Commonwealth of Pennsylvania
Department of Environmental Protection
Southeast Regional Office
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Date: November 3, 2025

Subject: Technical Review Memo
Significant Modification - Addendum
Title V Operating Permit 23-00003
Monroe Energy, LLC/Trainer Refinery
Trainer Borough, Delaware County
Application No. 23-00003
APS ID #786636, AUTH ID #1530306

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Purpose of Addendum

This addendum addresses the revisions to the Monroe Energy LLC (MONROE) significant operating permit modification (SOPM) application submitted on December 22, 2020. In this addendum, the alternate RACT compliance for Source ID 106 (Process Drains and H2O Sep.) has been added.

The original SOPM and review memo were complete when this revised proposal was submitted on May 30, 2025. Therefore, this addendum addresses any modifications to the original SOPM review memo. This addendum framework will be structured just the same as the original memo. Using this framework any changes or additions introduced will be noted or discussed.
In this addendum, tables or attachments that are an addition or a modification of tables or attachments in the original review memo are given the same table or attachment number as those in the original memo but with the suffix “A”.

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 *Pennsylvania 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 50 tpy of NOx and/or 50 tpy of VOCs in a region designated as a Serious Non-attainment Area for Ozone.

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 the Pennsylvania Department of Environmental Protection (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.

MONROE submitted a timely and complete alternative Reasonably Available Control Technology (RACT) determination and a significant operating permit modification application to PADEP on December 22, 2022 in accordance with 25 Pa Code § 129.114(d)(1)(i) for the Fluid Catalytic Cracking (FCC) Unit (Source ID 101), Peabody Heater (Source ID 130), and the Ultra-Low Sulfur Gasoline (ULSG) Cooling Tower (Source ID 702). The refinery's Process Drains and Water (H2O) Separator (Source ID 106), which is generally subject to 25 Pa. Code § 129.55, was originally determined to be exempt from RACT requirements in accordance with 25 Pa. Code § 129.96(a) and 25 Pa. Code § 129.111(a). During the public comment period, concerns were raised about the exemption and whether this source should undergo a Case-by-case RACT determination. MONROE agreed to conduct the determination as an addendum to the original significant operating permit modification application. Because the components of Source ID 106 are not subject to any presumptive RACT limits under 25 Pa. Code § 129.112 and the collective potential volatile organic compound (VOC) emissions from Source ID 106 are greater than 2.7 tons per year, MONROE agreed to prepare an alternative RACT proposal in accordance with 25 Pa. Code § 129.112(d), which was confirmed during an April 8, 2025 conference call between MONROE, PADEP Southeastern Regional Office, PADEP Central Office, and ALL4 LLC (ALL4). During the referenced call, P MONROE agreed to submit an alternative RACT proposal, prepared in accordance with 25 Pa. Code § 129.112(d), as a supplement to the alternative RACT determination and significant operating permit modification application, which was originally submitted to PADEP on December 22, 2022. During the referenced conference call, PADEP agreed that only permit revisions related to Source ID 106 will be subject to public review because the contents of the original, complete alternative RACT determination and significant operating permit modification application already went through public review.

MONROE provided this supplement to the December 22, 2022 alternative RACT determination and significant operating permit modification application for the collective VOC emissions from Source ID 106 at the refinery.

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 Facility-wide Actual NO_x and VOC Emissions (tpy)

YEAR	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 25 Pa. Code §§ 129.112 - 129.114 are presented in Table A-1A.

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. There were no changes to Table A-2 (RACT III Rule Applicability Summary – NOx), A-4 (Sources Exempt from RACT III – VOC), A-5 (RACT III Rule Applicability Summary – PTE (ACD 542 VAC Heater, VOC Emissions). The amended Tables A-1A (RACT III Source Inventory) and A-3A (RACT III Rule Applicability Summary – VOC) are provided in Appendix A.

SOURCES EXEMPT FROM RACT III

No change to this section.

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

In addition to the emission sources excluded from RACT III analysis identified in the original RACT proposal submitted by MONROE and technical review memo produced by DEP, there are two storage tanks, Source IDs 167 (#65 Fixed Roof Tank) and 168 (#445 Fixed Roof Tank), that were excluded from RACT III. These storage tanks were identified in the Miscellaneous Section of the operating permit; however, these two storage tanks have been placed in service under Plan Approval 23-0003AG, D2 Renewables Project, which was issued July 15, 2022 (post August 3, 2018).

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 Clearinghouse (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 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 3A.

Table 3A includes the emission sources from the original technical review memo and the emission source from the supplemental proposal.

Table 3A- 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
Process Drains and H2O Sep (Source ID 106)	VOC

A case-by-case RACT analysis was required for the sources in Table 3A. RACT determinations were listed in the SOPM issued on May 29, 2025 for the FCC, Peabody Heater and ULSG Cooling Tower. There are no presumptive RACT requirement or RACT emission limitation for the process drains and wastewater fugitive emissions associated with Source ID 106.

The case-by-case RACT analysis for Source ID 106 can be found in Appendices H and I. There are no changes to Appendices C-E; therefore, those sections are not included in this Addendum.

A summary of the case-by-case RACT determinations is presented in the Table 4A below.

Table 4A – 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 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.
106 – Process Drains & H2O Sep.	25 Pa. Code § 129.114(c)	NA	Good operating practices
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

No change to this section, including Table 5.

MISCELLANEOUS CHANGES

There were no changes to Appendix F or G. Added 40 C.F.R. § 61.346 (Subpart FF - National Emission Standard for Benzene Waste Operations Standards: Individual drain systems) to the Work Practice Requirements of Source ID 106. Deleted the flare (C103) from the permit map of Source ID 106 and removed the reference under C103 (Main Flare), Condition #022 since Source ID 106 does not have any components that vent to the Main Flare.

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 in the

PA Bulletin on November 1, 2025 and on November 7, 2025 through November 9, 2025 in the *Delaware County Daily Times* and *Daily & Sunday Times Digital*.

RECOMMENDATIONS

TBD

APPENDIX A – APPICABILITY TABLES

Table A-1A
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
092	Yanmar CI RICE (LP Basement Godwin Pump)	Reciprocating Internal Combustion Engine	Custom	Custom	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
106	Process Drain & H2O Sep	Process Drain & H2O Sep	Custom	Custom	Main Refinery
111	Cooling Towers	Cooling Towers	Custom	Custom	Main Refinery
118	Railcar Loading LPG & Butane	Railcar Loading	Custom	Custom	Main Refinery
122	Back-up Flare	Flare	Custom	Custom	Main 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
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-3A
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.
092	Yanmar CI RICE (LP Basement Godwin Pump)	28 bhp	N/A	N/A	Lean burn stationary internal combustion engine rated less than 500 bhp, and rich burn stationary internal combustion engines rated less than 100 bhp	§129.112(c)(6) and (7)	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	N/A	VOC air contamination source with PTE <2.7 ton/yr VOC	§129.112(c)(2)	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	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.

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

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.
106	Process Drains & H2O Sep	4.3 MMgal/day	Wastewater	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.
122	Back-up Flare	N/A	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.
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.

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

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.
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.

Appendix B

No change to this section.

Appendix C – FCCU and NOX

No change to this section.

Appendix D - Peabody Heater

No change to this section.

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

No change to this section.

Appendix F
Boilers 9 and 10 Emission/RACT NOx Limit

No change to this section.

Appendix G
Miscellaneous Changes

No changes to this section.

Appendix H – Source ID 106 - Process Drains

Source ID 106 includes the Refinery's wastewater collection system and Advanced Wastewater Treatment Facility (AWWTP). The components of Source ID 106 collect and treat various wastewater streams from the refining processes to ensure that the Refinery's effluent discharge meets applicable environmental regulations. Source ID 106 encompasses multiple sources that include the facility-wide population of process drains and AWWTP. A simplified process flow diagram depicting Source ID 106 and its components is included in Figure H-1. The collection system is comprised of a series of drains, manholes, junction boxes, sumps and lift stations that collect and direct the various wastewater streams to the AWWTP. The AWWTP includes an American Petroleum Institute (API) separator, which uses gravity separation to remove contaminants. The wastewater is processed by the AWWTP unit and discharged in accordance with the Refinery's National Pollutant Discharge Elimination System (NPDES) permit.

Sources of wastewater that are treated through the AWWTP include aboveground bulk storage tank water draining, boiler blowdown, bundle cleaning pad effluent, cooling tower blowdown, infiltration water, laboratory wastes, pump cooling water, service water, steam trap condensate, stormwater, and surface skimmings from Marcus Hook and Stoney Creek Guard Basins. The AWWTP is divided into five treatment sections as described below:

- Primary Treatment includes the API Separator, Primary Filter Feed Sump, and five Primary Sand Filters. Together these provide physical and chemical processes for the removal of coarse solids, suspended solids, and oil and grease. In addition, the pH is adjusted in-line prior to wastewater entering the Primary Sand Filters.

- Secondary Treatment includes the Equalization Tank, Biological Aeration Tank, and three Secondary Clarifiers. Together these provide equalization of flow and pollutant loading, biological treatment, pollutant degradation, solids thickening, and water clarification.

- Tertiary Treatment includes six Tertiary Sand Filters that remove any suspended solids carried over from the Secondary Treatment section.

- Oily Sludge Treatment and Disposal includes a Dissolved Air Floatation (DAF) Thickening System and a Filter Press. Together these systems thicken and dewater sludge and solids removed from the API Separator and Primary Sand Filters.

- Biological Sludge Treatment and Disposal includes a DAF Thickening System, Biological Sludge Conditioning System, and a Filter Press. Together these thicken and dewater biological sludge that is wasted from the biological process in the Secondary Treatment section.

The system is designed to handle up to 4.3 million gallons of refinery wastewater (WW) per day. Several components under Source ID 106 are subject to Federal requirements under 40 C.F.R. Part 60, Subpart QQQ (Standards of Performance for VOC Emissions from Petroleum Refinery Wastewater Systems), 40 C.F.R. Part 61, Subpart FF (National Emission Standard for Benzene

Waste Operations) requirements, and State requirements under 25 Pa. Code §129.55 (Petroleum refineries – specific processes).

Step 1: Available Control Options – VOC Source 106 – Process Drains

The following are VOC control options for Source 106 – Process Drains:

- Good Operating Practices
- Retrofitting Uncontrolled Drains with Water Seal Controls
- Use of Closed Drain System
- Capture and Control of Fugitive VOC Emissions

A description of the potential VOC control technologies for Source 106-Process Drains is provided below for each VOC control option.

Step 2: Technical Feasibility

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
Good Operating Practices	Good operating practices include but are not limited to operating equipment in accordance with manufacturer-related specifications. Good operating practices are technically feasible and this approach is considered further in this RACT analysis. Examples of good operating practices as related to refinery wastewater drains include: • Strict adherence to good management procedures and standard operating procedures (SOP); • Employee training detailing good work practices for minimizing emissions; • Periodic inspection of components; and • Monitoring, recordkeeping, and reporting of wastewater throughput rates and activities. MONROE currently uses good operating practices for Source ID 106-Process Drains. MONROE does not anticipate any additional economic, environmental, and energy impacts associated with this control technique.	Yes	Yes
Retrofitting Uncontrolled Drains with Water Seal Controls	Installing or retrofitting water seals on existing components is a proven method to reduce VOC emissions from existing process drains at a refinery. Water seals reduce emissions by limiting the effects of heat transfer and diffusion on VOC in wastewater	Yes	Yes

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
	streams. Specifically, water seals installed on process drains have been found to result in up to a 50 percent reduction in VOC emissions[1]. While water seals act to control VOC emissions, the seals must be properly maintained and coupled with work practices to achieve optimal emissions control. This control technique is considered technically feasible and MONROE has included the retrofit of uncontrolled drains in this analysis.		
Use of Closed Drain System	The use of an closed drain system can reduce fugitive VOC emissions from process drains. Complete drainage system enclosures can include "hard-piping" process units, removal or capping all existing drains, hard-piping process units to a drain box enclosure, and completely covering and sealing junction boxes and process drains to ensure no openings. Closed drain systems have historically been associated with drains handling extremely volatile compounds such as benzene, toluene, and xylene. While these strategies can effectively reduce emissions, the use of a closed system (i.e., hard-piping) at the refinery is not technically feasible due to the age of the Refinery and associated safety challenges and complexity of converting and/or reconstructing the entire existing collection system.	Yes	No
Capture and Control of Fugitive VOC Emissions	In order use an add-on VOC control device to abate fugitive emissions from process drains, the emissions must first be captured by local ventilation at many drains and manholes throughout the refinery. This approach would require the retrofitting of the entire wastewater collection system to accommodate the addition of exhaust collection points for the ventilation system and route them to either a oxidizer or absorber.	Yes	No

[1] EPA Office of Air Quality Planning and Standards: EPA-340/1-91-013 Regulatory and Inspection Manual for Petroleum Refinery Wastewater Systems. (September 1991).

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
	Adsorption is preferential partitioning of substances from the gaseous or liquid phase onto the surface of a solid substrate and is add-on control technology to abate VOC. Physical adsorption is caused mainly by van der Waals forces and electrostatic forces between the adsorbate (i.e., VOC) molecules and the atoms which compose the adsorbent surface.[2] Regenerative adsorption systems are used to control VOC emissions from industrial processes and are typically a batch operation involving the use of two or more fixed adsorption beds. One or more of the beds is operated in adsorption mode, while the remaining bed(s) are operated in regeneration mode. Different adsorbent materials have historically been used in adsorbers, including but not limited to activated carbon, organic resin polymers, and inorganic materials such as zeolite. Thermal or catalytic oxidation is a commonly used control technology to abate VOC emissions. Gases are captured by local ventilation and routed to control devices to be destroyed by oxidative chemical reactions at high temperatures (thermal oxidation [e.g., flaring]) or at a lower temperature (and higher cost) using a chemical catalyst. Thermal or catalytic oxidation is estimated to achieve 98% control efficiency for VOC and HAPs.[3] To evaluate this control option, MONROE reviewed U.S. EPA's Permanent Total Enclosures[4] technical document, which describe permanently installed structures that completely surround one or more sources of emissions. A permanently installed structure around the collection of drains to capture VOC emissions and route them to a VOC control device would add complexities along with other occupational hazards (e.g., potential health hazards and fire and explosive conditions). The fact that		

[2] What is adsorption? International Adsorption Society, (https://www.int-ads-soc.org/what-is-adsorption/)

[3] U.S. EPA Air Pollution Control Technology Fact Sheet, EPA-452/F-03-022.

[4] EPA Office of Air Quality Planning and Standards: Control Techniques Guidelines for Permanent Total Enclosures (EPA/452/B-02-001), September 2002.

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
	numerous drains and manholes are scattered throughout the refinery would make it very challenging to capture emissions with a centralized capture system. Due to space constraints and the layout/configuration of the refinery significant excavation and structural changes to refinery process equipment are anticipated would be required in order for a capture system to be installed. Capturing fugitive drain system VOC emissions and routing to a VOC control device is not a feasible control technology and MONROE has not considered it further in this RACT analysis.		

Step 3: Rank of technically feasible control options

Ranking	Control options	Control Efficiency (%)
1	Water Seal Controls	50[5]
2	Good operating practices	Variable – Vendor and process dependent

Step 4: Cost Effectiveness of Each Control Option

Control Device	Cost Effectiveness ($/ton)
Water Seal Controls	31,140
Good operating practices	--

Step 5: What is RACT – Source ID - Process Drains

MONROE proposes VOC RACT for the collection of process drains to be the use of good operating practices and adherence to 40 C.F.R. Part 60, Subpart QQQ for affected process drains. MONROE uses management of change procedures to ensure process drains comply with the provisions of 40 C.F.R. Part 60, Subpart QQQ when sewer modifications occur or when the applicability of 40 C.F.R. Part 60, Subpart QQQ is triggered. MONROE will demonstrate compliance with the proposed RACT, as described in Section 4.1 of the RACT Proposal, and by keeping the records described in Section 4.3 of the RACT Proposal.

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[5] EPA Office of Air Quality Planning and Standards: EPA-340/1-91-013 Regulatory and Inspection Manual for Petroleum Refinery Wastewater Systems. (September 1991).

DEP concurs with MONROE that closed drain systems are technically infeasible. While this method is considered to have up to 100 percent control efficiency, the potential safety issues and reconstruction complexity may be limiting factors on the feasibility of converting an existing open drainage system to a totally enclosed system.[6]

DEP agrees that the large footprint needed for capture and control system, excavation and structural changes required presents a significant hurdle.

Therefore, DEP agrees that good operating practice and adherence to 40 C.F.R. Part 60, Subpart QQQ for affected process drains constitutes RACT.

Retrofitting existing uncontrolled drains with water seal controls at $31,140 per ton of VOC abated is cost prohibitive when compared to the guidance value of $7,500 per ton of VOC abated.

The following conditions were highlighted in the Title V Operating Permit for MONROE for inclusion for compliance with the Alternate RACT III Plan for MONROE in accordance with 25 Pa. Code §§ 129.114 and 129.115 and submittal to the U.S. EPA for inclusion in the State Implementation Plan (SIP) for Pennsylvania.

- Section C, Source ID 106, Condition #005 – recordkeeping requirements for individual drain systems, junction boxes and sewer lines.
- Section C, Source ID 106, Condition #007(c) – reporting requirements that summarizes inspections.
- Section C, Source ID 106, Condition #008(a) – work practice requirements for individual drain systems.
- Source C, Source 106, Condition #013 – work practice requirements for individual drain systems
- Source C, Source 106, Condition #016 – work practice requirements for drains, junction boxes, and sewer lines.

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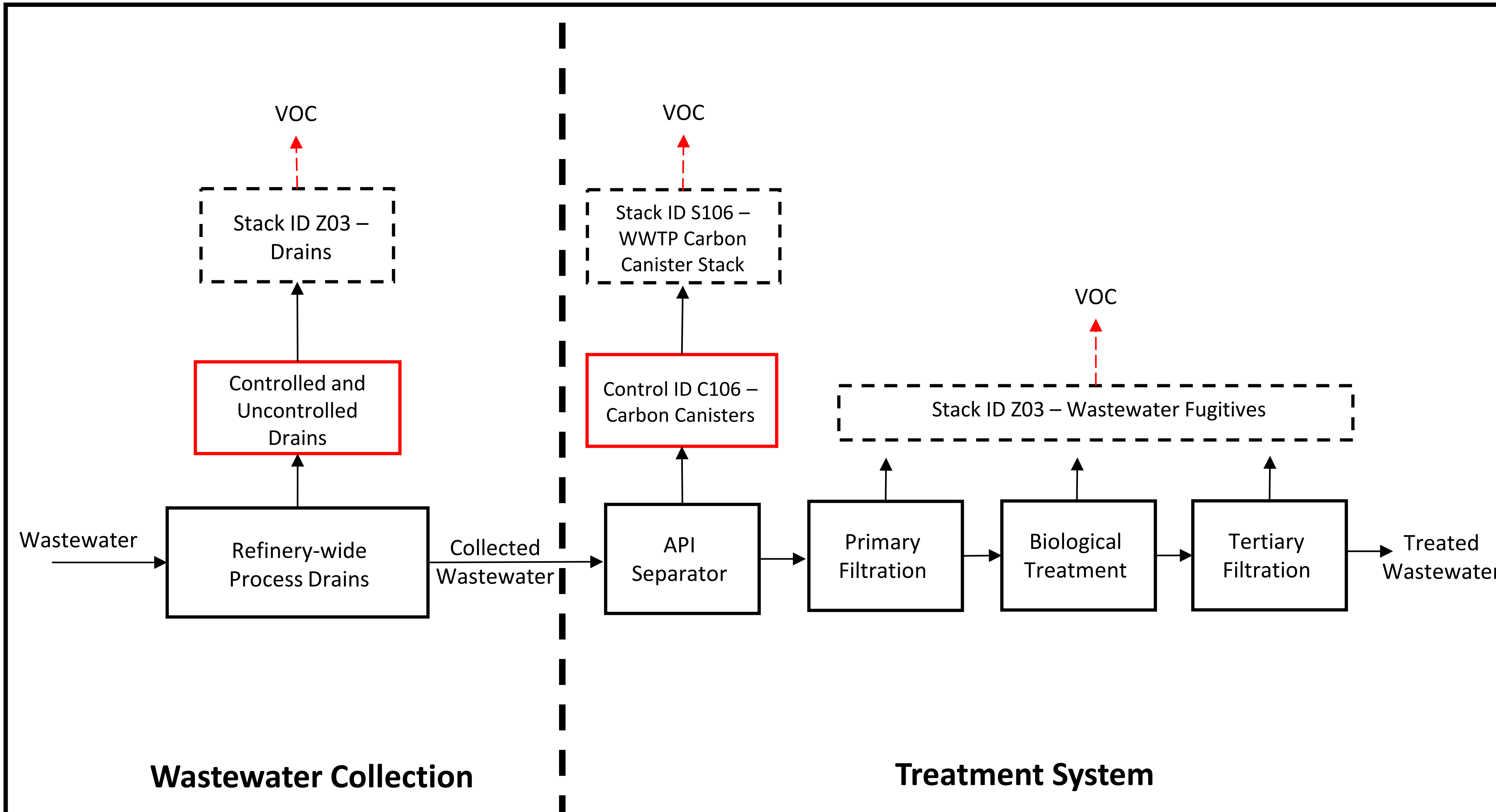
[6] K Balakrishnan. *Final Staff Report Proposed Amendments To Regulation 8: Organic Compounds, Rule 8: Wastewater Collection And Separation Systems.* Bay Area Air Quality Management District. December 2023



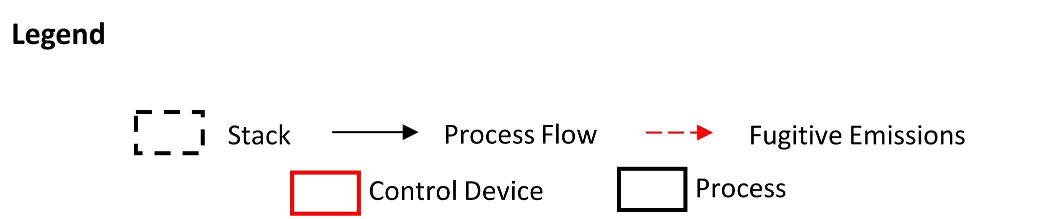


Figure 2-1
Source ID 106
Process Flow Diagram

Monroe Energy, LLC
Trainer, PA Refinery

Appendix I – Source ID 106 – Wastewater Treatment System (WW Fugitives)

Fugitive VOC emissions are generated by hydrocarbon volatilization across the AWWTP. The AWWTP is divided into five treatment sections. Primary Treatment includes the API Separator, Primary Filter Feed Sump, and five Primary Sand Filters. Together these provide physical and chemical processes for the removal of coarse solids, suspended solids, and oil and grease. In addition, the pH is adjusted in-line prior to wastewater entering the Primary Sand Filters. Secondary Treatment includes the Equalization Tank, Biological Aeration Tank, and three Secondary Clarifiers. Together these provide equalization of flow and pollutant loading, biological treatment, pollutant degradation, solids thickening, and water clarification.

Tertiary Treatment includes six Tertiary Sand Filters that remove any suspended solids carried over from the Secondary Treatment section. Oily Sludge Treatment and Disposal includes a DAF Thickening System and a Filter Press. Together these systems thicken and dewater sludge and solids removed from the API Separator and Primary Sand Filters. Biological Sludge Treatment and Disposal includes a DAF Thickening System, Biological Sludge Conditioning System, and a Filter Press. Together these thicken and dewater biological sludge that is wasted from the biological process in the Secondary Treatment section.

The API separator is a component of the AWWTP and is subject to 40 C.F.R. Part 60, Subpart QQQ. The API separator removes the bulk oil from the wastewater stream and has controls in place to minimize fugitive VOC emissions by a combination of floating roof and fixed roof sections, with the fixed roof sections operated as a closed system venting to a control device (carbon canisters).

Step 1: Available Control Options – VOC Source 106 – WW Fugitives

The following VOC control options for Source 106 – WW Fugitives:

- Good Operating Practices
- Capture and Control of Fugitive VOC Emissions

Step 2: Technical Feasibility

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
Good Operating Practices	Good operating practices include but are not limited to operating equipment in accordance with manufacturer-related specifications. This control technique is considered technically feasible and is considered further in this RACT analysis. Other examples of good operating practices include: • Tanks being equipped with submerged fill pipes; • Strict adherence to good management procedures and standard operating procedures;	Yes	Yes

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
	• Employee training detailing good work practices for minimizing emissions; • Good housekeeping procedures for the storage, use, and disposal of product; • Periodic inspection of wastewater activities; • Monitoring, recordkeeping, and reporting of wastewater throughput rates and activities. MONROE currently uses good operating practices for Source ID 106-Process Drains. MONROE does not anticipate any additional economic, environmental, and energy impacts associated with this control technique.		
Capture and Control of Fugitive VOC Emissions	While it is technically feasible to abate VOC emissions using common VOC control systems (i.e., sorbent capture, oxidation, etc.), capturing VOC emissions associated with wastewater handling across the AWWTP is technically challenging based on its "footprint" and the diffuse nature of fugitive wastewater VOC emissions after the API separator. While several types of VOC control devices are available, the use of a regenerative thermal oxidizer (RTO) is the control choice typically selected based on its simplicity and economics. Therefore, the evaluation included herein reflects the use of an RTO. A description of thermal oxidation is provided below. • Thermal oxidation is a commonly used control technology to abate VOC emissions. Gases are captured by local ventilation and routed to control devices to be destroyed by oxidative chemical reactions at high temperatures. Thermal or catalytic oxidation is estimated to achieve 98% control efficiency for VOC and HAPs.[7] While permanently installing structures that surround one or more sources of emissions would pose technical challenges and add complexities along with other occupational hazards (e.g., potential health hazards and fire and explosive conditions) to the existing wastewater system, MONROE considered the capture and control of VOC emissions technically	Yes	Yes

[7] U.S. EPA Air Pollution Control Technology Fact Sheet, EPA-452/F-03-022.

Control Option	Facility's Evaluation of Technical Feasibility	DEP concurs?	Technically Feasible?
	feasible and has considered this technology further in this RACT analysis.		

Step 3: Rank of technically feasible control options

Ranking	Control options	Control Efficiency (%)
1	Capture and Control to Thermal Oxidation	95-99[8]
2	Good operating practices	Variable – Vendor and process dependent

Step 4: Cost Effectiveness of Each Control Option

Control Device	Cost Effectiveness ($/ton)
Capture and Control to Thermal Oxidation	31,209
Good operating practices	--

Step 5: What is RACT – Source ID – WW Fugitives

MONROE proposes VOC RACT for wastewater fugitives to be the use of good operating practices and adherence to 40 C.F.R. Part 61, Subpart FF. This includes the current restrictions, testing requirements, monitoring requirements, and work practice requirements currently specified in the permit. MONROE will demonstrate compliance with the proposed RACT on Source ID 106, as described in Section 4.2 of the RACT Proposal, and by keeping the records described in Section 4.3 of the RACT Proposal. DEP concurs that good operating practice constitutes RACT for the wastewater fugitives. The capture and control option at $31,209 per ton of VOC abated is cost prohibitive when compared to the guidance value of $7,500 per ton of VOC abated.

The following conditions were highlighted in the Title V Operating Permit for MONROE for inclusion for compliance with the Alternate RACT III Plan for MONROE in accordance with 25 Pa. Code §§ 129.114 and 129.115 and submittal to the U.S. EPA for inclusion in the State Implementation Plan (SIP) for Pennsylvania.

[8] EPA Office of Air Quality Planning and Standards: EPA-340/1-91-013 Regulatory and Inspection Manual for Petroleum Refinery Wastewater Systems. (September 1991).

- Source C, Source 106, Condition #016 – work practice requirements for wastewater streams.
- Source C, Source 106, Condition #017 – work practice requirements for wastewater streams.