ALLEGHENY COUNTY HEALTH DEPARTMENT
AIR QUALITY PROGRAM

June 30, 2023

SUBJECT: **Reasonable Available Control Technology (RACT III) Determination**
US Steel Irvin (0050)
Camp Hollow Road
West Mifflin, PA 15122
Allegheny County

Title V Operating Permit No. 0050-OP16

TO: JoAnn Truchan, P.E.
Program Manager, Engineering

FROM: Gregson Vaux
Air Quality Engineer

I. Executive Summary

The U.S. Steel Irvin Works (Irvin) is defined as a major source of NO_X and VOC emissions and was subjected to a Reasonable Achievable Control Technology (RACT III) review by the Allegheny County Health Department (ACHD) required for the 1997, 2008, and 2015 Ozone National Ambient Air Quality Standard (NAAQS). The findings of the review established that technically and financially feasible RACT would result in no changes since emission sources were either exempt, additional changes were not technically or financially feasible, or changes had previously been made and were already incorporated into issued permits.

Table 1 Technically and Financially Feasible Control Options Summary for NO_X/VOC

Unit ID	Emissions Unit	Financially Feasible Control Option	Current NO_X/VOC PTE	RACT Reduction	Revised NO_X/VOC PTE	Annualized Control Cost ($/yr)	Cost Effectiveness ($/ton NO_X/VOC removed)
There are no additional technically and financially feasible control options available for NO_X/VOC reduction from RACT II to RACT III.							

These findings are based on the following documents:

- RACT evaluation performed by Trinity Consultants (U S Steel Irvin RACT III Report 12-21-2022.pdf) – Submitted on December 22, 2022
- RACT II permit No.0050-OP16b, issued December 9, 2016 (EPA approval on October 21, 2021, 86 FR 58223)

II. Regulatory Basis

On October 26, 2015, the US EPA revised the ozone NAAQS. To meet the new standards, ACHD requested all major sources of NO_X (potential emissions of 100 tons per year or greater) and all major sources of VOC (potential emissions of 50 tons per year or grater) to reevaluate NO_X and/or VOC RACT for incorporation into Allegheny

County's portion of the PA SIP. ACHD has also incorporated by reference 25 Pa. Code, §§129.111-115 under Article XXI, §2105.08 ("RACT III").

This document is the result of ACHD's determination of RACT submitted by the subject source and supplemented with additional information as needed by ACHD. The provisions of RACT III will replace those of the previous RACT I and RACT II.

As part of the RACT regulations codified in 25 Pa. Code §§ 129.111—129.115 (relating to additional RACT requirements for major sources of NO_x and VOCs for the 2015 ozone NAAQS) (RACT III), ACHD has adopted the Pennsylvania Department of Environmental Protection's established method under § 129.114(i) (relating to alternative RACT proposal and petition for alternative compliance schedule) for an applicant to demonstrate that the alternative RACT compliance requirements incorporated under § 129.99 (relating to alternative RACT proposal and petition for alternative compliance schedule) (RACT II) for a source that commenced operation on or before October 24, 2016, and which remain in force in the applicable operating permit continue to be RACT under RACT III as long as no modifications or changes were made to the source after October 24, 2016. The date of October 24, 2016, is the date specified in § 129.99(i)(1) by which written RACT proposals to address the 1997 and 2008 8-hour ozone National Ambient Air Quality Standard (NAAQS) were due to the Department from the owner or operator of an air contamination source located at a major NO_X emitting facility or a major VOC emitting facility subject to § 129.96(a) or (b) (relating to applicability).

The procedures to demonstrate that RACT II is RACT III are specified in § 129.114(i)(1)(i), 129.114(i)(1)(ii) and 129.114(i)(2), that is, subsection (i), paragraphs (1) and (2). An applicant may submit an analysis, certified by the responsible official, that the RACT II permit requirements remain RACT for RACT III by following the procedures established under subsection (i), paragraphs (1) and (2).

Paragraph (1) establishes cost effectiveness thresholds of $7,500 per ton of NO_X emissions reduced and $12,000 per ton of VOC emissions reduced as ''screening level values'' to determine the amount of analysis and due diligence that the applicant shall perform if there is no new pollutant specific air cleaning device, air pollution control technology or technique available at the time of submittal of the analysis. Paragraph (1) has two subparagraphs.

Subparagraph (i) under paragraph (1) specifies that the applicant that evaluates and determines that there is no new pollutant specific air cleaning device, air pollution control technology or technique available at the time of submittal of the analysis and that each technically feasible air cleaning device, air pollution control technology or technique evaluated for the alternative RACT requirement or RACT emission limitation approved by the Department (or appropriate approved local air pollution control agency) under § 129.99(e) had a cost effectiveness equal to or greater than $7,500 per ton of NO_X emissions reduced or $12,000 per ton of VOC emissions reduced shall include the following information in the analysis:

- A statement that explains how the owner or operator determined that there is no new pollutant specific air cleaning device, air pollution control technology or technique available.
- A list of the technically feasible air cleaning devices, air pollution control technologies or techniques previously evaluated under RACT II.
- A summary of the economic feasibility analysis performed for each technically feasible air cleaning device, air pollution control technology or technique in the previous bullet and the cost effectiveness of each technically feasible air cleaning device, air pollution control technology or technique as submitted previously under RACT II.

- A statement that an evaluation of each economic feasibility analysis summarized in the previous bullet demonstrates that the cost effectiveness remains equal to or greater than $7,500 per ton of NO_X emissions reduced or $12,000 per ton of VOC emissions reduced.

Subparagraph (ii) under paragraph (1) specifies that the applicant that evaluates and determines that there is no new pollutant specific air cleaning device, air pollution control technology or technique available at the time of submittal of the analysis and that each technically feasible air cleaning device, air pollution control technology or technique evaluated for the alternative RACT requirement or RACT emission limitation approved by the Department (or appropriate approved local air pollution control agency) under § 129.99(e) had a cost effectiveness less than $7,500 per ton of NO_X emissions reduced or $12,000 per ton of VOC emissions reduced shall include the following information in the analysis:

- A statement that explains how the owner or operator determined that there is no new pollutant specific air cleaning device, air pollution control technology or technique available.
- A list of the technically feasible air cleaning devices, air pollution control technologies or techniques previously evaluated under RACT II.
- A summary of the economic feasibility analysis performed for each technically feasible air cleaning device, air pollution control technology or technique in the previous bullet and the cost effectiveness of each technically feasible air cleaning device, air pollution control technology or technique as submitted previously under RACT II.
- A statement that an evaluation of each economic feasibility analysis summarized in the previous bullet demonstrates that the cost effectiveness remains less than $7,500 per ton of NO_X emissions reduced or $12,000 per ton of VOC emissions reduced.
- A new economic feasibility analysis for each technically feasible air cleaning device, air pollution control technology or technique.

Paragraph (2) establishes the procedures that the applicant that evaluates and determines that there is a new or upgraded pollutant specific air cleaning device, air pollution control technology or technique available at the time of submittal of the analysis shall follow.

- Perform a technical feasibility analysis and an economic feasibility analysis in accordance with § 129.92(b) (relating to RACT proposal requirements).
- Submit that analysis to the Department (or appropriate approved local air pollution control agency) for review and approval.

The applicant shall also provide additional information requested by the Department (or appropriate approved local air pollution control agency) that may be necessary for the evaluation of the analysis submitted under § 129.114(i).

III. Facility Description

The U. S. Steel Irvin Works is a secondary steel processing facility located in West Mifflin Borough, Allegheny County, Pennsylvania. The Irvin Plant receives steel slabs and performs one of several finishing processes on the steel slabs. The finishing processes commonly referred to as secondary steel processes, include hot and cold rolling, continuous pickling, annealing, and galvanizing. The facility is composed of an 80" hot strip mill, 64" & 84" continuous hydrochloric acid pickle lines, a cold reduction mill, HPH annealing furnaces, open coil annealing furnaces, a continuous annealing furnace, continuous galvanizing line no. 1, continuous galvanizing and aluminum coating line no. 2, a continuous terne line, four coke oven gas flares, and four natural gas/coke oven gas fired

boilers. The last full compliance evaluation (FCE) at U.S. Steel Irvin Works was conducted on July 30, 2020 and the facility was found to be in compliance. The facility currently has no violations.

There were no modifications or changes made to the facility after October 24, 2016. There have been no changes to this facility since the RACT II permit No. 00050a was issued on April 16, 2020.

U. S. Steel Irvin Works is a major source of NO_X and VOC emissions.

Tables 2 and 3 are lists of sources subject to § 129.114(i). The RACT II determination assures compliance with RACT III requirements:

Table 2 Facility Sources Subject to NO_X Case-by-Case RACT III per PA Code 129.114

Source ID	Description	Rating	NO_X PTE (TPY)	NO_X CBC Limit (RACT II)	NO_X CBC Limit (RACT III)	RACT II as RACT III
P001 – P005	80-inch hot strip mill, five reheat furnaces	140 MMBtu/hr each furnace Coke Oven Gas	220.1 ton/yr each furnace	Maintain and operate the source in accordance with good engineering and air pollution control practices; annual combustion process adjustment	No change from RACT II requirements (129.114(i)(1)(i))	Y
B001	Boiler 1	79.8 MMBtu/hr Coke Oven Gas	55.9 ton/yr	Maintain and operate the source in accordance with good engineering and air pollution control practices; annual combustion process adjustment	No change from RACT II requirements (129.114(i)(1)(i))	Y
B002	Boiler 2	84.6 MMBtu/hr Coke Oven Gas	59.3 ton/yr	Maintain and operate the source in accordance with good engineering and air pollution control practices; annual combustion process adjustment	No change from RACT II requirements (129.114(i)(1)(i))	Y

Table 3 Facility Sources Subject to VOC Case-by-Case RACT III per PA Code 129.114

Source ID	Description	Rating	VOC PTE (TPY)	VOC CBC Limit (RACT II)	VOC CBC Limit (RACT III)	RACT II as RACT III
P008	Cold Reduction Mill	2.5 million ton/yr steel coil	13.1 ton/yr	1. Operate with oil-water emulsion 2. Oil shall have a maximum VOC content of 2% 3. The cold re duction mill shall be operated with a mist eliminator control system 4. Records of compliance with Consent Order No. 258 and Article XXI 2105.06 shall be maintained at least two years	No change from RACT II requirements (129.114(i)(1)(i))	Y
P016	Roughing and Finishing Mill for 80-Inch Hot Strip Mill	750 tons/yr rolling oil	30 ton/yr	1. Operate rolling stand with oil-water emulsion 2. Oil shall have a maximum VOC content of 1% 3. Records of compliance with Consent Order No. 258 and Article XXI 2105.06 shall be maintained at least two years	No change from RACT II requirements (129.114(i)(1)(i))	Y

Table 4 Facility Sources Exempt from RACT III per PA Code 129.111 {< 1 TPY NO_X; < 1 TPY VOC}

Source ID	Description	Combustion Fuel
N/A	Paints, Thinners, Inks & Solvents	None
N/A	Fuel/Other HC Storage Tanks	None
P002	64” continuous coil HCL pickle	None
P007	84” continuous pickle line	None
F001	Fugitive particulates from roads	None

Table 5 Facility Sources Subject to Presumptive RACT III per PA Code 129.112

Source ID	Source Description	Rating	NO_x PTE (ton/yr)	VOC PTE (ton/yr)	Presumptive Limit RACT III
P001	80-Inch Hot Strip Mill Reheat Furnace No. 1	(140 MMBtu/hr; firing COG/NG)	NA	6.2	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. 25 PA Code §129.112(d)
P002	80-Inch Hot Strip Mill Reheat Furnace No. 2	140 MMBtu/hr; firing COG/NG	NA	6.2	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. 25 PA Code §129.112(d)
P003	80-Inch Hot Strip Mill Reheat Furnace No. 3	140 MMBtu/hr; firing COG/NG	NA	6.2	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. 25 PA Code §129.112(d)
P004	80-Inch Hot Strip Mill Reheat Furnace No. 4	140 MMBtu/hr; firing COG/NG	NA	6.2	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. 25 PA Code §129.112(d)
P005	80-Inch Hot Strip Mill Reheat Furnace No. 5	140 MMBtu/hr; firing COG/NG	NA	6.2	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. 25 PA Code §129.112(d)
P009	HPH Batch Annealing Furnaces	31 individual furnaces; each 4.9 MMBtu/hr; firing COG and NG	99.8	4.2	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. 25 PA Code §129.112(c)(4)
P010	Furnaces No. 1 to No. 9	7.2 MMBtu/hr each; firing COG and NG	184 combined	3.4 combined	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. 25 PA Code §129.112(c)(4)
P010	Furnaces No. 10 to No. 13	9.0 MMBtu/hr each; firing COG and NG			Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. 25 PA Code §129.112(c)(4)
P010	Furnace No. 14	5.4 MMBtu/hr; firing COG and NG			Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. 25 PA Code §129.112(c)(4)
P010	Furnace No. 15 to No. 16	7.47 MMBtu/hr each; firing COG and NG			Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. 25 PA Code §129.112(c)(4)
P011	Continuous Annealing	45 MMBtu/hr; firing COG and NG	78.8	1.3	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. 25 PA Code §129.112(d) Conduct a biennial tune-up 25 PA Code §129.112(b)(1)(i)
P012	No. 1 Continuous Galvanizing line	50 MMBtu/hr palvanizinng preheat furnace and 18 MMBtu/hr Galvanneal furnace both firing NG	13.1	1.4	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices applies to the 18 MMBtu/hr furnace 25 PA Code §129.112(c)(4) 0.10 lb NOX/MMBtu heat input for 50 MMBtu/hr furnace §129.112(g)(1)(i)
P013	No. 2 Continuous Galvanizing Preheat Furnace	18 MMBtu/hr; firing NG	31.5	0.5	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. 25 PA Code §129.112(c)(4)

Source ID	Source Description	Rating	NO_X PTE (ton/yr)	VOC PTE (ton/yr)	Presumptive Limit RACT III
P015	COG Flares No. 1 through No. 3	6.75 MMSCFD, each	180 combined	None	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. 25 PA Code §129.112(c)(8)
P015	Peachtree COG Flare	Line A and B) (6.75 MMSCFD			
B001	Boiler No. 1	Nebraska boiler; 79.8 MMBtu/hr; firing COG and NG	NA	2.2	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. §129.112(c)(2)
B002	Boiler No. 2 Cleaver Brooks; Model DL-76	84.6 MMBtu/hr; firing COG and NG	NA	2.4	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. §129.112(c)(2)
B003	Boiler No. 3 Nebraska boiler	41.6 MMBtu/hr; firing COG and NG	29.2	1.2	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. §129.112(c)(2) Conduct a biennial tune-up §129.112(b)(1)(i)
B004	Boiler No. 4 Nebraska boiler	41.6 MMBtu/hr; firing COG and NG	29.2	1.2	Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. §129.112(c)(2) Conduct a biennial tune-up 25 PA Code §129.112(b)(1)(i)
N/A	Misc. Natural Gas Combustion				Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices. 25 PA Code §129.112(c)(4)

IV. RACT III Determination

A RACT Review was conducted by U.S. Steel to evaluate its Irvin facility and incorporated into the ACHD RACT Determination.

The case-by-case RACT Control Options for U.S. Steel Irvin are detailed in Table 6 (NO_X) and Table 7 (VOC).

Table 6 RACT NO_X Control Comparisons with RACT III Costs

Control Option		P001-P005 Reheat Furnaces	B001	B002
	Combustion Fuel	Coke Oven Gas	Coke Oven Gas	Coke Oven Gas
Low NO_X Burners	tpy NO_X Removed	18.27 (each)	14	14.84
	RACT III Cost	$1,364,984 (each)	$156,719	$156,719
	$/ton	74,712	11,202	10,561
Selective Catalytic Reduction	tpy NO_X Removed	Technically Infeasible	44.74	47.43
	RACT III Cost	Technically Infeasible	$1,394,772	$1,467,062
	$/ton	Technically Infeasible	31,178	30,930
Selective Non-Catalytic Reduction	tpy NO_X Removed	Technically Infeasible	25.16	26.68
	RACT III Cost	Technically Infeasible	$3,679,341	$3,904,443
	$/ton	Technically Infeasible	146,214	146,341
Combustion Performance Optimization	tpy NO_X Removed	Previously Implemented	Previously Implemented	Previously Implemented
	RACT III Cost	N/A	N/A	N/A
	$/ton	N/A	N/A	N/A

Table 7 RACT VOC Control Comparisons with RACT III Costs

Control Option	P008 Cold Reduction Mill	P016 HSM Roughing and Finishing
Thermal Oxidation	Technically Infeasible	Not Employed at Industrial Scale
Mist Eliminator	Previously Implemented	Not Employed at Industrial Scale
Good Work Practices	Previously Implemented	Previously Implemented
Oil Substitution	Technically Infeasible	Not Employed at Industrial Scale

Identified Control Options

U.S Steel – Irvin identified the following control options during the RACT III case-by-case analysis:

Reheat Furnaces (P001- P005) – NO_X Control

- **Low NO_X Burners (LNBs)** – LNB technology is considered to be technically feasible for the hot strip mill reheat furnaces and therefore the cost-effectiveness is further considered in this proposal. It should be noted that the costs were calculated in accordance with EPA's Cost Control Manual algorithms assuming an average retrofit cost and appropriately updated for inflation. Actual site-specific retrofit factors and considerations have not been taken into account, which very likely would increase the costs LNBs have been previously installed in reheat furnaces at other facilities. In the case of retrofits, such as Irvin, results have been mixed with product quality being affected by the degree of NO_X reduction and in some cases, the actual NO_X emission reductions being less than indicated in the RACT/BACT/LAER Clearinghouse Database and thus the cost of emission reductions per ton to be greater than expected. When taking the previous factors into consideration, and especially the predominant usage of coke oven gas, LNBs are determined to not be economically feasible.

- **Selective catalytic reduction (SCR)** – A review of EPA's RACT/BACT/LAER Clearinghouse database showed two entries citing use of SCR for NO_X control on steel industry furnaces. The first case involved a pickling line furnace where SCR is used in conjunction with a caustic scrubber. As this source is materially different from the Irvin Plant's reheat furnaces, this is not considered a comparable application of the technology. In the second case, the facility was never constructed, and as such SCR has not been successfully demonstrated in practice on a similar source. The SCR process is temperature sensitive, such that any exhaust gas temperature fluctuations will result in reduced removal efficiency and will upset the NH_3/NO_X molar ratio. The installation of necessary components of the ammonia injection system and catalyst would also require extensive structural modifications to the furnaces and nearby structures. SCR requires an optimum temperature range of 480 to 800°F and fairly constant temperatures, or NO_X removal efficiency will decrease. Below this temperature range, the reaction rate drops sharply and effective reduction of NO_X is no longer feasible. Above this temperature, conventional reduction catalysts break down and are unable to perform their desired functions. As noted in the SNCR discussion below, the exhaust gas temperatures from the Irvin Plant's reheat furnaces are below the optimum SCR operating range, and these furnaces are all direct-fired sources, where there is risk of product contamination from contact with the reagent. For the various reasons described

above, SCR is considered to be not technically feasible for controlling NO_X emissions from the hot strip mill reheat furnaces.

- **Selective non-catalytic reduction (SNCR)** – SNCR requires a relatively high and very specific/narrow temperature range (generally between 1,550 °F and 1,950 °F), uncontrolled NO_X emissions above 200 ppm, and residence times of at least 1 second to be effective. Exhaust temperatures for the Irvin Plant hot strip mill reheat furnaces (P001 – P005) average below 500 °F, which is well below the effective SNCR threshold operating temperature range of 1,550 – 1,950 °F. In addition, the uncontrolled concentrations of NO_X in the exhaust gas from these furnaces averages around 75 ppm, which is well below the effective SNCR threshold of > 200 ppm. Finally, the hot strip mill furnaces are direct-fired units, where the injection of reagent (if there was even adequate space to accomplish injection) could contact the steel product and compromise product quality. A review of EPA's RBLC database shows that SNCR has not been commercially demonstrated on any steel reheat furnaces in the U.S. The significant technical challenges posed by the installation of SNCR for treating the furnaces' exhaust streams make the control technology not technically feasible for RACT for the reheat furnaces.

- **Combustion optimization / tune-up** – The formation of NO_X can be minimized by proper furnace operation. Generally, emissions are minimized when the furnace temperature is kept at the lower end of the desired range and when the distribution of air at the air and fuel injection zones is controlled. A high thermal efficiency would lead to less consumption of heat and fuel and would produce less NO_X emissions. General improvement in thermal efficiency is one design method of reducing NO_X formation, since less fuel is used.

  U. S. Steel currently maintains and operates the hot strip mill reheat furnaces at the Irvin Plant in accordance with good combustion practices and proper furnace design as demonstrated through annual tune-up activities. These are technically feasible methods for controlling NO_X emissions from the furnaces.

Reheat Furnaces (P001-P005) – VOC Control

- **Thermal oxidation** – Thermal oxidation to control VOCs is not technically feasible due to the low VOC concentrations (less than 0.4 ppm) in the exhaust stream.

- **Carbon adsorption** – Carbon adsorption is only feasible at concentrations equal to or greater than 1000 ppm, but the VOC concentrations in the exhaust stream are less than 0.4 ppm and thus technically infeasible.

- **Routing to a boiler** – The boilers at Irvin have operating temperatures of approximately 700°F, which is too low to measurably reduce VOC concentrations and thus this option is technically infeasible.

- **Routing to a flare** – Routing to the four flares at Irvin are not expected to measurably reduce VOC concentrations and thus are technically infeasible.

- **Condensers** – A condenser requires the inlet stream to have a VOC concentration of at least 5,000 PPM and since the VOC concentration in the reheat furnaces' waste stream is less than 0.4 ppm, this control option is technically infeasible.

- **Combustion optimization / tune-up** - This technology is technologically and economically feasible and has been previously implemented at the Irvin reheat furnaces.

Boilers B001 and B002 – NO_X Control

- **Low NO_X burners (LNBs)** – LNBs are considered technically feasible with respect to application on existing Boilers 1 and 2. The boilers already achieve a relatively low NO_X emissions rate which inherently limits the benefit of implementation of LNB technology. Based on the economic analysis, this option is not economically feasible.

- **Selective catalytic recirculation (SCR)** - SCR is considered technically feasible for this application although there are certain considerations that may complicate the level of control achievable. These considerations include, but are not limited to, the sulfur content of the fuel (i.e., COG fuel sulfur), which can leave to formation of sulfur trioxide (SO_3) and subsequently ammonium sulfur salts. The exhaust gases from the boilers would also need preheating prior to treatment via SCR. Based on the economic analysis, this option is not economically feasible.

- **Selective non-catalytic reduction** – As mentioned above, SCNR requires a high and narrow temperature range. The exhaust gases from the boilers would need to be preheated prior to treatment via SNCR. However, the control is deemed technically feasible for this type of operation.

- **Tune-up** – This option has been previously implemented

Cold Reduction Mill (P008) – VOC Control

- **Mist eliminators** – Mist eliminators remove visible or entrained oil vapor, moisture, and VOC mist (partially considered to be particulate matter greater than 10 microns in diameter) from the gaseous stream of processes when liquid droplets come in contact with the mist eliminator's wire mesh surface/pad or filter. The liquids present in the gas stream are separated by either diffusion, impaction, or interception and are then collected, filtered and sent to a storage tank. The Irvin Plant CRM is already equipped with a mist eliminator.

- **Thermal oxidizer** – A thermal oxidizer is not considered to be technically feasible for the cold reduction mill since the majority of the mist from the operation is water resulting in the thermal oxidizer needing to be significantly large to control the operation. Additionally, the VOC concentration is the exhaust stream is less than 4 ppm, which is too low to consistently control.

- **Oil substitution** – Oil substitution for the cold reduction mill is not considered to be technically feasible since an oil with a lower VOC content cannot be identified that can be applied to the cold reduction mill and offer the same product quality performance.

Roughing and Finishing Mill (P016) – VOC Control

U. S. Steel is not aware of any VOC controls deployed in the industry that reduce VOC emissions from lubricating oils applied at hot strip mill roughing and finishing mills.

- **Mist eliminators** – The hot strip mill rolling involves rolling heated steel slabs from the 80-inch Hot Strip Mill Furnaces. The use of the oil/water emulsion at the much higher temperatures compared to the cold reduction mill, makes the use of mist eliminators and similar filtration systems not effective in oil reduction. Additionally, significant enclosures, hoods, and ducting would need to be installed, which are anticipated to significantly increase costs. Therefore, a mist eliminator is not considered technically feasible for the Hot Strip Roughing and Finishing Mill.

- **Thermal oxidizer** – A thermal oxidizer is not considered to be technically feasible for the roughing and finishing mill since the majority of the mist from the operation is water resulting in the thermal oxidizer needing to be significantly large to control the operation.

- **Oil substitution** – Oil substitution is considered not technically feasible for the Hot Strip Mill, where the current oil emulsion has a VOC content of less than 1% by weight.

V. RACT III New Technology

In response to Allegheny County Health Department (ACHD)'s May 3, 2023 request for additional RACT III information, U.S. Steel provided the following information in a letter signed by the responsible official:

"U.S. Steel contracted a consultant, Trinity Consultants, to assist with the RACT III analyses for the Irvin, Edgar Thomson and Clairton Plants. Trinity Consultants was selected based on their knowledge of pollution controls, including those specific to the processes in the iron and steel industry and coke plants. Trinity is also engaged, on an as-needed consulting basis for a wide multitude of air emission and control evaluations with relevant trade organizations such as the American Coke and Coal Chemicals Institute and the American Iron and Steel Institute. Trinity has been employed in the past to provide training for state/consortiums as part of conferences and also specific training such as air dispersion modeling. The firm's experience extends beyond U. S. Steel and it is well known and recognized throughout the country by the regulated community as well as many Federal and State regulators.

Trinity's process for identifying technologies considered in the RACT III analysis started with an updated review of EPA's RBLC database for the sector and NO_X /VOC emissions. Trinity then performed internet searches for any other more recent related permitting actions or new, demonstrated technologies. No information on new technologies (i.e., those not included in the RACT III evaluation) was obtained from these internet-based searches. Trinity's analysis is consistent with recent EPA analyses and considerations. Subsequent to the submittal of the RACT III analyses, this conclusion was confirmed by EPA in April 2023 in finalizing the Good Neighbor Plan for the 2015 Ozone NAAQS. In the final version of the rule, after significant consideration and evaluation, EPA concluded that NO_X control technologies have not been demonstrated to be feasible because of the uniqueness of the processes and the fuels burned in the iron and steel emission units. EPA concluded that NO_X controls may be feasible for only reheat furnaces and boilers in the iron and steel/coke industry. The RACT III evaluations performed considered all technologies listed in the final rule. As such, to the best of U. S. Steel's knowledge a complete search was conducted to rule out new technologies."

VI. RACT II as RACT III

The conditions listed in Table 8 of this document below supersede the relevant conditions of Plan Approval Order and Agreement No. 258 (RACT I), issued December 30, 1996 and RACT II. The RACT III conditions are at least as stringent as those from RACT II. Other RACT I conditions, not affected by RACT III, remain in effect.

Application of RACT III requirements did not result in any emissions reduction. Application of RACT II conditions did not result in any emissions reduction.

VII. RACT III Summary and Revised RACT III Permit Conditions

The Department has analyzed the facility's proposal for considering RACT II requirements as RACT III and also performed an independent analysis. Based on the information provided by the facility and independently verified by the Department, ACHD has determined that the RACT II requirements satisfy the RACT III requirements. The RACT III requirements are identical to the RACT II requirements and are as stringent as RACT II.

The RACT III conditions (Table 8) have already been implemented in previous ACHD air quality permits resulting in no emission reduction at the U.S. Steel Irvin facility for this particular RACT analysis. All RACT I and II conditions, including emission limitations, emission requirements, work practices, monitoring, testing and recordkeeping still apply.

Table 8 Previous RACT Permit Conditions and RACT III Analogs

Source ID	Description	Permit Condition 0050a	RACT II Regulations	RACT III Regulations
P001-P005	**80-inch hot strip mill, five reheat furnaces** (140 MMBtu/hr; firing COG/NG)	Condition V.A.1.e Condition V.A.4.a Condition V.A.4.b Condition V.A.4.c Condition V.A.4.d Condition V.A.6.a	25 PA Code §129.99 25 PA Code §129.100 25 PA Code §129.100 25 PA Code §129.100 25 PA Code §129.100 25 PA Code §129.99	25 PA Code §129.114(i) 25 PA Code §129.115 25 PA Code §129.115 25 PA Code §129.115 25 PA Code §129.115 25 PA Code §129.114(i)
P008	**Cold Reduction Mill**	Condition V.D.1.a Condition V.D.1.d Condition V.D.3.a Condition V.D.3.b Condition V.D.4.b Condition V.D.4.d Condition V.D.6.a	25 PA Code §129.99 25 PA Code §129.99 25 PA Code §129.100 25 PA Code §129.100 25 PA Code §129.100 25 PA Code §129.100 25 PA Code §129.99	25 PA Code §129.114(i) 25 PA Code §129.114(i) 25 PA Code §129.115 25 PA Code §129.115 25 PA Code §129.115 25 PA Code §129.115 25 PA Code §129.114(i)
P009	**HPH Annealing Furnaces** (31 individual furnaces; each 4.9 MMBtu/hr; firing COG and NG)	Condition V.E.4.c Condition V.E.6.a	25 PA Code §129.100 25 PA Code §129.97(c)(3)	25 PA Code §129.115 129.112(c)(4)
P010	**Open Coil Annealing Furnaces** (all furnaces under 10 MMBtu/hr; firing COG and NG)	ConditionV.F.4.d Condition V.F.6	25 PA Code §129.100 25 PA Code §129.97(c)(3)	25 PA Code §129.115 25 PA Code §129.112(c)(4)
P011	**Continuous Annealing** (45 MMBtu/hr; firing COG and NG)	Condition V.G.4.c Condition V.G.6.a	25 PA Code §129.100 25 PA Code §129.97(b)(1)	25 PA Code §129.115 25 PA Code §129.112(b)(1)(i)
P012	**No. 1 Continuous Galvanizing Line** (50 MMBtu/hr; firing NG)	Condition V.H.1.c Condition V.H.4.b Condition V.H.6.a	25 PA Code §127.97.g.1.i 25 PA Code §129.100 25 PA Code §129.97(c)(3)	25 PA Code §129.112(g)(1)(i) 25 PA Code §129.115 129.112(c)(4)
P013	**No. 2 Continuous Galvanizing** (18 MMBtu/hr; firing NG)	Condition V.I.4.c Condition V.I.6	25 PA Code §129.100 25 PA Code §129.97(c)(3)	25 PA Code §129.115 129.112(c)(4)
P015	**Coke Oven Gas Flares** (6.75 MMSCFD, each)	Condition V.J.4.a Condition V.J.4.b Condition V.J.6	25 PA Code §129.100 25 PA Code §129.100 25 PA Code §129.99	25 PA Code §129.115 25 PA Code §129.115 25 PA Code §129.114(i)
P016	**Roughing and Finishing Mill**	Condition V.A.1.e Condition V.A.4.c Condition V.A.4.d	25 PA Code §129.99 25 PA Code §129.100 25 PA Code §129.100	25 PA Code §129.114(i) 25 PA Code §129.115 25 PA Code §129.115

Source ID	Description	Permit Condition 0050a	RACT II Regulations	RACT III Regulations
B001	**Boiler 1** (79.8 MMBtu/hr; firing COG and NG)	Condition V.K.4.a Condition V.K.4.c Condition V.K.6.a	25 PA Code §129.100 25 PA Code §129.100 25 PA Code §129.99	25 PA Code §129.115 25 PA Code §129.115 25 PA Code §129.114(i)
B002	**Boiler 2** (84.6 MMBtu/hr firing COG and NG)	Condition V.L.4.a Condition V.L.4.c Condition V.L.6.a	25 PA Code §129.100 25 PA Code §129.100 25 PA Code §129.99	25 PA Code §129.115 25 PA Code §129.115 25 PA Code §129.114(i)
B003 **B004**	**Boiler 3 and Boiler 4** (41.6 MMBtu/hr; firing COG and NG)	Condition V.M.4.a Condition V.M.4.c Condition V.M.6.a	25 PA Code §129.100 25 PA Code §129.100 25 PA Code §129.99	25 PA Code §129.115 25 PA Code §129.115 25 PA Code §129.114(i) §129.112(b)(1)(i) §129.112(c)(2)

All other RACT monitoring, recordkeeping and reporting requirements applicable to case-by-case RACT III determination have already been included in previous ACHD air quality permits.