

ALLEGHENY COUNTY HEALTH DEPARTMENT AIR QUALITY PROGRAM

January 28, 2021

SUBJECT: **United States Steel Corporation – Mon Valley Works – Clairton Plant**
400 State Street
Clairton, PA 15025
Allegheny County

Installation Permit No. 0052-I021

Replacement of 2nd Unit Pushing Emission Control Baghouse System – Batteries 13-15 (P052) and 19-20 (P053)

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FACILITY DESCRIPTION

United States Steel Corporation (U. S. Steel) operates the Mon Valley Works, Clairton Plant located in the city of Clairton, which produces coke and coke by-products under title V operating permit No. 0052.

The Clairton Plant is an existing major source of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), particulate matter (PM), particulate matter less than 10 microns in diameter (PM₁₀), particulate matter less than 2.5 microns in diameter (PM_{2.5}), hazardous air pollutants (HAPs), and volatile organic compounds (VOCs), as defined in §2101.20 of Article XXI. Allegheny County, or portions of it, is currently designated as nonattainment for SO₂ and PM_{2.5}. In addition, because the county is located within the Ozone Transport Region (OTR), the area is considered non-attainment for ozone precursor pollutants (NO_x and VOC).

INSTALLATION DESCRIPTION

This installation involves replacing the 2nd Unit PEC Baghouse System (comprised of Title V Permit Source IDs P052 and P053) which controls pushing emissions from existing Batteries 13, 14 and 15 and Batteries 19 and 20. The existing Batteries 13, 14, and 15 consist of 61 ovens per battery for a total of 183 ovens. Batteries 19 and 20 consist of 87 ovens per Battery for a total of 174 ovens. The current system consists of ten modules, with five modules dedicated to Batteries 13-15; and five modules dedicated to Batteries 19-20. In addition to improved capture equipment, the new system will improve control, as it will consist of twelve modules that are interchangeable between the two sets of batteries. The batteries will not be modified as part of this installation and there will be no operational change to these sources as a result of this project.

This installation will ultimately result in improved capture and control efficiency of fugitive pushing emissions and there will be a decrease in actual emissions of particulate matter (PM), particulate matter less than 10 microns (PM₁₀) and fine particulate matter (PM_{2.5}).

The installation will result in the following project emissions changes, in tons per year:

Pollutant	Project Emissions Increase (tpy) Pushing from Batteries 13 – 15	Project Emissions Increase (tpy) Pushing from Batteries 19 – 20	Project Emissions Increase Total* (tpy)
PM	0.0	0.0	0.0
PM ₁₀	0.0	0.0	0.0
PM _{2.5}	6.3	3.6	9.9
lead	-5.0E-4	-5.4E-4	-1.0E-3
SO ₂	17.9	21.3	39.2
NO _x	2.8	3.3	6.1
CO	4.6	7.9	12.5
VOC	0.2	0.2	0.5
Ammonia	<0.1	<0.1	0.1
CO _{2e}	1,159.8	2,019.0	3,178.8

* Total project emissions increase is based on the difference between baseline actual emissions and future projected actual emissions, as well as the higher capture efficiency of the new baghouse resulting in more emissions being directed to the PEC baghouse stack and less PEC fugitive emissions. Projected emission values are reflective of the modified PEC system total (stack and fugitive). There are no changes to operations of Batteries 13-15, 19-20.

PERMIT APPLICATION COMPONENTS:

1. Installation Permit Application No. 0052-I021, dated June 30, 2020.
2. Settlement Agreement and Order (#190601), dated February 5, 2020.

EMISSION SOURCES:

I.D.	SOURCE DESCRIPTION	CONTROL DEVICE(S)	MAXIMUM CAPACITY	FUEL/RAW MATERIAL
P052	Battery No. 13, 14 and 15 Pushing Emission Control (PEC) System	Baghouse	545,675 tons of coal charged per year per battery	Coal
P053	Battery No. 19 and 20 Pushing Emission Control (PEC) System	Baghouse	1,002,290 tons of coal charged per year per battery	Coal

METHOD OF DEMONSTRATING COMPLIANCE:

Compliance with the emission limitations of this permit will be demonstrated by particulate matter stack testing of the pushing emission control baghouse outlets during operation and simultaneous visible emission observations of pushing fugitives, upon operation of the modified system and every 24 consecutive months afterward. Compliance with the fugitive visible emission standard and proper operation of the pushing control system within specified permit parameters for differential pressure drop along with baghouse cleaning provisions will be used to demonstrate continuing compliance between emission tests. See the Installation Permit No. 0052-I021 for the specific conditions for determining compliance with the applicable requirements.

REGULATORY APPLICABILITY:

1. Article XXI Requirements for Issuance:

See Permit Application No. 0052-I021, Section 5: Applicable Requirements. The requirements of Article XXI, Parts B and C for the issuance of minor modification installation permits have been met for this facility. Article XXI, Part D, Part E & Part H will have the necessary sections addressed individually.

2. BACT Analysis:

The Department considers BACT to be established as follows for this permitting action:

- Continued use of movable hoods and baghouse technology; and
- PM filterable from the baghouse outlet limited to 0.004 gr/dscf.

Compliance will be verified through baghouse stack testing performed every two years.

3. Testing Requirements:

Baghouse particulate and SO₂ emission stack tests shall be conducted upon initial operation after modification and every 24 consecutive months afterward using EPA Methods 1 through 5 and performed according to Section 2108.02 of Article XXI. Visible emissions on the baghouse stack exhaust and fugitive pushing emissions shall be conducted upon initial operation after modification and every 24 consecutive months afterward using EPA Method 9, be done simultaneously with the baghouse stack tests and performed according to Section 2108.02 of Article XXI.

4. New Source Review/Prevention of Significant Deterioration (NSR/PSD):

The facility is a major source of NO_x and CO, SO₂, PM, PM₁₀, PM_{2.5}, HAPs and VOCs as defined in §2101.20 of Article XXI, therefore this installation modification must be evaluated for NNSR and PSD. NNSR pollutants include PM_{2.5}, SO₂, ozone (NO_x and VOC) and Ammonia; PSD pollutants are PM, PM₁₀, lead, CO and CO_{2e}.

ACHD's Article XXI regulations adopt the Federal PSD permitting procedures from 40 CFR §52.21 and the state NNSR permitting procedures from 25 PA Code §127.203. To determine the major NSR applicability for the project under these two programs, the steps outlined in the **U.S. EPA's NSR Workshop Manual, pages A.46-49** were followed. See Section 5 of the permit application for a complete PSD/NNSR analysis.

Step 1 is to evaluate the proposed emissions increase with the threshold limits in §52.21(b)(23)(i).

The project emission increase (PEI) is:

$$PEI = (PAE - DGE) - BAE$$

Where:

- PEI = Net Emission Increase
- PAE = Projected Actual Emissions
- DGE = Demand Growth Exclusion
- BAE = Baseline Actual Emission Rates

Table provides a summary of the result of this increase calculation for each emission unit and for the project. For this project, there is no Demand Growth Exclusion.

Project Emissions Summary

Pollutant	PSD /NNSR	Projected Actual Emissions (tpy)		Baseline Actual Emissions (tpy)		Project Emissions Increase (tpy)*		Total Increase (tpy)	Significant Emission Rates
		Pushing from Batteries 13 – 15	Pushing from Batteries 19 – 20	Pushing from Batteries 13 – 15	Pushing from Batteries 19 – 20	Pushing from Batteries 13 – 15	Pushing from Batteries 19 – 20		
PM	PSD	121.6	127.8	121.6	127.8	0.0	0.0	0.0	25
PM ₁₀	PSD	56.7	59.6	56.7	59.6	0.0	0.0	0.0	15
PM _{2.5}	NNSR	34.8	33.9	28.5	30.3	6.3	3.6	9.9	10
Lead	PSD	4.5E-3	5.3E-3	5.0E-3	5.8E-3	-5.0E-4	-5.4E-4	-1.0E-3	0.6
SO ₂	NNSR	24.0	27.5	6.1	6.2	17.9	21.3	39.2	40
NO _x	NNSR	10.8	11.5	8.0	8.1	2.8	3.3	6.1	40
CO	PSD	40.6	50.1	36	42.2	4.6	7.9	12.5	100
VOC	NNSR	1.0	0.8	0.7	0.6	0.2	0.2	0.5	40
Ammonia	NNSR	0.1	0.1	0.1	0.1	0.0	0.0	0.1	40
CO _{2e}	PSD	10,311.6	12,735.2	9,151.8	10,716.2	1,159.8	2,019.0	3,178.8	75,000

The proposed modification project does not result in a significant emission increase in Step 1. No further netting analysis is required for PSD pollutants. For NNSR pollutants, per §127.203a(2), for a de minimis emission increase (less than the significant emission rate), a netting analysis must be performed, comparing the proposed emission increase to any actual emissions increases or decreases contemporaneous with the project (within 10 years of receipt of a complete installation application). Changes at the US Steel Clairton Plant in the past 10 years have not resulted in any emissions increases. Therefore, neither PSD nor NNSR is triggered by this project.

5. New Source Performance Standards (NSPS):

No NSPS are applicable to the proposed project.

6. NESHAP Standards:

The following is the list of applicable NESHAP regulations of relevance to the proposed project:

- **40 CFR Part 63, Subpart L – Coke Oven Batteries**

NESHAP Subpart L applies to existing and new coke oven batteries. The batteries for which the pushing emissions control project pertains are not being modified themselves and are already subject to this Subpart. The appropriate provisions of Subpart L are already contained within the site’s Title V permit and there are no changes in regulatory applicability of this subpart as a result of the project.

- **40 CFR Part 63, Subpart CCCCC – Coke Ovens: Pushing, Quenching and Battery Stacks**

NESHAP Subpart CCCCC establishes HAP standards for pushing, soaking, quenching, and battery stacks at coke oven batteries. Emissions from the batteries are already subject to the following, non-exhaustive, list of requirements under this rule:

- ▶ PM (filterable) emissions to the atmosphere from the baghouse stack(s) must not exceed 0.02 lb/ton of coke [40 CFR 63.7290(a)(2)];
- ▶ Maintain (monitor and record) the daily average volumetric flow rate at the inlet of the control device at or above the minimum level established during the initial performance test or maintain (monitor and record) the daily average fan motor amperes at or above the minimum level established during the initial performance test [40 CFR 63.7290(b)(3); 40 CFR 63.7330(d)];
- ▶ Perform, and record, opacity observations of fugitive pushing emissions in accordance with 40 CFR 63.7291(a) to ensure compliance with opacity limitations spelled out in this section of the rule;

▶ Prepare and operate at all times according to a written operation and maintenance plan for each PECS which includes provisions for monthly inspections, preventative maintenance and corrective actions [40 CFR 63.7300(c)];

▶ Establish site-specific operating limits for either fan motor amperes or volumetric flow rate [40 CFR 63.7323(c)];

• Operating limits may be changed through the procedures of 40 CFR 63.7323(e) and U. S. Steel will evaluate whether such change procedures need to be enacted as a result of this project.

▶ Use, monitor and maintain a bag leak detection system [40 CFR 63.7330(a); 40 CFR 63.7331(a)];

▶ Develop a site-specific monitor plan for each continuous parametric monitoring system (CPMS) [40 CFR 63.7331(b) through (d)];

▶ Conduct performance tests no less frequently than twice during each term [40 CFR 63.7321, 40 CFR 63.7322, 40 CFR 63.7333(a)];

The applicable parts of Subpart CCCCC are already incorporated into the site's Title V permit and there is no change to the regulatory applicability of this Subpart as part of the project.

7. Risk Management Plan; CAA Section 112(r):

No materials stored at the facility meet the threshold for CAA §112(r). Therefore, the facility is not subject to CAA §112(r).

8. Greenhouse Gas Reporting (40 CFR Part 98):

If the facility emits 25,000 metric tons or more of carbon dioxide equivalent (CO₂e) in any 12-month period, the facility shall submit reports to the US EPA in accordance with 40 CFR Part 98.

EMISSIONS CALCULATIONS:

PEC Baghouse Projected Actual Emissions- Batteries 13-15 and 19-20

Batteries 13-15; Coal Charged (tpy):	1,347,000 (Projected Actual)
Batteries 19-20; Coal Charged (tpy):	1,591,900 (Projected Actual)
Batteries 13-15; Coke (tpy):	990,000 (Projected Actual)
Batteries 19-20; Coke (tpy):	1,170,000 (Projected Actual)
Annual Average Baghouse Flowrate (dscfm):	95,200
Capture Efficiency:	95%
Hours per Year:	8,760

Pollutant	Emission Factor	Factor Units	Projected Actual Emissions (tpy)		EF Source
			Batteries 13-15	Batteries 19-20	
PM (filterable)	0.004	gr/dscf	7.15	7.15	Vendor guarantee
PM ₁₀ (filterable)	0.004	gr/dscf	7.15	7.15	Vendor guarantee
PM _{2.5} (filterable + condensable)	0.0082	gr/dscf	14.7	14.7	Vendor guarantee/Historical Testing
NO _x	0.018	lb/ton coal	12.16	14.37	AP-42 Table 12.2-9 and capture efficiency
CO	0.060	lb/ton coal	40.31	47.64	AP-42 Table 12.2-9 for the entire push (lb/ton coal charged) minus PEC Fugitive Emission Factor
SO ₂	0.036	lb/ton coal	24.25	28.65	Engineering estimate considering increased capture
VOC – Batteries 13-15	0.0016	lb/ton coal	1.07	-	2019 AEI Factor (historical stack testing). Updated for improved capture
VOC – Batteries 19-20	0.0012	lb/ton coal	-	0.97	2019 AEI Factor (historical stack testing). Updated for improved capture
CO ₂ e	0.0080	tons CO ₂ e/ton coal charge	10237.20	12098.44	40 CFR 98.173(c). Capture efficiency.
Ammonia	0.0002	lb/ton coal	0.14	0.17	2019 AEI Factor (historical stack testing). Updated for improved capture
Total HAPs (including Lead)	-	-	3.29	3.52	2019 AEI Factor. Updated for improved capture

PEC baghouse Fugitives Projected Actual Emissions- Batteries 13-15 and 19-20

Pollutant	Emission Factor	Factor Units	Projected Actual Emissions (tpy)		EF Source
			Batteries 13-15	Batteries 19-20	
PM (filt.) Battery 13-15	0.1800	lb/ton coal	121.23	-	Based on historical factors used in AEI; updated for improved capture
PM (filt.) Battery 19-20	0.1810	lb/ton coal	-	144.03	Based on historical factors used in AEI; updated for improved capture
Total PM ₁₀ - Battery 13-15	0.0829	lb/ton coal	55.85	-	Based on historical factors used in AEI; updated for improved capture
Total PM ₁₀ - Battery 19-20	0.0834	lb/ton coal	-	66.40	Based on historical factors used in AEI; updated for improved capture
Total PM _{2.5} - Battery 13-15	0.0415	lb/ton coal	27.97	-	Based on historical factors used in AEI; updated for improved capture
Total PM _{2.5} - Battery 19-20	0.0418	lb/ton coal	-	33.27	Based on historical factors used in AEI; updated for improved capture

Pollutant	Emission Factor	Factor Units	Projected Actual Emissions (tpy)		EF Source
			Batteries 13-15	Batteries 19-20	
NO _x	0.001	lb/ton coke	0.56	0.66	2019 AEI Factor. Updated for improved capture
CO	0.003	lb/ton coal	2.12	2.51	2019 AEI Factor (Based on AP-42). Updated for improved capture
SO ₂	0.0019	lb/ton coal	1.28	1.51	Engineering estimate updated for improved capture
VOC – Batteries 13-15	0.0001	lb/ton coal	0.06	-	2019 AEI Factor (historical stack testing). Updated for improved capture
VOC – Batteries 19-20	0.0001	lb/ton coal	-	0.05	2019 AEI Factor (historical stack testing). Updated for improved capture
CO _{2e}	0.0080	tons CO _{2e} /ton coal charge	538.800	636.76	40 CFR 98.173(c). Capture efficiency.
Ammonia	1.11e-05	lb/ton coal	0.01	0.01	2019 AEI Factor (historical stack testing). Updated for improved capture
Total HAPs (including Lead)			8.15	9.69	2019 AEI Factor. Updated for improved capture

EMISSIONS SUMMARY:

Emission Limitations Summary

POLLUTANT	ANNUAL EMISSION LIMIT (tons/year)*
Particulate Matter	279.6
Particulate Matter <10 µm (PM ₁₀)	151.6
Particulate Matter <2.5 µm (PM _{2.5})	90.6
Nitrogen Dioxide (NO ₂)	27.7
Sulfur Oxides (SO ₂)	55.7
Carbon Monoxide (CO)	92.6
Volatile Organic Compounds (VOC)	2.1
Total HAPs (including Lead)	24.65
Greenhouse Gases (CO _{2e})	23,511.2

* A year is defined as any consecutive 12-month period.

RECOMMENDATION:

All applicable Federal, State, and County regulations have been addressed in the permit application, and the provisions of Article XXI, §2102.04.k relating to ‘Restrictions on Sources with Violations’ does not apply to this installation permit because paragraph §2102.04.k.1 states that: This subsection does not apply to sources installing air pollution control equipment, or project that do not increase total potential air emissions of any

regulated pollutant at those sources. This project includes the shutdown of Boilers 1, 2 & R1 and the installation of cogeneration units, which will result in overall decrease in total potential air emissions.

The Installation Permit for U. S. Steel, Clairton should be approved with the emission limitations and terms & conditions in Permit No. 0052-I021.

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