbing liquid so particles can be collected by deposition on droplets and fiber bed mats. Waste gas streams are often cooled before entering fiber-bed filters to condense as much liquid as possible and to increase the size of the existing aerosol particles through condensation. Fiber-bed scrubbers or mist eliminators are capable of control efficiencies ranging from 70% to 99%, depending on exhaust stream characteristics and size of aerosols. Insoluble PM will clog the fiber-bed filter over time; therefore, fiber-bed filters have a limited commercial acceptance for dust collection. Fiber-bed scrubbers can treat exhaust streams with flow rates ranging from 1,000 scfm to 100,000 scfm and temperatures up to 140°F. For mist eliminators to be considered effective at reducing $PM/PM_{10}/PM_{2.5}$ emissions, the inlet loading must be at least 0.1 gr/dscf.

2. ***Ingot Grinding (EP 03-10):***

Decision Summary: Consistent with the BACT evaluation conducted and submitted by the applicant, the Division determines that the use of a baghouse/fabric filter and Good Work Practices constitutes BACT for PM, PM_{10}, and $PM_{2.5}$ for the emission point listed above. The permit establishes the BACT limits, which are as follows:

Emission Point	BACT	BACT limit for PM (filterable)	BACT limit for PM_{10}	BACT limit for $PM_{2.5}$
03-10	Baghouse (C0310); GWP Plan	0.005 gr/dscf; 2.07 lb/hr; 9.07 ton/yr	0.005 gr/dscf; 2.07 lb/hr; 9.07 ton/yr	0.0025 gr/dscf; 1.04 lb/hr; 4.54 ton/yr

Technologies: The possible particulate control technologies identified are fabric filters, wet scrubbers, ESPs, high efficiency cylones, and Good Work Practices (GWP).

Analyses: ESPs are not technically feasible for controlling particulate emissions because the iron compounds will adhere strongly to the ESP collection plates, making them very difficult to remove. This causes a reduction in efficiency as the iron compounds will deflect other particles away from the plates and back into the exhaust stream.

The available and feasible control device with the highest efficiency is the baghouse/fabric filter. The applicant has indicated that a baghouse/fabric filter with >99% control efficiency will be used for the emission point listed above for particulate control. The building will serve as an additional control of the uncaptured emissions.

Good Work Practices, such as proper operation to ensure emissions are minimized, are both feasible and cost effective ways to minimize particulate emissions. As a result, the use of Good Work Practices is also chosen as BACT for the emission points listed above.

BACT limitations were set based on projected emissions using baghouse grain loading values.

3. ***Ingot Grinding Oxy-Fuel Cutting Torch (EP 03-11):***

Decision Summary: Consistent with the BACT analysis conducted by the applicant, the Division determines that the use of Good Work Practices constitutes BACT for PM, PM_{10}, and $PM_{2.5}$ emissions from the Ingot Grinding Oxy-Fuel Cutting Torch. The permit establishes the BACT limits, both short term (lb/MMscf) and long term (ton/year).

Emission Point	BACT	BACT limit for PM (filterable)	BACT limit for PM_{10}	BACT limit for $PM_{2.5}$
03-11	GWP Plan	163 lb/MMscf; 0.33 ton/yr	169 lb/MMscf; 0.34 ton/yr	169 lb/MMscf; 0.34 ton/yr

Analyses: The emissions of PM, PM_{10}, and $PM_{2.5}$ from the Ingot Grinding Oxy-Fuel Cutting Torch are less than 1 ton per year, making the use of any add-on control devices infeasible.

Good Work Practices, such as proper operation to ensure complete combustion and that no additional fumes are generated, are both feasible and cost effective ways to minimize PM, PM_{10}, and $PM_{2.5}$ emissions. As a result, the use of Good Work Practices is chosen as BACT for the emission point listed above.

4. ***Cooling Towers (EU 09):***

Melt Shop ICW Cooling Tower System 100 (EP 09-01), Melt Shop DCW Cooling Tower System 200 (EP 09-02), Rolling Mill DCW Cooling Tower System 400 (EP 09-04), Rolling Mill ACC ICW Cooling Tower System 500 (EP 09-05), Heavy Plate Quench DCW Cooling Tower System 600 (EP 09-06), Quench & ACC Laminar DCW Cooling Tower System 700 (EP 09-07), Heat Treat Cooling Tower System 800 (EP 09-08), Air Separation Plant Cooling Tower, System 900 (EP 09-09)

Decision Summary: Consistent with the BACT evaluation conducted and submitted by NSB, the Division determines that the use of the use of high efficiency mist eliminators and limiting TDS constitutes BACT for PM, PM_{10}, and $PM_{2.5}$ for the cooling towers. The permit establishes the BACT limits, both short term (lb/hr) and long term (ton/year), which are as follows:

Emission Point	BACT	BACT limit for PM (filterable)	BACT limit for PM_{10}	BACT limit for $PM_{2.5}$
09-01	Mist Eliminator	0.69 lb/hr; 3.02 ton/yr	0.51 lb/hr; 2.25 ton/yr	0.002 lb/hr; 0.007 ton/yr
09-02	Mist Eliminator	0.24 lb/hr; 1.05 ton/yr	0.17 lb/hr; 0.76 ton/yr	0.0005 lb/hr; 0.002 ton/yr
09-04	Mist Eliminator	0.83 lb/hr; 3.62 ton/yr	0.57 lb/hr; 2.49 ton/yr	0.002 lb/hr; 0.0078 ton/yr
09-05	Mist Eliminator	0.49 lb/hr; 2.15 ton/yr	0.34 lb/hr; 1.48 ton/yr	0.001 lb/hr; 0.005 ton/yr
09-06	Mist Eliminator	0.15 lb/hr; 0.66 ton/yr	0.11 lb/hr; 0.48 ton/yr	0.0003 lb/hr; 0.001 ton/yr
09-07	Mist Eliminator	0.66 lb/hr; 2.89 ton/yr	0.48 lb/hr; 2.10 ton/yr	0.001 lb/hr; 0.006 ton/yr

Emission Point	BACT	BACT limit for PM (filterable)	BACT limit for PM_{10}	BACT limit for $PM_{2.5}$
09-08	Mist Eliminator	0.46 lb/hr; 2.03 ton/yr	0.34 lb/hr; 1.48 ton/yr	0.001 lb/hr; 0.004 ton/yr
09-09	Mist Eliminator	0.18 lb/hr; 0.79 ton/yr	0.13 lb/hr; 0.59 ton/yr	0.0004 lb/hr; 0.002 ton/yr

Technologies: Feasible control technologies provided by the applicant include high efficiency drift eliminators, limiting total dissolved solid concentrations in circulating water, and proper equipment design, operation, and maintenance.

Analyses: Each of the control technologies listed above are feasible for control of particulate emissions from cooling towers. Limiting TDS concentration and proper equipment maintenance, design, and operation are essentially free, base case technologies. The BACT is selected as a high efficiency drift eliminator (<0.001%) because this has the greatest quantifiable level of particulate control. Each of the above technologies will be used in conjunction to reduce emissions as much as possible.

BACT limitations were set based on projected emissions using cooling tower system data from a similar facility, Nucor Steel Gallatin.

Initial compliance demonstration with BACT will be shown by properly installing mist eliminators on each emission point and monitoring TDS and flow to each cooling tower.

5. ***Emergency Generators > 500 HP (EU 10)):***

Note that the PM/PM_{10}/$PM_{2.5}$, CO, NOx and SO_2 BACT analyses are included here for the emergency generators since energy efficiency and low-sulfur diesel fuel as fuel are the key to minimizing all of these pollutants.

G100-2 Emergency Generator (EP 10-02), G100-3 Emergency Generator (EP 10-03), G500-1 Emergency Generator (EP 10-10)

Decision Summary: Consistent with the BACT evaluation conducted and submitted by the applicant, the Division determines that the use of energy efficient design, Ultra Low Sulfur Diesel fuel (ULSD), and good combustion practices constitutes BACT for PM/PM_{10}/$PM_{2.5}$, CO, NOx, VOC, SO_2, and GHG for the new diesel emergency generators. The permit establishes BACT emission limitations (g/hp-hr) for the generators for those pollutants the manufacturer will certify emission rates for. To ensure compliance with these limitations, the permit requires recordkeeping and monitoring.

Emission Point	BACT	BACT for PM/PM_{10}/$PM_{2.5}$	BACT for CO	BACT for NMHC + NO_X
10-02	Energy Efficient Design, GCOP, ULSD Fuel	0.15 g/hp-hr	2.61 g/hp-hr	4.77 g/hp-hr
10-03	Energy Efficient Design, GCOP, ULSD Fuel	0.15 g/hp-hr	2.61 g/hp-hr	4.77 g/hp-hr

Emission Point	BACT	BACT for $PM/PM_{10}/PM_{2.5}$	BACT for CO	BACT for NMHC + NO_X
10-10	Energy Efficient Design, GCOP, ULSD Fuel	0.15 g/hp-hr	2.61 g/hp-hr	2.98 g/hp-hr

Technologies: The possible control technologies identified for the diesel emergency generators are Particulate Filters, Oxidation Catalysts, Selective Catalytic Reduction (SCR), Energy Efficient Design, Fuel Selection, and Good Combustion and Operation Practices (GCOP).

Analyses: After identifying possible technologies available, NSB presented a review of the different possible technologies, discussing the technical feasibility of each one, and the relevant advantages and disadvantages for use in the diesel generators.

A diesel particulate filter captures and stores particulate matter that results from the burning of diesel fuel in an engine. Due to the limited operation of these emergency engines, the emissions of criteria pollutants are minimal. Therefore, an add-on control, such as a diesel particulate filter is not practical.

Selective catalytic reduction reduces NO_X emissions by reacting NO_X with ammonia in the presence of a catalyst. SCR technology has been used most frequently with larger natural gas combustion sources, such as large boilers or combustion turbines. The reaction occurs effectively in a specific temperature range. Due to rapid startup and shutdown periods for these emergency engines, they will not effectively maintain the required temperature to complete the reaction. Therefore, SCR is not a suitable control for the emergency engines.

An oxidation catalyst reduces emissions be reacting pollutants in the presence of a catalyst at a specific temperature range. As with the SCR technology, discussed above, the rapid startup and shutdown periods prevent the engines from maintaining the temperatures required for complete reactions. Therefore, oxidation catalysts are not suitable for the emergency engines.

Energy efficient design results in lower emissions by virtue of using less fuel in order to accomplish the same amount of work. In addition, following equipment specific Good Combustion Practices also optimizes engine operation and diminishes fuel use. By using less fuel via increasing the efficiency, all emissions are minimized.

Careful fuel selection offers another opportunity to curtail emissions. SO_2 is emitted during combustion of diesel as the result of the oxidation of sulfur compounds. Selecting a low sulfur fuel, such as ULSD, means less sulfur is available to combine with oxygen and form SO_2. When less SO_2 forms, less is emitted.

As configured, BACT for the emergency engines limits emissions in a manner consistent with current standards. Analysis of other similar facilities demonstrates that virtually all diesel emergency engines in the industry are controlled by energy efficient design, good combustion practices, and the use of ultra-low sulfur fuel.

Compliance, both initial and continuous, is demonstrated by purchasing an engine certified to the emission standards in 40 CFR 60.4205(b) and (c), using ULSD, and the use of Good Combustion Practices.

C. BACT for NOx

1. General Control Measures for NO_x

NSB submitted BACT analyses for NOx emissions and evaluated available NOx control technologies and practices. The feasibility of the previously identified control technologies has not changed from the initial application, so the specific control technologies are not revisited here.

2. *Ingot Grinding Oxy-Fuel Cutting Torch (EP 03-11)*

Decision Summary: Consistent with the BACT evaluation conducted and submitted by the applicant, the Division determines that the use of Good Work Practices constitutes BACT for NOx for the Oxy-Fuel Torch listed above. The permit establishes the BACT limits, which are as follows:

Emission Point	BACT	BACT limit for NOx
03-11	GWP Plan	100 lb/MMscf; 0.20 ton/yr

Technologies: The possible NOx control technologies identified are Selective Catalytic Reduction (SCR), Nonselective Catalytic Reduction (NSCR), Selective Non-catalytic Reduction (SNCR), Low NOx Burners, Good Work Practices (GWP).

Analyses: Equipping the emission point listed above with SCR, NSCR, or SNCR to control the low amount of NOx (less than 1 tpy) emitted would be expensive and not cost effective. As a result, the use of SCR, NSCR, and SNCR are rejected in favor of more cost effective controls.

Low NOx burners are a very common control technology used to control NOx emissions from combustion and are capable of providing NOx control in the range of 40% to 80%. However, no low NO_x burner solutions exist for these types of cutters. As a result, low NOx burners were rejected in favor of more feasible controls.

Good Work Practices, such as proper operation to ensure complete combustion and that no additional fumes are generated, are both feasible and cost effective ways to minimize NOx emissions. As a result, the use of Good Work Practices is chosen as BACT for the emission point listed above.

BACT limitations were set based on projected emissions using approved emission factors and throughputs.

3. Emergency Generators >500 HP (EU 10):
G100-2 Emergency Generator (EP 10-02), G100-3 Emergency Generator (EP 10-03), G500-1 Emergency Generator (EP 10-10)

Decision Summary: Please note that all the pollutant BACT analyses for the emergency generators are contained in the Particulate BACT analysis section for this equipment, above.

D. BACT for CO and VOC

1. General Control Measures for CO and VOC

NSB submitted BACT analyses for CO and VOC emissions and evaluated available CO and VOC control technologies and practices. Because the control strategies for CO often provide co-control for VOC, the BACT analyses for these pollutants are combined. If a unit emits only VOC, only the control strategies applicable to VOC are analyzed. A control technology for an emission point may serve as a BACT control for other equipment as well. The feasibility of the previously identified control technologies has not changed from the initial application, so the specific control technologies are not revisited here.

2. Caster Spray Vent (EP 01-05)

Decision Summary: Consistent with the BACT analysis conducted by the applicant, the Division determines that a Good Work Practices (GWP) Plan constitutes BACT for VOC emissions from the Caster Spray Vent. The permit establishes the BACT limits, both short term (lb/hr) and long term (ton/year). There are no CO emissions expected from this emission point.

Emission Point	BACT	BACT limit for VOC
01-05	GWP Plan	4.4 lb/hr; 19.27 tons/yr

Technology: The possible VOC control technologies identified for use in the caster spray vents are incineration, catalytic oxidation, adsorption, absorption, and good work practices.

Analyses: The concentration of VOC in the caster spray vent is less than 50 ppmv, which is below the pollutant loading range of incinerators (1500 – 3000 ppmv), absorbers (250-10,000 ppmv), adsorption (400 – 2,000 ppmv) and condensation(>5,000 ppmv). Using these add-on technologies would be expensive in comparison with the small amounts of VOC removed. Because the concentration of VOC from the Caster Spray Vent is expected to be so much lower than these ranges, the use of any add-on control devices is infeasible.

NSB will utilize proper equipment design and good work practices for VOC emissions from the Caster Spray Vent. Initial compliance with BACT emission limitations will be demonstrated through testing and continuous compliance will be demonstrated through a GWP plan and monitoring, recordkeeping, and reporting.

The emission factor and BACT limit selected for this emission point are based on the BACT limit at Nucor Steel Arkansas, which Nucor determined was the most comparable Nucor facility to the operations at Nucor Steel Brandenburg.

3. Ingot Grinding Oxy-Fuel Cutting Torch (EP 03-11)

Decision Summary: Consistent with the BACT analysis conducted by the applicant, the Division determines that the use of Good Work Practices constitutes BACT for CO and VOC emissions from the Ingot Grinding Oxy-Fuel Cutting Torch. The permit establishes the BACT limits, both short term (lb/MMscf) and long term (ton/year).

Emission Point	BACT	BACT limit for CO	BACT limit for VOC
03-11	GWP Plan	84 lb/MMscf; 0.17 ton/yr	5.5 lb/MMscf; 0.011 tons/yr

Analyses: The emissions of CO and VOC from the Ingot Grinding Oxy-Fuel Cutting Torch is less than 1 ton per year, making the use of any add-on control devices infeasible. Because this process is specialized and requires little to no human adjustments, a GWP plan is also unnecessary.

Good Work Practices, such as proper operation to ensure complete combustion and that no additional fumes are generated, are both feasible and cost effective ways to minimize NOx emissions. As a result, the use of Good Work Practices is chosen as BACT for the emission point listed above.

4. Emergency Generators >500 HP (EU 10):

Decision Summary: Please note that all the pollutant BACT analyses for the emergency generators are contained in the Particulate BACT analysis section for this equipment, above.

E. BACT for SO_2

1. General Control Measures for SO_2

NSB submitted a BACT analysis for SO_2 emissions. As with the assignment of BACT limits, discussed above, the technology chosen to control a particular final emission point may serve as the BACT control for a diverse group of equipment. The feasibility of the previously identified control technologies has not changed from the initial application, so the specific control technologies are not revisited here.

2. Ingot Grinding Oxy-Fuel Cutting Torch (EP 03-11)

Decision Summary: Consistent with the BACT analysis conducted by the applicant, the Division determines that that the use of Good Work Practices constitutes BACT for SO_2 emissions from the Ingot Grinding Oxy-Fuel Cutting Torch. The permit establishes the BACT limits, both short term (lb/MMscf) and long term (ton/year).

Emission Point	BACT	BACT limit for SO_2
03-11	GWP Plan	0.6 lb/MMscf; 0.001 ton/yr

Analyses: The emissions of SO_2 from the Ingot Grinding Oxy-Fuel Cutting Torch is less than 1 ton per year, making the use of any add-on control devices infeasible.

Good Work Practices, such as proper operation to ensure complete combustion and that no additional fumes are generated, are both feasible and cost effective ways to minimize

SO_2 missions. As a result, the use of Good Work Practices is chosen as BACT for the emission point listed above.

3. ***Emergency Generators >500 HP (EU 10):***
Decision Summary: Please note that all the pollutant BACT analyses for the emergency generators are contained in the Particulate BACT analysis section for this equipment, above.

F. BACT for GHG

1. ***General Control Measures for GHG***
NSB submitted a BACT analysis for GHG emissions. As with the assignment of BACT limits, discussed above, the technology chosen to control a particular final emission point may serve as the BACT control for a diverse group of equipment. The feasibility of the previously identified control technologies has not changed from the initial application, so the specific control technologies are not revisited here.

2. ***Ingot Grinding Oxy-Fuel Cutting Torch (EP 03-11)***
Decision Summary: Consistent with the BACT analysis conducted by the applicant, the Division determines that the use of Good Work Practices constitutes BACT for GHG emissions from the Ingot Grinding Oxy-Fuel Cutting Torch. The permit establishes the long term (ton/year) BACT limits.

Emission Point	BACT	BACT limit for GHG
03-11	GWP Plan	246 tons/yr

Technologies: NSB identified good work practices (incl. equipment design and operation) as the control method primarily utilized for the Ingot Grinding Oxy-Fuel Cutting Torch. The use of an add-on control device is not feasible at the low level of emissions.

Analyses: NSB will utilize proper equipment design and good work practices for GHG emissions from the Ingot Grinding Oxy-Fuel Cutting Torch when using oxy-fuel. Initial and continuous compliance with BACT limitations is demonstrated through a GWP plan and monitoring, recordkeeping, and reporting.

IV. AIR QUALITY IMPACT ANALYSIS

i. Screening Methodology

The incremental increases in ambient pollutant concentrations associated with the Nucor Steel Brandenburg (NSB) mill expansion project have been estimated through the use of a dispersion model (AERMOD) applied in conformance to applicable guidelines in the United States Environmental Protection Agency (USEPA) Guideline on Air Quality Models (GAQM, 40CFR Appendix W, May 2017) and other applicable guidance, and followed the methodology presented in the Air Dispersion Modeling Protocol approved by KDAQ on April 17, 2023.
Model simulations for short-term and annual-averaged CO, NO_2, PM_{10}, $PM_{2.5}$ and SO2 emissions are performed with the AERMOD model using the 5-year meteorological database. The highest predicted impacts (H1H) were used as the design concentrations

in the SIL analyses while the design concentrations for the NAAQS and PSD increment analyses followed the form of the NAAQS and PSD increment for each applicable pollutant and averaging time. Each pollutant is being assessed against the SIL for the NAAQS, the maximum value over 5 years for each applicable time averaging period is compared to the appropriate SIL.

Significant Impact Levels (SILs)

Pollutant	Averaging Period	Modeled Concentration (μg/m^3)	Significant Impact Level (μg/m^3)	Significant Monitoring Concentrations (μg/m^3)	SIL Exceeded & Additional Modeling Required?	Significant Monitoring Concentration Exceeded?
CO	1-hour	725.9	2000	-	No	-
	8-hour	344.7	500	575	No	No
PM_{10}	24-hour	26.63	5	10	Yes	Yes
	Annual	4.47	1	-	Yes	-
$PM_{2.5}$ (2)	24-hour	7.97	1.2	4	Yes	Yes
	Annual	1.57	0.2	-	Yes	-
NO_2	1-hour	112.41	7.5	-	Yes	-
	Annual	6.57	1	14	Yes	No
SO_2 (1)	1-hour	27.64	7.8	-	Yes	-
	3-hour	17.90	25	-	No	-
	24-hour	5.58	5	13	Yes	No
	Annual	0.579	1	-	No	-

(1) The 24-hour and annual SO2 Standards were revoked on June 22nd, 2010. However, they are still considered active until 1-year after the area being studied has been designated for the 1-hour SO2 standard.

(2) The SIL and SMC for PM2.5 were vacated by the DC Circuit Court in January 2013. See Section 4.5 for a discussion of PM2.5 modeling considerations.

ii. <u>Background Concentrations</u>

Representative background concentrations were added to the maximum predicted concentrations so that small sources that were not explicitly modeled are included in the NAAQS and KYAAQS assessment. Background concentrations are based on ambient monitoring data collected for the three-year period available (2019 through 2021) determined to be the most representative for use in the modeling analysis. Since all of the criteria pollutants are not monitored at one location, data from several different monitoring locations are used.

Representative Background Concentrations

Monitoring Location	Site ID	Data Collection Period	Pollutant	Averaging Period	Basis of Design Value	Design Value
Owensboro, Daviess Co., KY	21-059-0005	2019-2021	SO_2	1-hour	Average of the three year 99th percentile	54.53 μg/m^3
Owensboro, Daviess Co., KY	21-059-0005	2019-2021	NO_2	1-hour	Average of the three year 98th percentile	Season/Hour/Day
				Annual	Annual Mean	8.62 μg/m^3
Charlestown State Park, Clark Co.	18-019-0008	2019-2021	$PM_{2.5}$	24-hour	Average of the three year 98th percentile	17.33 μg/m^3

Monitoring Location	Site ID	Data Collection Period	Pollutant	Averaging Period	Basis of Design Value	Design Value
				Annual	Average of three year annual averages	7.50 μg/m^3
Smithland, Livingston Co., KY	21-139-0004	2019-2021	PM_{10}	24-hour	2nd high	29.0 μg/m^3
Mammoth Cave NP	21-061-0501	2019-2021	CO	1-hour	2nd high	458 μg/m^3
				8-hour	2nd high	458 μg/m^3
Leopold, Perry Co., IN	18-123-0009	2019-2021	Ozone	8-hour	3 year 4th high maximum 8-hour average	64.0 ppb

The applicant may propose, for the reviewing authority's consideration, the use of existing monitoring data if appropriate justification is provided. NSB proposed the use of representative regional background data to satisfy this requirement as necessary.

iii. <u>Cumulative NAAQS Analyses</u>

NAAQS analyses, using five years of meteorological data, were performed for 1-hour and annual NO_2; 1-hour SO_2; 24-hour PM_{10}; and 24-hour and annual $PM_{2.5}$. The Ambient Ratio Method (ARM2) regulatory default Tier-2 NO_X to NO_2 conversion methodology for modeling ambient NO_2 impacts was used in the multi-source analyses. The NAAQS analyses were carried out by modeling facility-wide NSB source parameters and emission rates; modeling off-property source inventory for the surrounding area; and adding the representative background concentrations to modeled concentrations for comparison with the NAAQS.

NAAQS Modeling Results

Pollutant	Averaging Period	Modeled Concentration (μg/m^3)	Background (μg/m^3)	Total (μg/m^3)	NAAQS (μg/m^3)	Max Nucor Contribution (μg/m^3)
PM_{10}	24-hour	20.38	29	49.38	150	N/A
$PM_{2.5}$	24-hour	6.21	17.33	23.54	35	N/A
	Annual	2.54	7.50	10.04	12	N/A
$PM_{2.5}$ (secondary)	24-hour	7.53	17.96[1]	24.17	35	N/A
	Annual	1.59	7.52[1]	10.06	12	N/A
NO_2	1-hour	182.29	Included	182.29	188	N/A
	Annual	12.91	8.62	21.53	100	N/A
SO_2	1-hour	21.68	54.53	76.21	196	N/A
Lead[3]	Rolling 3-month	0.0125	N/A	.00125	0.15	N/A

[1] The amount of secondary PM2.5 added to the monitor background values. Secondary PM2.5 concentrations estimated using the default KDAQ MERP values. See Section 5.5 for details.

iv. <u>Class II Increment Analysis</u>

In addition, a PSD Class II increment modeling analysis, using five years of meteorological data, was also performed for annual NO_2, 24-hour SO_2, 24-hr and annual PM_{10}, and 24-hour and annual $PM_{2.5}$ by modeling increment consuming and expanding

NSB source parameters and emission rates as well increment consuming and expanding off-property sources.

The NSB mill is the first PSD application for $PM_{2.5}$ in Meade County. The Minor Source Baseline Dates for each pollutant for which PSD review was triggered were previously set in Meade County for all pollutants other than $PM_{2.5}$. The previous NSB project set the Minor Source Baseline Date for $PM_{2.5}$ in Meade County. The full cumulative inventories for NAAQS were conservatively assumed to be increment consuming and were used in the cumulative PSD increment modeling. There are no PSD Increments for 1-hour NO_2 or 1-hour SO_2. Therefore, it was only necessary to include off-property increment consuming and expanding sources in the Class II PSD Increment model runs for annual NO_2, 24-hour SO_2, 24-hour and annual PM_{10}, and 24-hour and annual $PM_{2.5}$ to assess compliance.

Class II Increments

Pollutant	Averaging Period	Modeled Concentration (μg/m^3)	PSD Class II Increment Standard (μg/m^3)
PM_{10}	24 hour	25.97	30
	Annual	5.11	17
$PM_{2.5}$	24 hour	8.19	9
	Annual	2.67	4
$PM_{2.5}$ (secondary)	24 hour	8.82[1]	9
	Annual	2.69[1]	4
SO_2	24-hour	4.88	91
NO_2	Annual	12.91	25
(1) Secondary PM2.5 concentrations estimated using the default KDAQ MERP values. See Section 5.5 for details.			

v. <u>Secondary $PM_{2.5}$ and Ozone Formation</u>

The Division has provided recent (August 2, 2018) guidance on addressing secondary pollutant impacts with a state-specific guidance on the application of EPA's Modeled Emission Rates for Precursors (MERPs) Tier-1 demonstration tool. This guidance was used to assess secondary formation of ozone and $PM_{2.5}$for this project. A MERP represents a level of precursor emissions that is not expected to contribute significantly to concentrations of ozone or secondarily-formed $PM_{2.5}$.

MERPs are used to determine if proposed emission increases from a facility will result in primary and secondary impacts. NOx, SO_2, $PM_{2.5}$, and VOC emissions from the project must be included in the analysis. If the project emissions from all relevant pollutants are below the SER, no further analysis is required. If the project emissions from any of the relevant emissions are above the SER, a Tier 1 demonstration is required. The Tier 1 demonstration consists of a SILs analysis and, if needed, a cumulative analysis. The analysis must be below the NAAQS for each precursor in order to pass.

NSB Emission for MERPs Analysis

Precursor	Emissions (tpy)	SER (tpy)
NO_X	787.2	40
SO_2	313.0	40
$PM_{2.5}$	275.9	10
VOC	161.3	40

The highest modeled concentration for all Project sources for annual and 24-hour $PM_{2.5}$ SIL. The values represent the maximum predicted concentrations over the 5 modeling years and are later used in the PSD Increment analysis. In the NAAQS analysis of the direct model-predicted concentrations, the average over 5 years were used.

SIL Modeling Results for $PM_{2.5}$ MERPs Analysis

Pollutant	Project Modeled Concentration (μg/m^3)
Annual $PM_{2.5}$	1.59
Daily $PM_{2.5}$	9.52

The highest modeled concentration for all sources, including nearby sources, for annual and 24-hour primary $PM_{2.5}$ NAAQS are as follow:

NAAQS and PSD Increment Modeling Results for MERPs Analysis

Pollutant	Project + Nearby NAAQS Source Impacts (μg/m^3)	Project + Nearby PSD Increment Source Impacts (μg/m^3)
Annual $PM_{2.5}$	2.54	2.67
Daily $PM_{2.5}$	6.21	8.19

The background concentrations for ozone and $PM_{2.5}$ annual / 24-hour are as follows:

Background Concentrations for MERPs Analysis

Pollutant	Background Concentrations	Monitor ID
Ozone	68.6 ppb	18-123-0009, Perry Co. IN
Annual $PM_{2.5}$	7.5 μg/m^3	18-019-0008, Clark, Co. IN
Daily $PM_{2.5}$	17.3 μg/m^3	

The KDAQ default MERPs as described in the KY MERPs guidance. The default MERPs provided by KDAQ are used in the analysis for the Project.

KDAQ Default MERPS

Precursor	8-Hour Ozone (tpy)	Daily PM2.5 (tpy)	Annual PM2.5 (tpy)
Ozone	169	2,449	8,333
Annual $PM_{2.5}$	-	1,500	10,000
Daily $PM_{2.5}$	3,333	-	-

If the result of the SIL Analysis is greater than 1, a cumulative analysis is required for that precursor. If the result is less than 1, a cumulative analysis is not required. The SIL analysis results for ozone and PM2.5 are as follows:

MERPs SIL Analyses

Pollutant	Analysis Results	Less than 1?
Ozone	4.63	No
Annual $PM_{2.5}$	8.10	No
Daily $PM_{2.5}$	8.46	No

The table below shows the cumulative analysis results for ozone and $PM_{2.5}$.

MERP Cumulative NAAQS Analysis

Precursor	Analysis	NAAQS	Below NAAQS?
Ozone	68.68 ppb	70 ppb	Yes

Annual $PM_{2.5}$	10.06 μg/m^3	12 μg/m^3	Yes
Daily $PM_{2.5}$	24.17 μg/m^3	35 μg/m^3	Yes

Summary of the PSD Increment analysis results is as follows:

MERPs PSD Increment Analysis

Precursor	Analysis	PSD INC	Below PSD INC?
Annual $PM_{2.5}$	2.67 μg/m^3	4 μg/m^3	Yes
Daily $PM_{2.5}$	8.19 μg/m^3	9 μg/m^3	Yes

vi. Class I MERPs Analysis

In order to assess the total $PM_{2.5}$ impacts (primary and secondary) at the Mammoth Cave NP Class I area, the USEPA approved distance-dependent technique was used. In this case, the MERPs values were calculated based on the concentrations from a representative hypothetical stack at a specific distance representative of the distance between the Project and the Class I area.

USEPA $PM_{2.5}$ Modeling Results: Source 2 Dubois, IN, Central US

Precursor	Emissions (tpy)	Stack Height	Distance (km)	Max. Modeled 24-hour Concentration (μg/m^3)	Max. Modeled Annual Concentration (μg/m^3)
NO_x	1000	High (90m)	≥ 50	0.0821	0.0034
SO_2	500	High (90m)	≥ 50	0.0337	0.0011

The combined primary and secondary $PM_{2.5}$ impacts were compared to their respective SILs. The 24-hour and the annual $PM_{2.5}$ total concentrations are below the SIL standards. Therefore, it is not expected that the Project will contribute significantly to $PM_{2.5}$ levels at Mammoth Cave NP, and no further analysis is necessary.

CLASS I PRIMARY AND SECONDARY PM $_{2.5}$ MODELING RESULTS

Period	AERMOD $PM_{2.5}$ Concentrations (μg/m^3) at 50 km			Class I SIL
	Primary	Secondary	Total	
24-hour	0.165	0.085	0.250	0.27
Annual	0.013	0.003	0.017	0.05

vii. Class I Area Analysis

Class I area impacts are addressed if the proposed project has an impact that exceeds the screening threshold as described by Federal Land Managers' (FLM) Air Quality Related Values Work Group (FLAG) guidance. In this guidance the sum of the proposed project emissions (in tpy) of SO_2, NOx, PM_{10} and H_2SO_4 is divided by the distance to the Class I area and compared to the value of 10. This ratio is known as Q/D. If Q/D is 10 or less, the project is considered to have a negligible impact on the Class I area. If the Q/D value is greater than 10, then further analysis to evaluate impacts in the Class I area is warranted.

There is only one Federal Class I area within 300 km of the NSB mill: Mammoth Cave National Park (NP), at 80 km. The sum of emissions (SO_2, NOx, PM_{10} and H_2SO_4) for the proposed project is 1521 tpy. The calculated Q/D for the proposed project relative to Mammoth Cave NP is 19.2, which is above the FLM screening level of 10. Therefore, an addition AQRV analysis was conducted and included CALPUFF modeling.

Class I Area Q/D Screening Analysis

Pollutant	Project Emissions (tpy)	Q/D Analysis
NO_2	787.19	
SO_2	313.0	
PM_{10}	436.21	
H_2SO_4	0.0	
Total	1536	
Mammoth Cave National Park	80 km	19.2

The project related increase of NO_2, PM_{10}, $PM_{2.5}$, and SO_2 were evaluated against the Class I SILs by applying the AERMOD dispersion model receptors at the maximum spatial extent (50 km from the Project site to receptor). The maximum modeled concentrations at the 50 km receptors are less than the Class I SILs for all pollutants and averaging periods except for 24-hour PM_{10}, for which a further analysis was performed using CALPUFF.

Class I SIL Analysis with AERMOD at 50 km

Pollutant	Averaging Period	Modeled Concentration at 50 km ($\mu g/m^3$)	Class I SIL	% of SIL
PM_{10}	24-hour	0.522	0.3	174.0%
	Annual	0.024	0.2	11.9%
$PM_{2.5}$	24-hour	0.165	0.27	61.1%
	Annual	0.013	0.05	26.9%
$PM_{2.5}$[1] secondary	24-hour	0.250	0.27	92.5%
	Annual	0.017	0.05	33.5%
NO_2	Annual	0.045	0.1	45.2%
SO_2	3-hour	0.714	1	71.4%
	24-hour	0.180	0.2	90.2%
	Annual	0.012	0.1	11.9%
(1) The $PM_{2.5}$ peak concentrations represent the sum of the AERMOD predicted concentrations and the fraction accounting for the secondary $PM_{2.5}$ formations. See Section 5.5 for details.				

Class I screening model concentrations for the 24-hr averaging periods is greater than the SIL for PM_{10}. A refined CALPUFF analysis was performed to evaluate the impacts from NSB emission sources within the park proper. CALPUFF modeling system (Version 5.8.5) was executed with the VISTAS meteorological data set provided by EPA and was run conservatively without any chemical transformations to demonstrate compliance with the Class I SILs for PM_{10}.

Class I SIL Analysis with CALPUFF

Pollutant	Averaging Period	Modeled Concentration ($\mu g/m^3$)	Class I SIL ($\mu g/m^3$)	% of SIL
PM_{10}	24-hour	0.124	0.3	41.32%

As evident from the AERMOD and CALPUFF modeling results, model-predicted impacts from NSB emission sources are below the Class I SILs for all pollutants and averaging periods; therefore, compliance is demonstrated and no further analysis is required.

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS

Group 1 – EU 01, EU 02, & EP 08-04					
Pollutant	**Emission Limit or Standard**		**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
Opacity	C0101	3%	40 CFR 60.272a(a)(2)	N/A	Daily Method 9, Monitoring, Recordkeeping, Reporting
	EP 01-07	10%	40 CFR 60.272a(b)		
	Any EU 01 Opening	6%	40 CFR 60.272a(a)(3); 40 CFR 63.10686(b)(2)		
	Any EU 01 Opening or Stack	20%	401 KAR 59:010, Section 3(1)(a)		
PM	• P<0.5; E = 2.34 • P ≤ 30; E=$3.59 * P^{0.62}$ P>30; $E = 17.3 * P^{0.16}$		401 KAR 59:010, Section 3(2)	Refer to the PM BACT Limits Below	Assumed when complying with BACT.
PM	C0101 Stack	0.0052 gr/dscf	40 CFR 60.272a(a)(1); 40 CFR 63.10686(b)(1)	Refer to the PM BACT Limits Below	Assumed when complying with BACT.
PM	C0101 Stack	0.0018 gr/dscf; 25.49 lb/hr; 111.64 tons/yr	401 KAR 51:017	0.0018 gr/dscf	Operating Limits, Testing (C0101 & EP 01-05), Monitoring, Recordkeeping, Reporting, & GCOP/GWP Plan
	EP 01-03 (under vacuum)	0.008 gr/dscf; 0.89 lb/hr; 3.89 ton/yr		0.008 gr/dscf	
	EP 01-05	9.38 lb/hr; 41.09 tons/yr		0.00744 gr/dscf; Nucor Darlington Test	
	EP 01-06	43 lb/MMscf; 0.35 ton/yr		AWS	
	EP 01-07	0.005 gr/dscf; 0.077 lb/hr; 0.34 ton/yr		0.005 gr/dscf	
	EP 01-11	3.35 lb/hr; 14.7 ton/yr		0.00744 gr/dscf; Nucor Darlington Test	
	EP 01-12	45.8 lb/MMscf; 0.38 ton/yr		AWS	
PM_{10}	C0101 Stack	0.0052 gr/dscf; 73.64 lb/hr; 322.53 ton/yr	401 KAR 51:017	0.0052 gr/dscf	Operating Limits, Testing (C0101 & EP 01-05), Monitoring, Recordkeeping, Reporting, &
	EP 01-03 (under vacuum)	0.008 gr/dscf; 0.89 lb/hr; 3.89 ton/yr		0.008 gr/dscf	

Group 1 – EU 01, EU 02, & EP 08-04					
	EP 01-05	1.50 lb/hr; 6.57 tons/yr		0.00119 gr/dscf; Reisman & Frisbie Sizing	GCOP/GWP Plan
	EP 01-06	49 lb/MMscf; 0.40 ton/yr		AWS	
	EP 01-07	0.005 gr/dscf; 0.077 lb/hr; 0.34 ton/yr		0.005 gr/dscf	
	EP 01-11	0.54 lb/hr; 2.35 ton/yr		0.00119 gr/dscf; Reisman & Frisbie Sizing	
	EP 01-12	51.5 lb/MMscf; 0.43 ton/yr		AWS	
$PM_{2.5}$	C0101 Stack	0.0034 gr/dscf; 48.15 lb/hr; 210.88 ton/yr	401 KAR 51:017	0.0034 gr/dscf	Operating Limits, Testing (C0101 & EP 01-05), Monitoring, Recordkeeping, Reporting, & GCOP/GWP Plan
	EP 01-03 (under vacuum)	0.008 gr/dscf; 0.89 lb/hr; 3.89 ton/yr		0.008 gr/dscf	
	EP 01-05	0.19 lb/hr; 0.82 ton/yr		0.00015 gr/dscf; Reisman & Frisbie Sizing	
	EP 01-06	49 lb/MMscf; 0.40 ton/yr		AWS	
	EP 01-07	0.005 gr/dscf; 0.077 lb/hr; 0.34 ton/yr		0.005 gr/dscf	
	EP 01-11	0.07 lb/hr; 0.29 ton/yr		0.00015 gr/dscf; Reisman & Frisbie Sizing	
	EP 01-12	51.5 lb/MMscf; 0.43 ton/yr		AWS	
CO	C0101 Stack	1.98 lb/ton; 495 lb/hr; 1,733 ton/yr	401 KAR 51:017	Design Spec.	Operating Limits, CEMs (C0101), Monitoring, Recordkeeping, Reporting, & GCOP/GWP Plan
	EP 01-03 (under vacuum)	0.075 lb/ton; 65.63 tons/yr		Design Spec.	
	EP 01-06	84 lb/MMscf; 0.68 ton/yr		AP-42, Table 1.4-1	
	EP 01-12	84 lb/MMscf; 0.70 ton/yr			

Group 1 – EU 01, EU 02, & EP 08-04					
NO_x	C0101 Stack	0.42 lb/ton; 104 lb/hr; 363.8 ton/yr	401 KAR 51:017	Design Spec.	Operating Limits, CEMs (C0101), Monitoring, Recordkeeping, Reporting, & GCOP/GWP
	EP 01-03	0.005 lb/ton; 4.38 tons/yr		Design Spec.	
	EP 01-06	100 lb/MMscf; 0.81 ton/yr		AP-42, Table 1.4-1	
	EP 01-12	100 lb/MMscf; 0.84 ton/yr			
SO_2	C0101 Stack	0.35 lb/ton; 86.63 lb/hr; 303.2 ton/yr	401 KAR 51:017	Design Spec.	Operating Limits, CEMs (C0101), Monitoring, Recordkeeping, Reporting, & GCOP/GWP
	EP 01-03 (under vacuum)	0.005 lb/ton; 4.38 tons/yr		Design Spec.	
	EP 01-06	0.6 lb/MMscf; 0.005 ton/yr		AP-42, Table 1.4-2	
	EP 01-12	0.6 lb/MMscf; 0.005 ton/yr			
GHG	C0101 Stack	463,444 ton/yr	401 KAR 51:017	IISI	Operating Limits, Testing (C0101 & EP 01-05), Monitoring, Recordkeeping, Reporting, & GCOP/GWP Plan
	EP 01-03 (under vacuum)	2,511 ton/yr		Nucor Crawfordsville Test	
	EP 01-06	975 tons/yr		AP-42, Table 1.4-2	
	EP 01-12	1,011 tons/yr			
VOC	C0101 Stack	0.09 lb/ton; 77.96 tons/yr	401 KAR 51:017	Design Spec.	Operating Limits, Testing (C0101 & EP 01-05), Monitoring, Recordkeeping, Reporting, & GCOP/GWP Plan
	EP 01-03 (under vacuum)	0.005 lb/ton; 4.38 tons/yr		Design Spec.	
	EP 01-05	4.4 lb/hr; 19.27 tons/yr		BACT from Nucor Arkansas	
	EP 01-06	5.5 lb/MMscf; 0.044 tons/yr		AP-42, Table 1.4-2	
	EP 01-12	5.5 lb/MMscf; 0.046 tons/yr			

Initial Construction/Modification Dates: EP 01-01 thru EP 01-10 (2020); EP 01-11 & EP 01-12 (2022); EP 02-01 thru EP 02-06 (2020); EP 08-04 (2020)

Process Description:

Emission Unit 01 (EU 01) – Melt Shop:

Controls: Negative Pressure Pulse-Jet Baghouse (C0101). The Melt Shop is equipped with

Group 1 – EU 01, EU 02, & EP 08-04

canopy hoods to capture and vent emissions that are not captured by the direct shell evacuation system (DEC or DSE). The melt shop has an overall capture efficiency of 99% of emissions generated within the melt shop.

EP 01-01 – Single Shell AC Electric Arc Furnace (EAF)
Once the EAF is charged, the roof is placed over the furnace and the electrodes are lowered to the feed mixture. The AC EAF melts down scrap through the use of graphite electrodes. When power is fed into the furnace, the electricity jumps between the two energized electrodes and into the neutral, grounded electrode. The high-voltage electric arcs created by these graphite electrodes generate large amounts of direct and radiant heat that melt the contents of the furnace. The EAF initially uses lower voltages to melt shred metal and protect the roof and walls from excessive heat. Later in the process, higher voltage is used to lengthen the electric arcs and melt the heavier scrap and scrap substitutes.

In the EAF, oxygen, natural gas, and carbon are injected into the scrap, which further accelerates scrap melting. When needed, carbon may be added to the initial charge prior to melting. At specific temperatures, the heated raw materials chemically react. These reactions are very complex and primarily involve the combustion of carbon, which releases heat to further accelerate the melting process. However, not all carbon is combusted fully to carbon dioxide (CO_2); a portion remains in the steel and a portion is removed through the furnace direct evacuation control (DEC) system in the form of carbon monoxide (CO). Elevated temperatures and proper design of the DEC system promote optimal downstream combustion of CO to CO_2. In other reactions, impurities in the steel react with the lime to form slag, which separates from the liquid steel and forms a foam-like layer on top of the liquid steel. The slag layer is decanted from the molten steel, removing the phosphorus and silica contained therein. When all conditions and steel specifications are achieved, the batch of molten steel or "heat" is tapped into a preheated ladle by opening the EAF tap hole and tilting the EAF. Steel is tapped from the EAF sump near the bottom and to one side of the furnace hearth. The hot metal is tapped into the ladle, which is transported by ladle car to the LMF. A small quantity of liquid steel may be left in the furnace bottom known as a "heel". The remaining slag in the furnace is drained out the slag door, located on the front of the furnace, into a slag pot that is transported to a separate slag processor via Kress carrier.

The EAF is equipped with a DEC system that captures and vents emissions generated during the melting and refining processes to a negative pressure baghouse (C0101). Emissions that escape the DEC system or are generated during charging and tapping are captured by canopy hoods strategically located on the ceiling of the melt shop. The canopy hoods vent emissions to the Melt Shop Baghouse (C0101) for control of particle-phase pollutants. Small quantities of emissions escape the melt shop (1%), primarily through the scrap charge bay door, as melt shop fugitives.

Seven (7) oxy-fuel fired burners are mounted at strategic locations around the EAF shell to supply additional energy to the heat. The burners each have a maximum design heat input capacity of 17.1 MMBtu/hr for a total capacity of 119.7 MMBtu/hr

Maximum Capacity: 272 ton steel/hr; 1,750,000 ton/yr
Burner Maximum Capacity: 119.7 MMBtu/hr
Control Device: Baghouse (C0101)

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EP 01-02 - Ladle Metallurgical Furnace (LMF)

From the EAF, the ladles of molten steel are transferred to the LMF where final steel refining takes place. At the LMF, the molten bath is first sampled to determine the existing chemistry. The chemistry is then adjusted by additions of various materials such as carbon, lime, and alloys. After reaching the appropriate chemistry, the bath temperature is elevated above the melting point of steel to prevent the steel from solidifying prior to reaching the vacuum degasser or caster. The LMF is a twin-shell design that provides the ability to add flux and alloys to one ladle while another ladle is under heat using the shared set of electrodes. With this design, the shared set of electrodes can only heat one ladle at a time.

The LMF is equipped with a direct capture system (e.g., side draft hoods) that captures and vents emissions to the Melt Shop Baghouse (C0101). Emissions that escape the LMF capture system are captured by canopy hoods and ducted to the Melt Shop Baghouse (C0101) for control of particle-phase pollutants. Oxygen will be removed from the steel in the LMF through addition of aluminum and silicon. This deoxidation process removes dissolved oxygen in the melt, and minimizes the potential for natural decarburization during the vacuum degassing processes.
Maximum Capacity: 272 ton steel/hr; 250 lb fluorspar/heat; 1,750,000 ton/yr
Control Device: Baghouse (C0101)

EP 01-03 – Vacuum Degasser

Molten steel will be transferred via ladle from the LMF to a vacuum degasser or directly to the continuous caster. The primary purpose of the vacuum degasser is to reduce/eliminate dissolved gases, especially hydrogen and nitrogen. During this process, sulfur is retained in the slag, resulting in minimal SO_2 emissions. Process gases are evacuated by a dry mechanical vacuum pumping system, which maintains the degasser at the required operating pressures. The process gases are filtered prior to being evacuated by the vacuum pump and exhausted to the atmosphere through a stack.

During the degassing process, material additions are made for deoxidation, desulfurizing, and alloying. These materials will be supplied to the vacuum degasser by the Alloy Handling System. Similar to the LMF, the vacuum degasser will consist of a twin-tank design that will allow material addition to one ladle while a second ladle is under vacuum. With this design, the two vacuum tank degassers will share the vacuum pump system, which will only permit one ladle to be under vacuum at a time.

During alloy addition, the vacuum tank degasser is exhausted to the Melt Shop Baghouse (C0101) for PM control. When the vacuum tank degasser is under negative pressure, the exhaust stream is routed to a filtration system to remove particulate matter from the degasser exhaust stream prior to the mechanical vacuum pump. The filtration system is integral to the vacuum degassing process, as it is required to maintain protection of the dry mechanical vacuum pumps against abrasive particles. The filter system is located between the vacuum tank and the vacuum pump. The steel does not undergo decarburization during the degassing process, as oxygen is not added to the vacuum degasser.
Maximum Capacity: 272 ton steel/hr; 1,750,000 ton/yr
Control Device: Baghouse (C0101) (during alloy addition); Filter System (under vacuum)

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EP 01-04 – Caster
In the casting unit, liquid steel is poured from the ladle into a tundish, which meters the molten steel into a vertical, water-cooled, copper mold that is the desired width and thickness of the resulting slab. The tundish is a refractory-lined, elongated trough that has a drain sized for the slab caster. From the mold, the steel then moves down through the water-spray cooling chamber via rollers and begins solidifying on the outside.

In order to maintain a continuous casting process, ladles of molten steel are staged to provide enough buffer for the desired period of continuous casting. This staging process results in a greater short-term maximum capacity of the continuous caster (370 ton/hr) than the EAF, LMF, and vacuum degasser (250 ton/hr). However, the increased capacity cannot be maintained for extended periods, and the continuous caster must be idled until sufficient molten steel buffer capacity is achieved again.

Emissions generated during the casting process are captured by canopy hoods and vented to the Melt Shop Baghouse (C0101)
Maximum Capacity: 420 ton steel/hr; 1,750,000 ton/yr
Control Device: Baghouse (C0101)

EP 01-05 – Caster Spray Vent
Steam formed from the contact of cooling water with the hot steel is captured and vented through caster spray vents that discharge above the roof of the Melt Shop.
Maximum Capacity: 420 ton steel/hr; 1,750,000 ton/yr
Control Device: None

EP 01-06 – Primary Caster Torch Cutoff
The continuous steel slab exits at the bottom of cooling the chamber and is cut to specified lengths using an oxy-fuel torch to form discrete slabs. The slabs may then be further cooled in the quench box before being transferred to the slab storage yard or continuing on the processing line to the reheat furnace.

Emissions generated from the oxy-fuel torch cutting of the cast slabs is emitted within the building at the end of the caster and discharged to atmosphere through the Rolling Mill building monovent.
Maximum Capacity: 420 ton steel/hr; 1,750,000 ton/yr
Burner Maximum Capacity: 1.88 MMBtu/hr
Control Device: None

EP 01-07 - Melt Shop Baghouse Dust Silo & Dust Handling System
Dust collected in the Melt Shop Baghouse (C0101) is conveyed via an enclosed conveyor system to a silo for temporary storage. The silo is constructed over a railcar loading station, where the baghouse dust is pneumatically loaded from the silo to the rail car. A passive bin vent located on top of the silo is used to balance the air within the silo during loading from the baghouse and unloading to the railcar.
Maximum Capacity: 6.8 ton dust/hr; 43,750 ton/yr
Control Device: Bin Vent Filter (C0107)

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EP 01-08 – Tundish Relining Station (01-08B)
Tundish repair and relining activities occur in the melt shop and are conducted as needed. These operations include repair of the tundish refractory by rebricking with new refractory. Tundish repair results in both particulate emissions and VOC emissions from the refractory resin. New tundish refractory is added in the melt shop where potential particulate emissions are captured by the local canopy hoods for control at the Melt Shop Baghouse (C0101).
Maximum Capacity: 1.35 ton refractory/hr; 1,800 ton/yr
Control Device: Baghouse (C0101)

EP 01-09 – Ladle Preparation (dump and relining station)
Ladle preparation activities, including ladle dump and ladle repair, occur in the melt shop where potential particulate emissions generated during refractory preparation and repair are captured by the local canopy hoods for control at the Melt Shop Baghouse (C0101).
Maximum Capacity: 36 tons refractory/hr for dump station and 6 tons/hr for relining station; 6,000 tons/yr
Control Device: Baghouse (C0101)

EP 01-10 – Furnace Refractory Cleanout
Furnace refractory cleanout, using pneumatic and manual tools, occurs in the melt shop where potential particulate emissions released within the melt shop are captured by the local canopy hoods for control at the Melt Shop Baghouse (C0101).
Maximum Capacity: 3.13 tons refractory/hr; 813 tons/yr
Control Device: Baghouse (C0101)

EP 01-11 – Caster Quench Box
Steam formed during slab cooling via water spray in the Caster Quench Box is captured and vented through caster quench box vent that discharge above the roof of the Melt Shop.
Maximum Capacity: 420 ton steel/hr; 1,750,000 ton/yr
Control Device: None

EP 01-12 – Secondary Caster Torch Cutoff
Secondary caster torch cutting machine used to cut cold slabs per customer specifications that are wider than the standard casted slab can produce. Secondary caster torch cutting machine includes two trolleys, one in operation and the other as backup. Each trolley is equipped with a double torch, one for main oxy-cutting process and the other for sample cutting. Worst-case emissions based on a maximum of 4 cuts per slab and 10 minutes to move cut slabs and reposition new slab, where one torch is completing the main cutting process and the other torches are on stand-by with pilot flame. Emissions generated from the oxy-fuel torch cutting of the cast slabs is emitted within the building at the end of the caster and discharged to atmosphere through the Rolling Mill building monovent.
Maximum Capacity: 420 ton steel/hr; 1,750,000 ton/yr
Burner Maximum Capacity: 1.95 MMBtu/hr
Control Device: None

Emission Unit 02 (EU 02) – Melt Shop Natural Gas Combustion Sources:
EP 02-01 – Five (5) Ladle Preheaters & Two (2) LMF Ladle Preheaters

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Seven (7) ladle preheaters are employed to preheat the Melt Shop ladles, including three (3) horizontal ladle preheaters, two (2) vertical ladle preheaters, and two (2) LMF vertical preheaters. Each preheater will be equipped with low-NOx burners. The two lid-mounted vertical ladle preheaters are equipped with a duct that is connected directly to the Melt Shop baghouse. The three horizontal ladle preheaters and two LMF ladle preheaters are discharge the natural gas combustion emissions into the melt shop where they are captured by the canopy hoods ducted to the Melt Shop Baghouse for PM control. Three (3) horizontal ladle preheaters – EP 02-01A, B, and C Two (2) vertical ladle preheaters – EP 02-01D and E Two (2) LMF vertical ladle preheaters – EP 02-01F and G **Burner Maximum Capacity:** five ladle preheaters at 15 MMBtu/hr, each; two LMF ladle preheaters at 10 MMBtu/hr, each **Control Device:** Baghouse (C0101) *EP 02-03 – Tundish Preheaters #1 & #2* Two (2) tundish preheaters, equipped with low-NOx burners. Emissions from natural gas combustion are discharged into the melt shop and captured by the canopy hoods that are ducted to the Melt Shop Baghouse (C0101) for PM control. **Burner Maximum Capacity:10.9** MMBtu/hr, each **Control Device:** Baghouse (C0101) *EP 02-04 – Tundish Dryer* One (1) tundish dryer, equipped with low-NOx burners. Emissions from natural gas combustion are discharged into the melt shop and captured by the canopy hoods that are ducted to the Melt Shop Baghouse (C0101) for PM control. **Burner Maximum Capacity:** 10.9 MMBtu/hr **Control Device:** Baghouse (C0101) *EP 02-05 –Mandrel Preheater #1 & #2* Two (2) tundish mandrel preheater all equipped with low-NOx burners. Emissions from natural gas combustion are discharged into the melt shop and captured by canopy hoods that are ducted to the Melt Shop Baghouse (C0101) for PM control. **Burner Maximum Capacity:** 5 MMBtu/hr, each **Control Device:** Baghouse (C0101) *EP 02-06 –Tundish SEN Preheaters #1 & #2* Two (2) tundish submerged entry nozzle (SEN) preheaters, all equipped with low-NOx burners. Emissions from natural gas combustion are discharged into the melt shop and captured by canopy hoods that are ducted to the Melt Shop Baghouse (C0101) for PM control. **Burner Maximum Capacity:** 1.42 MMBtu/hr, each **Control Device:** Baghouse (C0101) ***Emission Unit 08 (EU 08) – Scrap Handling System:*** *EP 08-04 – Scrap Charging* Emissions resulting from charging scrap to the EAF. Emissions are discharged into the melt shop and captured by canopy hoods that are ducted to the Melt Shop Baghouse (C0101) for PM control. **Maximum Capacity:** 299 ton scrap/hr; 1,925,000 ton/yr

Group 1 – EU 01, EU 02, & EP 08-04
Control Device: Baghouse (C0101) **Applicable Regulations:** **401 KAR 51:017,** *Prevention of significant deterioration of air quality,* applies to PM, PM_{10}, $PM_{2.5}$, CO, NO_x, SO_2, GHG, and VOC. **401 KAR 59:010,** *New process operations,* applies to each affected facility or source, associated with a process operation, which is not subject to another emission standard with respect to particulates in 401 KAR 59, commenced on or after July 2, 1975. **401 KAR 60:005, Section 2(1)**, **40 C.F.R. 60.1 to 60.19, Table 1 (Subpart A),** *General Provisions,* specifically, the requirement to develop and implement a written startup, shutdown, and malfunction (SSM) plan that describes, in detail, procedures for operating and maintaining the source during periods of startup, shutdown, and malfunction; and a program of corrective action for malfunctioning process, air pollution control, and monitoring equipment used to comply with the relevant standard. The startup, shutdown, and malfunction plan does not need to address any scenario that would not cause the source to exceed an applicable emission limitation in the relevant standard. The SSM plan shall meet the requirements in 40 CFR 63.6(e)(3). This plan must be developed by the owner or operator before startup of the EAF. **401 KAR 60:005, Section 2(2)(jj)**, **40 C.F.R. 60.270a to 60.276a (Subpart AAa),** *Standards of Performance for Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 17, 1983*, applies to the following affected facilities in steel plants that produce carbon, alloy, or specialty steels: electric arc furnaces, argon-oxygen decarburization vessels, and dust-handling systems that commences construction, modification, or reconstruction after August 17, 1983. **401 KAR 63:002, Section 2(4)(aaaaa), 40 C.F.R. 63.10680 to 63.10692, Table 1 (Subpart YYYYY),** *National Emission Standards for Hazardous Air Pollutants for Area Sources: Electric Arc Furnace Steelmaking Facilities*, applies to each electric arc furnace (EAF) steelmaking facility that is an area source of hazardous air pollutant (HAP) emissions. **401 KAR 63:010,** *Fugitive emissions*, applies to each apparatus, operation, or road which emits or may emit fugitive emissions provided that the fugitive emissions from such facility are not elsewhere subject to an opacity standard within the administrative regulations of the Division for Air Quality. **40 CFR 64,** *Compliance Assurance Monitoring,* applies to the capture system and PM control device required by 40 CFR 63, Subpart YYYYY. The exemption in 40 CFR 64.2(b)(1)(i) for emissions limitations or standards proposed after November 15, 1990 under section 111 or 112 of the CAA does not apply. **Comments:** Emissions are calculated using factors from AP-42, Section 1.4, MSDS information, RBLC data, design specifications for control devices, test data from Nucor Gallatin, Crawfordsville, Darlington, Berkley data from Steel Production: Consensus of Experts and IISI Environmental Performance Indicators, International Iron and Steel Institute (IISI), 2004, a paper by Reisman and Frisbie. (*"Calculating Realistic PM_{10} Emissions From Cooling Towers."* Reisman-Frisbie. Environmental Progress 21 (July 2002)), and a paper entitled: Fumes & Gases in the Welding Environment, the American Welding Society (AWS), 01/90.

Group 2 – EU 03, EP 04-01, EP 04-03, EP 04-04, EP 04-05, EU 05, EP 12-04, EP 15-01, EP 17-01 A&B, EP 17-02, EP 18-01, EP 18-02					
Pollutant	**Emission Limit or Standard**		**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
Opacity	20%		401 KAR 59:010, Section 3(1)(a)	N/A	Qualitative Monitoring, Recordkeeping
PM	• P<0.5; E = 2.34 • P ≤ 30; E=3.59 $* P^{0.62}$ • P>30; $E = 17.3 * P^{0.16}$		401 KAR 59:010, Section 3(2)	Refer to the PM BACT Limits Below	Assumed when complying with BACT.
PM	EP 03-01	1.9 lb/MMscf; 3.02 ton/yr	401 KAR 51:017	AP-42, Table 12.5.1-3	Operating Limits, Testing (EP 03-04), Monitoring, Recordkeeping, Reporting, & GCOP/GWP Plan
	EP 03-02	1.9 lb/MMscf 1.00 ton/yr		AP-42, Table 1.4-2	
	EP 03-03	0.81 lb/hr; 3.54 ton/yr		0.000198 gr/dscf; Tests at Nucor Facilities	
	EP 03-04	0.005 gr/dscf; 3.72 lb/hr; 16.28 ton/yr		0.005 gr/dscf	
	EP 03-05	1.9 lb/MMscf 0.18 ton/yr		AP-42, Table 1.4-2	
	EP 03-06	0.0029 lb/in cut; 0.022 ton/yr		SIPER	
	EP 03-07	0.016 lb/hr; 0.008 ton/yr		0.00022 lb/ton SDS for Ink	
	EP 03-08	0.075 lb/hr; 0.33 ton/yr		SIPER	
	EP 03-09	0.075 lb/hr; 0.33 ton/yr		SIPER	
	EP 03-10	0.005 gr/dscf; 2.07 lb/hr; 9.07 ton/yr		Grain Loading	
	EP 03-11	163 lb/MMscf; 0.33 ton/yr		AWS	
	EP 04-01	0.003 gr/dscf; 0.41 lb/hr; 1.77 ton/yr		0.003 gr/dscf	
	EP 04-03	1.9 lb/MMscf; 0.39 ton/yr		AP-42, Table 1.4-2	
	EP 04-04	0.0053 lb/in cut; 0.35 ton/yr		SIPER	
	EP 04-05	0.01 lb/hr; 0.024 ton/yr		0.00027 lb/ton; SDS for ink	
	EP 04-06	0.002 lb/hr; 0.002 ton/yr		0.000042 lb/ton	

Group 2 – EU 03, EP 04-01, EP 04-03, EP 04-04, EP 04-05, EU 05, EP 12-04, EP 15-01, EP 17-01 A&B, EP 17-02, EP 18-01, EP 18-02					
				SDS for ink	
	EP 05-01	1.9 lb/MMscf; 1.50 ton/yr		AP-42, Table 1.4-2	
	EP 05-03	0.0067 lb/inches cut (plasma); 60 lb/MMscf (oxy-fuel); 0.22 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
	EP 05-04	0.00003 lb/hr; 0.00001 ton/yr		6.167E-8 lb/ton; SDS for ink	
	EP 12-04	1.95 lb/MMscf; 0.08 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
	EP 15-01	1.9 lb/MMscf; 0.33 ton/yr		AP-42, Table 1.4-2	
	EP 17-01 A&B	0.00532 lb/in cut (plasma); 104 lb/MMscf (oxy-fuel); 2.16 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
	EP 17-02	0.003 lb/hr; 0.0045 ton/yr		4.24E-5 lb/ton; SDS for Ink	
	EP 18-02	0.003 gr/dscf; 0.31 lb/hr; 1.35 ton/yr		0.003 gr/dscf	
PM_{10}	EP 03-01	7.6 lb/MMscf; 12.06 ton/yr	401 KAR 51:017	AP-42, Table 12.5.1-3	Operating Limits, Testing (EP 03-04), Monitoring, Recordkeeping, Reporting, & GCOP/GWP Plan
	EP 03-02	7.6 lb/MMscf 4.01 ton/yr		AP-42, Table 1.4-2	
	EP 03-03	0.92 lb/hr; 4.04 ton/yr		0.000226 gr/dscf; Tests at Nucor Facilities	
	EP 03-04	0.005 gr/dscf; 3.28 lb/hr; 14.36 ton/yr		0.005 gr/dscf	
	EP 03-05	7.6 lb/MMscf; 0.73 ton/yr		AP-42, Table 1.4-2	
	EP 03-06	0.0029 lb/in cut; 0.022 ton/yr		SIPER	
	EP 03-07	0.016 lb/hr; 0.008 ton/yr		0.00022 lb/ton SDS for Ink	
	EP 03-08	0.075 lb/hr; 0.33 ton/yr		SIPER	
	EP 03-09	0.075 lb/hr;			

Group 2 – EU 03, EP 04-01, EP 04-03, EP 04-04, EP 04-05, EU 05, EP 12-04, EP 15-01, EP 17-01 A&B, EP 17-02, EP 18-01, EP 18-02					
		0.33 ton/yr			
	EP 03-10	0.005 gr/dscf; 2.07 lb/hr; 9.07 ton/yr		Grain Loading	
	EP 03-11	169 lb/MMscf; 0.34 ton/yr		AWS	
	EP 04-01	0.003 gr/dscf; 0.85 lb/hr; 3.72 ton/yr		0.003 gr/dscf	
	EP 04-03	7.6 lb/MMscf; 1.42 ton/yr		AP-42, Table 1.4-2	
	EP 04-04	0.0053 lb/in cut; 0.35 ton/yr		SIPER	
	EP 04-05	0.0001 lb/hr; 0.00013 ton/yr		0.00027 lb/ton; SDS for ink	
	EP 05-01	7.6 lb/MMscf; 6.0 ton/yr		AP-42, Table 1.4-2	
	EP 05-03	0.0067 lb/in cut; 66 lb/MMscf (Oxy-fuel); 0.23 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
	EP 05-04	0.00003 lb/hr; 0.00001 ton/yr		6.167E-8 lb/ton; SDS for ink	
	EP 12-04	7.65 lb/MMscf; 0.33 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
	EP 15-01	7.6 lb/MMscf; 1.31 ton/yr		AP-42, Table 1.4-2	
	EP 17-01 A&B	0.00532 lb/in cut (plasma); 109 lb/MMscf (oxy-fuel); 2.17 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
	EP 17-02	0.003 lb/hr; 0.0045 ton/yr		4.24E-5 lb/ton; SDS for Ink	
	EP 18-02	0.003 gr/dscf; 0.31 lb/hr; 1.35 ton/yr		0.003 gr/dscf	
$PM_{2.5}$	EP 03-01	7.6 lb/MMscf; 12.06 ton/yr	401 KAR 51:017	AP-42, Table 12.5.1-3	Operating Limits, Testing (EP 03-04), Monitoring, Recordkeeping, Reporting, & GCOP/GWP
	EP 03-02	7.6 lb/MMscf 4.01 ton/yr		AP-42, Table 1.4-2	
	EP 03-03	0.36 lb/hr; 1.57 ton/yr		0.000088 gr/dscf; Tests at Nucor Facilities	

Group 2 – EU 03, EP 04-01, EP 04-03, EP 04-04, EP 04-05, EU 05, EP 12-04, EP 15-01, EP 17-01 A&B, EP 17-02, EP 18-01, EP 18-02					
	EP 03-04	0.0025 gr/dscf; 1.40 lb/hr; 6.13 ton/yr		0.0025 gr/dscf	Plan
	EP 03-05	7.6 lb/MMscf 0.73 ton/yr		AP-42, Table 1.4-2	
	EP 03-06	0.0029 lb/in cut; 0.022 ton/yr		SIPER	
	EP 03-07	0.016 lb/hr; 0.008 ton/yr		0.00022 lb/ton SDS for Ink	
	EP 03-08	0.075 lb/hr; 0.33 ton/yr		SIPER	
	EP 03-09	0.075 lb/hr; 0.33 ton/yr			
	EP 03-10	0.0025 gr/dscf; 1.04 lb/hr; 4.54 ton/yr		Grain Loading	
	EP 03-11	169 lb/MMscf; 0.34 ton/yr		AWS	
	EP 04-01	0.003 gr/dscf; 0.85 lb/hr; 3.72 ton/yr		0.003 gr/dscf	
	EP 04-03	7.6 lb/MMscf; 1.42 ton/yr		AP-42, Table 1.4-2	
	EP 04-04	0.0053 lb/in cut; 0.35 ton/yr		SIPER	
	EP 04-05	0.0001 lb/hr; 0.00013 ton/yr		0.00027 lb/ton; SDS for ink	
	EP 05-01	7.6 lb/MMscf; 6.0 ton/yr		AP-42, Table 1.4-2	
	EP 05-03	0.0067 lb/in cut; 66 lb/MMscf (Oxy-fuel); 0.23 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
	EP 05-04	0.00003 lb/hr; 0.00001 ton/yr		6.167E-8 lb/ton; SDS for ink	
	EP 12-04	7.65 lb/MMscf; 0.33 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
	EP 15-01	7.6 lbs/MMscf; 1.31 ton/yr		AP-42, Table 1.4-2	
	EP 17-01 A&B	0.00532 lb/in cut (plasma); 109 lb/MMscf (oxy-fuel); 2.17 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	

Group 2 – EU 03, EP 04-01, EP 04-03, EP 04-04, EP 04-05, EU 05, EP 12-04, EP 15-01, EP 17-01 A&B, EP 17-02, EP 18-01, EP 18-02					
	EP 17-02	0.003 lb/hr; 0.0045 ton/yr		4.24E-5 lb/ton; SDS for Ink	
	EP 18-02	0.003 gr/dscf; 0.31 lb/hr; 1.35 ton/yr		0.003 gr/dscf	
CO	EP 03-01	84 lb/MMscf; 130.6 ton/yr	401 KAR 51:017	AP-42, Table 1.4-1	Operating Limits, Testing (EPs 03-01, 03-02, & 05-01), Monitoring, Recordkeeping, Reporting, & GCOP/GWP Plan
	EP 03-02	84 lb/MMscf; 44.40 ton/yr		AP-42, Table 1.4-1	
	EP 03-05	84 lb/MMscf; 8.07 ton/yr		AP-42, Table 1.4-1	
	EP 03-08	84 lb/MMscf; 0.004 ton/yr		SIPER	
	EP 03-09	84 lb/MMscf; 0.004 ton/yr			
	EP 03-11	84 lb/MMscf; 0.17 ton/yr		AP-42, Table 1.4-1	
	EP 04-03	154 lb/MMscf; 28.8 ton/yr		AP-42, Table 1.4-1	
	EP 05-01	84 lb/MMscf; 66.36 ton/yr		AP-42, Table 1.4-1	
	EP 05-03	84 lb/MMscf (oxy-fuel); 0.077 ton/yr		AP-42, Table 1.4-1	
	EP 12-04	84 lb/MMscf (oxy-fuel); 3.64 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
	EP 15-01	84 lb/MMscf; 14.43 ton/yr		AP-42, Table 1.4-1	
	EP 17-01 A&B	84 lb/MMscf (oxy-fuel); 0.03 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
NO_x	EP 03-01	71.4 lb/MMscf; 111.05 ton/yr	401 KAR 51:017	AP-42, Table 1.4-1	Operating Limits, Testing (EPs 03-01, 03-02, & 05-01), Monitoring, Recordkeeping, Reporting, & GCOP/GWP Plan
	EP 03-02	122.14 lb/MMscf; 64.51 ton/yr		Vendor Guarantee	
	EP 03-05	81.6 lb/MMscf; 7.84 ton/yr		Low-NOx Burner Design	
	EP 03-06	0.57 lb/hr; 2.51 ton/yr		SIPER	
	EP 03-08	100 lb/MMscf; 0.004 ton/yr		SIPER	
	EP 03-09	100 lb/MMscf; 0.004 ton/yr			

Group 2 – EU 03, EP 04-01, EP 04-03, EP 04-04, EP 04-05, EU 05, EP 12-04, EP 15-01, EP 17-01 A&B, EP 17-02, EP 18-01, EP 18-02					
	EP 03-11	100 lb/MMscf; 0.20 ton/yr		AP-42, Table 1.4-1	
	EP 04-03	70 lb/MMscf; 14.43 ton/yr		AP-42, Table 1.4-1	
	EP 04-04	0.93 lb/hr; 4.09 ton/yr		SIPER	
	EP 05-01	81.6 lb/MMscf; 64.48 ton/yr		Low-NOx Burner Design	
	EP 05-03	1.4 lb/hr (plasma); 100 lb/MMscf (oxy-fuel); 6.22 ton/yr		SIPER; AP-42, Table 1.4-1	
	EP 12-04	100 lb/MMscf (oxy-fuel); 4.34 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
	EP 15-01	70 lb/MMscf; 12.02 ton/yr		AP-42, Table 1.4-1	
	EP 17-01 A&B	1.4 lb/hr (plasma); 100 lb/MMscf (oxy-fuel); 18.42 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
SO_2	EP 03-01	0.6 lb/MMscf; 0.93 ton/yr	401 KAR 51:017	AP-42, Table 1.4-2	Operating Limits, Monitoring, Recordkeeping, Reporting, & GCOP/GWP Plan
	EP 03-02	0.6 lb/MMscf; 0.32 ton/yr		AP-42, Table 1.4-2	
	EP 03-05	0.6 lb/MMscf; 0.06 ton/yr		AP-42, Table 1.4-2	
	EP 03-08	0.6 lb/MMscf; 0.00003 ton/yr		SIPER	
	EP 03-09	0.6 lb/MMscf; 0.00003 ton/yr			
	EP 03-11	0.6 lb/MMscf; 0.001 ton/yr		AP-42, Table 1.4-2	
	EP 04-03	0.6 lb/MMscf; 0.11 ton/yr		AP-42, Table 1.4-2	
	EP 05-01	0.6 lb/MMscf; 0.48 ton/yr		AP-42, Table 1.4-2	
	EP 05-03	0.6 lb/MMscf (oxy-fuel); 0.0005 ton/yr		AP-42, Table 1.4-2	
	EP 12-04	0.6 lb/MMscf (oxy-fuel); 0.026 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
	EP 15-01	0.6 lb/MMscf;		AP-42, Table	

Group 2 – EU 03, EP 04-01, EP 04-03, EP 04-04, EP 04-05, EU 05, EP 12-04, EP 15-01, EP 17-01 A&B, EP 17-02, EP 18-01, EP 18-02					
		0.10 ton/yr		1.4-2	
	EP 17-01 A&B	0.6 lb/MMscf (oxy-fuel); 0.00021 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
GHG	EP 03-01	187,744 ton/yr	401 KAR 51:017	AP-42, Table 1.4-2; 40 CFR 98, Table A-1	Operating Limits, Monitoring, Recordkeeping, Reporting, & GCOP/GWP Plan
	EP 03-02	63,758 ton/yr		AP-42, Table 1.4-2; 40 CFR 98, Table A-1	
	EP 03-03	150 ton/yr		Oil & Grease; 40 CFR 98, Table A-1	
	EP 03-04	227 ton/yr		Oil & Grease; 40 CFR 98, Table A-1	
	EP 03-05	11,611 ton/yr		AP-42, Table 1.4-2; 40 CFR 98, Table A-1	
	EP 03-08	5.3 ton/yr		AP-42, Table 1.4-2	
	EP 03-09	5.3 ton/yr			
	EP 03-11	246 ton/yr		40 CFR 98, Table A-1	
	EP 04-03	22,538 ton/yr		AP-42, Table 1.4-2; 40 CFR 98, Table A-1	
	EP 05-01	95,378 ton/yr		AP-42, Table 1.4-2; 40 CFR 98, Table A-1	
	EP 05-03	1,480 ton/yr		AP-42, Table 1.4-2; 40 CFR 98, Table A-1	
	EP 12-04	5,234 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
	EP 15-01	20,734 ton/yr		AP-42, Table 1.4-2; 40 CFR 98, Table A-1	
	EP 17-01 A&B	42 ton/yr		SIPER; AWS; AP-42, Table 1.4-2	
VOC	EP 03-01	5.5 lb/MMscf; 8.64 ton/yr	401 KAR 51:017	AP-42, Table 1.4-2	Operating Limits, Testing (EPs 03-04), Monitoring,
	EP 03-02	5.5 lb/MMscf; 2.90 ton/yr		AP-42, Table 1.4-2	

Group 2 – EU 03, EP 04-01, EP 04-03, EP 04-04, EP 04-05, EU 05, EP 12-04, EP 15-01, EP 17-01 A&B, EP 17-02, EP 18-01, EP 18-02					
	EP 03-03	1.35 lb/hr; 3.94 ton/yr		0.0045 lb/ton; Mackus & Joshi	Recordkeeping, Reporting, & GCOP/GWP Plan
	EP 03-04	1.70 lb/hr; 5.83 ton/yr		0.0067 lb/ton; Mackus & Joshi	
	EP 03-05	5.5 lb/MMscf; 0.53 ton/yr		AP-42, Table 1.4-2	
	EP 03-07	0.19 lb/hr; 0.096 ton/yr		0.00077 lb/ton; SDS for ink	
	EP 03-08	5.5 lb/MMscf; 0.00024 ton/yr		AP-42, Table 1.4-2	
	EP 03-09	5.5 lb/MMscf; 0.00024 ton/yr		AP-42, Table 1.4-2	
	EP 03-11	5.5 lb/MMscf; 0.011 ton/yr		AP-42, Table 1.4-2	
	EP 04-03	5.5 lb/MMscf; 1.03 ton/yr		AP-42, Table 1.4-2	
	EP 04-05	0.03 lb/hr; 0.04 ton/yr		0.00096 lb/ton; SDS for ink	
	EP 04-06	0.43 lb/hr; 0.6 ton/yr		0.0035 lb/ton; SDS for ink	
	EP 05-01	5.5 lb/MMscf; 4.34 ton/yr		AP-42, Table 1.4-2	
	EP 05-03	5.5 lb/MMscf (oxy-fuel); 0.005 ton/yr		AP-42, Table 1.4-2	
	EP 05-04	0.014 lb/hr; 0.0073 ton/yr		3.24E-5 lb/ton; SDS for ink	
	EP 12-04	5.5 lb/MMscf; 0.238 ton/yr		AP-42, Table 1.4-2	
	EP 15-01	5.5 lb/MMscf; 0.94 ton/yr		AP-42, Table 1.4-2	
	EP 17-01 A&B	5.5 lb/MMscf (oxy-fuel); 0.002 ton/yr		AP-42, Table 1.4-2	
	EP 17-02	0.87 lb/hr; 1.23 ton/yr		0.0035 lb/ton; SDS for ink	

Initial Construction Date: 2020

Process Description:
Emission Unit 03 (EU 03) - Hot Rolling Mill:
EP 03-01 – Walking Beam Reheat Furnace
For cast slabs, the steel rolling process at the mill is initiated at the walking beam reheat furnace. Cast steel slabs exiting the quench box move through the natural gas-fired reheat furnace, which reheats and equalizes the temperature of the steel slabs to increase malleability. The furnace has a maximum design heat input rate of 460 MMBtu/hr, which accounts for the total thermal capacity of all burners installed in all heating zones of the furnace. This maximum heat input

Group 2 – EU 03, EP 04-01, EP 04-03, EP 04-04, EP 04-05, EU 05, EP 12-04, EP 15-01, EP 17-01 A&B, EP 17-02, EP 18-01, EP 18-02

capacity is more thermal capacity than is required (360 MMBtu/hr) to operate the furnace at the maximum design processing rate of 333 tons/hr of cold slabs.

The furnace design includes multiple heat distribution zones that are individually controlled with a combination of modulating and pulse-firing regulation. This combination of operating conditions optimizes the temperature uniformity of the heating zones while minimizing excess air and reducing the oxygen content inside the chamber. Preheating, heating, and bottom soaking zones will be equipped with direct-fired, low-NOx flameless burners that can work efficiently in both flame and flameless mode to maintain the required heating zone temperatures when feeding cold slabs. The top soaking zones will be equipped with direct-fired, low-NOx radiant burners. All burners operate by preheating combustion air supplied by a heat recuperative system that utilizes heat from the furnace exhaust gas to preheat the combustion air.
Maximum Capacity: 333 ton/hr; 1,750,000 ton/yr
Burner Maximum Capacity: 460 MMBtu/hr
Control Device: Low-NOx Burners (inherent)

EP 03-02 – Ingot Bogie Hearth Furnaces #1 - #3
Three (3) direct-fired natural gas bogie hearth furnaces are employed to reheat ingots produced off-site. The slabs and ingots are heated to a uniform rolling temperature of approximately 2,250 °F.
Burner Maximum Capacity: 41 MMBtu/hr, each
Control Device: Low-NOx Burners (inherent)

EP 03-03 – Roughing Mill Stand with Descaler
The slabs and ingots are descaled with high-pressure water to remove any scale from the surface prior to rolling. The slabs/ingots then move through a single-stand, four-high reversible roughing mill to reduce the slab/ingot thickness for processing as heavy plate or for further processing (i.e., transfer bar) through the Steckel mill to produce light plates or coils.
Maximum Capacity: 333 ton/hr; 1,750,000 ton/yr
Control Device: Wet Suppression

EP 03-04 – Steckel Mill Finishing Stand
After exiting the roughing mill, the transfer bar travels to the four-high, reversing Steckel mill. The Steckel Mill design also includes descalers located on both sides of the mill to remove any scale formed during heating process prior to rolling. When the steel has reached the desired thickness, it is transferred to the on-line, laminar flow cooling system where it is sprayed with water from the top and bottom to obtain the desired cooling temperature.
Maximum Capacity: 250 ton/hr; 1,750,000 ton/yr
Control Device: Wet Scrubber (C0304)

EP 03-05 –Steckel Mill Coiling Furnaces #1 & #2
On each side of the Steckel mill, mandrels housed in direct-fired heated chambers continually wind and unwind the ribbon of steel as it passes back and forth through the Steckel mill. The goal is to reduce radiant heat loss so the steel can be rolled longer and thinner. These furnaces burn natural gas.
Burner Maximum Capacity: 11.2 MMBtu/hr, each

Group 2 – EU 03, EP 04-01, EP 04-03, EP 04-04, EP 04-05, EU 05, EP 12-04, EP 15-01, EP 17-01 A&B, EP 17-02, EP 18-01, EP 18-02
Control Device: Low-NOx Burners (inherent) *EP 03-06 – Coil Sample Plasma Cutter* The steel sheet from the Steckel mill is either cut to length with plasma torches for processing as light plate or banded into coils via a downcoiler before transfer to the coil yard. **Maximum Capacity:** 250 ton/hr; 250,000 ton/yr **Control Device:** Baghouse (C0306) *EP 03-07 – Coil Tagger* The tagger is a robotic stenciling system used to apply ink-based identification markings on the rolled coils for inventory control. Emissions from the tagger are released within the Rolling Mill building, with a final egress point to atmosphere through the building roof monovent. **Maximum Capacity:** 250 ton steel/hr; 250,000 ton/yr **Control Device:** None *EP 03-08 – Rolling Mill Oxy-Fuel Plate Cutting Torch* Cutting torch is used for dividing a long mother plate 2 to 4 inches thick into two shorter plates. **Maximum Capacity:** 750 ton steel/hr; 100,000 ton/yr **Burner Maximum Capacity:** 10 scf/hr **Control Device:** None *EP 03-09 – Rolling Mill Oxy-Fuel Coil Cutting Torch* Cutting torch is used for cutting sheets to specified lengths prior to being coiled at the down-coiler. **Maximum Capacity:** 750 ton steel/hr; 100,000 ton/yr **Burner Maximum Capacity:** 10 scf/hr **Control Device:** None *EP 03-10 – Ingot Grinding* The ingot grinding operations include a traversing grinder and a stationary grinder contained within a partial enclosure. A travelling capture system collects potential emissions that are vented to the baghouse (Ingot Grinding Baghouse) for control of particle-phase pollutants to 0.005 gr/dscf. The uncaptured emissions are emitted within the building and discharged to the atmosphere through the Rolling Mill building monovent. **Maximum Capacity:** 225 ton steel/hr; 1,860,000 ton/yr **Control Device:** Baghouse (C0310) *EP 03-11 – Ingot Grinding Oxy-Fuel Cutting Torch* The ingot grinding oxy-fuel cutting torch is used for cutting ingots that are 5 to 36 inches thick. Emissions generated from the oxy-fuel torch cutting of ingots will be emitted within the building and discharged to atmosphere through the Rolling Mill building monovent. **Maximum Capacity:** 225 ton steel/hr; 1,860,000 ton/yr **Control Device:** None ***EU 04 - Continuous Heat Treat Line:*** *EP 04-01 – Shot Blaster*

Group 2 – EU 03, EP 04-01, EP 04-03, EP 04-04, EP 04-05, EU 05, EP 12-04, EP 15-01, EP 17-01 A&B, EP 17-02, EP 18-01, EP 18-02
Steel plates are first descaled in a shot blast unit to remove any metal oxide scale, which could affect the plate surface quality if not removed prior to quench and tempering. The shot blast unit is an integral, all welded unit, divided into four (4) compartments - an entrance vestibule, the blast compartment, a blow-off compartment to house the abrasive removal system, and an exit vestibule. Each vestibule is equipped with a series of slit rubber curtains to permit passage of the work and retain rebounding abrasive. Fresh air enters the cabinet through the work openings and is exhausted through a ventilating hood to the dust collector. The Shot Blaster is a self-contained unit with specially designed work openings to provide inward airflow generated by the baghouse fan. PM emissions generated during shot blasting are captured and vented to the baghouse for control prior to discharge to the atmosphere through a dedicated stack. **Maximum Capacity:** 50 ton/hr; 339,000ton/yr **Control Device:** Baghouse (C0401) *EP 04-03 – Tempering Furnace* The Tempering Furnace is heated with direct-fired, low NOx, natural gas cold air burners. The burners are grouped into specific heating zones and the temperature in each zone is automatically controlled. The burners fire directly into the furnace to maintain the furnace operating temperature at 1,200ºF, and the waste combustion gases are vented from the furnace into an exhaust duct, pulled into an exhaust fan, and discharged to atmosphere through a vertical stack. **Burner Maximum Capacity:** 43.48 MMBtu/hr **Control Device:** Low-NOx Burners (inherent) *EP 04-04 – Continuous Heat Treat Plasma Torch Cutting* The plasma torch cutting is equipped with down draft burn table to capture fume generated during the cutting process and is vented to a dust collector for PM control. The dust collector will discharge within the building with a final egress point to atmosphere through the building roof monovent. **Maximum Capacity:** 50 ton/hr; 339,000 ton/yr **Control Device:** Dust Collector (C0404) *EP 04-05 – Continuous Heat Treat Entry Tagger* Continuous Heat Treat Tagger is a small source of PM, VOC, and HAP (toluene) emissions. Emissions from the tagger are released within the building, with a final egress point to atmosphere through the building roof monovent. **Maximum Capacity:** 125 ton/hr; 339,000 ton/yr **Control Device:** None *EP 04-06 – Continuous Heat Treat Exit Tagger* Continuous Heat Treat Tagger is a small source of PM, VOC, and HAP (toluene) emissions. Emissions from the tagger are released within the building, with a final egress point to atmosphere through the building roof monovent. **Maximum Capacity:** 125 ton/hr; 339,000 ton/yr **Control Device:** None ***EU 05 - Heavy Plate Processing:*** Following the Roughing Mill and prior to the Steckel Mill, heavy plates (3 inches to 14 inches

Group 2 – EU 03, EP 04-01, EP 04-03, EP 04-04, EP 04-05, EU 05, EP 12-04, EP 15-01, EP 17-01 A&B, EP 17-02, EP 18-01, EP 18-02

thick) can be removed from the Hot Rolling Mill line and transferred to the Heavy Plate Processing area for heat treatment. Unlike light plates where the plate finish is important to the customers, the heavy plate processing operations do not require a shot blaster or other surface treatment process prior to heat treatment. As such, the heavy plates can be fed directly to the car bottom furnaces after being transferred to temporary storage from the Hot Rolling Mill.

EP 05-01 – Heavy Plate Car Bottom Furnaces #1-#4
Heavy Plate car bottom furnaces are used to perform various heat treatment processes, such as stress relieving, normalizing, tempering, austenitizing, and annealing, as required by customer specifications. This group are direct-fired car bottom furnaces, fueled by natural gas. For plates that are austenitized, they are removed from the furnace and immediately lowered into the batch quench tank for a defined duration to complete the quenching process. After cooling, the fully hardened plates are placed into another car bottom furnace to temper the plate to the desired hardness.
Burner Maximum Capacity: 46 MMBtu/hr, each
Control Device: Low-NOx Burners (inherent)

EP 05-03 – Heavy Plate Cutting Beds #1 - #3 (Plasma Torch & Oxy-Fuel Torches)
Three plate cutting beds (i.e., burning beds) are used to cut heavy plates to specific customer specifications, as well as for obtaining samples for quality assurance testing. Each Heavy Plate burning bed have two (2) gantries, and each gantry have two (2) oxy-fuel torches. One of the three burning beds also will include a plasma cutter (i.e., total of twelve oxy-fuel torches and one plasma torch). Each burning bed employs a downdraft table connected to a dust collector.
Maximum Capacity: For Plasma torch**:** 440 tons/hr; 180,000 tons/yr;
For Oxy-Fuel torches: 275 tons/hr; 268,750 tons/yr; 0.00021 MMscf/hr
Control Device: Baghouses (C0503A, B, C,)

EP 05-04 – Heavy Plate Tagger
A hand-held tagger can be used to stencil identification markings on the side of plates for inventory control. With maximum ink application rate per plate of 0.0148 oz and 18.33 plates per hour
Maximum Capacity: 400 tons/hr & 450,000 tons/yr
Control Device: None

Emission Unit 12 (EU 12) – Slag processing:
EP 12-04 – Slag Plant Oxy Fuel-Fired Torches
The scrap metal cutting table is used to cut revert scrap (off-specification plates/coils) with up to five (5) oxy-fuel torches to sizes that can be fed to the EAF for recycle. The oxy-fuel torches will each have a maximum natural gas consumption rate of 33 scfm. The cutting table is equipped with a fume collection system to capture PM generated during the cutting process, which will be vented to a dedicated dust collector for PM control.
Maximum Capacity: 12 ton/hr; 105,120 ton/yr
Burner Maximum Capacity: 86.7 MMscf/yr
Control Device: Baghouse (C1204)

Group 2 – EU 03, EP 04-01, EP 04-03, EP 04-04, EP 04-05, EU 05, EP 12-04, EP 15-01, EP 17-01 A&B, EP 17-02, EP 18-01, EP 18-02

Emission Unit 15 (EU 15) – Miscellaneous Equipment:
EP 15-01- Natural Gas Direct-Fired Space Heaters, Process Water Heaters, & Air Makeup Heaters
Numerous small (<1 MMBtu/hr, each) heaters located around the facility.
Maximum Capacity: 40 MMBtu/hr, combined
Control Device: Low-NOx Burners (inherent)

Emission Unit 17 (EU 17) – Light Plate Finishing Line:
EP 17-01 A&B – Two (2) Light Plate Cutting Beds #1 - #2 (Plasma Cutters & Oxy-Fuel Torches)
The two (2) Light Plate Burning Beds are each equipped with two gantries. Each gantry has two oxy-fuel torches and one plasma cutter. Each burning bed is equipped with a down draft burn table to capture fume generated during the cutting process. The down draft tables is vented through two baghouses (one for each gantry) for PM control, which is discharged to atmosphere through dedicated stacks.
Maximum Capacity: 500 ton/hr; 317,000 ton/yr
Burner Maximum Capacity: 80 scf/hr
Control Device: Baghouse (C1701A, B, C, D)

EP 17-02 – Light Plate Tagger
Light Plate Tagger is a small source of PM, VOC, and HAP (toluene) emissions. Emissions from the tagger are released within the building, with a final egress point to atmosphere through the building roof monovent.
Maximum Capacity: 250 ton/hr; 711,000 ton/yr
Control Device: None

Emission Unit 18 (EU 18) – Blast and Prime Line:
EP 18-01 – Paint System Preheater
Small natural gas-fired combustion source
Maximum Capacity: 660 Btu/hr, combined (two burners)
Control Device: None

EP 18-02 – Shot Blaster
Cleaning steel plates to remove scale prior to the painting operation is accomplished by a roller conveyor shot blaster. The plates continuously pass through a pre-chamber, blasting chamber, and cleaning chamber on a roller conveyor. A ventilating hood with baffles to retain good abrasive over the plates is directed to a baghouse dust collector.
Maximum Capacity: 400 ton/hr; 1,000,000 ton/yr
Control Device: None

Applicable Regulations:
401 KAR 51:017, *Prevention of significant deterioration of air quality*, applies to PM, PM_{10}, $PM_{2.5}$, CO, NO_x, SO_2, GHG, and VOC.
401 KAR 59:010, *New process operations*, applies to each affected facility or source, associated with a process operation, which is not subject to another emission standard with respect to particulates in 401 KAR 59, commenced on or after July 2, 1975.

Group 2 – EU 03, EP 04-01, EP 04-03, EP 04-04, EP 04-05, EU 05, EP 12-04, EP 15-01, EP 17-01 A&B, EP 17-02, EP 18-01, EP 18-02
State-Origin Requirements: **401 KAR 63:020,** *Potentially hazardous matter or toxic substances,* applies to each affected facility which emits or may emit potentially hazardous matter or toxic substances, provided such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division for Air Quality. **Comments:** Emissions are calculated using factors from AP-42, Section 12.5.1, Section 1.4, grain loading, MSDS information, test data from Nucor Berkeley, Hickman, Texas, Tuscaloosa, the EPA paper: Volatized Lubricant Emissions from Steel Rolling Operations by Mackus and Joshi, 1980, data from the Swedish Institute of Production Engineering Research (SIPER), and a paper entitled: Fumes & Gases in the Welding Environment, the American Welding Society (AWS), 01/90.

Group 3 – EU 06, EU 08, & EU 12					
Pollutant	**Emission Limit or Standard**		**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
Opacity	20%		401 KAR 59:010, Section 3(1)(a)	N/A	Qualitative Monitoring, Recordkeeping
PM	• P<0.5; E = 2.34 • P ≤ 30; $E=3.59 * P^{0.62}$ • P>30; $E = 17.3 * P^{0.16}$		401 KAR 59:010, Section 3(2)	Refer to the PM BACT Limits Below	Assumed when complying with BACT.
PM	EP 06-01	0.28 lb/hr; 0.13 ton/yr	401 KAR 51:017	AP-42, Section 13.2.4	Operating Limitations, Monitoring, Recordkeeping, Control Device Design
	EP 06-02A, B & C	0.005 gr/dscf; 0.12 lb/hr; 0.52 ton/yr		0.005 gr/dscf	
	EP 06-03	0.28 lb/hr; 0.033 ton/yr		AP-42, Section 13.2.4	
	EP 06-04	0.005 gr/dscf; 0.04 lb/hr; 0.17 ton/yr		0.005 gr/dscf	
	EP 06-05	0.28 lb/hr; 0.07 ton/yr		AP-42, Section 13.2.4	
	EP 08-01	0.0003 lb/ton; 0.14 ton/yr		0.0003 lb/ton; AP-42, Table 12.5-4	
	EP 08-02	0.0003 lb/ton; 0.09 ton/yr		0.0003 lb/ton; AP-42, Table 12.5-4	
	EP 08-03	0.0009 lb/ton; 0.86 ton/yr		0.0009 lb/ton; AP-42, Table 13.2.4-1	
	EP 12-01	2.06 lb/hr;		0.013 lb/ton;	

Group 3 – EU 06, EU 08, & EU 12					
		1.77 ton/yr		AP-42, Table 11.19.2-2	
	EP 12-03	0.01 lb/hr; 0.041 ton/yr		0.0007 lb/ton; AP-42, Table 11.19.2-2	
PM_{10}	EP 06-01	0.13 lb/hr; 0.06 ton/yr	401 KAR 51:017	AP-42, Section 13.2.4	Operating Limitations, Monitoring, Recordkeeping, Control Device Design
	EP 06-02A, B & C	0.005 gr/dscf; 0.12 lb/hr; 0.52 ton/yr		0.005 gr/dscf	
	EP 06-03	0.13 lb/hr; 0.015 ton/yr		AP-42, Section 13.2.4	
	EP 06-04	0.005 gr/dscf; 0.04 lb/hr; 0.17 ton/yr		0.005 gr/dscf	
	EP 06-05	0.13 lb/hr; 0.034 ton/yr		AP-42, Section 13.2.4	
	EP 08-01	0.00015 lb/ton; 0.07 ton/yr		0.00015 lb/ton; AP-42, Table 12.5-4	
	EP 08-02	0.00015 lb/ton; 0.04 ton/yr		0.00015 lb/ton; AP-42, Table 12.5-4	
	EP 08-03	0.0004 lb/ton; 0.40 ton/yr		0.00042 lb/ton; AP-42, Table 13.2.4-1	
	EP 12-01	0.76 lb/hr; 0.77 ton/yr		AP-42, Table 11.19.2-2	
	EP 12-03	0.003 lb/hr; 0.014 ton/yr		AP-42, Table 11.19.2-2	
$PM_{2.5}$	EP 06-01	0.02 lb/hr; 0.01 ton/yr	401 KAR 51:017	AP-42, Section 13.2.4	Operating Limitations, Monitoring, Recordkeeping, Control Device Design
	EP 06-02A, B & C	0.005 gr/dscf; 0.12 lb/hr; 0.52 ton/yr		0.005 gr/dscf	
	EP 06-03	0.02 lb/hr; 0.002 ton/yr		AP-42, Section 13.2.4	
	EP 06-04	0.005 gr/dscf; 0.04 lb/hr; 0.17 ton/yr		0.005 gr/dscf	
	EP 06-05	0.02 lb/hr; 0.005 ton/yr		AP-42, Section 13.2.4	
	EP 08-01	0.00004 lb/ton; 0.02 ton/yr		0.000043 lb/ton; AP-42, Table 12.5-4	

Group 3 – EU 06, EU 08, & EU 12					
	EP 08-02	0.00004 lb/ton; 0.01 ton/yr		0.000043 lb/ton; AP-42, Table 12.5-4	
	EP 08-03	0.0001 lb/ton; 0.06 ton/yr		0.000064 lb/ton; AP-42, Table 13.2.4-1	
	EP 12-01	0.001 lb/hr; 0.26 tpy		AP-42, Table 11.19.2-2	
	EP 12-03	0.001 lb/hr; 0.004 ton/yr		AP-42, Table 11.19.2-2	

Initial Construction Date: EP 06-01 thru 06-05 and EP 12-01 & 12-03 (2022). EP 08-01 thru 08-03 (2020)

Process Description:
Emission Unit 06 (EU 06) – Lime, Carbon, Alloy Handling Systems:
EP 06-01 – EAF Flux and Carbon Handling System (dump station & material transfer)
Lime (flux) and carbon charged to the LMF is unloaded from trucks or railcar in a dump station and transferred to storage bins prior to being fed to the LMF. The dump station includes an underground unloading hopper inside a building equipped with a canopy connected to baghouse for PM control. Material from the hopper is transported to storage bins using an elevating belt conveyor and horizontal belt conveyors. The conveyors are equipped with covers to protect the conveyed material from atmospheric conditions and reduce dust emissions. Covered transfer points are equipped with suction hoods connected to the system baghouse for PM capture and control.
Maximum Capacity: 120 ton/hr; 70,000 ton/yr
Control Device: Baghouse (C0601)

EP 06-02A ,B, & C – Lime Silos A , B, & C
The lime storage silos have the capability of being loaded pneumatically directly from a truck. The lime silos are equipped with 920-scfm bin vents to control PM emissions during silo loading.
Maximum Capacity: 120 ton/hr, each; 75,000 ton/yr, each
Control Device: Passive Bin Vent Filter (C0602A, B, & C)

EP 06-03 – LMF Flux and Carbon Handling System
Flux and carbon is charged to the EAF is unloaded from trucks or railcar in a dump station and transferred to storage bins prior to being fed to the EAF. The EAF flux & carbon dump station is located inside a building equipped with a canopy connected to a baghouse for PM control. Downstream of the underground unloading hopper, conveyors used to transport the EAF flux and carbon to storage bins is shared with the LFM Flux & Carbon Handling System.
Maximum Capacity: 120 ton/hr; 35,000 ton/yr
Control Device: Baghouse (C0601)

EP 06-04 – EAF Carbon Silo
The carbon storage silo has the capability of being loaded pneumatically directly from a truck. The carbon silo is equipped with a 920-scfm bin vent to control PM emissions during silo loading.
Maximum Capacity: 120 ton/hr; 30,625 ton/yr

Group 3 – EU 06, EU 08, & EU 12

Control Device: Passive Bin Vent Filter (C0604)

EP 06-05 – LMF Alloy Handling System
Alloys are added to the LMF is unloaded from trucks in a dump station, similar to the LMF Flux & Carbon Handling System, and transferred to storage bins. The alloy dump station is separate from the LMF flux and carbon dump station, but both systems share some of the same covered conveyors to load the material specific storage bins. Both systems also share the same baghouse for PM capture and control
Maximum Capacity: 120 ton/hr; 62,000 ton/yr
Control Device: Baghouse (C0605)

Emission Unit 08 (EU 08) – Scrap Handling System:
EP 08–01 – Barge Scrap Unloading
The barge terminal will be used to unload raw materials, primarily scrap and scrap substitutes, and load finished products. Scrap will be unloaded from the barge via a clamshell or magnetic crane located on the dock and loaded into Euclid trucks for transport to scrap stockpiles.
Maximum Capacity: 600 ton/hr; 962,500 ton/yr
Control Device: None

EP 08–02 – Rail Scrap Unloading
Railcars of scrap will be unloaded via a magnetic crane directly to stockpiles or into Euclid trucks for transport to scrap stockpiles.
Maximum Capacity: 200 ton/hr; 577,500 ton/yr
Control Device: None

EP 08–03 – Scrap Pile Loading and Unloading
Trucks delivering scrap to the mill will dump the scrap directly to the scrap stockpiles. Potential emissions from scrap unloading to stockpiles from on-site Euclid trucks or off-site transport trucks, as well as from loading the scrap trucks from the stockpiles are included in the stockpile loading and unloading emission point.
Maximum Capacity: 1,000 ton/hr; 1,925,000 ton/yr
Control Device: None

Emission Unit 12 (EU 12) – Slag Processing:
EP 12-01 – Slag Processing Equipment
Slag processing equipment will be required to handle, quench, crush, and screen the slag that is generated as part of the molten steel production in the melt shop.
Maximum Capacity: 400 ton/hr; 262,500 ton/yr
Control Device: Dust Suppression/Wetting

EP 12-03 – Slag Plant Pot Slagger
Pot Slagging includes 1 ton of EAF slag per 100 cubic feet of pot volume (for slag pot protection).
Maximum Capacity: 13.5 ton/hr; 118,260 ton/yr
Control Device: Dust Suppression/Wetting

Applicable Regulations:
401 KAR 51:017, *Prevention of significant deterioration of air quality*, applies to PM, PM_{10},

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and $PM_{2.5}$

401 KAR 59:010, *New process operations,* applies to each affected facility or source, associated with a process operation, which is not subject to another emission standard with respect to particulates in 401 KAR 59, commenced on or after July 2, 1975.

401 KAR 63:010, *Fugitive emissions*, applies to each apparatus, operation, or road which emits or may emit fugitive emissions provided that the fugitive emissions from such facility are not elsewhere subject to an opacity standard within the administrative regulations of the Division for Air Quality.

Comments:

For most EPs listed above, emissions were calculated using the grain loading value for the required control device. For uncaptured or otherwise uncontrolled emissions, emissions were calculated using AP-42, Section 13.2.4 and AP-42, Table 12.5-4, the MSDS for DRI, and DRI particle size distribution from Nucor Steel Louisiana on 5/12/14.

For EP 12-01, The throughput of the slag processing operations is based on a slag generation rate of 300 pounds of slag per ton of the liquid steel produced at the melt shop. As such, emissions estimates for the slag processing equipment are based on 262,500 tons/yr. Calculation of these emissions were completed based on AP-42, Section 11.19.2 and Section 12.5.

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Pollutant	Emission Limit or Standard		Regulatory Basis for Emission Limit or Standard	Emission Factor Used and Basis	Compliance Method
Opacity	20%		401 KAR 59:010, Section 3(1)(a)	N/A	Qualitative Monitoring, Recordkeeping
PM	• P<0.5; E = 2.34 • $P \leq 30$; $E=3.59 * P^{0.62}$ • P>30; $E = 17.3 * P^{0.16}$		401 KAR 59:010, Section 3(2)	All PM EFs based on TDS and total drift.	Assumed when complying with BACT.
PM	EP 09-01	0.69 lb/hr 3.02 ton/yr	401 KAR 51:017	0.234 lb/MMgal; TDS = 2800 ppm Drift = 0.001%	Operating Limits, Monitoring, Recordkeeping
	EP 09-02	0.24 lb/hr 1.05 ton/yr		0.250 lb/MMgal; TDS = 3000 ppm Drift = 0.001%	
	EP 09-04	0.83 lb/hr; 3.62 ton/yr		0.250 lb/MMgal; TDS = 3000 ppm Drift = 0.001%	
	EP 09-05	0.49 lb/hr; 2.15 ton/yr		0.234 lb/MMgal; TDS = 2800 ppm Drift = 0.001%	
	EP 09-06	0.15 lb/hr; 0.66 ton/yr		0.250 lb/MMgal; TDS = 3000 ppm Drift = 0.001%	

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	EP 09-07	0.66 lb/hr; 2.89 ton/yr		0.250 lb/MMgal; TDS = 3000 ppm Drift = 0.001%	
	EP 09-08	0.46 lb/hr; 2.03 ton/yr		0.250 lb/MMgal; TDS = 3000 ppm Drift = 0.001%	
	EP 09-09	0.18 lb/hr; 0.79 ton/yr		0.234 lb/MMgal; TDS = 2800 ppm Drift = 0.001%	
PM_{10}	EP 09-01	0.51 lb/hr 2.25 ton/yr	401 KAR 51:017	74.68% of PM; Reisman-Frisbie	Operating Limits, Monitoring, Recordkeeping
	EP 09-02	0.17 lb/hr 0.76 ton/yr		72.66% of PM; Reisman-Frisbie	
	EP 09-04	0.57 lb/hr; 2.49 ton/yr		68.81% of PM; Reisman-Frisbie	
	EP 09-05	0.34 lb/hr; 1.48 ton/yr		68.81% of PM; Reisman-Frisbie	
	EP 09-06	0.11 lb/hr; 0.48 ton/yr		72.66% of PM; Reisman-Frisbie	
	EP 09-07	0.48 lb/hr; 2.10 ton/yr		72.66% of PM; Reisman-Frisbie	
	EP 09-08	0.34 lb/hr; 1.48 ton/yr		74.68% of PM; Reisman-Frisbie	
	EP 09-09	0.13 lb/hr; 0.59 ton/yr		74.68% of PM; Reisman-Frisbie	
$PM_{2.5}$	EP 09-01	0.002 lb/hr 0.007 ton/yr	401 KAR 51:017	0.22% of PM; Reisman-Frisbie	Operating Limits, Monitoring, Recordkeeping
	EP 09-02	0.0005 lb/hr 0.002 ton/yr		0.22% of PM; Reisman-Frisbie	
	EP 09-04	0.002 lb/hr; 0.0078 ton/yr		0.22% of PM; Reisman-Frisbie	
	EP 09-05	0.001 lb/hr; 0.005 ton/yr		0.22% of PM; Reisman-Frisbie	
	EP 09-06	0.0003 lb/hr; 0.001 ton/yr		0.22% of PM; Reisman-Frisbie	
	EP 09-07	0.001 lb/hr; 0.006 ton/yr		0.22% of PM; Reisman-Frisbie	
	EP 09-08	0.001 lb/hr; 0.004 ton/yr		0.22% of PM; Reisman-Frisbie	
	EP 09-09	0.0004 lb/hr; 0.002 ton/yr		0.22% of PM; Reisman-Frisbie	

Initial Construction Date: 2020

Process Description:
EU 09 - Cooling Towers:
Eight (8) cooling tower systems are used to provide the required cooling capacity for the facility's

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direct cooling water (DCW) and indirect cooling water (ICW) systems. The eight cooling tower systems include the following:

EP 09-01 – Melt Shop ICW Cooling Tower System 100 (3 Cell)
A 3-cell cooling tower to support the noncontact cooling water demand for the melt shop processes.
Maximum Capacity: 49,200 gal/min
Control Device: Mist Eliminator, 0.001% drift loss

EP 09-02 – Melt Shop DCW Cooling Tower System 200 (2 Cell)
A 2-cell cooling cell cooling tower to provide contact cooling water to the melt shop.
Maximum Capacity: 16,000 gal/min
Control Device: Mist Eliminator, 0.001% drift loss

EP 09-04 – Rolling Mill DCW Cooling Tower System 400 (3 Cell)
A 3-cell cooling tower to support the Rolling Mill contact cooling water demand.
Maximum Capacity: 55,000 gal/min
Control Device: Mist Eliminator, 0.001% drift loss

EP 09-05 – Rolling Mill ACC ICW Cooling Tower System 500 (2 Cell)
A 2-cell cooling tower for the ACC cooling water system in the Rolling Mill.
Maximum Capacity: 35,000 gal/min
Control Device: Mist Eliminator, 0.001% drift loss

EP 09-06 – Heavy Plate Quench DCW Cooling Tower System 600 (4 Cells)
A 4-cell cooling tower to support the contact cooling water demand for the heavy plate quenching operation.
Maximum Capacity: 10,100 gal/min
Control Device: Mist Eliminator, 0.001% drift loss

EP 09-07 – Quench & ACC Laminar DCW Cooling Tower System 700 (3 Cells)
A 3-cell cooling tower to support the contact cooling water demand for the heavy plate processing area.
Maximum Capacity: 44,000 gal/min
Control Device: Mist Eliminator, 0.001% drift loss

EP 09-08 – Heat Treat Cooling Tower System 800 (8 Cells)
A 8-cell cooling tower to support cooling water demand from the Continuous Heat Treat Line water quenching MFQ.
Maximum Capacity: 30,900 gal/min
Control Device: Mist Eliminator, 0.001% drift loss

EP 09-09 – Air Separation Plant Cooling Tower, System 900 (4 Cells)
An 4-cell cooling tower to support the cooling water demand from the Air Separation Plant.
Maximum Capacity: 7,044 gal/min
Control Device: Mist Eliminator, 0.001% drift loss

Group 4 – EU 09

Applicable Regulations:

401 KAR 51:017, *Prevention of significant deterioration of air quality*, applies to PM, PM_{10}, and $PM_{2.5}$

401 KAR 59:010, *New process operations*, applies to each affected facility or source, associated with a process operation, which is not subject to another emission standard with respect to particulates in 401 KAR 59, commenced on or after July 2, 1975.

Precluded Regulations:

401 KAR 63:002, Section 2(4)(j), 40 C.F.R. 63.400 to 63.407, Table 1 (Subpart Q), *National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers,* precluded by prohibiting the use of chromium-based water treatment chemicals in the cooling towers.

Comments:

All cooling towers are equipped with mist eliminators designed to minimize drift losses to 0.001% and emission calculations are based on a technical paper about calculating particulates from cooling towers by Reisman and Frisbie. (*"Calculating Realistic PM_{10} Emissions From Cooling Towers."* Reisman-Frisbie. Environmental Progress 21 (July 2002))

Group 5 – EP 10-01, EP 10-02, EP 10-03, EP 10-04, EP 10-08, EP 10-09, & EP 10-10

Pollutant	Emission Limit or Standard	Regulatory Basis for Emission Limit or Standard	Emission Factor Used and Basis	Compliance Method
NMHC + NO_x	4.77 g/HP-hr	40 CFR 60.4205; 401 KAR 51:017	40 CFR 89.112, Table 1	Certified Engine, Monitoring, Recordkeeping, Reporting, GCOP Plan
PM, PM_{10}, $PM_{2.5}$	0.15 g/HP-hr	40 CFR 60.4205; 401 KAR 51:017	40 CFR 89.112, Table 1	
CO	2.61 g/HP-hr	40 CFR 60.4205; 401 KAR 51:017	40 CFR 89.112, Table 1	

Initial Construction Date: 2022; 2024

Process Description:

Diesel emergency generators and a fire water pump used to provide emergency power/fire water supply for critical operations should the facility power supply be interrupted. These generators have a displacement of less than 30 liters per cylinder.

Emission Point #	Unit Name	Maximum Rated Capacity	Fuel Used	Control Device
Emission Unit 10 (EU 10): Emergency Generators > 500 HP				
10-01	G100-1 Emergency Generator	1474 HP	Diesel	None
10-02	G100-2 Emergency Generator	2,937 HP	Diesel	None
10-03	G100-3 Emergency Generator	2,937 HP	Diesel	None
10-04	G200-1 Emergency Generator	1,474 HP	Diesel	None
10-08	G300-1 Emergency Generator	1,474 HP	Diesel	None
10-09	G400-1 Emergency Generator	1,474 HP	Diesel	None
10-10	G500-1 Emergency Generator	1,411 HP	Diesel	None

Group 5 – EP 10-01, EP 10-02, EP 10-03, EP 10-04, EP 10-08, EP 10-09, & EP 10-10
Applicable Regulations: **401 KAR 51:017,** *Prevention of significant deterioration of air quality,* applies to PM, PM_{10}, $PM_{2.5}$, CO, NO_x, SO_2, GHG, and VOC. **401 KAR 60:005, Section 2(2)(dddd)**, **40 C.F.R. 60.4200 to 60.4219, Tables 1 to 8 (Subpart IIII)**, *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines,* applies to owners and operators of stationary compression ignition (CI) internal combustion engines (ICE) and other persons as specified in 40 CFR 60.4200(a)(1) through (4). For the purposes of 40 CFR 60, Subpart IIII, the date that construction commences is the date the engine is ordered by the owner or operator. **401 KAR 63:002, Section 2(4)(eeee), 40 C.F.R. 63.6580 to 63.6675, Tables 1a to 8, and Appendix A (Subpart ZZZZ),** *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines,* applies to each new stationary RICE located at a major or area source of HAP emissions. **Comments:** The emergency engines may be operated for a maximum of 100 hours per calendar year for the purposes of maintenance checks and readiness testing in accordance with 40 CFR 60, Subpart IIII. However, because these regulations do not limit the number of hours the emergency generators may operate during an emergency, annual emissions calculations are based on 500 hours per year of operation. Emissions based on AP-42, Section 3.4, 40 CFR 98, Subpart A, Table A-1, 40 CFR 98, Subpart C, C-2, and emission standards from 40 CFR 60, Subpart IIII.

Group 6 – EP 11-06 & EP 11-07					
Pollutant	**Emission Point #**	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
NO_x	EP 11-06	2.0 g/HP-hr	40 CFR 60.4233(d); 401 KAR 51:017	592 lb/MMscf; 40 CFR 60, Subpart JJJJ, Table 1	Cert. Engine, Recordkeeping, GCOP Plan
	EP 11-07	10 g/HP-hr			
CO	EP 11-06	4.0 g/HP-hr		1184 lb/MMscf; 40 CFR 60, Subpart JJJJ, Table 1	
	EP 11-07	387 g/HP-hr			
VOC	EP 11-06	1.0 g/HP-hr		296 lb/MMscf; 40 CFR 60, Subpart JJJJ, Table 1	

Initial Construction Date: 2022

Process Description:
Emission Unit 11 (EU11) – Emergency Generators < 500 HP:
Natural Gas emergency generators used to provide emergency power supply for critical operations should the facility power supply be interrupted. These generators are 4-stroke, rich-burn engines that have a displacement of less than 30 liters per cylinder.
EP 11-06 - Air Separation Plant Emergency Generator
Fuel: Natural Gas
Maximum Rating: 410 HP
Control Device: None

Group 6 – EP 11-06 & EP 11-07
EP 11-07 - Admin Building Emergency Generator **Fuel:** Natural Gas **Maximum Rating:** 103 HP **Control Device:** None **Applicable Regulations:** **401 KAR 51:017,** *Prevention of significant deterioration of air quality,* applies to PM, PM_{10}, $PM_{2.5}$, CO, NO_x, SO_2, GHG, and VOC. **401 KAR 60:005, Section 2(2)(eeee), 40 C.F.R. 60.4230 to 60.4248, Tables 1 to 4 (Subpart JJJJ),** *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines,* applies to owners and operators of stationary spark ignition (SI) internal combustion engines (ICE) as specified in 40 CFR 60.4230(a)(1) through (6). For the purposes of 40 CFR 60, Subpart JJJJ, the date that construction commences is the date the engine is ordered by the owner or operator. **401 KAR 63:002, Section 2(4)(eeee), 40 C.F.R. 63.6580 to 63.6675, Tables 1a to 8, and Appendix A (Subpart ZZZZ),** *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines,* applies to each new stationary RICE located at a major or area source of HAP emissions. **Comments:** The emergency engines may be operated for a maximum of 100 hours per calendar year for the purposes of maintenance checks and readiness testing in accordance with 40 CFR 60, Subpart JJJJ. However, because these regulations do not limit the number of hours the emergency generators may operate during an emergency, annual emissions calculations are based on 500 hours per year of operation. Emissions based on AP-42, Section 3.2, 40 CFR 98, Subpart A, Table A-1, 40 CFR 98, Subpart C, Table C-1 and C-2, emission standards from 40 CFR 60, Subpart JJJJ, and a NG heating value of 1,020 Btu/scf.

Group 7 – EP 04-02 & EU 13					
Pollutant	**Emission Limit or Standard**		**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
PM (filterable)	EP 04-02	0.35 lb/MMBtu	401 KAR 59:015, Section 4(1)(c)	AP-42, Table 1.4-2	Operating Limits, Monitoring, Recordkeeping, Reporting, & GCOP Plan
		1.9 lb/MMscf; 0.61 ton/yr	401 KAR 51:017		
	EP 13-01	0.35 lb/MMBtu	401 KAR 59:015, Section 4(1)(c)		
		1.9 lb/MMscf; 0.24 ton/yr	401 KAR 51:017		
PM_{10}	EP 04-02	7.6 lb/MMscf; 2.42 ton/yr	401 KAR 51:017	AP-42, Table 1.4-2	
	EP 13-01	7.6 lb/MMscf; 0.95 ton/yr			

Group 7 – EP 04-02 & EU 13					
$PM_{2.5}$	EP 04-02	7.6 lb/MMscf 2.42 ton/yr	401 KAR 51:017	AP-42, Table 1.4-2	
	EP 13-01	7.6 lb/MMscf; 0.95 ton/yr			
Opacity	20%		401 KAR 59:015, Section 4(2)	N/A	Assumed when burning NG
CO	EP 04-02	88.6 lb/MMscf; 28.24 ton/yr	401 KAR 51:017	AP-42, Table 1.4-1	Operating Limits, Monitoring, Recordkeeping, Reporting, & GCOP Plan
	EP 13-01	84 lb/MMscf; 10.46 ton/yr			
NO_x	EP 04-02	160 lb/MMscf; 51.0 ton/yr	401 KAR 51:017	AP-42, Table 1.4-1, Vendor Specifications	Operating Limits, Testing (EP 04-02), Monitoring, Recordkeeping, Reporting, & GCOP Plan
	EP 13-01	50 lb/MMscf; 6.23 ton/yr			
SO_2	EP 04-02	1.3 lb/MMBtu	401 KAR 59:015, Section 5(1)(c)	AP-42, Table 1.4-2	Operating Limits, Monitoring, Recordkeeping, Reporting, & GCOP Plan
		0.6 lb/MMscf; 0.19 ton/yr	401 KAR 51:017		
	EP 13-01	1.3 lb/MMBtu	401 KAR 59:015, Section 5(1)(c)		
		0.6 lb/MMscf; 0.07 ton/yr	401 KAR 51:017		
GHG	EP 04-02	38,478 ton/yr	401 KAR 51:017	AP-42, Table 1.4-2; 40 CFR 98, Table A-1	Operating Limits, Monitoring, Recordkeeping, Reporting, & GCOP Plan
	EP 13-01	15,032 ton/yr			
VOC	EP 04-02	5.5 lb/MMscf; 1.75 ton/yr	401 KAR 51:017	AP-42, Table 1.4-2	Operating Limits, Monitoring, Recordkeeping, Reporting, & GCOP Plan
	EP 13-01	5.5 lb/MMscf; 0.68 ton/yr			

Initial Construction Date: EP 04-02 (2022), EP 13-01 (2020)

Process Description:

Emission Unit 04 (EU 04) – Continuous Heat Treat Line:

EP 04-02 – Austenitizing Furnaces

The Austenitizing Furnace is indirect fired with a nitrogen atmosphere to prevent scale formation and the resulting scale pickup that occurs on the roll surface. The final design of the furnace includes recuperative burners with a guaranteed NOx emission rate of 0.16 lb/MMBtu (160 lb/MMscf) and CO emission rate of 0.009 lb/MMBtu (88.6 lb/MMscf).

Burner Maximum Capacity: 74.23 MMBtu/hr

Control Device: None

Group 7 – EP 04-02 & EU 13

Emission Unit 13 (EU 13) – Air Separation Plant:
EP 13-01 – Water Bath Vaporizer
The Water Bath Vaporizer is a backup unit employed when the air separation plant is down or the nitrogen or oxygen demand is more than the air separation plant is generating. During these events, liquefied gas maintained in storage tanks is passed through the Water Bath Vaporizer to vaporize the liquefied gas prior to distributing the gas to the process operations. The vaporizer consists of two natural gas-fired, low NOx burners to heat the water bath. The combustion gases from the indirect-fired burners exhaust directly to the atmosphere via individual stacks.
Burner Maximum Capacity: Two at 14.5 MMBtu/hr, each
Control Device: None

Applicable Regulation:
401 KAR 51:017, *Prevention of significant deterioration of air quality*, applies to PM, PM_{10}, $PM_{2.5}$, CO, NO_x, SO_2, GHG, and VOC.
401 KAR 59:015, *New indirect heat exchangers*, applies to each indirect heat exchanger having a heat input capacity greater than one (1) million BTU per hour (MMBTU/hr) commenced on or after April 9, 1972.
401 KAR 60:005, Section 2(2)(d), 40 C.F.R. 60.40c to 60.48c (Subpart Dc), *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units,* applies to EP 13-01 as a steam generating unit for which construction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/h)) or less, but greater than or equal to 2.9 MW (10 MMBtu/h).

State-Origin Requirements:
401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies to 04-02.

Comments:
Emissions based on AP-42, Section 1.4, 40 CFR 98, Subpart A, Table A-1, Vendor specifications for low-NOx burners, and a NG heating value of 1,020 Btu/scf.

Group 8 – EU 14, EP 12-02, & EP 01-08A

Initial Construction Date: EP 14-01, 14-02, 12-02 (2020). EP 01-08A (2022)

Process Description:
Emission Unit 14 (EU 14) – Roads:
EP 14-01 – Paved Roads
EP 14-02 – Unpaved Roads
Various paved and unpaved roads within the PSD-prescribed source boundary.
Unpaved Roads for transporting material between the melt shop and slag processing.
Maximum Capacity:
For EP 14-01: 814 VMT/day; 297,205 VMT/yr
For EP 14-02: 264 VMT/day; 96,462 VMT/yr
Controls: Wetting/Sweeping

Group 8 – EU 14, EP 12-02, & EP 01-08A
Emission Unit 12 (EU 12) – Slag Processing: *EP 12-02 – Slag Processing Piles* Slag processing piles are required to temporarily store inprocess material and final size-specific products prior to transport off site. **Maximum Capacity:** 400 tons/hr; 328,125 tons/yr **Controls:** Dust Suppression ***Emission Unit 01 (EU 01) – Melt Shop:*** *EP 01-08 A – Tundish Preparation Dump Station* Spent referactory removal. The tundish shells are dumped soon after they are removed from the casting deck turrets, so that the residual steel does not have time to solidify. **Maximum Capacity:** 2.7 tons refractory/hr; 1,800 tons refractory/yr **Controls:** None **Applicable Regulations:** **401 KAR 51:017,** *Prevention of significant deterioration of air quality*, applies to PM, PM_{10}, and $PM_{2.5}$ **401 KAR 63:010,** *Fugitive emissions*, applies to each apparatus, operation, or road which emits or may emit fugitive emissions provided that the fugitive emissions from such facility are not elsewhere subject to an opacity standard within the administrative regulations of the Division for Air Quality. **Comments:** Potential emissions for the roads were calculated using AP-42, Section 13.2.1. 3.21 miles paved, and 1.24 miles unpaved roadway. Potential emissions from the slag piles (EP 12-02) include material transfer onto the piles and loading material from the piles into trucks, as well as potential emissions from wind erosion. The calculation methodology divides the pile into different wind regimes and calculates a corresponding Erosion Potential for each regime. The calculation logic looks at the total percent of the surface area affected and selects the wind regimes to be included in the calculation starting with the regime with the largest erosion potential. The wind regime for us/ur of 1.1 has the largest erosion potential with a total area of 4%. Since the total percent of the surface area affected per disturbance for each pile is less than 4%, only that wind regime is included in the calculation. Calculation of these emissions were completed based on AP-42 emission calculation methodologies for Aggregate Handling and Storage Piles (Section 13.2.4) and Industrial Wind Erosion (Section 13.2.5). Potential emissions for Tundish Dump Station (EP 01-08A) were calculated using AP-42, Section 12.5 (Table 12.5-4).

Group 9 – EU 15
Initial Construction Date: 2020 **Process Description:** ***Emission Unit 15 (EU 15) – Miscellaneous Equipment:*** *EP 15-02 – Gasoline Storage Tanks #1 & #2* Two (2) 1000 Gallon Gasoline Storage Tanks **Control Device:** None

Group 9 – EU 15
Applicable Regulations: **401 KAR 51:017,** *Prevention of significant deterioration of air quality,* applies to VOC **401 KAR 59:050,** *New storage vessels for petroleum liquids,* applies to each affected facility with a storage capacity less than 40,000 liters (10,567 gallons) commenced on or after July 24, 1984, which is located in any other county (other than an urban county designated nonattainment for ozone under 401 KAR 51:010) and is a part of a major source of volatile organic compounds. **401 KAR 63:002, Section 2(4)(ddddd), 40 C.F.R. 63.11110 to 63.11132, Tables 1 to 3, (Subpart CCCCC),** *National emission standards for hazardous air pollutants for Source Category: Gasoline Dispensing Facilities,* applies to each GDF that is located at an area source. The affected source includes each gasoline cargo tank during the delivery of product to a GDF and also includes each storage tank. **Comments:** Emissions calculated using Tanks 4.0.9d.

Group 10 – EU 16				
Pollutant	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
VOC	0.52 tons/yr	401 KAR 51:017	9.02 lb VOC/gal solvent makeup	Operating Limitations, Monitoring, & Recordkeeping

Initial Construction Date: 2020

Process Description:
Emission Unit 16 (EU 16) – Cleaning Tanks:
EP 16-01 – Cleaning Tanks #1 - #16
Sixteen (16) 80-gallon cold parts cleaners equipped with a cover and using Mineral Spirits (< 1 mm Hg vapor pressure at 100 °F) as the cleaning solvent.
Control Device: None

Applicable Regulations:
401 KAR 51:017, *Prevention of significant deterioration of air quality,* applies to VOC
401 KAR 59:185, *New solvent metal cleaning equipment,* applies, except for Section 4(3) and (4), to each cold cleaner commenced on or after June 29, 1979 that is part of a major source located in a county or portion of a county designated attainment or marginal nonattainment for ozone in 401 KAR 51:010.

Comments:
Emissions calculated using information provided in the MSDS for the solvent, Crystal Clean 142 Mineral Spirits. No HAP or TAP was identified in the MSDS.

Group 11 – EU 18					
Pollutant	**Emission Limit or Standard**		**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
Opacity	20%		401 KAR 59:010, Section 3(1)(a)	N/A	Qualitative Monitoring, Recordkeeping
PM	• P<0.5; E = 2.34 • P ≤ 30; E=$3.59 * P^{0.62}$ • P>30; $E = 17.3 * P^{0.16}$		401 KAR 59:010, Section 3(2)		Assumed when complying with BACT.
PM	EP 18-03	0.51 lb/hr; 2.24 tons/yr	401 KAR 51:017	Coating SDS, (48.1% solid conten	Operating Limitations, 5-year testing, monthly calculation, monitoring, & recordkeeping
PM_{10}	EP 18-03	0.53 lb/hr; 2.30 tons/yr	401 KAR 51:017		
$PM_{2.5}$	EP 18-03	0.53 lb/hr; 2.30 tons/yr	401 KAR 51:017		
VOC	EP 18-03	85% control	401 KAR 59:225, Section 3	N/A	Assumed when complying with BACT.
VOC	EP 18-03	98% control	401 KAR 51:017	Coating and MEK Cleanup SDS,	RTO, Initial testing and testing once every 5 years.
		5.52 lb/hr; 24.20 ton/yr			Operating Limitations, 5-year testing, monthly calculation, monitoring, recordkeeping & GCOP Plan

Initial Construction Date: 2022

Process Description:
EU 18 - Blast and Prime Line:
Airless spraying of coating occurs in EP 18-03 and the coating is dried in EP 18-05. These two EPs share an RTO for coating emissions. EP 18-05 natural gas emissions are exhausted through a separate stack shared with EP 18-01. The paint prep room is exhausted to the painting cabinet and controlled by the RTO with destruction efficiency (DRE) of 98%.

EP 18-03 – Plate Painting Operation (Incl. paint prep room)
An automatic painting system within the painting cabinet applies the primer at the specified coating thickness, typically 0.5 to 1 mils. A sensor system is employed that provides recognition of the plate height and edges. Airborne paint particles are extracted by the optimized linear airflow of the air extraction system and transported directly to a brush pre-separator. This system catches most of the paint particles and reduces the particle load to the downstream paint filtration

Group 11 – EU 18

system. Following the paint filtration system, the airflow is routed to a regenerative thermal oxidizer (RTO, 2.4 MMBtu/hr)) for destruction of the VOC evolved from the painting and drying operations within the painting cabinet.
Maximum Capacity: 50.7 gal/hr; 444,132 gal/yr
Control Device: Booth Filter; Regenerative thermal oxidizer (RTO)

EP 18-05 – Paint System Dryer
After leaving the painting cabinet, the coated plates pass through the paint dryer for final curing to allow immediate handling of the plate without damaging the coating. The paint dryer is heated with the excess heat exhausted from the pre-heater. The dryer also is equipped with a 95 Btu/hr burner that is used to bring the dryer up to operating temperature during a cold start or to supplement the excess heat from the pre-heater if needed
Maximum Capacity: 95 Btu/hr burner
Control Device: Regenerative thermal oxidizer (RTO)

Applicable Regulations:
401 KAR 51:017, *Prevention of significant deterioration of air quality*, applies to PM, PM_{10}, $PM_{2.5}$, and VOC
401 KAR 59:010, *New process operations,* applies to each affected facility or source, associated with a process operation, which is not subject to another emission standard with respect to particulates in 401 KAR 59, commenced on or after July 2, 1975.
401 KAR 59:225, *New miscellaneous metal parts and products surface coating operations.*

State-Origin Requirements:
401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies to each affected facility which emits or may emit potentially hazardous matter or toxic substances, provided such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division for Air Quality.

Comments:
Emissions calculated using MSDS/Material Balance, AP-42, Chapter 1.4.

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS (CONTINUED)

Testing Requirements\Results

Emission Unit(s)	Control Device	Parameter	Regulatory Basis	Freq.	Test Method	Permit Limit	Test Result	Thruput & Operating Parameter(s) Established During Test	Activity Graybar	Date of Compliance Testing
EP 01-01	Baghouse (C0101)	PM & Opacity	40 CFR 60.272a(a)(1); 40 CFR 63.10686(b)(1)	Initial; Annual	Methods 5 & 9	0.0052 gr/dscf	TBD	TBD	TBD	TBD
C0101 Stack (Mult. EPs)	Baghouse (C0101)	PM (filterable)	401 KAR 51:017	Initial; Annual	Method 5	0.0018 gr/dscf; 25.49 lb/hr	TBD	TBD	TBD	TBD
C0101 Stack (Mult. EPs)	Baghouse (C0101)	PM_{10}	401 KAR 51:017	Initial; Annual	Methods 201A/202	0.0052 gr/dscf; 73.64 lb/hr	TBD	TBD	TBD	TBD
C0101 Stack (Mult. EPs)	Baghouse (C0101)	$PM_{2.5}$	401 KAR 51:017	Initial; Annual	Methods 201A/202	0.0034 gr/dscf; 48.15 lb/hr	TBD	TBD	TBD	TBD
C0101 Stack (Mult. EPs)	Baghouse (C0101)	VOC	401 KAR 51:017	Initial; Annual	Method 25	0.09 lb/ton	TBD	TBD	TBD	TBD
C0101 Stack (Mult. EPs)	Baghouse (C0101)	Lead	401 KAR 51:017 (Establish EF)	Initial	Method 12	N/A	TBD	TBD	TBD	TBD
C0101 Stack (Mult. EPs)	Baghouse (C0101)	Fluorides	401 KAR 51:017 (Establish EF)	Initial	Method 13A or 13B	N/A	TBD	TBD	TBD	TBD

Emission Unit(s)	Control Device	Parameter	Regulatory Basis	Freq.	Test Method	Permit Limit	Test Result	Thruput & Operating Parameter(s) Established During Test	Activity Graybar	Date of Compliance Testing
C0101 Stack (Mult. EPs)	Baghouse (C0101)	SO_2	401 KAR 51:017	Initial; Qtr RATA	PS 2	0.35 lb/ton	TBD	TBD	TBD	TBD
C0101 Stack (Mult. EPs)	Baghouse (C0101)	NO_x	401 KAR 51:017	Initial; Qtr RATA	PS 2	0.42 lb/ton	TBD	TBD	TBD	TBD
C0101 Stack (Mult. EPs)	Baghouse (C0101)	CO	401 KAR 51:017	Initial; Qtr RATA	PS 4	1.98 lb/ton	TBD	TBD	TBD	TBD
EP 01-05	None	PM (filterable)	401 KAR 51:017	Initial; Annual	Method 5	12.50 lb/hr	TBD	TBD	TBD	TBD
EP 01-05	None	PM_{10}	401 KAR 51:017	Initial; Annual	Methods 201A/202	2.0 lb/hr	TBD	TBD	TBD	TBD
EP 01-05	None	$PM_{2.5}$	401 KAR 51:017	Initial; Annual	Methods 201A/202	0.25 lb/hr	TBD	TBD	TBD	TBD
EP 01-05	None	VOC	401 KAR 51:017	Initial; Annual	Method 25	0.40 lb/hr	TBD	TBD	TBD	TBD
EP 03-01	None	NO_x	401 KAR 51:017	Initial	Method 7	71.4 lb/MMscf	TBD	TBD	TBD	TBD
EP 03-01	None	CO	401 KAR 51:017	Initial	Method 10	84 lb/MMscf	TBD	TBD	TBD	TBD
EP 03-02	None	NO_x	401 KAR 51:017	Initial	Method 7	122.14 lb/MMscf	TBD	TBD	TBD	TBD
EP 03-02	None	CO	401 KAR 51:017	Initial	Method 10	84 lb/MMscf	TBD	TBD	TBD	TBD
EP 03-04	Wet Scrubber (C0304)	PM (filterable)	401 KAR 51:017	Initial; Annual	Method 5	0.005 gr/dscf; 3.72 lb/hr	TBD	TBD	TBD	TBD

Emission Unit(s)	Control Device	Parameter	Regulatory Basis	Freq.	Test Method	Permit Limit	Test Result	Thruput & Operating Parameter(s) Established During Test	Activity Graybar	Date of Compliance Testing
EP 03-04	Wet Scrubber (C0304)	PM_{10}	401 KAR 51:017	Initial; Annual	Methods 201A/202	0.005 gr/dscf; 3.28 lb/hr	TBD	TBD	TBD	TBD
EP 03-04	Wet Scrubber (C0304)	$PM_{2.5}$	401 KAR 51:017	Initial; Annual	Methods 201A/202	0.0025 gr/dscf; 1.40 lb/hr	TBD	TBD	TBD	TBD
EP 03-04	Wet Scrubber (C0304)	VOC	401 KAR 51:017	Initial; Annual	Method 25	1.70 lb/hr	TBD	TBD	TBD	TBD
EP 04-02	None	NO_x	401 KAR 51:017	Initial	Method 7	160 lb/MMscf	TBD	TBD	TBD	TBD
EP 05-01	None	NO_x	401 KAR 51:017	Initial	Method 7	81.6 lb/MMscf	TBD	TBD	TBD	TBD
EP 05-01	None	CO	401 KAR 51:017	Initial	Method 10	84 lb/MMscf	TBD	TBD	TBD	TBD
EP 18-03	Booth Filter and RTO	PM (filterable)	401 KAR 51:017	Initial & 5 years	Methods 201A/202	0.51 lb/hr;	TBD	TBD	TBD	TBD
EP 18-03	Booth Filter and RTO	PM_{10}	401 KAR 51:017	Initial & 5 years	Methods 201A/202	0.53 lb/hr;	TBD	TBD	TBD	TBD
EP 18-03	Booth Filter and RTO	$PM_{2.5}$	401 KAR 51:017	Initial & 5 years	Methods 201A/202	0.53 lb/hr;	TBD	TBD	TBD	TBD
EP 18-03 & EP 18-05	RTO	VOC DRE	401 KAR 51:017	Initial & 5 years	Method 25A	98%	TBD	TBD	TBD	TBD
		VOC Capture			Method 204	100%				

Footnotes:

SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS

Table A - Group Requirements:

Emission and Operating Limit	Regulation	Emission Unit
1,750,000 tons of steel/yr; rolling 12-month	401 KAR 51:017	EP 01-01
3% Opacity	40 CFR 60.272a(a)(2)	Baghouse Stack (C0101) including: EPs 01-01, 01-02, 01-03 (alloy addition), 01-04, 01-08, 01-09, 01-10, 02-01, 02-03, 02-04, 02-05, 02-06, 08-04
0.0052 gr/dscf	40 CFR 60.272a(a)(1); 40 CFR 63.10686(b)(1)	
0.0018 gr/dscf; 25.49 lb/hr; 111.64 tons/yr of PM (filterable)	401 KAR 51:017	
0.0052 gr/dscf; 73.64 lb/hr; 322.53 tons/yr of PM_{10}	401 KAR 51:017	
0.0034 gr/dscf; 48.15 lb/hr; 210.88 tons/yr of $PM_{2.5}$	401 KAR 51:017	
1.98 lb/ton; 495 lb/hr (30-day rolling avg.); 1,733 ton/yr for CO	401 KAR 51:017	
0.42 lb/ton; 104 lb/hr (30-day rolling avg.); 363.8 ton/yr for NO_x	401 KAR 51:017	
0.35 lb/ton; 86.63 lb/hr (30-day rolling avg.) 303.2 ton/yr for SO_2	401 KAR 51:017	
0.09 lb/ton; 77.96 tons/yr of VOC	401 KAR 51:017	

Table B - Summary of Applicable Regulations:

Applicable Regulations	Emission Points
401 KAR 51:017, *Prevention of significant deterioration of air quality*, applies to the construction of a new major stationary source that commences construction after September 22, 1982, and located in an area designated attainment.	EPs 01-01, 01-02, 01-03, 01-04, 01-05, 01-06, 01-07, 01-08 A&B, 01-09, 01-10, 02-01, 02-03, 02-04, 02-05, 02-06, 03-01, 03-02, 03-03, 03-04, 03-05, 03-06, 03-07, 03-08, 03-09, 03-10, 03-11 04-01, 04-02, 04-03, 04-04, 04-05, 04-06, 05-01, 05-03, 05-04, 06-01, 06-02, 06-03, 06-04, 06-05, 08-01, 08-02, 08-03, 08-04, 09-01, 09-02, 09-04, 09-05, 09-06, 09-07, 09-08, 09-09, 10-01, 10-02, 10-03, 10-04, 10-08, 10-09, 10-10, 11-06, 11-07, 13-01, 12-01, 12-02, 12-03, 12-04, 14-01, 14-02, 15-01, 15-02, 16-01, 17-01 A&B, 17-02, 18-01, 18-02, 18-03, 18-05

Applicable Regulations	Emission Points
401 KAR 59:010, *New process operations*, applies to each affected facility or source, associated with a process operation, which is not subject to another emission standard with respect to particulates in 401 KAR 59, commenced on or after July 2, 1975.	EPs 01-01, 01-02, 01-03, 01-04, 01-05, 01-06, 01-07, 01-08 B, 01-09 A&B, 01-10, 01-11, 01-12, 02-01, 02-03, 02-04, 02-05, 02-06, 03-01, 03-02, 03-03, 03-04, 03-05, 03-06, 03-07, 03-08, 03-09, 03-10, 03-11, 04-01, 04-03, 04-04, 04-05, 04-06, 05-01, 05-03, 05-04, 06-01, 06-02, 06-03, 06-04, 06-05, 08-04, 09-01, 09-02, 09-04, 09-05, 09-06, 09-07, 09-08, 09-09, 12-04, 15-01, 17-01 A&B, 17-02, 18-02, 18-03
401 KAR 59:015, *New indirect heat exchangers,* applies to each indirect heat exchanger having a heat input capacity greater than one (1) million BTU per hour (MMBTU/hr) commenced on or after April 9, 1972.	EP 13-01
401 KAR 59:050, *New storage vessels for petroleum liquids,* applies to each affected facility with a storage capacity less than 40,000 liters (10,567 gallons) commenced on or after July 24, 1984, which is located in any other county (other than an urban county designated nonattainment for ozone under 401 KAR 51:010) and is a part of a major source of volatile organic compounds.	EP 15-02
401 KAR 59:185, *New solvent metal cleaning equipment,* applies, except for Section 4(3) and (4), to each affected facility commenced on or after June 29, 1979 that is part of a major source located in a county or portion of a county designated attainment or marginal nonattainment for ozone in 401 KAR 51:010.	EP 16-01
401 KAR 60:005, Section 2(1), 40 C.F.R. 60.1 to 60.19, Table 1 (Subpart A), *General Provisions,* specifically, the requirement to develop and implement a written startup, shutdown, and malfunction (SSM) plan that describes, in detail, procedures for operating and maintaining the source during periods of startup, shutdown, and malfunction; and a program of corrective action for malfunctioning process, air pollution control, and monitoring equipment used to comply with the relevant standard. The startup, shutdown, and malfunction plan does not need to address any scenario that would not cause the source to exceed an applicable emission limitation in the relevant standard. The SSM plan shall meet the requirements in 40 CFR 63.6(e)(3). This plan must be developed by the owner or operator before startup of the EAF.	EPs 01-01, 01-02, 01-03, 01-04, 01-05, 01-06, 01-07, 01-08 B, 01-09 A&B, 01-10, 01-11, 01-12, 02-01, 02-03, 02-04, 02-05, 02-06, 08-04

Applicable Regulations	Emission Points
401 KAR 60:005, Section 2(2)(d), 40 C.F.R. 60.40c to 60.48c (Subpart Dc), *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units,* applies to each steam generating unit for which construction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/h)) or less, but greater than or equal to 2.9 MW (10 MMBtu/h).	EP 13-01
401 KAR 60:005, Section 2(2)(jj), 40 C.F.R. 60.270a to 60.276a (Subpart AAa), *Standards of Performance for Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 17, 1983*, applies to the following affected facilities in steel plants that produce carbon, alloy, or specialty steels: electric arc furnaces, argon-oxygen decarburization vessels, and dust-handling systems that commences construction, modification, or reconstruction after August 17, 1983.	EPs 01-01 & 01-07
401 KAR 60:005, Section 2(2)(dddd), **40 C.F.R. 60.4200 to 60.4219, Tables 1 to 8 (Subpart IIII)**, *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines,* applies to owners and operators of stationary compression ignition (CI) internal combustion engines (ICE) and other persons as specified in 40 CFR 60.4200(a)(1) through (4). For the purposes of 40 CFR 60, Subpart IIII, the date that construction commences is the date the engine is ordered by the owner or operator.	EPs 10-01, 10-02, 10-03, 10-04, 10-08, 10-09, 10-10
401 KAR 60:005, Section 2(2)(eeee), 40 C.F.R. 60.4230 to 60.4248, Tables 1 to 4 (Subpart JJJJ), *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*, applies to owners and operators of stationary spark ignition (SI) internal combustion engines (ICE) as specified in 40 CFR 60.4230(a)(1) through (6). For the purposes of 40 CFR 60, Subpart JJJJ, the date that construction commences is the date the engine is ordered by the owner or operator.	EPs 11-06 & 11-07
401 KAR 63:002, Section 2(4)(eeee), 40 C.F.R. 63.6580 to 63.6675, Tables 1a to 8, and Appendix A (Subpart ZZZZ), *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines,* applies to each new stationary RICE located at a major or area source of HAP emissions.	EPs 10-01, 10-02, 10-03, 10-04, 10-08, 10-09, 10-10, 11-06 & 11-07
401 KAR 63:002, Section 2(4)(aaaaa), 40 C.F.R. 63.10680 to 63.10692, Table 1 (**Subpart YYYYY**), *National Emission Standards for Hazardous Air Pollutants for Area Sources: Electric Arc Furnace Steelmaking Facilities,* applies to each electric arc furnace (EAF) steelmaking facility that is an area source of hazardous air pollutant (HAP) emissions.	EPs 01-01, 01-02, 01-03, 01-04, 01-05, 01-06, 01-07, 01-08 B, 01-09 A&B, 01-10, 01-11, 01-12, 02-01, 02-03, 02-04, 02-05, 02-06, 08-04

Applicable Regulations	Emission Points
401 KAR 63:002, Section 2(4)(ddddd), 40 C.F.R. 63.11110 to 63.11132, Tables 1 to 3, (Subpart CCCCCC), *National emission standards for hazardous air pollutants for Source Category: Gasoline Dispensing Facilities,* applies to each GDF that is located at an area source. The affected source includes each gasoline cargo tank during the delivery of product to a GDF and also includes each storage tank.	EP 15-02
401 KAR 63:010, *Fugitive emissions,* applies to each apparatus, operation, or road which emits or may emit fugitive emissions provided that the fugitive emissions from such facility are not elsewhere subject to an opacity standard within the administrative regulations of the Division for Air Quality.	EPs 06-01, 06-03, 06-05, 08-01, 08-02, 08-03, 12-01, 12-02, 12-03, 14-01, 14-02
401 KAR 63:020, *Potentially hazardous matter or toxic substances,* applies to each affected facility which emits or may emit potentially hazardous matter or toxic substances, provided such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division for Air Quality.	EPs 03-01, 03-02, 03-03, 03-04, 03-05, 03-06, 03-10, 03-11, 04-01, 04-02, 04-03, 04-04, 04-05, 05-01, 05-03, 05-04, 15-01, 18-01, 18-02, 18-03, 18-05
40 CFR 64, *Compliance Assurance Monitoring*, applies to the capture system and PM control device required by 40 CFR 63, Subpart YYYYY. The exemption in 40 CFR 64.2(b)(1)(i) for emissions limitations or standards proposed after November 15, 1990 under section 111 or 112 of the CAA does not apply.	EPs 01-01, 01-02, 01-03, 01-04, 01-05, 01-06, 01-07, 01-08, 01-09, 01-10, 02-01, 02-03, 02-04, 02-05, 02-06, 08-04

Table C - Summary of Precluded Regulations:

Applicable Regulations	Emission Points
401 KAR 63:002, Section 2(4)(j), 40 C.F.R. 63.400 to 63.407, Table 1 (Subpart Q), *National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers*, precluded by prohibiting the use of chromium-based water treatment chemicals in the cooling towers.	EPs 09-01, 09-02, 09-04, 09-05, 09-06, 09-07, 09-08, 09-09

Table D - Summary of Non-Applicable Regulations:
N/A

Air Toxic Analysis
401 KAR 63:020, *Potentially Hazardous Matter or Toxic Substances*
The Division for Air Quality (Division) has determined based upon the use of natural gas and other pertinent information provided by the applicant that the conditions outlined in this permit will assure compliance with the requirements of 401 KAR 63:020.

Single Source Determination
N/A

SECTION 5 – PERMITTING HISTORY

Permit	Permit Type	Activity#	Complete Date	Issuance Date	Summary of Action	PSD/Syn Minor
V-20-001	Initial	APE20190004	1/24/2020	7/23/2020	Initial PSD Permit	PSD
V-20-001 R1	Sig Revision	APE20220003	3/21/2022	10/27/2022	Changes to PSD/design changes and addition of a Blast and Prime Line and other Support Equipment	PSD

SECTION 6 – PERMIT APPLICATION HISTORY

Permit Number: V-20-001 Activities: APE20190004

Received: September 9, 2019 Application Complete Date(s): January 24, 2020

Permit Action: ☒ Initial ☐ Renewal ☐ Significant Rev ☐ Minor Rev ☐ Administrative

Construction/Modification Requested? ☒Yes ☐No NSR Applicable? ☒Yes ☐No

Previous 502(b)(10) or Off-Permit Changes incorporated with this permit action ☐Yes ☒No

Description of Action:
With this application, NSB seeks a permit to construct a new plate mill just east of Brandenburg in Meade County. The NSB plate mill will recycle scrap steel and scrap substitutes using the electric arc furnace (EAF) process. Scrap steel and scrap substitutes will be delivered to the facility by barge, rail, and truck. Scrap steel, scrap substitutes, and flux will be charged to the EAF and melted by applying electric current through the feed mixture. Molten metal will be tapped to a ladle and transferred to the LMF, where the chemistry and temperature of the steel will be adjusted to customer specifications. From the LMF, the molten metal may be transferred to a vacuum degasser prior to being cast as slabs. The slabs will be heated to a consistent temperature in a reheat furnace and car bottom furnaces, respectively, prior to being rolled and shaped to its final form as hot rolled plate coils, light plates, or heavy plates.

V-20-001 Emission Summary		
Pollutant	Actual (tpy)	PTE V-20-001 (tpy)
CO	0	2145.30
NO_X	0	769.41
PT	0	255.93
PM_{10}	0	417.28
$PM_{2.5}$	0	270.48
SO_2	0	313.46
VOC	0	122.58
Lead	0	0.41
Greenhouse Gases (GHGs)		
Carbon Dioxide	0	1,080,464
Methane	0	27.41
Nitrous Oxide	0	11.14
CO_2 Equivalent (CO_{2e})	0	1,084,469
Hazardous Air Pollutants (HAPs)		
Hexane	0	9.50
Fluoride	0	2.08
Chlorine	0	0.85
Manganese	0	0.71
Hydrogen Fluoride	0	0.62
Formaldehyde	0	0.51
Acetaldehyde	0	0.36

V-20-001 Emission Summary		
Pollutant	Actual (tpy)	PTE V-20-001 (tpy)
Methylene Chloride	0	0.27
Methanol	0	0.20
Carbon Disulfide	0	0.17
Acrolein	0	0.15
Chromium	0	0.11
Toluene	0	0.10
Benzene	0	0.05
Combined HAPs:	0	13.94

Permit Number: V-20-001 R1 Activities: APE20220003

Received: January 18, 2022 Application Complete Date(s): March 21, 2022

Permit Action: ☐ Initial ☐ Renewal ☒ Significant Rev ☐ Minor Rev ☐ Administrative

Construction/Modification Requested? ☒Yes ☐No NSR Applicable? ☒Yes ☐No

Previous 502(b)(10) or Off-Permit Changes incorporated with this permit action ☐Yes ☒No

Description of Action:
With this application, NSB seeks to revise the Permit V-20-001 to incorporate design changes that have occurred since permit issuance, including addition of a Blast and Prime Line and other support equipment. The NSB plate mill will recycle scrap steel and scrap substitutes using the electric arc furnace (EAF) process. Scrap steel and scrap substitutes will be delivered to the facility by barge, rail, and truck. Scrap steel, scrap substitutes, and flux will be charged to the EAF and melted by applying electric current through the feed mixture. Molten metal will be tapped to a ladle and transferred to the LMF, where the chemistry and temperature of the steel will be adjusted to customer specifications. From the LMF, the molten metal may be transferred to a vacuum degasser prior to being cast as slabs. The slabs will be heated to a consistent temperature in a reheat furnace and car bottom furnaces, respectively, prior to being rolled and shaped to its final form as hot rolled plate coils, light plates, or heavy plates.

The Division requested additional information regarding the EP 12-02 emissions calculation on May 25, 2022. NSB submitted the requested information on May 26, 2022.

The Division sent the initial application to the U.S. EPA on April 5, 2022.

The Federal Land Manager (FLM) at Mammoth Cave National Park received an email from NSB on April 5, 2022, that contained a completed Air Quality Related Values (AQRV) form and information regarding the project and its possible impact on nearby Class I areas, including the Mammoth Cave National Park.

The air dispersion modeling was completed (made final) on April 5, 2022. The final air dispersion modeling files were sent via email to the U.S. EPA on April 5, 2022.

NSB also provided additional information regarding the requested response to the modeling submittal on June 1, 2022.

This permit includes the following overall changes:

- Permit language, such as compliance demonstration methods, precluded regulations, etc, has been updated or added to be consistent and clear.
- Emission calculations were updated to reflect more recent emission data where it was available and appropriate.
- The following table identifies emission points that have been removed from the permit:

Table 1 – Removed Emission Points

EP#	Title	Max. Cap.	Control Equipment
02-02	Ladle Dryer	15 MMBtu/hr	Baghouse
05-02*	*Group 2 Car Bottom Furnaces #3 & #4	See Note	
07-01	DRI Unloading Dock/Receiving Hopper	500 Tons/hr	Bin Vent Filter
07-02	DRI Storage Silo #1	500 Tons/hr	Bin Vent Filter
07-03	DRI Storage Silo #2	500 Tons/hr	Bin Vent Filter
07-04	DRI Storage Silo Loadout	500 Tons/hr	None
07-05	DRI Day Bin	500 Tons/hr	Bin Vent Filter
07-06	DRI Transfer Conveyors	500 Tons/hr	Bin Vent Filter A&B
07-07	DRI Emergency Chutes	125 Tons/hr	None
09-03	Rolling Mill ICW Cooling Tower	8500 gal/min	Mist Eliminator
10-05	Austenitizing Furnace Rolls Emergency Generator	636 HP	None
10-06	Tempering Furnace Rolls Emergency Generator	636 HP	None
10-07	Air Separation Plant Emergency Generator	700 HP	None
11-01	Melt Shop Emergency Generator	260 HP	None
11-02	Reheat Furnace Emergency Generator	190 HP	None
11-03	Rolling Mill Emergency Generator	440 HP	None
11-04	IT Emergency Generator	190 HP	None
11-05	Radio Tower Emergency Generator	61 HP	None

*Note: EP 05-02 car bottom furnaces #3 & #4 is now combined with EP 05-01 (with car bottom furnaces #1 & #2)

- The following table identifies proposed additional emission points to be added to the permit:

Table 2 – Added Emission Points

EP#	Title	Max. Cap.	Control Equipment
01-08A	Tundish Preparation – Dump Station	2.7 Tons/hr	None
01-11	Caster Quench Box	370 Tons/hr	None
01-12	Secondary Caster Torch Cut Off	370 Tons/hr	None
03-07	Coil Tagger	250 Tons/hr	None
03-08	Rolling Mill Oxy-Fuel Plate Cutting Torch	750 Tons/hr	None
03-09	Rolling Mill Oxy-Fuel Coil Cutting Torch	750 Tons/hr	None
04-06	Continuous Heat Treat Exit Tagger	125 Tons/hr	None
09-09	Air Separation Plant Cooling Tower, System 900	12,800 gal/min	Mist Eliminator
10-08	G300-1 Emergency Generator	1474 HP	None

EP#	Title	Max. Cap.	Control Equipment
10-09	G400-1 Emergency Generator	1474 HP	None
11-06	Air Separation Plant Emergency Generator	410 HP	None
11-07	Admin Building Emergency Generator	103 HP	None
12-03	Slag Plant Pot Slagger	13.5 Tons/hr	Dust Suppression/ Wetting
12-04	Slag Plant Oxy Fuel-Fired Torched	12 Tons/hr	Baghouse
17-01 A&B	Two (2) Light Plate Cutting Beds #1 - #2 (Plasma Cutters & Oxy-Fuel Torches)	500 Tons/hr	Baghouse
17-02	Light Plate Tagger	250 Tons/hr	None
18-01	Paint System Preheater	0.00066 MMBtu/hr	None
18-02	Paint System Shot Blaster	400 Tons/hr	Baghouse
18-03	Plate Painting Operation	50.7 Gal/hr	Regenerative thermal oxidizer
18-05	Paint System Dryer	0.000095 MMBtu/hr	Regenerative thermal oxidizer

The changes to the original project scope and BACT analysis consist of the following (these changes are outlined here, and are discussed in greater details in the relevant sections of this document):

- Update to short-term melt shop hourly production rates (short-term maximum capacity increase) EP 01-01, EP 01-02, and EP 01-03. These changes also increase the maximum short-term capacity of the meltshop baghouse dust silo and dust handling system (EP 01-07) and scrap charging (EP 08-04). The annual maximum throughput will remain unchanged. Accordingly, the BACT determination made previously for these units remain the same, and BACT will not be revisited here.
- NSB submitted a revised operating limitation requirement to lower operating limitation for fluorspar from 500 pounds per heat to 250 pounds per heat for EP 01-02.
- Update to Caster Spray Vent (EP 01-05) exhaust flow rate, increase of 147,139 scfm to 196,132 scfm. The flow rate has been revised based on final fan design specification. The permit does not limit the airflow to the Caster Steam Vent. Because BACT emission limits were previously set based on grain loading and flowrate, the BACT emission limits have been revised to reflect this change in flow rate. The BACT analysis for particulate emissions was not revisited in this action because the grain loading requirements are unchanged.
- Updates to Caster Torch Cutoff (EP 01-06). Based on final design, the heat capacity of torches increased from 0.64 MMBtu/hr to 1.88 MMBtu/hr. The BACT determination made previously for this unit remains the same, and BACT will not be revisited here.
- The original application assumed that the dump and reline activities would occur inside the Melt Shop and Tundish Preparation Activities was designated as EP 01-08. In this update, Tundish Relining Station (EP 01-08B) is designated as EP 01-08 and Tundish Dump Station is designated as EP 01-08A. Tundish Dump Station is now located outside of the Melt Shop near the slag dump pits. For EP 01-08, the actual process has not changed. Accordingly, the BACT determination has not been revisited here. For EP 01-08A, a new BACT determination was made.
- The quantity of refractory removed and replaced for the tundish ladles, and furnace shell is revised in this application for Ladle Preparation (EP 01-09) and Refractory Cleanout (EP 01-10). These emissions are released within the Melt Shop and are ultimately controlled

by the melt shop baghouse. Accordingly, the BACT determination made previously for these units remains the same, and BACT will not be revisited here.

- As a result of revisions to the final design and to include steam generated from subsequent slab cooling via water spray in the caster quench box, BACT analysis for Caster Quench Box (EP 01-11) has been reevaluated.
- EU 02- Melt Shop Appurtenant Natural Gas Combustion Sources (EP 02-01, EP 02-03, EP 02-04, EP 02-05, and EP 02-06). The Tundish SEN Preheaters and the Mandrel Preheaters were identified as EP 02-05. With this application, the Tundish SEN Preheaters were separated out from Mandrel Preheaters (EP 02-06). Based on final manufacturing specification for the preheaters and dryers, the heat capacities have been changed by a small amount. However, as these units are ultimately exhausted to the melt shop baghouse, the BACT determination will remain the same and is not revisited here.
- Walking Beam Slab Reheat Furnace (EP 03-01). The final design included minor changes in the heat input capacity. The maximum physical heat input capacity of the furnace will be 460 MMBtu/hr (increased from 400 MMBtu/hr), which may only be reached during the end of the cold start process when preheating the furnace refractory to the desired operating temperatures across the various heat zones. When reheating cold steel slabs, the furnace may operate up to a maximum heat input capacity of 360 MMBtu/hr (decreased from 365 MMBtu/hr in the original permit application) during periods of continuous operation. Accordingly, the BACT determination made previously for this unit remains the same, and BACT will not be revisited here.
- Ingot Bogie Hearth Furnaces (EP 03-02). The initial design for ingot reheating, included four (4) ingot car bottom reheat furnaces (EP 03-02) each with a maximum heat input capacity of 37 MMBtu/hr. The final design includes three (3) furnaces, referred to as Bogie Hearth Furnaces to differentiate the furnaces from the heavy plate car bottom furnaces (EP 05-01). Each bogie hearth furnace will have a maximum heat input capacity of 41 MMBtu/hr. The BACT determination made previously for this unit remains the same, and BACT will not be revisited here.
- Roughing Mill Stand with Descaler (EP 03-03). As a result of revisions to the final design, the maximum short term capacity for this unit was increased to 333 tons/hr. The BACT determination made previously for this unit remains the same, and BACT will not be revisited here.
- Steckel Mill Finishing Stand (EP 03-04). The final manufacturer specification for the venturi scrubber (BACT) includes an increase in the exhaust flow rate from 40,000 scfm to 40,106 scfm. Because BACT emission limits were previously set based on grain loading and flowrate, the BACT emission limits has been revised to reflect this change in flow rate. The BACT analysis for particulate emissions was not revisited in this action because the grain loading requirements are unchanged.
- Updates to Steckel Mill Coiling Furnaces #1, and #2 (EP 03-05). Based on final design, the heat capacity of furnaces decreased from 17.5 MMBtu/hr to 11.2 MMBtu/hr. The BACT determination made previously for this unit remains the same, and BACT will not be revisited here.
- Updates to Heavy Plate Hand-Held Tagger (EP 05-04). Based on final design, the maximum quantity of steel plate processed increased from 4 plates/hr to 18.33 plates/hr. Because the emissions from this unit are so small, the BACT determination made previously for this unit remains the same, and BACT will not be revisited here.

- Reevaluating BACT for the Coil Sample Plasma Cutter (EP 03-06). The final design specifications for the plasma torches will have a different cutting speed, kerf width, number of cuts per hour.
- Reevaluating BACT for Continuous Heat Treat Plasma Torch Cutting (EP 04-04). The final design specifications for the plasma torches will have a different cutting speed, kerf width, number of cuts per hour.
- Reevaluating BACT for Continuous Heat Treat Entry Tagger (EP 04-05). The BACT analysis has been revisited for this unit due to a physical change to the design of the emission unit (or its exhaust parameters).
- Reevaluating BACT for the Heavy Plate Cutting Beds (EP 05-03). The final design specifications for the plasma and Oxy-fuel torches will have 3 burning beds, a different cutting speed, kerf width, number of cuts per hour.
- Reevaluating BACT for EU 06, Lime, Carbon, Alloy Handling Systems. The final design includes a different configuration for the material handling system, including the following; EAF Flux and Carbon Handling System (EP 06-01), Lime Silos A, B & C (EP 06-02), LMF Flux and Carbon Handling System (EP 06-03), EAF Carbon Silo (EP 06-04), LMF Alloy Handling System (EP 06-05).
- Reevaluating BACT for Melt Shop ICW Cooling Tower System 100 (EP 09-01). NSB is requesting to change the circulation rate to 41,000 gal/min and 3 cells for this cooling tower to reflect the final design.
- Reevaluating BACT for Melt Shop DCW Cooling Tower System 200 (EP 09-02). NSB is requesting to change the circulation rate to 14,000 gal/min and 2 cells for this cooling tower to reflect the final design.
- Reevaluating BACT for Rolling Mill DCW Cooling Tower System 400 (EP 09-04). NSB is requesting to change the circulation rate to 41,000 gal/min and 3 cells for this cooling tower to reflect the final design.
- Reevaluating BACT for Rolling Mill ACC ICW Cooling Tower System 500 (EP 09-05). NSB is requesting to change the circulation rate to 27,000 gal/min and 2 cells for this cooling tower to reflect the final design.
- Reevaluating BACT for Heavy Plate Quench DCW Cooling Tower System 600 (EP 09-06). NSB is requesting to change the circulation rate to 3,520 gal/min and 4 cells for this cooling tower to reflect the final design.
- Reevaluating BACT for Quench & ACC Laminar DCW Cooling Tower System 700 (EP 09-07). NSB is requesting to change the circulation rate to 30,000 gal/min and 3 cells for this cooling tower to reflect the final design.
- Reevaluating BACT for Heat Treat Cooling Tower System 800 (EP 09-08). NSB is requesting to change the circulation rate to 7,040 gal/min and 4 cells for this cooling tower to reflect the final design.
- Reevaluating BACT for Emergency Generators >500 HP. The BACT analysis has been revisited for these units since a physical change to the emission unit has been included in the application. The final design include the following changes;
  - G100-1 Emergency Generator (EP 10-01). NSB is requesting a decrease in the size of this generator from 2,922 HP to 1,474 HP.
  - G100-2 Emergency Generator (EP 10-02). NSB is requesting a decrease in the size of this generator from 2,922 HP to 2,682 HP.
  - G100-3 Emergency Generator (EP 10-03). NSB is requesting a decrease in the size of this generator from 2,922 HP to 2,682 HP.

  - o G200-1 Emergency Generator (EP 10-04). NSB is requesting to change a 920 HP Emergency Fire Pump with 1,474 HP emergency generator to serve roughing mill and rolling mill.
- Reevaluating BACT for Slag Processing Equipment (EP 12-01) and Slag Processing Piles (EP 12-02). With this revision, as a result of the final design, NSB is requesting an increase of the maximum short-term slag processing rate from 73 tons/hr to 400 tons/hr to account for the maximum amount of slag that can be processed based on the physical equipment limitations.

The following units have been added to the permit and the scope of the project:

- Based on the final design of the secondary slab cutting area, a Secondary Caster Torch Cutoff (EP 01-12) is included in BACT determination.
- Installation of a Coil Tagger (EP 03-07). The tagger is a robotic stenciling system used to apply ink-based identification markings on the rolled coils for inventory control.
- Rolling Mill Oxy-fuel Cutting Torches (EP 03-08 and EP 03-09). EP 03-08 is used for dividing a long mother plate 2 to 4 inches thick into two shorter plates and EP 03-09 is used for cutting sheets to specified lengths prior to being coiled at the down-coiler.
- Continuous Heat Treat Exit Tagger (EP 04-06). The tagger is robotic stenciling system used to apply ink-based identification markings on the plates for inventory control.
- Two Light Plate Cutting Beds #1 and #2 (EP 17-01 A&B). Revising the number of cutting beds used in the plate processing area. Each cutting bed will be equipped with a downdraft table to capture fume generated during the cutting process that will be vented to a dedicated dust collector for PM control.
- Light Plate Tagger (EP 17-02). The tagger is a robotic stenciling system used to apply ink-based identification markings.
- Air Separation Plant Cooling Tower, System 900 (EP 09-09). Based on the final design, NSB is installing a cooling tower for the Air Separation Plant. The circulation rate is 12,800 gal/min and 8 cells for this cooling tower.
- G300-1 and G400-1 Emergency Generators (EP 10-08, and EP 10-09). Based on the final design, NSB installing two emergency Generators with rating of 1,474 HP each to provide backup power to critical equipment.
- Air Separation Plant Emergency Generator, a 410 HP engine (EP 11-06) and Admin Building Emergency Generator, a 103 HP engine (EP 11-07). The final facility design includes the above two (2) emergency generators powered by spark ignition engines with a maximum output of less than 500 HP.
- Slag Plant Pot Slagger (EP 12-03). Based on the final design, the pot slagging equipment will be used to load processed slag in the bottom of slag pots for protection. The slag acts as a cushion to protect the bottom the pot from the molten slag as it is transported from the Melt Shop to the slag processing area. The pot slagging equipment includes a grizzly feeder, storage hopper, pan feeder, and conveyor. The pot slagging includes adding 1 ton of processed EAF slag per 100 cubic feet of pot volume. For the NSB slag pots, this equates to addition of up to 9 tons of slag per pot. Based on the equipment design, the processing rate is 1.5 pots slagged per hour.
- Slag Plant Oxy Fuel-Fired Torches (EP 12-04). The scrap metal cutting table will be used to cut revert scrap (off-specification plates/coils) with up to five (5) oxy-fuel torches to sizes that can be fed to the EAF for recycle. The oxy-fuel torches will each have a maximum natural gas consumption rate of 33 scfm. The cutting table will be equipped with a fume collection system to capture PM generated during the cutting process, which will

be vented to a dedicated dust collector for PM control. The dust collector will discharge to atmosphere through a dedicated stack.

- Blast and Prime Line (EU 18). With this revision NSB is requesting authorization to construct a Blast and Prime Line. The line will be used to apply a protective coating to certain plates per customer requirements. Emissions from the Blast and Prime Line will include:
  - Paint System Preheater (EP 18-01). A 660 Btu/hr preheater.
  - Paint System Shot Blaster (EP 18-02). Cleaning steel plates to remove scale prior to the painting operation is accomplished by a roller conveyor shot blaster. The plates continuously pass through a pre-chamber, blasting chamber, and cleaning chamber on a roller conveyor. The chambers separated by a series of slit rubber curtains that permit passage of the plates, while retaining rebounding abrasive. A ventilating hood with baffles to retain good abrasive over the plates will be directed to a baghouse dust collector. Fresh air enters the cabinet through the work openings and is exhausted through the hood to the dust collector to prevent fugitive dust emissions.
  - Plate Painting Operation (EP 18-03). An automatic painting system within the painting cabinet applies the primer at the specified coating thickness, typically 0.5 to 1 mils. A sensor system is employed that provides exact recognition of the plate height and edges, ensuring the coating is applied at the optimal distance from the plate face and only to the surface of the plate contributing to a reduction in paint consumption and limiting overspray to minimum. Airborne paint particles are extracted by the optimized linear airflow of the air extraction system and transported directly to a brush pre-separator. This system catches most of the paint particles and reduces the particle load to the downstream paint filtration system. Following the paint filtration system, the airflow is routed to a regenerative thermal oxidizer (RTO) for destruction of the VOC evolved from the painting and drying operations within the painting cabinet.
  - Paint System Dryer (EP 18-05). The coated plates pass through the paint dryer for final curing to allow immediate handling of the plate without damaging the coating. The paint dryer is heated with the excess heat exhausted from the pre-heater. The dryer also is equipped with a 95 Btu/hr burner that is used to bring the dryer up to operating temperature during a cold start or to supplement the excess heat from the pre-heater if needed. Recirculating fans and special air channels provide a consistent and homogeneous flow of hot air around the plates. Exhaust from the dryer is routed to the RTO for VOC control.

V-20-001 R1 Emission Summary			
Pollutant	Actual (tpy)	PTE V-20-001 (tpy)	Revised PTE V-20-001 R1 (tpy)
CO	0	2145.30	2159.06
NO_X	0	769.41	782.65
PT	0	255.93	306.30
PM_{10}	0	417.28	432.65
$PM_{2.5}$	0	270.48	279.47
SO_2	0	313.46	312.97
VOC	0	122.58	143.66
Lead	0	0.41	0.397

V-20-001 R1 Emission Summary			
Pollutant	Actual (tpy)	PTE V-20-001 (tpy)	Revised PTE V-20-001 R1 (tpy)
Greenhouse Gases (GHGs)			
Carbon Dioxide	0	1,080,464	1,069,309
Methane	0	27.41	26.68
Nitrous Oxide	0	11.14	10.94
CO_2 Equivalent (CO_{2e})	0	1,084,469	1,073,236
Hazardous Air Pollutants (HAPs)			
Hexane	0	9.50	9.34
Fluoride	0	2.08	2.08
Chlorine	0	0.85	0.84
Manganese	0	0.71	0.74
Hydrogen Fluoride	0	0.62	0.62
Formaldehyde	0	0.51	0.40
Acetaldehyde	0	0.36	0.34
Methylene Chloride	0	0.27	0.27
Methanol	0	0.20	0.20
Carbon Disulfide	0	0.17	0.17
Acrolein	0	0.15	0.14
Chromium	0	0.11	0.21
Toluene	0	0.10	0.10
Benzene	0	0.05	0.05
Combined HAPs:	0	13.94	19.05

APPENDIX A – ABBREVIATIONS AND ACRONYMS

AAQS – Ambient Air Quality Standards
BACT – Best Available Control Technology
Btu – British thermal unit
CAA – Clean Air Act
CAM – Compliance Assurance Monitoring
CEM – Continuous Emission Monitoring
CI – Compression Ignition
CO – Carbon Monoxide
CO_2e – Carbon Dioxide Equivalent
Division – Kentucky Division for Air Quality
EAF – Electric Arc Furnace
ESP – Electrostatic Precipitator
GCOP – Good Combustion & Operating Practices
GDF – Gasoline Dispensing Facility
GHG – Greenhouse Gas
GWP – Good Work Practices
HAP – Hazardous Air Pollutant
HF – Hydrogen Fluoride (Gaseous)
HP – Horse Power
LMF – Ladle Metallurgical Furnace
MSDS – Material Safety Data Sheets
mmHg – Millimeter of mercury column height
NAAQS – National Ambient Air Quality Standards
NESHAP – National Emissions Standards for Hazardous Air Pollutants
NO_x – Nitrogen Oxides
PM – Particulate Matter
PM_{10} – Particulate Matter equal to or smaller than 10 micrometers
$PM_{2.5}$ – Particulate Matter equal to or smaller than 2.5 micrometers
PSD – Prevention of Significant Deterioration
PTE – Potential to Emit
RICE – Reciprocating Internal Combustion Engine
SEN – Submerged Entry Nozzle
SER – Significant Emission Rate
SI – Spark Ignition
SO_2 – Sulfur Dioxide
SSM – Startup, Shutdown, & Malfunction
TDS – Total Dissolved Solids
TF – Total Fluoride (Particulate & Gaseous)
VOC – Volatile Organic Compounds
MMBtu/hr – million BTU per hour