Permit Renewal & Amendment
Source Analysis & Technical Review

Company	**Valero Refining-Texas LP**	Permit Number	**2501A**
City	**Houston**	Project Numbers	**339790**
County	**Harris**	Regulated Entity Number	**RN100219310**
Project Types	**Renewal and Amendment**	Customer Reference Number	**CN600127468**
Project Reviewer	**Maryam Rasti**	Received Date	**March 9, 2022**
Site Name	**Houston Refinery**		

Project Overview

This renewal and amendment project authorizes an increase in the annual CO limit for the Fluid Catalytic Cracking Unit (FCCU), incorporates several PBRs and standard permits, adds particulate matter (PM) to the MAERT for multiple sources, removes benzene emissions from the MAERT, updates storage tank calculations using AP-42 Chapter 7.1 equations and emission factors, and makes several minor corrections to the Special Conditions.

Emission Summary

Air Contaminant	Current Allowable Emission Rates (tpy)	Consolidated Emission Rates (tpy)	Proposed Allowable Emission Rates (tpy)	Change in Allowable Emission Rates (tpy)
PM	395.70*	-46.54	349.16	0.00
PM_{10}	382.62	-41.69	340.93	0.00
$PM_{2.5}$	269.83	+1.51	271.34	0.00
VOC	927.89	+61.88	990.24	+0.47
NO_X	412.20	0.00	412.20	0.00
CO	596.19	0.00	645.02	+48.83
SO_2	656.80	0.00	656.80	0.00
H_2S	4.58	+ 0.01	4.59	0.00
H_2SO_4	6.91	0.00	6.91	0.00
HCN	100	0.00	100	0.00
NH_3	4.23	+0.01	4.24	0.00
NaOH	0.00	+0.60	0.60	0.00
H_2O_2	0.00	+0.13	0.13	0.00

*Current Allowable PM emission rates are not listed in the MAERT, but the Proposed Allowable PM rates do not reflect any actual or potential increase in emissions. These are existing emissions that were not previously required to be quantified on the MAERT.

Compliance History Evaluation - 30 TAC Chapter 60 Rules

A compliance history report was reviewed on:	**October 30, 2024**
Site rating & classification:	**13.00 / Satisfactory**
Company rating & classification:	**4.05 / Satisfactory**
Has the permit changed on the basis of the compliance history or rating?	**No**
Did the Regional Office have any comments? If so, explain.	**No**

Public Notice Information

Requirement	Date	
	Renewal	Amendment
Legislator letters mailed	3/16/2022	N/A
Date 1st notice published*	4/9/2022	N/A
Publication Name: **Houston Chronicle**		
Pollutants: CO, HAPs, H_2S, NOx, VOCs, PM including PM_{10} and $PM_{2.5}$, SO_2, and H_2SO_4		
Date 1st notice Alternate Language published*	4/10/2022	N/A
Publication Name (Alternate Language): **El Perico**		
1st public notice tearsheet(s) received*	4/25/2022	N/A
1st public notice affidavit(s) received*	4/25/2022	N/A
1st public notice certification of sign posting/application availability received*	5/5/2022	N/A

*The 1st public notice comment period was extended to March 13th, 2023.

Public Interest

Public Interest Information	
Number of comments received	21
Number of meeting requests received	0
Number of hearing requests received	0
Date meeting held	N/A
Date response to comments filed with OCC	4/15/2025
Date of SOAH hearing	N/A

Renewal Requirements

Requirement	
Date of permit expiration:	**06/25/2022**
Date written notice of review was mailed:	**05/13/2021**
Was there a condition of air pollution that had to be addressed during this project review?	**No**
If yes, explain: N/A	
Permit Renewal Fee: $	**10,900.00**

Federal Rules Applicability

Requirement			
Subject to NSPS?	**Yes**		
Subparts	**A**	&	**Db, Dc, J, Ja, K, Ka, Kb, GGG, GGGa, QQQ**
Subject to NESHAP?	**Yes**		
Subparts	**A**	&	**FF**

Subject to NESHAP (MACT) for source categories? **Yes**

Subparts **A** & **CC, UUU, DDDDD**

Nonattainment review applicability: This site is in a severe ozone nonattainment area. This project does not involve any modification that increases VOC or NOx emissions. There is a 0.47 tpy increase in VOC emissions which comes from updating the storage tank calculation methodology using AP-42 Chapter 7.1 equations and emission factors, but there is no physical or operational change to the storage tanks. Therefore, nonattainment review is not applicable.

PSD review applicability: This site is an existing major source for PSD. The only modified source in this project is the FCCU stack (EPN 42CB2201). The Project Emission Increase calculated by subtracting Baseline Actual Emissions (158.63 tpy) from the Proposed Allowable (246.83 tpy) is 88.20 tpy of CO, which is below the PSD major modification threshold of 100 tpy for CO. Therefore, PSD review is not applicable.

Requirement

Title V applicability: This site is a Title V major source under 30 TAC Chapter 122 and operates under Federal Operating Permit No. O1381.

Periodic Monitoring (PM) applicability: This site is a major source and is subject to PM under 30 TAC Chapter 122. The permit require PM as listed in the following table.

Source (EPN)	SCs	Description of Monitoring
Atmospheric Tower Heater (23BC201)	6, 61, Att. G	H_2S concentration measured in the fuel gas for SO_2 and H_2S. Fuel gas heat content is measured daily. Fuel flow to the heater measured continuously. CEMS collecting concentration data at least four times per hour and averaged hourly for NOx, and CO.
Crude Topper Heater (17H01)	61	CEMS collecting concentration data at least four times per hour and averaged hourly for NOx and CO. Hourly fuel gas consumption monitored.
Other Heaters (23BA301, 23BA302, 27BA1000, 28BA1200, 29BA1300, 41BA101, 41BA102, and 40BA1001)	7, 8, 9	H_2S monitoring requirements of 40 CFR 60.107(2) if 40 CFR 60.107(1) monitoring of SO_2 is not utilized. Opacity monitored via EPA Reference Method 9. Hourly and annual firing rate to the heaters monitored.
Fluid Catalytic Cracking Unit Stack (42CB2201)	61, Att. G	CEMS collecting concentration data at least four times per hour and averaged hourly for NOx, CO, and SO_2. Flow rate continuously monitored.
Cooling Towers (27CWT2, 22CWT3, 23CWT7, 44CWT9, 42CWT10, and 40CWT11)	29, Att. G	Cooling water monitored monthly for VOC leakage from heat exchangers. Inlet flow to the cooling tower sampled and analyzed for hydrocarbons each month. Total dissolved solids (TDS) in the cooling tower return analyzed monthly. Drift eliminators maintained and inspected at least annually.
Storage Tanks (22FB747, 42FB28O2, 45FB6001, 45FB6002, 45FB7403, 46FB6301, 91FB922, 90FB735)	30, Att. G	Average temperature, average material vapor pressure, and throughput are recorded on a monthly basis.
DAF Unit (47AD5409)	37, Att. G	Monthly samples to determine VOC concentration in wastewater and the wastewater flow rate is averaged on a monthly basis.
Vapor Combustor Unit (90CB5601)	39	Temperature in, or immediately downstream of combustion chamber shall be monitored and measurements reduced to 6 minutes or less averaging frequency. Pilot flame continuously monitored by a thermocouple or an infrared monitor.
Fugitives (FUG)	41	28VHP Leak Detection and Repair (LDAR) program. Weekly AVO checks for connectors.
Loading (9058LOAD and	32, 33	Monthly records of loading spot, control method, throughput, vapor

9059LOAD)		molecular weight, temperature, and vapor pressure. All lines and connectors visually inspected prior to hookups. Vapor-tight testing for tank trucks every 12 months.

Compliance Assurance Monitoring (CAM) applicability: The site is subject to 30 TAC Chapter 122 requirements. The permit covers the following control devices which will be used to comply with applicable requirements of the permit, and which control source of emissions with a pre-control emission rate in excess of the Title V Major Source thresholds.

Source (EPN)	SCs	Description of Monitoring
Flares (30FL1 and 30FL6)	38, 40, and Att. G	Pilot flame monitored continuously by a thermocouple or infrared monitor. Monitoring device calibrated at manufacturer's recommended frequency. Continuous flow monitor and composition analyzer to record inlet flow and composition to the flare every 15 minutes with hourly averages recorded. Inlet gas heat content measured daily. Flared gas net heating value and actual exit velocity determined in accordance with 40 CFR §60.18(f)(4) recorded at least once every 15 minutes. Once a year, complete either AVO inspection of capture system or verify capture system is leak free by performing Test Method 21 inspection with leak definition of 50 ppmv above background. Bypasses to capture system are not allowed. H_2S and total sulfur concentration are measured in vent gas.
FCCU Wet Gas Scrubber (EPN 42CB2201)	16 and 40	Liquid-to-gas ratio, WGS recirculation pump discharge header pressure, and Agglo Filtering Modules pump discharge pressure drop shall be monitored on an hourly basis. Once a year, complete either visible inspection of capture system or visible emissions observation in accordance with EPA Test Method 22. Bypasses to capture system are not allowed.
Tail Gas Incinerator Units (39CB2001 and 46CB6301)	28, 40, and 61	Firebox exit temperature and O_2 concentration shall be monitored. Temperature readings shall be reduced to 6 minute or less averaging frequency. Temperature monitor calibrated at least annually. CEMS continuously monitors SO_2 and O_2. Once a year, complete either AVO inspection of capture system or verify capture system is leak free by performing Test Method 21 inspection with leak definition of 50 ppmv above background. Bypasses to capture system are not allowed.

Process Description

Valero Refining – Texas, L.P. (Valero) owns and operates a petroleum refinery located at 9701 Manchester Street in Houston, Harris County, Texas. The refinery processes crude oil to produce products such as blended gasoline, diesel, kerosene, etc. The crude oil is received from off-site sources via marine facilities, pipeline, and/or transport vessels. Permit 2501A authorizes process equipment such as heaters to support the Crude Combo and Topper Units (which separate crude oils into various hydrocarbon fractions), the Fluid Catalytic Cracking Unit (FCCU), the Sulfur Recovery Unit (SRU), the Tail Gas Incinerator Units (TGIs), cooling towers, storage tanks, loading activities, wastewater treatment facilities, flares, a Vapor Combustor Unit (VCU), piping components, and maintenance, startup, and shutdown activities (MSS). The refinery includes a tank farm that is permitted under NSR Permit No. 129444.

Project Scope

Valero submitted this renewal application with a concurrent amendment to make the following proposed changes:

1. Increase the annual CO limit for the Fluid Catalytic Cracking Unit (FCCU) based on updated operational data.
2. Incorporate several PBRs and standard permits via full consolidation, partial consolidation, or reference.
3. Add particulate matter (PM) to the MAERT for multiple sources.
4. Remove benzene emissions from the MAERT.
5. Update storage tank calculations using AP-42 Chapter 7.1 equations and emission factors
6. Several minor corrections to special conditions including:
    - Remove heaters 81BA25, 44BA3001, 44BA3002, 44BA3005
    - Update a few federal rule references
    - Add another monitoring instrumentation option
    - Update drift eliminator control efficiency for EPN 23CWT7
    - Specify the type of H_2S and sulfur analyzers allowed for flare flow monitoring
    - Update opacity/visible emissions language to current boilerplate
    - Correct errors in CAM condition
    - Update names of a few heaters
    - Add CEMS recordkeeping requirements
    - Update list of referenced PBRs
    - Remove projected actuals condition
    - Revise monitoring description for flares in Attachment G

These changes are described in more detail below.

Increase the annual CO limit for the FCCU

The current FCCU annual CO limit of 198 tpy was established during the Standard Permit no. 50232 in 2004 to replace the existing stack to a more emission control efficient wet gas scrubber system. The Standard Permit was subsequently rolled into the Permit 2501A. According to the Standard Permit application, the annual CO permit limit was reduced from 1,178 tpy to 198 tpy. The 198 tpy permit limit was based on an average of actual emissions during 1997-1998 period. Valero proposes to increase the annual CO to a more representable limit based on actual operating scenarios. The average CO concentration and stack flow rate established for the emission calculations are based on Continuous Emission Monitoring System (CEMS) and operational data.

Incorporating several PBRs

Most of the PBRs to be incorporated affect EPN FUG. There are three additional non-fugitive EPNs which are affected: 23CWT7, 39CB2001, and 46CB6301. The original scope of this project included the consolidation of PBR No. 164545. However, it was determined during the technical review that the PBR will be referenced. In the future, incorporation by consolidation of PBR No. 164545 will require a BACT analysis for the increases associated with EPNs 29BA1300 and 41BA102.

Adding PM to MAERT

Currently, only PM_{10} and $PM_{2.5}$ are quantified on the MAERT. Except for the cooling towers, PM emission rate for all sources will equal the sum of PM_{10} and $PM_{2.5}$. This change is an administrative update and does not result in any new increase in emissions. The cooling tower (EPN 23CWT7) was replaced with a new cooling tower, which was authorized under PBR § 106.371. The new placement cooling tower is equipped with a drift eliminator with a drift loss of 0.001%. Therefore, emissions from cooling tower 23CWT7 have decreased. The PM emission rates for cooling towers added to the MAERT with this project do not represent any actual or operational change. These emissions were always present, but not quantified on the MAERT.

Remove benzene emissions from the MAERT

Benzene was previously required to be specified in the MAERT, because the site is in an area that was designated as an Air Pollutant Watch Area (APWA) for benzene. The area is no longer designated as an APWA for benzene as of 2017. Benzene is already accounted for in the MAERT as a subset of total VOC. Therefore, this request is granted.

AP-42 Chapter 7.1 Storage Tank Updates

The applicant was asked to provide updated storage tank calculations for EPNs 22FB747, 42FB2802, 45FB6001,

45FB6002, 45FB7403, 46FB6301,91FB922, and 90FB735 using the methodology and emission factors provided in AP-42 Chapter 7.1 Organic Liquid Storage Tanks. The applicant represented that the tanks store the following materials:

EPN	Material
22FB747	Sulfuric Acid
42FB2802	Corrosive Inhibitor
45FB6001	MDEA
45FB6002	MDEA
45FB7403	VLO-Sour Water (RVP3)
46FB6301	MDEA
91FB922	Recovered Oil
90FB735	Oily Caustic

Changes to Special Conditions

Old SC	New SC	Description of Change
7	7	Added EPN 17H01 because it is now operational. Changed 40 CFR Part 60 Subpart J to Subpart Ja because sub-condition B stated that subpart Ja for H_2S monitoring would apply upon start of operation of 17H01. According to §60.100(e), Ja can be used to satisfy requirements of J. Removed EPNs 81BA25, 44BA3001, 44BA3002, 44BA3005 because they should have been removed with Project 320812.
7.B	7.B	Removed last sentence that began, "When EPN 17H01 becomes operational…", because EPN 17H01 is now operational. Updated rule reference from "40 CFR 60.105(a)(4)" to "40 CFR 60.107a(2)" and "40 CFR 50.105(a)(3)" to "40 CFR 60.107a(1)" due to the change from Subpart J to Subpart Ja.
8	8	Replaced condition with updated boilerplate language (2021 version) for opacity requirements for combustion devices. The previous wording did not specify any frequency for the observations/tests that must be conducted to show compliance with opacity requirements. The revised language specifies that visible emission observations (Method 22) shall be conducted and recorded at least once per quarter. If visible emissions are observed, a Method 9 observation is required within 24 hours.
25	25	Applicant requested to remove the word "manual" from the third sentence and add option of "or level instrumentation" in third sentence for hydrocarbon checks. This request was granted.
29.C	29.C	Changed Drift Eliminator Control Efficiency from 0.05% to 0.001% for cooling tower 23CWT7, because this cooling tower was replaced with a new cooling tower authorized under PBR § 106.371 and the new cooling tower is equipped with a drift eliminator with drift loss of 0.001%.
38.D	38.D	Added requirement to install H_2S, total sulfur, or total reduced sulfur analyzers to continuous monitoring requirements for flare.
38.F	38.F	
40.A(2)	40.A(2)	Corrected "VCU" to "fugitive" because the word "VCU" was inadvertently added to the condition during a previous project.
40.C	40.C	Added the requirement that control devices cannot have a bypass, because this is standard boilerplate language for CAM. The applicant verified via email dated 12/5/2024 that the control devices for the EPNs in SC 40 do not have bypasses.
58	58	Updated name of 17H01 to Crude "Topper" Heater
59	59	
61	61	
62	62	
Att. A	Att. A	
Att. B	Att. B	
Att. C	Att. C	
-	62.C(5)	Applicant requested additional CEMS language as 62.C(5). This request was granted.
65	65	Added referenced permits and deleted voided or consolidated permits. See "Permit Incorporation" section for details.
67	-	Deleted because the time period specified in 30 TAC 116.27(b)(1) has passed. Applicant is no longer required to monitor actual emissions for the purpose of this condition.

Att. A	Att. A	Revised "'B' Unifiner Reactor Charge Heater" name to "'B-GDU' Reactor Charge Heater" at applicant request
Att. G	Att. G	Revised "CEMS" to "Continuous Monitoring" and specified "flare inlet" instead of "vent" because applicant confirmed they are not measuring the actual emissions from the stack exhaust for EPNs 23BC201 (SO_2 and H_2S) and flares (all pollutants for EPNs 30FL1 and 30FL6). Also added "Total Sulfur" to clarify that applicant is using total sulfur concentration measurements to demonstrate compliance with SO_2 and H_2S rates for EPNs 30FL1 and 30FL6.

Best Available Control Technology

Source Name	EPN	Best Available Control Technology Description
Cooling Towers 2, 3, 7, 9, 10, and 11	27CWT2, 22CWT3, 23CWT7, 44CWT9, 42CWT10, 40CWT11	Consolidation of PBR §106.371 triggers BACT analysis for 23CWT7. All cooling towers are subject to the following requirements: VOCs: Monthly monitoring of VOCs in water per Appendix P or approved equivalent. Identified leaks repaired as soon as possible. Shutdown triggered by 0.08 ppmw cooling water VOC concentration. This meets Tier I BACT. $PM/PM_{10}/PM_{2.5}$: Except for 27CWT2, all cooling towers equipped with drift eliminators achieving <0.001% control efficiency. This meets Tier I BACT. 27CWT2 drift eliminator control efficiency is 0.05%, but it is not subject to current Tier I BACT because it is not modified with this project and Valero plans to either demolish 27CWT2 or equip it with drift eliminators with a drift loss of 0.001%.
Tail Gas Incinerator Units for 39 SRU and 46 SRU	39CB2001 and 46CB6301	Consolidation of PBR 136714 triggers BACT analysis for both TGIs. TGIs are part of Tier I BACT requirements for SRUs with >10 LTPD. There is currently no published TCEQ Tier I BACT specifically for TGI units, but these units are subject to the following requirements: VOC: 99.9% destruction efficiency of waste streams CO: Maximum CO in-stack concentration 100 ppmv on hourly average dry and 3% O_2 basis. H_2S: 99.9% destruction efficiency of waste streams with maximum exhaust H_2S concentration of <5 ppmv, corrected to 3% oxygen. NH_3: 99.9% destruction efficiency of waste streams. NOx: Limited to stack-tested emission factor represented in application SO_2: Maximum SO_2 in-stack concentration from TGI 250 ppmv on hourly average dry basis. $PM/PM_{10}/PM_{2.5}$: No visible emissions from the TGI stacks.
Fluid Catalytic Cracking Unit	42CB2201	The annual emission increase of CO triggers BACT analysis for this unit. This unit is subject to the following requirements: NOx: Hourly average limit 200 ppmv; 7-day rolling average of 38 ppmvd; rolling 365-day average of 19 ppmvd. All concentrations are corrected to 0% oxygen. This meets Tier I BACT. CO: Hourly average limit 500 ppmvd, corrected to 0% oxygen. This meets Tier I BACT. VOC: Limited to 10 ppmv on hourly and annual basis. This meets Tier I BACT. SO_2: Hourly emission limit 300 ppmvd; 7-day rolling average of 50 ppmvd; rolling 365-day average of 25 ppmvd. All concentrations are corrected to 0% oxygen. This meets Tier I BACT. $PM/PM_{10}/PM_{2.5}$: Limited to 1 pound particulate matter per 1,000 pounds of coke burn-off. Opacity of emissions from FCCU limited to 20% averaged over 6-minute period. This meets Tier I BACT.

		H_2SO_4: Limited to stack-tested emission factor represented in application. There is currently no published Tier I BACT for H_2SO_4 from FCCUs. HCN: Compliance with the CO hourly emission limit of 500 ppmvd indicates effective combustion of coke in the regenerator, which limits emissions of HCN. There is currently no published Tier I BACT for HCN from FCCUs.
Fugitives	FUG	Consolidation of various PBRs triggers BACT analysis for fugitives. Fugitive components are subject to the following requirements: VOC: 28VHP Leak Detection and Repair Program. This meets Tier I BACT. H_2S: AVO checks. This meets Tier I BACT. NH_3: AVO checks. This meets Tier I BACT. NaOH: There is currently no published Tier I BACT for inorganic species from fugitive components. H_2O_2: There is currently no published Tier I BACT for inorganic species from fugitive components.

Permits Incorporation

Permit by Rule (PBR) / Standard Permit / Permit Nos.	Description (include affected EPNs)	Action (Reference / Consolidate / Void)
51612	EPN: FUG - Oil separator drum (45FA1511) and associated piping to provide stream separation prior to entry into sour water tanks. The only emissions are associated with fugitive components.	Fully Consolidate & Void
48166	EPN: FUG - Reactivation of depentanizer - Addition of piping and fugitive components to connect depentanizer tower at FCCU to other equipment (Tank 91FB920); also, catalyst in A Unifiner changed. The only emissions are associated with fugitive components.	Fully Consolidate & Void
50600	EPN: FUG - Minor piping changes from addition of fugitive components to corrosion inhibitors and installation analyzer. The only emissions are associated with fugitive components.	Fully Consolidate & Void
54616	EPN: FUG - Summary of fugitive emission increases from piping changes made at site in 2002. The only emissions are associated with fugitive components.	Fully Consolidate & Void
55752	EPN: FUG - Piping and fugitive components to allow desulfurization of heavy naptha produced at FCCU at “D” and “A” Unifiners; new amine absorber & associated equipment; also, two natural gas fired recycle hydrogen compressors replaced with electric motor-driven compressors. The only emissions are associated with fugitive components.	Fully Consolidate & Void
70289	EPN: FUG - Addition of fugitive components associated with replacing portion of gasoline pool with iso-octene for the MTBE Unit. The only emissions are associated with fugitive components.	Fully Consolidate & Void
71680	EPN: FUG - Summary of fugitive emission increases from piping changes made at site in 2003. The only emissions are associated with fugitive components.	Fully Consolidate & Void
73902	EPN: FUG - Fugitive equipment component emissions associated with installation of A-Unifier Selective Hydrogenation Unit (SHU). The only emissions are associated with fugitive components.	Fully Consolidate & Void
75514	EPN: FUG - Summary of fugitive emission increases from piping changes made at site in 2004. The only emissions are associated with fugitive components.	Fully Consolidate & Void

78574	EPN: FUG - Summary of fugitive emission increases from piping changes made at site in 2005. The only emissions are associated with fugitive components.	Fully Consolidate & Void
81166	EPN: FUG - Installation of new 37 mile, 12-inch pipeline capable of conveying naphtha and heavy liquids from Texas City to Houston Refinery ending at Tanks 90FB216 and 90FB233 in Houston. The only emissions are associated with fugitive components.	Fully Consolidate & Void
81526	EPN: FUG - Fugitive emissions from miscellaneous projects completed in 2006. The only emissions are associated with fugitive components.	Fully Consolidate & Void
87909	EPN: FUG - Summary of fugitive emission increases from piping changes made at site in 2008. The only emissions are associated with fugitive components.	Fully Consolidate & Void
101936	EPN: FUG - Authorized a physical modification related to Alkylation Unit Debottlenecking, a ROSE hot oil heater firing rate increase, and minor projects adding fugitive components in 2011. The Alkylation Unit Debottlenecking did not result in additional emissions. The heater associated with the ROSE unit is no longer in service. Therefore, the only emissions to consolidate are from fugitive components.	Fully Consolidate & Void
136714	EPNs: 39CB2001 and 46CB6301 - Authorized increased flow of fuel (60,000 scf/hour) to Tail Gas Treating Units combustors and Tail Gas Incinerators pilots. No physical or operational changes are associated with the fuel gas increases. This consolidation only involves hourly and annual increases of PM, $PM_{2.5}$, and PM_{10}, because the PBR authorized emission rates were based on projected actuals for the other pollutants, which were all below the current allowable emission rates in this NSR permit.	Fully Consolidate & Void
145105	EPN: FUG - Seven projects: New Piping Components in Crude Topper Unit and Crude Combo Unit, ULSD Unit, Upgrade to ULSD Recycle Gas Compressor, Upgrade Diesel Feed Surge Drum Pump Impeller, Upgrade Control Valve of Diesel Feed Surge Drum, and New Heat Exchanger on Diesel Feed Surge Drum Spill-Back. The only emissions are associated with fugitive components. Valero confirmed that the emission rates listed for the non-fugitive upstream/downstream sources included in the PBR have not changed.	Fully Consolidate & Void
146134	EPN: FUG - Miscellaneous projects in 2016 which resulted in addition and removal of fugitive components, including lube oil mist systems. The only emissions are associated with fugitive components.	Fully Consolidate & Void
151193	EPN: FUG - Summary of fugitive emissions from several projects in 2017: Crude Combo Unit, Crude Topper Unit, Fluid Catalytic Cracking Unit, Unifiners Unit, Gasoline Desulfurization Unit, Alkylation Operations Projects, Ultra-Low Sulfur Diesel Unit, Utilities Projects. The only emissions are associated with fugitive components.	Fully Consolidate & Void
156300	EPN: FUG – Summary of fugitive emissions from several projects in 2018: Crude Combo Unit, Crude Topper Unit, Fluid Catalytic Cracking Unit, Gasoline Desulfurization Unit, Alkylations Operations Projects, Ultra-Low Sulfur Diesel Unit, Product Storage and Loading Projects, Utilities Projects. The only emissions are associated with fugitive components.	Fully Consolidate & Void
30 TAC §106.371	EPN: 23CWT7 – Cooling Tower No. 7 Construction. Equipped with a better drift eliminator resulting in decreased emissions associated with this incorporation.	Fully Consolidate & Void
146851	EPNs FUG, 29BA1300, 41BA101, 41BA102, 39CB2001, 46CB6301, 81BF01, 50BF02, 50BF03, 81BF05, and 81BF06 – Modifications affecting the Gasoline Desulfurization Unit (“B” and “D” GDU) to meet EPA’s Tier 3 program new sulfur content standards. EPNs 81BF01,	Fully Consolidate & Void

	50BF02, 50BF03, 81BF05, and 81BF06 are no longer operating or authorized. The only emissions are associated with fugitive components. Valero confirmed that the emission rates listed for the non-fugitive upstream/downstream sources included in the PBR have not changed.	
109315	EPN FUG – Fugitive emissions from miscellaneous projects conducted in 2012 (does not include those associated with Alkylation Unit Turnaround) associated with FCCU Turnaround: FCC Reactor Stripper Packing and FCC Main Fractionator Modifications. The only emissions are associated with fugitive components. Valero confirmed that the emission rates listed for the non-fugitive upstream/downstream sources included in the PBR have not changed.	Fully Consolidate & Void
109220	EPN FUG – Three projects from 2012 associated with Alkylation Unit Turnaround: Stratco Contractor Improvements, New Chiller on Kellogg Reactor, and Kellogg Compressor Upgrades. The only emissions are associated with fugitive components. Valero confirmed that the emission rates listed for the non-fugitive upstream/downstream sources included in the PBR have not changed.	Fully Consolidate & Void
131534	EPN FUG - Miscellaneous projects in 2014 which resulted in addition and removal of fugitive components, including injection totes and lube oil mist systems. The only emissions are associated with fugitive components. Hydrogen peroxide and sodium hydroxide representations added with this fugitive consolidation.	Fully Consolidate & Void
SE 11	EPN FUG - Saturation Off Gas Compressor	Fully Consolidate & Void
92272	EPN: FUG - Three projects from 2009: Alkylation Unit Debottlenecking Operation, 2009 Fugitive Component Installation, and Process Analyzer Vent Operation. Only the fugitives will be consolidated.	Partial Consolidation
95584	EPN FUG – Two projects from 2010: Open Top Sludge Storage Tank (EPN 47FA2) and numerous fugitive components removed and replaced throughout site. Only the fugitives will be consolidated.	Partial Consolidation
73869	EPN: FUG – New Dock #2 (EPN 90DOCK2) to replace Dock #5 for loading/unloading barges with products <0.5psia. Only the fugitives will be consolidated.	Partial Consolidation
118800	EPN FUG – Summary of fugitive emission increases from piping changes made at site in 2013. Only the fugitives will be consolidated.	Partial Consolidation
139439	EPNs FUG, 47AD5407, and 47AD5409 – Projects to increase reliability of DAF and Lift Station Pumps; Increase reliability of biological treatment operations; New wet surface air cooler (WSAC) between Lift Station and Equalization Tank; Increase reliability of water clarification processing operations. Only the fugitives will be consolidated.	Partial Consolidation
139777	EPN FUG – Miscellaneous projects in 2015 which resulted in addition and removal of fugitive components. Only the fugitives will be consolidated.	Partial Consolidation
162211	EPN FUG – Miscellaneous projects in 2019 which resulted in addition and removal of fugitive components and FCC Slurry Oil Filtration project. Only the fugitives will be consolidated.	Partial Consolidation
164545	EPNs: FUG, 29BA1300, and 41BA102 – Summary of emission changes in 2020 associated with increased firing rates for “B” Unifiner Reactor Charge Heater (from 30 to 36 MMBtu/hr) and “D” Unifiner Rerun Tower Reboiler (from 27 to 30 MMBtu/hr). Only the fugitives will be consolidated.	Partial Consolidation
154326	PCP Standard Permit for tank roof replacement for Tank 47FB504	Reference
104999	Standard Exemption for Tank 90FB722 (slop oil storage)	Reference

30 TAC § 106.533	Alternate ground water recovery TO blower operation	Reference
30 TAC § 106.511	Central Control Room Emergency Generator	Reference
30 TAC § 106.478	Additional slotted guide pole on Tank 90FB723	Reference
30 TAC § 106.478	Additional slotted guide pole on Tank 90FB722	Reference
30 TAC § 106.511	Plant radio system reliability diesel emergency generator	Reference
30 TAC § 106.472	Bleach storage tank 50FA6	Reference
30 TAC § 106.472	Miscellaneous bulk tanks installation (9/8/2020)	Reference
30 TAC § 106.263	Annual MSS activities	Reference
30 TAC § 106.355	Buckling pin on isobutane pipeline	Reference
30 TAC § 106.472	Miscellaneous bulk tanks (7/6/2021)	Reference
175862	Annual Registration for PBR authorizing fugitive emissions in accordance with 30 TAC §106.261	Reference
176200	Install new cooling tower 27CWT2A	Reference
168499	Annual notification for projects with fugitive emissions that will be authorized under 30 TAC §106.261 (EPN FUG)	Reference
172319	Fugitive emissions associated with projects conducted in 2022 (EPN FUG)	Reference
177297	Tank 917A (EPN 91FB917A) to store FCCU feedstock material and associated fugitive emissions (EPN FUG)	Reference
88508	Caustic Scrubber (EPN 22SKD4201) and /Thermal Oxidizer (EPN 22SKD4202)	Reference
105027, 105024, 105020, 33180, 33933, 34151, 105003, 105009, 105000	Standard Exemptions for ROSE Unit; C-9S Unit; Asphalt Loading Rack; Loading Dock No. 3; Tank No. 415; Tank No. 91FB333; Tank No. 91FB378; Tank No. 91FB923; Gas Fire Compressor Engine; these facilities are demolished or no longer operating	Void*
105025	Standard Exemptions for loading No. 2 Fuel Oil at an existing dock; this dock is no longer owned or operated by Valero.	Void*
105017 and 105015	Standard Exemptions for Storage Tank No. T-232; this storage tank was previously incorporated into NSR Permit No. 129444	Void*
105014	Standard Exemption for Pigging Station; this facility is already permitted in the current NSR Permit No. 2501A as an ILE activity in Attachment D	Void*
105002	Standard Exemption for Storage Tank No. 91FB919; this storage tank authorization was replaced by another PBR and belongs to a different CN now	Void*
35206, 37102, 40306, 42119, 41495	PBRs (originally Standard Exemptions) for Tank No. 91FB370; Tank No. 91FB371; Tank Nos. 91FB405 and 91FB412, Tank Nos. 91FB375 and 91FB376; Tank No. 90FB231; these facilities are demolished or no longer operating	Void*
44387, 50138, 42999, 45869, 54510	PBRs for Pseudocumene purification processing; Throughput increases for Tank Nos. 91FB336, 91FB339, and 91FB347; Throughput and vapor pressure increases for Tank Nos. 91FB405 and 91FB412; Tank No. 47FA3; Two air compressor engines previously installed in 1990 or earlier; Operation of a cold solvent cleaner ~ 1,500 gallons per year; these facilities are demolished or no longer operating	Void*
47166	Increase the Throughput in Crude Oil and Naphtha Storage Tanks 90FB002, 90FB003, 90FB004, 90FB005, 90FB006, 91FB910, and 91FB911; these facilities are demolished or no longer operating.	Void*
45273	Outdoor coating facility for maintenance of interconnecting pipelines and other small equipment; these activities are authorized under 106.263	Void*
152125, 135023*, 107049	PBRs for Storage Tanks 90FB228A, 90FB506, and 91FB915.; these sources are now under a different RN and not associated with Permit 2501A. PBRs 152125 and 107049 were consolidated into NSR Permit No. 129444.	N/A (just remove from SCs)

86142	Standard Permit for Storage Tank 90FB001; this source is now under a different RN and not associated with Permit 2501A. PBR 86142 was consolidated into NSR Permit No. 129444.	N/A (just remove from SCs)
30 TAC §106.472/§106.478	Storage Tank 90FB231 storing slurry oil/residual (EPN 90FB001)	N/A (just remove from SCs)
81979, 99288, 102846, 133453	Standard Permits for Two temporary rented boilers; Temporary natural gas fired boiler 81BF99 to operate as replacement for 50BF02; Another authorization of temporary boiler 81BF99 for different failure of 50BF02; Two natural gas/process gas package boilers 81BF05 and 81BF06 as reliability sources; these facilities are demolished or no longer operating	Void
086, 006, 051, 079, 111	Standard Exemptions for 91FB922, 45GG2062, 9058LOAD, 90FB1001, 90FB1002, 90FB229. Tank 91FB922 was previous incorporated into NSR Permit No. 2501A. All other facilities are demolished or no longer operating.	Void

*Voided by applicant through STEERs on 09/30/2022 as part of concurrent federal operating permit changes

Impacts Evaluation

Was modeling conducted? **Yes** Type of Modeling: **AERMOD and SCREEN3**

Is the site within 3,000 feet of any school? **No**

Additional site/land use information: located along Houston ship channel; southwest property line directly neighbors residential area

The applicant conducted AERMOD and SCREEN3 generic modeling to determine unit impact multipliers (UIMs) at 1 pound per hour emission rates for five EPNs: 39CB2001, 46CB6301, FUG, 22FB747, and 90FB735. A scaling factor of 0.4 was applied to the UIMs to convert 1-hour concentrations from SCREEN3 to 24-hour averaging times. A scaling factor of 0.08 was applied to the UIMs to convert 1-hour concentrations to annual averaging times. The resulting UIMs are shown in Table 1 below:

Table 1. Unit Impact Multipliers

EPN	1-hr GLCmax (ug/m^3 per lb/hr)	24-hr GLCmax (ug/m^3 per lb/hr)	Annual GLCmax (ug/m^3 per lb/hr)
39CB2001	0.9581	0.38324	0.076648
46CB6301	0.9187	0.36748	0.073496
FUG	17.256	6.9024	1.38048
22FB747*	13.156	5.512	1.461
90FB735*	35.456	13.124	4.73

*UIMs determined by AERMOD were confirmed by ADMT via email dated 8/7/2024.

A NAAQS analysis was conducted for the consolidated increases of $PM_{2.5}$ and PM_{10} from the tail gas incinerator units (EPNs 39CB2001 and 46CB6301). Table 2 below summarizes the results of the NAAQS de minimis analysis.

Table 2. Modeling Results for De Minimis Review

Pollutant	Averaging Time	GLCmax ($\mu g/m^3$) for consolidated increases	De Minimis ($\mu g/m^3$)
PM_{10}	24-hr	0.173	5
$PM_{2.5}$	24-hr	0.173	1.2
$PM_{2.5}$	Annual	0.035	0.13

The annual increase of CO from the FCCU was not modeled, because there is no annual NAAQS SIL for CO and this project will not affect CO concentrations at the 1-hour or 8-hour averaging periods. To alleviate any concern about short-term CO concentrations, the applicant submitted a SCREEN3 model from a previous permitting action for the FCCU. The

1-hr UIM from that model is 0.4725 µg/m^3. Therefore, the maximum off-property CO concentration from the full FCCU short-term allowable emission rate of 269 lb/hr is calculated as follows: 0.4725 µg/m^3 per 1 lb/hr * 269 = 127 µg/m^3. This concentration is below the 1-hr and 8-hr CO de minimis values of 2,000 and 500 µg/m^3, respectively.

The applicant provided a health effects review as specified in the TCEQ's March 2018 Modeling and Effects Review Applicability (MERA) guidance for project emission increases of non-criteria pollutants from fugitive components (EPN FUG) and paper increases of non-criteria pollutants from storage tanks (EPNs 22FB747, 42FB2802, 91FB922, and 90FB735). A summary of the review for the pollutants with allowable emissions increases is included below in Table 3 below.

Table 3. Health Effects Analysis using MERA Evaluation Guidance

Pollutant & CAS#	Averaging Time	GLCmax (µg/m^3)	ESL (µg/m^3)	Modeling and Effects Review Applicability (MERA) Step in Which Pollutant Screened Out
Distillates (petroleum), hydrotreated light 64742-47-8	1-hr	217.253	3500	Step 3 – GLCmax ≤ 10% of ESL
	Annual	-	350	Step 0 – Long-term evaluation is not required because long-term ESL is ≥ 10% of short-term ESL.
Heavy coker gas oil 64741-81-7	1-hr	41.41	1000	Step 3 – GLCmax ≤ 10% of ESL
	Annual	-	100	Step 0 – Long-term evaluation is not required because long-term ESL is ≥ 10% of short-term ESL.
Ammonia 7664-41-7	1-hr	-	180	Step 2 – Long-term ESL is ≥ 10% of short-term ESL and short-term increase is less than de minimis level of 0.04 lb/hr
	Annual	-	92	Step 0 – Long-term evaluation is not required because long-term ESL is ≥ 10% of short-term ESL.
Hydrogen Peroxide 7722-84-1	1-hr	-	14	Step 2 – Long-term ESL is ≥ 10% of short-term ESL and short-term increase is less than de minimis level of 0.04 lb/hr
	Annual	-	1.4	Step 0 – Long-term evaluation is not required because long-term ESL is ≥ 10% of short-term ESL.
Naptha, petroleum, arom-contg (Corrosion Inhibitor) 68603-08-7	Annual	-	350	Step 0 – Long-term evaluation is not required because long-term ESL is ≥ 10% of short-term ESL. There is no short-term increase of this pollutant.
Refinery Heavy (Recovered Oil[1])	1-hr	-	1,000	Step 2 – Long-term ESL is ≥ 10% of short-term ESL and short-term increase is less than de minimis level of 0.1 lb/hr
	Annual	-	100	Step 0 – Long-term evaluation is not required because long-term ESL is ≥ 10% of short-term ESL.
Sodium Hydroxide (component of Oily Caustic[2]) 1310-73-2	1-hr	2.462	20	Step 6 – Ratio of GLCmax to ESL is (2.462:20). This is ≤ ratio of project increases to proposed sitewide emissions (1:1).

[1] Recovered oil is a mixture of mostly recovered crude oil feed and products produced at the refinery. The short-term ESL of 1,000 µg/m^3 and long-term ESL of 100 µg/m^3 were determined to be appropriately conservative based on ESLs for similar materials.

[2] Oily caustic is a mixture of sodium sulfide, sodium hydroxide, kerosene, and hydrogen sulfide. Sodium sulfide is not an organic compound and is not expected to be emitted due to very low vapor pressure. Sodium hydroxide is also an inorganic compound and is not expected to be emitted. To be conservative, the applicant estimated an emission rate of NaOH from tank 90FB735 based on a ratio of the partial pressure to the total vapor pressure of the oily caustic. The

	Annual	-	2	Step 0 – Long-term evaluation is not required because long-term ESL is ≥ 10% of short-term ESL.
Kerosene (component of Oily Caustic[2]) 8008-20-6	1-hr	7.09	1,000	Step 3 – GLCmax ≤ 10% of ESL
	Annual	-	100	Step 0 – Long-term evaluation is not required because long-term ESL is ≥ 10% of short-term ESL.

A State Property Line (SPL) analysis was conducted for consolidated increases of H_2S from EPN FUG, paper increases of H_2S from tank 90FB735, and paper increases of H_2SO_4 from tank 22FB747. Sitewide modeling was triggered for H_2SO_4, so H_2SO_4 from an additional source (EPN 42CB2201) was added to the modeling. Additional details on the sitewide H_2SO_4 analysis can be found in the Air Quality Analysis Audit Memo dated October 2, 2024, in WCC (Content ID 7303134). A summary of the SPL analysis is shown in Table 4 below.

Table 4. Modeling Results for State Propery Line Analysis

Pollutant	Averaging Time	GLCmax (µg/m³)	Standard (µg/m³)
H_2S	1-hr	0.180	108
H_2SO_4	1-hr	3.42	50
H_2SO_4	24-hr	1.55	15

Based on this modeling, the air quality analysis (AQA) is acceptable for all review types and pollutants. No adverse health effects are expected to occur among the general public as a result of exposure to the emissions from the facilities authorized by this permit.

Maryam Rasti 4/16/2025

4/18/2025

Project Reviewer	Date	Team Leader	Date
Maryam Rasti		Matthew Ray	

estimated emission rate of NaOH from the tank (0.0013 lb/hr) and fugitives (0.14 lb/hr) was combined for evaluation at Step 6. The project increase of NaOH (0.1413 lb/hr) is equal to the sitewide emissions of NaOH.