Commonwealth of Pennsylvania
Department of Environmental Protection
Southeast Regional Office
(484) 250-5920

Date: May 22, 2025

Subject: Technical Review Memo
Significant Modification
Title V Operating Permit 23-00003
Monroe Energy, LLC/Trainer Refinery
Trainer Borough, Delaware County
Application No. 23-00003
APS ID #770788, AUTH ID #1421281

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INTRODUCTION/FACILITY DESCRIPTION

The Reasonably Available Control Technology (RACT) standards were created to satisfy the 2015 National Ambient Air Quality Standards (NAAQS) for ozone. The NAAQS are established by the U.S Environmental Protection Agency (EPA) as the maximum concentrations in the atmosphere for specific air contaminants to protect public health and welfare. The RACT requirements apply statewide to the owner or operator of any major Nitrogen Oxides (NOx) emitting facility, any major Volatile Organic Compounds (VOC) emitting facility or both when the installation/modification of the source(s) occurred on or before August 3, 2018.

The RACT III major source rulemaking was published in the Pa. Bulletin and became effective on November 12, 2022. The requirements of 25 Pa. Code §§ 129.111 – 129.115 (RACT III) apply to the owners and operators of all facilities in Pennsylvania that emit or have the potential to emit greater than 100 tpy of NOx and/or 50 tpy of VOCs.

Monroe Refinery, LLC (MONROE) owns and operates a petroleum refinery located on the Delaware River in the Borough of Trainer, Delaware County, Pennsylvania. The air emission sources at the refinery are regulated under PADEP Title V Operating Permit (TVOP) No. 23-00003. Emission sources associated with this facility include process units, boilers, process heaters, storage tanks, wastewater treatment and diesel-fired internal combustion engines. Multiple owners/operators have operated the refinery under TVOP 23-00003 since the original operating permit issuance in February 2003.

The facility-wide NO_x and VOC emissions, as reported in the annual emission statements, for calendar years 2017 through 2022 are presented in Table 1.

Table 1 – 2017 and 2022 Actual NO_x and VOC Emissions (tpy)

	NO_x	VOC
2017	721.02	274.39
2018	611.83	289.74
2019	748.68	304.09
2020	558.36	291.70
2021	729.19	271.11
2022	695.47	268.88

The NOx and VOC emissions from the MONROE refinery as demonstrated in Table 1 above, exceed the major NOx emitting facility and VOC emitting facility thresholds for RACT III; and since the refinery's operations commenced before August 3, 2018, MONROE must comply with RACT III requirements. MONROE submitted two documents: *RACT III Compliance Proposal and Significant Operating Permit Modification* (RACT III Proposal), and *Notification of RACT III Applicability [25 Pa. Code § 129.115(a)] and Alternative RACT Compliance Analysis [25 Pa. Code § 129.114(i)]* (Notification) in accordance with 25 Pa. Code § 129.114(i) on December 22, 2022, to demonstrate how it would comply with RACT III.

RACT III ANALYSIS for NOx and VOC APPLICABILITY

MONROE provided the following in the Notification to demonstrate compliance with RACT III requirements:

- Emission sources subject to a RACT requirement or RACT emission limitation in 25 Pa. Code §§ 129.112 – 129.114 [25 Pa. Code § 129.115(a)(2)(i)];
- Emission sources exempted from requirements under 25 Pa. Code §§ 129.112 – 129.114 [25 Pa. Code § 129.115(a)(2)(ii)]; and
- Emission sources exempted from requirements under 25 Pa. Code §§ 129.112 – 129.114 because the source's potential to emit less is than 1 tpy of NO_x or VOC [25 Pa. Code § 129.115(a)(4)]

The requirements under 25 Pa. Code §129.115(a)(3) are not applicable to MONROE or this analysis.

In accordance with 25 Pa. Code §129.115(a)(5), the following information is required for emission sources subject to, or exempt from, RACT requirements or RACT emission limitations under 25 Pa. Code §§ 129.112 – 129.114:

- A description, including make, model, and location, of each source [25 Pa. Code § 129.115(a)(5)(i)];
- The applicable RACT requirement or RACT emission limitation, or both, in §§ 129.112—129.114 for each source listed in accordance with 25 Pa. Code § 129.115(a)(2)(i) [25 Pa. Code § 129.115(a)(5)(ii)];
- The method of compliance proposed by the owner or operator in accordance with 25 Pa. Code § 129.115(a)(5)(ii) for each source listed in 25 Pa. Code § 129.115(a)(5)(i) [25 Pa. Code § 129.115(a)(5)(iii)]; and
- The reason why the source is exempt from the RACT requirements and RACT emission limitations in §§ 129.112—129.114 for each source listed in accordance with 25 Pa. Code § 129.115(a)(2)(ii) [25 Pa. Code § 129.115(a)(5)(iv)].

DEP has incorporated the tables provided by MONROE in the Notification in Appendix A of this document.

The description, including make, model, and location, of each emission source subject to RACT requirements or RACT emission limitations or exempt from RACT requirements and RACT emission limitations in §§ 129.112 - 129.114 are presented in Table A-1.

The emission sources, that are subject to RACT requirements or RACT emission limitations or exempt from RACT requirements and RACT emission limitations under 25 Pa. Code §§ 129.112—129.114 are provided in Tables A-2 and A-4.

Several emission sources in Tables A-2 and A-3 have the designation "case by case RACT" in the RACT III Applicability determination column. Additional analyses or determinations are presented below and in Appendices C-E, where applicable, for these emission sources.

SOURCES EXEMPT FROM RACT III

In accordance with 25 Pa. Code § 129.111, the requirements of RACT III do not apply to emissions sources for which a requirement or emissions limitation, or both, has been established in 25 Pa. Code §§ 129.51 – 129.52(a)-(k) and Table I categories 1-11, 129.52a-129.52e, 129.54 – 129.63a, 129.64-129-129.69, 129.71 – 129.75, 129.77 and 129.101 – 129.107 regulations. Emission sources that fall under this category are presented in Table A-4.

In accordance with 25 Pa. Code § 129.115(a)(4), emission sources required to be identified in the Notification but have the potential to emit less than 1 tpy of NOx or VOC are exempt from requirements under 25 Pa. Code §§ 129.112-129.114. The emission sources exempt from RACT requirements based on NOx or VOC emissions are presented in Table 2. Additional information is provided in Table A-5.

Table 2 – Emission Sources with NOx or VOC Potential Emissions Less Than 1 Ton Per Year

Source ID	Source Description	Emissions/Pollutant
102	Claus Sulfur Recovery	0.62 ton of VOC
119	Platformer Regenerator	0.21 ton of VOC
743	ACD 542 VAC Heater	0.79 ton VOC

SOURCES EXCLUDED FROM RACT III, NO LONGER IN OPERATION OR COMMENCED OPERATION AFTER AUGUST 2018

Plan Approval 23-0003Z was issued for three cooling towers under Source ID 701 (Cooling Towers). The installation of the three cooling towers is staged over major refinery turnaround events. Installation of the Area 3 Cooling Tower was placed in service in December 2018. Installation of the FCC Cooling Tower was completed and placed in service in Fall 2023. MONROE plans to place the Alkyl Cooling Tower in service during the next major refinery turnaround. Since none of these cooling towers commenced operation before August 3, 2018, Source ID 701 does not meet the applicability criteria of 25 Pa. Code §129.111(a) and the cooling towers are not subject to RACT III.

The following emission sources are no longer in operation at the refinery:

- Source ID 092 - Yanmar CI RICE (LP Basement Godwin Pump)
- Source ID 122 – Back up Flare

RACT III CASE-by-CASE ANALYSIS

An alternative RACT proposal was conducted in accordance with 25 Pa. Code § 129.114(c). A case-by-case RACT proposal involves conducting a step-by-step top-down analysis pursuant to 25 Pa. Code §§ 129.92(a) and (b). This involves the use of the RACT/BACT/LAER Clearing house (RBLC), as well as the use of additional information available on the US EPA's website and information garnered from control device vendors.

A RACT III case by case analysis involves a 5-step process per 25 Pa. Code § 129.92(b). Below are the steps involved.

I. Identify all potentially available control technologies.
    a. Researching the RACT/BACT Clearinghouse (RBLC) database
    b. Surveying regulatory agencies
    c. Drawing from previous engineering experience
    d. Surveying air pollution control equipment vendors
    e. Surveying available literature.
II. Evaluate the technical feasibility of the control options.
III. Rank remaining control technologies.

IV. Determine the cost effectiveness of each control technology.
V. Select RACT as the technology which is most effective in removing the pollutant. The technology must also be cost effective.

A case-by-case RACT analysis was performed for the emission sources listed in Table 3.

Table 3 - Emission Source Requiring Case-by-Case RACT Analysis

Emission Source	Pollutant
FCC (Source ID 101)	NOx
Peabody Heater (Source ID 130)	NOx
ULSG Cooling Tower (Source ID 702)	VOC

A case-by-case RACT analysis was required for the sources in Table 3 for the following reasons:

- There are no presumptive RACT requirements or RACT emission limitation for the FCCU. The exhaust from the FCCU regenerator produces steam through indirect contact; therefore, the FCCU is not a combustion source under 25 Pa. Code § 121.1 and 25 Pa. Code § 129.112(k) does not apply.
- The Peabody Heater, a direct-fired heater, appears to be subject to the NOx RACT emission limit of 0.1 lb/MMBtu under 25 Pa. Code § 129.112(k). The vintage of the Peabody Heater suggests that the emission level for refinery processes using direct-fired heaters[1] achieve a minimum emission level of 0.34 lb/MMBtu, which exceeds the NOx RACT emission limit.
- There are no presumptive RACT requirement or RACT emission limitations for a cooling tower.

The case-by-case RACT analysis can be found in Appendices C-E for the emission sources in Table 3.

A summary of the case-by-case RACT determinations is presented in the table below.

Table 4 – Case-by-case RACT Determinations

Source ID – Description	Citation	Air Cleaning Devices and Air Pollution Control Technologies or Techniques	
		Current RACT	Proposed RACT III
101 – FCC Unit	25 Pa. Code § 129.114(b)	Selective noncatalytic reduction (SNCR) and good operating practices	SNCR and good operating practices including NOX is limited to, 121.1 ppmdv as a 365-day rolling average at 0

[1] U.S. EPA, Assessment of NOx Emission Factors for Direct-Fired heaters, Newman, C.R, EPA/600/S7-85/047, November 1985

			percent oxygen, 155.3 ppmdv as a 7-day rolling average at 0 percent oxygen, 500 ppmdv as a 3-hour average at 0 percent oxygen.
130 – Peabody Heater	25 Pa. Code § 129.114(b)	Good operating practices	Same as current
702 – ULSG Cooling Tower	25 Pa. Code § 129.114(c)	NA	Good operating practices, which includes leak detection and repair (LDAR) monitoring for fugitive VOC emissions.

RACT II as RACT III

In a separate memo it was demonstrated that the RACT II requirements for the emission sources presented in the table below continues to be RACT for RACT III.

Table 5 – RACT II Equals RACT III Summary

Emission Source ID	Emission Source		EPA Summary[2]
101	FCC Unit	VOC	- Use of the CO boiler -Operating of control devices in accordance with manufacturer specifications and good air pollution control practices -VOC limit of 8.1 tpy calculated as a 12-month rolling sum (RACT-strengthening condition) -Relevant recordkeeping related to the limits such as combustion rates and hours of operation
104	Marine Vessel Ballasting	VOC	-At least 98% of the total volume of receipts of crude oil and gasoline during each calendar year shall be delivered to the facility in vessels which do not ballast, such as barges, or in

[2] PADEP's Conclusions summarized by EPA, EPA-R03-OAR-2021-3800-0005, pp 88-89

			vessels which do not emit VOCs when ballasted, such as tankers using segregated ballast tanks -VOC limit 9.2 tons 12-month rolling sum (RACT-strengthening condition) -Recordkeeping of crude or gasoline received at the facility including delivery dates, cargo type and amount, ballast tank type, and percent total volume of receipt delivered in non-ballasting or VOC emitting vessels
105	Marine Vessel Loading	VOC	-Use of marine vapor recovery device to reduce VOCs by at least 98% by weight and route to the fuel gas system -Monitoring and recordkeeping of gasoline loading and monthly emissions
111 and 700	Cooling Towers and Heat Exchange Systems	VOC	Good operating practices, defined as compliance with the applicable monitoring, work practice, reporting and recordkeeping requirements of 40 C.F.R. §§ 63.654 and 63.653
118	Railcar Loading – LPG and Butane	VOC	-VOC limit of 3.94 tons per 12-month consecutive month period -Recordkeeping of the number of rail cars that vent to the atmosphere during loading, amount of propane or butane loaded, calculated emissions each month
735	Kerosene/ HCN HTU Heater	NOx	-Annual tune-up or once in five (5) years if equipped with oxygen trim system -Recordkeeping related to the tune ups performed including, dates, service provider, operating rate or loads, CO and NOx emission rates, and final excess oxygen rate -NOx limit of 14.32 calculated as a 12-month rolling sum (RACT-strengthening condition)
736	Diesel HTU Heater	NOx	-Annual tune-up or once in five (5) years if equipped with oxygen trim system -Recordkeeping related to the tune ups performed including, dates, service provider, operating rate or loads, CO, and NOx emission rates, and final excess oxygen rate -NOx limit of 14.32 calculated as a 12-month rolling sum (RACT-strengthening condition)

MISCELLANEOUS CHANGES

- Appendix F addresses the correction of a condition previously considered RACT.
- Appendix G address miscellaneous changes to the operating permit.

SUPPLEMENTAL RACT III Analysis

Monroe has agreed to perform an additional review under 25 Pa. Code § 129.114(d) to formally establish RACT requirements for Process Drains & H2O Sep (Source ID 106) and Disulfide Oxidizer Separator Vent (Source ID 129).

PUBLIC NOTICE

A public notice of intent to issue the Significant Modification Title V Operating Permit to address the Additional RACT Requirement for Major Sources of NOx and VOC for the 2015 ozone NAAQS (25 Pa. Code §§ 129.111 – 129.115) referred to as RACT III was published on December 14, 2024 and January 4, 2025, in the *Pa Bulletin* and on December 20, 2024 through December 22, 2024 in the *Delaware County Daily Times* and *Daily & Sunday Times Digital*.

PUBLIC HEARING/COMMENTS

A public hearing was conducted on January 30, 2025. A transcript of the comments received during the public hearing were prepared for DEP. Additionally, DEP received comments from the public via email. DEP addressed the comments from the hearing and public in a Comments and Response document which was prepared under separate cover. EPA did not submit to DEP any comments.

RECOMMENDATIONS

DEP recommends issuance of the Significant Modification Title V Operating Permit to Monroe Energy LLC.

APPENDIX A – APPICABILITY TABLES

Table A-1
RACT III Source Inventory
Monroe Energy, LLC - Trainer, PA

Source ID	Source Name	Source Description	Make	Model	Location
034	Boiler 9	349.6 Million British Thermal Unit per Hour (MMBtu/hr) Boiler	B&W	FM 160-124	Boiler House
035	Boiler 10	349.6 MMBtu/hr Boiler	B&W	FM 160-124	Boiler House
053	Boiler 14	349.6 MMBtu/hr Boiler	Rentech	Serial No. 2001-29	Boiler House
090	Existing Emergency Compression Ignition Engines <500 HP	Four Emergency Generators with ratings of 255, 420, 420, and 270 horsepower (HP)	Two Cummins and Two Caterpillar	Cummins: NT-855-F1 (255 HP) and HT-855-GS2 (270 HP) Caterpillar: 3406C (420 HP) and 3406B DIT (420 HP)	Main Refinery
091	Existing Emergency Compression Ignition Engines (IC <30 Liter)	Four Emergency Generators with ratings of 490 and 619 HP	Caterpillar	C-15	Main Refinery
101	FCC Unit	Fluid Catalytic Cracking Unit	Custom	Custom	Main Refinery
102	Claus Sulfur Recovery Plant	Sulfur Recovery Plant	Custom	Custom	Main Refinery
103	Main Flare	Flare	Custom	Custom	Main Refinery
104	Marine Vessel Ballasting	Marine Vessel Ballasting	Custom	Custom	Main Refinery
105	Marine Vessel Loading	Marine Vessel Loading	Custom	Custom	Main Refinery
111	Cooling Towers	Cooling Towers	Custom	Custom	Main Refinery
118	Railcar Loading LPG & Butane	Railcar Loading	Custom	Custom	Main Refinery
119	Platformer Regenerator	Platformer Regenerator	Custom	Custom	Mai Refinery
130	Peabody Heater	74 MMBtu/hr Heater	Custom	Custom	Main Refinery
131	AWWTP Emergency Generator	1,793 Standard Cubic Foot per Minute (scfm) Emergency Generator	Caterpillar	GENSET 3508	Main Refinery
702	ULSG Cooling Tower	One Cooling Tower	Cooling Tower Depot	Custom	Main Refinery
733	FCCU Feed Heater	95 MMBtu/hr Heater	Onquest	Custom	Main Refinery
735	Kerosene/HCN HTU Heater	23 MMBtu/hr Heater	Petrochem	Custom	Main Refinery
736	Diesel HTU Heater	39 MMBtu/hr Heater	Petrochem	Custom	Main Refinery
737	Naphtha HDS Heater	65 MMBtu/hr Heater	Foster Wheeler	Custom	Main Refinery
738	Platformer Feed Heater	913 MMBtu/hr Heater	Custom	Custom	Main Refinery
739	Isocracker Splitter Reboiler	50 MMBtu/hr Heater	Custom	Custom	Main Refinery

Table A-1
RACT III Source Inventory
Monroe Energy, LLC - Trainer, PA

Source ID	Source Name	Source Description	Make	Model	Location
740	D2/VGO Hydrotreater Feed Heater	76 MMBtu/hr Heater	Custom	Custom	Main Refinery
741	VCD 541 VAC Heater	56 MMBtu/hr Heater	Custom	Custom	Main Refinery
742	VCD 542 VAC Heater	56 MMBtu/hr Heater	Custom	Custom	Main Refinery
743	ACD 542 VAC Heater	72 MMBtu/hr Heater	Custom	Custom	Main Refinery
744	ACD 543 Crude Heater	13,664 scfm Heater	Petrochem	Custom	Main Refinery
745	ACD 544 Crude Heater	6,260 scfm Heater	Petrochem	Custom	Main Refinery
746	VCD 544 VAC Heater	16,792 scfm Heater	Petrochem	Custom	Main Refinery
C01	CO Boiler	Direct Flame Incinerator With Heat Exchange	Custom	Custom	Main Refinery
C102	SRU Incinerator	Direct Flame Incinerator Without Heat Exchange	Custom	Custom	Main Refinery
747	Reactor Effluent Heater H-124-01	99.6 MMBtu/hr Heater	Tulsa Heaters, Inc.	Custom	Main Refinery
748	Stripper Reboiler Heater H-124-02	44.2 MMBtu/hr Heater	Tulsa Heaters, Inc.	Custom	Main Refinery

Table A-2
RACT III Rule Applicability Summary - NO_X
Monroe Energy, LLC - Trainer, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/ Throughput Material	NO_X Permit Limitation/PTE	RACT III Applicability		
					Classification	Citation	NO_X Limitation/ Requirement
034	Boiler 9	349.6 MMBtu/hr	Refinery Fuel Gas or Natural Gas	0.1 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(i) and (iv)	Natural gas emissions limit of 0.10 lb/MMBtu and refinery gas emissions limit of 0.25 lb/MMBtu.
035	Boiler 10	349.6 MMBtu/hr	Refinery Fuel Gas or Natural Gas	0.1 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(i) and (iv)	Natural gas emissions limit of 0.10 lb/MMBtu and refinery gas emissions limit of 0.25 lb/MMBtu.
053	Boiler 14	349.6 MMBtu/hr	Refinery Fuel Gas or Natural Gas	0.0077 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(i) and (iv)	Natural gas emissions limit of 0.10 lb/MMBtu and refinery gas emissions limit of 0.25 lb/MMBtu.
090	Existing Emergency Compression Ignition Engines <500 HP	Four Emergency Generator Engines with ratings of 255, 420, 420, and 270 horsepower (HP)	Diesel	N/A	Lean burn stationary internal combustion engine rated less than 500 bhp	§ 129.112(c)(6)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
091	Existing Emergency Compression Ignition Engines (IC <30 Liter)	Two Emergency Generator Engines with ratings of 490 and 619 HP	Diesel	N/A	Lean burn stationary internal combustion engine rated less than 500 bhp, and emergency standby engines that operate less than 500 hours in a 12-month rolling period	§ 129.112(c)(6) and (10)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
101	FCC Unit	2,167 bbl/hr	Gas Oil and Coke-Regenerator	654.5 tpy	NO_X air contamination source with PTE > 5 ton/yr NO_X	§129.114(b)	Case-by-case RACT determination.
102	Claus Sulfur Recovery Plant	3.7 tons/hr Sulfur	Fuel Gas	N/A	Boiler and combustion source with an individual rated gross heat input less than 20 MMBtu/hr	§129.112(c)(4)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
103	Main Flare	1 bbl/hr Fuel Gas	Fuel Gas or Natural Gas	69 tpy	Flare used primarily for air pollution control	§129.112(c)(8)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
130	Peabody Heater	74 MMBtu/hr	Natural Gas	7.6 tpy	NO_X air contamination source with PTE > 5 ton/yr NO_X	§129.114(b)	Case-by-case RACT determination.
131	AWWTP Emergency Generator Engine	100 gal/hr	Diesel	N/A	Emergency standby engine operating less than 500 hours in a 12-month rolling period	§129.112(c)(10)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
733	FCCU Feed Heater	63 MMBtu/hr	Fuel Gas	0.045 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(iv)	Refinery gas emissions limit of 0.25 lb/MMBtu.

Table A-2
RACT III Rule Applicability Summary - NO_X
Monroe Energy, LLC - Trainer, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/ Throughput Material	NO_X Permit Limitation/PTE	RACT III Applicability		
					Classification	Citation	NO_X Limitation/ Requirement
735	Kerosene/HCN HTU Heater	23 MMBtu/hr	Refinery Fuel Gas	14.32 tpy	NO_X air contamination source with PTE > 5 ton/yr NO_X	§129.114(b) and §129.114(i)	Case-by-case RACT determination.
736	Diesel HTU Heater	39 MMBtu/hr	Refinery Fuel Gas	24.36 tpy	NO_X air contamination source with PTE > 5 ton/yr NO_X	§129.114(b) and §129.114(i)	Case-by-case RACT determination.
737	Naphtha HDS Heater	76 MMBtu/hr	Refinery Fuel Gas	0.2 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(iv)	Refinery gas emissions limit of 0.25 lb/MMBtu.
738	Platformer Feed Heater	913 MMBtu/hr	Refinery Fuel Gas	0.12 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(iv)	Refinery gas emissions limit of 0.25 lb/MMBtu.
739	Isocracker Splitter Reboiler	50 MMBtu/hr	Refinery Fuel Gas	0.2 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(iv)	Refinery gas emissions limit of 0.25 lb/MMBtu.
740	D2/VGO Hydrotreater Feed Heater	76 MMBtu/hr	Refinery Fuel Gas	0.45 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(iv)	Refinery gas emissions limit of 0.25 lb/MMBtu.
741	VCD 541 VAC Heater	56 MMBtu/hr	Refinery Fuel Gas	0.25 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(iv)	Refinery gas emissions limit of 0.25 lb/MMBtu.
742	VCD 542 VAC Heater	56 MMBtu/hr	Refinery Fuel Gas or Natural Gas	0.25 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(iv)	Refinery gas emissions limit of 0.25 lb/MMBtu.
743	ACD 542 VAC Heater	72 MMBtu/hr	Refinery Fuel Gas or Natural Gas	0.25 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(iv)	Refinery gas emissions limit of 0.25 lb/MMBtu.
744	ACD 543 Crude Heater	514 Mcf/hr	Refinery Fuel Gas	0.2 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(iv)	Refinery gas emissions limit of 0.25 lb/MMBtu.
745	ACD 544 Crude Heater	514 Mcf/hr	Refinery Fuel Gas	0.2 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(iv)	Refinery gas emissions limit of 0.25 lb/MMBtu.
746	VCD 544 VAC Heater	229 Mcf/hr	Refinery Fuel Gas	0.06 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(iv)	Refinery gas emissions limit of 0.25 lb/MMBtu.
C01	CO Boiler	N/A	N/A	N/A	Catalytic Oxidizer used primarily for air pollution control	§129.112(c)(8)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
C102	SRU Incinerator	N/A	N/A	N/A	Incinerator used primarily for air pollution control	§129.112(c)(8)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
747	Reactor Effluent Heater H-124-01	99.6 MMBtu/hr	Refinery Fuel Gas	0.035 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(iv)	Refinery gas emissions limit of 0.25 lb/MMBtu.
748	Stripper Reboiler Heater H-124-02	44.2 MMBtu/hr	Refinery Fuel Gas	0.035 lb/MMBtu	Refinery gas-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	§129.112(g)(1)(iv)	Refinery gas emissions limit of 0.25 lb/MMBtu.

Table A-3
RACT III Rule Applicability Summary - VOC
Monroe Energy, LLC - Trainer, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/ Throughput Material	VOC Permit Limitation/PTE	RACT III Applicability		
					Classification	Citation	VOC Limitation/ Requirement
034	Boiler 9	349.6 MMBtu/hr	Refinery Fuel Gas or Natural Gas	2 tpy	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
035	Boiler 10	349.6 MMBtu/hr	Refinery Fuel Gas or Natural Gas	2 tpy	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
053	Boiler 14	349.6 MMBtu/hr	Refinery Fuel Gas or Natural Gas	1.98 tpy	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
090	Existing Emergency Compression Ignition Engines <500 HP	Four Emergency Generator Engines with ratings of 255, 420, 420, and 270 horsepower (HP)	Diesel	N/A	Lean burn stationary internal combustion engine rated less than 500 bhp	§129.112(c)(6)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
091	Existing Emergency Compression Ignition Engines (IC <30 Liter)	Two Emergency Generator Engines with ratings of 490 and 619 HP	Diesel	N/A	Lean burn stationary internal combustion engine rated less than 500 bhp, and emergency standby engines that operate less than 500 hours in a 12-month rolling period	§129.112(c)(6) and (10)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
101	FCC Unit	2,167 bbl/hr	Gas Oil and Coke-Regenerator	8.1 tpy	VOC air contamination source with PTE >2.7 ton/yr VOC	§129.114(c)	Case-by-case RACT determination.
102	Claus Sulfur Recovery Plant	3.7 tons/hr Sulfur	Fuel Gas	0.62 tpy	VOC air contamination source subject to §129.111	§ 129.111(c)	Exempt on the basis of a PTE < 1 tpy
103	Main Flare	1 bbl/hr Fuel Gas	Fuel Gas or Natural Gas	N/A	Flare used primarily for air pollution control	§129.112(c)(8)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
104	Marine Vessel Ballasting	8.5 Th bbl/hr	Crude Oil	9.2 tpy	VOC air contamination source with PTE >2.7 ton/yr VOC	§129.114(c) and §129.114(i)	Case-by-case RACT determination.
105	Marine Vessel Loading	108.6 Th gal/hr	Gasoline	N/A	VOC air contamination source with PTE >2.7 ton/yr VOC	§129.114(c) and §129.114(i)	Case-by-case RACT determination.
111	Cooling Towers	60 Th bbl/hr	Cooling Water	7.59 tpy	VOC air contamination source with PTE >2.7 ton/yr VOC	§129.114(c) and §129.114(i)	Case-by-case RACT determination.
118	Railcar Loading LPG & Butane	N/A	LPG and Butane	3.94 tpy	VOC air contamination source with PTE >2.7 ton/yr VOC	§129.114(c) and §129.114(i)	Case-by-case RACT determination.

Table A-3
RACT III Rule Applicability Summary - VOC
Monroe Energy, LLC - Trainer, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/ Throughput Material	VOC Permit Limitation/PTE	RACT III Applicability		
					Classification	Citation	VOC Limitation/ Requirement
119	Platformer Regenerator	2,333 bbl/hr	Coke	0.21	VOC air contamination source subject to §129.111	§129.111(c)	Exempt on the basis of a PTE < 1 tpy
130	Peabody Heater	74 MMBtu/hr	Natural Gas	N/A	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
131	AWWTP Emergency Generator Engine	100 gal/hr	Diesel	N/A	Emergency standby engine operating less than 500 hours in a 12-month rolling period	§129.112(c)(10)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
702	ULSG Cooling Tower	612,000 gal/hr	Cooling Water	6.02 tpy	VOC air contamination source with PTE >2.7 ton/yr VOC	§129.114(c) and §129.114(i)	Case-by-case RACT determination.
733	FCCU Feed Heater	63 MMBtu/hr	Fuel Gas	2.2 tpy	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
735	Kerosene/HCN HTU Heater	23 MMBtu/hr	Refinery Fuel Gas	N/A	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
736	Diesel HTU Heater	39 MMBtu/hr	Refinery Fuel Gas	3.4 tpy	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
737	Naphtha HDS Heater	76 MMBtu/hr	Refinery Fuel Gas	N/A	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
738	Platformer Feed Heater	913 MMBtu/hr	Refinery Fuel Gas	N/A	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
739	Isocracker Splitter Reboiler	50 MMBtu/hr	Refinery Fuel Gas	N/A	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
740	D2/VGO Hydrotreater Feed Heater	76 MMBtu/hr	Refinery Fuel Gas	N/A	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
741	VCD 541 VAC Heater	56 MMBtu/hr	Refinery Fuel Gas	N/A	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
742	VCD 542 VAC Heater	56 MMBtu/hr	Refinery Fuel Gas or Natural Gas	N/A	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.

Table A-3
RACT III Rule Applicability Summary - VOC
Monroe Energy, LLC - Trainer, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/ Throughput Material	VOC Permit Limitation/PTE	RACT III Applicability		
					Classification	Citation	VOC Limitation/ Requirement
743	ACD 542 VAC Heater	72 MMBtu/hr	Refinery Fuel Gas or Natural Gas	< 1 tpy	Combustion unit subject to §129.111	§129.111(c)	Exempt on the basis of a PTE < 1 tpy.
744	ACD 543 Crude Heater	514 Mcf/hr	Refinery Fuel Gas	N/A	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
745	ACD 544 Crude Heater	514 Mcf/hr	Refinery Fuel Gas	N/A	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
746	VCD 544 VAC Heater	229 Mcf/hr	Refinery Fuel Gas	5.5 tpy	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
C01	CO Boiler	N/A	N/A	N/A	Catalytic Oxidizer used primarily for air pollution control	§129.112(c)(8)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
C102	SRU Incinerator	N/A	N/A	N/A	Incinerator used primarily for air pollution control	§129.112(c)(8)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
747	Reactor Effluent Heater H-124-01	99.6 MMBtu/hr	Refinery Fuel Gas	3.15 tpy	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
748	Stripper Reboiler Heater H-124-02	44.2 MMBtu/hr	Refinery Fuel Gas	3.15 tpy	Combustion unit subject to §129.111	§129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.

Table A-4
Sources Exempt From RACT III - VOC
Monroe Energy, LLC - Trainer, PA

Source ID	Source Description	Reason for Exemption	RACT III Citation
743	ACD 542 VAC Heater	Exempt on the basis of a PTE < 1 tpy.	25 Pa. Code §129.111(c)
106	Process Drains & H_2O Sep.	The source is subject to 25 Pa. Code §129.55.	25 Pa. Code §129.111(a)
112	Purging & Sampling, etc.	The source is subject to 25 Pa. Code §129.58.	25 Pa. Code §129.111(a)
113	LPG Recovery Unit[(a)]	The source is subject to 25 Pa. Code §129.58.	25 Pa. Code §129.111(a)
114	RACT Fugitive Equipment	The source is subject to 25 Pa. Code §129.58.	25 Pa. Code §129.111(a)
115	NSPS Fugitive Equipment	The source is subject to 25 Pa. Code §129.58.	25 Pa. Code §129.111(a)
123	#66 Ext. Float 43 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
124	#67 Ext. Float 43 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
125	#68 Ext. Float 43 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
126	#95 Ext. Float 59 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
127	#96 Ext. Float 59 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
128	MACT Fugitives	The source is subject to 25 Pa. Code §129.58.	25 Pa. Code §129.111(a)
133	Benzene Waste Operations	The source is subject to 25 Pa. Code §129.55.	25 Pa. Code §129.111(a)
134	#132 Int. Float 15 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
136	#151 Ext. Float 53 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
137	#152 Int. Float 61 Mbbl	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
138	#153 Ext. Float 53 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
139	#154A Int. Float 105 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
140	#155 Int. Float 63 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
141	#156 Ext. Float 53 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
142	#157 Ext. Float 77 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
143	#159 Ext. Float 79 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
144	#161 Ext. Float 86 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
145	#162 Ext. Float 82 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
146	#163 Ext. Float 82 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
147	#164 Ext. Float 83 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
148	#165 Ext. Float 82 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
149	#166 Ext. Float 83 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
150	#168 Int. Float 79 Mbbls.	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
151	#169 Ext. Float 78 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)

Table A-4
Sources Exempt From RACT III - VOC
Monroe Energy, LLC - Trainer, PA

Source ID	Source Description	Reason for Exemption	RACT III Citation
152	#170 Ext. Float 71 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
153	#171 Int. Float 83 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
154	#172 Ext. Float 81 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
155	#174 Ext. Float 154 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
156	#175 Ext. Float 151 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
157	#178 Ext. Float 80 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
160	#181 Ext. Float 129 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
161	#182 Ext. Float 129 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
162	#184 Ext. Float 26 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
163	#185 Ext. Float 150 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
164	#186 Ext. Float 151 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
165	#93 Ext. Float 244 Mbbl	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
166	#94 Ext. Float 243 Mbbl	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
180	#54 Cone Roof Tk 54 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
190	#134 Int. Float 15 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
194	#160 Int. Float 85 Mbbls	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
215	NSPS New Fugitive Equipment	The source is subject to 25 Pa. Code §129.58.	25 Pa. Code §129.111(a)
300	Miscellaneous MACT Group 2 Tanks	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
501	Spheroid 501 (1.26 MMgal)	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
502	Spheroid 502 (1.26 MMgal)	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
513	Spheroid 513 (1.26 MMgal)	The source is subject to 25 Pa. Code §129.56.	25 Pa. Code §129.111(a)
730	Reformer Unit Fugitives	The source is subject to 25 Pa. Code §129.58.	25 Pa. Code §129.111(a)

[a] VOC emissions from the LPG Recovery Unit are limited to 4.6 tpy in the Refinery's current TVOP. However, there are no direct process vents associated with the LPG Recovery Unit and potential emissions of VOC are fugitive in nature and may occur through leaking components. Therefore, fugitive VOC emissions from the LPG Recovery Unit are subject to the standards codified at 25 Pa. Code §129.58, as specified in the conditions for TVOP No. 23-00003 Source ID 114 – RACT Fugitive Equipment.

Table A-5
RACT III Rule Applicability Summary - PTE
Monroe Energy, LLC - Trainer, PA

Source Name	Capacity (MMBtu/hr)	VOC Emissions Limit	Emission Limit Units	PTE (tpy) [(a)]	RACT III Non-Applicability/Exemption Criteria
ACD 542 VAC Heater	72	0.18	lbs/hr[(b)]	0.79	Exempt - PTE < 1 tpy for VOC

[(a)] Calculations assume the following:

8,760	hr/yr - Heater
2,000	lb/ton

[(b)] TVOP 23-00003 has an emission limit of 0.18 lb/hr for Source ID 743 in accordance with Section D, Source ID 743, Condition No. 002.

Appendix B

Good Operating Practices

Good operating practices are a method of controlling NOX emissions. Good operating practices for combustion sources include maintaining optimum combustion efficiency, implementing appropriate maintenance procedures, optimizing the air-fuel ratio, and utilizing low excess air during combustion. Depending upon the operation of the emissions sources, other techniques may be used.

Water or Steam Injection

Water or steam injection is an example of a “front end” NOx control technology. The addition of an inert diluent, such as water or steam, into the high temperature region of the combustion flame controls NOx formation by quenching peak flame temperatures. Increasing the water-to-fuel ratio employed with this technique has been shown to increase the control of NOx emissions.

Selective Catalytic Reduction (SCR)

The SCR process chemically reduces the NOx molecule into molecular nitrogen and water vapor. A nitrogen-based reagent such as ammonia or urea is injected into the ductwork, downstream of the combustion unit. The flue gas mixes with the reagent and enters the reactor module containing catalyst. The hot flue gas and reagent diffuse through the catalyst. The reagent reacts selectively with the NOx within a specific temperature range, generally somewhere between 600ºF and 800ºF degrees, and in the presence of the catalyst and oxygen.

Selective Non-Catalytic Reduction (SNCR)

SNCR is based on the chemical reduction of the NOx molecule into molecular nitrogen and water vapor. A nitrogen based reducing agent such as ammonia or urea is injected into the post combustion flue gas. The reduction reaction with NOx is favored over other chemical reaction processes at temperatures ranging between 1600°F and 2100°F (870°C to 1150°C), therefore, it is considered a selective chemical process.

Both ammonia and urea are used as reagents. Urea-based systems have advantages over ammonia-based systems. Urea is non-toxic, less volatile liquid that can be stored and handled more safely. Urea solution droplets can penetrate farther into the flue gas when injected into the boiler, enhancing the mixing with the flue gas which is difficult in large boilers. However, urea is more expensive than ammonia. The Normalized Stoichiometric Ratio (NSR) defines the ratio of reagent to NOx required to achieve the targeted NOx reduction. In practice, more than the theoretical amount of reagent needs to be injected into the boiler flue gas to obtain a specific level of NOx reduction.

Oxygen firing

Oxygen firing involves replacing the air used to create combustion in the furnace with oxygen. This eliminates the nitrogen in the air which significantly reduces NOx formation. With nitrogen in the air eliminated NOx can only form using nitrogen in the fuel and through prompt NOx formation.

Low NOx burner and Ultra Low NOx burner

NOx is formed during the combustion of fuel at high temperatures and when excess oxygen is present. A low NOx burner serves to create a combustion environment at relatively low temperature in which there is low excess oxygen. This is generally done by initially burning the fuel in a fuel rich zone which creates an oxygen poor environment while limiting the amount of fuel burned, thus lowering flame temperatures. The remaining fuel is then burned in an environment with excess oxygen. The addition of the excess air serves to lower the temperature so that little NOx is formed despite the presence of excess oxygen.

SCONOX™ Process

The SCONOX™ process is a NOX control technology developed by GLET. It uses a coated oxidation catalyst to oxidize and remove NOX (as well as CO) without using a reagent such as NH3 or NH3(aq). The technology is now on its second generation, called EMx, and is distributed by EmeraChem (formerly GLET). The technology is made of a platinum-based catalyst coated with K2CO3 and works by oxidizing CO to CO2 and NO to NO2. The CO2 is then exhausted from the system and the NO2 absorbs onto the K2CO3 catalyst to form KNO2 and KNO3. The K2CO3 is regenerated by running H2 across one of five catalyst modules (i.e., four are operating while one is regenerated).

A pitfall of the control technology is the potential for the catalyst to deactivate when exposed to SOX. In order to prevent this issue, an additional catalytic oxidation/absorption system known as SCOSOX™ is installed upstream of the SCONOX™ catalyst to first oxidize SO2 to SO3. Also, both the SCONOX™ and SCOSOX™ catalysts are required to be washed every six to 12 months, which involves removing the catalysts from the modules. Using a fuel with low sulfur content decreases the frequency of washes required.

FGR

Flue gas recirculation is designed to take a portion of the flue gas and reintroduce it to the burner for combustion. This reduces NOx by two mechanisms. The first is by introducing combustion products which inhibit NOx formation during the combustion and lower peak flame temperatures. The second is by lowering the oxygen concentration in the primary flame zone. Both these serve to lower flame temperature and oxygen concentration which works to lower NOx formation.

LOTOX

LOTOX is a patented technology sold to refineries by Belco Technologies Corporation. LOTOX is a low temperature oxidation process that employs ozone to oxidize NOX to higher oxides of nitrogen (e.g., N2O5). The higher oxides of nitrogen are soluble and reactive, and forms dilute nitric acid inside the scrubber tower. The operating costs for the LOTOX system are associated with the power, oxygen, and cooling water for the generation of ozone and caustic solution for the neutralization of the scrubbing solution. Operating costs are proportional to the NOX concentration being controlled. Additionally, this process is not affected by acid gases and particulates.

Reburning

Reburning is accomplished through a combustion hardware modification that allows the NOX produced in the main combustion zone to be reduced in a second, downstream combustion zone. It is accomplished through the introduction of fuel (e.g., methane, natural gas, etc.) into the exhaust gases, typically after the primary combustion zone. Fuel-rich conditions are unfavorable to NOX and it is reduced back to N2 through this fuel-rich reducing zone. The net effect is that NOX formation is reduced.

Appendix C – FCCU and NOX

Source ID 101 is comprised of a reactor vessel, a regeneration vessel, and process control device (Control ID C01) resulting in a FCCU "system". The purpose of Source ID 101 is to convert high molecular weight (high boiling point) feed streams to lighter products via cracking of the carbon bonds in the reactor vessel. A portion of the feed stream is converted to coke during the cracking process which fouls the catalyst. The coke is "burned" off the spent catalyst in the FCC regenerator and the resulting "heat" provides energy to "crack" the feed stream. The FCCU at the Refinery operates in a "partial burn" mode. In partial-burn units, much of the carbon in the coke is partially combusted to carbon monoxide (CO) to decrease the heat of combustion to allow the processing of feed streams. The FCCU is equipped with Source ID C01 downstream to convert CO to carbon dioxide (CO2), to control CO emissions, and to recover the energy for steam production. The flue gas from the regenerator is comprised primarily of CO but can include reduced sulfur compounds and NO_x precursors such as ammonia and hydrogen cyanide (HCN). Most of the reduced sulfur and nitrogen species in the flue gas are converted to more highly oxidized forms in Source ID C01, which in a control device and as such is exempt from RACT applicability. NO_x emissions associated with Source ID 101 are controlled by an SNCR system (Source ID C101-3) that is associated with Source ID C01.

Step 1: Available Control Options – NOX FCCU

The following NOx control options for the FCCU:

- Good Operating Practices
- Water/Steam Injection
- Selective Catalytic Reduction (SCR)
- Selective Non-Catalytic Reduction (SNCR)
- Ultra Low NOx burner
- Low NOx burner
- FGR

A description of the potential NOx control technologies is available in Appendix B.

Step 2: Technical Feasibility

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
Good Operating Practices		Yes	Yes
Water/Steam Injection	The increased moisture from water/steam injection for NOx control is likely to result in equipment corrosion within the FCCU regenerator. The CO Boiler's ability to control CO emissions from the FCCU regenerator would be adversely affected by water steam	Yes	No

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
	injection[3]. There are also no entries identified in the RBLC database indicating that this technology has been used in practice for the control of NOx emissions from an FCCU. Water/steam injection has primarily been applied to combustion turbines for the control of NOx emissions.		
Selective Catalytic Reduction (SCR)	There are technical and associated space/configuration issues that complicate the installation and use of SCR on the existing FCCU. Despite these issues, SCR is a technically feasible control technology to abate NOX emissions from the FCCU exhaust and has been demonstrated in practice, as identified in the RBLC database. The environmental, energy, and economic impacts of an SCR retrofit on the FCCU are described below. The transport, handling, and use of aqueous ammonia, a corrosive hazardous material, poses a potential exposure health and safety risk[4]. The spent catalyst from the SCR would be required to be periodically replaced and disposed of properly, creating additional residual waste that would need to be landfilled. An SCR retrofit would require additional compressed air, which would require an upgrade of the Facility's infrastructure. Additional natural gas combustion would be required to adequately heat the exhaust gas temperature to the optimum minimum temperature required for the SCR, adding to the energy costs of the SCR retrofit and resulting in additional emissions of greenhouse gases and criteria pollutants. Facility age-related space and infrastructure (e.g., compressed air, water, electrical, steam, etc.) constraints present complications for Facility construction projects, especially in the areas surrounding the FCCU.	Yes	Yes

[3] Evaluation of Construction Permit Application No. 98-172-C (M-15) (PSD) – Section VI. PSD Review – Best Available Control Technology (BACT) – Steam Injection (Page 55).
[4] Ammonia, Agency for Toxic Substances and Disease Registry, Centers for Disease Control and Prevention (http://www.atsdr.cdc.gov/mhmi/mmg126.pdf)

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
SNCR	Monroe currently uses SNCR for NOx control.	Yes	Yes
Low NOX Burners (LNB)	LNB are typically used in practice to reduce thermal NOx formation from boilers and other combustion sources by lowering the temperature of combustion. NOx emissions from the FCCU regenerator are formed primarily from "fuel" nitrogen in the regenerator exhaust gases that has been deposited on the catalyst during cracking. Because the FCCU regenerator does not combust fuel using burners, LNB are not technically feasible for the control of NOx emissions from the FCCU.	Yes	No
Ultra-Low NOX Burners (ULNB)	Because the FCCU regenerator does not combust fuel using burners, ULNB are not technically feasible for the control of NOX emissions from Source ID 101.	Yes	No
SCONOX™	Monroe contacted EmeraChem, the manufacturer of the SCONOX™ technology and confirmed that the SCONOX™ technology has not been demonstrated in practice to control NOX emissions in an FCCU exhaust stream. EmeraChem also confirmed that SCONOX™ is technically infeasible for the FCCU as significant research and development would be required to install SCONOX™ on units other than combustion turbines and large Reciprocating Internal Combustion Engines (RICE). SCONOX™ is not technically feasible for the control of a NOx emissions from the FCCU.	Yes	No
Flue Gas Recirculation (FGR)	FGR is typically used to control thermal NOx emissions in boiler applications by recirculating flue gases to absorb heat, reducing the peak flame temperature. FGR also lowers the oxygen (O2) content of the air, starving the NOx-forming reaction and effectively inhibiting thermal NOx formation.[5] FGR has only a limited effect on fuel NOx formation. The FCCU regenerator is already operated in an	Yes	No

[5] Flue Gas Recirculation for NOX Reduction, Eclipse Combustion, http://www.genesyscombustion.com/whitepages-417.pdf

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
	oxygen deficient, partial burn mode, thereby reducing thermal NOx formation. NOx emissions from the FCCU are formed primarily from nitrogen in the coke that has been deposited on the catalyst during cracking and then secondarily from combustion that occurs in Source ID C01. There are no entries identified in the RBLC database indicating that FGR has been used in practice to control NOx emissions from an FCCU. FGR is not technically feasible for the control of a NOx emissions from the FCCU.		
LOTOX	LOTOX is a technically feasible add-on air pollution control technology for the control of NOX emissions in the FCCU exhaust and has been demonstrated in practice. A description of the LOTOX process is provided in Appendix A.	Yes	Yes
Reburning	Reburning as a control technology is not viable for use on the FCCU exhaust due to the design of the regenerator. Reburning to reduce NOX emissions depends on mixing secondary fuel with the combustion products from the main combustion zone and the thermal environment in the fuel-rich, secondary combustion zone. Air in the fuel-rich zone must be reduced to approximately 90% excess air and the temperature in the fuel-rich zone must be about 2,400 degrees Fahrenheit (°F) or higher[6]. If the temperature is lower than 2,400°F, NOX reduction (i.e., reduction of NO to N2) will not happen. The required temperature profile for reburning is not met in Source ID 101. Reburning is not technically feasible for the control of NOX emissions from Source ID 101.	Yes	No

Step 3: Rank of technically feasible control options

Control options	Control Efficiency (%)	Ranking
LOTOX[7]	30-95+	1

[6] Evaluation of Construction Permit Application No. 98-172-C (M-15) (PSD) – Section VI. PSD Review – Best Available Control Technology (BACT) – Reburning (https://www.deq.state.ok.us/aqdnew/permitting/permissue/98172-cp19.doc) (Page 55).
[7] Vendor Data: The Linde Group – Emissions Solutions – LOTOX (https://www.lindegas.com/en/processes/emissions_solutions/lotox/index.html)

SCR[8]	70-90	2
SNCR[9]	30-50	3
Good operating practices		4

Step 4: Cost Effectiveness of Each Control Option

Monroe used sixth edition of the OAQPS Control Cost Manual for the FCCU control cost calculations for SCR. While Monroe understands that the 2002 OAQPS Control Cost Manual, Seventh Edition includes cost calculations for "combustion units" using SCR, this costing strategy is not representative for Source ID 101 because it is not a combustion unit. For this reason, the sixth edition was used. A cost analysis for the installation and operation of an SCR system using the sixth edition of the OAQPS Control Cost Manual is provided in Appendix D. The estimated average cost of controlling NOX emissions by installing an SCR system on the FCCU exhaust is greater than $16,000 per ton of NOX removed and is therefore not economically feasible. The addition of SCR to the FCCU would also require an unscheduled shutdown, resulting in significant lost revenue, which has not been quantified herein. SCR is not a feasible control option for reducing NOx emissions from Source ID 101 based on adverse economic, environmental, and energy impacts.

Monroe evaluated the economic impact of a LOTOX retrofit on the FCCU exhaust based on the guidance included in the U.S. EPA Office of Air Quality Planning and Standards (OAQPS) Control Cost Manual, Sixth Edition. The Sixth edition of OAQPS Control Cost Manual was used because it can be adapted to analyze a LOTOX system. A cost analysis for the installation and operation of a LOTOX system is provided in Appendix D. Monroe conservatively assumed that the LOTOX system has a control efficiency of 95%.

The average cost of controlling NOX emissions by installing a LOTOX system on the FCCU exhaust is greater than $21,000 per ton of NOx removed and is therefore not economically feasible. Additional energy impacts associated with the use of a LOTOX system include the electrical requirements to operate the ozone generator that converts O_2 to ozone, which is then injected into the flue gas stream to oxidize NOx to soluble nitrogen compounds. Because LOTOX uses ozone injection, there is the potential for ozone slip into the environment.[10] Therefore, LOTOX is not a feasible control option for reducing NOx emissions from the FCCU based on the high economic cost, and adverse environmental and energy impacts.

Control Device	Cost Effectiveness ($/ton)
LOTOX	21,000
SCR	16,000

[8] U.S EPA Air Pollution Control Technology Fact Sheet – SCR Achievable Emissions Limits/Reductions (https://www.epa.gov/sites/default/files/2020-08/documents/fscr.pdf) (Page 1)
[9] U.S. EPA Air Pollution Control Technology Fact Sheet – SNCR Achievable Emissions Limits/Reduction
[10] South Coast Air Quality Management District, LAER/BACT Determination for Application No. 259724 (http://www.aqmd.gov/docs/defaultsource/bact/laer-bact-determinations/other-technologies/laer-bact-determination-259724.pdf?sfvrsn=2)

LOTOX and SCR were economically infeasible, while the remaining control options are currently in place at the refinery. No additional controls are proposed and the continued use of SNCR constitutes RACT for the FCCU.

Step 5: What is RACT – FCCU and NOx

Monroe proposes that NOX RACT[11] for Source ID 101 is the use of good operating practices and the use of SNCR to achieve the current permitted emissions limits, where NOX is limited to, 121.1 ppmdv as a 365-day rolling average at 0 percent oxygen, 155.3 ppmdv as a 7-day rolling average at 0 percent oxygen, 500 ppmdv as a 3-hour average at 0 percent oxygen and 654.5 tons per year calculated as a 12-month rolling sum. DEP agrees that SNCR and good operating practices including NOX is limited to, 121.1ppmdv as a 365-day rolling average at 0 percent oxygen, 155.3 ppmdv as a 7-day rolling average at 0 percent oxygen, 500 ppmdv as a 3-hour average at 0 percent oxygen constitutes RACT. The NOx emission limit of 654.5 tons per 12-month rolling basis is a RACT-strengthening condition.

[11] Section 2.2.5 of RACT III Compliance Proposal and Significant Operating Permit Modification Application (December 2022)

Appendix D - Peabody Heater

The Peabody Heater[12] (Source ID 130) is a direct fired natural gas combustion source with a rated heat input capacity of 74 MMBtu/hr. Source ID 130 is only operated during startup and warm idle periods of the FCC Unit (Source ID 101) and thus has a very limited frequency and time of operation per year.

Step 1: Available Control Options – NOX Peabody Heater

The following NOx control options for the Peabody Heater:

- Good Operating Practices
- Water/Steam Injection
- Selective Catalytic Reduction (SCR)
- Selective Non-Catalytic Reduction (SNCR)
- Oxygen firing
- Ultra Low NOx burner
- Low NOx burner
- FGR

Detailed description of the technologies is provided in Appendix B.

Step 2: Technical Feasibility

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
Good Operating Practices	Monroe currently uses good operating practices for Source ID 130; therefore, a control cost analysis was not conducted. Monroe does not anticipate any additional economic, environmental, and energy impacts associated with this control technique.	Yes	Yes
Water/Steam Injection	Injection of water or steam to reduce the firing temperature to control NOX emissions has been primarily associated with minimizing NOX emissions from combustion turbines. Increased moisture resulting from the steam is likely to result in equipment corrosion[13]. Additionally, the injection of moisture into the system would reduce the efficiency of Source ID 130 during the startup of the FCCU.	Yes	No

[12] The Peabody Heater meets the definition of a fuel gas combustion device described in 40 C.F.R. § 60.101a. It is not a process heater as defined in Subpart Ja. Email from Gerallyn Duke (EPA) to Xiaoyin Sun (DEP), Applicability of NSPS Subpart Ja to ConocoPhillips Peabody Heater, dated Friday, November 20, 2009.

[13] Evaluation of Construction Permit Application No. 98-172-C (M-15) (PSD) – Section VI. PSD Review – Best Available Control Technology (BACT) – Steam Injection (Page 52)

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
SCR	Water/steam injection is not technically feasible for the control of NOX emissions from Source ID 130. The Peabody Heater is only operated during the startup of the FCCU. The burner exhaust gases from Source ID 130 are blown into the FCCU regenerator which are then vented through Source ID C01 and other emissions control devices, therefore, the SCR cannot be inserted between the burner and the control device. The exhaust temperature from Source ID 130 exceeds the temperature limit recommended for using a SCR as an add-on control. Based on the intermittent nature of Source ID 130 operation, its purpose to only heat the FCCU vessels during start-up and idle, and the fact that the Source ID 130 exhaust gases are introduced to and exhausted from the FCCU exhaust train, SCR is not technically feasible for the control of NOX emissions from Source ID 130.	Yes	No
SNCR	SNCR requires a high but very specific temperature (generally between 1,600°F - 2,400°F) and residence time at this temperature to be effective.[14] The temperature during start-up will not fall in this optimum range and will not help with controlling NOX emissions. SNCR is generally used on large field erected boilers, typically with limited operational flexibility and is not typically used on smaller combustion sources[15] such as Source ID 130. Based on the intermittent nature of Source ID 130 operation, its purpose to only heat the FCCU vessels during start-up and idle, and the fact that the Source ID 130 exhaust gases are introduced to and exhausted from the FCCU exhaust train, SNCR is not technically feasible for the control of NOX emissions from Source ID 130.	Yes	No
LNB	A LNB retrofit is technically feasible for the control of NOX emissions from smaller process heaters, similar to Source ID 130 and has been demonstrated in practice, as identified in the RBLC. Monroe evaluated	Yes	Yes

[14] EPA OAQPS Air Pollution Control Cost Manual, Seventh Edition, April 2019, Chapter 1 – Selective Non-Catalytic Reduction
[15] Reducing NOX FGR vs SCR. October 28, 2015. Cleaver Brooks, http://www.cleaverbrooks.com/Search-Results.aspx?query=reducing%20nox%20scr

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
	the economic impact of a LNB retrofit on Source ID 130 based on guidance included in the U.S. EPA 2002 OAQPS Control Cost Manual, Sixth Edition. A cost analysis for the retrofit installation and operation of LNB is provided in Appendix D. The estimated cost of control of NOX emissions by installing LNB is approximately $91,000 per ton of NOX removed for Source ID 130. Therefore, the installation of LNB on Source ID 130 is not economically feasible. Monroe does not anticipate any additional environmental or energy impacts associated with this control technique.		
ULNB	A ULNB retrofit is technically feasible for the control of NOX emissions from smaller process heaters, similar to the Source ID 130 and has been demonstrated in practice, as identified in the RBLC. Monroe evaluated the economic impact of a ULNB retrofit on Source ID 130 based on guidance included in the U.S. EPA 2002 OAQPS Control Cost Manual, Sixth Edition. A cost analysis for the retrofit installation and operation of ULNB is provided in Appendix D. The cost of control of NOX emissions by installing a ULNB is greater than $77,000 per ton of NOX removed for Source ID 130. Therefore, the installation of ULNB on Source ID 130 is not economically feasible. Monroe does not anticipate any additional environmental or energy impacts associated with this control technique.	Yes	Yes
Oxygen Firing	Not feasible with direct-fired heater.	Yes	No
FGR	FGR is typically used to control thermal NOX emissions in boiler applications by recirculating flue gases to absorb heat, reducing the peak flame temperature. FGR also lowers the oxygen content of the air, starving the NOX-forming reaction and effectively inhibiting thermal NOX formation. Based on the intermittent nature of Source ID 130 operation, its purpose to only heat the FCCU vessels during start-up and idle, and the fact that Source ID 130 exhaust gases are introduced to and exhausted from the FCCU	Yes	No

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
	exhaust train, FGR is not technically feasible for the control of NOX emissions from Source ID 130.		

Step 3: Rank of technically feasible control options

Control options	Control Efficiency	Ranking
ULNB	75[16]	1
LNB	50	2
Good operating practices	Vendor and process dependent	3

Step 4: Cost Effectiveness of Each Control Option

Control Device	Cost Effectiveness ($/ton)
ULNB	77,000
LNB	91,000
Good operating practices	-

Step 5: What is RACT – Peabody Heater

MONROE proposes that NOX RACT for Source ID 130 is the use of good operating practices to achieve a NOX emissions limit of 7.6 tons per 12-month rolling period for Source ID 130. DEP concurs that good operating practice constitutes RACT for the heater. The NOx emissions limit of 7.6 tons per 112-month rolling period is a RACT strengthening condition.

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[16] Alternative Control Techniques Document – NOX Emissions from Process Heaters (Revised). https://www3.epa.gov/ttncatc1/dir1/procheat.pdf. U.S. EPA. September 2013.

Appendix E – ULSG Cooling Tower (Source ID 702) VOC RACT III Analysis

Cooling towers are used extensively in refinery cooling water systems to transfer waste heat from the cooling water to the atmosphere. In the cooling tower, warm cooling water returning from refinery processes is contacted with air by cascading through packing.

Atmospheric emissions from the cooling tower consist of fugitive VOCs and gases stripped from the cooling water as the air and water come into contact. These contaminants enter the cooling water system from leaking heat exchangers and condensers.

Control of cooling tower emissions is accomplished by reducing contamination of cooling water through the proper maintenance of heat exchangers and condensers. The effectiveness of cooling tower controls is highly variable, depending on refinery configuration and existing maintenance practices.

Step 1: Available Control Options – Cooling Towers and VOC Emissions

DEP queried of the RBLC database and reviewed Section 4.1.4 (Petroleum Refinery Cooling Towers) of Control Techniques for Volatile Organic Compound Emissions from Stationary Sources (EPA 453/R-92-018, December 1992) and confirmed that the results of an RBLC query finds that LDAR programs, or components of LDAR programs, and non-contact cooling tower design are pollution prevention measures to reduce VOC emissions from cooling towers. MONROE proposed two control options for VOC controls; however, for this analysis, they are considered one option. A description of each as presented in the Compliance Proposal is presented below.

Good Operating Practices

Good operating practices are a method of controlling VOC emissions. Good operating practices entail monitoring the VOC concentration in the cooling water, monitoring the heat exchangers/cooling tower under a leak detection and repair (LDAR) program in accordance with 40 C.F.R. Part 63, Subpart CC (National Emission Standards of Hazardous Air Pollutants from Petroleum Refineries).

Non-Contact Design

Non-contact design for cooling towers is when the water used to reduce the temperature does not come in contact with raw materials. This design does not include any process waters, nor is it exposed to raw material inside the system which eliminates the risk of contamination.

Step 2: Technical Feasibility

Table E-1 provides the technically feasible VOC control options for wet cooling tower/heat exchange system.

Table E-1

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
Good Operating Practices	As determined through a search of the RBLC database, good operating practices, including non-contact design, were the only control technology that was identified as an available option for reducing emissions of VOC from cooling towers. Through further research it was confirmed that no add-on control technologies have been implemented to control VOC from similar sources. Therefore, the use of good operating practices is the only technically feasible VOC control technology for Source ID 702.	Yes	Yes

Compliance with the heat exchange systems requirements in 40 C.F.R. Part 63, Subpart CC constituents RACT for the ULSG Cooling Tower. The ranking of the technically feasible control option (Step 3) and economic cost effectiveness analysis (Step 4) were not necessary since there was only a single technically feasible control option for the cooling tower.

Step 3: Rank of technically feasible control options (does not apply)

Step 4: Cost Effectiveness of Each Control Option (does not apply)

Step 5: What is RACT

MONROE proposes to use good operating practices, which includes LDAR monitoring for fugitive VOC emissions to achieve the current permitted emissions limits under Section D (Source ID 702), Condition No. 002 of Plan Approval No. 23-00003AB[17], which limits VOC emissions from Source ID 702 to 6.02 tons per year, based on a 12-month rolling sum.

DEP agrees that good operating practices, which includes leak detection and repair (LDAR) monitoring for fugitive VOC emissions. The VOC emission limit of 6.02 tons per 12 month rolling sum is a RACT-strengthening condition.

[17] Plan Approval 23-0003AB was incorporated into the Title V Operating Permit issued April 28, 2023. The VOC emission limit is listed under Source ID 702, Condition #002 in the operating permit issued to incorporate RACT III requirements.

Appendix F
Boilers 9 and 10 Emission/RACT NOx Limit

INTRODUCTION NEEDED

During the review of the TVOP, MONROE indicated that they identified an inconsistency in the NO_x limits for Boilers 9/10 (Group 10). Based on comments provided to DEP during the permit review process, we believe the limit on NOx is 2.7 lbs/hr on a 12-month rolling average (calculated monthly).

MONROE proposed the following conditions under the RACT III CEMS requirements Boilers 9 and 10:

> Existing CEMS limits, more stringent than presumptive RACT:
>
> 1) 2.7 NOx lb/hr hourly excluding SU/SD;
>
> 2) 34.9 lb/hr (equivalent to 0.10 lb/MMBtu at max HI) during SU/SD

The following excerpt is from the plan approval review memo review memo (dated January 19, 2007, from George Eckert, through Tom McGinley, PE, to Francine Carlini,

> NOx – use of Ultra Low NOx Burners (ULNB), Flue Gas Recirculation (FGR), and Selective Catalytic Reduction (SCR) suffices for BAT. 40 CFR 60.48b(h) of 0.2 lbs/MMBtu equates to 70 lbs/hr. This federal standard is less stringent than the 2.7 lbs/hr

In the plan approval review memo, a federal NOx emission rate of 70 lb/hr was estimated based on the NSPS emission limit of 0.2 lb/MMBtu[18] and a rated heat input of 349.6 MMBtu/hr.

The NOx hourly emission rate of 2.7 lb/hr was calculated based on the following information:

- NOx outlet concentration of 6 ppmvd
- Stack exhaust flowrate of 100,200 acfm
- Stack exhaust temperature of 300 °F
- Stack exhaust moisture content 10.2%

Compliance with the NSPS limit of 0.2 lb/MMBtu is done on a 30-day rolling basis and includes SSM emission. This is an incompatible comparison since the two rates have two different averaging periods.

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[18] The current NOx limit, on a lb/MMBtu basis, for Boilers 9 and 10 is 0.1 lb/MMBtu on a 30-day rolling average.

While the facility is a major source of NOx emissions, the plan approval issued for the boilers was for a minor source (i.e., non-attainment new source review was not required). There was no rigorous LAER evaluation to establish the 2.7 lb/hr (on an hourly basis) as a permit condition. Therefore, 2.7 lb/hr emission rate was removed and the boilers will continue to comply with the NSPS and the new RACT III presumptive limit.

Appendix G
Miscellaneous Changes

The following changes were made to the operating permit:

1. Source 101 – Added note to Condition #025 that compliance the listed condition with assures compliance with the streamlined condition 25 Pa. Code § 129.112(d).

2. Source ID 113 (LPG Recovery Unit) – This source was removed deleted as a standalone source since there are no emissions through a stack (i.e., fugitive emissions only), all Source ID 113 conditions reference Source ID 115 (NSPS Fugitive Equipment) and Source ID 113, along with other process units at the refinery are identified in the Additional Requirements condition of Source ID 115. The equipment components under Source ID 115 are regulated under 40 C.F.R. Part 60, Subpart GGG (Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries)

3. Source ID 130 – The following condition was identified as a RACT II condition (25 Pa. Code § 129.99):

   > NOx emissions from this heater shall not exceed 7.6 tons per 12-month rolling sum.

   Guidance from EPA instructed DEP that annual emissions are "RACT-strengthening" conditions, but not RACT. The condition was moved to an emission restriction under 25 Pa. Code § 127.441.

4. Source ID 733, Condition #001(a), the following condition was reported under RACT II as derived from 25 Pa. Code § 129.97(g)(1)(iv).

   > Nitrogen Oxides (NOx) emissions shall not exceed 0.045 lb/MMBtu heat input and 12.48 tons per year calculated as a 12-month rolling sum.

   The 0.045 lb/MMBtu is an "annual average" and does not represent RACT. This condition is a RACT-strengthening condition. This source shall comply with the RACT III presumptive limit and strengthened using the annual lb/MMBtu and 12-month rolling sum to prevent easing of condition.

5. Source ID 733, Condition #005 (Testing Requirement) – Added the following language for RACT III compliance.

   > [Compliance with this condition assures compliance with the RACT testing requirement in accordance with 25 Pa. Code § 129.115(b)(6).]

6. Source ID 738, Condition #001(a), the following condition was reported under RACT II as derived from 25 Pa. Code § 129.97(g)(1)(iv).

   (1) 0.12bs/MMBtu heat input; and
   (2) 317.0 tons in any 12 consecutive month period.

   The 0.012 lb/MMBtu is an "annual average" and does not represent RACT. This condition is a RACT-strengthening condition. This source shall comply with the RACT III presumptive limit and strengthened using the annual lb/MMBtu and 12-month rolling sum to prevent easing of condition.

7. Source ID 739, Condition #001(a), the following condition was reported under RACT II as derived from 25 Pa. Code § 129.97(g)(1)(iv).

   The 0.2 lb/MMBtu is an "annual average" and does not represent RACT. This condition is a RACT-strengthening condition. This source shall comply with the RACT III presumptive limit and strengthened using the annual lb/MMBtu and 12-month rolling sum to prevent easing of condition.

8. Source ID 744, Condition #001(a)(1) – Changed "24-hour basis" to "daily average". The emission limit in the operating permit is more stringent than RACT III presumptive limit of 0.25 lb/MMBtu (daily average).

9. Source ID 745, Condition #001 - The emission limit in the operating permit is more stringent than RACT III presumptive limit of 0.25 lb/MMBtu (daily average).

10. Source ID 746, Condition #001(a), the following condition was reported under RACT II as derived from 25 Pa. Code § 129.97(g)(1)(iv).

    Nitrogen Oxides (NOx) emissions shall not exceed 0.06 lb/MMBtu heat input and 42.05 tons per year calculated as a 12-month rolling sum.

    The 0.06 lb/MMBtu is an "annual average" and does not represent RACT. This condition is a RACT-strengthening condition. This source shall comply with the RACT III presumptive limit and strengthened using the annual lb/MMBtu and 12-month rolling sum to prevent easing of condition.

11. Source ID T001 – The following streamlined statement was inadvertently deleted when Condition #006 (Authorization 1235010) was replaced with Condition #007 (Authorization 1238881) due to the new Refinery Sector Rules (RSR) requirements. It has been added back to the operating permit.

    [Compliance with this streamlined permit condition assures compliance with 25 Pa. Code §129.56(h).]

12. Source ID T002 – The following streamlined statement was inadvertently deleted when Conditions #003 and #008 (Authorization 1235010) was replaced with Condition #004 and #012 (Authorization 1238881) due to the new RSR requirements. It has been added back to the operating permit.

    [Compliance with this streamlined permit condition assures compliance with 25 Pa. Code § 129.56(h).]

13. Source ID T003 – Currently, this group contains tanks both greater than 40,000 gallons and less than 40,000 gallons. The are no permit requirements that address 25 Pa. Code § 129.56, yet the NOTICATION indicates that it applies. Two separate source groups will be formed to identify the tanks under 25 Pa. Code § 129.56 and 25 Pa. Code § 129.57.

14. Source ID T005 - Added under Additional Requirements the following language:

    > Compliance with the requirements under 40 C.F.R. Part 60, Subpart Kb for Source ID T005 assures compliance with 25 Pa. Code § 129.56.

15. Section E, Group 35 – Added the following note to Condition #003 (40 C.F.R. § 63.7515):

    > Compliance with this work practice was an accepted surrogate to demonstrate compliance with 25 Pa. Code § 129.115(b)(6). Compliance with this condition assures compliance with the presumptive RACT III limit in the Emission Restriction section.

    Under RACT II, Monroe was granted a waiver from stack testing requirements and the tune-up of the processs heater was established as the RACT compliance demonstration.

16. Section E, Group 40, Condition #003 ((40 C.F.R. § 63.7515):

    See Comment 15.