ALLEGHENY COUNTY HEALTH DEPARTMENT
AIR QUALITY PROGRAM

June 30, 2023

SUBJECT: **Reasonable Available Control Technology (RACT III) Determination**
U.S. Steel Clairton Plant
400 State Street
Clairton, PA 15025-1855
Allegheny County

Operating Permit No. 0052

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

FROM: Hafeez Ajenifuja
Air Quality Engineer

I. Executive Summary

U.S. Steel Clairton Plant 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 2015 Ozone National Ambient Air Quality Standard (NAAQS). The findings of the review established that the U.S. Steel Clairton Plant is subject to both presumptive RACT III and case-by case RACT III requirements and the requirements are summarized below.

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

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

These findings are based on the following documents:

- RACT analysis performed by U.S. Steel Clairton Plant (2022-12-22 RACT III.pdf)- Submitted on December 22, 2022
- RACT II permit No.0052-I020b, issued on December 11, 2020 (modified on December 11, 2020) (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 grater) 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.

- 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, RACT I, Existing RACT II, Sources of NO_X, and Sources of VOC

U.S. Steel Clairton Works is the largest by-products coke plant in North America. Clairton Works operates 10 coke batteries and produces approximately 13,000 tons of coke per day from the destructive distillation (carbonization) of more than 18,000 tons of coal. During the carbonization process, approximately 225 million cubic feet of coke oven gas are produced. The volatile products of coal contained in the coke oven gas are recovered in the by-products plant. In addition to the coke oven gas, daily production of these by-products includes 145,000 gallons of crude coal tar, 55,000 gallons of light oil, 35 tons of elemental sulfur, and 50 tons of anhydrous ammonia. There are six (6) Boilers at Clairton, which are used to generate steam, heat, and electricity for the plant. The two (2) primary fuels for the boilers are Coke Oven Gas, (COG), and Natural Gas (NG).

The last full compliance evaluation (FCE) at U.S. Steel Clairton Works was conducted on June 10, 2021, and the facility was found to be in non-compliance with the applicable regulations, permit conditions, and conditions of the outstanding Consent Agreement (SAO 190604, issued June 27, 2019). See the details below:

1. Ongoing litigation regarding the fire at the No. 2 Control Room which resulted in un-desulfurized coke oven gas being combusted at the U.S. Steel Clairton, Edgar Thomson, and Irvin plants from December 24, 2018, through April 4, 2019 (Enforcement Order 190202).

   The desulfurization plant was put back online in April 2019, returning the Clairton Plant (and all other facilities burning coke oven gas generated at the Clairton Plant) to compliance with the H_2S concentration and SO_2 emission limits. The Enforcement case remains in litigation and/or negotiation due to the civil penalty to be agreed on or awarded in court.

2. US Steel was issued Notice of Violation #220302 related to exceedances of the hydrogen sulfide (H_2S) ambient air quality standard at the Department's Air Monitoring Station located in Liberty Borough on 153 occasions beginning 2020 and ending first quarter of 2022. The Department alleges that U.S. Steel's operations caused the H2S standard to be exceeded on these 32 occasions. These alleged violations are still under appeal/investigation.

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. 0052-I020 was issued on April 20, 2020 (amended (0052-I020b) on December 11, 2020).

U.S. Steel Clairton Works is a major source of NO_X & VOC emissions.

Table 2 is a list 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)	Case-by-Case Limit (RACT II)	Case-by-Case Limit (RACT III)	RACT II as RACT III
B001	Boiler No. 1	760 MMBtu/hr	1,598	0.48 MMBtu/hr with COG as the primary fuel & NG as the secondary fuel based on a 30-day rolling average; NOx CEM	No change from RACT II requirements (129.114(i)(1)(i))	Y
B002	Boiler No. 2	481 MMBtu/hr	780	0.37 MMBtu/hr with COG as the primary fuel & NG as the secondary fuel based on a 30-day rolling average' NOx CEM	No change from RACT II requirements (129.114(i)(1)(i))	Y
B005	Boiler R1	229 MMBtu/hr	310.94	0.31 MMBtu/hr with COG as the primary fuel & NG as the secondary fuel	No change from RACT II requirements (129.114(i)(1)(i))	Y
B006	Boiler R2	229 MMBtu/hr	310.94	0.31 MMBtu/hr with COG as the primary fuel & NG as the secondary fuel	No change from RACT II requirements (129.114(i)(1)(i))	Y

Source ID	Description	Rating	NO_X PTE (TPY)	Case-by-Case Limit (RACT II)	Case-by-Case Limit (RACT III)	RACT II as RACT III
B007	Boiler T1	156 MMBtu/hr	211.82	0.31 MMBtu/hr with COG as the primary fuel & NG as the secondary fuel	No change from RACT II requirements (129.114(i)(1)(i))	Y
B008	Boiler T2	156 MMBtu/hr	211.82	0.31 MMBtu/hr with COG as the primary fuel & NG as the secondary fuel	No change from RACT II requirements (129.114(i)(1)(i))	Y
P001	Underfiring Battery 1	517,935 tons/yr of coal	336.0	1. Comply with the NESHAP Subpart CCCCC and Subpart L work practice standard §63.7300 and §63.306 2. Maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices 3. Perform stack testing on combustion stack in accordance with the Title V Operating Permit. 4. Use of PROven System for C Battery	No change from RACT II requirements (129.114(i)(1)(i))	Y
P002	Underfiring Battery 2	517,935 tons/yr of coal	299.1			
P003	Underfiring Battery 3	517,935 tons/yr of coal	311.2			
P007	Underfiring Battery 13	545,675 tons/yr of coal	236.2			
P008	Underfiring Battery 14	545,675 tons/yr of coal	206			
P009	Underfiring Battery 15	545,675 tons/yr of coal	255.9			
P010	Underfiring Battery 19	1,002,290 tons/yr of coal	1,194.80			
P011	Underfiring Battery 20	1,002,290 tons/yr of coal	1,194.80			
P012	Underfiring Battery B	1,491,025 tons/yr of coal	767.7			
P046	Underfiring Battery C	1,379,059 tons/yr of coal	556.8			
P019	Desulfurization Plant	6,394,800 tons of coke	31.45	NO_X > 5 tpy 1. Maintain and operate the source in accordance with the good engineering and air pollution control practices. 2. Properly maintain two Claus Plants at the coke oven gas desulfurization plant. Each Claus Plant shall be capable of independently processing all the coke oven gas produced by the coke plant at full production	No change from RACT II requirements (129.114(i)(1)(i))	Y
B010	Ammonia Flare	12.5 MMBtu/hr	19.03	NO_X > 5 tpy 1. Flare minimization plan 2. Install, maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices	No change from RACT II requirements (129.114(i)(1)(i))	Y
	Pushing Emission (PEC) for the batteries			Maintain and operate the source in accordance with good engineering and air pollution control practices		

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

Source ID	Description	Rating	VOC PTE* (TPY) RACT III VOC PTE (TPY)	Case-by-Case Limit (RACT II)	Case-by-Case Limit (RACT III)	RACT II as RACT III
P001	Underfiring Battery 1	517,935 tons/yr of coal	9.50	Maintain and operate the source in accordance with good engineering and air pollution control practices	No change from RACT II requirements (129.114(i)(1)(i))	Y
P002	Underfiring Battery 2	517,935 tons/yr of coal	9.09			
P003	Underfiring Battery 3	517,935 tons/yr of coal	8.72			
P007	Underfiring Battery 13	545,675 tons/yr of coal	7.86			
P008	Underfiring Battery 14	545,675 tons/yr of coal	7.80			
P009	Underfiring Battery 15	545,675 tons/yr of coal	7.42			
P010	Underfiring Battery 19	1,002,290 tons/yr of coal	16.76			
P011	Underfiring Battery 20	1,002,290 tons/yr of coal	16.74			
P012	Underfiring Battery B	1,491,025 tons/yr of coal	16.51			
P046	Underfiring Battery C	1,379,059 tons/yr of coal	54			
P019	Desulfurization Plant	6,394,800 tons of coke	4.34			
P044	Light Oil Barge Loading	55,000,000 gallons/yr	8.74			
P021	Coke Byproduct Recovery Plant		68			
P013	Quench Tower No. 1	1,553,805 tons/yr of coal	9.71			
P015	Quench Tower No. 5	1,637,025 tons/yr of coal	9.17			
P016	Quench Tower No. 7	2,004,580 tons/yr of coal	13.83	PROven System; Operate and maintain according to good engineering and air pollution control practice	No change from RACT II requirements (129.114(i)(1)(i))	Y
P017	Quench Tower B	1,491,025 tons/yr of coal	9.83	Maintain and operate the source in accordance with good engineering and air pollution control practices & current Title V operating permit requirements	No change from RACT II requirements (129.114(i)(1)(i))	Y
P046	Quench Tower C	1,379,059 tons/yr of coal	44	1. Vapor Recovery 2. Maintain and operate the source in accordance with good engineering and air pollution control practices & current Title V operating permit requirements.	No change from RACT II requirements (129.114(i)(1)(i))	Y
P051	5A Quench Tower	1,270,200 tons/yr of coal	113.29	1. Maintain and operate the source in accordance with good engineering and air pollution control practices & current Title V operating permit requirements. 2. Comply with 40 CFR Part 61, Subpart V - *National Emission Standards for Equipment Leaks (Fugitive Emission Sources)*	No change from RACT II requirements (129.114(i)(1)(i))	Y
P046	7A Quench Tower	1,555,630 tons/yr of coal	116.60	>2.7 1. Maintain and operate the source in accordance with good engineering and air pollution control practices & current Title V operating permit requirements. 2. Comply with NESHAP 40 CFR 63, Subpart CCCCC [63.7295(b)]	No change from RACT II requirements (129.114(i)(1)(i))	Y

*The VOC emission limits for the quench towers were revised based on the existing installation permit and the renewal Title V Operating. There was no change in the operation or equipment.

Table 4 Facility Sources Subject to Presumptive RACT III per PA Code 129.112and PA Code 129.112

Source ID	Description	Rating	NO_X PTE (TPY)	VOC PTE (TPY)	Presumptive Limit RACT III
P013	Quench Tower No. 1	1,553,805 tons/yr of coal	1.55	NA	§129.112(c)(1) NO_X < 5 tpy 1. Maintain and operate the source in accordance with good engineering and air pollution control practices. 2. Operate in accordance with the Work-practice Standard NESHAP Subpart CCCCC-63.7295(b) and Title V Operating Permit requirements.
P015	Quench Tower No. 5	1,637,025 tons/yr of coal	1.88	NA	
P016	Quench Tower No. 7	2,004,580 tons/yr of coal	1.70	NA	
P017	Quench Tower B	1,491,025 tons/yr of coal	2.89	NA	
P046	Quench Tower C	1,379,059 tons/yr of coal	2.77	NA	
P051	5A Quench Tower	1,270,200 tons/yr of coal	1.88	NA	
P046	7A Quench Tower	1,555,630 tons/yr of coal	1.70	NA	
B010	Ammonia Flare	12.5 MMBtu/hr	NA	0.49	§129.112(c)(8) 1. Maintain, and operate the source in accordance with the manufacturer's and with good operating practices. 2. Operate in accordance with the Flare Minimization plan.
B001	Boiler No. 1	760 MMBtu/hr	NA	3.01	§129.112(d) Maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices for the control of VOC
B002	Boiler No. 2	481 MMBtu/hr	NA	0.93	
B005	Boiler R1	229 MMBtu/hr	NA	0.44	
B006	Boiler R2	229 MMBtu/hr	NA	0.44	
B007	Boiler T1	156 MMBtu/hr	NA	0.30	
B008	Boiler T2	156 MMBtu/hr	NA	0.30	

*The VOC emission limits for the boilers were revised based on the new emission factor that was used to estimate the emission limit during the Title V operating permit renewal. There was no change in the operation or equipment.

Table 5 Facility Sources Exempt from RACT III per PA Code 129.111(c) [< 1 TPY VOC)

Source ID	Description	Rating	NO_X PTE (TPY)	VOC (TPY)
P044b	Light Oil Truck Loading	49,315 gal/ day of light oil	NA	0.6

IV. RACT Determination

According to §129.114(i), a previously approved RACT II case-by-case determination that has not been modified or changed may submit a limited analysis as shown below for the Coke Oven Batteries, the Quench Towers, the Desulfurization Plant, the Coke By-Product Recovery Plant, and the VOC Loading Operations. There are no technically feasible control options for the processes. However, there are technically feasible control options for the boilers. Twelve technically feasible control options were identified (two for each of Boilers 1, 2, R1, R2, T1, and T2). All the options are above the threshold of $7,500 per ton of NO_X removed. Therefore, §129.114(i)(1)(i) needs to be addressed.

1. ***§129.114(i)(1)(i)(A):*** *A statement that explains how the permittee determined that there is no new pollutant specific air cleaning device, air pollution control technology or technique available.*

USS-Clairton Response:

a. <u>COKE BATTERY UNDERFIRE COMBUSTION STACKS (P001-P003; P007-P012)</u>

All available NO_X and VOC control technologies technically feasible to install at coke oven battery sources have been executed previously during the RACT II process. The coke batteries are currently subject to RACT I and RACT II requirements, and since the coke batteries commenced operation before October 24, 2016, have not been modified, and are subject to RACT II requirements under 25 Pa Code §129.99, which satisfy §129.114, this source meets the requirements for §129.114(i).

A review of the U.S. EPA's RACT/BACT (Best Available Control Technology)/LAER (Lowest Achievable Emission Rate) Clearinghouse (RBLC) database, literature on NO_X control, regulatory agencies, engineering experience, internet searches for any other more recently related permitting actions or new demonstrated technologies, and air pollution equipment vendors showed that there are no new technically feasible control devices, methods, or technologies that could be retrofit into the current coke oven battery processes at Clairton since the RACT II analysis was completed. Therefore, RACT III for coke batteries 1-3, 13-15, 19-20, B and C shall be continued compliance with the RACT II requirements listed above and contained in the current Title V operating permit.

b. **<u>BOILERS (Boiler No. 1; Boiler No. 2; Boiler R1, Boiler R2; Boiler T1; and Boiler T2)</u>**:

The Clairton Plant operations include several boilers that are not able to meet presumptive NO_X limits due to multi-fuel capabilities and have potential NO_X emissions greater than 5 tpy. The four smaller boilers (Boiler R1, R2, T1 and T2) are package boilers that typically operate when one of the two primary boilers (Boiler No. 1 and Boiler No. 2) are down.

A review of the U.S. EPA's RBLC database, literature on NO_X control, regulatory agencies, engineering experience, internet searches for any other more recent related permitting actions or new demonstrated technologies, and air pollution equipment vendors showed that there are no new technically feasible control devices, methods, or technologies for the boilers since the RACT II analysis was completed. Therefore, RACT III for boilers No. 1; boiler No. 2; boiler R1, boiler R2; boiler T1; and boiler T2 shall be continued compliance with the RACT II requirements listed above and contained in the current Title V operating permit.

c. <u>BATTERIES QUENCH TOWER (Quench Tower No. 1; Quench Tower No. 5; Quench Tower No. 7; Quench Tower B; Quench Tower C; 5A Quench Tower; and 7A Quench Tower)</u>

At the end of the coke cycle, when most of the volatiles have been driven off the coal to make coke, hot coke is pushed from the battery into a quench car. The quench car transports the coke to a quench tower where it is deluged with water to cool the coke.

A review of the RBLC database, engineering experience, internet searches, and other coke plant air permits showed that there are no new technically feasible control devices, methods, or technologies for the quench towers since the RACT II analysis was completed. Therefore, RACT III for quench tower no. 1; quench tower no. 5; quench tower no. 7; quench tower B; quench tower C; 5A quench tower; and 7A

quench tower shall be continued compliance with the RACT II requirements listed above and contained in the current Title V operating permit.

d. **DESULFURIZATION PLANT (INCINERATOR)**

The plant is a source of VOC, and after the volatile products in the COG are removed, the COG is processed in the desulfurization plant to remove hydrogen sulfide (H_2S) and other sulfur compounds. Clairton employs two Claus Plants in the desulfurization plant, a primary plant, and a backup in the event the primary Claus Plant is out of service. The acid off-gas is combusted at the SCOT Plant (i.e., thermal oxidizer). Thermal oxidation is the most effective means of reducing VOCs, and the emissions are already controlled by thermal oxidation.

A review of the RBLC database, engineering experience, internet searches and other coke plant air permits showed that there have not been any technological advancements or methods for the desulfurization plant since the RACT II analysis was completed.

During the RACT II process, thermal oxidation, carbon adsorption, catalytic oxidation, condensation, flaring, scrubbing technologies, and good operating practices technologies were identified as feasible control options. However, most of these technologies have not been demonstrated at a coke plant. Therefore, RACT III for the desulfurization plant shall be continued compliance (thermal oxidation) with the RACT II requirements listed above and contained in the current Title V operating permit.

e. BY -PRODUCTS PLANT

During the coking process, approximately 225 million cubic feet of raw coke oven gas are produced each day. The gases evolved leave the oven through standpipes, pass into gooseneck ducts, and then into the gas collection main.

Emissions of volatile organics from storage tanks and other equipment in the by-products plant are controlled by a gas blanketing system. The carrier gas in the blanketing system is clean COG. Storage tank atmospheric vents and other equipment are connected to this blanketing system where the collected organic vapors are mixed with the coke oven gas. This coke oven gas is used as fuel for boilers, furnaces and, other fuel burning equipment at the Clairton Plant, Irvin, and Edgar Thomson Plants. These combustion sources ultimately destroy VOCs captured by the blanketing system.

A review of the RBLC database, engineering experience, internet searches and other coke plant air permits showed that there are no new technically feasible control devices, methods, or advancement in control technologies for the by-product plant since the prior evaluation of RACT II analysis. Therefore, RACT III shall be continued compliance with the RACT II requirements listed above and contained in the current Title V operating permit.

f. LIGHT OIL LOADING OPERATIONS

Light oil is loaded once a week into 400,000-gallon river transport barges and it is pumped from the light oil storage tanks into the barge at a rate of 1,200 gpm. The light oil barge loading facility is equipped with a vapor recovery system and the VOC releases originating from the transfer of light oil are captured and directed to the plant gas handling system, with no release to the atmosphere.

A review of the RBLC database, engineering experience, internet searches, and other coke plant air permits showed that there are no new or feasible pollutant specific air cleaning devices or advancement in control technologies for the light oil loading operations since the prior evaluation of RACT II analysis.

Therefore, RACT III shall be continued compliance with the RACT II (vapor recovery system and proper operating practices) requirements listed above and contained in the current Title V operating permit.

g. COAL CRUDE TAR LOADING OPERATIONS

The Clairton Plant operates coal crude tar load-out facilities for both truck and railcar loading. Coal crude tar is pumped from the coal crude tar tanks into the tank truck or railcar up to 130,000 gallons per day.

A review of the RBLC database, engineering experience, and internet searches did not produce any similar tar loading operations or feasible pollutant specific air cleaning devices or advancement in control technologies for the coal crude tar loading operations since the prior evaluation of RACT II analysis.

Good Work Practices are the only technology that are considered technically feasible. Therefore, RACT III shall be continued compliance with the RACT II requirements listed above and contained in the current Title V operating permit.

2. ***§129.114(i)(1)(i)(B):*** *A list of the technically feasible air cleaning devices, air pollution control technologies or techniques previously identified and evaluated under §129.92(b)(1)—(3) included in the written RACT proposal submitted under §129.99(d) and approved by the Department or appropriate approved local air pollution control agency under §129.99(e).*

USS-Clairton Response:

a. COKE BATTERY UNDERFIRE COMBUSTION STACKS (P001-P003; P007-P012)

The RACT II analysis concluded that no control technology is technically feasible or cost effective.

b. BOILERS (Boiler No. 1; Boiler No. 2; Boiler R1, Boiler R2; Boiler T1; and Boiler T2)

The RACT II analysis concluded that the following control technologies are technically feasible for the Clairton Boilers:

1) Selective Catalytic Reduction (SCR); and
2) Selective Non-Catalytic Reduction (SNCR)

c. BATTERIES QUENCH TOWER

The RACT II analysis concluded that proper operating practices as required by NEESHAP, Subpart CCCCC work practice standard 63.7295(b) are technically feasible.

d. DESULFURIZATION PLANT (INCINERATOR)

The RACT II analysis concluded that thermal oxidation and/or good/proper operating practices are technically feasible.

e. BY -PRODUCTS PLANT

The RACT II analysis concluded that gas blanketing system and proper operating practices are technically feasible.

f. LIGHT OIL LOADING OPERATIONS

The RACT II analysis concluded that vapor recovery system and proper operating practices are technically feasible.

g. **COAL CRUDE TAR LOADING OPERATIONS**

The RACT II analysis concluded that proper operating practices is technically feasible for the coal crude tar loading operations.

3. ***§129.114(i)(1)(i)(C):*** *A summary of the economic feasibility analysis performed for each technically feasible air cleaning device, air pollution control technology or technique listed in paragraph 2 above and the cost effectiveness of each technically feasible air cleaning device, air pollution control technology or technique as submitted previously under §129.99(d) or as calculated consistent with the ''EPA Air Pollution Control Cost Manual'' (6th Edition), EPA/452/B- 02-001, January 2002, as amended.*

USS-Clairton Response:

As stated above, the RACT II analysis concluded that the only technologies technically feasible for Boilers 1, 2, R1, R2, T1, and T2 are Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR). USS Clairton performed an economic analysis for these control options. The analysis is included in Appendix A, Table 3 of the RACT III submittal and Table 6 below. The cost effectiveness for all technically feasible control options for Boilers 1, 2, R1, R2, T1, and T2 were calculated to be greater than $7,500 per ton NO_X removed; therefore, these control options are cost prohibitive.

4. ***§129.114(i)(1)(i)(D):*** *A statement that an evaluation of each economic feasibility analysis summarized in paragraph 3 above demonstrates that the cost effectiveness remains equal to or greater than $7,500 per ton of NOx emissions reduced*

USS-Clairton Response:

U.S. Steel Clairton Plant performed an evaluation of cost effectiveness of each technically feasible control option consistent with the "OAQPS Control Cost Manual" (Sixth Edition), EPA 450/3-90-006, and material and labor costs provided by boiler vendors. The OAQPS Control Cost Manual has not been updated since the RACT II analysis was completed. In addition, based on discussions with vendors and inflation, the costs of materials and labor are expected to have increased since the RACT II analysis. Based on the expected increase in material and labor costs, the cost effectiveness of the control technologies evaluated remains greater than $7,500 per ton of NO_X emissions reduced.

The Technically Feasible Control Options for NO_X are detailed in Table 6 below.

Table 6 RACT II Technically Feasible NO_X Control Cost Comparisons

Control Option	Process	NO_X Emissions Before the Control (TPY)	NO_X Emissions Removed (TPY)		Cost*
SCR	**B001**	**1,740.00**	**1392**	**Cost**	$10,853,479
				$/ton	$7,797
SNCR	**B001**	**1,740.00**	**783**	**Cost**	$29,965,679
				$/ton	$38,270
SCR	**B002**	**1,285**	**1028**	**Cost**	$6,244,441
				$/ton	$6,074
SNCR	**B002**	**1,285**	**578.3**	**Cost**	$16,665,226
				$/ton	$28,820
SCR	**B005 (R1)**	**525**	**420**	**Cost**	$2,475,842
				$/ton	$5,895
SNCR	**B005 (R1)**	**525**	**236.3**	**Cost**	$5,788,368
				$/ton	$24,501
SCR	**B006 (R2)**	**525**	**420**	**Cost**	$2,475,842
				$/ton	$5,895
SNCR	**B006 (R2)**	**525**	**236.3**	**Cost**	$5,788,368
				$/ton	$24,501
SCR	**B007 (T1)**	**358**	**286**	**Cost**	$1,931,322
				$/ton	$6,743
SNCR	**B007 (T1)**	**358**	**161.1**	**Cost**	4,441,590
				$/ton	$27,570
SCR	**B008 (T2)**	**358**	**286**	**Cost**	$1,931,322
				$/ton	$6,743
SNCR	**B008 (T2)**	**358**	**161.1**	**Cost**	4,441,590
				$/ton	$27,570

*2015 (July 31, 2015) RACT II Cost Spreadsheet

Table 7 RACT III Technically Feasible NO_X Control Cost Comparisons

Control Option	Process	NO_X Emissions Before the Control (TPY)	NO_X Emissions Removed (TPY)		Cost*
SCR	**B001**	**1,598.00**	**1,278.40**	**Cost**	$13,044,663
				$/ton	$10,204
SNCR	**B001**	**1,598.00**	**719.10**	**Cost**	$32,806,833
				$/ton	$45,622
SCR	**B002**	**780**	**624**	**Cost**	$7,962,064
				$/ton	$12,760
SNCR	**B002**	**780**	**351**	**Cost**	$19,129,906
				$/ton	$54,501
SCR	**B005 (R1)**	**310.94**	**248.75**	**Cost**	$1,906,125
				$/ton	$7,663
SNCR	**B005 (R1)**	**310.94**	**139.92**	**Cost**	$3,506,417
				$/ton	$25,060
SCR	**B006 (R2)**	**310.94**	**248.75**	**Cost**	$1,906,125
				$/ton	$7,663
SNCR	**B006 (R2)**	**310.94**	**139.92**	**Cost**	$1,906,125
				$/ton	$25,060
SCR	**B007 (T1)**	**211.82**	**169.46**	**Cost**	$2,240,947
				$/ton	$13,224
SNCR	**B007 (T1)**	**211.82**	**95.32**	**Cost**	4,816,160
				$/ton	$50,527
SCR	**B008 (T2)**	**211.82**	**169.46**	**Cost**	$1,958,225
				$/ton	$11,556
SNCR	**B008 (T2)**	**211.82**	**95.32**	**Cost**	$4,385,975
				$/ton	$46,014

*RACT III Submittal, December 21, 2022

V. RACT II as RACT III

The conditions listed in the Table 9 below supersede the relevant conditions of Plan Approval Order and Agreement #234 (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 listed in Table 9 below not affected by RACT III remain in effect.

Table 8 RACT II as RACT III Summary

Unit ID	New source or change to existing source?	Pollutant	RACT II PTE (tpy)	RACT III PTE (tpy)	RACT II NO_X	RACT III NO_X	RACT III Same as RACT II?
P001	No	NO_X	336.0	336.0	cbc	cbc	Y
P002	No	NO_X	299.1	299.1	cbc	cbc	Y
P003	No	NO_X	311.2	311.2	cbc	cbc	Y
P007	No	NO_X	236.2	236.2	cbc	cbc	Y
P008	No	NO_X	206	206	cbc	cbc	Y
P009	No	NO_X	255.9	255.9	cbc	cbc	Y
P010	No	NO_X	1,194.80	1,194.80	cbc	cbc	Y
P011	No	NO_X	1,194.80	1,194.80	cbc	cbc	Y
P012	No	NO_X	767.7	767.7	cbc	cbc	Y
P046	No	NO_X	556.8	556.8	cbc	cbc	Y
P019	No	NO_X	19.03	19.03	cbc	cbc	Y
B001	No	NO_X	1,598	1,598	cbc	cbc	Y
B002	No	NO_X	780	780	cbc	cbc	Y
B005	No	NO_X	310.94	310.94	cbc	cbc	Y
B006	No	NO_X	310.94	310.94	cbc	cbc	Y
B007	No	NO_X	211.82	211.82	cbc	cbc	Y
B008	No	NO_X	211.82	211.82	cbc	cbc	Y
TOTAL			**8,801.05**	**8,801.05**			

VI. 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.

Table 9 RACT I, RACT II, and RACT III Summary

Unit ID	Permit Condition No.	RACT I Requirement	RACT II Requirement	RACT III Requirement
Boilers-B001 – B002	V.A.1.b	Order #234, 1.2, 1.5	§129.99	§129.114(i)
Boilers-B001 – B002	V.A.2.a	Order #234, 1.4	§129.100	§129.115(b)(1)
Boilers-B001 – B002	V.A.3	Order #234, 1.4	§129.99	§129.115
Boilers-B001 – B002	V.A.4.a & V.A.4.c	Order #234, 1.5	§129.99	§129.115(f) & (k)
Boilers-B001 – B002	V.A.5.a	Order #234	§129.99	§129.115
Boilers-B001 – B002	V.A.6	Order #234, 1.1	§129.99	§129.114(c)
Boilers-B005 – B006 (Boilers R1 & R2)	V.B.1.b	Order #234, 1.2	§129.99	§129.114(i)

Unit ID	Permit Condition No.	RACT I Requirement	RACT II Requirement	RACT III Requirement
Boilers-B005 – B006 (Boilers R1 & R2)	V.B.2.a	Order #234, 1.3 & 1.4	§129.100	§129.115 (b)(6)
Boilers-B005 – B006 (Boilers R1 & R2)	V.B.4.a & V.B.4.c	Order #234, 1.7 & 1.8	§129.99	§129.115(f) & (k)
Boilers-B005 – B006 (Boilers R1 & R2)	V.B.5.a	Order #234	§129.99	§129.115
Boilers-B005 – B006 (Boilers R1 & R2)	V.B.6.	Order #234, 1.1	§129.99	§129.114(c)
Boilers-B007 – B008 (Boilers T1 & T2)	V.C.1.b	Order #234, 1.2	§129.99	§129.114(i)
Boilers-B007 – B008 (Boilers T1 & T2)	V.C.2.a	Order #234, 1.2	§129.99	§129.114(i)
Boilers-B007 – B008 (Boilers T1 & T2)	V.C.4.a & V.C.4.c	Order #234, 1.7 & 1.8	§129.99	§129.115(f) & (k)
Boilers-B007 – B008 (Boilers T1 & T2)	V.C.5.a	Order #234	§129.99	§129.115
Boilers-B007 – B008 (Boilers T1 & T2)	V.C.6.	Order #234, 1.1	§129.99	§129.114(c)
P001-P003	V.D.1.b	Order #234, 1.1	§129.99	§129.114(i)
P007-P009	V.D.1.b	Order #234, 1.1	§129.99	§129.114(i)
P010-P013	V.D.1.b	Order #234, 1.1	§129.99	§129.114(i)
P046	V.D.1.b – V.D.1.c		§129.99	§129.114(i)
P019 (Desulfurization Plant)	V.D.1.b – V.D.1.g	Order #234, 1.1	§129.99	§129.114(i)
P021 (coke byproduct plant)	V.D.1.b, V.D.1.e & V.D.1.f	Order #234, 1.1	§129.99	§129.114(i)
P013, P0115-P016; P047; P051 & P052	V.E.1.b & V.E.1.c	Order #234, 1.1	§129.99	§129.114(i)
B010 (ammonia flare)	V.F.1.a & V.F.1.b	Order #234, 1.1	§129.99	§129.114(i)

VII. New and Revised RACT III IP/OP Permit Conditions

All sources at the facility either meet Presumptive RACT III requirements in PA Code 129.112 or case by case as per PA Code 129.114. The installation permit No. 0022- I020 will be revised to add the appropriate PA RACT III regulation citations for each of these sources.

1. Section V.A: Remove and Add. Remove RACT I & II citations. RACT III citations was add and to supersede RACT II.

2. Section V.B: Remove and Add. Remove RACT I & II citations. RACT III citations was add and to supersede RACT II

3. Section V.C: Remove and Add. Remove RACT I & II citations. RACT III citations was add and to supersede RACT II.

4. Section V.D: Remove and Add. Remove RACT I & II citations. RACT III citations was add and to supersede RACT II.

5. Section V.E: Remove and Add. Remove RACT I & II citations. RACT III citations was add and to supersede RACT II.

6. Section V.F: Remove and Add. Remove RACT I & II citations. RACT III citations was add and to supersede RACT II.