KOCH
METHANOL ST. JAMES

LDEQ RECEIPT
2023 FEB -1 PM 4:27

Koch Methanol St. James
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St. James, LA 70086

Post Office Box 510
Vacherie, LA 70090

HAND DELIVERED

February 1, 2023

Louisiana Department of Environmental Quality
Office of Environmental Services
PO Box 4313
Baton Rouge, LA 70821-4313

RE: Koch Methanol St. James, LLC
Koch Methanol Facility
KMe Optimization Project: Addendum to Application for a Significant Modification to Title V Permit No. 2560-00295-V4 and an Initial PSD Permit
AI No. 194165
Activity Nos. PER20220006 and PER20220007

Dear Sir or Madam:

Koch Methanol St. James, LLC (Koch) operates the Koch Methanol (KMe) Plant and KMe Terminal located in St. James, St. James Parish, Louisiana. The KMe Plant currently operates under Title V Permit No. 2560-00295-V4, and the KMe Terminal currently operates under Title V Permit No. 3169-V3. Koch is submitting this addendum to the pending Application for a Significant Modification to Title V Permit No. 2560-00295-V4 and initial PSD permit submitted to LDEQ on November 2, 2022.

With this addendum, Koch is making various revisions and updates to the November 2022 permit application. An updated Air Quality Impact Assessment (AQIA) and Environmental Assessment Statement (EAS) reflecting these changes will be submitted under separate cover.

Enclosed are the original permit application addendum and two copies, as required by LDEQ; and per LAC 33:III.517.A.2, a copy of the permit application addendum is also being submitted to the United States Environmental Protection Agency, Region 6.

If you or your staff have any questions or require additional information during your review of this addendum or the application in general, please contact Kevan Reardon at (580) 478-7621, kevan.reardon@kochind.com, or Brian Glover at (225) 408-2741, bglover@ramboll.com.

Sincerely,

Marc Hoss
VP of Manufacturing & Plant Manager

cc: EPA Region 6 (r6airpermitsla@epa.gov)
Anthony Randall (LDEQ)

Prepared for
Koch Methanol St. James, LLC
Koch Methanol Facility (KMe Facility)
St. James, St. James Parish, Louisiana

Date
February 1, 2023

Prepared by
Ramboll US Consulting, Inc.

Agency Interest No.
194165

KME OPTIMIZATION PROJECT: ADDENDUM TO APPLICATION FOR SIGNIFICANT MODIFICATION TO TITLE V PERMIT NO. 2560-00295-V4 AND AN INITIAL PSD PERMIT

KOCH™
METHANOL ST. JAMES

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TABLES

APPENDICES

1. INTRODUCTION

1.1 Addendum Overview

Koch Methanol St. James, LLC (Koch) submitted an Application for a Significant Modification to Title V Permit No. 2560-00295-V4 and an initial PSD Permit on November 2, 2022 (November 2022 Application), assigned Activity Numbers PER20220006 and PER20220007, respectively. This submittal provides an addendum to the pending application to incorporate additional information into, and revise certain information contained in, the pending application. An updated Air Quality Impact Assessment (AQIA) and Environmental Assessment Statement (EAS) reflecting the application changes and additional information contained in this addendum will be submitted under separate cover.

With this addendum, Koch is making the following changes to the pending application:

1) Adding carbon monoxide (CO) and greenhouse gas (GHG) emissions for the Cooling Water Tower (EPN CWT, EQT 0007);
2) Revising average hourly emission rates for the SMR, Boiler, PCS Vent CAP (EPN SMR BLR PCS Vent CAP, GRP 0002);
3) Revising average hourly emission rates for the Methanol Transfer and Product Tank Cap (EPN MTPCAP, GRP TBD);
4) Revising estimated emissions for the Flare (EPN FLR, EQT 0003);
5) Revising emission estimates for all natural gas combustion sources to include hazardous air pollutants (HAPs) and toxic air pollutants (TAPs);
6) Revising the $PM_{10}/PM_{2.5}$ maximum hourly emissions for the Admin Building Emergency Generator (EPN EGEN2, EQT 0026);
7) Updating New Source Review applicability analysis;
8) Updating regulatory analysis for LAC 33:III.Chapter 51;
9) Updating BACT analysis for the Cooling Water Tower to address CO and GHG emissions; and,
10) Correcting the answer in Section 24.G.a of the Louisiana Application for Approval of Emissions form, NSR Applicability Summary, to indicate "No" because the nearest Class I area is greater than 100 km.

The information included in this application addendum is organized as follows:

Part 1 – Introduction provides an overview of the addendum.

Part 2 – Application Revisions provides a narrative description of changes to the pending application that are being made with this addendum.

Part 3 – BACT Analysis Update includes supplemental information to be included in the BACT analysis for the Cooling Water Tower to address CO and GHG emissions.

Part 4 – Updated Application for Approval of Emissions includes updated Sections 1 through 25 of the Louisiana Application for Approval of Emissions of Air Pollutants from Part 70 Sources, as needed.

Appendix A – Emission Calculations includes detailed revised potential to emit calculations for each emissions source for which emissions rates are being revised.

Appendix B – BACT Analysis Documentation includes search results from EPA's RACT/BACT/LAER Clearinghouse to support the BACT analysis for the Cooling Water Tower.

1.2 Facility-Wide Emissions

As mentioned in the initial application submitted November 2, 2022, the permit application proposes consolidating the Koch Methanol (KMe) Plant and the KMe Terminal, collectively known as the KMe Facility, into a single Title V permit. Therefore, Table 1-1 included in the pending application provided a summary of the current KMe Plant (Title V Permit No. 2560-00295-V4) and Terminal (Title V Permit No. 3169-V3) permitted facility-wide criteria pollutant emissions. The table also included the proposed Title V Permit No. 2560-00295-V5 allowable emission rates for the consolidated permit, as well as the resulting changes in facility-wide permitted emissions. An updated Table 1-1 is provided below. The proposed emission rates and change in emissions listed in the updated Table 1-1 account for the revisions included with this application addendum.

Table 1-1: Facility-Wide Emission Rate Changes[1]

Pollutant	Current 2560-00295-V4 Permitted Emission Rate (tpy)	Current 3169-V3 Permitted Emission Rate (tpy)	Proposed Allowable Emission Rate (tpy)	Change in Emissions (tpy)
CO	92.57	3.96	181.46	+84.93
NOx	87.29	9.57	154.84	+57.98
PM_{10}	49.92	0.41	76.28	+25.95
$PM_{2.5}$	48.46	0.41	75.30	+26.43
SO_2	4.65	0.04	6.11	+1.42
VOC	63.55	24.81	166.34	+77.98

[1] The plant facility-wide emission rates presented in this table do not account for emissions from General Condition XVII Activities and Insignificant Activities.

Since the KMe Facility is not currently classified as a major source under the PSD regulations (see November 2022 Application Section 4.1), there are no GHG emission limits in the current KMe Plant and Terminal permits. Using the calculation method utilized in the initial November 2022 application, and considering the

changes included with this addendum, the GHG potential to emit (PTE) for the existing KMe Facility would be 980,269 TPY CO_2e. The proposed facility-wide GHG PTE following the Project considering the changes included with this addendum is 1,401,099 TPY CO_2e. Accordingly, the permit application, as revised by this addendum, represents an increase in proposed allowable GHG emissions of 420,830 TPY CO_2e.

2. APPLICATION REVISIONS

2.1 Emission Rate Reconciliations

Koch is making the following changes to the emission rate calculations represented in the pending application. Updated emission calculations and EIQ sheets reflecting these revisions are provided in Appendix A and Part 4, Section 23 of this application addendum, respectively.

2.1.1 Add Estimated CO and GHG Emissions for the Cooling Water Tower (EPN CWT, EQT 0007)

A counterflow Cooling Water Tower is used to evaporate heat from non-contact cooling water streams, with the aid of cooling tower fans to move air for proper heat exchange. The Cooling Water Tower is currently permitted to emit VOC, methanol, PM_{10}, and $PM_{2.5}$ emissions. However, based on current operations, Koch has determined that the Cooling Water Tower also has the potential to emit CO, and GHG (CO_2 and methane).

For exchangers which are regulated under the HON (i.e., contain methanol), the leak quantity of CO (as well as GHG) can be determined based on analyzing cooling water samples of the leaking exchanger for methanol and knowledge of stream content. The CO permit limit that Koch is proposing is based on CO emissions from HON-regulated heat exchangers. The GHG emissions from these same HON-regulated heat exchangers will also be considered for determining compliance with the sitewide GHG intensity limit.

Emissions of CO and GHG can also be generated from leaks of heat exchangers that are not HON-regulated; such emissions are not accounted for here due to the inability to quantify those emissions via exchanger monitoring. Therefore, Koch is proposing that the Cooling Water Tower CO emission limit (and the GHG contribution for determining the facility wide GHG intensity limit) apply only to leaks from exchangers subject to the HON.

Based on the discussion above, CO, CO_2, and methane emissions for the cooling tower are estimated based on a ratio of the anticipated mass fraction for CO, CO_2, and methane to the mass fraction of VOC and calculated VOC emissions[1] in the methanol-containing streams.

2.1.2 Revise Average Hourly Emission Rates for SMR, Boiler, PCS Vent CAP (EPN SMR BLR PCS Vent CAP, GRP 0002)

The SMR, Boiler, PCS Vent Cap accounts for the average hourly and the annual emissions from the Steam Methane Reformer (EPN SMR, EQT 0001), Auxiliary

[1] VOC emissions calculated based on the emission factor for controlled emissions from cooling towers, AP-42 Chapter 5.1, Table 5.1-3 "Fugitive Emission Factors for Petroleum Refineries."

Boiler (EPN BLR, EQT 0002), and Process Condensate Stripper Vent (EPN PCSVENT, RLP 0024). In the pending application, average hourly emission rates for all of the pollutants were estimated based on operations of 8,784 hours per year, which is based on the number of hours in a leap year. With this addendum, Koch is reconciling the average hourly emission rates based on 8,760 hours per year of operation. The annual emission rates are unchanged as a result of this revision.

2.1.3 Revise Average Hourly Emission Rates for Methanol Transfer and Product Cap (EPN MTPCAP, GRP 0001)

The Methanol Transfer and Product Tank Cap, which is currently permitted under the KMe Terminal Title V permit as GRP 0001, accounts for the average hourly and the annual emissions from the four (4) internal floating roof methanol product tanks (EPNs TK-26-202A, TK-26-202B, TK-26-202C, and TK-26-202D), including tank cleanings and tank landings, as well as emissions from truck and railcar loading operations (EPN RT LOAD). With this addendum, Koch is revising the average hourly emission rates for the MTPCAP to be based on the annual emission rates and 8,760 hours per year of operation. The annual emission rates are unchanged as a result of this revision.

2.1.4 Revise Estimated Emissions for the Flare (EPN FLR, EQT 0003)

With this addendum, the Flare emission calculations have been revised as follows: nitrogen oxides (NOx)[2] and pilot gas CO_2e emissions have been revised to reflect the heat input based on high heating value (HHV); sulfur dioxide (SO_2), VOC and methanol emissions associated with routine flaring have been revised; and the calculation basis for particulate matter ($PM_{10}/PM_{2.5}$), VOC and methanol emissions resulting from process shutdowns has been revised.

2.1.5 Update Estimated Emissions for all Natural Gas Combustion Sources to Include Hazardous and Toxic Air Pollutants

Based on recent LDEQ guidance for estimating HAP and TAP emissions from combustion sources[3], the PTE emissions calculations have been reviewed and updated to speciate additional HAPs and TAPs for each combustion source. Currently permitted emissions for the Steam Methane Reformer (EPN SMR, EQT 0001), Boiler (EPN BLR, EQT 0002), Methanol Railcar and Tank Truck Loading Operations (EPN RT LOAD, EQT TBD), and Methanol Transfer and Product Tank Cap (EPN MTPCAP, GRP TBD) include speciated organic HAPs and TAPs. Koch is proposing to update the PTE emissions for those sources to include inorganic HAP and TAP speciation. Additionally, the Flare and Portable Thermal Oxidizer (GCXVII-15) PTE emissions are being updated to include speciated organic and inorganic

[2] EPA AP-42 Section 13.5 Industrial Flares (02/2018) Table 13.5-1, footnote k.

[3] Letter from Bliss Higgins, Assistant Secretary, Louisiana Department of Environmental Quality to Robert Berg, Interim Regulatory Affairs Manager, Louisiana Mid-Continent Oil & Gas Association, October 20, 2022.

HAPs and TAPs. The calculation methodology for speciated HAPs and TAPs for these sources utilizes emission factors from AP-42 Section 1.4, "Natural Gas Combustion".

2.1.6 Admin Building Emergency Generator (EPN EGEN2, EQT 0026)

The Admin Building Emergency Generator maximum lb/hr emission calculations have been updated to reflect the inclusion of condensable $PM_{10}/PM_{2.5}$ emissions. There is no change to the permitted annual rates due to rounding.

2.2 Regulatory Applicability Updates

2.2.1 Prevention of Significant Deterioration (40 CFR Part 52 and LAC 33:III.509)

Prevention of Significant Deterioration (PSD) applicability for the proposed permitting action was discussed in the November 2022 Application and it was determined that PSD does not apply because the KMe Facility is not an existing major source and the changes proposed with the initial application did not themselves constitute construction of a new major stationary source. While Koch is proposing revisions to some of the emissions calculations contained in the initial application, emissions increases of non-GHG PSD-regulated pollutants remain less than 100 tons per year. Therefore, the initial determinations that the proposed changes do not themselves constitute construction of a new major stationary source and that PSD does not apply to this permitting action are not impacted by the revisions reflected in this addendum.

Although PSD does not apply, PSD requirements have been voluntarily and conservatively applied as if the KMe Facility has not yet been built and to all pollutants for which the post-Project facility-wide PTE will exceed the PSD Significant Emissions Rate (SER), including NOx, CO, VOC, PM, $PM_{2.5}$, PM_{10}, and GHG. Due to the revision of several emission rates, as proposed with this addendum, the PSD applicability analysis submitted in the November 2022 Application has been revised, as reflected in updated Table 2-1 below. The PTE calculations (tpy) for each source with revised emission rates as part of this Addendum is included in Appendix A.

Table 2-1: NSR Applicability Analysis Summary									
Description	**NOx**	**CO**	**VOC**	**PM**	**PM_{10}**	**$PM_{2.5}$**	**H_2S**	**SO_2**	**GHG (CO_2e)[2]**
Site PTE (tpy)[1]	155.79	183.08	174.88	76.76	76.38	75.40	9.13	6.18	1,401,099
NSR Significant Emissions Rate (SER) (tpy)	40	100	40	25	15	10	10	40	75,000
Is Site PTE > SER?	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes
PSD Review Performed?	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes

Notes:

[1] Site PTE: For the purposes of this voluntary PSD review, the facility was assessed as if the facility had not yet been built; therefore, the total site emissions, including emissions from GC XVII Activities and Insignificant Activities, are compared to the SER.

[2] Because Koch is taking on voluntary PSD review for other regulated pollutants and the site PTE of CO_2 equivalent (CO_2e) is greater than the SER for GHGs, the voluntary PSD review includes a BACT analysis for GHGs.

2.2.2 LAC 33:III.Chapter 51 – Comprehensive Toxic Air Pollutant Emission Control Program

The KMe Facility is major source of Louisiana Toxic Air Pollutants (LTAPs) as defined under LAC 33:III.Chapter 51. The Louisiana Air Toxics Program requires a major source emitting any Class I or II pollutant at a rate that equals or exceeds the minimum emission rate (MER) for that pollutant to demonstrate compliance with the Maximum Achievable Control Technology (MACT) standards in accordance with LAC 33:III.5109. Additionally, the Louisiana Air Toxics Program requires a major source emitting any Class I, II, or III toxic air pollutant greater than the MER for that pollutant to ensure compliance with the applicable ambient air standards (AAS) pursuant to LAC 33:III.5109.B. This regulation also requires owners or operators to submit an annual emissions report of the LTAPs as well as applicable air toxics permit application fees and annual fees.

LAC 33:III.5101.D provides that any affected source that is subject to a NESHAP in 40 CFR Part 61 or 63 is not subject to the requirements of Chapter 51 with the exceptions of annual emissions reporting, AAS requirements, applicable air toxics permit application fees, and air toxics annual fees. However, as provided in LAC

33:III.5101.D.2, if an affected source emits an LTAP not listed in section 112(b) of the Clean Air Act above the MER for that pollutant listed in LAC 33:III.5112, Table 51.1, the affected source is subject to the requirements of Chapter 51 for that pollutant.

Table 2-2 presents the facility-wide LTAP emissions increases proposed in the Koch November 2022 Application as revised with this addendum.

Table 2-2: Facility-wide LTAP Emissions Increases

LTAP	Emissions Increases (tpy)		MER (lb/yr)	Above MER?	Class I, II, III?
	(tons/yr)	(lb/yr)			
Arsenic	0.001	2	25	No	Class I
Benzene	0.003	6	260	No	Class I
Cadmium	0.011	22	25	No	Class I
Chromium	0.015	30	25	Yes	Class I
Formaldehyde	0.29	580	260	Yes	Class I
Nickel	0.021	42	25	Yes	Class I
Acetaldehyde	No emissions increases		700	N/A	Class II
1,4-Dichlorobenzene	No emissions increases		20,000	N/A	Class II
Barium	0.045	90	37.5	Yes	Class II
Cobalt[1]	0.01	20	N/A	N/A	Class II
Copper	0.008	16	25	No	Class II
Ethylbenzene	No emissions increases		20,000	N/A	Class II
Manganese	0.01	20	75	No	Class II
Mercury	0.003	6	25	No	Class II
Naphthalene	No emissions increases		1,990	N/A	Class II
Ammonia	19.27	38,540	1,200	Yes	Class III
Hexane (-n)	6.62	13,240	13,000	Yes	Class III
Hydrogen sulfide	No emissions increases		1,000	N/A	Class III
Methanol	73.22	146,440	20,000	Yes	Class III
Sulfuric acid	0.037	74	75	No	Class III
Toluene	0.01	20	20,000	No	Class III
2,2,4-Trimethylpentane[1]	No emissions increases		N/A	N/A	Class III
Zinc	0.31	620	200	Yes	Class III

Notes:
[1] 2,2,4-Trimethylpentane and cobalt are listed as a supplemental LTAP per LAC 33:III.5112, Table 51.3 and, therefore, have not been assigned a minimum emission rate.

As previously discussed in the November 2022 Application, the KMe Facility, and the facility's associated emissions sources, are part of an affected source under 40 CFR 63, Subparts F, G, and H, which regulates synthetic organic chemical manufacturing industry (SOCMI) process units. Methanol and hexane are listed in section 112(b) of the Clean Air Act and regulated as SOCMI chemicals according to 40 CFR Part 63, Subpart F, Table 1. As a result, only the annual emissions reporting, AAS requirements, applicable air toxics permit application fees, and air toxics annual emissions fees apply to the KMe Facility. In addition, the facility emits LTAPs not listed in section 112(b) of the Clean Air Act above the MER, specifically ammonia and hydrogen sulfide. Because ammonia and hydrogen sulfide are Class III LTAPs under Chapter 51, AAS requirements under LAC 33:III.5109.B as well as the standard operating procedures of LAC 33:III.5109.C apply to sources that emit ammonia and hydrogen sulfide.

Finally, LTAP emissions from all sources combusting a Group 1 virgin fossil fuel, including natural gas and diesel, at the KMe Facility are exempt from the requirements of Chapter 51 per LAC 33:III.5105.B.3.a. Chromium, formaldehyde, nickel, barium, hexane and zinc emissions increases exceed their MER; however, all or a portion of these emissions are a result of Group 1 virgin fossil fuels combustion. The non-exempt emission increases of these compounds are less than the MER and thus are exempt from the requirements of Chapter 51.

3. BACT ANALYSIS UPDATE

As previously discussed, while not required under LDEQ's PSD regulations, PSD requirements were voluntarily and conservatively applied for all emissions units that emit pollutants the KMe Facility will have the potential to emit in a significant amount following the proposed Project (i.e., NOx, CO, VOC, PM, PM_{10}, $PM_{2.5}$, and GHGs). Accordingly, a BACT analysis for all KMe Facility emission sources emitting these pollutants was included in the November 2022 Application. This addendum includes an update to the Cooling Water Tower (EPN CWT, EQT 0007) BACT analysis that addresses CO and GHG (expressed as CO_2e) emissions emitted from the Cooling Water Tower. Note that an overview of the BACT process, including discussion of the "Top-Down" BACT process and information relied upon for the review, was included in the November 2022 Application and is not reiterated in this section. An updated summary table of BACT determinations for the KMe Facility is included below in Table 3-1, which presents the BACT determinations made for NOx, CO, PM, PM_{10}, $PM_{2.5}$, VOC, and GHGs for the KMe Facility emissions units subject to BACT. For simplicity, for gas-fired combustion sources, PM is equivalent to $PM_{10}/PM_{2.5}$, and is not referenced separately. For ease of reference, the emission units have been grouped by emission unit type and plant area.

Table 3-1: Summary of BACT Determinations for KMe Facility

Emissions Unit/ Description	TEMPO ID	EPN	Pollutant	Control Technology or Work Practice	Emissions Level	Averaging Period
Facility-wide	UNF 0001	N/A	CO_2e (GHG)	Energy Efficiency measures including gaseous, low carbon fuels	0.56 MT CO_2e/MT MeOH at rates above 5100 MT MeOH Production/day; 0.68 MT CO_2e/MT MeOH at rates below 5100 MT MeOH/day	365-day rolling average
Steam Methane Reformer	EQT 0001	SMR	NOx	Selective Catalytic Reduction	0.01 lb/MMBtu	12-month rolling average
			CO	Catalytic Oxidation	0.0037 lb/MMBtu	12-month rolling average
			$PM_{10}/PM_{2.5}$	Good Combustion Practices	0.00745 lb/MMBtu	3-hour average
			VOC	Good Combustion Practices	0.00374 lb/MMBtu	3-hour average

Table 3-1: Summary of BACT Determinations for KMe Facility						
Emissions Unit/ Description	**TEMPO ID**	**EPN**	**Pollutant**	**Control Technology or Work Practice**	**Emissions Level**	**Averaging Period**
Auxiliary Boiler	EQT 0002	BLR	NOx	Selective Catalytic Reduction	0.01 lb/MMBtu	12-month rolling average
			CO	Good Combustion Practices	0.0046 lb/MMBtu	12-month rolling average
			$PM_{10}/PM_{2.5}$	Good Combustion Practices	0.00745 lb/MMBtu	3-hour average
			VOC	Good Combustion Practices	0.0016 lb/MMBtu	3-hour average
Process Vents	EQT 0003	FLR	NOx	Flare that complies with 40 CFR 60.18 and 40 CFR 63.11	N/A	N/A
			CO			
			$PM_{10}/PM_{2.5}$			
			VOC			
			CO_2e			
Methanol Railcar and Tank Truck Loading Operations	EQT TBD	RT LOAD	VOC	Routing Displaced Vapors to a Vapor Control Unit	18.54 lb/hr	3-hour average
Wastewater Treatment	FUG 0002	WWT	VOC	Good Air Pollution Control Practices and Compliance with 40 CFR 63, Subpart G	N/A	N/A

Table 3-1: Summary of BACT Determinations for KMe Facility						
Emissions Unit/ Description	**TEMPO ID**	**EPN**	**Pollutant**	**Control Technology or Work Practice**	**Emissions Level**	**Averaging Period**
Fugitive Component Emissions	FUG 0001	FUG	VOC	Equipment Design and LDAR Program via 40 CFR 60, Subpart VVa and 40 CFR, 63 Subpart H	N/A	N/A
			CO	Equipment Design and CO LDAR Program	N/A	N/A
			CO_2e	Equipment Design and Methane LDAR Program	N/A	N/A
Emergency Generator Engine, Three Firewater Pump Engines, and Two Generac SD 2000 Engines	EQTs 0004, 0005, 0006, 0022, TBD, TBD	EGEN, FWP-01, FWP-02, FWP-03, E.GEN 01, E.GEN 02	NOx	Compliance with 40 CFR 60, Subpart IIII for all Engines	N/A	N/A
			CO			
			$PM_{10}/PM_{2.5}$			
			VOC			
			CO_2e			
Admin Building Emergency Generator	EQT 0026	EGEN2	NOx	Compliance with 40 CFR 60, Subpart JJJJ	N/A	N/A
			CO			
			$PM_{10}/PM_{2.5}$			
			VOC			
			CO_2e			

Table 3-1: Summary of BACT Determinations for KMe Facility						
Emissions Unit/ Description	**TEMPO ID**	**EPN**	**Pollutant**	**Control Technology or Work Practice**	**Emissions Level**	**Averaging Period**
Cooling Water Tower	EQT 0007	CWT	CO	Monitoring and Repair in accordance with 40 CFR 63, Subpart F	N/A	N/A
			VOC			
			CO_2e			
			$PM/PM_{10}/PM_{2.5}$	Use of Drift Eliminators with 0.0005% Drift		
Methanol Plant Storage Tanks	EQTs 0008, 0013, 0017	TK-04001, TK-04002A, TK-04002B	VOC	Fixed Roof Tank with Vapor Collection System and Scrubber with 98% Efficiency	10.07 TPY	12-month rolling average
Methanol Slop Vessel	EQT 0018	F-03007	VOC	Fixed Roof Tank with Vapor Collection System and a Flare meeting 40 CFR 60.18 and 40 CFR 63.11	N/A	N/A
Gasoline Tank	EQT 0027	GASTANK	VOC	Fixed Roof with Submerged Fill	N/A	N/A
Process Condensate Stripper Vent & Condensate Trap Vents	RLP 0024, RLP0025	PCSVENT, CTVENT	CO	Minimizing vent operation	N/A	N/A
Terminal Tanks	EQTs TBD	TK-26-202A, TK-26-202B, TK-26-202C, TK-26-202D	VOC	Internal Floating Roof and compliance with 40 CFR Subpart G	N/A	N/A

3.1 Review for Cooling Water Tower

The KMe Facility includes a direct contact wet Cooling Water Tower (EPN CWT, EQT 0007). Potential emissions for $PM/PM_{10}/PM_{2.5}$ and VOC were discussed and evaluated as part of BACT analysis included in Section 4.11 of the November 2022 Application. Based on current operations, and as discussed in Section 2.11 of this addendum, Koch has quantified the potential to emit of CO and GHG leaks from

Hazardous Organic NESHAP (HON) regulated heat exchanger systems. Note, the cooling tower is subject to the HON (40 CFR Part 63, Subpart F).

CO and GHG BACT Review

3.1.1 Step 1 – Identify Control Technologies

The following are available CO and GHG emission control technologies for the cooling water tower.

1. Direct Contact design with Exchanger Monitoring and Repair
2. Indirect Contact Tower Exchangers
3. Dry Cooling Tower Design

Below these technologies are generally described.

3.1.1.1 Direct Contact Design with Exchanger Monitoring and Repair

An effective measure to reduce releases of emissions from cooling towers is to institute a monitoring program for water-cooled heat exchangers.

Emissions from direct contact design cooling towers may occur when heat exchangers leak into cooling tower recirculating water. Water from direct contact cooling towers is circulated through heat exchangers throughout the plant to cool process streams. When a leak occurs in a shell and tube heat exchanger, and the process stream operates at a higher pressure than the cooling water stream pressure, the process stream contents are exposed to the circulating water and eventually contaminate the recirculating water stream. As the contaminated water enters the cooling tower, the contaminants in the process stream may be emitted into the atmosphere.

To reduce the possibility of hydrocarbon emissions, the inlet and outlet of a cooling tower or heat exchangers can be sampled and analyzed to determine if a leak is present. Logs can be kept and maintained on site. For instance, HON (40 CFR Part 63, Subpart F) requires cooling tower/heat exchanger monitoring to minimize HAP emissions. For streams containing a mixture of hydrocarbon and other contaminants, such as CO and GHG, the hydrocarbon sample results can be used to indicate presence of a leak not just of hydrocarbons, but also of CO or GHG, since CO and GHG are not directly measured. In such cases, the monitoring program can be utilized to minimize CO and GHG emissions, as well as hydrocarbons.

3.1.1.2 Indirect Contact Tower Exchangers

An indirect contact heat exchanger can be considered 100% effective. The process water that could contain CO and GHG is not exposed to the atmosphere in the type of tower.

3.1.1.3 Dry Cooling Tower Design

For control of CO and GHG emissions, a dry cooling tower can be considered 100% effective.

3.1.2 Step 2 – Eliminate Technically Infeasible Options

3.1.2.1 Indirect contact tower exchangers

RBLC data indicates only a couple of instances of nondirect/indirect contact tower exchangers that are used in the chemical process industry for this technology. As noted in the PM BACT Review discussion for cooling towers in the November 2022 Application, indirect contact tower exchangers may also increase PM_{10} emissions from drift aerosols. Therefore, the use of indirect contact tower exchangers is eliminated from further evaluation.

3.1.2.2 Dry cooling tower design

The dry cooling tower design option is only technically feasible for use during cooler months because the ambient dry bulb temperature must be below the required cooling water supply temperature. A dry cooling tower could not be used for 4 to 6 months of the year in this location as its use is limited to when ambient temperature is below 75°F. Thus, dry cooling tower design is eliminated since not technically feasible in this location.

3.1.3 Steps 3 – Rank Remaining Control Technologies by Control Effectiveness, 4 – Evaluate Most Effective Control Options and Document Results, and 5 – Selection of CO and GHG BACT for the Cooling Water Tower

The only remaining technically feasible CO and GHG emission control technology for the Cooling Water Tower is Direct Contact Design with Exchanger Monitoring and Repair. Koch has determined that Direct Contact Design with Exchanger Monitoring and Repair in accordance with HON (40 CFR Part 63, Subpart F) is BACT for CO and GHG.

4. UPDATED APPLICATION FOR APPROVAL OF EMISSIONS OF AIR POLLUTANTS FROM PART 70 SOURCES, SECTIONS 1-25 (AS NEEDED)

10. Certification of Compliance With Applicable Requirements

Statement for Applicable Requirements for Which the Company and Facility Referenced In This Application Is In Compliance

Based on information and belief, formed after reasonable inquiry, and except as provided in Note 1 below, the company and facility referenced in this application is in compliance with and will continue to comply with all applicable requirements pertaining to the sources covered by the permit application, as outlined in Tables 1 and 2 in the permit application. For requirements promulgated as of the date of this certification with compliance dates effective during the permit term, I further certify that the company and facility referenced in this application will comply with such requirements on a timely basis and will continue to comply with such requirements.

[Note 1: This certification excludes any ongoing deviations that have been identified since the close of the last deviation reporting period (September 30, 2022) and that will be included in the next deviation report to be submitted to LDEQ by March 31, 2023.]

For corporations only: By signing this form, I certify that, in accordance with the definition of Responsible Official found in LAC 33:III.502, (1) I am a president, secretary, treasurer, or vice-president in charge of a principal business function, or other person who performs similar policy or decision-making functions; or (2) I am a duly authorized representative of such person; am responsible for the overall operation of one or more manufacturing, production, or operating facilities addressed in this permit application; and either the facilities employ more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars); or the delegation of authority has been approved by LDEQ prior to this certification.*

CERTIFICATION: I certify, under provisions in Louisiana and United States law which provide criminal penalties for false statements, that based on information and belief formed after reasonable inquiry, the statements and information contained in this Application for Approval of Emissions of Air Pollutants from Part 70 Sources, including all attachments thereto and the compliance statement above, are true, accurate, and complete.

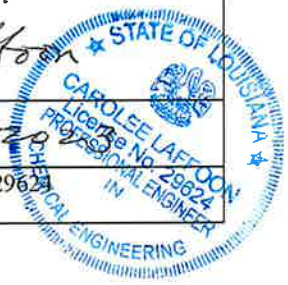
a. Responsible Official		
Name Marc Hoss		
Title VP of Manufacturing & Plant Manager		
Company Koch Methanol St. James, LLC		
Suite, mail drop, or division		
Street or P.O. Box 5181 Wildcat Street		
City St. James	**State** LA	**Zip** 70086
Business phone (580) 215-7907		
Email Address marc.hoss@kochind.com		
Signature of responsible official (See 40 CFR 70.2): Marc Hoss		
Date: 2-1-2023		

* Approval of a delegation of authority can be requested by completing a Duly Authorized Representative Designation Form (Form_7218) available on LDEQ's website at http://www.deq.louisiana.gov/portal/tabid/2758/Default.aspx

10. Certification by a Professional Engineer

CERTIFICATION: I certify that the engineering calculations, drawings, and design are true and accurate to the best of my knowledge.

b. Professional Engineer		
Name Carolee Laffoon, PE		
Title Principal Consultant		
Company Ramboll US Consulting, Inc.		
Suite, mail drop, or division Suite 300		
Street or P.O. Box 8235 YMCA Plaza Drive		
City Baton Rouge	**State** LA	**Zip** 70810
Business phone (225) 408-2692		
Email Address claffoon@ramboll.com		
Signature of Professional Engineer: Carolee Laffoon		
Date: January 26, 2023		
Louisiana Registration No. 29624		



12. Proposed Project Emissions [LAC 33:III.517.D.3]

List the total emissions following the proposed project for this facility or process unit (for process unit-specific permits). Speciate all criteria pollutants, TAP, and HAP for the proposed project.

Pollutant	Proposed Emission Rate (tons/yr)
CARBON MONOXIDE	181.46
NITROGEN OXIDES	154.84
PM10	76.28
PM2.5	75.30
SULFUR DIOXIDE	6.11
TOTAL VOC (INCL. LISTED)	166.34
1,4-DICHLOROBENZENE	0.01
2,2,4-TRIMETHYLPENTANE	< 0.01
ACETALDEHYDE	< 0.01
BENZENE	0.03
ETHYLBENZENE	< 0.01
FORMALDEHYDE	0.48
HEXANE (-N)	11.31
METHANOL	140.72
NAPHTHALENE	0.01
TOLUENE	0.02
AMMONIA	120.49
ARSENIC (AND COMPOUNDS)	0.001
BARIUM (AND COMPOUNDS)	0.045
CADMIUM (AND COMPOUNDS)	0.011
CHROMIUM VI (AND COMPOUNDS)	0.015
COBALT COMPOUNDS	< 0.01
COPPER (AND COMPOUNDS)	0.008
HYDROGEN SULFIDE	9.13
MANGANESE (AND COMPOUNDS)	< 0.01
MERCURY (AND COMPOUNDS)	0.003
NICKEL (AND COMPOUNDS)	0.021
ZINC (AND COMPOUNDS)	0.29

Comment: Emissions from GC XVII Activities and Insignificant Activities are not inlcuded in the above table.

19. General Condition XVII Activities- ☑ Yes ☐ No

Enter all activities that qualify as Louisiana Air Emissions Permit General Condition XVII Activities.

- Expand this table as necessary to include all such activities.
- See instructions to determine what qualifies as a General Condition XVII Activity.
- Do not include emissions from General Condition XVII Activities in the proposed emissions totals for the permit application.

		Emission Rates - TPY					
Work Activity	**Schedule**	**PM10/2.5**	**SO2**	**NOx**	**CO**	**VOC**	**Other**
[GCXVII-1] Plant Control Device Inspections	2 events/year					< 0.01	
[GCXVII-2] Plant Control Device Service	8 events/year					0.04	
[GCXVII-3] Plant Equipment Cleaning	100 events/year				0.60	0.60	
[GCXVII-4] Plant Valve Maintenance	20 events/year				< 0.01	< 0.01	
[GCXVII-5] Plant Compressor Maintenance	3 events/year				0.01	0.01	
[GCXVII-6] Plant Filter and Strainer Changeouts	50 events/year				0.03	0.03	
[GCXVII-7] Plant Pump Maintenance	50 events/year				0.05	0.05	
[GCXVII-8] Plant Instrument Maintenance	300 events/year				0.04	0.04	
[GCXVII-9] Plant Catalyst Handling Operations	10 events/year	< 0.01				0.04	
[GCXVII-10] Plant Sampling	8000 events/year					0.06	
[GCXVII-11] Plant Tank Inspections	9 events/year					0.01	
[GCXVII-12] Plant Piping & Heat Exchanger Draining	20 events/year				0.10	0.10	
[GCXVII-13] Plant Sump Solids Removal	52 events/year					0.22	
[GCXVII-14] Plant Tank Cleaning	3 events/year					0.13	
[GCXVII-15] Plant Portable Thermal Oxidizer	7 events/year	0.01	< 0.01	0.18	0.15	0.01	N-HEXANE: 0.003
[GCXVII-16] Plant Miscellaneous Painting	1 event/year					2.13	
[GCXVII-17] Plant Frac Tanks	35					0.07	
[GCXVII-18] Plant Sulfuric Acid Tanks	Daily						SULFURIC ACID: 0.04

		Emission Rates - TPY					
Work Activity	**Schedule**	**PM10/2.5**	**SO2**	**NOx**	**CO**	**VOC**	**Other**
[GCXVII-19] Terminal Control Device Inspections	4 events/year					< 0.01	
[GCXVII-20] Terminal Control Device Service	12 events/year					0.06	
[GCXVII-21] Terminal Equipment Cleaning	5 events/year					0.03	
[GCXVII-22] Terminal Valve Maintenance	5 events/year					< 0.01	
[GCXVII-23] Terminal Filter and Strainer Changeouts	365 events/year					0.22	
[GCXVII-24] Terminal Pump Maintenance	24 events/year					0.02	
[GCXVII-25] Terminal Instrument Maintenance	1 event/year					< 0.01	
[GCXVII-26] Terminal Sampling	100 events/year					< 0.01	
[GCXVII-27] Terminal Tank Inspections	4 events/year					< 0.01	
[GCXVII-28] Terminal Line Preparation	2 events/year					0.01	
[GCXVII-29] Terminal Sump Solids Removal	4 events/year					0.02	
[GCXVII-30] Terminal Miscellaneous Painting	1 event/year					2.13	
[GCXVII-31] Terminal Railcar Cleanings	75 cars/year					2.43	

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
SMR BLR PCS Vent CAP	SMR, Boiler, PCS Vent CAP	Method ____ Datum ____
Tempo Subject Item ID No. GRP 0002		UTM Zone 15 Horizontal ____ mE Vertical ____ mN
		Latitude ____ o ____ ' ____ " ____ hundredths
		Longitude ____ o ____ ' ____ " ____ hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (^oF)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
No	ft / ft^2	ft	ft/sec	ft^3/min	^oF	hr/yr		25	25	25	25

Fuel	Type of Fuel Used and Heat Input (see instructions)		
		Type of Fuel	Heat Input (MMBTU/hr)

Notes

This Cap includes emissions from the following sources: Steam Methane Reformer (EPN SMR, EQT 0001), Auxiliary Boiler (EPN BLR, EQT 0002), and the Process Condensate Stripper Vent (EPN PCSVENT, RLP 0024).

Operating Parameters (include units)		
	Parameter	Description
Normal Operating Rate/Throughput		
Maximum Operating Rate/Throughput		
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered ____ Engine Model Year ____

Date Engine Was Built by Manufacturer ____

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID) SMR BLR PCS Vent CAP	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
Pollutant				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
CARBON MONOXIDE				9.25		40.51	10.22	Change		
NITROGEN OXIDES				22.50		98.56	69.75	Change		
PM10				16.76		73.42	46.96	Change		
PM2.5				16.76		73.42	46.96	Change		
SULFUR DIOXIDE				1.35		5.91	4.53	Change		
TOTAL VOC (INCL. LISTED)				7.30		31.99	11.56	Change		
1,4-DICHLOROBENZENE			106-46-7	0.002		0.01	< 0.01	Change		
BENZENE			71-43-2	0.003		0.01	< 0.01	Change		
FORMALDEHYDE			50-00-0	0.10		0.44	0.18	Change		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
SMR BLR PCS Vent CAP	SMR, Boiler, PCS Vent CAP	Method ____ Datum ____
Tempo Subject Item ID No. GRP 0002		UTM Zone 15 Horizontal ____ mE Vertical ____ mN
		Latitude ____ o ____ ' ____ " ____ hundredths
		Longitude ____ o ____ ' ____ " ____ hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (^oF)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
	ft / ft^2							Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
No		ft	ft/sec	ft^3/min	^{o}F	hr/yr		25	25	25	25

Fuel

Type of Fuel Used and Heat Input (see instructions)		
	Type of Fuel	**Heat Input (MMBTU/hr)**

Notes

This Cap includes emissions from the following sources: Steam Methane Reformer (EPN SMR, EQT 0001), Auxiliary Boiler (EPN BLR, EQT 0002), and the Process Condensate Stripper Vent (EPN PCSVENT, RLP 0024).

Operating Parameters (include units)		
	Parameter	**Description**
Normal Operating Rate/Throughput		
Maximum Operating Rate/Throughput		
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered ____ Engine Model Year ____

Date Engine Was Built by Manufacturer ____

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID) / Pollutant	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
SMR BLR PCS Vent CAP										
HEXANE (-N)			110-54-3	2.39		10.47	4.44	Change		
METHANOL			67-56-1	4.38		19.20	1.69	Change		
NAPHTHALENE			91-20-3	0.002		0.01	< 0.01	Change		
TOLUENE			108-88-3	0.01		0.02	0.01	Change		
AMMONIA			7664-41-7	26.40		115.63	96.79	Change		
ARSENIC (AND COMPOUNDS)			7440-38-2	0.001		0.001		Add		
BARIUM (AND COMPOUNDS)			7440-39-3	0.010		0.043		Add		
CADMIUM (AND COMPOUNDS)			7440-43-9	0.003		0.011		Add		
CHROMIUM VI (AND COMPOUNDS)			7440-47-3	0.004		0.014		Add		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
SMR BLR PCS Vent CAP	SMR, Boiler, PCS Vent CAP	Method ____ Datum ____
Tempo Subject Item ID No. GRP 0002		UTM Zone 15 Horizontal ____ mE Vertical ____ mN
		Latitude ____ o ____ ' ____ " ____ hundredths
		Longitude ____ o ____ ' ____ " ____ hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (^oF)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
	ft / ft^2							Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
No		ft	ft/sec	ft^3/min	^oF	hr/yr		25	25	25	25

Fuel

Type of Fuel Used and Heat Input (see instructions)		
	Type of Fuel	**Heat Input (MMBTU/hr)**

Notes

This Cap includes emissions from the following sources: Steam Methane Reformer (EPN SMR, EQT 0001), Auxiliary Boiler (EPN BLR, EQT 0002), and the Process Condensate Stripper Vent (EPN PCSVENT, RLP 0024).

Operating Parameters (include units)		
	Parameter	**Description**
Normal Operating Rate/Throughput		
Maximum Operating Rate/Throughput		
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered ____ Engine Model Year ____

Date Engine Was Built by Manufacturer ____

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID) / Pollutant	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
SMR BLR PCS Vent CAP										
COBALT COMPOUNDS			7440-48-4	0.001		< 0.01		Add		
COPPER (AND COMPOUNDS)			7440-50-8	0.002		0.008		Add		
MANGANESE (AND COMPOUNDS)			7439-96-5	0.001		< 0.01		Add		
MERCURY (AND COMPOUNDS)			7439-97-6	0.001		0.003		Add		
NICKEL (AND COMPOUNDS)			7440-02-0	0.005		0.020		Add		
ZINC (AND COMPOUNDS)			7440-66-6	0.06		0.28		Add		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
SMR	Steam Methane Reformer	Method: 18,"Interpolation - Map" Datum: NAD83
Tempo Subject Item ID No. EQT 0001		UTM Zone: 15 Horizontal: 706279 mE Vertical: 3318808 mN
		Latitude: 29 ° 58 ' 58 " 23 hundredths
		Longitude: 90 ° 51 ' 42 " 67 hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
No	10.7 ft / ft ²	213.25 ft	78.93 ft/sec	422666 ft^3/min	336 °F	8760 hr/yr	1/9/2017 constructed	25	25	25	25

Fuel

	Type of Fuel	Heat Input (MMBTU/hr)
a	Natural Gas	1725
b	Process Gas	Balance

Notes

The SMR is designed to operate with either 100% natural gas feed or a combination of natural gas and process gas feed. The average hourly and annual emissions are accounted for under the SMR, Boiler, PCS Vent CAP (GRP 0002, EPN SMR BLR PCS Vent CAP).

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	1,725.00 MMBtu/hr	
Maximum Operating Rate/Throughput	1,794.00 MMBtu/hr	
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered: | Engine Model Year:

Date Engine Was Built by Manufacturer:

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID) / Pollutant	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
SMR				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
CARBON MONOXIDE					98.50			Change		
NITROGEN OXIDES					269.10			Change		
PM10					13.37			Change		
PM2.5					13.37			Change		
SULFUR DIOXIDE					1.08			Change		
TOTAL VOC (INCL. LISTED)					6.71			Change		
1,4-DICHLOROBENZENE			106-46-7		0.001			Change		
BENZENE			71-43-2		0.003			Change		
FORMALDEHYDE			50-00-0		0.09			Change		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
SMR	Steam Methane Reformer	Method: 18,"Interpolation - Map" Datum: NAD83
Tempo Subject Item ID No. EQT 0001		UTM Zone: 15 Horizontal: 706279 mE Vertical: 3318808 mN
		Latitude: 29 ° 58 ' 58 " 23 hundredths
		Longitude: 90 ° 51 ' 42 " 67 hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
No	10.7 ft / ft ²	213.25 ft	78.93 ft/sec	422666 ft^3/min	336 °F	8760 hr/yr	1/9/2017 constructed	25	25	25	25

Fuel

	Type of Fuel	Heat Input (MMBTU/hr)
a	Natural Gas	1725
b	Process Gas	Balance

Notes

The SMR is designed to operate with either 100% natural gas feed or a combination of natural gas and process gas feed. The average hourly and annual emissions are accounted for under the SMR, Boiler, PCS Vent CAP (GRP 0002, EPN SMR BLR PCS Vent CAP).

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	1,725.00 MMBtu/hr	
Maximum Operating Rate/Throughput	1,794.00 MMBtu/hr	
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered: | Engine Model Year:

Date Engine Was Built by Manufacturer:

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID) / Pollutant	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
SMR				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
HEXANE (-N)			110-54-3		2.20			Change		
METHANOL			67-56-1		4.98			Change		
NAPHTHALENE			91-20-3		< 0.001			Unchanged		
TOLUENE			108-88-3		0.004			Change		
AMMONIA			7664-41-7		24.06			Change		
ARSENIC (AND COMPOUNDS)			7440-38-2		< 0.001			Add		
BARIUM (AND COMPOUNDS)			7440-39-3		0.008			Add		
CADMIUM (AND COMPOUNDS)			7440-43-9		0.002			Add		
CHROMIUM VI (AND COMPOUNDS)			7440-47-3		0.002			Add		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
SMR	Steam Methane Reformer	Method: 18,"Interpolation - Map" Datum: NAD83
Tempo Subject Item ID No. EQT 0001		UTM Zone: 15 Horizontal: 706279 mE Vertical: 3318808 mN
		Latitude: 29 ° 58 ' 58 " 23 hundredths
		Longitude: 90 ° 51 ' 42 " 67 hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
No	10.7 ft / ft ²	213.25 ft	78.93 ft/sec	422666 ft^3/min	336 °F	8760 hr/yr	1/9/2017 constructed	25	25	25	25

Fuel

	Type of Fuel	Heat Input (MMBTU/hr)
a	Natural Gas	1725
b	Process Gas	Balance

Notes

The SMR is designed to operate with either 100% natural gas feed or a combination of natural gas and process gas feed. The average hourly and annual emissions are accounted for under the SMR, Boiler, PCS Vent CAP (GRP 0002, EPN SMR BLR PCS Vent CAP).

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	1,725.00 MMBtu/hr	
Maximum Operating Rate/Throughput	1,794.00 MMBtu/hr	
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered: Engine Model Year:

Date Engine Was Built by Manufacturer:

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID) SMR / Pollutant	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
COBALT COMPOUNDS			7440-48-4		< 0.001			Add		
COPPER (AND COMPOUNDS)			7440-50-8		0.002			Add		
MANGANESE (AND COMPOUNDS)			7439-96-5		< 0.001			Add		
MERCURY (AND COMPOUNDS)			7439-97-6		< 0.001			Add		
NICKEL (AND COMPOUNDS)			7440-02-0		0.004			Add		
ZINC (AND COMPOUNDS)			7440-66-6		0.05			Add		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
BLR	Auxiliary Boiler	Method: 18,"Interpolation - Map" Datum: NAD83
Tempo Subject Item ID No. EQT 0002		UTM Zone: 15 Horizontal: 706241 mE Vertical: 3318778 mN
		Latitude: 29 ° 58 ' 57 " 28 hundredths
		Longitude: 90 ° 51 ' 44 " 11 hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Yes	8.26 ft / ft ²	213.25 ft	44.59 ft/sec	210010 ft^3/min	300 °F	8760 hr/yr	1/9/2017 constructed	25	25	25	25

Fuel

	Type of Fuel	Heat Input (MMBTU/hr)
a	Natural Gas	525
b	Process Gas	Balance

Notes

The Auxiliary Boiler is designed to operate with either 100% natural gas feed or a combination of natural gas and process gas feed. The average hourly and annual emissions are accounted for under the SMR, Boiler, PCS Vent CAP (GRP 0002, EPN SMR BLR PCS Vent CAP).

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	525.00 MMBtu/hr	
Maximum Operating Rate/Throughput	1,100.00 MMBtu/hr	
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered: | Engine Model Year:

Date Engine Was Built by Manufacturer:

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID) / Pollutant	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
BLR				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
CARBON MONOXIDE					48.02			Change		
NITROGEN OXIDES					108.90			Change		
PM10					8.20			Change		
PM2.5					8.20			Change		
SULFUR DIOXIDE					0.66			Change		
TOTAL VOC (INCL. LISTED)					5.94			Change		
1,4-DICHLOROBENZENE			106-46-7		< 0.001			Unchanged		
BENZENE			71-43-2		0.001			Unchanged		
FORMALDEHYDE			50-00-0		0.02			Unchanged		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
BLR	Auxiliary Boiler	Method: 18,"Interpolation - Map" Datum: NAD83
Tempo Subject Item ID No. EQT 0002		UTM Zone: 15 Horizontal: 706241 mE Vertical: 3318778 mN
		Latitude: 29 ° 58 ' 57 " 28 hundredths
		Longitude: 90 ° 51 ' 44 " 11 hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Yes	8.26 ft / ft ²	213.25 ft	44.59 ft/sec	210010 ft^3/min	300 °F	8760 hr/yr	1/9/2017 constructed	25	25	25	25

Fuel

	Type of Fuel	Heat Input (MMBTU/hr)
a	Natural Gas	525
b	Process Gas	Balance

Notes

The Auxiliary Boiler is designed to operate with either 100% natural gas feed or a combination of natural gas and process gas feed. The average hourly and annual emissions are accounted for under the SMR, Boiler, PCS Vent CAP (GRP 0002, EPN SMR BLR PCS Vent CAP).

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	525.00 MMBtu/hr	
Maximum Operating Rate/Throughput	1,100.00 MMBtu/hr	
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered: | Engine Model Year:

Date Engine Was Built by Manufacturer:

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID) / Pollutant	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
BLR				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
HEXANE (-N)			110-54-3		0.58			Change		
METHANOL			67-56-1		0.84			Change		
TOLUENE			108-88-3		0.001			Unchanged		
AMMONIA			7664-41-7		10.21			Change		
BARIUM (AND COMPOUNDS)			7440-39-3		0.005			Add		
CADMIUM (AND COMPOUNDS)			7440-43-9		0.001			Add		
CHROMIUM VI (AND COMPOUNDS)			7440-47-3		0.002			Add		
COPPER (AND COMPOUNDS)			7440-50-8		< 0.001			Add		
MANGANESE (AND COMPOUNDS)			7439-96-5		< 0.001			Add		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
BLR	Auxiliary Boiler	Method: 18,"Interpolation - Map" Datum: NAD83
Tempo Subject Item ID No. EQT 0002		UTM Zone: 15 Horizontal: 706241 mE Vertical: 3318778 mN
		Latitude: 29 ° 58 ' 57 " 28 hundredths
		Longitude: 90 ° 51 ' 44 " 11 hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Yes	8.26 ft / ft ²	213.25 ft	44.59 ft/sec	210010 ft^3/min	300 °F	8760 hr/yr	1/9/2017 constructed	25	25	25	25

Fuel

	Type of Fuel	Heat Input (MMBTU/hr)
a	Natural Gas	525
b	Process Gas	Balance

Notes

The Auxiliary Boiler is designed to operate with either 100% natural gas feed or a combination of natural gas and process gas feed. The average hourly and annual emissions are accounted for under the SMR, Boiler, PCS Vent CAP (GRP 0002, EPN SMR BLR PCS Vent CAP).

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	525.00 MMBtu/hr	
Maximum Operating Rate/Throughput	1,100.00 MMBtu/hr	
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered: | Engine Model Year:

Date Engine Was Built by Manufacturer:

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID) / Pollutant	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
BLR										
MERCURY (AND COMPOUNDS)			7439-97-6		< 0.001			Add		
NICKEL (AND COMPOUNDS)			7440-02-0		0.002			Add		
ZINC (AND COMPOUNDS)			7440-66-6		0.03			Add		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
FLR	Flare	Method: 18,"Interpolation - Map" Datum: NAD83
Tempo Subject Item ID No. EQT 0003		UTM Zone: 15 Horizontal: 705987 mE Vertical: 3318635 mN
		Latitude: 29 ° 58 ' 52 " 79 hundredths
		Longitude: 90 ° 51 ' 53 " 68 hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Yes	4.45 ft / ft ²	185 ft	65.6 ft/sec	31668 ft^3/min	1832 °F	8760 hr/yr	1/9/2017 constructed	25	25	25	25

Fuel	Type of Fuel Used and Heat Input (see instructions)		
		Type of Fuel	Heat Input (MMBTU/hr)

Notes

Operating Parameters (include units)		
	Parameter	Description
Normal Operating Rate/Throughput		
Maximum Operating Rate/Throughput		
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered		Engine Model Year	
Date Engine Was Built by Manufacturer			

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID) / Pollutant	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
FLR										
CARBON MONOXIDE				25.23	2170.00	110.50	67.55	Change		
NITROGEN OXIDES				6.15	523.60	26.92	15.11	Change		
PM10				0.04	2.50	0.16	0.08	Change		
PM2.5				0.04	2.50	0.16	0.08	Change		
SULFUR DIOXIDE				0.02	0.67	0.10	0.05	Change		
TOTAL VOC (INCL. LISTED)				2.25	11056.44	9.87	7.49	Change		
BENZENE			71-43-2	< 0.001	0.06	< 0.01		Add		
FORMALDEHYDE			50-00-0	0.01	2.02	0.03		Add		
HEXANE (-N)			110-54-3	0.16	48.38	0.69		Add		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
FLR	Flare	Method: 18,"Interpolation - Map" Datum: NAD83
Tempo Subject Item ID No. EQT 0003		UTM Zone: 15 Horizontal: 705987 mE Vertical: 3318635 mN
		Latitude: 29 ° 58 ' 52 " 79 hundredths
		Longitude: 90 ° 51 ' 53 " 68 hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Yes	4.45 ft / ft ²	185 ft	65.6 ft/sec	31668 ft^3/min	1832 °F	8760 hr/yr	1/9/2017 constructed	25	25	25	25

Fuel

Type of Fuel Used and Heat Input (see instructions)		
	Type of Fuel	**Heat Input (MMBTU/hr)**

Notes

Operating Parameters (include units)		
	Parameter	**Description**
Normal Operating Rate/Throughput		
Maximum Operating Rate/Throughput		
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered | Engine Model Year

Date Engine Was Built by Manufacturer

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID) FLR / Pollutant	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
METHANOL			67-56-1	1.88	11056.44	8.22	5.93	Change		
TOLUENE			108-88-3	< 0.001	0.09	< 0.01		Add		
BARIUM (AND COMPOUNDS)			7440-39-3	< 0.001	0.118	0.002		Add		
CHROMIUM VI (AND COMPOUNDS)			7440-47-3	< 0.001	0.038	0.001		Add		
NICKEL (AND COMPOUNDS)			7440-02-0	< 0.001	0.056	0.001		Add		
ZINC (AND COMPOUNDS)			7440-66-6	0.003	0.78	0.01		Add		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
CWT	Cooling Water Tower	Method: 18,"Interpolation - Map" Datum: NAD83
Tempo Subject Item ID No. EQT 0007		UTM Zone: 15 Horizontal: 706192 mE Vertical: 3318720 mN
		Latitude: 29 ° 58 ' 55 " 42 hundredths
		Longitude: 90 ° 51 ' 45 " 97 hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Yes	34.38 ft / ft 2	46 ft	22.13 ft/sec	123453 ft^3/min	68 °F	8760 hr/yr	1/9/2017 constructed	25	25	25	25

Fuel

Type of Fuel Used and Heat Input (see instructions)		
	Type of Fuel	Heat Input (MMBTU/hr)

Notes

Operating Parameters (include units)		
	Parameter	Description
Normal Operating Rate/Throughput	200,000.00 gpm	circulation rate
Maximum Operating Rate/Throughput		
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered | Engine Model Year

Date Engine Was Built by Manufacturer

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID) / Pollutant	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
CWT										
CARBON MONOXIDE				1.07		4.69		Add		
PM10				0.41		1.82	2.78	Change		
PM2.5				0.19		0.84	1.32	Change		
TOTAL VOC (INCL. LISTED)				8.40		36.79	8.65	Change		
METHANOL			67-56-1	8.40		36.79	8.65	Change		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
EGEN2	Admin Building Emergency Generator	Method: 18,"Interpolation - Map" Datum: NAD83
Tempo Subject Item ID No. EQT0026		UTM Zone: 15 Horizontal: 708673.5 mE Vertical: 3319560 mN
		Latitude: 29 ° 59 ' 21 " 18 hundredths
		Longitude: 90 ° 50 ' 12 " 84 hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Yes	0.04 ft / ft ²	12 ft	264.51 ft/sec	19.32 ft^3/min	1175 °F	100 hr/yr	May 2019 constructed	25	25	25	25

Fuel	Type of Fuel Used and Heat Input (see instructions)		
		Type of Fuel	Heat Input (MMBTU/hr)
	a	Natural Gas	1.59

Notes

Operating Parameters (include units)		
	Parameter	Description
Normal Operating Rate/Throughput	210.00 hp	
Maximum Operating Rate/Throughput		
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered: | Engine Model Year:

Date Engine Was Built by Manufacturer:

SI Engines: ☐ Rich Burn ☑ Lean Burn ☐ 2 Stroke ☑ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID) / Pollutant	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
EGEN2				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
CARBON MONOXIDE				1.85	1.85	0.09	0.09	Unchanged		
NITROGEN OXIDES				0.92	0.92	0.05	0.05	Unchanged		
PM10				0.02	0.02	< 0.01	< 0.01	Change		
PM2.5				0.02	0.02	< 0.01	< 0.01	Change		
SULFUR DIOXIDE				< 0.001	< 0.001	< 0.01	< 0.01	Unchanged		
TOTAL VOC (INCL. LISTED)				0.46	0.46	0.02	0.02	Unchanged		
ACETALDEHYDE			75-07-0	0.01	0.01	< 0.01	< 0.01	Unchanged		
FORMALDEHYDE			50-00-0	0.08	0.08	< 0.01	< 0.01	Unchanged		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
MTPCAP	Methanol Transfer and Product Tank Cap	Method ____ Datum ____
Tempo Subject Item ID No. GRP TBD		UTM Zone 15 Horizontal ____ mE Vertical ____ mN
		Latitude ____ o ____ ' ____ " ____ hundredths
		Longitude ____ o ____ ' ____ " ____ hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (^oF)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
No	ft / ft^2	ft	ft/sec	ft^3/min	^{o}F	hr/yr					

Fuel

Type of Fuel Used and Heat Input (see instructions)		
	Type of Fuel	Heat Input (MMBTU/hr)

Notes

This Cap is currently permitted as GRP 0001 under the KMe Terminal Title V Permit No. 3169-V3 and includes emissions from the following sources: EPNs RT LOAD, TK-26-202A, TK-26-202B, TK-26-202C, and TK-26-202D.

Operating Parameters (include units)		
	Parameter	Description
Normal Operating Rate/Throughput		
Maximum Operating Rate/Throughput		
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered ____ Engine Model Year ____

Date Engine Was Built by Manufacturer ____

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID)	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
Pollutant				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
MTPCAP										
CARBON MONOXIDE				1.81		7.94		Add		
NITROGEN OXIDES				5.50		24.09		Add		
PM10				0.16		0.72		Add		
PM2.5				0.16		0.72		Add		
SULFUR DIOXIDE				0.01		0.06		Add		
TOTAL VOC (INCL. LISTED)				6.36		27.88		Add		
FORMALDEHYDE			50-00-0	0.001		0.01		Add		
HEXANE (-N)			110-54-3	0.03		0.15		Add		
METHANOL			67-56-1	6.23		27.29		Add		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
MTPCAP	Methanol Transfer and Product Tank Cap	Method ____ Datum ____
Tempo Subject Item ID No. GRP TBD		UTM Zone 15 Horizontal ____ mE Vertical ____ mN
		Latitude ____ o ____ ' ____ " ____ hundredths
		Longitude ____ o ____ ' ____ " ____ hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (^oF)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
No	ft / ft 2	ft	ft/sec	ft^3/min	°F	hr/yr					

Fuel	Type of Fuel Used and Heat Input (see instructions)		
		Type of Fuel	Heat Input (MMBTU/hr)

Notes

This Cap is currently permitted as GRP 0001 under the KMe Terminal Title V Permit No. 3169-V3 and includes emissions from the following sources: EPNs RT LOAD, TK-26-202A, TK-26-202B, TK-26-202C, and TK-26-202D.

Operating Parameters (include units)		
	Parameter	Description
Normal Operating Rate/Throughput		
Maximum Operating Rate/Throughput		
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered		Engine Model Year	
Date Engine Was Built by Manufacturer			

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID)	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
Pollutant				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
MTPCAP										
ZINC (AND COMPOUNDS)			7440-66-6	0.001		< 0.01		Add		

State of Louisiana
Emissions Inventory Questionaire (EIQ) for Air Pollutants

Date of Submittal: February 2023

Emission Point ID No. (Alternate ID)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
RT LOAD	Methanol Railcar and Tank Truck Loading Operations	Method: 18,"Interpolation - Map" Datum: NAD83
Tempo Subject Item ID No. TBD		UTM Zone: 15 Horizontal: 705814 mE Vertical: 3318793 mN
		Latitude: 29 ° 58 ' 58 " 2 hundredths
		Longitude: 90 ° 52 ' 0 " 2 hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Thoughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Yes	8 ft / ft 2	45 ft	1.85 ft/sec	66350 ft^3/min	1320 °F	8760 hr/yr	1/9/2017 constructed	25	25	25	25

Fuel

Type of Fuel Used and Heat Input (see instructions)		
	Type of Fuel	**Heat Input (MMBTU/hr)**

Notes

Source is currently permitted as EQT 0005 under the KMe Terminal Title V Permit No. 3169-V3. The average hourly and annual emissions are accounted for under the Methanol Transfer and Product Tank Cap (EPN MTPCAP).

Operating Parameters (include units)		
	Parameter	**Description**
Normal Operating Rate/Throughput	908,850.00 Mgal/yr	truck & railcar throughput
Maximum Operating Rate/Throughput	6,000.00 gal/min	truck & railcar throughput
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof ☐ Floating Roof ☐ External ☐ Internal

Date Engine Ordered: | Engine Model Year:

Date Engine Was Built by Manufacturer:

SI Engines: ☐ Rich Burn ☐ Lean Burn ☐ 2 Stroke ☐ 4 Stroke

Air Pollutant Specific Information

Emmision Point ID No. (Alternate ID) / Pollutant	Control Equipment Code	Control Equipment Efficiency	HAP/TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration of gases exiting at stack
RT LOAD				Average (lbs/hr)	Max (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
CARBON MONOXIDE					3.07			Add		
NITROGEN OXIDES					9.31			Add		
PM10					0.28			Add		
PM2.5					0.28			Add		
SULFUR DIOXIDE					0.02			Add		
TOTAL VOC (INCL. LISTED)					0.10			Add		
FORMALDEHYDE			50-00-0		0.001			Add		
HEXANE (-N)			110-54-3		0.03			Add		
ZINC (AND COMPOUNDS)			7440-66-6		0.001			Add		

24. NSR Applicability Summary [LAC 33:III.504 and LAC 33:III.509] ☐ N/A*

This section consists of seven subsections, A-G, and is applicable only to new and existing major stationary sources (as defined in LAC 33:III.504 or in LAC 33:III.509) proposing to permit a physical change or change in the method of operation. It would also apply to existing minor stationary sources proposing a physical change or change in the method of operation where the change would be a major source in and of itself. Add rows to each table as necessary. Provide a written explanation of the information summarized in these tables. Consult instructions.

*** PSD requirements has been voluntarily and conservatively applied. Please refer to Section 2.2.1 for further detail.**

24.A. Project Summary

		A	B	C	D	E	F
Emission Point ID	**Description**	**New, Modified, Affected, or Unaffected***	**Pre-Project Allowables (TPY)**	**Baseline Actual Emissions (over 24-month period)**	**Projected Actual Emissions (TPY)**	**Post-Project Potential to Emit (TPY)**	**Change**
$PM_{2.5}$	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						$PM_{2.5}$ Change:	
PM_{10}	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						PM_{10} Change:	
SO_2	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						SO_2 Change:	
NO_X	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						NO_X Change:	

CO	24-Month Period: MM/DD/YYYY – MM/DD/YYYY						
						CO Change:	

VOC	24-Month Period: MM/DD/YYYY – MM/DD/YYYY						
						VOC Change:	

CO_2e	24-Month Period: MM/DD/YYYY – MM/DD/YYYY						
						CO_2e Change:	

* Unaffected emissions units are not required to be listed individually. By choosing not to list unaffected emissions units, the applicant asserts that all emissions units not listed in Table 24.A will not be modified or experience an increase in actual annual emissions as part of the proposed project.

24.B. Creditable Contemporaneous Changes – Not applicable

Contemporaneous Period: MM/DD/YYYY – MM/DD/YYYY	

		A	B	C	D	E	F
Emission Point ID	Description	Date of Modification	Pre-Project Allowables (TPY)	Baseline Actual Emissions (over 24-month period)	24-Month Period	Post-Project Potential to Emit (TPY)	Change
$PM_{2.5}$							
						$PM_{2.5}$ Change:	
PM_{10}							

24.B. Creditable Contemporaneous Changes – Not applicable

						PM_{10} Change:	
SO_2							
						SO_2 Change:	
NO_X							
						NO_X Change:	
CO							
						CO Change:	
VOC							
						VOC Change:	
CO_2e							
						CO_2e Change:	

For each source identified as "New" or "Modified" in Section 24.A, complete the following table for each pollutant that will trigger NSR. If LAER is not required per LAC 33:III.504.D.3, indicate such.

24.C. BACT/LAER Summary - Please refer to Part 3, Table 3-1 of this application addendum for the BACT summary table.

Emission Point ID	Pollutant	BACT/LAER	Limitation	Averaging Period	Description of Control Technology/Work Practice Standard(s)

24.D. PSD Air Quality Analyses Summary

		A	B	C	D	E	F	G	H	I
Pollutant	Averaging Period	Preliminary Screening Concentration ($\mu g/m^3$)	Level of Significant Impact ($\mu g/m^3$)	Significant Monitoring Concentration ($\mu g/m^3$)	Background ($\mu g/m^3$)	Maximum Modeled Concentration ($\mu g/m^3$)	Modeled + Background Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Modeled PSD Increment Consumption ($\mu g/m^3$)	Allowable Class II PSD Increment ($\mu g/m^3$)
$PM_{2.5}$	24-hour	1.01	1.2	-	NR	NR	NR	35	NR	9
	Annual	0.11	0.2	-	NR	NR	NR	12	NR	4
PM_{10}	24-hour	1.32	5	10	NR	NR	NR	150	NR	30
	Annual	0.16	1	-	NR	NR	NR	-	NR	17
SO_2	1-hour	NR	7.8	-	NR	NR	NR	195	NR	-
	3-hour	NR	25	-	NR	NR	NR	1300	NR	512
	24-hour	NR	5	13	NR	NR	NR	365	NR	91
	Annual	NR	1	-	NR	NR	NR	80	NR	20
NO_X	1-hour	11.86	7.5	-	56.4	117.6	174.0	188	NR	-
	Annual	0.40	1	14	NR	NR	NR	100	NR	25
CO	1-hour	1453.56	2000	-	NR	NR	NR	40,000	-	-
	8-hour	441.48	500	575	NR	NR	NR	10,000	-	-
Lead	3-month	NR	-	0.1	NR	NR	NR	1.5	-	-

NR = Not Required.

24.E Nonattainment New Source Review Offsets [LAC 33:III.517.D.16, LAC 33:III.504.D.4 & 5] ☒ N/A

Complete this section only if the proposed project triggers Nonattainment New Source Review (NNSR).
This project triggers NNSR review for: ☐ **NO_X** ☐ **VOC** ☐ **SO_2**

NO_X:

Is the applicant proposing to use internal offsets? ☐ **Yes** ☐ **No**

If not, identify the source of the offsets. **Company:** _____
Facility/Unit: _____
Permit No.: _____

Is an ERC Bank Application included with this application, or has an application already been submitted to LDEQ?
☐ **Yes** ☐ **No**

If the ERC application has already been submitted, give the date: _____

Identify the emissions units from which the offsets will be obtained (reference specific Emission Point ID numbers).

VOC:

Is the applicant proposing to use internal offsets? ☐ **Yes** ☐ **No**

If not, identify the source of the offsets. **Company:** _____
Facility/Unit: _____
Permit No.: _____

Is an ERC Bank Application included with this application, or has an application already been submitted to LDEQ?
☐ **Yes** ☐ **No**

If the ERC application has already been submitted, give the date: _____

Identify the emissions units from which the offsets will be obtained (reference specific Emission Point ID numbers).

SO_2:

Is the applicant proposing to use internal offsets? ☐ **Yes** ☐ **No**

If not, identify the source of the offsets. **Company:** _____
Facility/Unit: _____
Permit No.: _____

Is an ERC Bank Application included with this application, or has an application already been submitted to LDEQ?
☐ **Yes** ☐ **No**

If the ERC application has already been submitted, give the date: _____

Identify the emissions units from which the offsets will be obtained (reference specific Emission Point ID numbers).

In order to expedite processing, please be sure the ERC Bank Application is completed properly. In the case of NO_X, the document should clearly differentiate between ozone season and non-ozone season actual emissions during the baseline period. Be sure to indicate if a portion of the reductions are no longer surplus (e.g., due to new or revised federal or state regulations, use in a netting analysis, etc.).

24.F. Economic Impact

Answer the following questions.

How many temporary jobs will be added as a result of this project? 50-100

How many permanent jobs will be added as a result of this project? Less than 5

24.G Notification of Federal Land Manager [LAC 33:III.504.E.1, LAC 33:III.509.P.1]
Complete this section only if the proposed project triggers NNSR or PSD.

a. Is the proposed facility or modification located within 100 kilometers of a Class I Area? ☐ **Yes** ☒ **No**
If Yes, determination of Q/d is not required; skip to the next question. If No, complete the Q/d equation below:

$$Q/d = \frac{PM_{10\,(NEI)} + SO_{2\,(NEI)} + NO_{X\,(NEI)} + H_2SO_{4\,(NEI)}}{\text{Class I km}}$$

where:
- $PM_{10\,(NEI)}$ = net emissions increase of PM_{10}[1,2]
- $SO_{2\,(NEI)}$ = net emissions increase of SO_2[1,2]
- $NO_{X\,(NEI)}$ = net emissions increase of NO_X[1,2]
- $H_2SO_{4\,(NEI)}$ = net emissions increase of
- Class I km = distance to nearest Class I Area[3]

$$Q/d = \frac{76.38 \text{ tpy} + 6.18 \text{ tpy} + 155.79 \text{ tpy} + 0.04 \text{ tpy}}{185 \text{ km}} = 1.29 \text{ tpy/km}$$

Per Federal Land Manager guidance, Q values should reflect annual emissions (in tons per year, based on 24-hour maximum allowable emissions). If Q/d < 10, proceed to Section 25. If Q/d ≥ 10, complete the remainder of this Section.

b. Has the applicant provided a copy of the application to the Federal Land Manager? ☐ **Yes** ☐ **No**

c. Does the application contain modeling that demonstrates no adverse impact on Air Quality Related Values (AQRVs) in the Class I Area? ☐ **Yes** ☐ **No**

d. If Yes, indicate the model used: ☐ **VISCREEN** ☐ **PLUVUE II** ☐ **CALPUFF** ☐ **Other:**[4] _____

e. Has the Federal Land Manager concurred that the proposed project will not adversely impact any AQRVs?
☐ **Yes** ☐ **No** If Yes, please attach correspondence.

[1]If the net emissions increase of any pollutant is negative, enter "0."
[2]If the project did not trigger a netting analysis, use the project increase. In this case, the value will be less than the pollutant's significance level.
[3]In kilometers.
[4]Model must be approved by LDEQ and the Federal Land Manager.

APPENDIX A
EMISSIONS CALCULATIONS

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Summary of Emissions

Date: 1/26/2023

Source Description	TEMPO ID	Pollutant (tpy)										
		PM	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO	VOC	CO_2e	Ammonia	Methanol	Hydrogen Sulfide
SMR, Boiler, PCS Vent CAP	GRP 0002	73.42	73.42	73.42	5.91	98.56	40.51	31.99	1,335,462	115.63	19.20	-
SMR	*EQT 0001*	*56.29*	*56.29*	*56.29*	*4.53*	*75.56*	*27.96*	*28.26*	*1,066,245*	*91.98*	*17.44*	-
Auxiliary Boiler	*EQT 0002*	*17.13*	*17.13*	*17.13*	*1.38*	*23.00*	*10.58*	*3.73*	*269,191*	*21.46*	*1.76*	-
PCS Vent Stream	*RLP 0024*	-	-	-	-	-	*1.97*	-	*27*	*2.18*	-	-
Flare	EQT 0003	0.16	0.16	0.16	0.10	26.92	110.50	9.87	47,641	-	8.22	-
Emergency Generator	EQT 0004	0.06	0.06	0.06	0.01	1.91	1.05	0.11	208	-	-	-
Firewater Pump No. 1	EQT 0005	0.01	0.01	0.01	0.01	0.20	0.17	0.07	34	-	-	-
Firewater Pump No. 2	EQT 0006	0.01	0.01	0.01	0.01	0.20	0.17	0.07	34	-	-	-
Firewater Pump No. 3	EQT 0022	0.01	0.01	0.01	0.03	0.07	0.02	0.03	14	-	-	-
Cooling Tower	EQT 0007	2.20	1.82	0.84	-	-	4.69	36.79	634	-	36.79	-
Ammonia Tank	EQT 0014	-	-	-	-	-	-	-	-	0.56	-	-
Fugitive Emissions - KMe Facility	FUG 0001	-	-	-	-	-	15.97	43.51	3,306	0.93	38.82	-
Methanol Scrubber Cap	EMS 0001	-	-	-	-	-	-	10.07	2137	-	10.07	-
TK-04001	*EQT 0008*	-	-	-	-	-	-	*4.83*	*2137*	-	*4.83*	-
TK-04002A	*EQT 0013*	-	-	-	-	-	-	*2.62*	-	-	*2.62*	-
TK-04002B	*EQT 0017*	-	-	-	-	-	-	*2.62*	-	-	*2.62*	-
Wastewater Treatment	FUG 0002	-	-	-	-	-	-	5.53	-	3.29	0.33	9.13
Admin Bldg EGEN	EQT 0026	0.01	0.01	0.01	0.01	0.05	0.09	0.02	9	-	-	-
Gasoline Tank	EQT 0027	-	-	-	-	-	-	0.20	-	-	-	-
Condensate Trap Vents	RLP 0025	-	-	-	-	-	0.07	-	1	0.08	-	-

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Summary of Emissions

Date: 1/26/2023

Source Description	TEMPO ID	Pollutant (tpy)										
		PM	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO	VOC	CO_2e	Ammonia	Methanol	Hydrogen Sulfide
MTPCAP	GRP TBD	0.72	0.72	0.72	0.06	24.09	7.94	27.88	11,282	-	27.29	-
Methanol Product Tank 2301	*EQT TBD*	-	-	-	-	-	-	*2.39*	-	-	*2.39*	-
Methanol Product Tank 2302	*EQT TBD*	-	-	-	-	-	-	*2.31*	-	-	*2.31*	-
Methanol Product Tank 2303	*EQT TBD*	-	-	-	-	-	-	*2.24*	-	-	*2.24*	-
Methanol Product Tank 2304	*EQT TBD*	-	-	-	-	-	-	*2.33*	-	-	*2.33*	-
Terminal Tank Landings and Cleanings	*N/A*	-	-	-	-	-	-	*2.08*	-	-	*2.08*	-
Loading and VCU	*EQT TBD*	*0.72*	*0.72*	*0.72*	*0.06*	*24.09*	*7.94*	*16.37*	*11,282*	-	*15.93*	-
E.GEN 02	EQT TBD	0.04	0.04	0.04	0.01	1.42	0.14	0.10	167	-	-	-
E.GEN 01	EQT TBD	0.04	0.04	0.04	0.01	1.42	0.14	0.10	167	-	-	-
Insignificant Activities	IAs	0.06	0.06	0.06	0.01	0.77	0.65	0.11	-	-	-	-
GCXVIIs	GC XVII	0.02	0.02	0.02	0.01	0.18	0.98	8.43	-	-	-	-
Facility-Wide Emissions Summary		**76.76**	**76.38**	**75.40**	**6.18**	**155.79**	**183.08**	**174.88**	**1,401,099**	**120.49**	**140.72**	**9.13**

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
SMR, Boiler, PCS Vent CAP

SOURCE INFORMATION

Source Description: SMR, Boiler, PCS Vent CAP
Source ID No. SMR BLR PCS Vent CAP
Tempo ID No. GRP 0002

Calculation Date: 1/26/2023
Calculated by: AHN
Reviewed by: MR

Description:

The following table presents the combined average hourly and annual emission limits (CAP) for the Steam Methane Reformer (EPN SMR), Process Condensate Stripper Vent (EPN PCSVENT), and Auxiliary Boiler (EPN BLR). Emissions calculations for each source are provided on the following pages.

Summary of Emissions from SMR, Auxiliary Boiler, and PCS Vent:

Pollutant	Average Emissions (lb/hr)	Annual Emissions (tpy)
$PM/PM_{10}/PM_{2.5}$	16.76	73.42
VOC	7.30	31.99
SO_2	1.35	5.91
NO_X	22.50	98.56
CO	9.25	40.51
Ammonia	26.40	115.63
Benzene	0.003	0.01
Dichlorobenzene	0.002	0.01
Formaldehyde	0.10	0.44
Hexane	2.39	10.47
Methanol	4.38	19.20
Naphthalene	0.002	0.01
Toluene	0.005	0.02
Arsenic	0.001	0.001
Barium	0.010	0.043
Cadmium	0.003	0.011
Chromium[1]	0.004	0.014
Chromium VI[1]	0.001	0.003
Cobalt	0.001	0.001
Copper	0.002	0.008
Manganese	0.001	0.004
Mercury	0.001	0.003
Nickel	0.005	0.020
Zinc	0.06	0.28
CO_2e	--	1,335,462

Note:

1. Total chromium emissions are estimated for permitting purposes and utilized in comparing facility-wide emission increases to the "chromium VI (and compounds)" minimum emission rate provided in LAC 33:III. Chpater 51. Chromium VI is speciated from total chromium for Environmental Justice (EJ) modeling purposes. Chromium VI is conservatievly assumed to be 20% of total chromium based on information provided in Table 4-3, footnote I of the Emissions Estimation Portocol for Petroleum Refineries document (April 2015) for refinery fuel gas.

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Steam Methane Reformer Emission Calculations

SOURCE INFORMATION

Source Description:	Steam Methane Reformer (B-01001)	**Calculation Date:**	1/26/2023
Source ID No.	SMR	**Calculated by:**	AHN
Tempo ID No.	EQT 0001	**Reviewed by:**	MR

Description:

The Steam Methane Reformer will convert natural gas to syngas for conversion to methanol in the methanol synthesis unit. It will be equipped with SCR to control NO_x emissions and oxidation catalyst to control CO/VOC emissions. The emissions presented below include anticipated periods of startup and shutdown. The SMR will operate for brief periods without SCR control/oxidation catalyst, for example during startup and shutdown or SCR maintenance. Maximum hourly emissions and annual emissions account for these periods, as well as periods with operating parameters (e.g. firing rate or fuel heating value) outside of the typical range. Average hourly and annual emissions are accounted for under the SMR, Boiler, PCS Vent CAP (GRP 0002, EPN SMR BLR PCS Vent CAP).

Basis	Units	Parameter	Source
1,725	MMBtu/hr	Design Capacity Firing Rate, HHV	Project Design Basis
1,794	MMBtu/hr	Maximum Firing Rate	Project Design Basis
1,020	Btu/scf	Heating Value	AP-42 Table 1.4-2, Footnote a.
8,760	hr/yr	Annual Operating Hours	Based on continuous operation, max hours per year
100	hr/yr	Hours elevated NOx emissions	Estimated hours to account for startups, shutdowns, or periods when SCR is not operating.
15,111,000	MMBtu/yr	Annual Average Heat Input	Calculated from Design Capacity Firing Rate (MMBtu/hr) and the Annual Operating Hours (hr/yr).
99.9	%	Methanol Destruction Efficiency	Supported by EPA doc EPA530-R-97-047 (Note 4)

Summary of Criteria Pollutant and Ammonia Emissions:

Pollutant	Emission Factors		Average Emissions (lb/hr)	Maximum Emissions (lb/hr)	Annual Emissions (tpy)	Emission Factor Source, Notes
	lb/MMscf (or ppm_v)	lb/MMBtu				
NO_X (Annual Operation)	--	0.01	17.25	--	75.56	Annual emissions TPY based on 8,760 hr/yr operation at 0.01 lb/MMBTU at design capacity firing rate. Annual emissions and emission factor takes into account controlled and uncontrolled periods of operation.
NO_X (SCR Not Operating)	--	0.15	--	269.10	--	Project Design Basis. 0.15 lb/MMBtu accounts for times when SCR not operating, unit fired above design firing rate, and/or fuel heating value greater than 1,020 Btu/scf.
CO (Annual Operation)	--	0.0037	6.38	--	27.96	Emission factor based on results of January 2022 stack test, plus contingency to account for catalyst end of run performance, elevated emissions upon SU/SD, and production rate increase. Annual emissions and emission factor takes into account controlled and uncontrolled periods of operation.
CO (Maximum, no catalyst control)	--	0.0549	--	98.50	--	Project Design Basis: 100 ppm CO, max design capacity fire, adjusted to 3% O2
$PM/PM_{10}/PM_{2.5}$	7.6	0.00745	12.85	13.37	56.29	Emission factor selected as BACT; Reference Part 4 in permit application.
VOC	--	0.00374	6.45	6.71	28.26	Emission factor based on results of January 2022 stack test, plus contingency to account for catalyst end of run performance, elevated emissions upon SU/SD, and production rate increase.
SO_2	0.6	0.0006	1.04	1.08	4.53	AP-42 Table 1.4-2. The conversion to equivalent lb/MMBtu factors is shown for information only.
Ammonia	--	--	21.00	24.06	91.98	Emissions based on process knowledge that accounts for SCR end of run performance.

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Steam Methane Reformer Emission Calculations

SOURCE INFORMATION

Source Description: Steam Methane Reformer (B-01001)
Source ID No. SMR
Tempo ID No. EQT 0001
Calculation Date: 1/26/2023
Calculated by: AHN
Reviewed by: MR

Summary of Speciated Emissions from Fuel:

Speciated emissions represent maximum potential to emit of each compound.

Pollutant	Emission Factors [2] lb/MMscf	Average Emissions (lb/hr)	Maximum Emissions (lb/hr)	Annual Emissions (tpy)	EIQ Threshold [1] (tpy)	HAP/TAP?	Requires Permitting?	Emission Factor Source
Organic HAPs								
2-Methylnaphthalene	1.66E-05	2.82E-05	2.93E-05	1.23E-04	5.00E-04	YES	NO	AP-42 Table 1.4-3
3-Methylchloranthrene	1.25E-06	2.11E-06	2.20E-06	9.25E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
7,12-Dimethylbenz(a)nthracene	1.11E-05	1.88E-05	1.95E-05	8.22E-05	5.00E-04	YES	NO	AP-42 Table 1.4-3
Acenaphthene	1.25E-06	2.11E-06	2.20E-06	9.25E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Acenaphthylene	1.25E-06	2.11E-06	2.20E-06	9.25E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Anthracene	1.66E-06	2.82E-06	2.93E-06	1.23E-05	5.00E-04	YES	NO	AP-42 Table 1.4-3
Benz(a)thracene	1.25E-06	2.11E-06	2.20E-06	9.25E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Benzene	1.46E-03	2.46E-03	2.56E-03	1.08E-02	5.00E-04	YES	YES	AP-42 Table 1.4-3
Benzo(a)pyrene	8.32E-07	1.41E-06	1.46E-06	6.17E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Benzo(b)fluoranthene	1.25E-06	2.11E-06	2.20E-06	9.25E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Benzo(g,h,i)perylene	8.32E-07	1.41E-06	1.46E-06	6.17E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Benzo(k)fluoranthene	1.25E-06	2.11E-06	2.20E-06	9.25E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Butane	1.46E+00	2.46E+00	2.56E+00	1.08E+01	5.00E-04	NO	NO	AP-42 Table 1.4-3
Chrysene	1.25E-06	2.11E-06	2.20E-06	9.25E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Dibenzo(a,h)anthracene	8.32E-07	1.41E-06	1.46E-06	6.17E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Dichlorobenzene	8.32E-04	1.41E-03	1.46E-03	6.17E-03	5.00E-04	YES	YES	AP-42 Table 1.4-3
Ethane	2.15E+00	3.64E+00	3.78E+00	1.59E+01	5.00E-04	NO	NO	AP-42 Table 1.4-3
Fluoranthene	2.08E-06	3.52E-06	3.66E-06	1.54E-05	5.00E-04	YES	NO	AP-42 Table 1.4-3
Fluorene	1.94E-06	3.28E-06	3.42E-06	1.44E-05	5.00E-04	YES	NO	AP-42 Table 1.4-3
Formaldehyde	5.20E-02	8.80E-02	9.15E-02	3.85E-01	5.00E-04	YES	YES	AP-42 Table 1.4-3
n-Hexane	1.25E+00	2.11E+00	2.20E+00	9.25E+00	5.00E-04	YES	YES	AP-42 Table 1.4-3
Indeno(1,2,3-cd)pyrene	1.25E-06	2.11E-06	2.20E-06	9.25E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Methanol [3]	2.35E+00	3.98E+00	4.98E+00	1.74E+01	5.00E-04	YES	YES	Note 3
Naphthalene	4.23E-04	7.16E-04	7.44E-04	3.13E-03	5.00E-04	YES	YES	AP-42 Table 1.4-3
Pentane	1.80E+00	3.05E+00	3.17E+00	1.34E+01	5.00E-04	NO	NO	AP-42 Table 1.4-3
Phenanathrene	1.18E-05	1.99E-05	2.07E-05	8.73E-05	5.00E-04	YES	NO	AP-42 Table 1.4-3
Propane	1.11E+00	1.88E+00	1.95E+00	8.22E+00	5.00E-04	NO	NO	AP-42 Table 1.4-3
Pyrene	3.47E-06	5.87E-06	6.10E-06	2.57E-05	5.00E-04	YES	NO	AP-42 Table 1.4-3
Toluene	2.36E-03	3.99E-03	4.15E-03	1.75E-02	5.00E-04	YES	YES	AP-42 Table 1.4-3
Total PAH	--	7.53E-05	7.83E-05	3.30E-04	5.00E-04	YES	NO	--
Total HAP	--	6.19	7.27	27.11	--	--	--	--

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Steam Methane Reformer Emission Calculations

SOURCE INFORMATION

Source Description: Steam Methane Reformer (B-01001)
Source ID No. SMR
Tempo ID No. EQT 0001
Calculation Date: 1/26/2023
Calculated by: AHN
Reviewed by: MR

Pollutant	Emission Factors [2] lb/MMscf	Average Emissions (lb/hr)	Maximum Emissions (lb/hr)	Annual Emissions (tpy)	EIQ Threshold [1] (tpy)	HAP/TAP?	Requires Permitting?	Emission Factor Source
Metals								
Arsenic	2.00E-04	3.38E-04	3.52E-04	1.48E-03	5.00E-04	YES	YES	AP-42 Table 1.4-4
Barium	4.40E-03	7.44E-03	7.74E-03	3.26E-02	5.00E-04	YES	YES	AP-42 Table 1.4-4
Beryllium	1.20E-05	2.03E-05	2.11E-05	8.89E-05	5.00E-04	YES	NO	AP-42 Table 1.4-4
Cadmium	1.10E-03	1.86E-03	1.93E-03	8.15E-03	5.00E-04	YES	YES	AP-42 Table 1.4-4
Chromium	1.40E-03	2.37E-03	2.46E-03	1.04E-02	5.00E-04	YES	YES	AP-42 Table 1.4-4, Note 5
Chromium VI	--	4.74E-04	4.92E-04	2.07E-03	5.00E-04	NO	NO	Note 5
Cobalt	8.40E-05	1.42E-04	1.48E-04	6.22E-04	5.00E-04	YES	YES	AP-42 Table 1.4-4
Copper	8.50E-04	1.44E-03	1.50E-03	6.30E-03	5.00E-04	YES	YES	AP-42 Table 1.4-4
Manganese	3.80E-04	6.43E-04	6.68E-04	2.81E-03	5.00E-04	YES	YES	AP-42 Table 1.4-4
Mercury	2.60E-04	4.40E-04	4.57E-04	1.93E-03	5.00E-04	YES	YES	AP-42 Table 1.4-4
Molybdenum	1.10E-03	1.86E-03	1.93E-03	8.15E-03	5.00E-04	NO	NO	AP-42 Table 1.4-4
Nickel	2.10E-03	3.55E-03	3.69E-03	1.56E-02	5.00E-04	YES	YES	AP-42 Table 1.4-4
Selenium	2.40E-05	4.06E-05	4.22E-05	1.78E-04	5.00E-04	YES	NO	AP-42 Table 1.4-4
Vanadium	2.30E-03	3.89E-03	4.05E-03	1.70E-02	5.00E-04	NO	NO	AP-42 Table 1.4-4
Zinc	2.90E-02	4.90E-02	5.10E-02	2.15E-01	5.00E-04	YES	YES	AP-42 Table 1.4-4

Notes

1. Emissions less than permitting thresholds of 0.0005 tpy will not be included in the permit or EIQ sheets.
2. Emission factors for speciated organic HAP/TAPs are based on AP-42 Table 1.4-3 and ratioed down based on ratio of PTE emission factor to the AP-42 VOC emission factor. Emission factors for metals are based on AP-42 Table 1.4-4.
3. Methanol emissions are based on an anticipated methanol mass flow rate and 99.9% destruction efficiency. The maximum hourly emission rates are based on the average hourly emission rates plus a 25% contingency.
4. EPA520-R-97-047 document references 99.99% and 99.9999% destruction efficiencies for "methane reforming furnaces". This application assumes 99.9% DRE.
5. Total chromium emissions are estimated for permitting purposes and utilized in comparing facility-wide emission increases to the "chromium VI (and compounds)" minimum emission rate provided in LAC 33:III. Chpater 51. Chromium VI is speciated from total chromium for Environmental Justice (EJ) modeling purposes. Chromium VI is conservatievly assumed to be 20% of total chromium based on information provided in Table 4-3, footnote l of the Emissions Estimation Portocol for Petroleum Refineries document (April 2015) for refinery fuel gas.

Sample Calculations

CO emission factor calculation basis:

5	ppmv CO, average dry basis, adjusted to 3% O_2
100	ppmv CO, maximum dry basis, adjusted to 3% O_2
385	scf/lb-mol, standard molar volume based on definition of standard conditions in 40 CFR 60 Subpart A (68°F and 14.7 psia)
28	lb/lb-mol, CO molecular weight
454,822	acfm (wet basis), stack flow rate
23.77	%, stack gas moisture content
351	°F, stack gas temperature
225,725	dscfm (dry), stack gas flow rate
4.92	lb/hr, CO avg emission rate
98.50	lb/hr, CO max emission rate
0.055	lb/MMBtu, CO max emission factor

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Steam Methane Reformer Emission Calculations

SOURCE INFORMATION

Source Description: Steam Methane Reformer (B-01001)
Source ID No. SMR
Tempo ID No. EQT 0001

Calculation Date: 1/26/2023
Calculated by: AHN
Reviewed by: MR

Maximum percentage of methanol in streams calculation basis:

Speciation of Off Gas from Distillation Stream		
Pollutant	**Mol %**	**Molecular Weight**
Methanol (VOC)	19.28	32
CO_2	69.92	44
CO	0.19	28
H_2	2.01	2
Ar	0.09	40
N_2	0.04	28
Methane	5.51	16
Low Boiler	2.96	--
Total	**100**	

CO_2 emissions from streams calculation basis:

Fuel Types	**CO_2 Post Combustion Combined Flow**	**CO_2 PTE Emissions (lb/hr)[6]**	**CO_2 PTE Emissions (tpy)**
Natural Gas	776,463	108,087	473,420
Purge gas from synthesis loop	438,007	60,972	267,059
PSA tail gas	270,678	37,679	165,036
Expansion gas	136,098	18,945	82,981
Off gas from distillation	126,022	17,543	76,837
Total	**1,747,269**	**243,227**	**1,065,332**

Notes:

5. Includes both combustion related CO_2 and pass through CO_2 from each SMR furnace fuel stream via process engineering mass balance.

6. CO_2 PTE Emissions(lb/hr) = CO_2 post-combustion combined flow rate (scf/hr) x 379.3 scf/lb-mol * MW CO_2 (44 lb/lb-mol) * 1.2. An engineering judgement factor of 20% was applied to cover a reasonable range of outcomes, potential for feed/fuel gas variability, and recognizing the limitations in precision of the CEMS stack flow meter and CO_2 analyzer within EPA's performance specifications tolerance range.

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Steam Methane Reformer Emission Calculations

SOURCE INFORMATION

Source Description:	Steam Methane Reformer (B-01001)	**Calculation Date:**	1/26/2023
Source ID No.	SMR	**Calculated by:**	AHN
Tempo ID No.	EQT 0001	**Reviewed by:**	MR

Summary of GHG Emissions:

Pollutant	Emission Factor (kg/MMBtu)[7]	Emissions (metric tons/yr)[8]	Emissions (US tons/yr)[9]
CO_2	*Eng calc above*	966,726	1,065,332
CH_4	1.0E-03	15.11	16.65
N_2O	1.0E-04	1.51	1.67
CO_2e[10]	--	967,554	**1,066,245**

Notes

7. Based on EPA default factors in Subpart C Tables C-1 and C-2 for natural gas, rev. 11/29/2013.
8. Calculated based on the heat input, emission factors, and equations C-1b and C-8b of Subpart C. CO_2e based on Subpart A Table A-1 factors.
9. 1 metric ton = 1.102 US ton
10. CO_2e = CO_2, CH_4, or N_2O (tpy) * Global Warming Potential factor (GWP). GWPs from 40 CFR 98 Subpart A, Table A-1, rev. 11/29/2013.

CO_2 GWP	1
CH_4 GWP	25
N_2O GWP	298

Koch Methanol St. James, LLC
KMe Facility
Auxiliary Boiler Emission Calculations

SOURCE INFORMATION

Source Description: Auxiliary Boiler (B-14001)
Source ID No. BLR
Tempo ID No. EQT 0002

Calculation Date: 1/26/2023
Calculated by: AHN
Reviewed by: MR

Description:

The auxiliary boiler is fired on natural gas and provides steam for the Steam Methane Reformer and process. Firing rate is dependent on stage in life cycle of methanol synthesis catalyst in the Plant. Boiler will be equipped with SCR to control NO_x emissions and oxidation catalyst to control CO/VOC emissions. The emissions presented below include anticipated periods of startup and shutdown. The boiler will operate for brief periods without SCR control/oxidation catalyst, for example during startup and shutdown or SCR maintenance. Maximum hourly emissions and annual emissions account for these periods, as well as periods with operating parameters (e.g. firing rate or fuel heating value) outside of the typical range. Average hourly and annual emissions are accounted for under the SMR, Boiler, PCS Vent CAP (GRP 0002, EPN SMR BLR PCS Vent CAP).

Basis	Units	Parameter	Source
525	MMBtu/hr	Max Annual Average Firing Rate, HHV	Project Design Basis. Normal operating base load is 262.5 MMBtu/hr (30%). This max annual average allows for up to 42.5% of annual hours to be at 100% load if remaining hours are at base load (i.e., annual average emissions based on two times the anticipated base load operation).
1100	MMBtu/hr	Design Maximum Firing Rate, HHV	Project Design Basis; Used to estimate maximum hourly emission rate.
1,020	Btu/scf	Natural Gas High Heating Value	AP-42 Table 1.4-2, Footnote a.
8,760	hr/yr	Annual Operating Hours	Based on continuous operation, max hours per year
100	hr/yr	Hours elevated NOx emissions	Estimated hours to account for startups, shutdowns, or periods when SCR is not operating.
0.51	MMscf/hr	Natural Gas Feed	Calculated from Average Firing Rate (MMBtu/hr) and Heating Value (Btu/scf).
385.00	scf/lb-mol	Standard Molar Volume	Ideal Gas Law
4,599,000	MMBtu/yr	Annual Average Heat Input	Calculated from Design Capacity Firing Rate (MMBtu/hr) and the Annual Operating Hours (hr/yr).
99.9	%	Destruction Efficiency	Supported by EPA doc EPA530-R-97-047 (Note 9)
17,398	lb/hr	Purge gas fired	Project design basis.
210,010	acfm	Stack flow rate, wet basis	Project Design Basis

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Auxiliary Boiler Emission Calculations

SOURCE INFORMATION

Source Description: Auxiliary Boiler (B-14001)
Source ID No. BLR
Tempo ID No. EQT 0002

Calculation Date: 1/26/2023
Calculated by: AHN
Reviewed by: MR

Summary of Criteria Pollutant and Ammonia Emissions:

Pollutant	Emission Factors		Average Emissions (lb/hr)	Maximum Emissions (lb/hr)	Annual Emissions (tpy)	Emission Factor Source
	lb/MMscf (or ppm_v)	lb/MMBtu				
NO_X (Annual Operation)	--	0.01	5.25	--	23.00	Annual emissions TPY based on 8,760 hr/yr operation at 0.01 lb/MMBTU at design capacity firing rate. Annual emissions and emission factor takes into account controlled and uncontrolled periods of operation.
NO_X (SCR Not Operating)	--	0.10	--	108.90	--	Project Design Basis. 0.10 lb/MMBtu (0.09 lb/MMBTU plus 10% contingency) at normal firing rates with SCR offline due to planned maintenance or equipment malfunction.
CO (Annual Operation)	--	0.0046	2.42	--	10.58	Emission factor based on results of November 2021 stack test, plus contingency to account for catalyst end of run performance, elevated emissions upon SU/SD, and production rate increase. Annual emissions and emission factor takes into account controlled and uncontrolled periods of operation.
CO (Maximum, no catalyst control)	--	0.0437	--	48.02	--	Project Design Basis: 100 ppm CO, max design capacity fire, adjusted to 3% O2
$PM/PM_{10}/PM_{2.5}$	7.6	0.00745	3.91	8.20	17.13	Emission factor selected as BACT; Reference Part 4 in permit application.
VOC (Average, with Catalyst)	--	0.0016	0.85	--	3.73	Emission factor based on results of November 2021 stack test, plus contingency to account for catalyst end of run performance, elevated emissions upon SU/SD, and production rate increase.
VOC (Maximum)		0.0054	--	5.94	--	Based on AP-42, Table 1.4-2.
SO_2	0.6	0.0006	0.32	0.66	1.38	AP-42 Table 1.4-2. The conversion to equivalent lb/MMBtu factors is shown for information only.
Ammonia	--	--	4.90	10.21	21.46	Emissions based on process knowledge that accounts for SCR end of run performance.

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Auxiliary Boiler Emission Calculations

SOURCE INFORMATION

Source Description: Auxiliary Boiler (B-14001)
Source ID No. BLR
Tempo ID No. EQT 0002

Calculation Date: 1/26/2023
Calculated by: AHN
Reviewed by: MR

Summary of Speciated Emissions from Natural Gas Combustion:
Speciated emissions represent maximum potential to emit of each compound.

Pollutant	Emission Factors lb/MMscf	Average Emissions (lb/hr)	Maximum Emissions (lb/hr)	Annual Emissions (tpy)	EIQ Threshold [1] (tpy)	HAP/TAP?	Requires Permitting?	Emission Factor Source
2-Methylnaphthalene	7.21E-06	3.71E-06	7.78E-06	1.63E-05	5.00E-04	YES	NO	AP-42 Table 1.4-3
3-Methylchloranthrene	5.41E-07	2.78E-07	5.83E-07	1.22E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
7,12 - Dimethylbenz(a)nthracene	4.81E-06	2.47E-06	5.18E-06	1.08E-05	5.00E-04	YES	NO	AP-42 Table 1.4-3
Acenaphthene	5.41E-07	2.78E-07	5.83E-07	1.22E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Acenaphthylene	5.41E-07	2.78E-07	5.83E-07	1.22E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Anthracene	7.21E-07	3.71E-07	7.78E-07	1.63E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Benz(a)thracene	5.41E-07	2.78E-07	5.83E-07	1.22E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Benzene	6.31E-04	3.25E-04	6.80E-04	1.42E-03	5.00E-04	YES	YES	AP-42 Table 1.4-3
Benzo(a)pyrene	3.61E-07	1.86E-07	3.89E-07	8.13E-07	5.00E-04	YES	NO	AP-42 Table 1.4-3
Benzo(b)fluoranthene	5.41E-07	2.78E-07	5.83E-07	1.22E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Benzo(g,h,i)perylene	3.61E-07	1.86E-07	3.89E-07	8.13E-07	5.00E-04	YES	NO	AP-42 Table 1.4-3
Benzo(k)fluoranthene	5.41E-07	2.78E-07	5.83E-07	1.22E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Butane	6.31E-01	3.25E-01	6.80E-01	1.42E+00	5.00E-04	NO	NO	AP-42 Table 1.4-3
Chrysene	5.41E-07	2.78E-07	5.83E-07	1.22E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Dibenzo(a,h)anthracene	3.61E-07	1.86E-07	3.89E-07	8.13E-07	5.00E-04	YES	NO	AP-42 Table 1.4-3
Dichlorobenzene	3.61E-04	2.00E-04	4.00E-04	8.76E-04	5.00E-04	YES	YES	AP-42 Table 1.4-3
Ethane	9.31E-01	4.79E-01	1.00E+00	2.10E+00	5.00E-04	NO	NO	AP-42 Table 1.4-3
Fluoranthene	9.01E-07	4.64E-07	9.72E-07	2.03E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Fluorene	8.41E-07	4.33E-07	9.07E-07	1.90E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Formaldehyde	2.25E-02	1.16E-02	2.43E-02	5.08E-02	5.00E-04	YES	YES	AP-42 Table 1.4-3
n-Hexane	5.41E-01	2.78E-01	5.83E-01	1.22E+00	5.00E-04	YES	YES	AP-42 Table 1.4-3
Indeno(1,2,3-cd)pyrene	5.41E-07	2.78E-07	5.83E-07	1.22E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Methanol[3]	7.82E-01	4.02E-01	8.43E-01	1.76E+00	5.00E-04	YES	YES	Note 3
Naphthalene	1.83E-04	9.43E-05	1.98E-04	4.13E-04	5.00E-04	YES	NO	AP-42 Table 1.4-3
Pentane	7.81E-01	4.02E-01	8.42E-01	1.76E+00	5.00E-04	NO	NO	AP-42 Table 1.4-3
Phenanathrene	5.11E-06	2.63E-06	5.51E-06	1.15E-05	5.00E-04	YES	NO	AP-42 Table 1.4-3
Propane	4.81E-01	2.47E-01	5.18E-01	1.08E+00	5.00E-04	NO	NO	AP-42 Table 1.4-3
Pyrene	1.50E-06	7.73E-07	1.62E-06	3.39E-06	5.00E-04	YES	NO	AP-42 Table 1.4-3
Toluene	1.02E-03	5.26E-04	1.10E-03	2.30E-03	5.00E-04	YES	YES	AP-42 Table 1.4-3
Total PAH	--	9.93E-06	2.08E-05	4.35E-05	5.00E-04	YES	NO	--
Total HAP	--	0.69	1.45	3.04	--	--	--	--

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Auxiliary Boiler Emission Calculations

SOURCE INFORMATION

Source Description: Auxiliary Boiler (B-14001)
Source ID No. BLR
Tempo ID No. EQT 0002

Calculation Date: 1/26/2023
Calculated by: AHN
Reviewed by: MR

Pollutant	Emission Factors lb/MMscf	Average Emissions (lb/hr)	Maximum Emissions (lb/hr)	Annual Emissions (tpy)	EIQ Threshold [1] (tpy)	HAP/TAP?	Requires Permitting?	Emission Factor Source
Metals								
Arsenic	2.00E-04	1.03E-04	2.16E-04	4.51E-04	5.00E-04	YES	NO	AP-42 Table 1.4-4
Barium	4.40E-03	2.26E-03	4.75E-03	9.92E-03	5.00E-04	YES	YES	AP-42 Table 1.4-4
Beryllium	1.20E-05	6.18E-06	1.29E-05	2.71E-05	5.00E-04	YES	NO	AP-42 Table 1.4-4
Cadmium	1.10E-03	5.66E-04	1.19E-03	2.48E-03	5.00E-04	YES	YES	AP-42 Table 1.4-4
Chromium	1.40E-03	7.21E-04	1.51E-03	3.16E-03	5.00E-04	YES	YES	AP-42 Table 1.4-4, Note 4
Chromium VI	--	1.44E-04	3.02E-04	6.31E-04	5.00E-04	NO	NO	Note 4
Cobalt	8.40E-05	4.32E-05	9.06E-05	1.89E-04	5.00E-04	YES	NO	AP-42 Table 1.4-4
Copper	8.50E-04	4.38E-04	9.17E-04	1.92E-03	5.00E-04	YES	YES	AP-42 Table 1.4-4
Manganese	3.80E-04	1.96E-04	4.10E-04	8.57E-04	5.00E-04	YES	YES	AP-42 Table 1.4-4
Mercury	2.60E-04	1.34E-04	2.80E-04	5.86E-04	5.00E-04	YES	YES	AP-42 Table 1.4-4
Molybdenum	1.10E-03	5.66E-04	1.19E-03	2.48E-03	5.00E-04	NO	NO	AP-42 Table 1.4-4
Nickel	2.10E-03	1.08E-03	2.26E-03	4.73E-03	5.00E-04	YES	YES	AP-42 Table 1.4-4
Selenium	2.40E-05	1.24E-05	2.59E-05	5.41E-05	5.00E-04	YES	NO	AP-42 Table 1.4-4
Vanadium	2.30E-03	1.18E-03	2.48E-03	5.19E-03	5.00E-04	NO	NO	AP-42 Table 1.4-4
Zinc	2.90E-02	1.49E-02	3.13E-02	6.54E-02	5.00E-04	YES	YES	AP-42 Table 1.4-4

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Auxiliary Boiler Emission Calculations

SOURCE INFORMATION

Source Description: Auxiliary Boiler (B-14001)
Source ID No. BLR
Tempo ID No. EQT 0002

Calculation Date: 1/26/2023
Calculated by: AHN
Reviewed by: MR

Maximum percentage of methanol in streams calculation basis:

Speciation of Purge Gas Stream				
Pollutant	**Mol %**	**Molecular Weight**	**Mass (lb)**	**Mass %**
Methanol (VOC)	0.55	32	0.18	**2.1**
CO_2	6.98	44	3.07	36.7
CO	1.84	28	0.52	6.2
H_2	72.54	2	1.45	17.3
Ar	0.70	40	0.28	3.3
N_2	0.78	28	0.22	2.6
Methane	16.57	16	2.65	31.7
H_2O	0.04	18	0.01	0.1
Low Boiler	0.00	--	--	--
Total	**100**		8.37	100

Summary of GHG Emissions:
Fuel Combustion (40 CFR 98 Subpart C)

Pollutant	Emission Factor (kg/MMBtu)[5]	Emissions (metric tons/yr)[6]	Emissions (US tons/yr)[7]
CO_2	53.06	244,022.94	268,913.28
CH_4	1.0E-03	4.60	5.07
N_2O	1.0E-04	0.46	0.51
CO_2e[8]	--	244,274.97	**269,191**

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Auxiliary Boiler Emission Calculations

SOURCE INFORMATION

Source Description:	Auxiliary Boiler (B-14001)	**Calculation Date:**	1/26/2023
Source ID No.	BLR	**Calculated by:**	AHN
Tempo ID No.	EQT 0002	**Reviewed by:**	MR

Notes:

1. Emissions less than permitting thresholds of 0.0005 tpy will not be included in the permit or EIQ sheets.
2. Emission factors for speciated organic HAP/TAPs are based on AP-42 Table 1.4-3 and ratioed down based on the VOC emissions from 30% vendor guarantee (without oxidation catalyst) and supported by the November 2021 performance test. Emission factors for metals are based on AP-42 Table 1.4-4.
3. Methanol emissions are based on the percentage of methanol in purge gas, a purge gas flow rate (13,918 lb/hr), and 99.9% destruction efficiency. The maximum hourly emission rates are estimated from the average hourly emission rates ratioed up based on the average and maximum firing rates.
4. Total chromium emissions are estimated for permitting purposes and utilized in comparing facility-wide emission increases to the "chromium VI (and compounds)" minimum emission rate provided in LAC 33:III. Chpater 51. Chromium VI is speciated from total chromium for Environmental Justice (EJ) modeling purposes. Chromium VI is conservatievly assumed to be 20% of total chromium based on information provided in Table 4-3, footnote I of the Emissions Estimation Portocol for Petroleum Refineries document (April 2015) for refinery fuel gas.
5. Based on EPA default factors in Subpart C Tables C-1 and C-2 for natural gas, rev. 11/29/2013.
6. Calculated based on the heat input, emission factors, and equations C-1b and C-8b of Subpart C. CO_2e based on Subpart A Table A-1 factors.

   CO_2, CH_4, or N_2O (metric tpy) = 1E-03 * Gas (MMBtu/yr) * Emission Factor (kg/MMBtu)

7. 1 metric ton = 1.102 US ton
8. CO_2e = CO_2, CH_4, or N_2O (tpy) * Global Warming Potential factor (GWP). GWPs from 40 CFR 98 Subpart A, Table A-1, rev. 11/29/2013.

CO_2 GWP	1
CH_4 GWP	25
N_2O GWP	298

9. EPA520-R-97-047 document references 99.99% and 99.9999% destruction efficiencies for "methane reforming furnaces". This application assumes 99.9% DRE.

CO emission factor calculation basis:

10	ppm_v CO (dry @ stack gas O_2), average dry basis
100	ppm_v CO (dry @ stack gas O2), maximum dry basis
385	scf/lb-mol, standard molar volume based on definition of standard conditions in 40 CFR 60 Subpart A (68°F and 14.7 psia)
28	lb/lb-mol, CO molecular weight
210,010	acfm (wet basis), stack flow rate
17.23	%, stack gas moisture content
374	°F, stack gas temperature
110,048	dscfm (dry), stack gas flow rate
4.80	lb/hr, CO avg emission rate
48.02	lb/hr, CO max emission rate
0.044	lb/MMBtu hr, CO max emission rate

Koch Methanol St. James, LLC
KMe Facility
PCS Vent Emission Calculations

SOURCE INFORMATION

Source Description:	Process Condensate Stripper Vent	**Calculation Date:**	7/14/2022
Source ID No.	PCSVENT	**Calculated by:**	MO
Tempo ID No.	RLP 0024	**Reviewed by:**	AG

Description:

The site has a Process Condensate Stripper that generates offgas that is routed to the Steam Methane Reformer for destruction during normal operations. It diverts to atmosphere during process unit upsets and during startups. The gas is primarily steam, with trace quantities of other components. The stream composition is based on a facility mass balance and engineering judgement. For the purposes of this estimate, it is assumed that venting will occur 100 hours per year. Average hourly and annual emissions are accounted for under the SMR, Boiler, PCS Vent CAP (GRP 0002, EPN SMR BLR PCS Vent CAP).

Annual Operating Hours 100 hr/yr

Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
CO	39.38	1.97
CO_2	480.24	24.01
CH_4	2	0.10
CO_2e [1]	--	26.51
H_2	12.25	0.61
NH_3	43.69	2.18
H_2O	34,803	1,740
Ar	0.2	0.01
N_2	0.1	0.005

Notes:

1. CO_2e = CO_2 or CH_4 (tpy) * Global Warming Potential factor (GWP). GWPs from 40 CFR 98 Subpart A, Table A-1, rev. 11/29/2013.

CO_2 GWP	1
CH_4 GWP	25

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Flare Emissions Summary

SOURCE INFORMATION

Source Description: Flare
Source ID No. FLR
Tempo ID No. EQT 0003

Calculation Date: 1/26/2023
Calculated by: AHN
Reviewed by: MR

Description:

Below is a summary of emissions for the flare associated with the flare pilot, routine flaring, and flaring from startups/shutdowns. Detailed emission calculations for each of these categories are calculated separately.

Emissions Summary:

Pollutant	Emissions per Stream			Total Emissions		
	Pilot (tpy)	Routine Flaring (tpy)	SUSD (tpy)	Average Emissions (lb/hr)	Maximum Emissions (lb/hr)	Annual Emissions (tpy)
CO	0.28	28.51	81.71	25.23	2,170.00	110.50
NO_x	0.33	6.88	19.72	6.15	523.60	26.92
$PM/PM_{10}/PM_{2.5}$	0.02	0.04	0.09	0.04	2.50	0.16
SO_2	0.003	0.08	0.01	0.02	0.67	0.10
VOC	0.02	0.82	9.03	2.25	11,056.44	9.87
Methanol	--	0.82	7.39	1.88	11,056.44	8.22
Benzene	4.66E-06	2.08E-04	5.92E-04	1.84E-04	0.06	8.05E-04
Formaldehyde	1.67E-04	7.44E-03	2.11E-02	6.56E-03	2.02	2.87E-02
n-Hexane	4.00E-03	1.79E-01	5.07E-01	1.57E-01	48.38	6.90E-01
Toluene	7.55E-06	3.37E-04	9.58E-04	2.97E-04	0.09	1.30E-03
Barium	9.77E-06	4.36E-04	1.24E-03	3.85E-04	0.118	1.69E-03
Chromium[1]	3.11E-06	1.39E-04	3.94E-04	1.22E-04	0.038	5.36E-04
Chromium VI[1]	6.22E-07	2.78E-05	7.89E-05	2.45E-05	0.008	1.07E-04
Nickel	4.66E-06	2.08E-04	5.92E-04	1.84E-04	0.056	8.05E-04
Zinc	6.44E-05	2.88E-03	8.17E-03	2.54E-03	0.779	1.11E-02
CO_2e	265	13,213	34,162	--	--	47,641

Note:

1. Total chromium emissions are estimated for permitting purposes and utilized in comparing facility-wide emission increases to the "chromium VI (and compounds)" minimum emission rate provided in LAC 33:III. Chpater 51. Chromium VI is speciated from total chromium for Environmental Justice (EJ) modeling purposes. Chromium VI is conservatievly assumed to be 20% of total chromium based on information provided in Table 4-3, footnote l of the Emissions Estimation Portocol for Petroleum Refineries document (April 2015) for refinery fuel gas.

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Flare Pilot Emission Calculations

SOURCE INFORMATION

Source Description: Flare (Pilot)	**Calculation Date:** 1/26/2023
Source ID No. FLR	**Calculated by:** AHN
Tempo ID No. EQT 0003	**Reviewed by:** MR

Description:
Pilot emissions from the combustion of natural gas to the flare are estimated below.

Basis	Unit	Parameter	Source
1,020	Btu/scf	Heating Value	EPA AP-42 Section 1.4: Natural Gas Combustion
0.47	MMBtu/hr	Heat Input (LHV)	Process Design Basis
750	scfh	Fuel Flow	Based on Actual Flare Data provided by Koch 8/11/2022 and engineering judgement
8,760	hours/yr	Operating Time	Based on continuous operation, max hours per year
4,117	MMBtu/yr	Annual Average Heat Input	Calculated from Heat Input (MMBtu/hr) and the Annual Operating Hours (hr/yr).

Emissions Summary:

Component	Emission factor		Hourly Emissions (lb/hr)	Annual Emissions (tpy)	Emission Factor Source
NO_x	100	lb/MMscf	0.08	0.33	AP-42 Table 1.4-1
CO	84	lb/MMscf	0.06	0.28	AP-42 Table 1.4-1
$PM/PM_{10}/PM_{2.5}$	7.6	lb/MMscf	5.70E-03	0.02	AP-42 Table 1.4-2. All PM (total, condensable, and filterable) is assumed to be less than 1.0 micrometer in diameter.
SO_2	0.9	lb/MMscf	6.74E-04	2.95E-03	5 ppmv (2,995 grains/MMscf) of total Sulfur in fuel gas. Emission factor is a ratioed up from AP-42 Table 1.4-2 (2,000 grains/MMscf basis).
VOC	5.5	lb/MMscf	0.004	0.02	AP-42 Table 1.4-2

GHG Emission Calculation Basis:

4,529 Annual Average Heat Input (MMBtu/yr) (HHV)

Summary of GHG Emissions:
Fuel Combustion (40 CFR 98 Subpart C)

Pollutant	Emission Factor (kg/MMBtu)[1]	Emissions (metric tons/yr)[2]	Emissions (US tons/yr)[3]
CO_2	53.06	240.30	264.82
CH_4	1.0E-03	0.0045	0.0050
N_2O	1.0E-04	0.0005	0.0005
CO_2e[4]	--	240.55	**265**

Notes
1. Based on EPA default factors in Subpart C Tables C-1 and C-2 for natural gas, revised 11/29/2013.
2. Calculated based on the heat input, emission factors, and equations C-1b and C-8b of Subpart C. CO_2e based on Subpart A Table A-1 factors.
   CO_2, CH_4, or N_2O (metric tpy) = 1E-03 * Gas (MMBtu/yr) * Emission Factor (kg/MMBtu)
3. 1 metric ton = 1.102 US ton
4. CO_2e = CO_2, CH_4, or N_2O (tpy) * Global Warming Potential factor (GWP). GWPs revised 11/29/2013.

CO_2 GWP	1
CH_4 GWP	25
N_2O GWP	298

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Routine Flaring Emission Calculations

SOURCE INFORMATION

Source Description:	Flare (Routine Flaring)	**Calculation Date:**	1/26/2023
Source ID No.	FLR	**Calculated by:**	JLS
Tempo ID No.	EQT 0003	**Reviewed by:**	AHN

Description:

The flare design includes a continuous flow of natural gas and nitrogen as a purge stream to the flare. Additionally, the flare will control emissions from the methanol slop vessel and other routine/intermittent streams.

Stream Data

Parameter	Units	Value	Source
Duration	hr/yr	8,760	
Molweight	lb/lbmol	17	Based on actual flare data, natural gas basis
Flow rate (total)	scf/hr	70,000	Based on actual flare data
Flow rate (natural gas)	scf/hr	21,000	Based on actual flare data, natural gas basis
Lower Heating Value (LHV)	Btu/scf	1,000	Based on actual flare data, natural gas basis
Firing Rate (LHV)	MMBtu/hr	21.00	Calculated from Flow rate (scf/hr) and LHV (Btu/scf).
Firing Rate (HHV)	MMBtu/hr	23.10	Converted from the Firing Rate (LHV).
VOC Content	%	1.00	Based on actual flare data, natural gas basis
VOC Destruction Efficiency	%	98	Based on actual flare data, natural gas basis

Combustion Emissions

Pollutant	Emission Factor (lb/MMBtu)	Emission Factor (lb/MMscf)	Emissions (lb/hr)	Emissions (tpy)	Emission Factor Source
Carbon monoxide	0.31	--	6.51	28.51	AP-42 Table 13.5-2
Nitrogen oxides	0.068	--	1.57	6.88	AP-42 Table 13.5-1
SO_2	0.0009	0.9	0.02	0.08	5 ppmv (2,995 grains/MMscf) of total Sulfur in fuel gas. Emission factor is a ratioed up from AP-42 Table 1.4-2 (2,000 grains/MMscf basis). The conversion to equivalent lb/MMBtu factors from the LHV (Btu/scf). Basis natural gas.
$PM/PM_{10}/PM_{2.5}$	1.25E-04	0.12	0.009	0.04	AP-42 Table 13.5-1, Footnote d. Conservatively based on 5% of 40 µg/L for lightly smoking flares as the flare is non-smoking.
VOC	0.009	8.96	0.19	0.82	Based on unit conversions of natural gas molecular weight, VOC Content and VOC Destruction Efficiency
Methanol	--	--	0.19	0.82	

Sample Calculations

Average Hourly Emissions for CO:

$$\frac{0.31\ \text{lb}}{\text{MMBtu}} \times \frac{21\ \text{MMBtu}}{\text{hr}} = 6.51\ \text{lb/hr}$$

Annual Emissions for CO:

$$\frac{6.51\ \text{lb}}{\text{hr}} \times \frac{8760\ \text{hr}}{\text{yr}} \times \frac{1\ \text{ton}}{2000\ \text{lb}} = 28.51\ \text{lb/hr}$$

GHG Emission Calculation Basis:

202,356 Annual Average Heat Input (MMBtu/yr)

Summary of GHG Emissions

Fuel Combustion (40 CFR 98 Subpart C)

Pollutant	Emission Factor (kg/MMBtu)[1]	Emissions (metric tons/yr)[2]	Emissions (US tons/yr)[3]
CO_2	59.00	11,939.00	13,156.78
CH_4	3.0E-03	0.61	6.69E-01
N_2O	6.0E-04	0.12	1.34E-01
CO_2e[4]	--	11,990.36	**13,213**

Notes

1. Based on EPA default factors in Subpart C Tables C-1 and C-2 for fuel gas.
2. Calculated based on the heat input, emission factors, and equations C-1b and C-8b of Subpart C. CO_2e based on Subpart A Table A-1 factors.

   CO_2, CH_4, or N_2O (metric tpy) = 1E-03 * Gas (MMBtu/yr) * Emission Factor (kg/MMBtu)
3. 1 metric ton = 1.102 US ton
4. CO_2e = CO_2, CH_4, or N_2O (tpy) * Global Warming Potential factor (GWP)

CO_2 GWP	1
CH_4 GWP	25
N_2O GWP	298

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Flare Emission Calculations - Startups/Shutdowns

SOURCE INFORMATION

Source Description: Flare (Startups/Shutdowns)
Source ID No. FLR
Tempo ID No. EQT 0003
Calculation Date: 1/26/2023
Calculated by: JLS
Reviewed by: AHN

Description:
The following calculations provide a basis for estimate of flare emissions from startups and shutdowns. Facility specific operating data and design data were utilized to provide a reasonable representation of startup/shutdown events.

Total Annual Emissions (tpy)

Emissions Summary (tpy)	Emission Factor (lb/MMBTU)[1,2]	Emission Factor (lb/MMSCF)[3,4]	Startup Stream 1	Startup Stream 2	Startup Stream 3	Startup Stream 4	Startup Stream 5	Synloop ASU Trip Stream 6	Synloop ASU Trip 7	Unplanned Shutdown Stream 8	Planned Shutdown Stream 9	Exchanger E-03008A/B Stream 10	Total Annual Emissions (TPY)
VOC[5]	--	--	0.11	--	0.22	0.30	0.34	0.20	0.20	1.33	0.80	5.53	9.03
Carbon monoxide	0.31	--	3.98	33.85	2.23	0.10	0.26	4.34	28.21	5.00	3.00	0.73	81.71
Nitrogen oxides	0.068	--	0.96	8.17	0.54	0.02	0.06	1.05	6.81	1.21	0.72	0.18	19.72
$PM/PM_{10}/PM_{2.5}$	--	0.12	1.69E-03	0.04	3.00E-03	1.87E-04	3.15E-04	4.99E-03	0.03	0.01	0.004	4.70E-04	0.09
SO_2	--	0.9	0.01	--	--	--	--	--	--	--	--	--	0.01
Methanol[5]	--	--	--	--	0.22	0.30	0.34	0.20	0.20	0.50	0.10	5.53	7.39

Maximum Hourly Emissions (lb/hr)

Emissions Summary (lb/hr)	Emission Factor (lb/MMBTU)[1,2]	Emission Factor (lb/MMSCF)[3,4]	Startup Stream 1	Startup Stream 2	Startup Stream 3	Startup Stream 4	Startup Stream 5	Synloop ASU Trip Stream 6	Synloop ASU Trip 7	Unplanned Shutdown Stream 8	Planned Shutdown Stream 9	Exchanger E-03008A/B Stream 10	Max Hourly Emissions (lb/hr)
VOC[5]	--	--	6.33	--	9.30	10.09	9.38	100.00	10.00	66.39	199.16	11,056.44	11,056.44
Carbon monoxide	0.31	--	220.88	1,410.50	93.00	3.36	7.29	2,170.00	1,410.50	250.00	750.00	1,469.69	2,170.00
Nitrogen oxides	0.068	--	53.30	340.34	22.44	0.81	1.76	523.60	340.34	60.32	180.97	354.62	523.60
$PM/PM_{10}/PM_{2.5}$	--	0.12	0.09	1.62	0.12	0.01	0.01	2.50	1.62	0.32	0.97	0.94	2.50
SO_2	--	0.9	0.67	--	--	--	--	--	--	--	--	--	0.67
Methanol[5]	--	--	--	--	9.30	10.09	9.38	100.00	10.00	25.00	25.00	11,056.44	11,056.44

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Flare Emission Calculations - Startups/Shutdowns

SOURCE INFORMATION

Source Description: Flare (Startups/Shutdowns)
Source ID No. FLR
Tempo ID No. EQT 0003
Calculation Date: 1/26/2023
Calculated by: JLS
Reviewed by: AHN

Parameter	Units	Startup Stream 1	Startup Stream 2	Startup Stream 3	Startup Stream 4	Startup Stream 5	Synloop ASU Trip Stream 6	Synloop ASU Trip 7	Unplanned Shutdown Stream 8	Planned Shutdown Stream 9	Exchanger E-03008A/B Stream 10
Duration	hr/yr	36	48	48	60	72	4	40	40	8	0.98
Molweight (combined)	lb/lbmol	16	11.21	8.40	23.20	39.70	11.21	32.50	--	--	30.30
Flow rate	scf/hr	750,000	13,000,000	1,000,000	50,000	70,000	20,000,000	13,000,000	--	--	7,648,290
Lower Heating Value (LHV)	BTU/scf	950	350	300	217	336	350	350	300	300	--
Firing Rate (LHV)	MMBtu/hr	712.50	4550.00	300.00	10.85	23.52	7,000	4,550	--	--	4821.28
Firing Rate (HHV)	MMBtu/hr	783.75	5005.00	330.00	11.94	25.87	7,700	5,005	--	--	5303.41
Firing Rate (LHV)	MMBtu/yr	25,650	218,400	14,400	651	1,693	28,000	182,000	--	--	4821.28
VOC Destruction Efficiency	%	98.00	--	98.00	98.00	98.00	98.00	98.00	--	--	98.00

[1] CO Emission factor from AP-42 Table 13.5-2 (02/18). Emissions factor basis is LHV.

[2] NOx Emission factor from AP-42 Table 13.5-1 (02/18). Emission factor basis is HHV.

[3] PM/PM10/PM2.5 Emission factor from AP-42 Table 13.5-1, Footnote D. Conservatively based on 5% of 40 µg/L for lightly smoking flares as the flare is non-smoking.

[4] SO2 Emission factor: 5 ppmv (2,995 grains/MMscf) of total Sulfur in fuel gas. Emission factor is a ratioed up from AP-42 Table 1.4-2 (2,000 grains/MMscf basis). The conversion to equivalent lb/MMBtu factors is shown for information only.

[5] VOC and Methanol determined from stream flow rate, mol% content in streams, and VOC destruction efficiency.

Standard Conditions for SCF/HR calculations

P	1	atm
T	60	F
T	519.67	R
Gas Constant	0.73024	ft3-atm/R-lbmol
Gas Constant	379.3	SCF/lb-mole

GHG Emission Calculation Basis:

523,177 Annual Average Heat Input (MMBtu/yr)

Summary of GHG Emissions
Fuel Combustion (40 CFR 98 Subpart C)

Pollutant	Emission Factor (kg/MMBtu)[1]	Emissions (metric tons/yr)[2]	Emissions (US tons/yr)[3]
CO_2	59.00	30,867.46	34,015.94
CH_4	3.0E-03	1.57	1.73
N_2O	6.0E-04	0.31	0.35
CO_2e[4]	--	31,000.24	**34,162.27**

Notes

1. Based on EPA default factors in Subpart C Tables C-1 and C-2 for fuel gas.
2. Calculated based on the heat input, emission factors, and equations C-1b and C-8b of Subpart C. CO_2e based on Subpart A Table A-1 factors.

   CO_2, CH_4, or N_2O (metric tpy) = 1E-03 * Gas (MMBtu/yr) * Emission Factor (kg/MMBtu)
3. 1 metric ton = 1.102 US ton
4. CO_2e = CO_2, CH_4, or N_2O (tpy) * Global Warming Potential factor (GWP)

   CO_2 GWP 1
   CH_4 GWP 25
   N_2O GWP 298

SOURCE INFORMATION

Source Description: Flare (Startups/Shutdowns)
Source ID No. FLR
Tempo ID No. EQT 0003
Calculation Date: 1/26/2023
Calculated by: JLS
Reviewed by: AHN

Startup Process Stream 1: Natural Gas Vent to Flare through FV-301

Stream Data

Parameter	Units	Value	Source
Duration per event	hours	3	Based on Actual Flare Data provided by Koch 8/22/2022
Events per year	--	12	
Annual Duration	hr/yr	36	
Molweight (combined)	lb/lbmol	16.00	
Flow rate	scf/hr	750,000	
Lower Heating Value (LHV)	Btu/scf	950	
Firing Rate (LHV)	MMBtu/hr	712.50	Calculated from Flow rate (scf/hr) and LHV (Btu/scf).
Firing Rate (HHV)	MMBtu/hr	783.75	Converted from the Firing Rate (LHV).
VOC Content	%	1.00	Based on Actual Flare Data provided by Koch 8/22/2022
VOC Destruction Efficiency	%	98.00	

Combustion Emissions

Pollutant	Emission Factor (lb/MMBtu)	Emission Factor (lb/mmscf)	Emissions (lb/hr)	Emissions (tpy)	Emission Factor Source
VOC	--	8.44	6.33	0.11	Based on unit conversions of Molecular weight, VOC Content and VOC Destruction Efficiency
Carbon monoxide	0.31	--	220.88	3.98	AP-42 Table 13.5-2
Nitrogen oxides	0.068	--	53.30	0.96	AP-42 Table 13.5-1
SO_2	--	0.9	0.67	0.01	5 ppmv (2,995 grains/MMscf) of total Sulfur in fuel gas. Emission factor is a ratioed up from AP-42 Table 1.4-2 (2,000 grains/MMscf basis). The conversion to equivalent lb/MMBtu factors is shown for information only.
$PM/PM_{10}/PM_{2.5}$	--	0.12	0.094	0.002	AP-42 Table 13.5-1, Footnote d. Conservatively based on 5% of 40 µg/L for lightly smoking flares as the flare is non-smoking.

Startup Process Stream 2: Reformed Gas Vent to Flare

Stream Data

Parameter	Units	Value	Source
Duration per event	hours	4	Based on Actual Flare Data provided by Koch 8/22/2022
Events per year	--	12	
Annual Duration	hr/yr	48	
Molweight (combined)	lb/lbmol	11.21	
Flow rate	scf/hr	13,000,000	
Lower Heating Value (LHV)	Btu/scf	350	
Firing Rate (LHV)	MMBtu/hr	4550.00	Calculated from Flow rate (scf/hr) and LHV (Btu/scf).
Firing Rate (HHV)	MMBtu/hr	5005.00	Converted from the Firing Rate (LHV).

Combustion Emissions

Pollutant	Emission Factor (lb/MMBtu)	Emission Factor (lb/mmscf)	Emissions (lb/hr)	Emissions (tpy)	Emission Factor Source
VOC	--	--	--	--	This stream contains no volatile organic compounds.
Carbon monoxide	0.31	--	1410.50	33.85	AP-42 Table 13.5-2
Nitrogen oxides	0.068	--	340.34	8.17	AP-42 Table 13.5-1
SO_2	--	--	--	--	This stream contains no sulphur content.
$PM/PM_{10}/PM_{2.5}$	--	0.12	1.62	0.04	AP-42 Table 13.5-1, Footnote d. Conservatively based on 5% of 40 µg/L for lightly smoking flares as the flare is non-smoking.

SOURCE INFORMATION

Source Description:	Flare (Startups/Shutdowns)	**Calculation Date:**	1/26/2023
Source ID No.	FLR	**Calculated by:**	JLS
Tempo ID No.	EQT 0003	**Reviewed by:**	AHN

Startup Process Stream 3: Purge Gas Vent to Flare

Stream Data

Parameter	Units	Value	Source
Duration	hours	4	Based on Actual Flare Data provided by Koch 8/22/2022
Events per year	--	12	
Annual Duration	hr/yr	48	
Molweight (combined)	lb/lbmol	8.40	
Flow rate	scf/hr	1,000,000	
Lower Heating Value (LHV)	Btu/scf	300	
Firing Rate (LHV)	MMBtu/hr	300.00	Calculated from Flow rate (scf/hr) and LHV (Btu/scf).
Firing Rate (HHV)	MMBtu/hr	330.00	Converted from the Firing Rate (LHV).
VOC Content	%	2.10	Based on Actual Flare Data provided by Koch 8/22/2022
VOC Destruction Efficiency	%	98.00	

Combustion Emissions

Pollutant	Emission Factor (lb/MMBtu)	Emission Factor (lb/mmscf)	Emissions (lb/hr)	Emissions (tpy)	Emission Factor Source
VOC	--	9.30	9.30	0.22	Based on unit conversions of Molecular weight, VOC Content and VOC Destruction Efficiency
Methanol	--	--	9.30	0.22	
Carbon monoxide	0.31	--	93.00	2.23	AP-42 Table 13.5-2
Nitrogen oxides	0.068	--	22.44	0.54	AP-42 Table 13.5-1
SO_2	--	--	--	--	This stream contains no sulphur content.
$PM/PM_{10}/PM_{2.5}$	--	0.12	0.12	0.003	AP-42 Table 13.5-1, Footnote d. Conservatively based on 5% of 40 µg/L for lightly smoking flares as the flare is non-smoking.

SOURCE INFORMATION

Source Description:	Flare (Startups/Shutdowns)	**Calculation Date:**	1/26/2023
Source ID No.	FLR	**Calculated by:**	JLS
Tempo ID No.	EQT 0003	**Reviewed by:**	AHN

Startup Process Stream 4: Off Gas Vent to Flare

Stream Data

Parameter	Units	Value	Source
Duration	hours	5	Based on Actual Flare Data provided by Koch 8/22/2022
Events per year	--	12	
Annual Duration	hr/yr	60	
Molweight (combined)	lb/lbmol	23.20	
Flow rate	scf/hr	50,000	
Lower Heating Value (LHV)	Btu/scf	217	
Firing Rate (LHV)	MMBtu/hr	10.85	Calculated from Flow rate (scf/hr) and LHV (Btu/scf).
Firing Rate (HHV)	MMBtu/hr	11.94	Converted from the Firing Rate (LHV).
VOC Content	%	16.50	Based on Actual Flare Data provided by Koch 8/22/2022
VOC Destruction Efficiency	%	98.00	

Combustion Emissions

Pollutant	Emission Factor (lb/MMBtu)	Emission Factor (lb/mmscf)	Emissions (lb/hr)	Emissions (tpy)	Emission Factor Source
VOC	--	201.85	10.09	0.30	Based on unit conversions of Molecular weight, VOC Content and VOC Destruction Efficiency
Methanol	--	--	10.09	0.30	
Carbon monoxide	0.31	--	3.36	0.10	AP-42 Table 13.5-2
Nitrogen oxides	0.068	--	0.81	0.02	AP-42 Table 13.5-1
SO_2	--	--	--	--	This stream contains no sulphur content.
$PM/PM_{10}/PM_{2.5}$	--	0.12	0.01	0.0002	AP-42 Table 13.5-1, Footnote d. Conservatively based on 5% of 40 µg/L for lightly smoking flares as the flare is non-smoking.

SOURCE INFORMATION

Source Description: Flare (Startups/Shutdowns)
Source ID No. FLR
Tempo ID No. EQT 0003
Calculation Date: 1/26/2023
Calculated by: JLS
Reviewed by: AHN

Startup Process Stream 5: Expansion Gas to Flare

Stream Data

Parameter	Units	Value	Source
Duration	hours	6	Based on Actual Flare Data provided by Koch 8/22/2022
Events per year	--	12	
Annual Duration	hr/yr	72	
Molweight (combined)	lb/lbmol	39.70	
Flow rate	scf/hr	70,000	
Lower Heating Value (LHV)	Btu/scf	336	
Firing Rate (LHV)	MMBtu/hr	23.52	Calculated from Flow rate (scf/hr) and LHV (Btu/scf).
Firing Rate (HHV)	MMBtu/hr	25.87	Converted from the Firing Rate (LHV).
VOC Content	%	6.40	Based on Actual Flare Data provided by Koch 8/22/2022
VOC Destruction Efficiency	%	98.00	

Startup Process Stream 5: Combustion Emissions

Pollutant	Emission Factor (lb/MMBtu)	Emission Factor (lb/mmscf)	Emissions (lb/hr)	Emissions (tpy)	Emission Factor Source
VOC	--	133.97	9.38	0.34	Based on unit conversions of Molecular weight, VOC Content and VOC Destruction Efficiency
Methanol	--	--	9.38	0.34	
Carbon monoxide	0.31	--	7.29	0.26	AP-42 Table 13.5-2
Nitrogen oxides	0.068	--	1.76	0.06	AP-42 Table 13.5-1
SO_2	--	--	--	--	This stream contains no sulphur content.
$PM/PM_{10}/PM_{2.5}$	--	0.12	0.01	3.02E-04	AP-42 Table 13.5-1, Footnote d. Conservatively based on 5% of 40 µg/L for lightly smoking flares as the flare is non-smoking.

Stream 6: Synloop/ASU Trip Reformed Gas Vent to Flare (Initial trip)

Stream Data

Parameter	Units	Value	Source
Duration	hours	1	Based on Actual Flare Data provided by Koch 8/22/2022
Events per year	--	4	
Annual Duration	hr/yr	4	
Molweight (combined)	lb/lbmol	11.21	
VOC emissions per events	lbs	100.00	
Flow rate	scf/hr	20,000,000	
Lower Heating Value (LHV)	Btu/scf	350	
Firing Rate (LHV)	MMBtu/hr	7000.00	Calculated from Flow rate (scf/hr) and LHV (Btu/scf).
Firing Rate (HHV)	MMBtu/hr	7700.00	Converted from the Firing Rate (LHV).

Combustion Emissions

Pollutant	Emission Factor (lb/MMBtu)	Emission Factor (lb/mmscf)	Emissions (lb/hr)	Emissions (tpy)	Emission Factor Source
VOC	--	--	100.00	0.20	Emissions based on actual flare data provided by Koch
Methanol	--	--	100.00	0.20	
Carbon monoxide	0.31	--	2170.00	4.34	AP-42 Table 13.5-2
Nitrogen oxides	0.068	--	523.60	1.05	AP-42 Table 13.5-1
SO_2	--	--	--	--	This stream contains no sulphur content.
$PM/PM_{10}/PM_{2.5}$	--	0.12	2.50	0.005	AP-42 Table 13.5-1, Footnote d. Conservatively based on 5% of 40 µg/L for lightly smoking flares as the flare is non-smoking.

SOURCE INFORMATION

Source Description: Flare (Startups/Shutdowns)
Source ID No. FLR
Tempo ID No. EQT 0003
Calculation Date: 1/26/2023
Calculated by: JLS
Reviewed by: AHN

Stream 7: Synloop/ASU Trip Reformed Gas Vent to Flare

Stream Data

Parameter	Units	Value	Source
Duration	hours	10	Based on Actual Flare Data provided by Koch 8/22/2022
Events per year	--	4	
Annual Duration	hr/yr	40	
VOC emissions per event	lbs	100.00	
Flow rate	scf/hr	13,000,000	
Lower Heating Value (LHV)	Btu/scf	350	
Firing Rate (LHV)	MMBtu/hr	4550.00	Calculated from Flow rate (scf/hr) and LHV (Btu/scf).
Firing Rate (HHV)	MMBtu/hr	5005.00	Converted from the Firing Rate (LHV).

Combustion Emissions

Pollutant	Emission Factor (lb/MMBtu)	Emission Factor (lb/mmscf)	Emissions (lb/hr)	Emissions (tpy)	Emission Factor Source
VOC	--	--	10.00	0.20	Emissions based on actual flare data provided by Koch
Methanol	--	--	10.00	0.20	
Carbon monoxide	0.31	--	1,410.50	28.21	AP-42 Table 13.5-2
Nitrogen oxides	0.068	--	340.34	6.81	AP-42 Table 13.5-1
SO_2	--	--	--	--	This stream contains no sulphur content.
$PM/PM_{10}/PM_{2.5}$	--	0.12	1.62	0.03	AP-42 Table 13.5-1, Footnote d. Conservatively based on 5% of 40 µg/L for lightly smoking flares as the flare is non-smoking.

Stream 8: Unplanned Shutdown

Stream Data

Parameter	Units	Value	Source
Duration	hr/yr	4	Conservative estimate
Events per year	--	10	Based on engineering judgement
Annual Duration	hr/yr	40	Conservative estimate
VOC emissions per event	lbs	265.55	Emissions based on engineering judgement
Methanol emissions per event	lbs	100.00	
CO emissions per event	tons	0.50	
NOx emissions per event	tons	0.12	
PM emissions per event	tons	0.001	

Combustion Emissions

Pollutant	Emission Factor (lb/MMBtu)	Emission Factor (lb/mmscf)	Emissions (lb/hr)	Emissions (tpy)	Emission Factor Source
VOC	--	--	66.39	1.33	Emissions based on actual flare data provided by Koch
Methanol	--	--	25.00	0.50	
Carbon monoxide	--	--	250.00	5.00	Emissions based on actual flare data provided by Koch
Nitrogen oxides	--	--	60.32	1.21	Emissions based on actual flare data provided by Koch
SO_2	--	--	--	--	This stream contains no sulphur content.
$PM/PM_{10}/PM_{2.5}$	--	--	0.32	0.01	Emissions based on actual flare data provided by Koch

SOURCE INFORMATION

Source Description: Flare (Startups/Shutdowns)
Source ID No. FLR
Tempo ID No. EQT 0003
Calculation Date: 1/26/2023
Calculated by: JLS
Reviewed by: AHN

Stream 9: Planned Shutdown

Stream Data

Parameter	Units	Value	Source
Duration	hr/yr	4	Conservative estimate
Events per year	--	2	Based on engineering judgement
Annual Duration	hr/yr	8	Conservative estimate
VOC emissions per event	lbs	796.65	Emissions based on engineering judgement
Methanol emissions per event	lbs	100.00	
CO emissions per event	tons	1.50	
NOx emissions per event	tons	0.36	
PM Emissions per event	tons	0.002	

Combustion Emissions

Pollutant	Emission Factor (lb/MMBtu)	Emission Factor (lb/mmscf)	Emissions (lb/hr)	Emissions (tpy)	Emission Factor Source
VOC	--	--	199.16	0.80	Emissions based on actual flare data provided by Koch
Methanol	--	--	25.00	0.10	
Carbon monoxide	--	--	750.00	3.00	Emissions based on actual flare data provided by Koch
Nitrogen oxides	--	--	180.97	0.72	Emissions based on actual flare data provided by Koch
SO_2	--	--	--	--	This stream contains no sulphur content.
$PM/PM_{10}/PM_{2.5}$	--	--	0.97	0.004	Emissions based on actual flare data provided by Koch

Stream 10: Exchanger E-03008A/B

Stream Data

Parameter	Units	Value	Source
Duration	hr/yr	0.98	Described as "minutes" of flaring
Molweight (combined)	lb/lbmol	30.30	Per Doc 69930-91-01-PR_171001
Flow rate	lb-m/hr	610,680	Per Doc 69930-91-01-PR_171001
Flow rate	scf/hr	7,648,290	Calculated from Molweight (lb/lbmol), Flow rate (lb-m/hr), and the Ideal Gas Law.
Lower Heating Value (LHV)	BTU/lbmol	7,895	Per Doc 69930-91-01-PR_171001
Firing Rate (LHV)	MMBtu/hr	4821.28	Calculated from Flow rate (scf/hr) and LHV (Btu/scf).
Firing Rate (HHV)	MMBtu/hr	5,303.41	Converted from the Firing Rate (LHV).
VOC (Methanol) Content	%	92.06	
VOC Destruction Efficiency	%	98.00	

Combustion Emissions

Pollutant	Emission Factor (lb/mmbtu)	Emission Factor (lb/mmscf)	Emissions (lb/hr)	Emissions (tpy)	Emission Factor Source
VOC	--	--	11,056.44	5.53	Emissions based on actual flare data provided by Koch
Methanol	--	--	11056.44	5.53	
Carbon monoxide	0.31	--	1,469.69	0.73	AP-42 Table 13.5-2
Nitrogen oxides	0.068	--	354.62	0.18	AP-42 Table 13.5-1
SO_2	--	--	--	--	This stream contains no sulphur content.
$PM/PM_{10}/PM_{2.5}$	--	0.12	0.94	4.70E-04	AP-42 Table 13.5-1, Footnote d. Conservatively based on 5% of 40 µg/L for lightly smoking flares as the flare is non-smoking.

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Flare HAP Emissions from NG Combustion Emission Calculations

SOURCE INFORMATION

Source Description: Flare (HAP Emissions from NG Combustion)
Source ID No. FLR
Tempo ID No. EQT 0003

Calculation Date: 1/26/2023
Calculated by: JLS
Reviewed by: AHN

Description:
Hazardous Air Pollutant (HAP) emissions from the combustion of natural gas (NG) to the flare are estimated below. The natural gas streams include the pilot, a routine purge stream, and a startup/shutdown streams.

Stream Data

Parameters	Pilot	Routine Purge Stream	Startup Process Stream 1: Natural Gas Vent to Flare through FV-301	Startup Process Stream 2: Reformed Gas Vent to Flare	Startup Process Stream 3: Purge Gas Vent to Flare	Startup Process Stream 4: Off Gas Vent to Flare	Startup Process Stream 5: Expansion Gas to Flare	Stream 6: Synloop/ASU Trip Reformed Gas Vent to Flare (Initial trip)	Stream 7: Synloop/ASU Trip Reformed Gas Vent to Flare	Stream 8: Unplanned Shutdown	Stream 9: Planned Shutdown	Stream 10: Exchanger E-03008A/B
Heat Input (MMBtu/hr) (HHV)	0.52	23.10	783.75	5005.00	330.00	11.94	25.87	7,700	5,005	806	2,419	5,303.41
Hours of Operation (hr/yr)	8,760	8,760	36	48	48	60	72	4	40	40	8	0.98
Natural Gas Heating Value (Btu/scf)[1]	1,020	1,020	1,020	1,020	1,020	1,020	1,020	1,020	1,020	1,020	1,020	1,020

HAP Emissions Summary by Stream
Speciated emissions represent maximum potential to emit of each compound for each natural gas stream.

		Pilot		Routine Purge Stream		Startup Process Stream 1		Startup Process Stream 2		Startup Process Stream 3		Startup Process Stream 4	
	Emission Factors[2]	Hourly Emissions	Annual Emissions	Hourly Emissions	Annual Emissions	Hourly Emissions	Annual Emissions	Hourly Emissions	Annual Emissions	Hourly Emissions	Annual Emissions	Hourly Emissions	Annual Emissions
Pollutant	lb/MMscf	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Organic HAPs													
2-Methylnaphthalene	2.40E-05	1.22E-08	5.33E-08	5.44E-07	2.38E-06	1.84E-05	3.32E-07	1.18E-04	2.83E-06	7.76E-06	1.86E-07	2.81E-07	8.42E-09
3-Methylchloranthrene	1.80E-06	9.12E-10	4.00E-09	4.08E-08	1.79E-07	1.38E-06	2.49E-08	8.83E-06	2.12E-07	5.82E-07	1.40E-08	2.11E-08	6.32E-10
7,12-Dimethylbenz(a)nthracene	1.60E-05	8.11E-09	3.55E-08	3.62E-07	1.59E-06	1.23E-05	2.21E-07	7.85E-05	1.88E-06	5.18E-06	1.24E-07	1.87E-07	5.62E-09
Acenaphthene	1.80E-06	9.12E-10	4.00E-09	4.08E-08	1.79E-07	1.38E-06	2.49E-08	8.83E-06	2.12E-07	5.82E-07	1.40E-08	2.11E-08	6.32E-10
Acenaphthylene	1.80E-06	9.12E-10	4.00E-09	4.08E-08	1.79E-07	1.38E-06	2.49E-08	8.83E-06	2.12E-07	5.82E-07	1.40E-08	2.11E-08	6.32E-10
Anthracene	2.40E-06	1.22E-09	5.33E-09	5.44E-08	2.38E-07	1.84E-06	3.32E-08	1.18E-05	2.83E-07	7.76E-07	1.86E-08	2.81E-08	8.42E-10
Benz(a)thracene	1.80E-06	9.12E-10	4.00E-09	4.08E-08	1.79E-07	1.38E-06	2.49E-08	8.83E-06	2.12E-07	5.82E-07	1.40E-08	2.11E-08	6.32E-10
Benzene	2.10E-03	1.06E-06	4.66E-06	4.76E-05	2.08E-04	1.61E-03	2.90E-05	1.03E-02	2.47E-04	6.79E-04	1.63E-05	2.46E-05	7.37E-07
Benzo(a)pyrene	1.20E-06	6.08E-10	2.66E-09	2.72E-08	1.19E-07	9.22E-07	1.66E-08	5.89E-06	1.41E-07	3.88E-07	9.32E-09	1.40E-08	4.21E-10
Benzo(b)fluoranthene	1.80E-06	9.12E-10	4.00E-09	4.08E-08	1.79E-07	1.38E-06	2.49E-08	8.83E-06	2.12E-07	5.82E-07	1.40E-08	2.11E-08	6.32E-10
Benzo(g,h,i)perylene	1.20E-06	6.08E-10	2.66E-09	2.72E-08	1.19E-07	9.22E-07	1.66E-08	5.89E-06	1.41E-07	3.88E-07	9.32E-09	1.40E-08	4.21E-10
Benzo(k)fluoranthene	1.80E-06	9.12E-10	4.00E-09	4.08E-08	1.79E-07	1.38E-06	2.49E-08	8.83E-06	2.12E-07	5.82E-07	1.40E-08	2.11E-08	6.32E-10
Butane	2.10E+00	1.06E-03	4.66E-03	4.76E-02	2.08E-01	1.61E+00	2.90E-02	1.03E+01	2.47E-01	6.79E-01	1.63E-02	2.46E-02	7.37E-04
Chrysene	1.80E-06	9.12E-10	4.00E-09	4.08E-08	1.79E-07	1.38E-06	2.49E-08	8.83E-06	2.12E-07	5.82E-07	1.40E-08	2.11E-08	6.32E-10
Dibenzo(a,h)anthracene	1.20E-06	6.08E-10	2.66E-09	2.72E-08	1.19E-07	9.22E-07	1.66E-08	5.89E-06	1.41E-07	3.88E-07	9.32E-09	1.40E-08	4.21E-10
Dichlorobenzene	1.20E-03	6.08E-07	2.66E-06	2.72E-05	1.19E-04	9.22E-04	1.66E-05	5.89E-03	1.41E-04	3.88E-04	9.32E-06	1.40E-05	4.21E-07
Ethane	3.10E+00	1.57E-03	6.88E-03	7.02E-02	3.08E-01	2.38E+00	4.29E-02	1.52E+01	3.65E-01	1.00E+00	2.41E-02	3.63E-02	1.09E-03
Fluoranthene	3.00E-06	1.52E-09	6.66E-09	6.79E-08	2.98E-07	2.31E-06	4.15E-08	1.47E-05	3.53E-07	9.71E-07	2.33E-08	3.51E-08	1.05E-09
Fluorene	2.80E-06	1.42E-09	6.22E-09	6.34E-08	2.78E-07	2.15E-06	3.87E-08	1.37E-05	3.30E-07	9.06E-07	2.17E-08	3.28E-08	9.83E-10
Formaldehyde	7.50E-02	3.80E-05	1.67E-04	1.70E-03	7.44E-03	5.76E-02	1.04E-03	3.68E-01	8.83E-03	2.43E-02	5.82E-04	8.78E-04	2.63E-05
n-Hexane	1.80E+00	9.12E-04	4.00E-03	4.08E-02	1.79E-01	1.38E+00	2.49E-02	8.83E+00	2.12E-01	5.82E-01	1.40E-02	2.11E-02	6.32E-04
Indeno(1,2,3-cd)pyrene	1.80E-06	9.12E-10	4.00E-09	4.08E-08	1.79E-07	1.38E-06	2.49E-08	8.83E-06	2.12E-07	5.82E-07	1.40E-08	2.11E-08	6.32E-10
Naphthalene	6.10E-04	3.09E-07	1.35E-06	1.38E-05	6.05E-05	4.69E-04	8.44E-06	2.99E-03	7.18E-05	1.97E-04	4.74E-06	7.14E-06	2.14E-07
Pentane	2.60E+00	1.32E-03	5.77E-03	5.89E-02	2.58E-01	2.00E+00	3.60E-02	1.28E+01	3.06E-01	8.41E-01	2.02E-02	3.04E-02	9.13E-04
Phenanathrene	1.70E-05	8.62E-09	3.77E-08	3.85E-07	1.69E-06	1.31E-05	2.35E-07	8.34E-05	2.00E-06	5.50E-06	1.32E-07	1.99E-07	5.97E-09
Propane	1.60E+00	8.11E-04	3.55E-03	3.62E-02	1.59E-01	1.23E+00	2.21E-02	7.85E+00	1.88E-01	5.18E-01	1.24E-02	1.87E-02	5.62E-04
Pyrene	5.00E-06	2.53E-09	1.11E-08	1.13E-07	4.96E-07	3.84E-06	6.92E-08	2.45E-05	5.89E-07	1.62E-06	3.88E-08	5.85E-08	1.76E-09
Toluene	3.40E-03	1.72E-06	7.55E-06	7.70E-05	3.37E-04	2.61E-03	4.70E-05	1.67E-02	4.00E-04	1.10E-03	2.64E-05	3.98E-05	1.19E-06
Total PAH	--	3.25E-08	1.43E-07	1.45E-06	6.37E-06	4.93E-05	8.88E-07	3.15E-04	7.56E-06	2.08E-05	4.98E-07	7.51E-07	2.25E-08
Metals													
Arsenic	2.00E-04	1.01E-07	4.44E-07	4.53E-06	1.98E-05	1.54E-04	2.77E-06	9.81E-04	2.36E-05	6.47E-05	1.55E-06	2.34E-06	7.02E-08
Barium	4.40E-03	2.23E-06	9.77E-06	9.96E-05	4.36E-04	3.38E-03	6.09E-05	2.16E-02	5.18E-04	1.42E-03	3.42E-05	5.15E-05	1.54E-06
Beryllium	1.20E-05	6.08E-09	2.66E-08	2.72E-07	1.19E-06	9.22E-06	1.66E-07	5.89E-05	1.41E-06	3.88E-06	9.32E-08	1.40E-07	4.21E-09
Cadmium	1.10E-03	5.58E-07	2.44E-06	2.49E-05	1.09E-04	8.45E-04	1.52E-05	5.40E-03	1.30E-04	3.56E-04	8.54E-06	1.29E-05	3.86E-07
Chromium[4]	1.40E-03	7.10E-07	3.11E-06	3.17E-05	1.39E-04	1.08E-03	1.94E-05	6.87E-03	1.65E-04	4.53E-04	1.09E-05	1.64E-05	4.91E-07
Chromium VI[4]	--	1.42E-07	6.22E-07	6.34E-06	2.78E-05	2.15E-04	3.87E-06	1.37E-03	3.30E-05	9.06E-05	2.17E-06	3.28E-06	9.83E-08
Cobalt	8.40E-05	4.26E-08	1.86E-07	1.90E-06	8.33E-06	6.45E-05	1.16E-06	4.12E-04	9.89E-06	2.72E-05	6.52E-07	9.83E-07	2.95E-08
Copper	8.50E-04	4.31E-07	1.89E-06	1.93E-05	8.43E-05	6.53E-04	1.18E-05	4.17E-03	1.00E-04	2.75E-04	6.60E-06	9.95E-06	2.98E-07
Manganese	3.80E-04	1.93E-07	8.44E-07	8.61E-06	3.77E-05	2.92E-04	5.26E-06	1.86E-03	4.48E-05	1.23E-04	2.95E-06	4.45E-06	1.33E-07
Mercury	2.60E-04	1.32E-07	5.77E-07	5.89E-06	2.58E-05	2.00E-04	3.60E-06	1.28E-03	3.06E-05	8.41E-05	2.02E-06	3.04E-06	9.13E-08
Molybdenum	1.10E-03	5.58E-07	2.44E-06	2.49E-05	1.09E-04	8.45E-04	1.52E-05	5.40E-03	1.30E-04	3.56E-04	8.54E-06	1.29E-05	3.86E-07
Nickel	2.10E-03	1.06E-06	4.66E-06	4.76E-05	2.08E-04	1.61E-03	2.90E-05	1.03E-02	2.47E-04	6.79E-04	1.63E-05	2.46E-05	7.37E-07
Selenium	2.40E-05	1.22E-08	5.33E-08	5.44E-07	2.38E-06	1.84E-05	3.32E-07	1.18E-04	2.83E-06	7.76E-06	1.86E-07	2.81E-07	8.42E-09
Vanadium	2.30E-03	1.17E-06	5.11E-06	5.21E-05	2.28E-04	1.77E-03	3.18E-05	1.13E-02	2.71E-04	7.44E-04	1.79E-05	2.69E-05	8.07E-07
Zinc	2.90E-02	1.47E-05	6.44E-05	6.57E-04	2.88E-03	2.23E-02	4.01E-04	1.42E-01	3.42E-03	9.38E-03	2.25E-04	3.39E-04	1.02E-05

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Flare HAP Emissions from NG Combustion Emission Calculations

SOURCE INFORMATION

Source Description: Flare (HAP Emissions from NG Combustion)
Source ID No. FLR
Tempo ID No. EQT 0003

Calculation Date: 1/26/2023
Calculated by: JLS
Reviewed by: AHN

HAP Emissions Summary by Stream

Speciated emissions represent maximum potential to emit of each compound for each natural gas stream.

		Startup Process Stream 5		Stream 6		Stream 7		Stream 8		Stream 9		Stream 10	
	Emission Factors [2]	Hourly Emissions	Annual Emissions	Hourly Emissions	Annual Emissions	Hourly Emissions	Annual Emissions	Hourly Emissions	Annual Emissions	Hourly Emissions	Annual Emissions	Hourly Emissions	Annual Emissions
Pollutant	lb/MMscf	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Organic HAPs													
2-Methylnaphthalene	2.40E-05	6.09E-07	2.19E-08	1.81E-04	3.62E-07	1.18E-04	2.36E-06	1.90E-05	3.80E-07	5.69E-05	2.28E-07	1.25E-04	6.14E-08
3-Methylchloranthrene	1.80E-06	4.57E-08	1.64E-09	1.36E-05	2.72E-08	8.83E-06	1.77E-07	1.42E-06	2.85E-08	4.27E-06	1.71E-08	9.36E-06	4.60E-09
7,12-Dimethylbenz(a)nthracene	1.60E-05	4.06E-07	1.46E-08	1.21E-04	2.42E-07	7.85E-05	1.57E-06	1.27E-05	2.53E-07	3.80E-05	1.52E-07	8.32E-05	4.09E-08
Acenaphthene	1.80E-06	4.57E-08	1.64E-09	1.36E-05	2.72E-08	8.83E-06	1.77E-07	1.42E-06	2.85E-08	4.27E-06	1.71E-08	9.36E-06	4.60E-09
Acenaphthylene	1.80E-06	4.57E-08	1.64E-09	1.36E-05	2.72E-08	8.83E-06	1.77E-07	1.42E-06	2.85E-08	4.27E-06	1.71E-08	9.36E-06	4.60E-09
Anthracene	2.40E-06	6.09E-08	2.19E-09	1.81E-05	3.62E-08	1.18E-05	2.36E-07	1.90E-06	3.80E-08	5.69E-06	2.28E-08	1.25E-05	6.14E-09
Benz(a)thracene	1.80E-06	4.57E-08	1.64E-09	1.36E-05	2.72E-08	8.83E-06	1.77E-07	1.42E-06	2.85E-08	4.27E-06	1.71E-08	9.36E-06	4.60E-09
Benzene	2.10E-03	5.33E-05	1.92E-06	1.59E-02	3.17E-05	1.03E-02	2.06E-04	1.66E-03	3.32E-05	4.98E-03	1.99E-05	1.09E-02	5.37E-06
Benzo(a)pyrene	1.20E-06	3.04E-08	1.10E-09	9.06E-06	1.81E-08	5.89E-06	1.18E-07	9.49E-07	1.90E-08	2.85E-06	1.14E-08	6.24E-06	3.07E-09
Benzo(b)fluoranthene	1.80E-06	4.57E-08	1.64E-09	1.36E-05	2.72E-08	8.83E-06	1.77E-07	1.42E-06	2.85E-08	4.27E-06	1.71E-08	9.36E-06	4.60E-09
Benzo(g,h,i)perylene	1.20E-06	3.04E-08	1.10E-09	9.06E-06	1.81E-08	5.89E-06	1.18E-07	9.49E-07	1.90E-08	2.85E-06	1.14E-08	6.24E-06	3.07E-09
Benzo(k)fluoranthene	1.80E-06	4.57E-08	1.64E-09	1.36E-05	2.72E-08	8.83E-06	1.77E-07	1.42E-06	2.85E-08	4.27E-06	1.71E-08	9.36E-06	4.60E-09
Butane	2.10E+00	5.33E-02	1.92E-03	1.59E+01	3.17E-02	1.03E+01	2.06E-01	1.66E+00	3.32E-02	4.98E+00	1.99E-02	1.09E+01	5.37E-03
Chrysene	1.80E-06	4.57E-08	1.64E-09	1.36E-05	2.72E-08	8.83E-06	1.77E-07	1.42E-06	2.85E-08	4.27E-06	1.71E-08	9.36E-06	4.60E-09
Dibenzo(a,h)anthracene	1.20E-06	3.04E-08	1.10E-09	9.06E-06	1.81E-08	5.89E-06	1.18E-07	9.49E-07	1.90E-08	2.85E-06	1.14E-08	6.24E-06	3.07E-09
Dichlorobenzene	1.20E-03	3.04E-05	1.10E-06	9.06E-03	1.81E-05	5.89E-03	1.18E-04	9.49E-04	1.90E-05	2.85E-03	1.14E-05	6.24E-03	3.07E-06
Ethane	3.10E+00	7.86E-02	2.83E-03	2.34E+01	4.68E-02	1.52E+01	3.04E-01	2.45E+00	4.90E-02	7.35E+00	2.94E-02	1.61E+01	7.92E-03
Fluoranthene	3.00E-06	7.61E-08	2.74E-09	2.26E-05	4.53E-08	1.47E-05	2.94E-07	2.37E-06	4.74E-08	7.12E-06	2.85E-08	1.56E-05	7.67E-09
Fluorene	2.80E-06	7.10E-08	2.56E-09	2.11E-05	4.23E-08	1.37E-05	2.75E-07	2.21E-06	4.43E-08	6.64E-06	2.66E-08	1.46E-05	7.16E-09
Formaldehyde	7.50E-02	1.90E-03	6.85E-05	5.66E-01	1.13E-03	3.68E-01	7.36E-03	5.93E-02	1.19E-03	1.78E-01	7.12E-04	3.90E-01	1.92E-04
n-Hexane	1.80E+00	4.57E-02	1.64E-03	1.36E+01	2.72E-02	8.83E+00	1.77E-01	1.42E+00	2.85E-02	4.27E+00	1.71E-02	9.36E+00	4.60E-03
Indeno(1,2,3-cd)pyrene	1.80E-06	4.57E-08	1.64E-09	1.36E-05	2.72E-08	8.83E-06	1.77E-07	1.42E-06	2.85E-08	4.27E-06	1.71E-08	9.36E-06	4.60E-09
Naphthalene	6.10E-04	1.55E-05	5.57E-07	4.60E-03	9.21E-06	2.99E-03	5.99E-05	4.82E-04	9.65E-06	1.45E-03	5.79E-06	3.17E-03	1.56E-06
Pentane	2.60E+00	6.59E-02	2.37E-03	1.96E+01	3.93E-02	1.28E+01	2.55E-01	2.06E+00	4.11E-02	6.17E+00	2.47E-02	1.35E+01	6.65E-03
Phenanathrene	1.70E-05	4.31E-07	1.55E-08	1.28E-04	2.57E-07	8.34E-05	1.67E-06	1.34E-05	2.69E-07	4.03E-05	1.61E-07	8.84E-05	4.35E-08
Propane	1.60E+00	4.06E-02	1.46E-03	1.21E+01	2.42E-02	7.85E+00	1.57E-01	1.27E+00	2.53E-02	3.80E+00	1.52E-02	8.32E+00	4.09E-03
Pyrene	5.00E-06	1.27E-07	4.57E-09	3.77E-05	7.55E-08	2.45E-05	4.91E-07	3.95E-06	7.91E-08	1.19E-05	4.74E-08	2.60E-05	1.28E-08
Toluene	3.40E-03	8.62E-05	3.10E-06	2.57E-02	5.13E-05	1.67E-02	3.34E-04	2.69E-03	5.38E-05	8.06E-03	3.23E-05	1.77E-02	8.69E-06
Total PAH	--	1.63E-06	5.86E-08	4.85E-04	9.69E-07	3.15E-04	6.30E-06	5.08E-05	1.02E-06	1.52E-04	6.09E-07	3.34E-04	1.64E-07
Metals													
Arsenic	2.00E-04	5.07E-06	1.83E-07	1.51E-03	3.02E-06	9.81E-04	1.96E-05	1.58E-04	3.16E-06	4.74E-04	1.90E-06	1.04E-03	5.11E-07
Barium	4.40E-03	1.12E-04	4.02E-06	3.32E-02	6.64E-05	2.16E-02	4.32E-04	3.48E-03	6.96E-05	1.04E-02	4.17E-05	2.29E-02	1.12E-05
Beryllium	1.20E-05	3.04E-07	1.10E-08	9.06E-05	1.81E-07	5.89E-05	1.18E-06	9.49E-06	1.90E-07	2.85E-05	1.14E-07	6.24E-05	3.07E-08
Cadmium	1.10E-03	2.79E-05	1.00E-06	8.30E-03	1.66E-05	5.40E-03	1.08E-04	8.70E-04	1.74E-05	2.61E-03	1.04E-05	5.72E-03	2.81E-06
Chromium[4]	1.40E-03	3.55E-05	1.28E-06	1.06E-02	2.11E-05	6.87E-03	1.37E-04	1.11E-03	2.21E-05	3.32E-03	1.33E-05	7.28E-03	3.58E-06
Chromium VI[4]	--	7.10E-06	2.56E-07	2.11E-03	4.23E-06	1.37E-03	2.75E-05	2.21E-04	4.43E-06	6.64E-04	2.66E-06	1.46E-03	7.16E-07
Cobalt	8.40E-05	2.13E-06	7.67E-08	6.34E-04	1.27E-06	4.12E-04	8.24E-06	6.64E-05	1.33E-06	1.99E-04	7.97E-07	4.37E-04	2.15E-07
Copper	8.50E-04	2.16E-05	7.76E-07	6.42E-03	1.28E-05	4.17E-03	8.34E-05	6.72E-04	1.34E-05	2.02E-03	8.06E-06	4.42E-03	2.17E-06
Manganese	3.80E-04	9.64E-06	3.47E-07	2.87E-03	5.74E-06	1.86E-03	3.73E-05	3.00E-04	6.01E-06	9.01E-04	3.61E-06	1.98E-03	9.71E-07
Mercury	2.60E-04	6.59E-06	2.37E-07	1.96E-03	3.93E-06	1.28E-03	2.55E-05	2.06E-04	4.11E-06	6.17E-04	2.47E-06	1.35E-03	6.65E-07
Molybdenum	1.10E-03	2.79E-05	1.00E-06	8.30E-03	1.66E-05	5.40E-03	1.08E-04	8.70E-04	1.74E-05	2.61E-03	1.04E-05	5.72E-03	2.81E-06
Nickel	2.10E-03	5.33E-05	1.92E-06	1.59E-02	3.17E-05	1.03E-02	2.06E-04	1.66E-03	3.32E-05	4.98E-03	1.99E-05	1.09E-02	5.37E-06
Selenium	2.40E-05	6.09E-07	2.19E-08	1.81E-04	3.62E-07	1.18E-04	2.36E-06	1.90E-05	3.80E-07	5.69E-05	2.28E-07	1.25E-04	6.14E-08
Vanadium	2.30E-03	5.83E-05	2.10E-06	1.74E-02	3.47E-05	1.13E-02	2.26E-04	1.82E-03	3.64E-05	5.46E-03	2.18E-05	1.20E-02	5.88E-06
Zinc	2.90E-02	7.36E-04	2.65E-05	2.19E-01	4.38E-04	1.42E-01	2.85E-03	2.29E-02	4.59E-04	6.88E-02	2.75E-04	1.51E-01	7.41E-05

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Flare HAP Emissions from NG Combustion Emission Calculations

SOURCE INFORMATION

Source Description: Flare (HAP Emissions from NG Combustion)
Source ID No. FLR
Tempo ID No. EQT 0003

Calculation Date: 1/26/2023
Calculated by: JLS
Reviewed by: AHN

HAP Emissions Summary

The following table summarizes the hourly and annual emissions calculated in the table above.

Pollutant	Hourly Emissions lb/hr	Annual Emissions tpy	EIQ Threshold [3] (tpy)	HAP/TAP?	Requires Permitting?
Organic Compounds					
2-Methylnaphthalene	6.45E-04	9.20E-06	5.00E-04	YES	NO
3-Methylchloranthrene	4.84E-05	6.90E-07	5.00E-04	YES	NO
7,12-Dimethylbenz(a)nthracene	4.30E-04	6.13E-06	5.00E-04	YES	NO
Acenaphthene	4.84E-05	6.90E-07	5.00E-04	YES	NO
Acenaphthylene	4.84E-05	6.90E-07	5.00E-04	YES	NO
Anthracene	6.45E-05	9.20E-07	5.00E-04	YES	NO
Benz(a)thracene	4.84E-05	6.90E-07	5.00E-04	YES	NO
Benzene	5.64E-02	8.05E-04	5.00E-04	YES	YES
Benzo(a)pyrene	3.23E-05	4.60E-07	5.00E-04	YES	NO
Benzo(b)fluoranthene	4.84E-05	6.90E-07	5.00E-04	YES	NO
Benzo(g,h,i)perylene	3.23E-05	4.60E-07	5.00E-04	YES	NO
Benzo(k)fluoranthene	4.84E-05	6.90E-07	5.00E-04	YES	NO
Butane	5.64E+01	8.05E-01	5.00E-04	NO	NO
Chrysene	4.84E-05	6.90E-07	5.00E-04	YES	NO
Dibenzo(a,h)anthracene	3.23E-05	4.60E-07	5.00E-04	YES	NO
Dichlorobenzene	3.23E-02	4.60E-04	5.00E-04	YES	NO
Ethane	8.33E+01	1.19E+00	5.00E-04	NO	NO
Fluoranthene	8.06E-05	1.15E-06	5.00E-04	YES	NO
Fluorene	7.53E-05	1.07E-06	5.00E-04	YES	NO
Formaldehyde	2.02E+00	2.87E-02	5.00E-04	YES	YES
n-Hexane	4.84E+01	6.90E-01	5.00E-04	YES	YES
Indeno(1,2,3-cd)pyrene	4.84E-05	6.90E-07	5.00E-04	YES	NO
Naphthalene	1.64E-02	2.34E-04	5.00E-04	YES	NO
Pentane	6.99E+01	9.96E-01	5.00E-04	NO	NO
Phenanathrene	4.57E-04	6.51E-06	5.00E-04	YES	NO
Propane	4.30E+01	6.13E-01	5.00E-04	NO	NO
Pyrene	1.34E-04	1.92E-06	5.00E-04	YES	NO
Toluene	9.14E-02	1.30E-03	5.00E-04	YES	YES
Total PAH	1.73E-03	2.46E-05	5.00E-04	YES	NO
Metals					
Arsenic	5.38E-03	7.66E-05	5.00E-04	YES	NO
Barium	1.18E-01	1.69E-03	5.00E-04	YES	YES
Beryllium	3.23E-04	4.60E-06	5.00E-04	YES	NO
Cadmium	2.96E-02	4.21E-04	5.00E-04	YES	NO
Chromium	3.76E-02	5.36E-04	5.00E-04	YES	YES
Chromium VI	7.53E-03	1.07E-04	5.00E-04	NO	NO
Cobalt	2.26E-03	3.22E-05	5.00E-04	YES	NO
Copper	2.28E-02	3.26E-04	5.00E-04	YES	NO
Manganese	1.02E-02	1.46E-04	5.00E-04	YES	NO
Mercury	6.99E-03	9.96E-05	5.00E-04	YES	NO
Molybdenum	2.96E-02	4.21E-04	5.00E-04	NO	NO
Nickel	5.64E-02	8.05E-04	5.00E-04	YES	YES
Selenium	6.45E-04	9.20E-06	5.00E-04	YES	NO
Vanadium	6.18E-02	8.81E-04	5.00E-04	NO	NO
Zinc	7.79E-01	1.11E-02	5.00E-04	YES	YES

Notes:

1. Heating value based on EPA AP-42 Section 1.4: Natural Gas Combustion, Table 1.4-2, Footnote a.
2. Emission factors are based on EPA AP-42 Section 1.4: Natural Gas Combustion, Tables 1.4-3 (organics) and 1.4-4 (metals).
3. Emissions less than permitting thresholds of 0.0005 tpy will not be included in the permit or EIQ sheets.
4. Total chromium emissions are estimated for permitting purposes and utilized in comparing facility-wide emission increases to the "chromium VI (and compounds)" minimum emission rate provided in LAC 33:III. Chpater 51. Chromium VI is speciated from total chromium for Environmental Justice (EJ) modeling purposes. Chromium VI is conservatievly assumed to be 20% of total chromium based on information provided in Table 4-3, footnote l of the Emissions Estimation Protocol for Petroleum Refineries document (April 2015) for refinery fuel gas.

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Cooling Water Tower Emission Calculations

SOURCE INFORMATION

Source Description:	Cooling Water Tower	**Calculation Date:**	1/26/2023
Source ID No.	CWT	**Calculated by:**	AHN
Tempo ID No.	EQT 0007	**Reviewed by:**	MR

Description:
Heat from the process will be removed by evaporating re-circulating cooling water in an induced-draft cooling tower.

Basis:		**Source:**
200,000	gal/min, avg water circulating rate	Project Design Basis.
8,760	hr/yr, annual operating rate	Project Design Basis.
0.0005	% Drift factor	Project Design Basis.
60	gal/hr, avg liquid drift rate	Calculated from data above.
0.7	lb/MMgal, VOC emission factor	See note 3.

PM Emission Calculation:

1,000	mg/L, average total dissolved solids (TDS)	Project Design Basis and 1H2022 sample data.
453,592	mg/lb, mass conversion	Conversion.
3.79	L/gal, liquid volume conversion	Conversion.
0.008	lb/gal, TDS per gallon of drift	Calculated from data above.
0.50	avg lb/hr, PM emission rate	Calculated from data above.

$PM_{10}/PM_{2.5}$ Emission Calculations[1]:

Solid Particle Diameter (d_p)= $D_d(TDS*(p_w/p_{tds}))^{1/3}$

$p_{w=}$	1	g/cm^3
$p_{tds=}$	2.2	g/cm^3
Average TDS=	1,000	ppm

d_d = droplet diameter (microns)
d_p =particle diameter (microns)
p_w =density water
p_{tds} =density tds

Droplet Diameter (D_d)[2]	Solid Particle Diameter (d_p) (Avg TDS)	% Drift Mass Smaller than[2]
10	0.77	12
15	1.15	20
35	2.69	40
65	5.00	60
115	8.84	80
170	13.07	90
230	17.68	95
375	28.83	99
525	40.37	100

Average TDS:
$PM_{2.5}$ Interpolation
38.34 % of total PM
PM_{10} Interpolation
82.74 % of total PM

VOC, CO, and GHG Emissions Calculations:

Pollutant	Mass fraction[4]	Average Hourly (lb/hr)	Annual (tons/yr)[5]
VOC/Methanol[3]	0.31	8.40	36.79
CO	0.04	1.07	4.69
Methane	0.21	5.53	24.23
CO_2	0.24	6.59	28.84

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Cooling Water Tower Emission Calculations

SOURCE INFORMATION

Source Description: Cooling Water Tower
Source ID No. CWT
Tempo ID No. EQT 0007

Calculation Date: 1/26/2023
Calculated by: AHN
Reviewed by: MR

Emissions Summary

Pollutant	Average Hourly (lb/hr)	Annual (ton/yr)
PM	0.50	2.20
PM_{10}	0.41	1.82
$PM_{2.5}$	0.19	0.84
VOC (Methanol)	8.40	36.79
CO	1.07	4.69
CO_2e^6	--	634

Notes:

1. PM_{10} and $PM_{2.5}$ emissions are estimated as a percent of total PM using methodology described in *Calculating Realistic PM $_{10}$ Emissions from Cooling Towers* by Joel Reisman and Gordon Frisbie and droplet size distribution data for a Marley drift eliminator.
2. Droplet diameter and % mass smaller columns are results of particle size distribution derived from test results for a Marley drift eliminator.
3. VOC emission factor based on controlled emissions from AP-42 Chapter 5, Table 5.1-3 Fugitive Emissions Factors for Petroleum Refineries.
4. Mass fraction based on representative HON-applicable stream containing methanol, CO, methane, and CO_2.
5. CO, Methane and CO_2 emissions based on the ratio of mass fraction of those emissions to the mass fraction of VOC/methanol.
6. CO_2e = CO_2 or CH_4 (tpy) * Global Warming Potential factor (GWP). GWPs from 40 CFR 98 Subpart A, Table A-1, rev. 11/29/2013.

CO_2 GWP	1
CH_4 GWP	25

Koch Methanol St. James, LLC
KMe Facility
Admin Building Emergency Generator Emission Calculations

SOURCE INFORMATION

Source Description: Admin Building Emergency Generator
Source ID No. EGEN2
Tempo ID No. EQT 0026
Calculation Date: 1/10/2023
Calculated by: JLS/MR
Reviewed by: AHN

Description:
The Admin Building Emergency Generator will provide electric power in case of a power failure and will be tested weekly for readiness and maintenance. Emissions from non-emergency use only are included for permitting.

Parameter	Basis	Unit	Source
Fuel:	Natural Gas		
Rating:	125	kW	Generator Name Plate
Rating:	210	hp	Conversion from kW assuming 80% Efficiency
Fuel Consumption Rate:	1665.6	SCFH	Vendor data
Heat Input:	1.59	MMBtu/hr	Vendor data
	159.02	MMBtu/yr	Calculated based on heat input (MMBtu/hr) and Hours of Operations (hr/yr)
Hours of Operation:	100	hrs/yr	Max hrs for non-emergency use per NSPS/NESHAP

Summary of Criteria Pollutant Emissions:

Pollutant	Emission Factor[1]		Hourly Emissions[2] (lb/hr)	Annual Emissions (ton/yr)
NO_x	2.00	g/HP-hr	0.92	0.05
CO	4.00	g/HP-hr	1.85	0.09
SO_2	5.88E-04	lb/MMBtu	0.0009	4.68E-05
PM_{10}	9.99E-03	lb/MMBtu	0.02	7.94E-04
$PM_{2.5}$	9.99E-03	lb/MMBtu	0.02	7.94E-04
VOC	1.00	g/HP-hr	0.46	0.02

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Koch Methanol St. James, LLC
KMe Facility
Admin Building Emergency Generator Emission Calculations

SOURCE INFORMATION

Source Description: Admin Building Emergency Generator
Source ID No. EGEN2
Tempo ID No. EQT 0026
Calculation Date: 1/10/2023
Calculated by: JLS/MR
Reviewed by: AHN

Summary of Speciated VOC Emissions:

Pollutant	Emission Factor[1] (lb/MMBtu)	Hourly Emissions[2] (lb/hr)	Annual Emissions (ton/yr)	EIQ Threshold (tpy)	HAP/TAP?	Requires Permitting?
1,1,2,2-Tetrachloroethane	4.00E-05	6.36E-05	3.18E-06	5.00E-04	YES	NO
1,1,2-Trichloroethane	3.18E-05	5.06E-05	2.53E-06	5.00E-04	YES	NO
1,1-Dichloroethane	2.36E-05	3.75E-05	1.88E-06	5.00E-04	YES	NO
1,2,3-Trimethylbenzene	2.30E-05	3.66E-05	1.83E-06	5.00E-04	NO	NO
1,2,4-Trimethylbenzene	1.43E-05	2.27E-05	1.14E-06	5.00E-04	NO	NO
1,2-Dichloroethane	2.36E-05	3.75E-05	1.88E-06	5.00E-04	YES	NO
1,2-Dichloropropane	2.69E-05	4.28E-05	2.14E-06	5.00E-04	YES	NO
1,3,5-Trimethylbenzene	3.38E-05	5.37E-05	2.69E-06	5.00E-04	NO	NO
1,3-Butadiene	2.67E-04	4.25E-04	2.12E-05	5.00E-04	YES	NO
1,3-Dichloropropene	2.64E-05	4.20E-05	2.10E-06	5.00E-04	YES	NO
2-Methylnaphthalene	3.32E-05	5.28E-05	2.64E-06	5.00E-04	YES	NO
2,2,4-Trimethylpentane	2.50E-04	3.98E-04	1.99E-05	5.00E-04	YES	NO
Acenaphthene	1.25E-06	1.99E-06	9.94E-08	5.00E-04	YES	NO
Acenaphthylene	5.53E-06	8.79E-06	4.40E-07	5.00E-04	YES	NO
Acetaldehyde	8.36E-03	1.33E-02	6.65E-04	5.00E-04	YES	YES
Acrolein	5.14E-03	8.17E-03	4.09E-04	5.00E-04	YES	NO
Benzene	4.40E-04	7.00E-04	3.50E-05	5.00E-04	YES	NO
Benzo(b)fluoranthene	1.66E-07	2.64E-07	1.32E-08	5.00E-04	YES	NO
Benzo(e)pyrene	4.15E-07	6.60E-07	3.30E-08	5.00E-04	YES	NO
Benzo(g,h,I)perylene	4.14E-07	6.58E-07	3.29E-08	5.00E-04	YES	NO
Biphenyl	2.12E-04	3.37E-04	1.69E-05	5.00E-04	YES	NO
Butane	5.41E-04	8.60E-04	4.30E-05	5.00E-04	NO	NO
Butyr/Isobutyraldehyde	1.01E-04	1.61E-04	8.03E-06	5.00E-04	NO	NO
Carbon Tetrachloride	3.67E-05	5.84E-05	2.92E-06	5.00E-04	YES	NO
Chlorobenzene	3.04E-05	4.83E-05	2.42E-06	5.00E-04	YES	NO
Chloroethane	1.87E-06	2.97E-06	1.49E-07	5.00E-04	YES	NO
Chloroform	2.85E-05	4.53E-05	2.27E-06	5.00E-04	YES	NO
Chrysene	6.93E-07	1.10E-06	5.51E-08	5.00E-04	YES	NO
Cyclopentane	2.27E-04	3.61E-04	1.80E-05	5.00E-04	NO	NO
Ethane	1.05E-01	1.67E-01	8.35E-03	5.00E-04	NO	NO
Ethylbenzene	3.97E-05	6.31E-05	3.16E-06	5.00E-04	YES	NO
Ethylene Dibromide	4.43E-05	7.04E-05	3.52E-06	5.00E-04	YES	NO
Fluoranthene	1.11E-06	1.77E-06	8.83E-08	5.00E-04	YES	NO
Fluorene	5.67E-06	9.02E-06	4.51E-07	5.00E-04	YES	NO
Formaldehyde	5.28E-02	8.40E-02	4.20E-03	5.00E-04	YES	YES
Methanol	2.50E-03	3.98E-03	1.99E-04	5.00E-04	YES	NO
Methylcyclohexane	1.23E-03	1.96E-03	9.78E-05	5.00E-04	NO	NO
Methylene Chloride	2.00E-05	3.18E-05	1.59E-06	5.00E-04	YES	NO
n-Hexane	1.11E-03	1.77E-03	8.83E-05	5.00E-04	YES	NO
n-Nonane	1.10E-04	1.75E-04	8.75E-06	5.00E-04	NO	NO
n-Octane	3.51E-04	5.58E-04	2.79E-05	5.00E-04	NO	NO
n-Pentane	2.60E-03	4.13E-03	2.07E-04	5.00E-04	NO	NO
Naphthalene	7.44E-05	1.18E-04	5.92E-06	5.00E-04	YES	NO
PAH	2.69E-05	4.28E-05	2.14E-06	5.00E-04	YES	NO
Phenanthrene	1.04E-05	1.65E-05	8.27E-07	5.00E-04	YES	NO
Phenol	2.40E-05	3.82E-05	1.91E-06	5.00E-04	YES	NO
Propane	4.19E-02	6.66E-02	3.33E-03	5.00E-04	NO	NO
Pyrene	1.36E-06	2.16E-06	1.08E-07	5.00E-04	YES	NO
Styrene	2.36E-05	3.75E-05	1.88E-06	5.00E-04	YES	NO
Tetrachloroethane	2.48E-06	3.94E-06	1.97E-07	5.00E-04	YES	NO
Toluene	4.08E-04	6.49E-04	3.24E-05	5.00E-04	YES	NO
Vinyl Chloride	1.49E-05	2.37E-05	1.18E-06	5.00E-04	YES	NO
Xylene	1.84E-04	2.93E-04	1.46E-05	5.00E-04	YES	NO

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Admin Building Emergency Generator Emission Calculations

SOURCE INFORMATION

Source Description: Admin Building Emergency Generator
Source ID No. EGEN2
Tempo ID No. EQT 0026
Calculation Date: 1/10/2023
Calculated by: JLS/MR
Reviewed by: AHN

Summary of GHG Emissions:
Fuel Combustion (40 CFR 98 Subpart C)

Pollutant	Emission Factor (kg/MMBtu)[3]	Emissions (metric tons/yr)[4]	Emissions (US tons/yr)[5]
CO_2	53.06	8.4	9.30
CH_4	1.0E-03	1.59E-04	1.75E-04
N_2O	1.0E-04	1.59E-05	1.75E-05
CO_2e[6]	--	8.45	**9**

Notes:

1. The NSPS JJJJ Emissions Standards for Emergency Engines HP>130 listed in Table 1 of Subpart JJJJ are used to estimate emissions of NOX, CO, and VOC. Emission factors from EPA AP-42 Section 3.2: Natural Gas-fired Reciprocating Engines, Table 3.2-2: Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines are used to estimate emissions for all other pollutants.
2. Average and maximum hourly emissions are equal since emissions are based on the maximum hourly heat input rating.
3. Based on EPA default factors in Subpart C Tables C-1 and C-2 for Distillate Fuel Oil No. 2.
4. Calculated based on the heat input, emission factors, and equations C-1b and C-8b of Subpart C. CO_2e based on Subpart A Table A-1 factors.

$$CO_2, CH_4, \text{ or } N_2O \text{ (metric tpy)} = 1E\text{-}03 * \text{Gas (MMBtu/yr)} * \text{Emission Factor (kg/MMBtu)}$$

5. 1 metric ton = 1.102 US ton
6. CO_2e = CO_2, CH_4, or N_2O (tpy) * Global Warming Potential factor (GWP). GWPs revised 11/29/2013.

CO_2 GWP	1
CH_4 GWP	25
N_2O GWP	298

Koch Methanol St. James, LLC
KMe Facility
MTPCAP Emissions Summary

SOURCE INFORMATION

Source Description: Methanol Transfer and Product Tank CAP
Source ID No. MTPCAP
Tempo ID No. GRP TBD

Calculation Date: 1/26/2023
Calculated by: AHN
Reviewed by: MR

The Methanol Transfer and Product Tank Cap (MTPCAP) accounts for emissions from the four (4) methanol product tanks as well as emissions from truck and railcar loading operations, tank cleanings, and tank landings. Please refer to the following worksheets for detailed emission estimates for each of these activities.

Summary of Pollutant Emissions for MTPCAP

Pollutant	Average Emissions (lb/hr)	Annual Emissions (tpy)
NO_X	5.50	24.09
CO	1.81	7.94
$PM/PM_{10}/PM_{2.5}$	0.16	0.72
SO_2	0.01	0.06
Total VOC*	6.36	27.88
Methanol	6.23	27.29
Formaldehyde	0.001	0.006
Hexane	0.03	0.148
Zinc	0.001	0.002
CO_2e	-	11,282

*Includes methanol, formaldehyde, and hexane.

Methanol Storage Tanks Summary

Methanol will be stored in four internal floating roof tanks (EPNs TK-26-202A, TK-26-202B, TK-26-202C, TK-26-202D). Emissions from the product storage tanks emissions were determined using the AP-42 Chapter 7 Calculation Methodology. The total annual throughput was divided evenly between the four (4) product tanks, which is worst case as compared to total throughput through one tank or divided between two or three tanks. Actual throughput may vary among the four tanks. For a conservative representation, each tank is represented to have a storage temperature of 91.3 F for the entire year, which is the average maximum ambient temperature for August in Baton Rouge, LA.

Parameter	Basis	Units	Source
Chemical Stored	Methanol	-	Project Design Basis
Volume	14,221,200	gal	Project Design Basis
Diameter	220	ft	Project Design Basis
Total Annual Throughput	754,551,010	gal/yr	M1 Plant Methanol Throughput
Annual Throughput per tank	188,637,753	gal/yr	Project Design Basis
Annual Turnovers per tank	13.3	gal/yr	Process Design Basis (tank volume divided by annual throughput per tank)
Storage Temperature	91.3	°F	Average daily maximum ambient temperature (T_{AX}) for August in Baton Rouge, LA (AP-42, Table 7.1-7).
Number of Tanks	4	-----	Project Design Basis
Hours of Operation	8,760	hr/yr	Hourly emission rate is based on 24 hr/day and 365 day/yr

Emissions Summary (All Tanks)

Pollutant	Emissions (lb/yr)	Average Hourly (lb/hr)	Annual Emissions (tpy)
Total VOC	18,547	2.12	9.27
Methanol	18,547	2.12	9.27

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Koch Methanol St. James, LLC
KMe Facility
Methanol Product Tank Emission Calculations

SOURCE INFORMATION

Source Description:	Methanol Product Tank 2301	**Calculation Date:**	9/9/2022
Source ID No.	TK-26-202A	**Calculated by:**	MO
Tempo ID No.	EQT TBD	**Reviewed by:**	AG

Table 1 - Calculation Constants

Description	Value	Units	Notes
α_S - Shell Paint Solar Absorptance	0.25	dimensionless	AP-42, Chapter 7 - Table 7.1-6
α_R - Roof Paint Solar Absorptance	0.25	dimensionless	AP-42, Chapter 7 - Table 7.1-6
α_T - Average Paint Solar Absorptance	0.25	dimensionless	Average of shell paint and roof paint solar absorptances
I - Daily Total Solar Insolation Factor	1428	dimensionless	AP-42, Chapter 7 - Table 7.1-7 for Baton Rouge, LA
T_{AX} - Daily Maximum Ambient Temperature	551.30	R	AP-42, Chapter 7 - Table 7.1-7 for Baton Rouge, LA (August)
T_{AN} - Daily Minimum Ambient Temperature	529.30	R	Based on measured data
R - Ideal Gas Constant	10.731	psia*ft3/lb-mole R	AP-42, Chapter 7 - Page 7.1-23
K_c - Product Factor	1	dimensionless	0.4 for Crude Oil; 1 for all other organic liquids (Note to Eqn. 2-4)
C_s - Shell Clingage Factor	0.0015	bbl/1000 ft^2	0.006 for Crude Oil; 0.0015 for others (Table 7.1-10 for Light Rust)
ΔP_V - Daily Vapor Pressure Range	0.93	psia	AP-42, Chapter 7 - Equation 1-9
P_A - Atmospheric Pressure	14.69	psia	

Table 2 - Tank Configuration

Description	Unit	Units	Notes
D_S - Shell Diameter	220	feet	
H_S - Shell Height	50	feet	
Tank Capacity	13,450,794	gallons	
L_{SEAM} - Total Length of Deck Seams	0	feet	
Construction Type (Tank/Deck)	Welded/Welded		
Rim Seal	Mechanical Shoe		
Rim Seal Type	Rim-Mounted Secondary		
Fitting Tightness	Average-Fitting		
K_{Ra} - Zero Wind Speed Rim Seal Loss Factor	0.6	lb-mole/ft-yr	
S_D - Deck Seam Length Factor	0.000	ft/ft^2	
K_D - Deck Seam Loss Factor	0	lb-mole/ft-yr	

Fittings	*Type*	*Number*	Notes
Access Hatch	Bolted cover, gasketed	4	
Support Column Well	Round pipe, gasketed sliding cover	25	
Guide Pole	Slotted-Gasketed sliding cover, with pole sleeve	2	
Gauge Float Well	Bolted cover, gasketed	0	
Gauge Hatch	Slit fabric seal, 10% open area	2	
Vacuum Breaker	Weighted mechanical actuation, gasketed	4	
Deck Drain	90% closed	0	
Deck Leg	Adjustable, internal floating deck	207	
Deck Leg			
Rim Vent	Weighted mechanical actuation, ungasketed	0	
Ladder Well	Sliding cover, gasketed	1	
Stub Drain	Stub drain (1-inch diameter)	39	
F_C - Effective Column Diameter	1		AP-42, Chapter 7 - Page 7.1-37 (1.1 for 9"x7" built-up column; 0.7 for 8"-diam pipe column; 1.0 if unknown)

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Methanol Product Tank Emission Calculations

SOURCE INFORMATION

Source Description: Methanol Product Tank 2301
Source ID No. TK-26-202A
Tempo ID No. EQT TBD

Calculation Date: 9/9/2022
Calculated by: MO
Reviewed by: AG

Table 3 - Calculation Inputs

Description	Value	Units	Notes
V_{LX} - Tank Maximum Liquid Volume	1,798,109.61	ft^3	
P_{VN} - Vapor Pressure at Minimum Daily Liquid Surface Tempera	2.49	psia	AP-42, Chapter 7 - Equation 1-24
P_{VA} - Vapor Pressure at Average Daily Liquid Surface Temperat	2.92	psia	AP-42, Chapter 7 - Equation 1-24
P_{VX} - Vapor Pressure at Maximum Daily Liquid Surface Tempera	3.42	psia	AP-42, Chapter 7 - Equation 1-24
M_V - Vapor Molecular Weight	32.04	lb/lb.mole	For Methyl alcohol
W_L - Liquid Density	6.63	lb/gal	For Methyl alcohol
Q - Throughput	4,491,375.06	bbl/yr	188,637,753 gallons/year

Table 4 - Calculated Values

Description	Value	Units	Notes
K_E - Vapor Space Expansion Factor	0.1205	dimensionless	AP-42, Chapter 7 - Equation 1-5
ΔT_V - Daily Vapor Temperature Range	22.54	R	AP-42, Chapter 7 - Equation 1-7
ΔT_A - Daily Ambient Temperature Range	22.00	R	AP-42, Chapter 7 - Equation 1-11
P* - Vapor Pressure Function	5.538E-02	dimensionless	AP-42, Chapter 7 - Equation 2-4
T_{LN} - Daily Minimum Liquid Surface Temperature	537.05	R	AP-42, Chapter 7 - Figure 7.1-17
T_{LA} - Daily Average Liquid Surface Temperature	542.69	R	AP-42, Chapter 7 - Equation 2-5
T_{LX} - Daily Maximum Liquid Surface Temperature	548.32	R	AP-42, Chapter 7 - Figure 7.1-17
T_{AA} - Daily Average Ambient Temperature	540.30	R	AP-42, Chapter 7 - Equation 1-30
T_B - Liquid Bulk Temperature	541.37	R	AP-42, Chapter 7 - Equation 1-31
N - Number of Turnovers	14.02	dimensionless	
F_F - Total Deck Fitting Loss factor	2,440.30	lb-mole/yr	AP-42, Chapter 7 - Equation 2-14

Table 4 - Calculated Emissions

Description	Value	Units	Notes
L_R- Rim Seal Loss	234.20	lbs/yr	AP-42, Chapter 7 - Equation 2-3
L_F- Deck Fitting Loss	4,329.65	lbs/yr	AP-42, Chapter 7 - Equation 2-13
L_D- Deck Seam Loss	0.00	lbs/yr	AP-42, Chapter 7 - Equation 2-18
L_S- Total Standing Loss	4,563.85	lbs/yr	AP-42, Chapter 7 - Equation 2-2
L_{WD} - Withdrawal Loss	213.21	lbs/yr	AP-42, Chapter 7 - Equation 2-19
L_T - Total Loss	4,777.07	lbs/yr	AP-42, Chapter 7 - Equation 2-1

Table 5 - Speciated Emissions per tank

		Emissions	
Pollutant	Wt. %	lb/yr	tpy
Total VOC	100%	4,777.07	2.39
Methanol	100%	4,777.07	2.39

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Methanol Product Tank Emission Calculations

SOURCE INFORMATION

Source Description: Methanol Product Tank 2302
Source ID No. TK-26-202B
Tempo ID No. EQT TBD

Calculation Date: 9/9/2022
Calculated by: MO
Reviewed by: AG

Table 1 - Calculation Constants

Description	Value	Units	Notes
α_S - Shell Paint Solar Absorptance	0.25	dimensionless	AP-42, Chapter 7 - Table 7.1-6
α_R - Roof Paint Solar Absorptance	0.25	dimensionless	AP-42, Chapter 7 - Table 7.1-6
α_T - Average Paint Solar Absorptance	0.25	dimensionless	Average of shell paint and roof paint solar absorptances
I - Daily Total Solar Insolation Factor	1428	dimensionless	AP-42, Chapter 7 - Table 7.1-7 for Baton Rouge, LA
T_{AX} - Daily Maximum Ambient Temperature	551.30	R	AP-42, Chapter 7 - Table 7.1-7 for Baton Rouge, LA (August)
T_{AN} - Daily Minimum Ambient Temperature	527.20	R	Based on measured data
R - Ideal Gas Constant	10.731	psia*ft3/lb-mole R	AP-42, Chapter 7 - Page 7.1-23
K_c - Product Factor	1	dimensionless	0.4 for Crude Oil; 1 for all other organic liquids (Note to Eqn. 2-4)
C_s - Shell Clingage Factor	0.0015	bbl/1000 ft^2	0.006 for Crude Oil; 0.0015 for others (Table 7.1-10 for Light Rust)
ΔP_V - Daily Vapor Pressure Range	0.97	psia	AP-42, Chapter 7 - Equation 1-9
P_A - Atmospheric Pressure	14.69	psia	

Table 2 - Tank Configuration

Description	Value	Units	Notes
D_S - Shell Diameter	220	feet	
H_S - Shell Height	50	feet	
Tank Capacity	13,450,794	gallons	
L_{SEAM} - Total Length of Deck Seams	0	feet	
Construction Type (Tank/Deck)	Welded/Welded		
Rim Seal	Mechanical Shoe		
Rim Seal Type	Rim-Mounted Secondary		
Fitting Tightness	Average-Fitting		
K_{Ra} - Zero Wind Speed Rim Seal Loss Factor	0.6	lb-mole/ft-yr	
S_D - Deck Seam Length Factor	0.000	ft/ft^2	
K_D - Deck Seam Loss Factor	0	lb-mole/ft-yr	

Fittings	*Type*	*Number*	Notes
Access Hatch	Bolted cover, gasketed	4	
Support Column Well	Round pipe, gasketed sliding cover	25	N_C
Guide Pole	Slotted-Gasketed sliding cover, with pole sleeve	2	
Gauge Float Well	Bolted cover, gasketed	0	
Gauge Hatch	Slit fabric seal, 10% open area	2	
Vacuum Breaker	Weighted mechanical actuation, gasketed	4	
Deck Drain	90% closed	0	
Deck Leg	Adjustable, internal floating deck	207	
Deck Leg			
Rim Vent	Weighted mechanical actuation, ungasketed	0	
Ladder Well	Sliding cover, gasketed	1	
Stub Drain	diameter)	39	
F_C - Effective Column Diameter	1		AP-42, Chapter 7 - Page 7.1-37 (1.1 for 9"x7" built-up column; 0.7 for 8"-diam pipe column; 1.0 if unknown)

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Methanol Product Tank Emission Calculations

SOURCE INFORMATION

Source Description: Methanol Product Tank 2302
Source ID No. TK-26-202B
Tempo ID No. EQT TBD

Calculation Date: 9/9/2022
Calculated by: MO
Reviewed by: AG

Table 3 - Calculation Inputs

Description	Value	Units	Notes
V_{LX} - Tank Maximum Liquid Volume	1,798,109.61	ft^3	
P_{VN} - Vapor Pressure at Minimum Daily Liquid Surface Temperatur	2.39	psia	AP-42, Chapter 7 - Equation 1-24
P_{VA} - Vapor Pressure at Average Daily Liquid Surface Temperature	2.84	psia	AP-42, Chapter 7 - Equation 1-24
P_{VX} - Vapor Pressure at Maximum Daily Liquid Surface Temperatu	3.35	psia	AP-42, Chapter 7 - Equation 1-24
M_V - Vapor Molecular Weight	32.04	lb/lb.mole	For Methyl alcohol
W_L - Liquid Density	6.63	lb/gal	For Methyl alcohol
Q - Throughput	4,491,375.06	bbl/yr	188,637,753 gallons/year

Table 4 - Calculated Values

Description	Value	Units	Notes
K_E - Vapor Space Expansion Factor	0.1258	dimensionless	AP-42, Chapter 7 - Equation 1-5
ΔT_V - Daily Vapor Temperature Range	24.01	R	AP-42, Chapter 7 - Equation 1-7
ΔT_A - Daily Ambient Temperature Range	24.10	R	AP-42, Chapter 7 - Equation 1-11
P* - Vapor Pressure Function	5.358E-02	dimensionless	AP-42, Chapter 7 - Equation 2-4
T_{LN} - Daily Minimum Liquid Surface Temperature	535.64	R	AP-42, Chapter 7 - Figure 7.1-17
T_{LA} - Daily Average Liquid Surface Temperature	541.64	R	AP-42, Chapter 7 - Equation 2-5
T_{LX} - Daily Maximum Liquid Surface Temperature	547.64	R	AP-42, Chapter 7 - Figure 7.1-17
T_{AA} - Daily Average Ambient Temperature	539.25	R	AP-42, Chapter 7 - Equation 1-30
T_B - Liquid Bulk Temperature	540.32	R	AP-42, Chapter 7 - Equation 1-31
N - Number of Turnovers	14.02	dimensionless	
F_F - Total Deck Fitting Loss factor	2,440.30	lb-mole/yr	AP-42, Chapter 7 - Equation 2-14

Table 4 - Calculated Emissions

Description	Value	Units	Notes
L_R- Rim Seal Loss	226.58	lbs/yr	AP-42, Chapter 7 - Equation 2-3
L_F- Deck Fitting Loss	4,188.89	lbs/yr	AP-42, Chapter 7 - Equation 2-13
L_D- Deck Seam Loss	0.00	lbs/yr	AP-42, Chapter 7 - Equation 2-18
L_S- Total Standing Loss	4,415.47	lbs/yr	AP-42, Chapter 7 - Equation 2-2
L_{WD} - Withdrawal Loss	213.21	lbs/yr	AP-42, Chapter 7 - Equation 2-19
L_T - Total Loss	4,628.69	lbs/yr	AP-42, Chapter 7 - Equation 2-1

Table 5 - Speciated Emissions per tank

		Emissions	
Pollutant	Wt. %	lb/yr	tpy
Total VOC	100%	4,628.69	2.31
Methanol	100%	4,628.69	2.31

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Methanol Product Tank Emission Calculations

SOURCE INFORMATION

Source Description: Methanol Product Tank 2303
Source ID No. TK-26-202C
Tempo ID No. EQT TBD

Calculation Date: 9/9/2022
Calculated by: MO
Reviewed by: AG

Table 1 - Calculation Constants

Description	Value	Units	Notes
α_S - Shell Paint Solar Absorptance	0.25	dimensionless	AP-42, Chapter 7 - Table 7.1-6
α_R - Roof Paint Solar Absorptance	0.25	dimensionless	AP-42, Chapter 7 - Table 7.1-6
α_T - Average Paint Solar Absorptance	0.25	dimensionless	Average of shell paint and roof paint solar absorptances
I - Daily Total Solar Insolation Factor	1428	dimensionless	AP-42, Chapter 7 - Table 7.1-7 for Baton Rouge, LA
T_{AX} - Daily Maximum Ambient Temperature	551.30	R	AP-42, Chapter 7 - Table 7.1-7 for Baton Rouge, LA (August)
T_{AN} - Daily Minimum Ambient Temperature	525.10	R	Based on measured data
R - Ideal Gas Constant	10.731	psia*ft3/lb-mole R	AP-42, Chapter 7 - Page 7.1-23
K_c - Product Factor	1	dimensionless	0.4 for Crude Oil; 1 for all other organic liquids (Note to Eqn. 2-4)
C_s - Shell Clingage Factor	0.0015	bbl/1000 ft^2	0.006 for Crude Oil; 0.0015 for others (Table 7.1-10 for Light Rust)
ΔP_V - Daily Vapor Pressure Range	1.00	psia	AP-42, Chapter 7 - Equation 1-9
P_A - Atmospheric Pressure	14.69	psia	

Table 2 - Tank Configuration

Description	Value	Units	Notes
D_S - Shell Diameter	220	feet	
H_S - Shell Height	50	feet	
Tank Capacity	13,450,794	gallons	
L_{SEAM} - Total Length of Deck Seams	0	feet	
Construction Type (Tank/Deck)	Welded/Welded		
Rim Seal	Mechanical Shoe		
Rim Seal Type	Rim-Mounted Secondary		
Fitting Tightness	Average-Fitting		
K_{Ra} - Zero Wind Speed Rim Seal Loss Factor	0.6	lb-mole/ft-yr	
S_D - Deck Seam Length Factor	0.000	ft/ft^2	
K_D - Deck Seam Loss Factor	0	lb-mole/ft-yr	

Fittings	*Type*	*Number*	Notes
Access Hatch	Bolted cover, gasketed	4	
Support Column Well	Round pipe, gasketed sliding cover	25	N_C
Guide Pole	Slotted-Gasketed sliding cover, with pole sleeve	2	
Gauge Float Well	Bolted cover, gasketed	0	
Gauge Hatch	Slit fabric seal, 10% open area	2	
Vacuum Breaker	Weighted mechanical actuation, gasketed	4	
Deck Drain	90% closed	0	
Deck Leg	Adjustable, internal floating deck	207	
Deck Leg			
Rim Vent	Weighted mechanical actuation, ungasketed	0	
Ladder Well	Sliding cover, gasketed	1	
Stub Drain	Stub drain (1-inch diameter)	39	
F_C - Effective Column Diameter	1		AP-42, Chapter 7 - Page 7.1-37 (1.1 for 9"x7" built-up column; 0.7 for 8"-diam pipe column; 1.0 if unknown)

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Methanol Product Tank Emission Calculations

SOURCE INFORMATION

Source Description: Methanol Product Tank 2303
Source ID No. TK-26-202C
Tempo ID No. EQT TBD

Calculation Date: 9/9/2022
Calculated by: MO
Reviewed by: AG

Table 3 - Calculation Inputs

Description	Unit	Units	Notes
V_{LX} - Tank Maximum Liquid Volume	1,798,109.61	ft^3	
P_{VN} - Vapor Pressure at Minimum Daily Liquid Surface Temperature	2.29	psia	AP-42, Chapter 7 - Equation 1-24
P_{VA} - Vapor Pressure at Average Daily Liquid Surface Temperature	2.75	psia	AP-42, Chapter 7 - Equation 1-24
P_{VX} - Vapor Pressure at Maximum Daily Liquid Surface Temperature	3.29	psia	AP-42, Chapter 7 - Equation 1-24
M_V - Vapor Molecular Weight	32.04	lb/lb.mole	For Methyl alcohol
W_L - Liquid Density	6.63	lb/gal	For Methyl alcohol
Q - Throughput	4,491,375.06	bbl/yr	188,637,753 gallons/year

Table 4 - Calculated Values

Description	Unit	Units	Notes
K_E - Vapor Space Expansion Factor	0.1309	dimensionless	AP-42, Chapter 7 - Equation 1-5
ΔT_V - Daily Vapor Temperature Range	25.48	R	AP-42, Chapter 7 - Equation 1-7
ΔT_A - Daily Ambient Temperature Range	26.20	R	AP-42, Chapter 7 - Equation 1-11
P* - Vapor Pressure Function	5.183E-02	dimensionless	AP-42, Chapter 7 - Equation 2-4
T_{LN} - Daily Minimum Liquid Surface Temperature	534.22	R	AP-42, Chapter 7 - Figure 7.1-17
T_{LA} - Daily Average Liquid Surface Temperature	540.59	R	AP-42, Chapter 7 - Equation 2-5
T_{LX} - Daily Maximum Liquid Surface Temperature	546.96	R	AP-42, Chapter 7 - Figure 7.1-17
T_{AA} - Daily Average Ambient Temperature	538.20	R	AP-42, Chapter 7 - Equation 1-30
T_B - Liquid Bulk Temperature	539.27	R	AP-42, Chapter 7 - Equation 1-31
N - Number of Turnovers	14.02	dimensionless	
F_F - Total Deck Fitting Loss factor	2,440.30	lb-mole/yr	AP-42, Chapter 7 - Equation 2-14

Table 4 - Calculated Emissions

Description	Unit	Units	Notes
L_R- Rim Seal Loss	219.21	lbs/yr	AP-42, Chapter 7 - Equation 2-3
L_F- Deck Fitting Loss	4,052.59	lbs/yr	AP-42, Chapter 7 - Equation 2-13
L_D- Deck Seam Loss	0.00	lbs/yr	AP-42, Chapter 7 - Equation 2-18
L_S- Total Standing Loss	4,271.80	lbs/yr	AP-42, Chapter 7 - Equation 2-2
L_{WD} - Withdrawal Loss	213.21	lbs/yr	AP-42, Chapter 7 - Equation 2-19
L_T - Total Loss	4,485.02	lbs/yr	AP-42, Chapter 7 - Equation 2-1

Table 5 - Speciated Emissions per tank

		Emissions	
Pollutant	Wt. %	lb/yr	tpy
Total VOC	100%	4,485.02	2.24
Methanol	100%	4,485.02	2.24

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Methanol Product Tank Emission Calculations

SOURCE INFORMATION

Source Description: Methanol Product Tank 2304
Source ID No. TK-26-202D
Tempo ID No. EQT TBD

Calculation Date: 9/9/2022
Calculated by: MO
Reviewed by: AG

Table 1 - Calculation Constants

Description	Value	Units	Notes
α_S - Shell Paint Solar Absorptance	0.25	dimensionless	AP-42, Chapter 7 - Table 7.1-6
α_R - Roof Paint Solar Absorptance	0.25	dimensionless	AP-42, Chapter 7 - Table 7.1-6
α_T - Average Paint Solar Absorptance	0.25	dimensionless	Average of shell paint and roof paint solar absorptances
I - Daily Total Solar Insolation Factor	1428	dimensionless	AP-42, Chapter 7 - Table 7.1-7 for Baton Rouge, LA
T_{AX} - Daily Maximum Ambient Temperature	551.30	R	AP-42, Chapter 7 - Table 7.1-7 for Baton Rouge, LA (August)
T_{AN} - Daily Minimum Ambient Temperature	527.60	R	Based on measured data
R - Ideal Gas Constant	10.731	psia*ft3/lb-mole R	AP-42, Chapter 7 - Page 7.1-23
K_c - Product Factor	1	dimensionless	0.4 for Crude Oil; 1 for all other organic liquids (Note to Eqn. 2-4)
C_s - Shell Clingage Factor	0.0015	bbl/1000 ft^2	0.006 for Crude Oil; 0.0015 for others (Table 7.1-10 for Light Rust)
ΔP_V - Daily Vapor Pressure Range	0.96	psia	AP-42, Chapter 7 - Equation 1-9
P_A - Atmospheric Pressure	14.69	psia	

Table 2 - Tank Configuration

Description	Value	Units	Notes
D_S - Shell Diameter	220	feet	
H_S - Shell Height	50	feet	
Tank Capacity	13,450,794	gallons	
L_{SEAM} - Total Length of Deck Seams	0	feet	
Construction Type (Tank/Deck)	Welded/Welded		
Rim Seal	Mechanical Shoe		
Rim Seal Type	Rim-Mounted Secondary		
Fitting Tightness	Average-Fitting		
K_{Ra} - Zero Wind Speed Rim Seal Loss Factor	0.6	lb-mole/ft-yr	
S_D - Deck Seam Length Factor	0.000	ft/ft^2	
K_D - Deck Seam Loss Factor	0	lb-mole/ft-yr	

Fittings	*Type*	*Number*	Notes
Access Hatch	Bolted cover, gasketed	4	
Support Column Well	Round pipe, gasketed sliding cover	25	N_C
Guide Pole	Slotted-Gasketed sliding cover, with pole sleeve	2	
Gauge Float Well	Bolted cover, gasketed	0	
Gauge Hatch	Slit fabric seal, 10% open area	2	
Vacuum Breaker	Weighted mechanical actuation, gasketed	4	
Deck Drain	90% closed	0	
Deck Leg	Adjustable, internal floating deck	207	
Deck Leg			
Rim Vent	Weighted mechanical actuation, ungasketed	0	
Ladder Well	Sliding cover, gasketed	1	
Stub Drain	Stub drain (1-inch diameter)	39	
F_C - Effective Column Diameter	1		AP-42, Chapter 7 - Page 7.1-37 (1.1 for 9"x7" built-up column; 0.7 for 8"-diam pipe column; 1.0 if unknown)

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Methanol Product Tank Emission Calculations

SOURCE INFORMATION

Source Description: Methanol Product Tank 2304
Source ID No. TK-26-202D
Tempo ID No. EQT TBD

Calculation Date: 9/9/2022
Calculated by: MO
Reviewed by: AG

Table 3 - Calculation Inputs

Description	Unit	Units	Notes
V_{LX} - Tank Maximum Liquid Volume	1,798,109.61	ft^3	
P_{VN} - Vapor Pressure at Minimum Daily Liquid Surface Temperatur	2.41	psia	AP-42, Chapter 7 - Equation 1-24
P_{VA} - Vapor Pressure at Average Daily Liquid Surface Temperature	2.85	psia	AP-42, Chapter 7 - Equation 1-24
P_{VX} - Vapor Pressure at Maximum Daily Liquid Surface Temperatu	3.37	psia	AP-42, Chapter 7 - Equation 1-24
M_V - Vapor Molecular Weight	32.04	lb/lb.mole	For Methyl alcohol
W_L - Liquid Density	6.63	lb/gal	For Methyl alcohol
Q - Throughput	4,491,375.06	bbl/yr	188,637,753 gallons/year

Table 4 - Calculated Values

Description	Unit	Units	Notes
K_E - Vapor Space Expansion Factor	0.1248	dimensionless	AP-42, Chapter 7 - Equation 1-5
ΔT_V - Daily Vapor Temperature Range	23.73	R	AP-42, Chapter 7 - Equation 1-7
ΔT_A - Daily Ambient Temperature Range	23.70	R	AP-42, Chapter 7 - Equation 1-11
P* - Vapor Pressure Function	5.391E-02	dimensionless	AP-42, Chapter 7 - Equation 2-4
T_{LN} - Daily Minimum Liquid Surface Temperature	535.91	R	AP-42, Chapter 7 - Figure 7.1-17
T_{LA} - Daily Average Liquid Surface Temperature	541.84	R	AP-42, Chapter 7 - Equation 2-5
T_{LX} - Daily Maximum Liquid Surface Temperature	547.77	R	AP-42, Chapter 7 - Figure 7.1-17
T_{AA} - Daily Average Ambient Temperature	539.45	R	AP-42, Chapter 7 - Equation 1-30
T_B - Liquid Bulk Temperature	540.52	R	AP-42, Chapter 7 - Equation 1-31
N - Number of Turnovers	14.02	dimensionless	
F_F - Total Deck Fitting Loss factor	2,440.30	lb-mole/yr	AP-42, Chapter 7 - Equation 2-14

Table 4 - Calculated Emissions

Description	Unit	Units	Notes
L_R- Rim Seal Loss	228.02	lbs/yr	AP-42, Chapter 7 - Equation 2-3
L_F- Deck Fitting Loss	4,215.35	lbs/yr	AP-42, Chapter 7 - Equation 2-13
L_D- Deck Seam Loss	0.00	lbs/yr	AP-42, Chapter 7 - Equation 2-18
L_S- Total Standing Loss	4,443.37	lbs/yr	AP-42, Chapter 7 - Equation 2-2
L_{WD} - Withdrawal Loss	213.21	lbs/yr	AP-42, Chapter 7 - Equation 2-19
L_T - Total Loss	4,656.58	lbs/yr	AP-42, Chapter 7 - Equation 2-1

Table 5 - Speciated Emissions per tank

Pollutant	Wt. %	Emissions	
		lb/yr	tpy
Total VOC	100%	4,656.58	2.33
Methanol	100%	4,656.58	2.33

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Vapor Control Unit Emissions Summary

SOURCE INFORMATION

Source Description: Methanol Railcar and Tank Truck Loading
Source ID No. RTLOAD
Tempo ID No. EQT TBD

Calculation Date: 1/26/2023
Calculated by: JLS
Reviewed by: AHN

Description:
The Vapor Control Unit (VCU) is used to control captured emissions from railcar and truck loading operations. Total VCU emissions include combustion emissions resulting from the combustion of pilot gas, enrichment gas, and the gases routed to the VCU for control. The uncontrolled and controlled loading VOC/methanol emissions are calculated on the following worksheet.

Parameter	Basis	Unit	Source
Methanol Vapor Stream Data			
Uncontrolled Vapor Rate	1,844.16	lb/hr	Uncontrolled maximum rate used for short term emissions
Uncontrolled Vapor Rate	1,593.25	tpy	Uncontrolled annual rate used for annual emissions
Methanol Heating Value, LHV	8,643	Btu/lb	Process Design Basis (1 Mj/kg =430 btu/lb, 20.1Mj/kg = 8,643 btu/lb)
Methanol Heating Value, HHV	9,847	Btu/lb	Process Design Basis (1 Mj/kg =430 btu/lb, 22.9Mj/kg = 9,847 btu/lb)
Hours of Operation	8,760	hr/yr	Maximum hours of operations
Maximum Heat Input	18.16	MMBtu/hr	Calculated value
Annual Heat Input	31,377	MMBtu/yr	Calculated value used for annual emissions
Natural Gas Pilot Data			
Flow Rate	1	scf/min	Process Design Basis
Natural Gas Heating Value	1,020	Btu/scf	EPA AP-42 Section 1.4 Natural Gas Combustion
Hours of Operation	8,760	hr/yr	Based on continuous operation, max hours per year
Maximum Heat Input	0.06	MMBtu/hr	Process Design Basis
Annual Heat Input	536.11	MMBtu/yr	Calculated value used for annual emissions
Assist/Enrichment Gas Data			
Average Flow Rate	300	scf/min	Process Design Basis
Maximum Flow Rate	311	scf/min	Process Design Basis
Natural Gas Heating Value	1,020	Btu/scf	EPA AP-42 Section 1.4 Natural Gas Combustion
Hours of Operation	8,760	hr/yr	Maximum hours of operations
Maximum Heat Input	19.03	MMBtu/hr	Calculated Value
Annual Heat Input	160,834	MMBtu/yr	Calculated value used for annual emissions
Total Heat Input for Loading			
VCU Maximum Heat Input	37.25	MMBtu/hr	Based on the sum of heat inputs from methanol vapors, natural gas pilot, and assist gas
VCU Annual Heat Input	192,747.10	MMBtu/yr	Calculated value used for annual emissions

Criteria Pollutants Combustion Emissions

Pollutant	Emission Factor (lb/MMBtu)	Maximum Hourly Emissions (lb/hr)	Annual Emissions (tpy)	Emission Factor Source
NO_x	2.50E-01	9.31	24.09	Vendor emission factor guarantee
CO	8.24E-02	3.07	7.94	AP-42 Table 1.4-1
$PM_{10}/PM_{2.5}$	7.45E-03	0.28	0.72	AP-42 Table 1.4-2
SO_2	5.88E-04	0.02	0.06	AP-42 Table 1.4-2
VOC (from pilot & enrichment gas)[1]	5.39E-03	0.10	0.44	AP-42 Table 1.4-2

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Vapor Control Unit Emissions Summary

SOURCE INFORMATION

Source Description: Methanol Railcar and Tank Truck Loading
Source ID No. RTLOAD
Tempo ID No. EQT TBD

Calculation Date: 1/26/2023
Calculated by: JLS
Reviewed by: AHN

Speciated Combustion Emissions:[1]

Pollutant	Emission Factors[2] lb/MMscf	Maximum Emissions (lb/hr)	Annual Emissions (tpy)	EIQ Threshold (tpy)	HAP/TAP?	Requires Permitting?
Organic HAPs						
2-Methylnaphthalene	2.40E-05	4.49E-07	1.97E-06	5.00E-04	YES	NO
3-Methylchloranthrene	1.80E-06	3.37E-08	1.48E-07	5.00E-04	YES	NO
7,12-Dimethylbenz(a)nthracene	1.60E-05	3.00E-07	1.31E-06	5.00E-04	YES	NO
Acenaphthene	1.80E-06	3.37E-08	1.48E-07	5.00E-04	YES	NO
Acenaphthylene	1.80E-06	3.37E-08	1.48E-07	5.00E-04	YES	NO
Anthracene	2.40E-06	4.49E-08	1.97E-07	5.00E-04	YES	NO
Benz(a)thracene	1.80E-06	3.37E-08	1.48E-07	5.00E-04	YES	NO
Benzene	2.10E-03	3.93E-05	1.72E-04	5.00E-04	YES	NO
Benzo(a)pyrene	1.20E-06	2.25E-08	9.84E-08	5.00E-04	YES	NO
Benzo(b)fluoranthene	1.80E-06	3.37E-08	1.48E-07	5.00E-04	YES	NO
Benzo(g,h,i)perylene	1.20E-06	2.25E-08	9.84E-08	5.00E-04	YES	NO
Benzo(k)fluoranthene	1.80E-06	3.37E-08	1.48E-07	5.00E-04	YES	NO
Butane	2.10E+00	3.93E-02	1.72E-01	5.00E-04	NO	NO
Chrysene	1.80E-06	3.37E-08	1.48E-07	5.00E-04	YES	NO
Dibenzo(a,h)anthracene	1.20E-06	2.25E-08	9.84E-08	5.00E-04	YES	NO
Dichlorobenzene	1.20E-03	2.25E-05	9.84E-05	5.00E-04	YES	NO
Ethane	3.10E+00	5.80E-02	2.54E-01	5.00E-04	NO	NO
Fluoranthene	3.00E-06	5.62E-08	2.46E-07	5.00E-04	YES	NO
Fluorene	2.80E-06	5.24E-08	2.30E-07	5.00E-04	YES	NO
Formaldehyde	7.50E-02	1.40E-03	6.15E-03	5.00E-04	YES	YES
n-Hexane	1.80E+00	3.37E-02	1.48E-01	5.00E-04	YES	YES
Indeno(1,2,3-cd)pyrene	1.80E-06	3.37E-08	1.48E-07	5.00E-04	YES	NO
Naphthalene	6.10E-04	1.14E-05	5.00E-05	5.00E-04	YES	NO
Pentane	2.60E+00	4.87E-02	2.13E-01	5.00E-04	NO	NO
Phenanathrene	1.70E-05	3.18E-07	1.39E-06	5.00E-04	YES	NO
Propane	1.60E+00	3.00E-02	1.31E-01	5.00E-04	NO	NO
Pyrene	5.00E-06	9.36E-08	4.10E-07	5.00E-04	YES	NO
Toluene	3.40E-03	6.36E-05	2.79E-04	5.00E-04	YES	NO
Total PAH	--	1.20E-06	5.12E-06	5.00E-04	YES	NO
Metals						
Arsenic	2.00E-04	3.74E-06	1.64E-05	5.00E-04	YES	NO
Barium	4.40E-03	8.24E-05	3.61E-04	5.00E-04	YES	NO
Beryllium	1.20E-05	2.25E-07	9.84E-07	5.00E-04	YES	NO
Cadmium	1.10E-03	2.06E-05	9.02E-05	5.00E-04	YES	NO
Chromium[3]	1.40E-03	2.62E-05	1.15E-04	5.00E-04	YES	NO
Chromium VI[3]	--	5.24E-06	2.30E-05	5.00E-04	NO	NO
Cobalt	8.40E-05	1.57E-06	6.89E-06	5.00E-04	YES	NO
Copper	8.50E-04	1.59E-05	6.97E-05	5.00E-04	YES	NO
Manganese	3.80E-04	7.11E-06	3.12E-05	5.00E-04	YES	NO
Mercury	2.60E-04	4.87E-06	2.13E-05	5.00E-04	YES	NO
Molybdenum	1.10E-03	2.06E-05	9.02E-05	5.00E-04	NO	NO
Nickel	2.10E-03	3.93E-05	1.72E-04	5.00E-04	YES	NO
Selenium	2.40E-05	4.49E-07	1.97E-06	5.00E-04	YES	NO
Vanadium	2.30E-03	4.31E-05	1.89E-04	5.00E-04	NO	NO
Zinc	2.90E-02	5.43E-04	2.38E-03	5.00E-04	YES	YES

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Vapor Control Unit Emissions Summary

SOURCE INFORMATION

Source Description: Methanol Railcar and Tank Truck Loading
Source ID No. RTLOAD
Tempo ID No. EQT TBD

Calculation Date: 1/26/2023
Calculated by: JLS
Reviewed by: AHN

GHG Emissions:

Fuel Combustion (40 CFR 98 Subpart C)

Pollutant	Emission Factor (kg/MMBtu)[4]	Emissions (metric tons/yr)[5]	Emissions (US tons/yr)[6]
CO_2	53.06	10,227.16	11,270.33
CH_4	1.0E-03	1.93E-01	2.12E-01
N_2O	1.0E-04	1.93E-02	2.12E-02
CO_2e[7]	--	10,238	**11,282**

Notes

1. VOC and HAP/TAP emissions are calculated utilizing emission factors in EPA AP-42 Section 1.4: Natural Gas Combustion and the natural gas pilot heat duty & enrichment gas heat duty.
2. Emission factors are based on EPA AP-42 Section 1.4: Natural Gas Combustion, Tables 1.4-3 (organics) and 1.4-4 (metals).
3. Total chromium emissions are estimated for permitting purposes and utilized in comparing facility-wide emission increases to the "chromium VI (and compounds)" minimum emission rate provided in LAC 33:III. Chpater 51. Chromium VI is speciated from total chromium for Environmental Justice (EJ) modeling purposes. Chromium VI is conservatievly assumed to be 20% of total chromium based on information provided in Table 4-3, footnote I of the Emissions Estimation Protocol for Petroleum Refineries document (April 2015) for refinery fuel gas.
4. Based on EPA default factors in Subpart C Tables C-1 and C-2 for natural gas, rev. 11/29/2013.
5. Calculated based on the heat input, emission factors, and equations C-1b and C-8b of Subpart C. CO_2e based on Subpart A Table A-1 factors.

   CO_2, CH_4, or N_2O (metric tpy) = 1E-03 * Gas (MMBtu/yr) * Emission Factor (kg/MMBtu)

6. 1 metric ton = 1.102 US ton
7. CO_2e = CO_2, CH_4, or N_2O (tpy) * Global Warming Potential factor (GWP). GWPs from 40 CFR 98 Subpart A, Table A-1, rev. 11/29/2013.

CO_2 GWP	1
CH_4 GWP	25
N_2O GWP	298

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Methanol Loading Emissions Summary

SOURCE INFORMATION

Source Description: Methanol Railcar and Tank Truck Loading
Source ID No. RTLOAD
Tempo ID No. EQT TBD

Calculation Date: 9/9/2022
Calculated by: MO
Reviewed by: AG

Description:

The Methanol Loading Operations source account for the vapors generated during methanol product loading in to tank trucks (TLOAD) and rail cars (RLOAD). Product loading in tank trucks and rail cars are for methanol only. Emissions from loading operations are collected by a dedicated vapor collection system and controlled by a vapor control unit that achieves at least 99% reduction of VOC/methanol. Annual emissions are estimated based on the maximum physical capability of the railcar and truck loading racks. Maximum hourly emissions are based on short term loading rates for simultaneously loading 10 railcars and 2 trucks, which is the maximum loading rate per current design.

Parameter	Basis	Unit	Source
Operating Hours	8,760	hr/yr	Hourly emission rate is based on 24 hr/day and 365 day/yr
Methanol Truck Loading Throughput	262,800	Mgal/yr	Process Design Basis
Methanol Railcar Loading Throughput	646,050	Mgal/yr	Process Design Basis
VOC Control Efficiency	99.0	%	Based on stack testing data
Maximum Loading Rate	1,000	gpm	Simultaneous Loading of 2 Trucks
Maximum Loading Rate	5,000	gpm	Simultaneous Loading of 10 Railcars
Max Hourly Loading Temperature	105	°F	Project Design Basis
Average Annual Loading Temp	91.3	°F	Average daily maximum ambient temperature (TAX) for August in Baton Rouge, LA (from AP-42, Table 7.1-7).

Loading Equation (AP-42 Section 5.2, Equation 1)

$L_L = 12.46 * (S*P*M/T) * (1 - eff/100)$

Where: L_L = Loading Loss Emission Factor (lb/Mgal)
S = Saturation Factor (AP-42 Table 5.2-1)
P = True Vapor Pressure of Product (psia)
M = Molecular Weight of Vapors (lb/lb-mol)
T = Temperature of Product (R)
eff = Vapor Recovery (%)

Loading Operation	S[1]	P[2] (psia)	M	Temperature		Loading Factor (lb/Mgal)
				°F	°R	
Annual TLOAD	1	3.668	32.04	91.3	551.3	2.66
Annual RLOAD	1.45	3.668	32.04	91.3	551.3	3.85
Max TLOAD	1	5.273	32.04	105	565	3.73
Max RLOAD	1.45	5.273	32.04	105	565	5.40

Uncontrolled Loading Emissions:

Loading Operation	Throughput		Capture Efficiency (%)	VOC Emissions	
	Maximum Hourly (Mgal/hr)	Annual (Mgal/year)		Maximum (lb/hr)	Annual (ton/yr)
TLOAD	60	262,800	100.0%	223.53	349.05
RLOAD	300	646,050	100.0%	1,620.63	1,244.20

Example Calculations:

Annual (ton/yr) = Annual Loading Factor (lb/Mgal) x Annual Throughput (Mgal/yr) ÷ 2000 lb/gal
Maximum (lb/hr) = Max Throughput (Mgal/hr) x Max Loading Factor (lb/Mgal)

Controlled Loading Emissions:

Operation	Product	Average (lb/hr)	Maximum (lb/hr)	Annual (ton/yr)
TLOAD	Methanol	0.80	2.24	3.49
RLOAD	Methanol	2.84	16.21	12.44
Total Methanol		3.64	18.44	15.93
Total VOC		3.64	18.44	15.93

Notes:

1. AP-42 Section 5.2, Transportation and Marketing of Petroleum Liquids, Table 5.2-1.
2. TVP based on Antoine's Coefficients for methanol and the specific loading temperatures of 91.3 and 105 degrees F.

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Methanol Product Tank Cleaning Emission Calculations

SOURCE INFORMATION

Source Description: Tank Cleanings
Source ID No. MTPCAP
Tempo ID No. GRP TBD

Calculation Date: 7/13/2022
Calculated by: MO
Reviewed by: AG

Description:

Emissions, as represented below, are the result of tank cleaning activities for the 13.45 million gallon Internal Floating Roof tanks, Methanol Product Tanks 2301 thru 2304. Typically, tank cleaning activities consist of draining the tank, standing idle periods, purging the vapor space, removal of sludge from the tank, and refilling the tank. Emissions are only generated during standing idle periods, purging the vapor space, removal of sludge from the tank, and refilling the tank. Emissions are calculated in accordance with API Technical Report 2568 (Evaporative Loss from the Cleaning of Storage Tanks), November 2007. For purposes of this calculation, we have conservatively assumed that the properties of the sludge are the same as those of the product being stored, and that no heel is present throughout the cleaning process, and that one quarter inch sludge depth is present. Emissions from these tank cleanings will be controlled by portable thermal oxidizer, which is permitted under GCXVII-15.

Operational Parameters

Tank Type(s):	IFR		True Vapor Pressure (P):	3.09	psia
Heel Type:	Drain-Dry		Atmospheric Pressure (P_a):	14.75	psia
Roof Leg Height (h_d):	5.00	feet	Liquid Density (W_l):	6.63	lb/gal
Tank Diameter (D):	220	feet	Vapor Molecular Weight (M_V):	32.04	lb/lb-mole
Tank Contents:	Methanol		Tank Bottom Slope (s):	0.24	in/ft
Number of Cleanings:	4	cleanings/yr	Temperature (T):	85	ºF
				544.70	ºR

Calculations

Standing Idle Emissions (L_s)

$L_S = 0.0063*W_l*(\pi/4)*D^2$ = **1,587.78** lbs

$L_{SMAX} = (P*V_V/(R*T))*M_V*S$ = 2,214.86 lbs

$L_{S\text{-}SELECTED}$ = **1,587.78** **lbs**

where:

P =	True Vapor Pressure =	3.09	psia
Vv =	Volume of Vapor Space =	217,942.75	cubic feet
R =	Ideal Gas Constant =	10.731	psia ft^3 /lb-mole ^oR
T =	Temperature =	544.7	R
M_V =	Vapor Molecular Weight =	32.04	lb/lb-mole
K_S =	Standing Idle Saturation Factor =	0.60	(dimensionless)
D =	Tank Diameter (D) =	220	feet
h_{le} =	Effective Liquid height =	0.08	feet
W_L =	Liquid Density =	6.63	lb/gal
h_V =	Height of vapor space =	5.73	feet
n_d =	Number of Days Standing Idle =	1	days

Vapor Space Purge Emissions (L_p)

$Lp = (P*V_V/(R*T))*M_V*S$ = **0.00** **lbs**

where:

P =	True Vapor Pressure =	3.09	psia
V_V =	Volume of Vapor Space =	190,066	cubic feet
R =	Ideal Gas Constant =	10.731	psia ft^3 /lb-mole ^oR
T =	Temperature =	544.7	R
M_V =	Vapor Molecular Weight =	32.04	lb/lb-mole
S =	Saturation factor =	0	Drain-Dry Tanks
h_V =	Height of vapor space =	5.00	feet
n_d =	Number of Days vapor space is purged =	4	

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
Methanol Product Tank Cleaning Emission Calculations

SOURCE INFORMATION

Source Description: Tank Cleanings
Source ID No. MTPCAP
Tempo ID No. GRP TBD

Calculation Date: 7/13/2022
Calculated by: MO
Reviewed by: AG

Sludge Removal Emissions (L_{SR})

$L_{SR} = 0.49*F_e*D^2*d_s*W_l$ **5,660.53 lbs**

where:

F_E =	fraction of sludge that evaporates =	0.20	
D =	Tank Diameter (D) =	220	feet
d_S =	Sludge Depth	0.18	inches
W_L =	Liquid Density =	6.63	lb/gal
n_{SR} =	Time for Sludge Removal =	1	days

Refilling Emissions (L_F)

$L_F = (P*V_V/R*T)*M_V*S$ = **553.72 lbs**

where:

P =	True Vapor Pressure of incoming liquid =	3.09	psia
V_V =	Volume of Vapor Space =	217,943	cubic feet
R =	Ideal Gas Constant =	10.731	psia ft^3 /lb-mole ^oR
T =	Temperature =	544.70	R
M_V =	Vapor Molecular Wt of Incoming Liquid =	32	lb/lb-mole
S =	Saturation Factor of Clean Tank =	0.15	(dimensionless)
h_V =	Height of vapor space (after sludge removal) =	5.73	feet

Volatile Organic Compound (VOC) and Toxic Air Pollutant Emissions Summary

Emissions per Tank Cleaning Event = $L_S+L_P+L_{SR}+L_F$ = **7,802.03 lbs per cleaning event**
3.90 tons/yr

Uncontrolled Emissions from Four (4) Methanol IFR Tank Cleanings

Pollutant	Vapor Weight Fraction	Emission Rates	
		Average (lb/hr)	Annual (tons/year)
Total VOC	**1.00**	**3.56**	**15.60**
Methanol	1.00	3.56	15.60

Controlled Emissions from Four (4) Methanol IFR Tank Cleanings

Pollutant	Control Efficiency	Emission Rates	
		Average (lb/hr)	Annual (tons/year)
Total VOC	95%	**0.18**	**0.78**
Methanol	95%	0.18	0.78

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Koch Methanol St. James, LLC
KMe Facility
Tank Landing Emissions Summary

SOURCE INFORMATION

Source Description: Tank Landings
Source ID No. MTPCAP
Tempo ID No. GRP TBD

Calculation Date: 7/13/2022
Calculated by: MO
Reviewed by: AG

Description:

Emissions from tank landings were calculated using methodology from AP-42 Chapter 7.1 for Organic Liquid Storage Tanks. Emissions are based on conducting eight landings per year. Total standing idle losses, L_{SL}, are assumed to be from drain-dry tanks and are therefore represented as total clingage loss, L_C. Total filling losses are assumed to be for drain-dry tanks and are calculated the same as if the tank contain a liquid heel. The difference is a lower saturation factor is applied due to the lack of an "arrival" component, which is covered by the "clingage" loss. Emissions from tank landings are included as part of the Methanol Transfer and Product Tank CAP (MTPCAP).

Landing Loss

$L_T = L_C + L_{FL}$ Where: L_T = total losses during roof landing, lb per landing episode
L_C = clingage loss from drained dry tank, lb per landing episode
L_{FL} = filling losses during roof landing, lb per landing episode

Clingage Loss

$L_C = 0.0042 * C_s * W_1 * Area$ Where: 0.042 = conversion factor
C_s = clingage factor for single component stock with light rust shell*
W_1 = density of the liquid (methanol)
Area = area of the tank bottom

	Value	Unit
C Factor	0.042	1000gal/bbl
C_s*	0.0015	bbl/1000ft^2
W_1	6.63	lb/gal
Area	38,013.27	ft^2

*AP-42 Organic Liquid Storage Tanks Table 7.1-10

L_C = **15.88 lb per event**

Filling Loss

$L_{FL} = (PV_V/RT)M_V S$ Where: P = calculated true vapor pressure of methanol at a storage temp of 104 F
M_V = Methanol vapor molecular weight
R = Ideal gas constant
T = storage temperature of methanol in degrees Rankine, R, provided by KMe St. James Holdings LLC
V_V = Volume of vapor space with a 2ft deck leg height; Project Design Basis
S = filling saturation factor for drain dry tanks

	Value	Unit
P	5.13	psia
M_V	32.04	lb/lb-mole
R	10.73	psia-ft^3/lb-mole-°R
T	564	°R
V_V	76,026.54	ft^3
S(3)	0.15	-

L_{FL} = **309.40 lb per event**

Loading Summary per Event			
Pollutant	**Clingage Loss (lb/event)**	**Filling Loss (lb/event)**	**Total Loss (lb/event)**
VOC	15.88	309.40	325.28
Methanol	15.88	309.40	325.28

Potential total Loading Emissions (two landings per tank a year for four tanks)			
Pollutant	**Emissions (lb/yr)**	**Maximum Emissions (lbs/hr)**	**Emissions (tpy)**
VOC	2,602	0.30	1.30
Methanol	2,602	0.30	1.30

Notes:

1. AP-42 Chapter 7.1 Organic Liquid Storage Tanks updated June 2020
2. Data taken from AP-42 Chapter 7 Calculation Methodology
3. AP-42 Section 7.1 pg 45

Koch Methanol St. James, LLC
KMe Facility
GCXVII - Portable Thermal Oxidizer Emission Calculations

SOURCE INFORMATION

Source Description: Portable Thermal Oxidizer
Source ID No. GCXVII-15

Calculation Date: 1/26/2023
Calculated by: JLS
Reviewed by: AHN

Description:
The portable thermal oxidizer will be used to control emissions during tank cleanings. Emissions estimates below are for combustion pollutants resulting from oxidizer operation. Controlled VOC emissions are captured under M1 Tank Cleaning (GCXVII-14) and T1 IFR Tank Cleanings, which is permitted under the MTPCAP.

Parameter	Basis	Unit
Operating Hours per day	12	hours
Number of days per cleaning	1	day
Annual Operating Hours	84	hours
Total Methanol Loaded	18.12	tons
Methanol High Heating Value	9,840	Btu/lb
Degassing Heat Duty	4.24	MMBtu/hr
Natural Gas Fuel	640	scfm
NG Heating Value	1020	Btu/scf
NG Heat Duty	39.17	MMBtu/hr
Total Heat Duty	43.41	MMBtu/hr

Criteria Pollutants Emissions Summary

Combustion Pollutant	Emission Factor (lb/MMBtu) [1]	Hourly (lb/hr)	Annual (tpy)
Criteria Pollutants			
CO	0.082	3.58	0.15
NOx	0.098	4.26	0.18
SO_2	0.0006	0.03	0.0011
PM_{10}	0.0075	0.32	0.01
$PM_{2.5}$	0.0075	0.32	0.01
VOC	0.0054	0.23	0.01

RAMBOLL

Koch Methanol St. James, LLC
KMe Facility
GCXVII - Portable Thermal Oxidizer Emission Calculations

SOURCE INFORMATION

Source Description: Portable Thermal Oxidizer
Source ID No. GCXVII-15

Calculation Date: 1/26/2023
Calculated by: JLS
Reviewed by: AHN

HAP Emissions Summary[2]

Combustion Pollutant	Emission Factor (lb/MMscf) [3]	Hourly (lb/hr)	Annual (tpy)	Permitting Threshold [4] (tpy)	HAP/TAP?	Requires Permitting?
Organic HAPs						
2-Methylnaphthalene	2.40E-05	9.22E-07	3.87E-08	5.00E-04	YES	NO
3-Methylchloranthrene	1.80E-06	6.91E-08	2.90E-09	5.00E-04	YES	NO
7,12-Dimethylbenz(a)nthracene	1.60E-05	6.14E-07	2.58E-08	5.00E-04	YES	NO
Acenaphthene	1.80E-06	6.91E-08	2.90E-09	5.00E-04	YES	NO
Acenaphthylene	1.80E-06	6.91E-08	2.90E-09	5.00E-04	YES	NO
Anthracene	2.40E-06	9.22E-08	3.87E-09	5.00E-04	YES	NO
Benz(a)thracene	1.80E-06	6.91E-08	2.90E-09	5.00E-04	YES	NO
Benzene	2.10E-03	8.06E-05	3.39E-06	5.00E-04	YES	NO
Benzo(a)pyrene	1.20E-06	4.61E-08	1.94E-09	5.00E-04	YES	NO
Benzo(b)fluoranthene	1.80E-06	6.91E-08	2.90E-09	5.00E-04	YES	NO
Benzo(g,h,i)perylene	1.20E-06	4.61E-08	1.94E-09	5.00E-04	YES	NO
Benzo(k)fluoranthene	1.80E-06	6.91E-08	2.90E-09	5.00E-04	YES	NO
Butane	2.10E+00	8.06E-02	3.39E-03	5.00E-04	NO	NO
Chrysene	1.80E-06	6.91E-08	2.90E-09	5.00E-04	YES	NO
Dibenzo(a,h)anthracene	1.20E-06	4.61E-08	1.94E-09	5.00E-04	YES	NO
Dichlorobenzene	1.20E-03	4.61E-05	1.94E-06	5.00E-04	YES	NO
Ethane	3.10E+00	1.19E-01	5.00E-03	5.00E-04	NO	NO
Fluoranthene	3.00E-06	1.15E-07	4.84E-09	5.00E-04	YES	NO
Fluorene	2.80E-06	1.08E-07	4.52E-09	5.00E-04	YES	NO
Formaldehyde	7.50E-02	2.88E-03	1.21E-04	5.00E-04	YES	NO
n-Hexane	1.80E+00	6.91E-02	2.90E-03	5.00E-04	YES	YES
Indeno(1,2,3-cd)pyrene	1.80E-06	6.91E-08	2.90E-09	5.00E-04	YES	NO
Naphthalene	6.10E-04	2.34E-05	9.84E-07	5.00E-04	YES	NO
Pentane	2.60E+00	9.98E-02	4.19E-03	5.00E-04	NO	NO
Phenanathrene	1.70E-05	6.53E-07	2.74E-08	5.00E-04	YES	NO
Propane	1.60E+00	6.14E-02	2.58E-03	5.00E-04	NO	NO
Pyrene	5.00E-06	1.92E-07	8.06E-09	5.00E-04	YES	NO
Toluene	3.40E-03	1.31E-04	5.48E-06	5.00E-04	YES	NO
Total PAH	--	2.47E-06	1.04E-07	5.00E-04	YES	NO
Metals						
Arsenic	2.00E-04	7.68E-06	3.23E-07	5.00E-04	YES	NO
Barium	4.40E-03	1.69E-04	7.10E-06	5.00E-04	YES	NO
Beryllium	1.20E-05	4.61E-07	1.94E-08	5.00E-04	YES	NO
Cadmium	1.10E-03	4.22E-05	1.77E-06	5.00E-04	YES	NO
Chromium[5]	1.40E-03	5.38E-05	2.26E-06	5.00E-04	YES	NO
Chromium IV[5]	--	1.08E-05	4.52E-07	5.00E-04	NO	NO
Cobalt	8.40E-05	3.23E-06	1.35E-07	5.00E-04	YES	NO
Copper	8.50E-04	3.26E-05	1.37E-06	5.00E-04	YES	NO
Manganese	3.80E-04	1.46E-05	6.13E-07	5.00E-04	YES	NO
Mercury	2.60E-04	9.98E-06	4.19E-07	5.00E-04	YES	NO
Molybdenum	1.10E-03	4.22E-05	1.77E-06	5.00E-04	NO	NO
Nickel	2.10E-03	8.06E-05	3.39E-06	5.00E-04	YES	NO
Selenium	2.40E-05	9.22E-07	3.87E-08	5.00E-04	YES	NO
Vanadium	2.30E-03	8.83E-05	3.71E-06	5.00E-04	NO	NO
Zinc	2.90E-02	1.11E-03	4.68E-05	5.00E-04	YES	NO

Notes:

1. Emission factors are based AP-42, Table 1.4-1 & 1.4-2 (7/98). There is no published emission factor for emissions of $PM_{2.5}$, so they are assumed to be 100% of PM_{10} emissions as a conservative measure.

2. HAP/TAP emissions are calculated utilizing emission factors in EPA AP-42 Section 1.4: Natural Gas Combustion and the natural gas heat duty only.

3. Emission factors are based on EPA AP-42 Section 1.4: Natural Gas Combustion, Tables 1.4-3 (organics) and 1.4-4 (metals).

4. Emissions less than permitting thresholds of 0.0005 tpy will not be included in the permit.

5. Total chromium emissions are estimated for permitting purposes and utilized in comparing facility-wide emission increases to the "chromium VI (and compounds)" minimum emission rate provided in LAC 33:III. Chpater 51. Chromium VI is speciated from total chromium for Environmental Justice (EJ) modeling purposes. Chromium VI is conservatievly assumed to be 20% of total chromium based on information provided in Table 4-3, footnote l of the Emissions Estimation Portocol for Petroleum Refineries document (April 2015) for refinery fuel gas.

APPENDIX B
BACT ANALYSIS DOCUMENTATION

Koch Methanol St. James, LLC - KMe Facility
Summary of RBLC Database Search
Process 99.009 - Industrial Process Cooling Towers
Carbon Dioxide Equivalent (CO2e)

RBLCID	FACILITY NAME	CORPORATE OR COMPANY NAME	PERMIT ISSUA	PROCESS NAME	PROCCESS	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	POLLUTANT	CONTROL METHOD DESCRIPTION	EMISSION LIMIT 1	EMISSION LIMIT 1 UNIT
TX-0774	BISHOP FACILITY	TICONA POLYMERS, INC.	11/12/2015	Cooling Tower	99.009		10400		Carbon Dioxide Equivalent (CO2e)	Minimize methane leaks into cooling water.	420	TPY
TX-0801	PL PROPYLENE HOUSTON OLEFINS PLANT	FLINT HILLS RESOURCES HOUSTON CHEMICAL LLC	6/24/2016	Cooling Tower	99.009		0		Carbon Dioxide Equivalent (CO2e)	% drift design	0.005	DRIFT
TX-0888	ORANGE POLYETHYLENE PLANT	CHEVRON PHILLIPS CHEMICAL COMPANY LP	4/23/2020	COOLING TOWERS	99.009		0		Carbon Dioxide Equivalent (CO2e)	Use of a non-contact cooling tower design and monthly monitoring.	0	
TX-0889	SWEENY OLD OCEAN FACILITIES	CHEVRON PHILLIPS CHEMICAL COMPANY LP	8/8/2020	cooling tower	99.009		0		Carbon Dioxide Equivalent (CO2e)	Good operational practices, non-contact	0	

Note, an RBLC database search was completed for carbon monoxide (CO) from Industrial Process Cooling Towers (Process 99.009). However, the search did not result in any applicable sources for CO BACT from cooling towers.