**COMMONWEALTH OF PENNSYLVANIA**

**Department of Environmental Protection**

**March 18, 2020**

|  |  |
| --- | --- |
| **Subject**: | Addendum to the Technical Review Memo for the Renewal of a Title V Operating PermitArcelorMittal Plate, LLCFile No. 15-00010APS No. 560025; Authorization No. 1307496139 Modena RoadCoatesville, PA 19320City of CoatesvilleChester County |
| **To:** | James D. RebarchakProgram ManagerAir Quality Bureau |
| **From:** | James A. Beach, P.E.Environmental Engineer ManagerAir Quality Bureau |

1. **Background**

The Department of Environmental Protection (DEP) issued a Title V Operating Permit renewal on October 3, 2019 to ArcelorMittal Plate, LLC (ArcelorMittal). The final permit included conditions for the case-by-case compliance with the requirements of 25 Pa. Code §§ 129.96 – 129.100 for Reasonably Available Control Technology (RACT II). On November 4, 2019, ArcelorMittal filed an appeal of the renewal of their Title V Operating Permit.

DEP met with ArcelorMittal on November 21, 2019 to learn more about their processes and why they had issues with certain terms and conditions that were added to the renewal permit issued on October 3, 2019. After careful consideration of all facts concerning the sources operating at the facility and the regulations and policies that apply to a case-by-case RACT II determination, DEP has revised the Title V Operating Permit for ArcelorMittal. The revisions made in the Title V Operating Permit are described in the next section.

1. **Revisions**
2. Electric Melt Shop Boiler (Source ID No. 055)

In this TVOP amendment, DEP removed the instantaneous limit of 0.147 lb NOx/Mcf for this source, which was originally added in the Title V Operating Permit renewal that was issued on October 3, 2019. DEP determined the instantaneous limit of 0.147 lb NOx/Mcf is inappropriate for this source because of the following reasons:

1. This boiler operates between a standby mode and production mode. The steam generated by the boiler during the production mode is used to de-gas molten steel in ladles and other vessels by forming a vacuum on the vessel. This practice keeps the steel from having bubbles that may affect the integrity and strength of the steel. ArcelorMittal keeps the boiler running on standby to have it ready to run on production mode when the need arises for the de-gassing process. This boiler does not operate at steady-state, and it may be difficult to tune to both standby and production modes in a manner that establishes appropriate instantaneous limits for NOx.
2. There is an existing limit of 267 million cubic feet of natural gas per 12-month rolling period that is approximately 49.9% of the maximum capacity for this boiler (See Attachment 1 for Calculations). This combined with stack testing once every five years to determine the emission factor that will be used for this boiler until the next stack test and the annual limit on NOx that was applied to this source should be sufficient to limit the NOx produced on a monthly basis and demonstrate compliance with RACT II Case-by-case requirements.

DEP has determined that the annual NOx emission limit of 19.92 tons per 12-month rolling period, combined with an annual throughput limit for fuel usage, and a stack testing requirement is sufficient to comply with RACT II Case-by-case.

1. Electric Arc Furnace (Source ID No. 104)

As part of this amendment to ArcelorMittal’s TVOP, DEP removed the 0.440 lbs NOx/ton steel produced and 0.636 lbs VOC/ton steel produced emission limits that were originally offered as part of ArcelorMittal’s compliance with RACT II case-by-case. DEP determined that monthly limits for NOx and VOC emissions are more appropriate for this source for the following reasons:

A diagram representing Source ID No. 104 (taken from the source test report submitted to DEP on August 22, 2017 by LCH Consulting Associates) is presented in Attachment 2. Source ID No. 104 contains two individual sources, the Electric Arc Furnace and the Ladle Refining Furnace. The Electric Arc Furnace emits fugitive emissions and vents to the DEC System Hood with three baghouses. The ladle has fugitive emissions and vents to a baghouse. There is also a Building Evacuation Canopy that collects emissions from the Electric Arc Furnace and Ladle Refining Furnace that vents to a baghouse. The scrap steel is molten in batches called heats. This is a semi-batch process in which the scrap steel is added to the Electric Arc Furnace and the cover with the electrodes is applied to the steel. The steel is melted as the cover slowly clamps down on the furnace. The cover is removed, and more scrap steel is added. The process repeats until the furnace is full enough to tap off the slag and the molten steel from the Electric Arc Furnace. The tapped molten steel goes to the ladle for further refining.

VOCs are generated by the paints and other coatings that were applied to the scrap steel. NOx is generated thermally from the contact of air with the heat from the molten steel. The emissions of NOx and VOC are variable because they are dependent on the amount of coatings on the scrap steel or how much contact the heated steel has with air. AP-42, Volume 1, 5th Edition, Chapter 12.10 (1995) for Iron Foundries has ranges of emission factors for NOx and VOC (0.04 to 0.6 lbs NOx/ton steel produced; and 0.06 to 0.3 lbs VOC/ton steel produced). The rating for the emission factors is E, which means that not much data was collected for this type of source to create the emission factor. Not much stack testing has been done with Source ID No. 104 at ArcelorMittal either, so the application of an instantaneous emission limit to the Electric Arc Furnace is difficult to establish.

Because of the variability of the emissions for this semi-batch process, DEP determined monthly limits on NOx and VOC (34.1 tons/month NOx; 49.3 tons/month VOC) are appropriate.   These proposed limits will be considered the maximum allowable monthly emissions for NOx and VOC.  DEP will retain the annual limits of 340.6 tons NOx/12-month rolling period and 492.29 tons VOC/12-month rolling period that cannot be exceeded at any time.  DEP will also continue to limit the amount of steel processed through Source ID No. 104 to less than 1.55 million tons per 12-month rolling period. Testing will only be performed to determine the effective emission factor that will be used to determine monthly and annual emissions of NOx and VOC.

1. Source ID Nos. 055, 104, 136, 146A, 146B, 151, 250, and 270

A condition to maintain and operate these sources in accordance with manufacture’s specifications and with good operating practices or in a manner consistent with safety and good air pollution control practices was added to each of the listed sources in the renewal permit issued on October 3, 2019. This condition was in Section C of the Title V Operating Permit and applied to all the sources listed in the permit.

 Source ID Nos. 055, 104, 136, 146A, 146B, and 151 were not subject to Presumptive RACT I or RACT II requirements for NOx or VOC under 25 Pa. Code §§ 129.93 and 129.96(c) for maintenance and operation in accordance with manufacturer’s specifications and good operating practices because the heat capacities of these units are greater than 20 MMBTU/hr. These sources also contain permitted limits and recordkeeping that are subject to RACT II for these sources that will be submitted for revision of the State Implementation Plan (SIP).

Source ID Nos. 250 and 270 have VOC emission limits and recordkeeping that constitute RACT II for these sources, as amended.

With the heat capacities of these combustion sources exceeding the applicability for 25 Pa. Code §§ 129.93 and 129.96(c) and proposed limits on the VOC sources, there are no presumptive RACT requirements that apply to the sources listed in the previous two paragraphs in this section. The condition for presumptive RACT I was applied to all sources in the permit in Section C, regardless of RACT applicability, and will remain in Section C of the permit with this revision. Operating Permit OP-15-0010 did contain language applying to Source ID Nos. 055, 104, 136, 146A, 146B, 151, 250, and 270, but the condition did not specify that the requirements were specifically derived from 25 Pa. Code § 129.93 (it was more generally derived from 25 Pa. Code §§ 129.91 – 129.95). This seems to indicate that the condition was more generally applied to the sources because DEP determined that the condition would be necessary to assure proper operation of the sources in the permit (25 Pa. Code § 127.441).

1. Misc. Procs & Gas Usage (Source ID No. 183)

In this amendment, DEP modified language in Condition #007 to state “The permittee shall provide any updates or changes to this list of sources with its renewal application.” DEP approves of the change in permit language for the following reasons:

1. The emissions from a 1 MMBTU/hr natural gas source do not exceed 0.43 tons NOx per year and 0.024 tons VOC per year (see calculations in Attachment 1).
2. There is no condition in the permit explicitly stating that only natural gas be used in these sources, but only natural gas appears as the listed fuel for these sources in the permit.
3. There are no applicable MACT conditions that apply to any of the sources listed. Section B, Condition #019 deals with authorizations for de minimis increases.
4. Identification Marking (Source ID No. 250)

In this amendment, DEP changed the VOC emission limit applicable to Source ID: 250 (Identification Marking), from 5.40 tons per year VOC emission limit to 9.40 tons/year. DEP determined a 9.40 tons/year VOC emission limit is appropriate because it is based on the maximum emissions in conjunction with the productivity data that is available when the VOCs were emitted (see Attachment 1).

**Recommendation**

 I recommend issuance of the revised Title V Operating Permit to ArcelorMittal Plate, LLC.

**Attachment 1: Calculations**

Source ID No. 055: Calculation of Maximum Capacity for Fuel Usage and Percentage of Maximum Capacity Allowed

Boiler Heat Input Rating = 62.3 MMBTU/hr

Higher Heating Value for Natural Gas = 1,020 BTU/cf natural gas

Total Hours of Operation for 1-year = 8,760 hours/yr

Allowable Annual Fuel Usage for Source ID No. 055 = 267 MMcf/yr

Maximum Annual Fuel Use for Boiler = (62.3 MMBTU/hr)\*(8,760 hours/yr)\*(106 BTU/1 MMBTU)\*(1 cf natural gas/1,020 BTU) = 5.35 x 108 cf natural gas/yr (535.05 MMcf/yr)

Operational Capacity Allowed by Permit Limitation = 100%\*[(267 MMcf/yr)/(535.05 MMcf/yr)] = 49.9%

Source ID No. 183 – Misc Procs & Gas Usage

Heat Input for a typical source = 1 MMBTU/hr

AP-42, Volume 1, 5th Edition, Chapter 1.4 (1995) Emission Factors:

 100 lbs NOx/MMcf natural gas

 5.5 lbs VOC/MMcf natural gas

Higher Heating Value of Natural Gas = 1,020 BTU/cf natural gas

Potential Hours of Operation Annually = 8,760 hours/yr

NOx Emissions = (106 BTU/hr)\*(1 cf natural gas/1,020 BTU)\*(100 lbs NOx/106 cf natural gas) = 0.098 lbs NOx/hr\*(8760 hours/yr)/(2,000 lbs/ton) = 0.43 tpy NOx

VOC Emissions = (106 BTU/hr)\*(1 cf natural gas/1,020 BTU)\*(5.5 lbs VOC/106 cf natural gas) = 0.0054 lbs VOC/hr\*(8760 hours/yr)/(2,000 lbs/ton) = 0.024 tpy VOC

Source ID No. 270: Calculation Provided by ArcelorMittal for Estimating Annual Emissions from Identification Marking

*Basis for the 9.4 tons/year request*:

* Highest VOC emissions reported in the last 15 years – 3.09 tons in 2007
* EAF production in 2007 – 612,851 tons
* Ratio EAF max cap to actual 2007 – 1,550,000/612,851 = 2.53
* Adjust 2007 actual VOC to max EAF capacity – 3.09\*2.53 = 7.82 tons of VOCs
* Add 20% to the adjusted value to account for variabilities – 7.82+20% = 9.38 tons/year or **9.4 tons/year**

**Attachment 2: Figure Representing Source ID No. 104**