ALLEGHENY COUNTY HEALTH DEPARTMENT
AIR QUALITY PROGRAM

January 22, 2021

SUBJECT: U. S. Steel Edgar Thomson Plant
13th Street and Braddock Avenue
Braddock, PA 15104
Allegheny County

Installation Permit No. 0051-I009
For the Installation of two 2,922 bhp emergency generators

TO: JoAnn Truchan, P.E.
Section Chief, Engineering

FROM: Reihaneh Etemadi
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FACILITY DESCRIPTION

The U. S. Steel Mon Valley Works Edgar Thomson Plant (ET) is an iron and steel making facility that produces mainly steel slabs. Raw materials such as coke, iron-bearing materials, and fluxes are charged to blast furnaces in the iron making process. Molten metal (iron) is tapped from the blast furnace at the casthouse into transfer ladles. The hot metal is then transferred to a hot metal mixer or direct pour station in preparation for desulfurization. For desulfurization, a reagent is added to the hot metal, causing sulfur and other impurities to form and rise to the surface. Desulfurized hot metal is then introduced into the basic oxygen process (BOP), where the hot metal is transformed into molten steel. Scrap, alloys, fluxes, and oxygen are also introduced at the BOP. The liquid steel is tapped from the BOP vessels and transferred to the ladle metallurgy facility (LMF) or Vacuum Degasser, where the properties of the steel can be more precisely refined according to customer specifications. To achieve this additional refining at the LMF or Vacuum Degasser, specific alloying materials are added to the process. The refined liquid steel is then charged to the dual strand continuous caster mold. The steel slabs are formed in the continuous caster and are cut to length, ground, slit as necessary, and shipped offsite. There are three Riley Boilers at ET, which are used to generate steam, heat, and electricity for the plant. The three primary fuels for the boilers are Blast Furnace Gas (BFG), Coke Oven Gas, (COG), and Natural Gas (NG).

The facility has two (2) processes that are operated by an outside contractor:
1. BOP Slag Processing; and
2. Waste Product Recycling and Briquetting.

The BOP slag handling system is being operated by Tube City IMS, LLC, while the Waste Product Recycling and Briquette is operated by Braddock Recovery Inc, a division of Harsco Corporation. Both Tube City IMS, Inc. and Braddock Recovery Inc. are located on U.S. Steel Edgar Thomson property and are considered Title V facilities by ACHD. These facilities are part of the same major source, acting as support facilities to Edgar Thomson Plant, and have their own Title V operating permits. In addition, Messer is another support facility that is located outside U. S. Steel Edgar Thomson compound but supplies oxygen to U. S. Steel Edgar Thomson Plant. Messer is also supplying gases to other companies and is therefore not considered a co-located Title V facility at this time.

The facility, which is located in Braddock, Pennsylvania, is a major source of particulate matter less than 10 microns in diameter (PM_{10}), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NO_X), volatile organic compounds (VOC), and Hazardous Air Pollutants (HAPs), as defined in Section 2101.20 of Article XXI.

INSTALLATION DESCRIPTION

This permit is for the installation of two 2,922 bhp emergency generators. The emergency generators are Cummins EPA-certified Tier 1 non-road diesel emergency generators.

The installation results in the following potential emissions changes, in tons per year:

Pollutant	New Generators (tons/year)
$PM/PM_{10}/PM_{2.5}$	0.7
NO_X	22.5
SO_2	0.0
CO	3.2
VOC	1.6
Total HAPs	1.5e-02

PERMIT APPLICATION COMPONENTS:

1. Installation Permit Application No. 00051-I009, dated October 5, 2020.
2. Email correspondence, dated November 9, 2020 (BACT Analysis for EGs)
3. Email correspondence dated November 20, 2020 (NNSR Applicability for EGs).

EMISSION SOURCES:

I.D.	SOURCE DESCRIPTION	CONTROL DEVICE(S)	MAXIMUM CAPACITY	FUEL/RAW MATERIAL	STACK I.D.
GEN-1	Emergency Generator 1	None	2,922 HP	Diesel Fuel	GEN-1
GEN-2	Emergency Generator 2	None	2,922 HP	Diesel Fuel	GEN-2

METHOD OF DEMONSTRATING COMPLIANCE:

Compliance with the emission standards set in this permit will be demonstrated by maintaining records of generator operation and fuel use as well as supplier certification of sulfur content. See Permit No. 0051-I009 for the specific conditions for determining compliance with the applicable requirements.

REGULATORY APPLICABILITY:

1. **Article XX1 Requirements for Issuance:**
   See Permit Application No. 0051-I009, 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:**
   U. S. Steel will be transporting the two emergency generators from another U. S. Steel facility to the Edgar

Thomson Plant to be used for emergency back-up power purposes. The emissions analysis uses a maximum of 500 hours of operation per year but will be much less in practice. BACT was considered for the Tier 1 engines to be use of an ultra-low sulfur diesel fuel, to follow good operating and maintenance practices, and comply with the New Source Performance Standards (NSPS) for Stationary Compression Ignition Internal Combustion Engines under 40 CFR Part 60 Subpart IIII. The RACT-BACT-LAER Clearinghouse was reviewed and it was found that some states note that the applicable portions of 40 CFR Part 89 would apply as BACT for emergency engines, while other states note the use of ultra-low sulfur diesel fuel. In this instance, BACT is ensuring that the applicable portions of 40 CFR Part 89 as referenced in 40 CFR Part 60 Subpart IIII would apply and use of ultra-low sulfur diesel fuel.

An evaluation was completed by U.S. Steel using a conservatively low cost of $195,000 each, for a similarly sized Tier 2 generator. The cost per ton of NO_X reduction between the Tier 1 and Tier 2 generators is approximately $71,000, which exceeds a BACT threshold of economic feasibility. Therefore, BACT was concluded to be use of ultra-low sulfur diesel fuel, following good operating and maintenance practices, and complying with the NSPS 40 CFR Part 60 Subpart IIII (including those portions of 40 CFR 89 that are referenced in Subpart IIII).

3. **Testing Requirements:**

No testing is required at this time. However, the Department reserves the right to require testing, if necessary, in the future to assure compliance with the terms and conditions of Installation Permit No. 0051-I009.

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

The Edgar Thomson (ET) Plant is an existing major source located in Allegheny County. 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). Therefore, both Non-Attainment New Source Review (NSR) and Prevention of Significant Deterioration (PSD) permitting requirements need to be evaluated. As noted in the emission calculations and application materials, the Emergency Generator project does not trigger PSD based on the Significant Emission Rate (SER) of 40 tons per year (tpy) for NO_2. The project increase from the Emergency Generator Project is also less than the major NSR SERs for NO_X and VOC. The following is a demonstration that the Emergency Generator Project is also not applicable to the Minor NSR provisions found in 25 Pa Code 127.203a(a)(2) for ozone precursors. Both NO_X and VOC triggers are 40 tons per year for each pollutant.

The following table indicates that the significant emissions rates are not exceeded.

Table 1. De Minimis NNSR Applicability Summary

Pollutant	Emergency Generator Project Emissions (tpy)	BOP Water Cooling Tower Emergency Fire Pump Engine Emissions (tpy)	Endless Casting and Rolling Facility Emissions (tpy)	Net Emissions Change (tpy)
NO_X	22.5	0.3	-0.15	22.65
VOC	1.6	0.0075	0.89	2.50

Because the significant emission rates are not exceeded for NO_X (as NO_2), PSD is not triggered. An NSR netting analysis was conducted which includes the proposed Endless Casting and Rolling (ECR) Facility emissions, and other project emissions in the last ten years, if any, in order to show that the NSR thresholds would not have been exceeded. Although the two projects are independent of each other and therefore not aggregated for purposes of NSR, it is not known which project will be completed first, so both need to be treated as contemporaneous and taken into consideration in the netting analysis. The proposed ECR project

is calculated to result in a net decrease of 0.15 tpy of NO_X. All other pollutants are well below the significant emission rates for NSR. The only other change at the facility in the past 10 years was the construction of a new stack which resulted in no change of emissions. Furthermore, there have been no changes at Tube City IMS or at Braddock Recovery in the past 10 years. Therefore, this project will not trigger NSR.

5. **New Source Performance Standards (NSPS):**
This installation is subject to 40 CFR Part 60, Subpart IIII – *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*.

6. **NESHAP and MACT Standards:**
The generators are subject to 40 CFR 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. However, per §63.6590(c), the generators meet the requirements of this subpart by meeting the requirements of 40 CFR Part 60, Subpart IIII, and no further requirements of Part 63, Subpart ZZZZ apply.

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):**
The U.S. Steel Edgar Thomson Plant is a major source of greenhouse gas (CO_2) emissions. However, the Greenhouse Gas (GHG) reporting rule under 40 CFR Part 98 are not considered applicable requirements under the Title V regulations at this time. Therefore, there are presently no greenhouse gas requirements at the facility.

EMISSIONS CALCULATIONS:

Emergency Generators GEN-01 and GEN-02

Generator Rating:	600 kW
Fuel	Diesel
Max Amount/hr	149 gal/hr
Annual Fuel Consumption	74,633 gal/yr
Fuel Rating:	20.5 MMBtu/gallon
Fuel Sulfur Content:	0.0015%
Operation:	500 hrs/yr

All Emissions, excluding sulfur oxides and HAPS, are based on data supplied by the manufacturer (see additional information for permit application #0051-I009). The sulfur oxides and HAP emissions are based on US EPA AP-42 factors, *Section 3.4: Large Stationary Diesel and All Stationary Dual-fuel Engines (10/96)*. A 15% adjustment is added to all emissions calculated with AP-42 factors to account for operational variability.

Pollutant	Manufacturer emissions data (g/kW-hr)	AP-42 emissions factor (lb/hp-hr)	Short-Term per generator (lb/hr)	Long-Term per generator (tons/yr[1])	Total Emissions – Both Generators (tons/yr[1])
$PM/PM_{10}/PM_{2.5}$	0.3		1.4	0.34	0.7
NO_X	9.4		45.1	11.3	22.5
SO_2	-	1.21e-05	0.04	0.01	0.01
CO	1.3		6.4	1.6	3.2

Pollutant	Manufacturer emissions data (g/kW-hr)	AP-42 emissions factor (lb/hp-hr)	Short-Term per generator (lb/hr)	Long-Term per generator (tons/yr[1])	Total Emissions – Both Generators (tons/yr[1])
VOC	0.7		3.2	0.81	1.6
Total HAPs	-	-	-	7.6e-03	1.5e-02

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

EMISSIONS SUMMARY:

Emergency Generators GEN-01 and GEN-02
Emission Limitations Summary

POLLUTANT	ANNUAL EMISSION LIMIT (tons/year*)
PM/ PM_{10}/$PM_{2.5}$	0.7
Nitrogen Oxides (NO_X)	22.5
Sulfur Oxides (SO_X)	0.01
Carbon Monoxide (CO)	3.2
Volatile Organic Compounds (VOC)	1.6
Total HAPs	1.5e-02

*** 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. The facility is not subject to the restrictions of §2102.04.k of Article XXI. The installation permit for the U.S. Steel Edgar Thomson should be approved with the emission limitations and terms & conditions in Installation Permit No. 0051-I009.