Construction Permit
Source Analysis & Technical Review

Company	**Sandpiper Chemicals, LLC**	Permit Number	**173470**
City	**Texas City**	Project Number	**360985**
County	**Galveston**	Regulated Entity Number	**RN111735213**
Project Type	**Initial**	Customer Reference Number	**CN606138428**
Project Reviewer	**James Brackin**	Received Date	**July 26, 2023**
Site Name	**Sandpiper Blue Methanol Plant**		

Project Overview

Sandpiper Chemicals, LLC (Sandpiper) is requesting a New Source Review (NSR) Initial Air Permit application to authorize construction of a new blue methanol production plant in Texas City. Sandpiper is seeking to authorize a flare, two cooling towers, two heaters, and a boiler. Permit By Rule (PBR) No. 172711 authorizes two emergency diesel engines and will be incorporated by reference into the permit.

Maintenance, Startup, and Shutdown emissions are authorized on this permit.

Emission Summary

Air Contaminant	Current Allowable Emission Rates (tpy)	Proposed Allowable Emission Rates (tpy)	Change in Allowable Emission Rates (tpy)	Project Changes at Major Sources (Baseline Actual to Allowable)*
PM	0.00	19.74	19.74	19.74
PM_{10}	0.00	18.87	18.87	18.87
$PM_{2.5}$	0.00	17.88	17.88	17.88
VOC	0.00	22.40	22.40**	22.40
NO_X	0.00	17.88	17.88	17.88
CO	0.00	25.90	25.90	25.90
SO_2	0.00	1.42	1.42	1.42
NH_3	0.00	6.23	6.23	N/A
HAPs	0.00	15.33	15.33**	N/A

* This site is a minor source and, after the issuance of this project, will remain a minor source. Additionally, with a baseline of zero all pollutants are below the major thresholds, netting is not applicable and federal review is not required for this project.

**Total HAPs are representative emissions from products of combustion and fugitive methanol emissions. HAPs authorized in this permit are also classified as VOC. HAPs are included in the VOC total and are also speciated out on the MAERT.

Compliance History Evaluation - 30 TAC Chapter 60 Rules

A compliance history report was reviewed on:	February 22, 2024
Site rating & classification:	N/A
Company rating & classification:	N/A
Has the permit changed on the basis of the compliance history or rating?	**No**
Did the Regional Office have any comments? If so, explain.	No

Public Notice Information

Requirement	Date
Legislator letters mailed	08/01/2023
Date 1st notice published	08/17/2023
Publication Name: ***Bay Area Observer***	
Pollutants: carbon monoxide, hazardous air pollutants, nitrogen oxides, organic compounds, particulate matter including particulate matter with diameters of 10 microns or less and 2.5 microns or less and sulfur dioxide.	
Date 1st notice Alternate Language published	08/17/2023
Publication Name (Alternate Language): ***El Perico***	
1st public notice tearsheet(s) received	08/26/2023
1st public notice affidavit(s) received	08/26/2023
1st public notice certification of sign posting/application availability received	02/15/2024
SB709 Notification mailed	01/23/2024
Date 2nd notice published	03/14/2024
Publication Name: ***Bay Area Observer***	
Pollutants: carbon monoxide, hazardous air pollutants, nitrogen oxides, organic compounds, particulate matter including particulate matter with diameters of 10 microns or less and 2.5 microns or less and sulfur dioxide.	
Date 2nd notice published (Alternate Language)	03/14/2024
Publication Name (Alternate Language): ***El Perico***	
2nd public notice tearsheet(s) received	04/17/2024
2nd public notice affidavit(s) received	04/17/2024
2nd public notice certification of sign posting/application availability received	04/17/2024

Public Interest

Number of comments received	0
Number of meeting requests received	0
Number of hearing requests received	0
Date meeting held	N/A
Date response to comments filed with OCC	N/A
Date of SOAH hearing	N/A

Federal Rules Applicability

Requirement	
Subject to NSPS?	**Yes**
Subparts **A, Db, Kb, VVa, NNN, & RRR**	
Subject to NESHAP?	**No**
Subject to NESHAP (MACT) for source categories?	**Yes**
Subparts **A, F, G, H, EEEE, & DDDDD**	

Nonattainment review applicability:
The Sandpiper Blue Methanol Plant will be constructed in Galveston County which is listed as nonattainment for NO_x and VOC. The plant does not qualify as a major source for the purpose of Nonattainment applicability as the PTE of emissions from the plant do not exceed any of the Major Source Thresholds (25 tpy) for NO_x (+17.88 tpy) and VOC (+22.40 tpy); therefore, Nonattainment review is not required.

PSD review applicability:
The Sandpiper Blue Methanol Plant is a named minor source and does not qualify as a major source for the purpose of PSD applicability. The PTE of emissions from the plant do not exceed any of the Major Source Thresholds (100 tpy), and therefore, PSD review is not required.

Contaminant	Proposed Project Increases (tpy)	PSD Major Source Threshold (tpy)
PM	19.74	100
PM_{10}	18.87	100
$PM_{2.5}$	17.88	100
SO_2	1.42	100
CO	25.90	100
VOC	22.40	100
NO_x	17.88	100

Title V Applicability - 30 TAC Chapter 122 Rules

Requirement
Title V applicability: This site currently does not have a Title V permit but will submit an application prior to start of operation.

Periodic Monitoring (PM) applicability: Although the site is a minor source and not subject to PM requirements, the following monitoring requirements have been established in NSR Permit 172791:

- Visible emission observations shall be performed and recorded monthly for the heaters and boiler.
- A CEMs is required to be installed to measure and record concentration of NO_x, CO, and NH_3 from the heaters and boiler.
- Methods of NH_3 monitoring shall be through direct measure of NH_3 via CEMs or through measure of inlet and outlet concentrations of NO_x via CEMs.
- Pilot flame for the flare shall be continuously monitored by a thermocouple, infrared monitor, or ultraviolet monitor.
- A continuous flow monitor and composition analyzer are to be installed to record the vent stream flow and composition to the flare.
- A calorimeter should also be installed to measure and record the net heating value of the gas sent to the flare.
- The cooling tower's drift eliminators are to be inspected annually and records of inspection/repairs are to be maintained.
- Cooling water for the cooling towers are to be sampled once per week for TDS.
- Monthly emission records for the cooling towers should be updated monthly.
- Fugitive components shall meet 28MID, 28CNTQ, and 28PI LDAR Program monitoring requirements.

Compliance Assurance Monitoring (CAM) applicability:
CAM is not applicable because the site is a minor source and is not subject to the Title V program.

Process Description
The Facility will produce a synthesis gas (syngas) by reforming natural gas feedstock using Autothermal Reformer (ATR) technology. The syngas will be conditioned and converted into methanol. Produced methanol will be cooled, removed from the gas loop, and purified in a distillation section before being routed to storage and distribution. The following sections provide additional detail about each step of the process and are supported by a process flow diagram presented in this application.

Project Scope
Sandpiper Chemicals has requested to construct a Blue Methanol Plant in Texas City. The proposed facility will produce up to 3,000 metric tons of blue methanol per day. The facility will be located at the Eastman Chemical Facility and will contain two heaters, one boiler, two cooling towers, one flare, and fugitives.

Reformer Heaters (EPN REFHEATERS)
The Primary Reformer Heaters consists of two heaters, Fire Process Heater and Fire Steam Superheater, which combined has maximum combustion rate of 455 MMBtu/hr. The heaters are both routed to a common stack which is then controlled by a Selective Catalytic Reduction (SCR) system and Carbon Monoxide (CO) Catalyst to reduce emissions NH_3 and VOC emissions. Additionally, the heater will be equipped with low-NOx burners.

The SCR will control NOx emissions with a vendor guaranteed exhaust NO_x and NH_3 concentration of 5 ppmw. The CO catalysts will control VOC emissions with a 90% reduction efficiency per vendor guarantee. SO_2 emissions are based on partial use of sulfur-free fuel gas and natural gas with 2 grains of sulfur per 100 dscf. Emissions are based on the unit running 8,760 hours per year.

A Continuous Emissions Monitoring System (CEMS) is required to be installed for the Reformer Heaters to record the in-stack concentration of NOx, CO, and NH3. Additionally, the heaters are to be stack tested for NO_x, VOC, CO, NH_3, and O_2 within 180 days of initial start-up of the facilities. The heaters shall be stack tested at maximum firing rate during emission testing.

Auxiliary Boiler (EPN AUX)
The boiler is used to generate steam for use in the various process equipment during plant start-up and is not use for control. The boiler is only run at design duty (762 MMBtu/hr) for up to 262 hours per year and is in standby mode (76.2 MMBtu/hr) for

the remainder of the year (8,498 hours). The boiler will be equipped with low-NO_x burners, an SCR System and Carbon Monoxide (CO) Catalyst to reduce emissions. The Boiler will only fire pipeline quality natural gas.

The SCR will control NOx emissions with a vendor guaranteed exhaust NOx and Ammonia concentration of 5 ppmw. The CO catalysts will control VOC emissions with a 90% reduction efficiency per vendor guarantee. SO_2 emissions are based on partial use of sulfur-free fuel gas and natural gas with 2 grains of sulfur per 100 dscf.

A CEMS is required to be installed for the Auxiliary Boiler to record the in-stack concentration of NOx, CO, and NH_3. Additionally, the boiler is to be stack tested for NO_x, VOC, CO, NH_3, and O_2 within 180 days of initial start-up of the facilities. The boiler shall be stack tested at maximum firing rate during emission testing.

Process Cooling Tower (EPN PCTOWER)
The Process Cooling Tower is used to provide cooling water to the heat exchangers that are used to service the process units that are part of the Sandpiper Blue Methanol Plant. Cooling water is used for the processes on site and has possible contact with VOC laden streams in the heat exchangers. VOC emissions are emitted from the cells of the cooling tower that service this cooling water. The cooling tower is equipped with drift eliminators that will minimize drift from the cooling tower to 0.001%.

PM emissions are based on a Total Dissolved Solids (TDS) concentration of 1000 ppmw and were estimated utilizing the methodology presented in "Calculating Realistic PM10 Emissions from Cooling Towers" by Joel Reisman and Gordon Frisbie. TDS concentration in the cooling tower are based on design information provided by Sandpiper.

Cooling water will be sampled at least once per week for TDS.

Utilities Cooling Tower (EPN UCTOWER)
The Utilities Cooling Water System is designed for the condensing of the steam from the project Steam Turbine Generator. This steam is condensed at a pressure measured in inches of water and is much less than the operating pressure of the cooling water system. This cooling water system is segregated from the Plant Cooling Water system/Process Cooling Tower. The cooling water used in the Utilities Cooling Tower will circulate through exchangers that have no contact with VOC-containing streams. Therefore, VOC emissions are not permitted for this cooling tower.

The cooling tower is equipped with drift eliminators that will minimize drift from this cooling tower to 0.001%. PM emissions are based on a TDS concentration of 1000 ppmw and were estimated utilizing the methodology presented in "Calculating Realistic PM10 Emissions from Cooling Towers" by Joel Reisman and Gordon Frisbie. TDS concentration in the cooling tower are based on design information provided by Sandpiper.

Cooling water will be sampled at least once per week for TDS.

Flare (EPN FLARE)
The flare is a steam assisted flare and emissions will result from combustion of natural gas (pilot gas and supplemental gas), streams from fugitive component relief valves, and vent streams associated with planned MSS activities.

The flare will combust methanol and higher alcohols with a Destruction Efficiency of 99% and 98% respectively. NO_x and CO emissions are based on Low-Btu Steam Assist emission factors. SO_2 emissions from natural gas combustion of the pilot flame is based on 2 grains of sulfur per 100 dscf.

Information for the pilot and the flared gas is based on design data provided by Sandpiper. NO_x emissions are the result of natural gas combustion for pilot gas and supplemental gas purposes, as well as the combustion of ammonia. A BTU Analyzer or composition analyzer and a calorimeter will be installed.

During normal plant operations, there will be no flow of process gas to the flare, and the only combusted gas will be the natural gas used for continuous pilot operation. Routine MSS will occur for up to 263 hours per year. Fugitive relief valves and syngas process streams associated with startup and shutdown are routed to the flare for destruction.

Process Fugitives (EPN FUG)
Equipment leak fugitive emissions from piping components and associated equipment will occur throughout the Facility. Sandpiper will utilize three (3) Leak Detection and Repair (LDAR) programs: 28MID, 28CNTQ, and 28PI. These three programs are being utilized as they provide the same control credits as 28LAER which Sandpiper initially proposed. However, since this will not be a nonattainment permit, 28LAER is not applicable. Calculations are based on Synthetic Organic Chemical Manufacturing Industry (SOCMI) non-ethylene facility factors and a 100% control credit for relief valves sent to the flare header for control (EPN FLARE).

For EPN FUG, VOC and HAPs have the same emission rate as the pollutants associated with fugitive emissions (methanol) are both a VOC and a HAP.

Best Available Control Technology

Source Name	EPN	Best Available Control Technology Description
Reformer Heaters	REFHEATERS	The Reformer Heaters fire pipeline quality natural gas and plant fuel. Both heaters will be equipped with low-NO_x burners and emissions are routed to a common stack that is controlled by an SCR that will achieve a NO_x emissions factor of 5 ppmv (0.006 lb/MMBtu). Outlet concentrations are based on vendor specifications. CO emissions will maintain an exhaust concentration of 10 ppmv per vendor specifications. SO_2 emissions are based on a factor of 0.6 lb/MMscf (0.2 gr SO_2/100 dscf). VOC emissions will be controlled by a Carbon Monoxide (CO) Catalyst and good combustion practices. Tier 1 BACT is satisfied.
Auxiliary Boiler	AUX	The auxiliary boiler will fire pipeline quality natural gas only. The boiler will be equipped with low-NO_x burners and emissions are controlled by an SCR that will achieve a NO_x emissions factor of 5 ppmv (0.006 lb/MMBtu). Outlet concentrations are based on vendor specifications. CO emissions will maintain an exhaust concentration of 10 ppmv per vendor specifications. SO_2 emissions are based on a factor of 0.6 lb/MMscf (0.2 gr SO_2/100 dscf). VOC emissions will be controlled by a Carbon Monoxide (CO) Catalyst and good combustion practices. Tier 1 BACT is satisfied.
Process Cooling Tower	PCTOWER	The cooling tower is a non-contact design with drift eliminators that achieve <0.001% drift. The cooling tower monitors VOC per Appendix P. VOC concentration assumed to be 0.70 lb of VOC per million gallons of cooling water. Tier 1 BACT is satisfied.
Utility Cooling Tower	UCTOWER	The cooling tower is a non-contact design with drift eliminators that achieve <0.001% drift. The cooling tower does not have VOC emissions as it is only used for condensing steam at a pressure less than the operating pressure of the cooling water system. Tier 1 BACT is satisfied.
Flare	FLARE	The flare will fire pipeline quality natural gas only. The flare calculations utilize emission factors of 0.068 lb/MMBtu

		and 0.3465 lb/MMBtu for NO_x and CO found in Table 4, Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers, RG-109. The flare also meets requirements of 40 CFR 60.18, achieving 99% DRE for certain compounds up to 3 carbons and 98% otherwise. The flare is steam assisted. SO_2 emissions are based on a factor of 0.6 lb/MMscf (0.2 gr SO_2/100 dscf). A BTU Analyzer or composition analyzer, a pilot flame detector, flow monitor, and a calorimeter will be installed. Halogenated compounds will not be flared. MSS operations maintain the same emission factors and DRE as routine operations. Tier 1 BACT is satisfied.
Fugitives	FUG	Sandpiper will utilize the 28MID, 28CNTQ, and 28PI LDAR programs. The result is total fugitive emissions of 1.13 lb/hr and 4.75 tpy of HAPs and VOC. Tier 1 BACT is satisfied.

Permits Incorporation

Permit by Rule (PBR) / Standard Permit / Permit Nos.	Description (include affected EPNs)	Action (Reference / Consolidate / Void)
PBR No. 172711	Authorizes Emergency Engine (EPN EMENG) and Fire Pump Engine (EPN FPENG)	Reference

Impacts Evaluation

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

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

Additional site/land use information: The site will be located in an industrial area on Galveston Bay. South of the proposed site is entirely industrial land. North of the site are residential neighborhoods. The nearest school is Texas City High School and is 1.38 miles Northwest of the proposed site.

On February 23, 2024, The TCEQ Air Dispersion Modeling Team (ADMT) conducted an Air Quality Analysis Audit (ADMT project number 8992, WCC Content ID 6936276) and determined that the air quality analysis is acceptable for all review types and pollutants.

Minor National Ambient Air Quality Standards (NAAQS) Analysis

A minor NAAQS analysis was conducted for SO_2, PM_{10}, $PM_{2.5}$, NO_x, and CO. The modeled GLCmax of NO_x, CO, SO_2, PM_{10} and $PM_{2.5}$ for each respective averaging times are under the de minimis levels and no further review is necessary.

State Property Line Analysis

A state property line analysis was conducted for SO_2. The modeled GLCmax for the 1-hour averaging time was below the de minimis level for SO_2 and no further review is necessary.

Health Effects Analysis

A health effects review was conducted using the Modeling Effects Review Applicability (MERA) for 31 health effects pollutants: ammonia, methanol, benzene, dichlorobenzene, formaldehyde, toluene, naphthalene, isopropanol, ethanol, 1-propanol, 2-methylnapthalene, 3-methylcholanthrene, 7,12-dimethylbenz[a]anthracene, acenaphthene, Acenaphthylene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, n-butane, chrysene, dibenz[a,h]anthracene, fluoranthene, fluorene, n-hexane, indeno [1,2,3-cd]pyrene, n-pentane,

phenanthrene, and pyrene.

The total predicted concentrations were compared to 10 percent of their respective ESLs (step 3 of the MERA guidance). All pollutants fell out at step 3 of the MERA guidance. The MERA analysis is therefore complete.

No adverse health effects are expected to occur among the public health, welfare, or the environment as a result of exposure to the emissions from the facilities authorized by this project.

Project Reviewer James Brackin	April 30, 2024 Date	Chirag Patel	April 30, 2024 Date