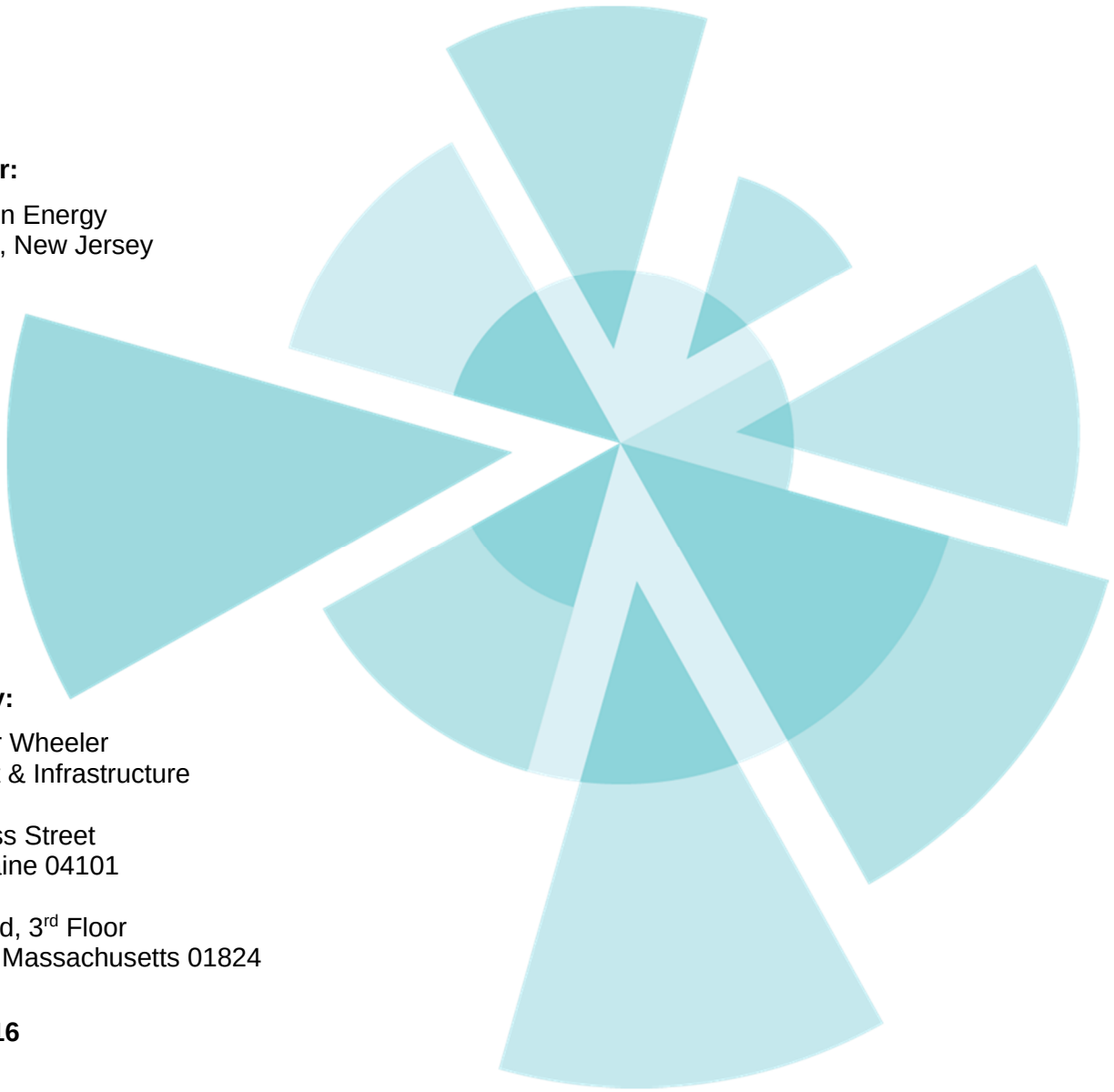
APPLICATION FOR CONSTRUCTION PERMIT

Marcellus Methanol Plant
Marshall County, West Virginia

Prepared for:

Primus Green Energy
Hillsborough, New Jersey



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APPENDICES

1.0 INTRODUCTION

Primus Green Energy, Inc. (Primus) is proposing to construct Marcellus Methanol Plant (Marcellus Methanol), a 160 metric ton per day (tpd) methanol production facility to be located at Covestro's New Martinsville chemical production facility located in an unincorporated area of Marshall County, West Virginia. Primus is applying for a construction permit under the West Virginia Code of State Regulations (CSR) at 45CSR13. The project will be a minor source of air emissions with respect to the U.S. Environmental Protection Agency's (USEPA) Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) pre-construction permit programs and USEPA's Title V Operating Permit program.

Covestro's existing chemical facility, upon which the Marcellus Methanol facility will be located, operates under a Title V Operating Permit issued by the West Virginia Department of Environmental Protection (WVDEP). The existing facility is an integrated chemical plant with a primary purpose to produce isocyantes, polyesters, polyethers and acrylics with the majority of the production units associated with production of polyurethane products. Because the Marcellus Methanol facility will not be under the same ownership or operational control of the Covestro facility, it will require its own air permit for construction and operation.

The purpose of this air permit application is to provide the technical information required by the WVDEP air permitting program, and demonstrate that the proposed facility will be in compliance with regulations related to ambient air quality. As such, this application provides:

- A description of the proposed project configuration (Section 2);
- An inventory of maximum potential emissions resulting from the project (Section 3);
- An analysis of applicable regulatory requirements (Section 4);
- Completed air permit application forms (Appendix A);
- Detailed emissions calculations (Appendix B); and
- A detailed site plan (Appendix C).

2.0 PROJECT DESCRIPTION

Marcellus Methanol is proposing to construct its facility in Marshall County near the unincorporated community of Proctor. This state-of-the-art facility will have a nameplate production capacity of approximately 160 metric tons per day of methanol, using natural gas as feedstock.

This section provides a description of the project location (Section 2.1), and the proposed equipment to be installed for the project (Section 2.2).

2.1 Site Location

The proposed site is located within the boundaries of the larger, existing Covestro chemical production complex located adjacent to the Ohio River in the southwestern corner of Marshall County (see Figures 1 and 2), approximately 5 miles north of the city of New Martinsville and 1.3 miles north of the unincorporated community of Proctor. A CSXT rail corridor runs adjacent to the river, along the west side of the larger complex. State Highway 2 runs along the east side of the larger complex. Additional industrial complexes are located to the north on the West Virginia side of the river, and to the south on the Ohio side.

The proposed facility is located in the USEPA's Steubenville-Weirton-Wheeling Interstate Air Quality Control Region (AQCR). The Marshall County portion of the AQCR is designated as attainment or unclassifiable for all criteria pollutants with the exception of the Clay, Franklin, and Washington Tax Districts which are designated nonattainment for the 1-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS). The project is located in the Franklin Tax District and is therefore located in the SO_2 nonattainment area. Marshall County is currently a maintenance area for the 1997 8-hour ozone standard and the 1997 annual $PM_{2.5}$ standard.

The location proposed for development of the project is in the north central portion of the Covestro complex. The area proposed for development consists of two blocks within the Covestro property. Based on a site plan provided by Marcellus Methanol, the proposed facility is expected to occupy approximately 1 acre within one block with the storage tanks to be located in the other block. The internal road system within Covestro surrounds the block areas, effectively bisecting the proposed site (see Figure 2). The two blocks have a combined acreage of approximately 5 acres available for development, not including the bisecting common roadway and other common areas. Existing rail sidings are located adjacent to the south side of the proposed site blocks and the rail loadout facilities will be constructed in this area.

The base elevation of the proposed site is approximately 641 feet (NAVD 1988); the site is depicted on the USGS New Martinsville topographic map (see Figure 1). The Ohio River runs from northwest to southeast through the site area. Hills rise steeply on both sides of the river to an elevation of approximately 1300 feet. The closest identified public park is the Lewis Wetzel Park located more than one mile to the south of the larger complex in Wetzel County. The Ohio River Scenic Byway runs along the western shore of the Ohio River across from the site. No schools, hospitals, nursing homes, day care or preschool facilities are identified within the site vicinity.

2.2 Summary of Proposed Facility

Primus has developed a proprietary technology for converting various feedstocks, including natural gas and syngas, into liquid fuels and chemicals, including gasoline and methanol. The proposed project will utilize Primus' gas-to-methanol system to produce 160 metric tpd of International Methanol Producers & Consumers Association (IMPCA) specification methanol from pipeline natural gas supplies sourced from the Marcellus shale region. For permitting purposes,

the availability of the plant is assumed to be 8,760 hours per year, resulting in an assumed operating capacity of 58,400 metric tons per year.

The project will be comprised of the following equipment:

- One Steam Methane Reformer (SMR) system (natural gas-fired) equipped with selective catalytic reduction (SCR) for nitrogen oxides (NO_X) emissions control;
- One methanol synthesis reactor system and off-gas recovery system;
- One methanol distillation system and off-gas recovery system;
- One start-up heater;
- Three methanol storage tanks; and
- Truck and rail loading racks (one each) equipped with a flare for volatile organic compounds (VOC) emissions control.

Figure 3 provides a schematic process flow diagram of the facility. Air emissions will be produced by the proposed equipment. The facility will not be equipped with an emergency engine or a diesel fire pump. The basis for the calculation of emissions from the various processes is provided in Section 3. Detailed calculations of the emissions are provided in Appendix B. A site plan of the project is included in Appendix C.

2.2.1 Steam Methane Reformer (SMR)

The SMR produces syngas from pipeline natural gas and steam feedstocks, and requires heat which is supplied by the combustion of natural gas and process gases. The SMR consists of a reactor where synthesis gas (syngas) is produced by a reaction of natural gas and steam, and a boiler where fuel is combusted to supply heat for the reaction and for producing steam. The fuel used in the boiler includes pipeline natural gas and recovered hydrogen-rich process gases from the methanol reactor system and methanol distillation system.

Combustion emissions from the SMR boiler will be exhausted to a selective catalytic reduction (SCR) unit for NO_X emissions control. Good combustion practices and the use of low-sulfur gaseous fuels will minimize emissions of other combustion pollutants. The SMR reactor, which normally operates under high pressure, is not normally exhausted to atmosphere. On rare occasions, startup conditions and upset conditions will result in syngas releases with four such startup events per year and four such upset events per year conservatively assumed for the purposes of this permit application. The syngas present in the SMR reactor during startups and process upsets would be vented to a process header which is in turn vented to a flare for control of emissions.

2.2.2 Methanol Synthesis Reactor System

The methanol synthesis reactor system consists of a series of reactor vessels that convert the syngas to a crude methanol liquid stream comprised of approximately 80 to 85 percent methanol and water. The system includes off-gas recovery, most of which is recycled to the front end of the methanol reactor system. A smaller hydrogen-rich process gas stream (HP Vent) is directed to the SMR furnace where it serves as fuel. The methanol synthesis reactor system, which normally operates under high pressure, is not normally exhausted to atmosphere. For facility startups and for emergency purposes, the reactor system is tied to the process header which is in turn vented to a flare for control of emissions. Startup venting will be of a duration of less than 4 hours and is expected to occur no more than 4 times per year. An emergency situation would involve a fire that engulfs the methanol synthesis reactor system. For the purposes of this permit application, one such emergency event over the life of the facility was considered.

2.2.3 Methanol Distillation System

The methanol distillation system consists of a series of distillation columns that purify the crude methanol to IMPCA-specification methanol. A small stream of process gas (LP Vent), comprised mostly of methane, methanol, hydrogen, and carbon dioxide, is directed to the SMR furnace where it serves as fuel. The methanol distillation system is not normally exhausted to atmosphere. For emergency purposes, the distillation system is tied to the process header which is in turn vented to a flare for control of emissions. The process header would only be used in extremely rare circumstances, such as during a fire that engulfs the methanol distillation system. For the purposes of this permit application, one such event over the life of the facility was considered.

2.2.4 Methanol Storage

Methanol storage will be comprised of the following:

- one 30,000 barrel (bbl) (24-day storage) carbon steel, 80 foot diameter by 40 foot high methanol product storage tank equipped with internal floating roof;
- one 30,000 gallon shift tank (cylindrical horizontal double-walled aboveground) to store methanol product from distillation, prior to transfer into the methanol product storage tank, and
- one 30,000 gallon off-spec tank (cylindrical horizontal double-walled aboveground) to store methanol deemed as off-specification.

All aboveground storage tanks will comply with the applicable requirements contained in the 2015 amendments to the Aboveground Storage Tank and Public Water Supply Protection Acts of the state of West Virginia and associated issued guidance from the WVDEP.

2.2.5 Methanol Loadout

Methanol loadout will be comprised of the following:

- one 400 gallon per minute (gpm) loading rack for filling trucks in dedicated methanol service; and
- one 800 gallon per minute (gpm) loading rack for filling railcars in dedicated methanol service.

Vapors displaced from the trucks and railcars during loading will be directed to an enclosed flare for VOC emissions control. This flare differs from that used for startups and emergency purposes.

2.2.6 Cooling Tower

An induced draft evaporative cooling tower will provide cooling of process water for the project. The tower will be of rectangular mechanical-draft design with two cells. The water flow rate will be approximately 2,000 gallons per minute, with a drift loss of 0.005 percent. Total dissolved solids in the water are expected to be approximately 5,000 mg/l.

2.2.7 Startup Heater

The facility will include a 2.55 MMBtu/hr startup heater to provide heat to the methanol synthesis reactor system during startups. The startup heater will combust only natural gas. Although the unit will be used only during facility startup conditions, the unit is assumed to operate 8,760 hours per year for permitting purposes.

3.0 EMISSIONS INVENTORY

This section describes how emissions from the proposed Marcellus Methanol project were calculated based upon data supplied by Primus' contractors and vendors, emission factors obtained from USEPA's AP-42 *Compilation of Air Pollutant Emission Factors* (AP-42), and USEPA emissions models such as TANKS. Detailed emissions calculations are provided in Appendix B.

From a practical perspective relevant to the proposed project and its emissions, the list of regulated New Source Review (NSR) pollutants includes the six criteria pollutants for which NAAQS have been established and those pollutants that are subject to the New Source Performance Standards (NSPS) promulgated pursuant to Section 111 of the federal Clean Air Act (CAA).

The six criteria pollutants are: sulfur dioxide (SO_2), particulate matter (PM), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), and lead (Pb). Volatile organic compounds (VOCs) and nitrogen oxides (NO_X) are included by virtue of being established as ozone precursors. For regulatory purposes, PM is further classified by particle size. $PM_{2.5}$ includes all particles with an aerodynamic diameter of less than 2.5 microns. PM_{10} includes all particles with an aerodynamic diameter of less than 10 microns. Total suspended particulate (TSP) includes particles of all sizes.

The list of Hazardous Air Pollutants (HAPs) is defined in Section 112(b) of the Clean Air Act. From a practical perspective, the HAPs to be emitted from the proposed project are subsets of regulated NSR pollutants, particularly trace metals (PM) and trace organics (VOCs). Methanol in particular is itself classified as both a HAP and a VOC.

Annual emissions were calculated for comparison to permitting thresholds, and short-term emissions (durations of 24 hours or less) are also provided. Emissions of regulated NSR pollutants, GHGs, and HAPs were calculated.

Emissions from point sources and fugitive sources were quantified separately. Point sources are emission sources that are vented through a stack or vent. Fugitive sources are emission sources that have no specific emission point.

3.1 Point Sources

3.1.1 Steam Methane Reformer (SMR)

The SMR produces syngas from natural gas and steam feedstocks, and requires heat which is supplied by the combustion of natural gas and process gases. Combustion emissions from the SMR were calculated based on the maximum hourly heat input (114.8 MMBtu/hr) of the unit and vendor-supplied emissions data. Emissions of HAPs were calculated based on USEPA's AP-42 for natural gas-fired boilers. The SMR will be equipped with selective catalytic reduction (SCR) for NO_X emissions control.

The SMR will not otherwise emit to atmosphere during normal operations. On rare occasions, startup conditions and upset conditions will result in syngas releases to a flare dedicated for control of releases during such startup, shutdown, and malfunction events (SSM Flare). Emissions from startups and process upsets are described below in the discussion of the SSM Flare.

The calculated emissions for the SMR are included in Table 3-1. Detailed emissions calculations are presented in Appendix B.

Table 3-1. Calculated Potential Emissions, SMR

Process	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_X (tpy)	CO (tpy)	VOC (tpy)	HAP (tpy)	CO_2e (tpy)
SMR	1.97	1.97	1.18	66.90	19.68	3.94	1.96	125,300

3.1.2 Startup Heater

A startup heater with a maximum heat input capacity of 2.55 MMBtu/hr will be used to provide heat to the methanol synthesis reactor system during plant startups. The startup heater will use natural gas and for air permitting purposes is conservatively assumed to operate at full capacity year-round. Combustion emissions were calculated based on the maximum heat input capacity of the heater and USEPA's AP-42 emission factors for natural gas-fired boilers.

The calculated emissions for the startup heater are included in Table 3-2. Detailed emissions calculations are presented in Appendix B.

Table 3-2. Calculated Potential Emissions, Startup Heater

Process	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_X (tpy)	CO (tpy)	VOC (tpy)	HAP (tpy)	CO_2e (tpy)
Heater	0.08	0.08	0.006	1.10	0.92	0.06	0.02	1,322

3.1.3 Methanol Synthesis Reactor and Distillation Systems

The methanol synthesis reactor and distillation systems do not have direct discharges to atmosphere during normal facility operations. Hydrogen-rich gases are recovered from these systems during normal operations and returned to the SMR for combustion. The calculated SMR combustion emissions includes consideration of these vent gases.

For the purposes of evaluating worst-case SSM emissions, a release of methanol from these systems to the SSM Flare was considered. Emissions from such a process upset are described below in the discussion of the SSM Flare.

3.1.4 Product Storage

VOC emissions from the methanol storage tank, shift tank, and off-spec tank were calculated using USEPA's TANKS 4.0.9d software (USEPA, 2001a). The methanol storage tank will be equipped with an internal floating roof and is assumed to handle the full production capacity of the facility. The methanol shift tank and off-spec tank will be of identical horizontal tank design and will share the full production capacity of the facility. Because of their identical designs, emissions for only one of the horizontal tanks at full production throughput are calculated. These emissions are representative of the combined emissions of both tanks.

The total VOC and HAP emissions are provided in Table 3-3. The calculated VOC and HAP emissions are comprised entirely of methanol. A summary of the TANKS inputs and outputs are provided in Appendix B, as are the detailed TANKS outputs.

Table 3-3. Calculated Potential Emissions, Storage Tanks

Process	VOC (tpy)	HAP (tpy)	Methanol (tpy)
Product Storage Tank	0.12	0.12	0.12
Shift Tank / Off-Spec Tank	1.90	1.90	1.90

3.1.5 Product Loadout

Product will be loaded onto tank trucks at a rate of 400 gallons per minute (gpm) and onto railcars at a rate of 800 gpm. Vapors displaced from the trucks and railcars will be exhausted directly to a flare dedicated for control of loadout emissions (Loadout Flare). Submerged fill techniques are assumed to be employed, and the trucks and railcars are assumed to be in dedicated methanol service. Displaced methanol vapor emissions were calculated using USEPA's AP-42, Section 5.2 (USEPA, 1995a). The captured VOC and HAP emissions will be destroyed in the Loadout Flare with a control efficiency of 98%.

The Loadout Flare will have a pilot that will combust natural gas. The pilot will have a capacity of 0.06 MMBtu/hr (1.0 scfm) and was assumed to operate 8,760 hours per year. Combustion emissions of criteria pollutants for pilot operation were calculated using USEPA's AP-42, Section 13.5 (USEPA, 1995b). PM emissions were calculated by conservatively assuming a lightly smoking flare.

The total VOC and HAP emissions are provided in Table 3-4. The calculated VOC and HAP emissions are comprised entirely of methanol. Detailed emissions calculations are presented in Appendix B. Emissions from pilot operation of the Loadout Flare are included in Table 3-4.

Table 3-4. Calculated Potential Emissions, Loadout Flare

Process	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_X (tpy)	CO (tpy)	VOC/HAP (tpy)	CO_2e (tpy)
Loadout Flare	0.03	0.03	0.007	0.81	4.39	0.17	1,642

3.1.6 SSM Flare

The SSM Flare will be used to control gases released during facility startups and process area upsets. The flare will use natural gas for the pilot. Annual potential emissions assume full year-round operation of the pilot and a conservative estimate of releases from SSM events, for which three scenarios are considered for emission calculation purposes. During facility startups (Scenario 1), the system is initially filled with hot nitrogen to bring the equipment up to operating temperature. As the SMR commences syngas production, a mixed stream of nitrogen and syngas is sent to the SSM Flare for control of emissions until the nitrogen is purged from the system and the system switched to normal operating mode.

Two upset scenarios are considered. Scenario 2 involves an upset condition that releases all syngas from the SMR to the flare for a period as long as 48 hours to maintain SMR temperature while downstream equipment is repaired. Minimizing thermal cycling of the SMR is important during such upset conditions, hence the need to consider a period of 48 hours for Scenario 2. Scenario 3 involves an external fire that engulfs the reactor and distillation area causing contents of both systems to boil off.

The SSM Flare will have a pilot that will combust natural gas. The pilot will have a capacity of 0.092 MMBtu/hr (1.5 scfm) and was assumed to operate 8,760 hours per year. Combustion emissions of criteria pollutants for pilot operation were calculated using USEPA's AP-42, Section 13.5 (USEPA, 1995b). PM emissions were calculated by conservatively assuming a lightly smoking flare. The calculated emissions for the pilot are included in Table 3-5. Detailed emissions calculations are presented in Appendix B.

Table 3-5. Calculated Potential Emissions, SSM Flare

Process	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_X (tpy)	CO (tpy)	VOC (tpy)	CO_2e (tpy)
SSM Flare	0.05	0.05	0.01	1.50	8.17	3.09	2,585

3.1.7 Cooling Tower

A mechanical draft cooling tower will provide cooling of process water for the project. The maximum design flow rate will be approximately 2,000 gallons per minute (GPM). Total dissolved solids in the cooling water are expected to be approximately 5,000 milligrams per liter (mg/l). The cooling tower will be designed with a drift rate of 0.005 percent or less to minimize PM_{10} emissions. The cooling tower will use a total of two cells.

Emissions were calculated using USEPA's AP-42, Section 13.4 (USEPA, 1995c). The total PM_{10} emissions from the cooling tower were calculated to be 1.10 tpy. The total $PM_{2.5}$ emissions were set equal to the PM_{10} emissions. Detailed emissions calculations are presented in Appendix B.

VOC emissions resulting from heat exchanger process fluid leaks into cooling water were calculated in accordance with the South Coast Air Quality Management District's (SCAQMD) "Guidelines for Calculating Emissions from Cooling Towers" (SCAQMD, 2006). Total VOC and HAP emissions from the cooling tower were calculated to be 0.37 tpy. Because Marcellus Methanol is proposing to perform weekly monitoring of VOCs in the cooling water, the emission factor that claims credit for VOC control was used. The calculated VOC and HAP emissions are comprised entirely of methanol. Detailed emissions calculations are presented in Appendix B. Equipment leaks will be minimized by implementation of a monitoring program that detects VOCs in cooling water.

3.2 Fugitive Sources

3.2.1 Fugitive VOC Equipment Leaks

Fugitive VOC emissions from equipment leaks were calculated in accordance with USEPA's "Protocol for Equipment Leak Emission Estimates" (USEPA, 1995d) using SOCMI emission factors. Component counts were estimated from preliminary engineering drawings of the proposed facility. Total fugitive VOC emissions from equipment leaks were calculated to be 2.55 tpy. Some of the fugitive VOC emissions occur at the SMR, and consequently not all of the VOC emissions are comprised of methanol (HAP). HAP emissions were calculated to be 2.42 tpy. Detailed emissions calculations are presented in Appendix B. Fugitive equipment leaks will be minimized by implementation of a monthly leak detection and repair (LDAR) monitoring program in accordance with New Source Performance Standard (NSPS) 40 CFR Part 60, Subpart VVa.

3.3 Summary of Calculated Potential Emissions

A summary of calculated potential emissions for Marcellus Methanol is provided in Table 3-6. A more detailed summary of pollutant emissions is provided in Appendix B along with detailed emission calculations.

Table 3-6. Summary of Calculated Potential Emissions, Marcellus Methanol

Process	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_X (tpy)	CO (tpy)	VOC (tpy)	HAP (tpy)	CO_2e (tpy)
SMR	1.97	1.97	1.18	66.90	19.68	3.94	1.96	125,306
Heater	0.08	0.08	0.006	1.10	0.92	0.06	0.02	1,322
Storage Tanks	--	--	--	--	--	2.02	2.02	--
Product Loadout	0.03	0.03	0.007	0.81	4.39	0.17	0.17	1,642
SSM Flare	0.05	0.05	0.01	1.50	8.17	3.09	--	2,585
Cooling Tower	1.10	1.10	--	--	--	0.37	0.37	--
Subtotal, Point Sources	**3.23**	**3.23**	**1.21**	**70.30**	**33.16**	**9.65**	**4.54**	**130,854**
Equipment Leaks	--	--	--	--	--	2.55	2.42	--
Subtotal, Fugitives	**--**	**--**	**--**	**--**	**--**	**2.55**	**2.42**	**--**
Total	***3.23***	***3.23***	***1.21***	***70.30***	***33.16***	***12.20***	***6.96***	***130,854***

4.0 REGULATORY ANALYSIS

The project will be subject to federal and state air quality requirements including federal emissions performance standards under 40 CFR Part 60 New Source Performance Standards (NSPS), VOC Reasonably Available Control Technology (RACT), and permitting requirements under the West Virginia Code of State Regulations (CSR). Based on the current facility design, the project will be a minor source under the PSD, NNSR, and Title V Operating Permit programs. Following is a discussion of regulatory requirements evaluated for this project.

4.1 Prevention of Significant Deterioration (40 CFR 52.21 and 45CSR14)

PSD permitting requirements apply to the criteria pollutants: SO_2, NO_2, PM, PM_{10}, $PM_{2.5}$, CO, VOC, and Pb as well as other NSR Regulated Pollutants such as sulfuric acid mist (SAM). The PSD permitting requirements do not apply to HAPs. The PSD regulations specify that any major new stationary source within an air quality attainment area must undergo PSD review and obtain applicable federal and state preconstruction air permits prior to the commencement of construction. The PSD regulations apply to:

- Any source type listed in any of 28 designated industrial source categories having potential emissions of 100 tpy or more of any pollutant regulated under the CAA;
- Any other source having potential emissions of 250 tpy or more of any pollutant regulated under the CAA;

The proposed facility will be located in Marshall County, which is designated as attainment or unclassifiable for all criteria pollutants with the exception of the Clay, Franklin, and Washington Tax Districts which are designated nonattainment for the 1-hour SO_2 NAAQS. The project is located in the Franklin Tax District and is therefore located in the SO_2 nonattainment area. Marshall County is currently a maintenance area for the 1997 8-hour ozone standard and the 1997 annual $PM_{2.5}$ standard. Sources with emissions of the attainment pollutants exceeding the PSD applicability thresholds noted above would be required to obtain a PSD permit prior to commencing construction.

The Marcellus Methanol facility is considered one of the 28 designated industrial source categories (chemical process plants) and is therefore subject to the 100 tpy applicability threshold. Based on the design criteria and calculated potential to emit, as summarized in Table 3-6, the project will not trigger PSD permitting requirements.

4.2 Nonattainment New Source Review (40 CFR 51.165 and 45CSR19)

The NNSR program regulates major sources located in areas that are nonattainment for one or more criteria pollutants. As noted above, the proposed facility is located in the Franklin Tax District of Marshall County, which is designated nonattainment for the 1-hour SO_2 NAAQS.

The major source emissions threshold for SO_2 nonattainment areas is 100 tpy. Based on the design criteria and calculated potential to emit, as summarized in Table 3-6, the project will not trigger NNSR permitting requirements.

4.3 Title V Operating Program (40 CFR 70 and 45CSR30)

The Title V Operating Permit program requires major sources to apply for a Title V Operating Permit within 12 months of beginning operation. Under Title V, a major source is defined as those facilities that have the potential to emit greater than 100 tons per year of any criteria pollutant, 25 tons per year of HAPs collectively, and 10 tons per year of an individual HAP. For new sources

subject to the program, a Title V Operating Permit application is due within 12 months of commencing construction.

The proposed project will be a minor source for criteria pollutants and HAPs. Therefore, a Title V Operating Permit will not be required for the project.

4.4 Compliance Assurance Monitoring (40 CFR 64)

The Compliance Assurance Monitoring (CAM) Rule, 40 CFR 64, was written to provide "reasonable assurance" of continuous compliance with emissions limitations or standards in cases where the underlying requirement for an emissions unit does not require continuous emissions monitoring and for units that are part of major sources that have Title V operating permits. The CAM rule applies to a pollutant-specific emissions limit for a unit at a major source required to have a Title V permit if the unit satisfies all of the applicability criteria.

The project will not be subject to the Title V Operating Permit program. Therefore, CAM does not apply to the project.

4.5 New Source Performance Standards (40 CFR 60 and 45CSR16)

NSPS apply to specific source categories. These standards are codified in 40 CFR 60, Standards of Performance for New Stationary Sources. NSPS standards have been adopted by reference in 45CSR16 for standards in effect as of June 1, 2015. The following NSPS will apply to the proposed facility:

- Subpart A – General Provisions;
- Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984;
- Subpart VVa – Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemical Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced after November 7, 2006;
- Subpart NNN – Standards of Performance for Volatile Organic Compound (VOC) Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations; and
- Subpart RRR – Standards of Performance for Volatile Organic Compound (VOC) Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes.

4.5.1 40 CFR 60 Subpart A

The general provisions contained in Subpart A apply to the emission sources that are subject to an NSPS standard [40 CFR §60.1(a)]. These general provisions include notification and recordkeeping requirements (described in 40 CFR §60.7), testing requirements (described in 40 CFR §60.8), monitoring requirements (described in 40 CFR §60.13), and flare requirements (40 CFR §60.18(b)). The facility will be subject to the requirements under Subpart A, including initial notifications in 40 CFR §60.7.

4.5.2 40 CFR 60 Subpart Kb

Subpart Kb applies to each storage vessel with a capacity greater than or equal to 75 cubic meters (m^3) [19,813 gallons] that is used to store volatile organic liquids (VOL) for which construction,

reconstruction, or modification is commenced after July 23, 1984 [40 CFR §60.110b(a)]. Applicability is a function of tank size and vapor pressure of the stored liquid. This subpart does not apply to the following [40 CFR §60.110b(b)]:

- Storage vessels with a capacity greater than or equal to 151 m^3 [39,890 gallons] storing a liquid with a maximum true vapor pressure less than 3.5 kilopascals (kPa) [0.51 pounds per square inch absolute or psia]; and
- Storage vessels with a capacity greater than or equal to 75 m^3 [19,813 gallons] but less than 151 m^3 [39,890 gallons] storing a liquid with a maximum true vapor pressure less than 15.0 kPa [2.18 psia].

Subpart Kb will apply to the 1.26 million gallon methanol storage tank as its capacity is greater than 19,813 gallons and is used to store volatile organic liquids. In addition, the storage tank does not meet the exemption in 60.110b(b) because its capacity is greater than 39,890 gallons and methanol has a maximum true vapor pressure greater than 0.51 psia at the site. The facility will comply with Subpart Kb by installing an internal floating roof tank in accordance with 60.112b.

The 1.26 million gallon methanol storage tank will require inspections of the tank, the internal floating roof, and its seals [§60.113b(a)]. In addition, §60.115b(a) requires Marcellus Methanol to keep records and submit reports regarding the control equipment installed to meet the requirements of §60.112b and inspections conducted under §60.113b(a).

Subpart Kb will apply to the two 30,000 gallon storage tanks (shift tank and off-spec tank). Each tank has a capacity between 19,813 gallons and 39,890 gallons, storing a liquid with a maximum true vapor pressure of 2.23 psia at 74°F based on monthly average temperature data for Pittsburgh. However, because the shift tanks have a true maximum vapor pressure less than 4.0 psia (27.6 kPa), the shift tank and off-spec tank are not subject to the control requirements listed in 40 CFR 60.112b.

Based on the design parameters for the tanks, the tanks are expected to comply with Subpart Kb.

4.5.3 40 CFR 60 Subpart VVa

40 CFR 60 Subpart VVa applies to an affected facility in the synthetic organic chemicals manufacturing industry (SOCMI) [40 CFR §60.480a(a)] that commences construction or modification after November 7, 2006 [40 CFR §60.480a(b)]. Further, this subpart applies to equipment components (i.e., each pump, compressor, pressure relief device, sampling connection system, open-ended valve or line, valve, and flange or other connector) in VOC service, which means that the piece of equipment contains or contacts a process fluid that is at least 10 percent VOC by weight [40 CFR §60.481a]. Any affected facility that has a design capacity to produce less than 1,000 Mg/yr (1,102 ton/yr) is exempt from §60.482a [40 CFR §60.480a(d)(2)]. By definition, the list of chemicals produced by affected facilities, as intermediates or final products, by process units covered under this subpart includes: CAS No. 67-56-1, methanol [40 CFR §60.489].

Subpart VVa will apply to the proposed facility because the facility is a SOCMI facility as defined under 60.481a and produces a chemical (methanol) listed in 40 CFR 60.489. Subpart VVa has specific requirements for controlling such leaks from pumps, compressors, relief devices, flanges, valves, etc. One requirement is the development of a Leak Detection and Repair (LDAR) program to insure compliance with Subpart VVa and any other requirements to control equipment leaks.

The equipment components proposed for the facility in VOC service will be subject to the standards, including controls, monitoring, repair, recordkeeping, and reporting requirements of Subpart VVa because the facility will have the design capacity to produce more than 1,102 tons

per year of methanol. Emissions from these components are identified as Fugitive Equipment Leaks. Marcellus Methanol will be required to identify all components subject to Subpart VVa and develop a leak detection and repair (LDAR) program for the facility.

4.5.4 40 CFR 60 Subpart NNN

40 CFR 60 Subpart NNN applies to an affected SOCMI facility [40 CFR §60.660(a)] that commences construction, modification, or reconstruction after December 30, 1983 [40 CFR §60.660(b)]. The affected facility is any of the following [40 CFR §60.660(b)(1), (2), (3)]:

- Each distillation unit not discharging its vent stream into a recovery system;
- Each combination of a distillation unit and the recovery system into which its vent stream is discharged; or
- Each combination of two or more distillation units and the common recovery system into which their vent streams are discharged.

Any affected facility that has the design capacity to produce less than 1,000 megagrams (Mg) per year (1,102 tons per year) is exempt from all provisions of this subpart except for the recordkeeping and reporting requirements. Each affected facility operated with a vent stream flow rate of less than 0.008 standard cubic meters per minute (scm/min) [0.28 standard cubic feet per minute (scfm)] is exempt from all provisions of this subpart except for the test method, procedure, recordkeeping, and reporting requirements. By definition, the list of chemicals produced by process units as a product, by-product, or intermediate covered under this subpart includes methanol, CAS No. [40 CFR §60.667].

Subpart NNN applies to methanol distillation if a vent stream exiting the unit is exhausted to the atmosphere from the distillation unit itself or through other process equipment such as the SMR. A vent stream is defined as a gas stream directly vented to the atmosphere or indirectly vented to the atmosphere through other process equipment. By definition, a vent stream excludes relief valve discharges and equipment leaks. Units with a total resource effectiveness (TRE) index greater than 8 are not required to meet the monitoring requirements under 60.663.

If applicable, emissions standards require one of the following:

- Reduce TOC emissions by 98% (weight);
- TOC (less methane and ethane) less than 20 ppmvd @3% O_2;
- Use of a flare that meets the specifications of 60.18; or
- Maintain a TRE index of greater than 1 without VOC control devices.

Because the distillation area has a vent stream routed to the SMR, Subpart NNN applies to the project. Combustion of the vent stream in the SMR will reduce TOC emissions by 98 percent. Thus, the project will meet the emissions requirements of Subpart NNN.

4.5.5 40 CFR 60 Subpart RRR

Subpart RRR applies to an affected SOCMI facility [40 CFR §60.700(a)] that commences construction, modification, or reconstruction after June 29, 1990 [40 CFR §60.700(b)]. The affected facility is any of the following [40 CFR §60.700(b)(1), (2), (3)]:

- Each reactor process not discharging its vent stream into a recovery system;

- Each combination of a reactor process and the recovery system into which its vent stream is discharged; or
- Each combination of two or more reactor processes and the common recovery system into which their vent streams are discharged.

Any affected facility that has the design capacity to produce less than 1,000 Mg/yr (1,102 ton/yr) is exempt from all provisions of this subpart except for the recordkeeping and reporting requirements. Other exemptions include: (1) a facility operated with a vent stream flow rate less than 0.011 scm/min (0.39 scfm); and (2) a vent stream from an affected facility that is routed to a distillation unit subject to Subpart NNN and has no other releases to the air except for a pressure relief valve. Both of these exemptions have some monitoring, recordkeeping and reporting requirements under Subpart RRR.

By definition, the list of chemicals produced by process units as a product, by-product, or intermediate covered under this subpart includes methanol, CAS No. 67-56-1 [40 CFR §60.707].

The SMR and methanol reactors will begin construction after June 29, 1990, the facility will produce a listed chemical, and will include a recovery system for the vent stream. A vent stream is defined as a gas stream directly vented to the atmosphere from a reactor process or indirectly vented to the atmosphere through other process equipment such as the SMR. The reactor vent stream will be discharged to a distillation unit regulated under Subpart NNN. However, part of the reactor vent stream (off-gas recovery) is routed to the SMR and then emitted to atmosphere after combustion in the SMR. Therefore, the project is subject to Subpart RRR.

Subpart RRR emissions standards require one of the following:

- Reduce TOC emissions by 98% (weight);
- TOC (less methane and ethane) less than 20 ppmvd @3% O_2;
- Use of a flare that meets the specifications of 60.18; or
- Maintain a TRE index of greater than 1 without VOC control devices.

The project will comply with Subpart RRR by reducing TOC by 98 weight percent.

Non-Applicable NSPS Regulations

The following NSPS are evaluated for reference purposes, but do not apply to Marcellus Methanol:

4.5.6 40 CFR 60 Subparts Db and Dc

40 CFR 60 Subpart Db applies to steam generating units capable of combusting more than 100 MMBtu/hr heat input of fuels, which is constructed, modified, or reconstructed after June 19, 1984. 40 CFR 60 Subpart Dc applies to steam generating units capable of combusting more than 10 but less than 100 MMBtu/hr heat input of fuels, which is constructed, modified, or reconstructed after June 19, 1984. The provisions of 40 CFR 60 Subparts Db and Dc will not apply to the SMR because it meets the rule's definition of a process heater. These rules do not apply to the startup heater because it is not a steam generating unit.

4.6 National Emission Standards for Hazardous Air Pollutants and Maximum Achievable Control Technology (40 CFR 61 and 40 CFR 63)

National Emission Standards for Hazardous Air Pollutants (NESHAPs) apply to specific pollutants, as codified in 40 CFR 61, and to specific source categories, as codified in 40 CFR 63, NESHAPs for Source Categories. The regulations in 40 CFR 63 contain standards for maximum achievable control technology (MACT) that apply mainly to major sources of HAP emissions – defined as a stationary source that has the potential to emit 10 tpy of any single HAP or 25 tpy of any combination of HAPs. However, in a few instances, MACT standards have been promulgated for HAP area sources (e.g., engines and boilers). NESHAP standards have been adopted by reference in 45CSR34 for standards in effect as of June 1, 2015.

None of the NESHAPs regulations apply to the proposed facility. The following NESHAP standards are evaluated for reference purposes because they potentially apply to SOCMI facilities, but they will not apply to Marcellus Methanol:

- 40 CFR 61 Subpart FF - National Emission Standard for Benzene Waste Operations;
- 40 CFR 63 Subpart F - National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry;
- 40 CFR 63 Subpart G - National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater; and
- 40 CFR 63 Subpart H - National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks.

4.6.1 40 CFR 61 Subpart FF

The provisions of Subpart FF apply to owners and operators of chemical manufacturing plants, coke by-product recovery plants, and petroleum refineries, and includes owners and operators of hazardous waste treatment, storage, and disposal facilities that treat, store, or dispose of hazardous waste generated by any facility listed in this paragraph. The waste streams at hazardous waste treatment, storage, and disposal facilities subject to the provisions of this subpart are benzene-containing hazardous waste from any facility listed in paragraph (a) of this section. A hazardous waste treatment, storage, and disposal facility is a facility that must obtain a hazardous waste management permit under subtitle C of the Solid Waste Disposal Act.

This section applies to waste storage tanks, surface impoundments, drain systems, containers and treatment systems. If the benzene quantity handled is less than 10 Mg/year, then certain portions of Subpart FF do not apply. The Marcellus Methanol facility will not handle benzene waste and is therefore not subject to this subpart.

4.6.2 40 CFR 63 Subparts F, G, and H

40 CFR 63 Subpart F, National Emissions Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry; Subpart G, National Emissions Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater; and Subpart H, National Emissions Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Equipment Leaks apply to major HAP sources. The proposed project will be a minor HAP source. Therefore, these subparts will not apply to the project.

4.7 Chemical Accident Prevention Provisions (40 CFR 68)

The Chemical Accident Prevention provisions in 40 CFR 68 apply to facilities that have more than a threshold quantity of a regulated toxic or flammable substance in a process [40 CFR §68.10(a)]. The proposed facility will not conduct any activities involving more than a threshold quantity of a regulated substance, including any use, storage, manufacturing, handling, or on-site movement of such substances, or combination of these activities. This includes the syngas in the process (contains both hydrogen and methane, each with less than 10,000 pounds in the process at any one time) and the proposed aqueous ammonia storage tank associated with the SCR (ammonia content less than 20 percent by weight). However, the general duty provisions will apply to the proposed facility.

4.8 West Virginia Code of State Regulations (45CSR)

Emissions sources at the Marcellus Methanol facility will be required to comply with regulations established by the WVDEP under 45 CSR. Following is a discussion of regulations applicable to the project.

4.8.1 45CSR2 Particulate Air Pollution from Combustion of Fuel

Combustion emissions from the SMR and startup heater will be subject to §45-2-3 (visible emissions) and §45-2-4 (weight emissions standards). Opacity from the units will be limited to 10 percent based on a six-minute block average. An applicant may petition for a different opacity standard under §45-2-3 if the applicant can demonstrate that the 10 percent opacity cannot be achieved. §45-2-4 limits particulate emissions based on the “type” of combustion unit. The types of units include:

- Type 'a' means any fuel burning unit which has as its primary purpose the generation of steam or other vapor to produce electric power for sale.
- Type 'b' means any fuel burning unit not classified as a Type 'a' or Type 'c' unit such as industrial pulverized-fuel-fired furnaces, cyclone furnaces, gas-fired and liquid-fuel-fired units.
- Type 'c' means any hand-fired or stoker-fired fuel burning unit not classified as a Type 'a' unit.

The SMR and the startup heater are “Type b” fuel burning devices. Particulate emissions (pounds per hour [lb/hour]) for the SMR are limited to 0.09 times the heat input of 114.8 MMBtu/hour, or 10.3 lb/hour. For the startup heater, particulate emissions are limited to 0.09 times the heat input of 2.55 MMBtu/hour or 0.23 lb/hour.

4.8.2 45CSR13 Permit Requirements

Permit requirements for sources that are not subject to PSD or NNSR are contained in 45CSR13. Sources that have the potential to emit in excess of the following are required to obtain a construction permit under 45CSR13:

- 6 pounds per hour and 10 tons per year of any regulated air pollutant;
- 144 pounds per calendar day, of any regulated air pollutant; and
- 2 pounds per hour or 5 tons per year of hazardous air pollutants considered on an aggregated basis;

In addition, 45CSR13 requires a facility to obtain a permit if there are potential emissions of one or more pollutants listed in Table 45-13A in the amounts greater than those listed in Table 4-1.

Table 4-1. 45CSR13 Toxic Air Pollutant Applicability Thresholds

Pollutant	Applicability Threshold (lb/year)
Acrylonitrile	500
Allyl Chloride	10,000
Arsenic Compounds (Inorganic)	200
Asbestos	14
Benzene	100
Beryllium	0.8
1,3 Butadiene	500
Carbon Tetrachloride	1,000
Chloroform	1,000
Ethylene Dichloride	1,000
Ethylene Oxide	500
Formaldehyde	1,000
Lead or lead compounds	1,200
Mercury	200
Methylene Chloride	5,000
Propylene Oxide	5,000
Trichloroethylene	10,000
Vinyl Chloride	1,000
Vinylidene Chloride	2,000

The project will have VOC, NO_X, and CO emissions greater than 6 pounds per hour and 10 tons per year. As previously noted, the project will not trigger major source requirements under PSD or NNSR. Therefore, a state minor source permit will be required under 45CSR13. Note that the project will not emit any of the toxic air pollutants listed in Table 4-1.

45CSR13 also specifies public notice requirements for minor source permits. Three notice levels are specified as follows:

Notice Level A. This notice of application is required at the time the permit application is submitted to WVDEP. The notice requires the applicant (Marcellus Methanol) to place a legal advertisement in a newspaper of general circulation in the area where the source will be located. A permit will not be issued until at least thirty (30) days' notice has been provided to the public. The project will be subject to Notice Level A requirements.

Notice Level B. This legal notice requirement is in addition to the Notice Level A requirements for construction and modification applications for sources subject to 45CSR16 (PSD), 45CSR27 (Toxic Air Pollutants) and 45CSR34 (Hazardous Air Pollutants), and all other applications not subject to the provisions of subsections 8.3 or 8.5. Notification Level B requires WVDEP to publish a legal notice of the agency's intent to issue a permit in a newspaper of general circulation in the area where the source is or will be located. Construction, modification or operating permits will not be issued until at least thirty (30) days' notice has been provided to the public. The project is not subject to 45CSR16, 45CSR27 or 45CSR34. Therefore, the Notice Level B requirements do not apply.

Notice Level C. This legal notice requirement is in addition to the Notice Level A requirements for sources for which the agency intends to issue a permit to limit physical and operational capacity below major stationary source thresholds (including 45CSR14 [PSD], 45CSR19 [NNSR], 45CSR30 [Title V] and 45CSR34 [Hazardous Air Pollutants]). Under Notice Level C, WVDEP is required to publish a legal notice of the agency's intent to issue a permit in a newspaper of general circulation in the area where the source is or will be located. Construction, modification or operating permits will not be issued until at least thirty (30) days' notice has been provided to the public. The Notice Level C requirements will apply.

WVDEP has published draft revisions to CSR13 for public notice. One key change that will take effect in 2017 is streamlining public notice requirements such that the Notice Level A will no longer be required for construction permits. Construction permits will be subject to public notice requirements before permit issuance.

45CSR13 also provides timelines for issuing permits. §45-13-5 specifies that the permit review timeline is 90 days after the permit application is determined to be complete. The completeness determination is a 30-day period. In addition, the permit timeline includes allows for an additional 30 days for public comment for a total potential timeline of 150 days.

§45-13-5 also provides a listing of allowable activities that may be conducted prior to permit issuance. Commencement of these activities are at the owner's risk that the permit may not be issued in accordance with the application. Allowed activities include:

- land clearing;
- removal of stumps and roots;
- excavation, grading, and soil compaction for temporary and final grades;
- digging and constructing foundations;
- demolition of structures (must consider issues such as asbestos and contamination issues);
- upgrade of utility support facilities;
- construct or modify buildings or structures that are offices or warehouses;
- order equipment and procure supplies; and
- receive equipment for storage off or on-site.

Lastly, §45-13-16 allows for a source to submit an application to commence construction prior to permit issuance.

4.8.3 45CSR21 Volatile Organic Compounds (VOCs)

45CSR21 contains regulations relating to the control of VOCs for listed source categories for Putnam, Kanawha, Cabell, Wayne, and Wood Counties. Because the project is located in Marshall County, these regulations do not apply.

4.8.4 45CSR22 Air Quality Management Fees

45CSR22 establishes fees for permits to construct and certificates to operate. §45-22-3.4a requires all applicants filing for a permit to construct, modify, or relocate submit a permit

application fee of $1,000. §45-22-3.4b imposes additional fees for sources subject to PSD, NNSR, NSPS, NESHAPS, or Toxic Air Pollutants. The project is subject to four NSPS subparts. The additional fee for NSPS sources is $1,000. Therefore, the total fee is $2,000.

4.8.5 45CSR27 Control Emissions of Toxic Air Pollutants

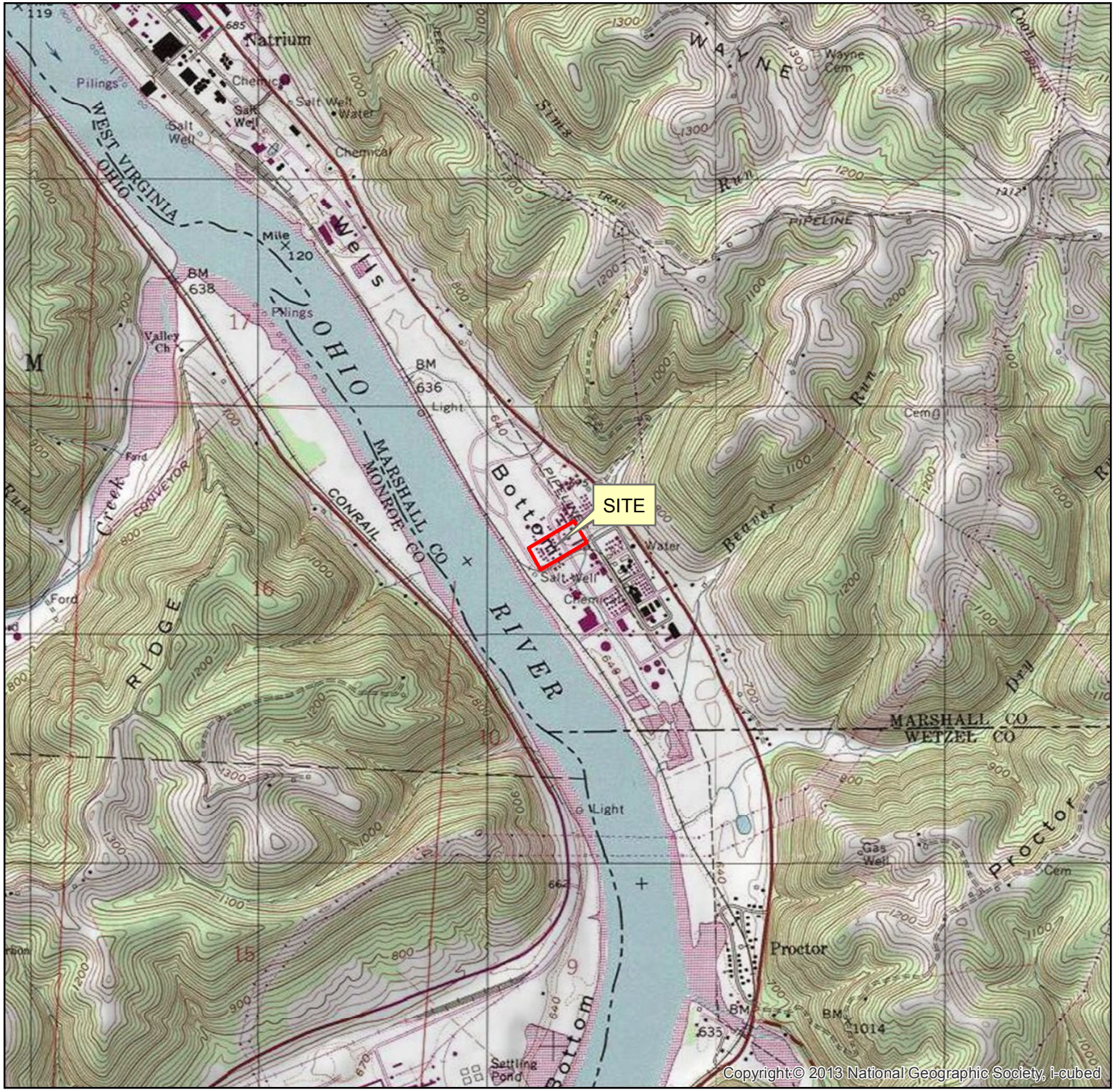
§45-27-3 applies to toxic air pollutants at chemical processing units that emits one or more pollutants at quantities specified in Table A of §45-27. §45-27-4, §45-27-5, §45-27-6, and §45-27-7 also apply to fugitive, tank, wastewater, and loading/unloading of rail cars and tank trucks of applicable toxic air contaminant emissions, respectively. Chemicals and threshold quantities in Table A of §45-27 are provided in Table 4-1 of this section under the discussion of 45CSR13. The proposed facility will not emit any of the contaminants listed in Table A and therefore, the rule does not apply to the project. However, emissions from the sources in this regulation emitting other organic pollutants will meet the requirements of NSPS Subparts Kb, VVa, NNN, and RRR, thereby limiting emissions.

4.9 Regulatory Analysis Summary

In summary, the Marcellus Methanol facility will be subject to the following requirements:

- The facility will be required to obtain a Construction Permit under 45CSR13 and associated fees at 45CSR22;
- The storage tanks will be subject to the Federal NSPS at 40 CFR 60 Subpart Kb;
- Fugitive equipment leaks will be subject to the Federal NSPS at 40 CFR 60 Subpart VVa and the WVDEP emissions standards at 45CSR21;
- The methanol distillation system will be subject to the Federal NSPS at 40 CFR 60 Subpart NNN;
- The SMR and methanol synthesis reactor system will be subject to the Federal NSPS at 40 CFR 60 Subpart RRR;
- The facility will be subject to the Federal NSPS at 40 CFR 60 Subpart A;
- The SMR and startup heater are subject to the WVDEP PM emissions standards at 45CSR2;

FIGURES



SITE LOCATION MAP

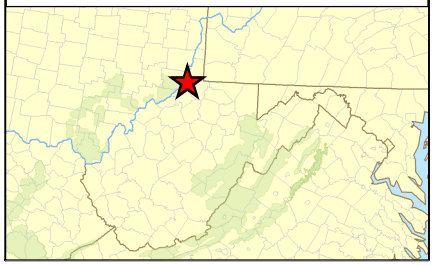
Marcellus Methanol

Marshall County, West Virginia

Legend

Approximate Site Boundary

Location of Site



Notes & Sources

USA Topo Maps basemap layer updated 03/01/15 obtained through ArcGIS Online.

0 2,000 Feet

N

amec foster wheeler
Amec Foster Wheeler
Environment & Infrastructure, Inc.
271 Mill Road
Chelmsford, MA 01824
(978) 692-9090

FIGURE 1

H:\PrimusGreenEnergy\Task1\MXD\Fig1_SiteLocus.mxd August 11, 2016 DWN: emily.gardiner CHKD: AKN

AERIAL SITE LOCATION

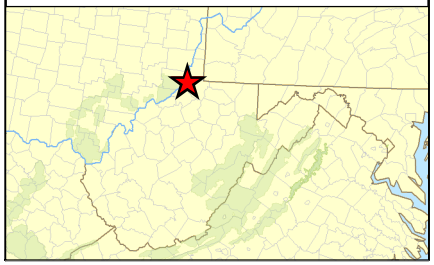
Marcellus Methanol

Marshall County, West Virginia

Legend

Approximate Site Boundary

Location of Site



Notes & Sources

0 500 Feet

N

amec foster wheeler

Amec Foster Wheeler
Environment & Infrastructure, Inc.
271 Mill Road
Chelmsford, MA 01824
(978) 692-9090

FIGURE 2

H:\PrimusGreenEnergy\Task1\MXD\Fig2_AerialSiteLocation.mxd August 09, 2016 DWN: emily.gardiner CHKD: AKN

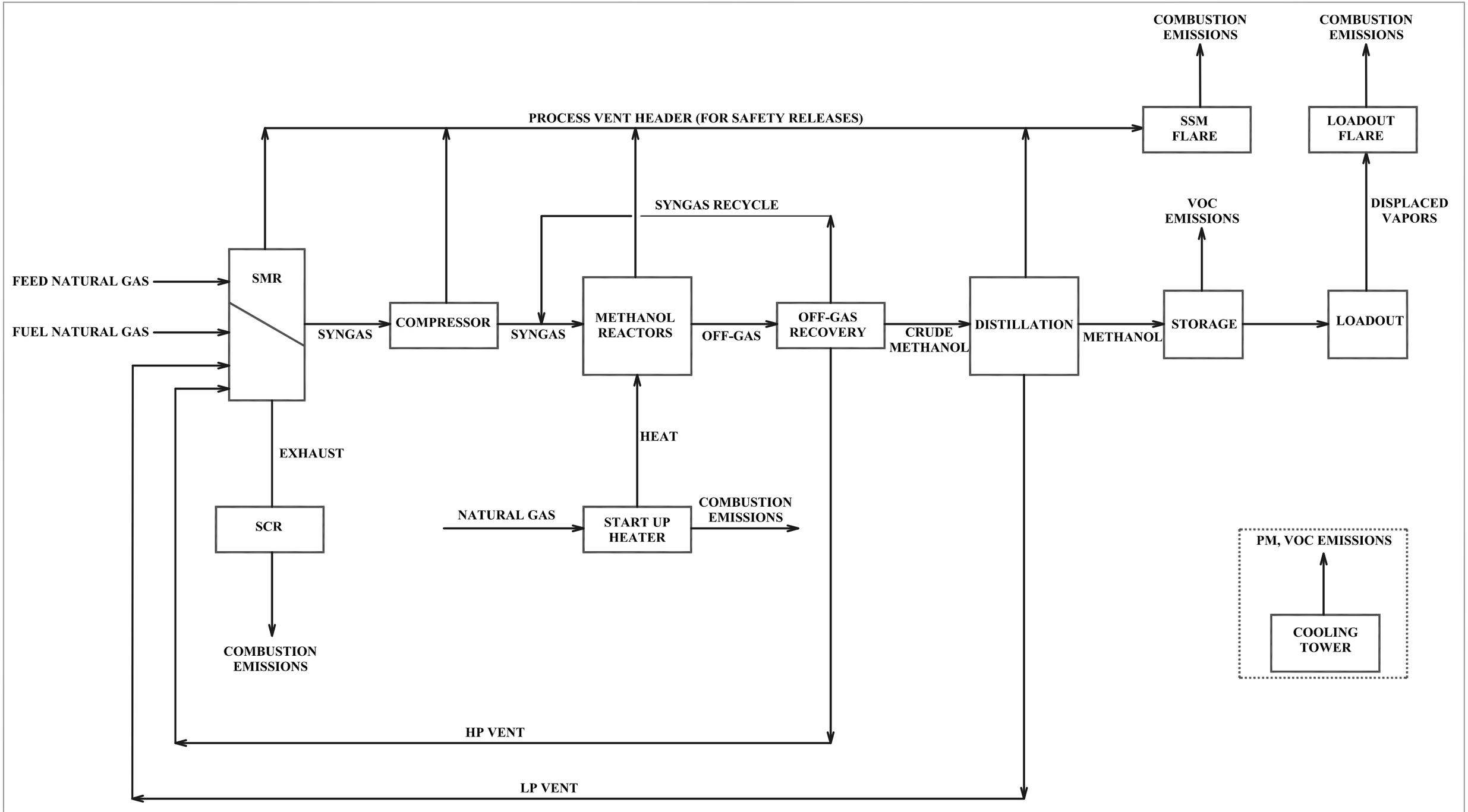


Figure 3. Process Flow Diagram

PRIMUS GREEN ENERGY HILLSBOROUGH, NJ			
PROJECT TITLE	MARCELLUS METHANOL PLANT PROCTOR,WV		
SCALE NONE		ACAD NO.	PROJ. NO.
DRAWN	DATE 10/03/2016	DRAWING NO. COM-PFD-001	REV.
CHECKED BY	DATE		

APPENDIX A

WVDEP Application Forms

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475
www.dep.wv.gov/daq

APPLICATION FOR NSR PERMIT AND TITLE V PERMIT REVISION (OPTIONAL)

PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN):

☒ **CONSTRUCTION** ☐ **MODIFICATION** ☐ **RELOCATION**
☐ **CLASS I ADMINISTRATIVE UPDATE** ☐ **TEMPORARY**
☐ **CLASS II ADMINISTRATIVE UPDATE** ☐ **AFTER-THE-FACT**

PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY):

☐ **ADMINISTRATIVE AMENDMENT** ☐ **MINOR MODIFICATION**
☐ **SIGNIFICANT MODIFICATION**

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS **ATTACHMENT S** TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant *(as registered with the WV Secretary of State's Office):*
Primus Green Energy, Inc.

2. Federal Employer ID No. ***(FEIN):***
22-3842180

3. Name of facility *(if different from above):*
Marcellus Methanol Plant

4. The applicant is the:
☒ **OWNER** ☐ **OPERATOR** ☐ **BOTH**

5A. Applicant's mailing address:
Primus Green Energy, Inc.
219 Homestead Road
Hillsborough, NJ 08844

5B. Facility's present physical address:
17595 Energy Road
Proctor, WV 26055

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☐ **YES** ☒ **NO**

- If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**
- If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

7. If applicant is a subsidiary corporation, please provide the name of parent corporation:

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**

- If **YES,** please explain: Lease

- If **NO,** you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be **constructed, modified, relocated, administratively updated** or **temporarily permitted** (e.g., coal preparation plant, primary crusher, etc.): Methanol production facility

10. North American Industry Classification System **(NAICS)** code for the facility:
32519

11A. DAQ Plant ID No. (for existing facilities only): N/A
–

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
N/A

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits,** please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B**.

The proposed site is leased from Covestro, which is located along State Route 2 approximately 5 miles north of New Martinsville and 19 miles south of Moundsville. A site location map is included as Attachment B.

12.B. New site address (if applicable):	12C. Nearest city or town:	12D. County:
17595 Energy Road Proctor, WV 26055	Proctor	Marshall
12.E. UTM Northing (KM): 4397.604	12F. UTM Easting (KM): 514.311	12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:
Construct and operate a new 160 metric ton per day methanol production facility on property leased from Covestro.

14A. Provide the date of anticipated installation or change: 01/15/2017 – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: / /	14B. Date of anticipated Start-Up if a permit is granted: 02/15/2018

14C. Provide a **Schedule** of the planned **Installation** of/**Change** to and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved). **Installation and startup of all units as noted in 14A and 14B**

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:
Hours Per Day 24 Days Per Week 7 Weeks Per Year 52

16. Is demolition or physical renovation at an existing facility involved? ☒ **YES** ☐ **NO**

17**. Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18**. Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process *(if known).* A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known).* Provide this information as **Attachment D.**

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

20. Include a **Table of Contents** as the first page of your application package.

21. Provide a **Plot Plan,** e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to ***Plot Plan Guidance***) **.**

– Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F.**

23. Provide a **Process Description** as **Attachment G.**

– Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**

– For chemical processes, provide a MSDS for each compound emitted to the air.

25. Fill out the **Emission Units Table** and provide it as **Attachment I.**

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J.**

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K.**

28. Check all applicable **Emissions Unit Data Sheets** listed below:

☒ Bulk Liquid Transfer Operations	☐ Haul Road Emissions	☐ Quarry
☒ Chemical Processes	☐ Hot Mix Asphalt Plant	☐ Solid Materials Sizing, Handling and Storage Facilities
☐ Concrete Batch Plant	☐ Incinerator	☒ Storage Tanks
☐ Grey Iron and Steel Foundry	☒ Indirect Heat Exchanger	

☒ General Emission Unit, specify: Cooling Tower

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L.**

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

☐ Absorption Systems	☐ Baghouse	☒ Flare
☐ Adsorption Systems	☐ Condenser	☐ Mechanical Collector
☐ Afterburner	☐ Electrostatic Precipitator	☐ Wet Collecting System

☒ Other Collectors, specify: Selective Catalytic Reduction (SCR)

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M.**

30. Provide all **Supporting Emissions Calculations** as **Attachment N,** or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O.**

➢ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and ***Example Legal Advertisement*** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33**. Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

☐ **YES** ☒ **NO**

➢ If **YES,** identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's ***"Precautionary Notice – Claims of Confidentiality"*** guidance found in the ***General Instructions*** as **Attachment Q.**

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

☐ Authority of Corporation or Other Business Entity	☐ Authority of Partnership
☐ Authority of Governmental Agency	☐ Authority of Limited Partnership

Submit completed and signed **Authority Form** as **Attachment R.**

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

Certification of Truth, Accuracy, and Completeness

I, the undersigned ☒ **Responsible Official** / ☐ **Authorized Representative,** hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE _____ *(Please use blue ink)* DATE: 10/4/16 *(Please use blue ink)*

35B. Printed name of signee: John Doyle		35C. Title: Chief Project Officer
35D. E-mail: jdoyle@primusge.com	36E. Phone: 908-281-6000 ext 146	36F. FAX: 908-431-5720
36A. Printed name of contact person (if different from above): N/A		36B. Title:
36C. E-mail:	36D. Phone:	36E. FAX:

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

☒ **Attachment A: Business Certificate**
☒ **Attachment B: Map(s)**
☒ **Attachment C: Installation and Start Up Schedule**
☒ **Attachment D: Regulatory Discussion**
☒ **Attachment E: Plot Plan**
☒ **Attachment F: Detailed Process Flow Diagram(s)**
☒ **Attachment G: Process Description**
☒ **Attachment H: Material Safety Data Sheets (MSDS)**
☒ **Attachment I: Emission Units Table**
☒ **Attachment J: Emission Points Data Summary Sheet**
☒ **Attachment K: Fugitive Emissions Data Summary Sheet**
☒ **Attachment L: Emissions Unit Data Sheet(s)**
☒ **Attachment M: Air Pollution Control Device Sheet(s)**
☒ **Attachment N: Supporting Emissions Calculations**
☐ **Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans**
☒ **Attachment P: Public Notice**
☐ **Attachment Q: Business Confidential Claims**
☐ **Attachment R: Authority Forms**
☐ **Attachment S: Title V Permit Revision Information**
☒ **Application Fee**

Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.

FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

☐ ***Forward 1 copy of the application to the Title V Permitting Group and:***
☐ ***For Title V Administrative Amendments:***
  ☐ ***NSR permit writer should notify Title V permit writer of draft permit,***
☐ ***For Title V Minor Modifications:***
  ☐ ***Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,***
  ☐ ***NSR permit writer should notify Title V permit writer of draft permit.***
☐ ***For Title V Significant Modifications processed in parallel with NSR Permit revision:***
  ☐ ***NSR permit writer should notify a Title V permit writer of draft permit,***
  ☐ ***Public notice should reference both 45CSR13 and Title V permits,***
  ☐ ***EPA has 45 day review period of a draft permit.***

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

Attachment A

Business Certificate

State of West Virginia

Certificate

I, Natalie E. Tennant, Secretary of State,
of the State of West Virginia, hereby certify that

Primus Green Energy Inc.

has filed the appropriate registration documents in my office according to the provisions of the West Virginia Code and hereby declare the organization listed above as duly registered with the Secretary of State's Office.

Given under my hand and
the Great Seal of West Virginia
on this day of
October 04, 2016

Natalie E Tennant

Secretary of State

STATE OF NEW JERSEY
DEPARTMENT OF THE TREASURY
DIVISION OF REVENUE AND ENTERPRISE SERVICES
SHORT FORM STANDING

PRIMUS GREEN ENERGY INC.
0400004778

I, the Treasurer of the State of New Jersey, do hereby certify that the above-named New Jersey Domestic For-Profit Corporation was registered by this office on November 25, 2001.

As of the date of this certificate, said business continues as an active business in good standing in the State of New Jersey, and its Annual Reports are current.

I further certify that the registered agent and office are:

VINCENT MARCHESE
219 HOMESTEAD ROAD
HILLSBOROUGH, NJ 08844

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal at Trenton, this 11th day of January, 2016

Ford M. Scudder
Acting State Treasurer

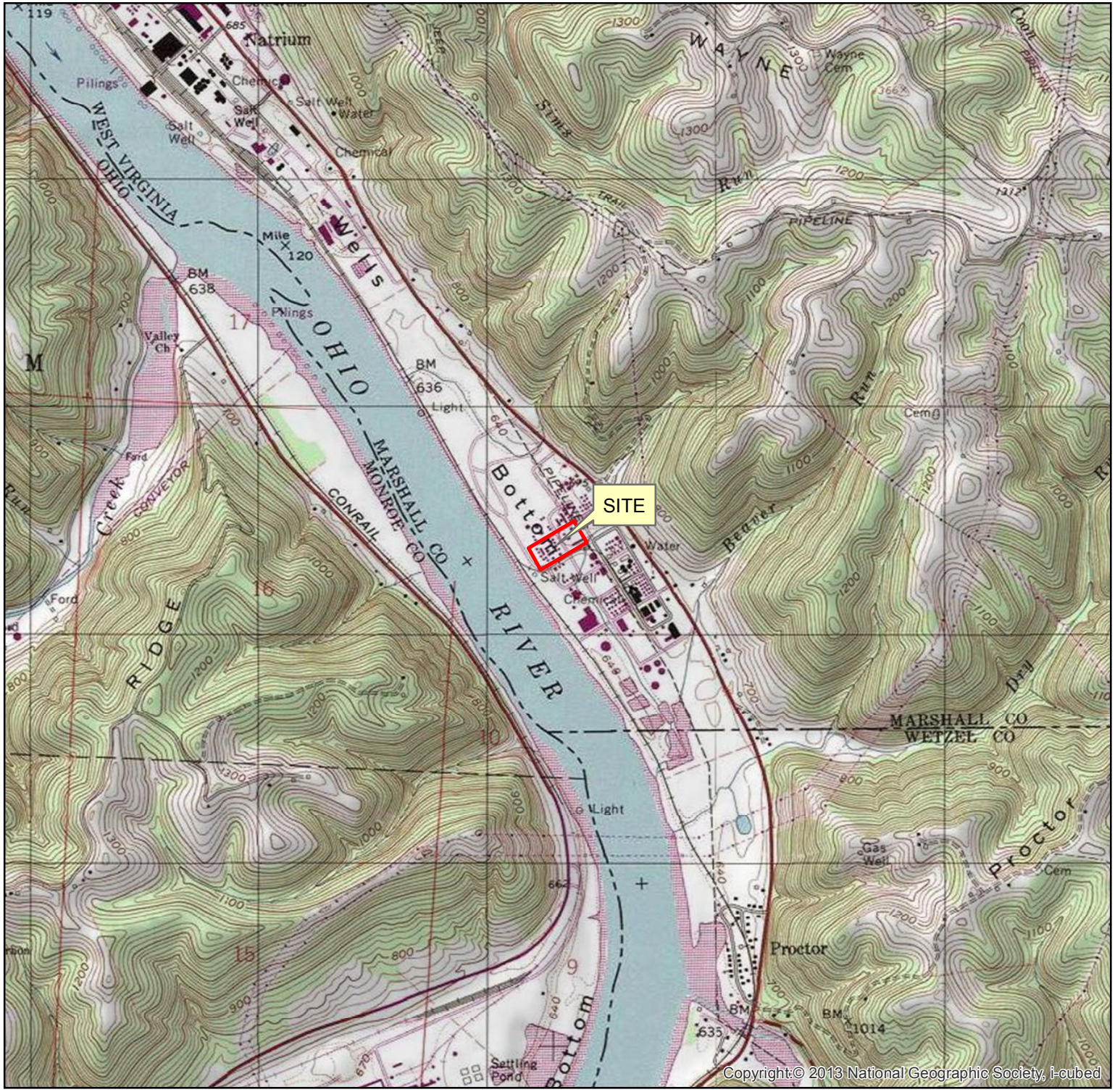
Certificate Number : 6011046881

Verify this certificate online at

https://www1.state.nj.us/TYTR_StandingCert/JSP/Verify_CERT.jsp

Attachment B

Maps



SITE LOCATION MAP

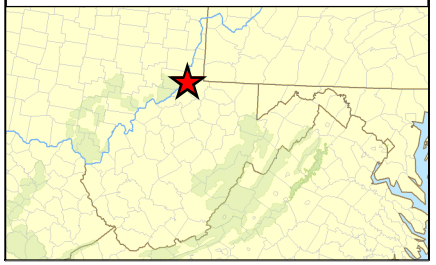
Marcellus Methanol

Marshall County, West Virginia

Legend

Approximate Site Boundary

Location of Site



Notes & Sources

USA Topo Maps basemap layer updated 03/01/15 obtained through ArcGIS Online.

0 2,000 Feet

N

amec foster wheeler
Amec Foster Wheeler
Environment & Infrastructure, Inc.
271 Mill Road
Chelmsford, MA 01824
(978) 692-9090

FIGURE 1

H:\PrimusGreenEnergy\Task1\MXD\Fig1_SiteLocus.mxd August 11, 2016 DWN: emily.gardiner CHKD: AKN

AERIAL SITE LOCATION

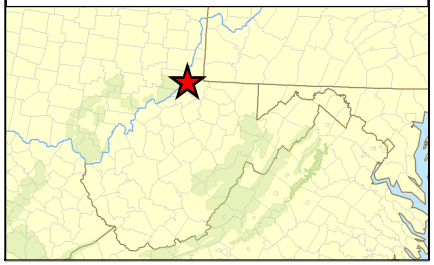
Marcellus Methanol

Marshall County, West Virginia

Legend

Approximate Site Boundary

Location of Site



Notes & Sources

0 500 Feet

N

amec foster wheeler

Amec Foster Wheeler
Environment & Infrastructure, Inc.
271 Mill Road
Chelmsford, MA 01824
(978) 692-9090

FIGURE 2

H:\PrimusGreenEnergy\Task1\MXD\Fig2_AerialSiteLocation.mxd August 09, 2016 DWN: emily.gardiner CHKD: AKN

Attachment C

Installation and Start Up Schedule

Attachment C. Installation and Start Up Schedule.

Primus Green Energy anticipates commencement of construction by January 15, 2017, pending receipt of a construction permit from WVDEP. Primus further anticipates start-up of the facility approximately February 15, 2018.

Attachment D

Regulatory Discussion

Attachment D. Regulatory Discussion.

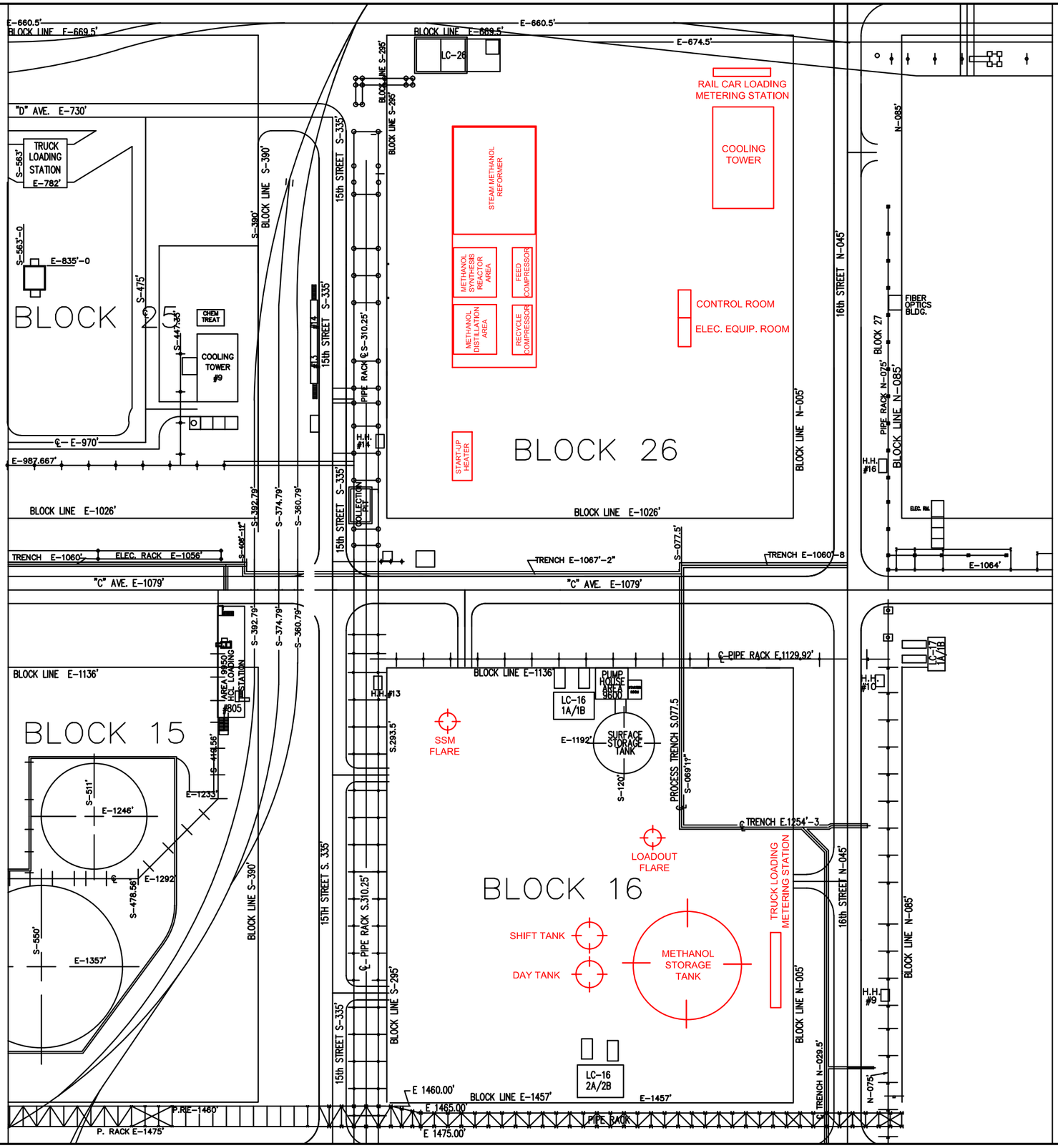
Please refer to Section 4 of the Technical Support Documentation.

Attachment E

Plot Plan

NORTH

PLANT NORTH



Notes:
1. New Primus Green Energy scope is displayed in "Red".
2. UTM Coordinates: 514.311 km Easting, 4397.604 km Northing, Zone 17
3. Elevation: 641 ft

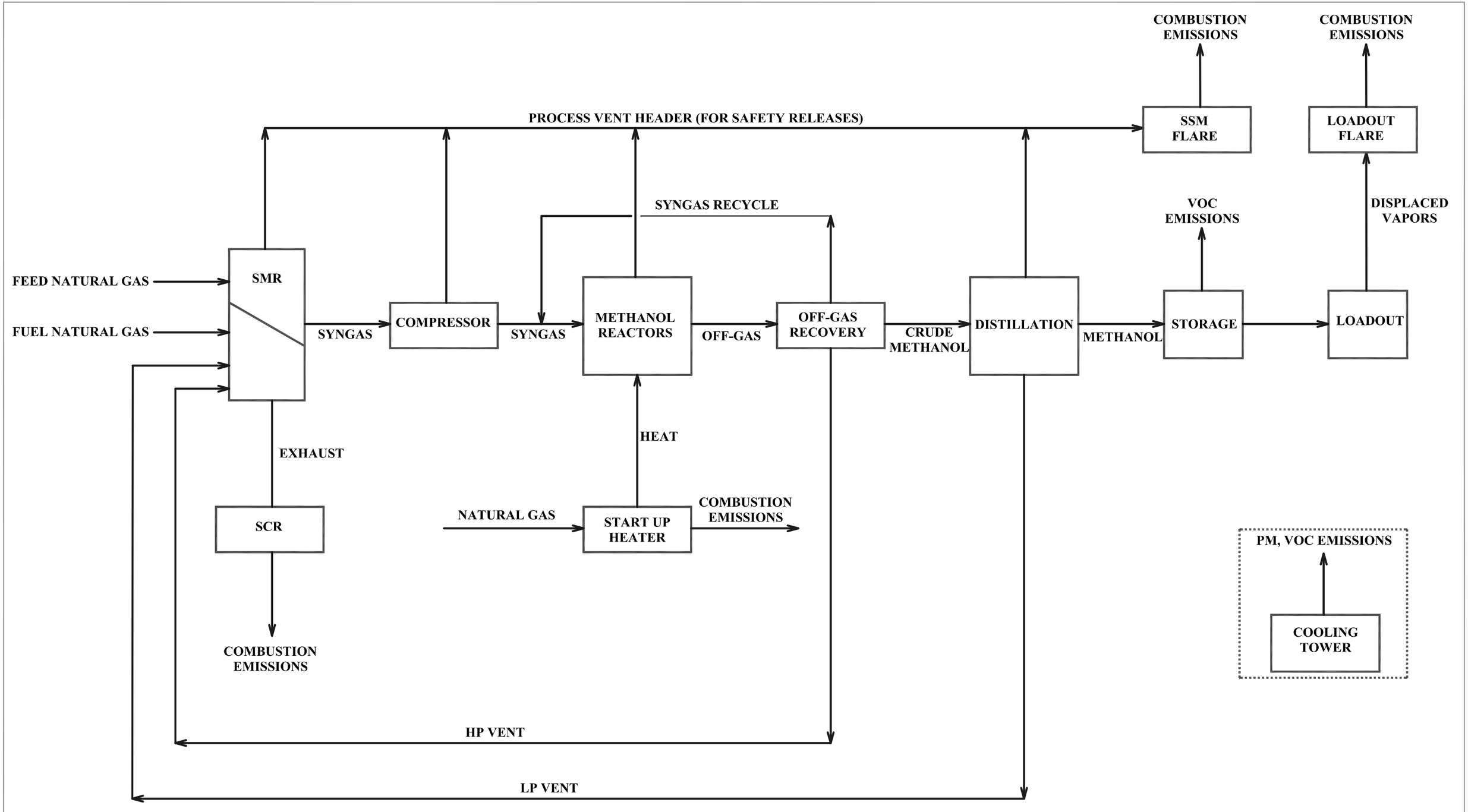
DRAWING SCALE

1"= 80'

PRIMUS GREEN ENERGY HILLSBOROUGH, NJ			
MARCELLUS METHANOL PLANT PROCTOR, WV			
SHEET SIZE 11" x 17"			
SCALE 1" = 80'		ACAD NO.	PROJ. NO.
DRAWN	DATE 10/03/2016	DRAWING NO. COM-BLK-001	REV.
CHECKED BY	DATE		

Attachment F

Process Flow Diagram



PRIMUS GREEN ENERGY HILLSBOROUGH, NJ			
PROJECT TITLE	MARCELLUS METHANOL PLANT PROCTOR,WV		
SCALE NONE		ACAD NO.	PROJ. NO.
DRAWN	DATE 10/03/2016	DRAWING NO.	REV.
CHECKED BY	DATE	COM-PFD-001	

Attachment G

Process Description

Attachment G. Process Description.

Please refer to Section 2 of the Technical Support Documentation.

Attachment H

Material Safety Data Sheets (MSDS)

SAFETY DATA SHEET

Version 6.3
Revision Date 09/23/2016
Print Date 10/02/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Methanol

Product Number : 322415
Brand : Sigma-Aldrich
Index-No. : 603-001-00-X

CAS-No. : 67-56-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311
Specific target organ toxicity - single exposure (Category 1), H370

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H301 + H311 + H331 Toxic if swallowed, in contact with skin or if inhaled
H370 Causes damage to organs.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.

P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P311	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor.
P307 + P311	IF exposed: Call a POISON CENTER or doctor/ physician.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Methyl alcohol
Formula	:	CH_4O
Molecular weight	:	32.04 g/mol
CAS-No.	:	67-56-1
EC-No.	:	200-659-6
Index-No.	:	603-001-00-X
Registration number	:	01-2119433307-44-XXXX

Hazardous components

Component	Classification	Concentration
Methanol		
	Flam. Liq. 2; Acute Tox. 3; STOT SE 1; H225, H301 + H311 + H331, H370	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Methanol	67-56-1	TWA	200.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Headache		

		Nausea Dizziness Eye damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption		
		STEL	250.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Headache Nausea Dizziness Eye damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption		
		TWA	200.000000 ppm 260.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		ST	250.000000 ppm 325.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		TWA	200.000000 ppm 260.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Headache Nausea Dizziness Eye damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption		
		STEL	250 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Headache Nausea Dizziness Eye damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption		
		TWA	200 ppm 260 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		ST	250 ppm 325 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		TWA	200 ppm 260 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

		STEL	250 ppm 325 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		Skin notation		
		TWA	200 ppm 260 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		Skin notation		
		C	1,000 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		
		PEL	200 ppm 260 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		
		STEL	250 ppm 325 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Methanol	67-56-1	Methanol	15.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		Methanol	15 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Skin contact	Long-term systemic effects	40mg/kg BW/d
Consumers	Skin contact	Long-term systemic effects	8mg/kg BW/d
Consumers	Ingestion	Long-term systemic effects	8mg/kg BW/d
Workers	Skin contact	Acute systemic effects	40mg/kg BW/d
Consumers	Skin contact	Acute systemic effects	8mg/kg BW/d
Consumers	Ingestion	Acute systemic effects	8mg/kg BW/d
Workers	Inhalation	Acute systemic effects	260 mg/m3
Workers	Inhalation	Acute local effects	260 mg/m3
Workers	Inhalation	Long-term systemic effects	260 mg/m3
Workers	Inhalation	Long-term local effects	260 mg/m3
Consumers	Inhalation	Acute systemic effects	50 mg/m3
Consumers	Inhalation	Acute local effects	50 mg/m3
Consumers	Inhalation	Long-term systemic effects	50 mg/m3
Consumers	Inhalation	Long-term local effects	50 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Soil	23.5 mg/kg
Marine water	15.4 mg/l
Fresh water	154 mg/l
Fresh water sediment	570.4 mg/kg
Onsite sewage treatment plant	100 mg/kg

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 31 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	pungent
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -98 °C (-144 °F)
f)	Initial boiling point and boiling range	64.7 °C (148.5 °F)
g)	Flash point	9.7 °C (49.5 °F) - closed cup

h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 36 %(V) Lower explosion limit: 6 %(V)
k)	Vapour pressure	130.3 hPa (97.7 mmHg) at 20.0 °C (68.0 °F) 546.6 hPa (410.0 mmHg) at 50.0 °C (122.0 °F) 169.27 hPa (126.96 mmHg) at 25.0 °C (77.0 °F)
l)	Vapour density	1.11
m)	Relative density	0.791 g/mL at 25 °C (77 °F)
n)	Water solubility	completely miscible
o)	Partition coefficient: n-octanol/water	log Pow: -0.77
p)	Auto-ignition temperature	455.0 °C (851.0 °F) at 1,013 hPa (760 mmHg)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	Not explosive
t)	Oxidizing properties	The substance or mixture is not classified as oxidizing.

9.2 Other safety information

Minimum ignition energy	0.14 mJ
Conductivity	< 1 µS/cm
Relative vapour density	1.11

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Acid chlorides, Acid anhydrides, Oxidizing agents, Alkali metals, Reducing agents, Acids

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LDLO Oral - Human - 143 mg/kg
Remarks: Lungs, Thorax, or Respiration:Dyspnea. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

LD50 Oral - Rat - 1,187 - 2,769 mg/kg

LC50 Inhalation - Rat - 4 h - 128.2 mg/l

LC50 Inhalation - Rat - 6 h - 87.6 mg/l

LD50 Dermal - Rabbit - 17,100 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation

Respiratory or skin sensitisation
Maximisation Test - Guinea pig
Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
Ames test
S. typhimurium
Result: negative

in vitro assay
fibroblast
Result: negative
Mutation in mammalian somatic cells.

Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)
Mouse - male and female
Result: negative

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
Damage to fetus not classifiable

Fertility classification not possible from current data.

Specific target organ toxicity - single exposure
Causes damage to organs.

Specific target organ toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
No aspiration toxicity classification

Additional Information
RTECS: PC1400000

Effects due to ingestion may include:, Headache, Dizziness, Drowsiness, metabolic acidosis, Coma, Seizures., Methyl alcohol may be fatal or cause blindness if swallowed.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	mortality LC50 - Lepomis macrochirus (Bluegill) - 15,400.0 mg/l - 96 h
	NOEC - Oryzias latipes - 7,900 mg/l - 200 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - > 10,000.00 mg/l - 48 h
Toxicity to algae	Growth inhibition EC50 - Scenedesmus capricornutum (fresh water algae) - 22,000.0 mg/l - 96 h

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 5 d Result: 72 % - rapidly biodegradable
Biochemical Oxygen Demand (BOD)	600 - 1,120 mg/g
Chemical Oxygen Demand (COD)	1,420 mg/g
Theoretical oxygen demand	1,500 mg/g

12.3 Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 72 d at 20 °C - 5 mg/l Bioconcentration factor (BCF): 1.0

12.4 Mobility in soil

Will not adsorb on soil.

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

Additional ecological information	Avoid release to the environment.
Stability in water	at 19 °C83 - 91 % - 72 h Remarks: Hydrolyses on contact with water.Hydrolyses readily.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1230 Class: 3 Packing group: II
Proper shipping name: Methanol
Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1230 Class: 3 (6.1) Packing group: II EMS-No: F-E, S-D
Proper shipping name: METHANOL

IATA
UN number: 1230 Class: 3 (6.1) Packing group: II
Proper shipping name: Methanol

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Methanol	67-56-1	2012-03-16

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H301	Toxic if swallowed.
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H311	Toxic in contact with skin.
H331	Toxic if inhaled.
H370	Causes damage to organs.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3

Reactivity Hazard: 0

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 6.3 Revision Date: 09/23/2016 Print Date: 10/02/2016

Attachment I

Emission Units Table

Attachment I

Emission Units Table

(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
EU01	EP01	Steam Methane Reformer Process Heater	Upon Receipt of Permit	114.8 MMbtu/hr	New	SCR01
EU02	EP02	Startup Heater	Upon Receipt of Permit	2.55 MMBtu/hr	New	None
EU03	EP01	Methanol Synthesis Reactors	Upon Receipt of Permit	211.6 ton/d crude methanol	New	SMR01
EU04	EP01	Methanol Distillation	Upon Receipt of Permit	176.4 ton/d methanol	New	SMR01
EU05	EP03	Product Storage Tank (Internal Floating Roof)	Upon Receipt of Permit	1,260,000 gallons	New	None
EU06	EP04	Shift Tank (Horizontal)	Upon Receipt of Permit	30,000 gallons	New	None
EU07	EP05	Off-Spec Tank (Horizontal)	Upon Receipt of Permit	30,000 gallons	New	None
EU08	EP06	Product Loading Rack (Trucks)	Upon Receipt of Permit	400 gal/min	New	FLARE01
EU09	EP06	Product Loading Rack (Railcars)	Upon Receipt of Permit	800 gal/min	New	FLARE01
EU10	EP07	Cooling Tower	Upon Receipt of Permit	2,000 gal/min	New	None
EU11	EP08	Process Vent Header (Various SSM Releases)	Upon Receipt of Permit	225 MMBtu/hr	New	FLARE02
---	---	Fugitive VOC Emissions Equipment Component Leaks	Upon Receipt of Permit	N/A	New	None

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

Attachment J

Emission Points Data Summary Sheet

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]	Emission Concentration [7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
EP01	Upward Vertical Stack	EU01 EU03 EU04	SMR Synthesis Reactors Distillation	SCR01	SCR	C	8,760	NO_X	53.91	236.11	15.27	66.90	Gas	EE	
								CO	4.49	19.68	4.49	19.68	Gas	EE	
								VOC	0.90	3.94	0.90	3.94	Gas	EE	
								$PM/PM_{10}/PM_{2.5}$	0.45	1.97	0.45	1.97	Solid	EE	
								SO_2	0.27	1.18	0.27	1.18	Gas	EE	
								HAP	0.45	1.96	0.45	1.96	Gas	EE	
								n-hexane	0.43	1.87	0.43	1.87	Gas	EE	
								CO_2e	28,609	125,306	28,609	125,306	Gas	EE	
EP02	Upward Vertical Stack	EU02	Startup Heater		None	C	8,760	NO_X	0.25	1.10	0.25	1.10	Gas	EE	
								CO	0.21	0.92	0.21	0.92	Gas	EE	
								VOC	0.01	0.06	0.01	0.06	Gas	EE	
								$PM/PM_{10}/PM_{2.5}$	0.02	0.08	0.02	0.08	Solid	EE	
								SO_2	0.001	0.006	0.001	0.006	Gas	EE	
								HAP	0.005	0.02	0.005	0.02	Gas	EE	
								n-hexane	0.005	0.02	0.005	0.02	Gas	EE	
								CO_2e	302	1,322	302	1,322	Gas	EE	
EP03	Internal Floating Roof Tank	EU05	Product Storage Tank		None	C	8,760	VOC	0.04	0.12	0.04	0.12	Gas	EE	
								HAP	0.04	0.12	0.04	0.12	Gas	EE	
								methanol	0.04	0.12	0.04	0.12	Gas	EE	

Attachment J
EMISSION POINTS DATA SUMMARY SHEET (continued)

Table 1: Emissions Data (continued)

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]	Emission Concentration [7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
EP04, EP05 Total	Horizontal Tanks	EU06 EU07	Shift Tank Off-Spec Tank		None	C	8,760	VOC	0.61	1.90	0.61	1.90	Gas	EE	
								HAP	0.61	1.90	0.61	1.90	Gas	EE	
								methanol	0.61	1.90	0.61	1.90	Gas	EE	
EP06	Flare	EU08 EU09	Loadout Trucks Railcars	FLARE01	Flare	C (pilot); displaced vapor vent time a function of truck or railcar size, pumping rate, and maximum plant production capacity	8,760	NO_X	0.18	0.81	0.18	0.81	Gas	EE	
								CO	0.98	4.39	0.98	4.39	Gas	EE	
								VOC	62.76	8.47	1.26	0.17	Gas	EE	
								$PM/PM_{10}/PM_{2.5}$	0.006	0.03	0.006	0.03	Solid	EE	
								SO_2	0.002	0.007	0.002	0.007	Gas	EE	
								HAP	62.76	8.47	1.26	0.17	Gas	EE	
								methanol	62.76	8.47	1.26	0.17	Gas	EE	
								CO_2e	368	1,642	368	1,642	Gas	EE	
EP07	Cooling Tower	EU10	Cooling Tower		None	C	8,760	$PM/PM_{10}/PM_{2.5}$	0.25	1.10	0.25	1.10	Solid	EE	
								VOC	0.08	0.37	0.08	0.37	Gas	EE	
								HAP	0.08	0.37	0.08	0.37	Gas	EE	
								methanol	0.08	0.37	0.08	0.37	Gas	EE	

Attachment J
EMISSION POINTS DATA SUMMARY SHEET (continued)

Table 1: Emissions Data (continued)

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]	Emission Concentration [7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
EP08	Flare	EU11	Process Vent Header (Various SSM Releases)	FLARE02	Flare	C (pilot); vent time a function of frequency and duration of SSM events	8,760	NO_X	15.32	1.50	15.32	1.50	Gas	EE	
								CO	8,616	68.93	83.37	8.17	Gas	EE	
								VOC	9,634	3.09	31.54	3.09	Gas	EE	
								$PM/PM_{10}/PM_{2.5}$	0.55	0.05	0.55	0.05	Solid	EE	
								SO_2	0.13	0.01	0.13	0.01	Gas	EE	
								CO_2e	26,384	2,585	26,384	2,585	Gas	EE	

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

[1] Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

[2] Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).

[3] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, and Noble Gases.

[4] Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[5] Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[6] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

[7] Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data								
Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
EP01	3.94	572	50,329	68.90	641	135	4397.604	514.311
EP02	0.5	1,050	1,481	126	641	TBD	4397.604	514.311
EP03	80	Ambient	Varies	Varies	641	TBD	4397.604	514.311
EP04	TBD	Ambient	Varies	Varies	641	TBD	4397.604	514.311
EP05	TBD	Ambient	Varies	Varies	641	TBD	4397.604	514.311
EP06	TBD	TBD	106.9	TBD	641	TBD	4397.604	514.311
EP07	7.0 (each)	94.4	117,200 (each) 234,400 (total)	50.8	641	TBD	4397.604	514.311
EP08	TBD	TBD	TBD	TBD	641	TBD	4397.604	514.311

[1] Give at operating conditions. Include inerts.
[2] Release height of emissions above ground level.

Attachment K

Fugitive Emissions Data Summary Sheet

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? ☐ Yes ☒ No ☐ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? ☐ Yes ☒ No ☐ If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? ☒ Yes ☐ No ☐ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? ☒ Yes ☐ No ☐ If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads						
Unpaved Haul Roads						
Storage Pile Emissions						
Loading/Unloading Operations	See Attachment J					
Wastewater Treatment Evaporation & Operations						
Equipment Leaks (various proportions of syngas and methanol)	VOC HAP methanol	Does not apply	7.02 6.83 6.83	Does not apply	2.55 2.42 2.42	EE
General Clean-up VOC Emissions						
Other						

[1] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. DO NOT LIST H_2, H_2O, N_2, O_2, and Noble Gases.

[2] Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[3] Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[4] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

Attachment L

Emissions Unit Data Sheets

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Control Device ID No. (must match List Form): SCR01

Equipment Information

1. Manufacturer: TBD	2. Model No. TBD Serial No. TBD
3. Number of units: 1	4. Use Steam Methane Reformer Process Heater (EU01)
5. Rated Boiler Horsepower: N/A hp	6. Boiler Serial No.: TBD
7. Date constructed: Upon Receipt of Permit	8. Date of last modification and explain: N/A
9. Maximum design heat input per unit: 114.8 ×10^6 BTU/hr	10. Peak heat input per unit: ×10^6 BTU/hr
11. Steam produced at maximum design output: N/A LB/hr psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☒ Natural Gas Burner ☒ Others, specify Process Gases (see Figure 3)	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☒ Induced	16. Percent of ash retained in furnace: N/A %
17. Will flyash be reinjected? ☐ Yes ☒ No	18. Percent of carbon in flyash: N/A %

Stack or Vent Data

19. Inside diameter or dimensions: 3.94 ft.	20. Gas exit temperature: 572 °F
21. Height: 135 ft.	22. Stack serves: ☒ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: 50,329 ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	8,000 ft^3/hr	206,300 ft^3/hr	TPH	
	Annually	$\times 10^3$ gal	70.1 $\times 10^6$ ft^3/hr	1,807 $\times 10^6$ ft^3/hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft^3	gr/100 ft^3	Maximum: wt. %	
	Ash (%)				Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	1,020 BTU/ft^3	BTU/ft^3	BTU/lb	
	Source					
	Supplier					
	Halogens (Yes/No)					
	List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture: TBD

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
18,986 acfm @ 95 °F, 14.7 PSIA, % moisture

33. Emission rate at rated capacity: 85,100 flue gas lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	4.49			
Hydrocarbons	0.90			
NO_x	53.91			
Pb	0.0001			
PM_{10}	0.45			
SO_2	0.27			
VOCs	0.90			
Other (specify) HAP	0.45			
CO2e	28,609			

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	4.49			
Hydrocarbons	0.90			
NO_x	15.27			
Pb	0.0001			
PM_{10}	0.45			
SO_2	0.27			
VOCs	0.90			
Other (specify) HAP	0.45			
CO2e	28,609			

39. How will waste material from the process and control equipment be disposed of?
N/A

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit. Yes

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet? Yes

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**

Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Control Device ID No. (must match List Form): None

Equipment Information

1. Manufacturer: TBD	2. Model No. TBD Serial No. TBD
3. Number of units: 1	4. Use Startup Heater (EU02)
5. Rated Boiler Horsepower: N/A hp	6. Boiler Serial No.: TBD
7. Date constructed: Upon Receipt of Permit	8. Date of last modification and explain: N/A
9. Maximum design heat input per unit: 2.55 $\times 10^6$ BTU/hr	10. Peak heat input per unit: $\times 10^6$ BTU/hr
11. Steam produced at maximum design output: N/A LB/hr psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☒ Natural Gas Burner ☐ Others, specify	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☒ Induced	16. Percent of ash retained in furnace: N/A %
17. Will flyash be reinjected? ☐ Yes ☒ No	18. Percent of carbon in flyash: N/A %

Stack or Vent Data

19. Inside diameter or dimensions: 0.5 ft.	20. Gas exit temperature: 1,050 °F
21. Height: TBD ft.	22. Stack serves: ☒ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: 1,481 ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25.						
	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	2,500 ft^3/hr	ft^3/hr	TPH	
	Annually	$\times 10^3$ gal	21.9 $\times 10^6$ ft^3/hr	$\times 10^6$ ft^3/hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft^3	gr/100 ft^3	Maximum: wt. %	
	Ash (%)				Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	1,020 BTU/ft^3	BTU/ft^3	BTU/lb	
	Source					
	Supplier					
	Halogens (Yes/No)					
	List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture: TBD

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	0.21			
Hydrocarbons	0.01			
NO_x	0.25			
Pb	0.000001			
PM_{10}	0.02			
SO_2	0.001			
VOCs	0.01			
Other (specify) HAP	0.005			
CO2e	302			

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	all same as above			
Hydrocarbons				
NO_x				
Pb				
PM_{10}				
SO_2				
VOCs				
Other (specify)				

39. How will waste material from the process and control equipment be disposed of?
N/A

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit. N/A

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet? Yes

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**

Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment L
EMISSIONS UNIT DATA SHEET
CHEMICAL PROCESS

For chemical processes please fill out this sheet and all supplementary forms (see below) that apply. Please check all supplementary forms that have been completed.

☒ *Emergency Vent Summary Sheet*
☒ *Leak Sources Data Sheet*
☒ *Toxicology Data Sheet*
☒ *Reactor Data Sheet*
☒ *Distillation Column Data Sheet*

1. Chemical process area name and equipment ID number (as shown in *Equipment List Form*)
   Steam Methane Reformer (EU01), Methanol Synthesis Reactors (EU03), and Methanol Distillation (EU04)

2. Standard Industrial Classification Codes (SICs) for process(es)
   NAICS 32519

3. List raw materials and ☐ attach MSDSs
   Natural Gas

4. List Products and Maximum Production and ☒ attach MSDSs

Description and CAS Number	Maximum Hourly (lb/hr)	Maximum Annual (ton/year)
methanol (CAS 67-56-1)	14,700	64,375

5. Complete the *Emergency Vent Summary Sheet* for all emergency relief devices.

6. Complete the *Leak Source Data Sheet* and describe below or attach to application the leak detection or maintenance program to minimize fugitive emissions. Include detection instruments, calibration gases or methods, planned inspection frequency, and record-keeping, and similar pertinent information. If subject to a rule requirement (e.g. 40CFR60, Subpart VV), please list those here.

   The facility will be subject to the 40 CFR 60 Subpart VVa requirements. See information provided in the included technical documentation.

7. Clearly describe below or attach to application Accident Procedures to be followed in the event of an accidental spill or release.

   The facility is designed for accidental releases to be vented to the SSM Flare. See information provided in the included technical documentation.

8A. Complete the *Toxicology Data Sheet* or attach to application a toxicology report (an up-to-date material safety data sheets (MSDS) may be used) outlining the currently known acute and chronic health effects of each compound or chemical entity emitted to the air. If these compounds have already been listed in Item 3, then a duplicate MSDS sheet is not required. Include data such as the OSHA time weighted average (TWA) or mutagenicity, teratogenicity, irritation, and other known or suspected effects should be addressed. Indicate where these are unknown, and provide references.

8B. Describe any health effects testing or epidemiological studies on these compounds that are being or may be conducted by the company or required under TSCA, RCRA or other federal regulations. Discuss the persistence in the environment of any emission (e.g. pesticides, etc.).

9. **Waste Products** - Waste products status: (If source is subject to RCRA or 45CSR25, please contact the Hazardous Waste Section of WVDEP, OAQ at (304) 926-3647.)

9A. Types and amounts of wastes to be disposed: Small amounts to be sent to Covestro's WWTP

9B. Method of disposal and location of waste disposal facilities: N/A

Carrier: Phone:

9C. Check here if approved USEPA/State Hazardous Waste Landfill will be used ☐ N/A

10. Maximum and Projected Typical Operating Schedule for process or project as a whole (circle appropriate units).

circle units:	(hrs/day) (hr/batch)	(days), (batches/day), (batches/week)	(days/yr), (weeks/year)
10A. Maximum	24 hours per day	7 days per week	52 weeks per year
10B. Typical	24 hours per day	7 days per week	52 weeks per year

11. Complete a *Reactor Data Sheet* for each reactor in this chemical process.

12. Complete a *Distillation Column Data Sheet* for each distillation column in this chemical process.

13. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
REPORTING	TESTING

MONITORING. Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

RECORDKEEPING. Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING. Please describe the proposed frequency of reporting of the recordkeeping.

TESTING. Please describe any proposed emissions testing for this process equipment or air pollution control device.

14. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

INFORMATION REQUIRED FOR CHEMICAL PROCESSES

The notes listed below for chemical processes are intended to help the applicant submit a complete application to the OAQ; these notes are not intended to be all inclusive. The requirements for a complete application for a permit issued under 45CSR13 are designed to provided enough information for a permit reviewer to begin a technical review. Additional information beyond that identified may be required to complete the technical review of any individual application.

Process Description

Please keep these points in mind when completing your process description as part of this permit application.

1. Provide a general process overview. This brief, but complete, process description should include chemical or registered trademark names of chemical products, intermediates, and/or raw materials to be produced or consumed, and the ultimate use(s) of the product(s). A list of the various chemical compounds is helpful.
2. Describe each process step. Include the process chemistry and stoichiometrically balanced reaction equation or material mass balance on all components.
3. Describe the methods and equipment used to receive, store, handle, and charge raw materials.
4. Describe the methods and equipment used to handle, store, or package final products and intermediates.
5. Provide process flow diagrams or equipment layout drawings which clearly show the process flow relationships among all pieces of process and control equipment. Identify all air emission discharge points. Discuss instrumentation and controls for the process.
6. Discuss the possibilities of process upsets, the duration and frequency of upsets, and consequences (including air emissions) of these upsets. Include a description of rupture discs, pressure relief valves, and secondary containment systems.
7. Discuss any fugitive emissions and the methods used to minimize them.
8. Include the following plans for the process if available:
   a. preventative maintenance and malfunction abatement plan (recommended for all control equipment).
   b. continuous emissions (in-stack) monitoring plan
   c. ambient monitoring plan
   d. emergency response plan

Regulatory Discussion

The following state and federal air pollution control regulations may be applicable to your chemical process. You should review these regulations carefully to determine if they apply to your process. Please summarize the results of your review in your permit application along with any other regulations you believe are applicable.

- Title 45 Legislative Rule Division of Environmental Protection, Office of Air Quality contains West Virginia's air pollution control regulations, including the following promulgated rules which may require emissions reductions or control technologies for your chemical process:
  a. 45CSR27 - Best Available Technology (BAT) for Toxic Air Pollutants (TAPs)
  b. 45CSR21 - VOC emissions controls for ozone maintenance in Kanawha, Cabell, Putnam, Wayne, and Wood counties.
  c. 45CSR13 (Table 45-13A) - plantwide emission thresholds for permitting for certain pollutants.
- Federal Guidelines for case-by-case MACT determinations under section 112(g) of the 1990 CAAA for individual and total HAPs greater than 10 and 25 tons per year, respectively.
- There are also subparts of the federal Standards of Performance for New Stationary Sources (NSPS), 40CFR60 60, and the National Emission Standards for Hazardous Air Pollutants (NESHAP) at 40CFR61 and 40CFR63, which apply to various chemical and nonchemical processes. These subparts are too numerous to list here, but these areas of the federal regulations should be consulted carefully to determine applicability to your process.

Emissions Summary and Calculations

Please keep these points in mind when submitting your emissions calculations as part of this permit application.

1. For each pollutant, provide the basis for the emissions estimate and for all emission reduction(s) or control efficiency(ies) claimed.
2. For all batch processes provide the following
   a. Emissions of each pollutant in pound(s) per batch, from each process step
   b. Annual emissions based on number of batches requested per year
   c. The total time for each process step and the duration of the emissions during the process step
   d. Total batch time, total emissions per batch (or per day), and annual emissions based on the number of batches requested per year.

EMERGENCY VENT SUMMARY SHEET

List below all emergency relief devices, rupture disks, safety relief valves, and similar openings that will vent only under abnormal conditions.

Emission Point ID[1]	Equipment to Relief Vent (type, ID if available)[2]	Relief Vents (type) & Set Pressure (psig)	Name of Chemical(s) or Pollutants Controlled	Worst Case Emission per Release Event (lbs)
EP08	See Attachment N of supporting documentation			

All routine vents (non-emergency) should be listed on the *Emission Points Data Summary Sheet.*

[1] Indicate the emission point, if any, to which source equipment normally vents. Do not assign emission point ID numbers to each emergency relief vent or device.

[2] List all emergency relief devices next to the piece of equipment from which they control releases.

LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components[1]	Number of Components Monitored by Frequency[2]	Average Time to Repair (days)[3]	Estimated Annual Emission Rate (lb/yr)[4]
Pumps[5]	light liquid VOC[6,7]	See Attachment N of supporting documentation.			
	heavy liquid VOC[8]				
	Non-VOC[9]				
Valves[10]	Gas VOC				
	Light Liquid VOC				
	Heavy Liquid VOC				
	Non-VOC				
Safety Relief Valves[11]	Gas VOC				
	Non VOC				
Open-ended Lines[12]	VOC				
	Non-VOC				
Sampling Connections[13]	VOC				
	Non-VOC				
Compressors	VOC				
	Non-VOC				
Flanges	VOC				
	Non-VOC				
Other	VOC				
	Non-VOC				

[1 - 13] See notes on the following page.

Notes for Leak Source Data Sheet

1. For VOC sources include components on streams and equipment that contain greater than 10% w/w VOC, including feed streams, reaction/separation facilities, and product/by-product delivery lines. Do not include certain leakless equipment as defined below by category.

2. By monitoring frequency, give the number of sources routinely monitored for leaks, using a portable detection device that measures concentration in ppm. Do not include monitoring by visual or soap-bubble leak detection methods. "M/Q(M)/Q/SA/A/O" means the time period between inspections as follows:

   Monthly/Quarterly, with Monthly follow-up of repaired leakers/Quarterly/Semi-annual/Annually/Other (specify time period)

   If source category is not monitored, a single zero in the space will suffice. For example, if 50 gas-service valves are monitored quarterly, with monthly follow-up of those repaired, 75 are monitored semi-annually, and 50 are checked bimonthly (alternate months), with non checked at any other frequency, you would put in the category “valves, gas service:” 0/50/0/75/0/50 (bimonthly).

3. Give the average number of days, after a leak is discovered, that an attempt will be made to repair the leak.

4. Note the method used: MB - material balance; EE - engineering estimate; EPA - emission factors established by EPA (cite document used); O - other method, such as in-house emission factor (specify).

5. Do not include in the equipment count sealless pumps (canned motor or diaphragm) or those with enclosed venting to a control device. (Emissions from vented equipment should be included in the estimates given in the Emission Points Data Sheet.)

6. Volatile organic compounds (VOC) means the term as defined in 40 CFR □51.100 (s).

7. A light liquid is defined as a fluid with vapor pressure equal to or greater than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if 20% w/w or more of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a light liquid.

8. A heavy liquid is defined as a fluid with a vapor pressure less than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if less than 20% w/w of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a heavy liquid.

9. LIST CO, H_2S, mineral acids, NO, NO_2, SO_3, etc. DO NOT LIST CO_2, H_2, H_2O, N_2, O_2, and Noble Gases.

10. Include all process valves whether in-line or on an open-ended line such as sample, drain and purge valves. Do not include safety-relief valves, or leakless valves such as check, diaphragm, and bellows seal valves.

11. Do not include a safety-relief valve if there is a rupture disk in place upstream of the valve, or if the valve vents to a control device.

12 Open-ended lines include purge, drain and vent lines. Do not include sampling connections, or lines sealed by plugs, caps, blinds or second valves.

13. Do not include closed-purge sampling connections.

TOXICOLOGY DATA SHEET[1]

Descriptor Name/CAS Number	OSHA Limits[2]		Acute[3] TC_{LO} - Animal LC_{LO} - Animal LC_{50} - Animal	Chronic[4]	Irritation[5]	References
	TWA	CL				
Methanol (CAS 67-56-1)	200 ppm	N/A	See MSDS in Attachment H			

[1] Indicate by "ND" where no data exists, in company's knowledge.
[2] Time Weighted Average, Ceiling Limit, or other, with units.
[3] If inhalation data is not available, provide other data as available.
[4] Relying on animal or human studies, indicate if any data suggests: C = carcinogenicity, M = mutagenicity, T = teratogenecity, O = oncogenicity.
[5] Indicate if there are dermal or eye irritation effects and whether they are considered to be low, moderate, or severe.

REACTOR DATA SHEET

Provide the following information for <u>each</u> piece of equipment that is a potential or actual source of emissions as shown on the *Equipment List Form* and other parts of application.

Identification Number (as shown on *Equipment List Form*): EU01

1. Name and type of equipment (e.g. CSTR, plug flow, batch, etc.)
   Steam Methane Reformer

2. Type of operation ☐ Batch ☒ Continuous ☐ Semi-batch

3. Projected Actual Equipment Operating Schedule (complete appropriate lines):

   24 hrs/day 7 days/week 52 weeks/year

   hrs/batch batches/day, weeks (Circle one) day,weeks/yr (Circle one)

4. Feed Data Flow In = gal/hr, or gal/batch

Material Name & CAS No.	Phase[a]	Specific Gravity	Vapor Pressure[b]	Charge Rate			Fill Time (min/batch, run)[c]
				Normal	Max	Units	
natural gas	G			8,417		lb/hr	
steam	G			11,312		lb/hr	

a. S = Solid, L = Liquid, G = gas or vapor
b. At feed conditions
c. Total time that equipment is filling per batch or run (start-up), for tank or vessel-type equipment.

5. Provide all **chemical reactions** that will be involved (if applicable), including the residence time and any side reactions that may occur as well as gases that may be generated during these reactions. Indicate if the reaction(s) are exothermic or endothermic.
   natural gas to syngas, endothermic reaction

6. Maximum Temperature	7A. Maximum Pressure 7B. Max. Set Pressure for venting	
°C	mmHg	mmHg
F	psig	psig

8. Output Data Flow Out = gal/hr or gal/batch

Material Name and CAS No.	Phase	Specific Gravity	Vapor Pressure	Hourly or Batch Output Rate		
				Normal	Maximum	Units
syngas	G			in engineering design		lb/hr

9. Complete the following emission data for equipment connected to a header exhaust system, giving emissions levels before entering header system (i.e. before control equipment).

☐ Check here if not applicable

Emission Point ID (exhaust point of header system):

Material Name and CAS No.	Maximum Potential Emission Rate (lb/hr)	Method **
syngas	SSM conditions only (see Attachment N)	EE

** MB - material balance: EE - Engineering Estimate: TM - Test Measurement (submit test data): O - other (Explain)

10. Provide the following information pertaining to each condenser that may be attached to this reactor. Attach additional pages as necessary if more than one condenser is used for this reactor. Complete the Condenser Air Pollution Control Device Sheet if necessary.

☒ Check here if not applicable

10A. Cooling material

10B. Minimum and Maximum flowrate of cooling material (gal/hr)

10C. Inlet temperature of cooling material (°F)

10D. Outlet temperature of cooling material (°F)

10E. Pressure drop of gas to be condensed from inlet to outlet (psig)

10F. Inlet temperature of gas stream (°F)

10G. Outlet temperature of gas stream (°F)

10H. Number of passes

10I. Cooling surface area

11. Provide the following pertaining to auxiliary equipment that burns fuel (heaters, dryers, etc.):

☐ Check here if not applicable

11A. Type of fuel and maximum fuel burn rate, per hour:

See other attachments for SMR Process Heater (EU01)

11B. Provide maximum percent sulfur (S), ash content of fuel, and the energy content using appropriate units:

%S % Ash BTU/lb, std. ft^3/day, gal

(circle one)

11C. Theoretical combustion air requirement in SCFD per unit of fuel (circle appropriate unit) @ 70°F and 14.7 PSIA:

SCFD/lb, SCFD, gal (circle one)

11D. Percent excess air: %

11E. Type, amount, and BTU rating of burners and all other firing equipment that are planned to be used:

11F. Total maximum design heat input: $\times 10^6$ BTU/hr.

12. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
REPORTING	TESTING

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION OR AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT OR AIR POLLUTION CONTROL DEVICE.

13. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

NOTE: An *AIR POLLUTION CONTROL DEVICE SHEET* must be completed for any air pollution device(s) (except emergency relief devices) used to control emissions from this reactor.

REACTOR DATA SHEET

Provide the following information for <u>each</u> piece of equipment that is a potential or actual source of emissions as shown on the *Equipment List Form* and other parts of application.

Identification Number (as shown on *Equipment List Form*): EU03

1. Name and type of equipment (e.g. CSTR, plug flow, batch, etc.)
   Methanol Synthesis Reactors

2. Type of operation ☐ Batch ☒ Continuous ☐ Semi-batch

3. Projected Actual Equipment Operating Schedule (complete appropriate lines):

   24 hrs/day 7 days/week 52 weeks/year

   hrs/batch batches/day, weeks (Circle one) day,weeks/yr (Circle one)

4. Feed Data Flow In = gal/hr, or gal/batch

Material Name & CAS No.	Phase[a]	Specific Gravity	Vapor Pressure[b]	Charge Rate			Fill Time (min/batch, run)[c]
				Normal	Max	Units	
syngas (includes recycle)	G			in engineer-ing design			

a. S = Solid, L = Liquid, G = gas or vapor
b. At feed conditions
c. Total time that equipment is filling per batch or run (start-up), for tank or vessel-type equipment.

5. Provide all **chemical reactions** that will be involved (if applicable), including the residence time and any side reactions that may occur as well as gases that may be generated during these reactions. Indicate if the reaction(s) are exothermic or endothermic.
   syngas to crude methanol, exothermic reaction

6. Maximum Temperature	7A. Maximum Pressure 7B. Max. Set Pressure for venting	
°C	mmHg	mmHg
F	psig	psig

8. Output Data Flow Out = gal/hr or gal/batch

Material Name and CAS No.	Phase	Specific Gravity	Vapor Pressure	Hourly or Batch Output Rate		
				Normal	Maximum	Units
crude methanol	L			in engineering design		

9. Complete the following emission data for equipment connected to a header exhaust system, giving emissions levels before entering header system (i.e. before control equipment).

☐ Check here if not applicable

Emission Point ID (exhaust point of header system):

Material Name and CAS No.	Maximum Potential Emission Rate (lb/hr)	Method **
syngas	SSM conditions only (see Attachment N)	EE

** MB - material balance: EE - Engineering Estimate: TM - Test Measurement (submit test data): O - other (Explain)

10. Provide the following information pertaining to each condenser that may be attached to this reactor. Attach additional pages as necessary if more than one condenser is used for this reactor. Complete the Condenser Air Pollution Control Device Sheet if necessary.

☒ Check here if not applicable

10A. Cooling material

10B. Minimum and Maximum flowrate of cooling material (gal/hr)

10C. Inlet temperature of cooling material (°F)

10D. Outlet temperature of cooling material (°F)

10E. Pressure drop of gas to be condensed from inlet to outlet (psig)

10F. Inlet temperature of gas stream (°F)

10G. Outlet temperature of gas stream (°F)

10H. Number of passes

10I. Cooling surface area

11. Provide the following pertaining to auxiliary equipment that burns fuel (heaters, dryers, etc.):

☐ Check here if not applicable

11A. Type of fuel and maximum fuel burn rate, per hour:

See other attachments for Startup Heater (EU02)

11B. Provide maximum percent sulfur (S), ash content of fuel, and the energy content using appropriate units:

%S % Ash BTU/lb, std. ft^3/day, gal

(circle one)

11C. Theoretical combustion air requirement in SCFD per unit of fuel (circle appropriate unit) @ 70°F and 14.7 PSIA:

SCFD/lb, SCFD, gal (circle one)

11D. Percent excess air: %

11E. Type, amount, and BTU rating of burners and all other firing equipment that are planned to be used:

11F. Total maximum design heat input: $\times 10^6$ BTU/hr.

12. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
REPORTING	TESTING

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION OR AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT OR AIR POLLUTION CONTROL DEVICE.

13. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

NOTE: An *AIR POLLUTION CONTROL DEVICE SHEET* must be completed for any air pollution device(s) (except emergency relief devices) used to control emissions from this reactor.

DISTILLATION COLUMN DATA SHEET

Identification Number (as assigned on *Equipment List Form*): EU04

1. Name and type of equipment **Methanol Distillation**

#. Projected actual equipment operating schedule (complete appropriate lines):

24 hrs/day	7 days/week	52 weeks/year
hrs/batch	batches/day, batches/week (circle one)	days/yr, weeks/yr (circle one)

2. Number of stages (plates), excluding condenser in engineering design

3. Number of feed plates and stage location in engineering design

4. Specify details of any reheating, recycling, or stage conditioning along with the stage locations
   in engineering design

5. Specify reflux ratio, R (where R is defined as the ratio of the reflux to the overhead product, given symbolically as R=L/D, where L = liquid down column, D = distillation product)
   in engineering design

6. Specify the fraction of feed which is vaporized, f (where f is the molal fraction of the feed that leaves the feed plate continuously as vapor).
   less than 1 percent

7A. Type of condenser used: ☐ total ☐ partial ☐ multiple ☐ other

7B. For each condenser provide process operating details including all inlet and outlet temperatures, pressures, and compositions.
   in engineering design

8. Feed Characteristics
   A. Molar composition 73.7% methanol, 25.9% water
   B. Individual vapor pressure of each component
   C. Total feed stage pressure atmospheric
   D. Total feed stage temperature 175°F
   E. Total mass flow rate of each stream into the system - in engineering design

9. Overhead Product
   A. Molar composition of components 60.1% hydrogen, 32.1% methane, 4.0% methanol, 2.3% CO_2
   B. Vapor pressure of components
   C. Total mass flow rate of all streams leaving the system as overhead products 23.3 lb/hr (to SMR heater)

10. Bottom Product
   A. Molar composition of all components
   B. Total mass flow rate of all steams leaving the system as bottom products Trace amounts to Covestro WWTP

11. General Information **All in engineering design**
    A. Distillation column diameter
    B. Distillation column height
    C. Type of plates
    D. Plate spacing
    E. Murphree plate efficiency
    F. Any other information necessary of describe the operation of this distillation column.

12. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
    Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
REPORTING	TESTING

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION OR AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT OR AIR POLLUTION CONTROL DEVICE.

13. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

NOTE: An *AIR POLLUTION CONTROL DEVICE SHEET* must be completed for any air pollution device(s) (except emergency relief devices) used to control emissions from this distillation column.

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name Product Storage	2. Tank Name Product Storage
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) EU05	4. Emission Point Identification No. (as assigned on *Equipment List Form*) EP03
5. Date of Commencement of Construction (for existing tanks) N/A	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable) N/A	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). N/A	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): None	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 1,260,000 gallons	
9A. Tank Internal Diameter (ft) 80	9B. Tank Internal Height (or Length) (ft) 40
10A. Maximum Liquid Height (ft) N/A	10B. Average Liquid Height (ft) N/A
11A. Maximum Vapor Space Height (ft) N/A	11B. Average Vapor Space Height (ft) N/A
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 1,050,000 gallons	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
19,423,840	53,216

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 15

15. Maximum tank fill rate (gal/min): 40

16. Tank fill method: ☒ Submerged ☐ Splash ☐ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):
- ☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)
- ☐ External Floating Roof ___ pontoon roof ___ double deck roof
- ☐ Domed External (or Covered) Floating Roof
- ☒ Internal Floating Roof ___ vertical column support X self-supporting
- ☐ Variable Vapor Space ___ lifter roof ___ diaphragm
- ☐ Pressurized ___ spherical ___ cylindrical
- ☐ Underground
- ☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe) See TANKS sheets

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):
☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one)
☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal
☐ Vapor Mounted Resilient Seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:

ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:

LADDER WELL	
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:

GAUGE-HATCH/SAMPLE PORT	
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:

ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)

VACUUM BREAKER	
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

RIM VENT	
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

DECK DRAIN (3-INCH DIAMETER)	
OPEN:	90% CLOSED:

STUB DRAIN
1-INCH DIAMETER:

OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☒ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  - Vacuum Setting Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss Amount	Working Loss Units	Annual Loss (lb/yr)	Estimation Method[1]
methanol CAS 67-56-1				239.9	EPA (TANKS)

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name Product Storage	2. Tank Name Shift Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) EU06	4. Emission Point Identification No. (as assigned on *Equipment List Form*) EP04
5. Date of Commencement of Construction (for existing tanks) N/A	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable) N/A	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). N/A	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): None	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 30,000 gallons	
9A. Tank Internal Diameter (ft) 10.5	9B. Tank Internal Height (or Length) (ft) 46.5
10A. Maximum Liquid Height (ft) N/A	10B. Average Liquid Height (ft) N/A
11A. Maximum Vapor Space Height (ft) N/A	11B. Average Vapor Space Height (ft) N/A
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 25,000 gallons	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
19,423,840 (shared with off-spec tank)	53,216 (shared with off-spec tank)

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)
649 (shared with off-spec tank)

15. Maximum tank fill rate (gal/min) 40 (shared with off-spec tank)

16. Tank fill method ☒ Submerged ☐ Splash ☐ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):
- ☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof
  ___ other (describe)
- ☐ External Floating Roof ___ pontoon roof ___ double deck roof
- ☐ Domed External (or Covered) Floating Roof
- ☐ Internal Floating Roof ___ vertical column support X self-supporting
- ☐ Variable Vapor Space ___ lifter roof ___ diaphragm
- ☐ Pressurized ___ spherical ___ cylindrical
- ☐ Underground
- ☒ Other (describe) Horizontal

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe) See TANKS sheets

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):
☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one)
☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal
☐ Vapor Mounted Resilient Seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:

ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:

LADDER WELL	
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:

GAUGE-HATCH/SAMPLE PORT	
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:

ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)

VACUUM BREAKER	
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

RIM VENT	
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

DECK DRAIN (3-INCH DIAMETER)	
OPEN:	90% CLOSED:

STUB DRAIN
1-INCH DIAMETER:

OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☒ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  - Vacuum Setting — Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss Amount	Working Loss Units	Annual Loss (lb/yr)	Estimation Method[1]
methanol CAS 67-56-1				3804.6	EPA (TANKS)

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name Product Storage	2. Tank Name Off-Spec Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) EU07	4. Emission Point Identification No. (as assigned on *Equipment List Form*) EP05
5. Date of Commencement of Construction (for existing tanks) N/A	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable) N/A	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). N/A	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): None	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 30,000 gallons	
9A. Tank Internal Diameter (ft) 10.5	9B. Tank Internal Height (or Length) (ft) 46.5
10A. Maximum Liquid Height (ft) N/A	10B. Average Liquid Height (ft) N/A
11A. Maximum Vapor Space Height (ft) N/A	11B. Average Vapor Space Height (ft) N/A
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 25,000 gallons	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
19,423,840 (shared with shift tank)	53,216 (shared with shift tank)

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)
649 (shared with shift tank)

15. Maximum tank fill rate (gal/min) 40 (shared with off-spec tank)

16. Tank fill method ☒ Submerged ☐ Splash ☐ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):
- ☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof
  ___ other (describe)
- ☐ External Floating Roof ___ pontoon roof ___ double deck roof
- ☐ Domed External (or Covered) Floating Roof
- ☐ Internal Floating Roof ___ vertical column support X self-supporting
- ☐ Variable Vapor Space ___ lifter roof ___ diaphragm
- ☐ Pressurized ___ spherical ___ cylindrical
- ☐ Underground
- ☒ Other (describe) Horizontal

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe) See TANKS sheets

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):
☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one)
☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal
☐ Vapor Mounted Resilient Seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:

ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:

LADDER WELL	
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:

GAUGE-HATCH/SAMPLE PORT	
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:

ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)

VACUUM BREAKER	
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

RIM VENT	
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

DECK DRAIN (3-INCH DIAMETER)	
OPEN:	90% CLOSED:

STUB DRAIN
1-INCH DIAMETER:

OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☒ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  - Vacuum Setting — Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss Amount	Working Loss Units	Annual Loss (lb/yr)	Estimation Method[1]
methanol CAS 67-56-1				3804.6	EPA (TANKS)

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L
EMISSIONS UNIT DATA SHEET
BULK LIQUID TRANSFER OPERATIONS

Furnish the following information for each new or modified bulk liquid transfer area or loading rack, as shown on the *Equipment List Form* and other parts of this application. This form is to be used for bulk liquid transfer operations such as to and from drums, marine vessels, rail tank cars, and tank trucks.

Identification Number (as assigned on *Equipment List Form*): EU08

1. Loading Area Name: Product Loading Rack (Trucks)

2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply):
■ Drums ■ Marine Vessels ■ Rail Tank Cars ☒ Tank Trucks

3. Loading Rack or Transfer Point Data:

Number of pumps	1
Number of liquids loaded	1
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1

4. Does ballasting of marine vessels occur at this loading area?
■ Yes ■ No ☒ Does not apply

5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point:

All vessels are in dedicated methanol service.

6. Are cargo vessels pressure tested for leaks at this or any other location?
☒ Yes ■ No
If YES, describe:
At other locations. Responsibility of contractor.

7. Projected Maximum Operating Schedule (for rack or transfer point as a whole):

Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	24	24	24	24

days/week	7	7	7	7
weeks/quarter	13	13	13	13

8. Bulk Liquid Data *(add pages as necessary):*

Pump ID No.		T-01					
Liquid Name		Methanol					
Max. daily throughput (1000 gal/day)		576					
Max. annual throughput (1000 gal/yr)		19,424					
Loading Method [1]		SUB					
Max. Fill Rate (gal/min)		400					
Average Fill Time (min/loading)		18					
Max. Bulk Liquid Temperature (°F)		72					
True Vapor Pressure [2]		2.23 psi					
Cargo Vessel Condition [3]		U					
Control Equipment or Method [4]		Flare					
Minimum control efficiency (%)		98					
Maximum Emission Rate	Loading (lb/hr) Simultaneous with Railcars	1.26					
	Annual (lb/yr) Shared with Railcars	339					
Estimation Method [5]		EPA					

[1] BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill

[2] At maximum bulk liquid temperature

[3] B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)

[4] List as many as apply (complete and submit appropriate *Air Pollution Control Device Sheets*):CA = Carbon Adsorption LOA = Lean Oil AdsorptionCO = Condensation SC = Scrubber (Absorption)CRA = Compressor-Refrigeration-Absorption TO = Thermal Oxidation or Incineration
CRC = Compression-Refrigeration-Condensation VB = Dedicated Vapor Balance (closed system)

O = other (descibe)
[5] EPA = EPA Emission Factor as stated in AP-42 MB = Material Balance TM = Test Measurement based upon test data submittal O = other (describe)

9. **Proposed Monitoring, Recordkeeping, Reporting, and Testing** Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.	
MONITORING	RECORDKEEPING
REPORTING	TESTING
MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF	
RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.	
REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.	

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Attachment L
EMISSIONS UNIT DATA SHEET
BULK LIQUID TRANSFER OPERATIONS

Furnish the following information for each new or modified bulk liquid transfer area or loading rack, as shown on the *Equipment List Form* and other parts of this application. This form is to be used for bulk liquid transfer operations such as to and from drums, marine vessels, rail tank cars, and tank trucks.

Identification Number (as assigned on *Equipment List Form*): EU09

1. Loading Area Name: Product Loading Rack (Railcars)

2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply):

■ Drums ■ Marine Vessels ☒ Rail Tank Cars ■ Tank Trucks

3. Loading Rack or Transfer Point Data:

Number of pumps	1
Number of liquids loaded	1
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1

4. Does ballasting of marine vessels occur at this loading area?

■ Yes ■ No ☒ Does not apply

5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point:

All vessels are in dedicated methanol service.

6. Are cargo vessels pressure tested for leaks at this or any other location?

☒ Yes ■ No

If YES, describe:
At other locations. Responsibility of contractor.

7. Projected Maximum Operating Schedule (for rack or transfer point as a whole):

Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	24	24	24	24

days/week	7	7	7	7
weeks/quarter	13	13	13	13

8. Bulk Liquid Data *(add pages as necessary):*

Pump ID No.		R-01					
Liquid Name		Methanol					
Max. daily throughput (1000 gal/day)		1,152					
Max. annual throughput (1000 gal/yr)		19,424					
Loading Method [1]		SUB					
Max. Fill Rate (gal/min)		800					
Average Fill Time (min/loading)		38					
Max. Bulk Liquid Temperature (°F)		72					
True Vapor Pressure [2]		2.23 psi					
Cargo Vessel Condition [3]		U					
Control Equipment or Method [4]		Flare					
Minimum control efficiency (%)		98					
Maximum Emission Rate	Loading (lb/hr) Simultaneous with Trucks	1.26					
	Annual (lb/yr) Shared with Trucks	339					
Estimation Method [5]		EPA					

[1] BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill

[2] At maximum bulk liquid temperature

[3] B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)

[4] List as many as apply (complete and submit appropriate *Air Pollution Control Device Sheets*):CA = Carbon Adsorption LOA = Lean Oil AdsorptionCO = Condensation SC = Scrubber (Absorption)CRA = Compressor-Refrigeration-Absorption TO = Thermal Oxidation or Incineration
CRC = Compression-Refrigeration-Condensation VB = Dedicated Vapor Balance (closed system)

O = other (descibe)
[5] EPA = EPA Emission Factor as stated in AP-42 MB = Material Balance TM = Test Measurement based upon test data submittal O = other (describe)

9. **Proposed Monitoring, Recordkeeping, Reporting, and Testing** Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.	
MONITORING	RECORDKEEPING
REPORTING	TESTING
MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF	
RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.	
REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.	

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): EU10

1. Name or type and model of proposed affected source:

   Cooling Tower

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   2,000 gallons per minute of cooling water

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   N/A

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   Cooling tower drift (PM) and VOC due to potential equipment leaks per SCAQMD guidance

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

N/A

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

N/A

(c) Theoretical combustion air requirement (ACF/unit of fuel):

N/A @ °F and psia.

(d) Percent excess air: N/A

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

N/A

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

N/A

(g) Proposed maximum design heat input: N/A × 10^6 BTU/hr.

7. Projected operating schedule:

Hours/Day	24	Days/Week	7	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ °F and psia

a.	NO_X		lb/hr	grains/ACF
b.	SO_2		lb/hr	grains/ACF
c.	CO		lb/hr	grains/ACF
d.	PM_{10}	0.25	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	0.08	lb/hr	grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	HAP	0.08	lb/hr	grains/ACF
	methanol	0.08	lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
REPORTING	TESTING

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Attachment M

Air Pollution Control Device Sheets

Attachment M
Air Pollution Control Device Sheet
(OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): SCR01

Equipment Information

1. Manufacturer: TBD Model No. TBD	2. Control Device Name: Type: Selective Catalytic Reduction
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected:	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: 29,350 SCFM	10. Capacity:
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. Approximately 15 gal/hr (53 lb/hr) of 19% aqueous ammonia.	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse of disposal. N/A	

Gas Stream Characteristics

14. Are halogenated organics present?	☐ Yes	☒ No
Are particulates present?	☐ Yes	☒ No
Are metals present?	☐ Yes	☒ No

15. Inlet Emission stream parameters:	**Maximum**	**Typical**
Pressure (mmHg):	ambient	ambient
Heat Content (BTU/scf):	N/A	N/A
Oxygen Content (%):	2	2
Moisture Content (%):	24	24
Relative Humidity (%):	N/A	N/A

16. Type of pollutant(s) controlled: ☐ SO_x ☐ Odor
☐ Particulate (type): ☒ Other (NO_X)

17. Inlet gas velocity: TBD ft/sec

18. Pollutant specific gravity:

19. Gas flow into the collector:
50,329 ACFM @ 572 °F and 14.7 PSIA

20. Gas stream temperature:
Inlet: 572°F
Outlet: 572°F

21. Gas flow rate:
Design Maximum: 50,329 ACFM
Average Expected: 50,329 ACFM

22. Particulate Grain Loading in grains/scf:
Inlet: N/A
Outlet: N/A

23. Emission rate of each pollutant (specify) into and out of collector:

Pollutant	IN Pollutant		Emission Capture Efficiency %	OUT Pollutant		Control Efficiency %
	lb/hr	grains/acf		lb/hr	grains/acf	
A NO_X	53.91		100	15.27		72
B NH_3	0.0		N/A	0.32	5 ppmdv	N/A
C						
D						
E						

24. Dimensions of stack: Height 135 ft. Diameter 3.94 ft.

25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.

Particulate Distribution

26. Complete the table:	Particle Size Distribution at Inlet to Collector	Fraction Efficiency of Collector
Particulate Size Range (microns)	Weight % for Size Range	Weight % for Size Range
0 – 2		
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

28. Describe the collection material disposal system:

29. Have you included ***Other Collectores Control Device*** in the Emissions Points Data Summary Sheet? Yes

30. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING:	RECORDKEEPING:
REPORTING:	TESTING:

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment M
Air Pollution Control Device Sheet
(FLARE SYSTEM)

Control Device ID No. (must match Emission Units Table): FLARE01

Equipment Information

1. Manufacturer: TBD

   Model No. TBD

2. Method:
   - ☒ Elevated flare
   - ☐ Ground flare
   - ☐ Other

   Describe: Enclosed Flare

3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.

4. Method of system used:
   ☐ Steam-assisted ☒ Air-assisted ☐ Pressure-assisted ☐ Non-assisted

5. Maximum capacity of flare:
   - 161 scf/min
   - 9,625 scf/hr

6. Dimensions of stack:
   - Diameter 4 ft.
   - Height 20 ft.

7. Estimated combustion efficiency:
   (Waste gas destruction efficiency)
   - Estimated: 98 %
   - Minimum guaranteed: 98 %

8. Fuel used in burners:
   - ☒ Natural Gas
   - ☐ Fuel Oil, Number
   - ☐ Other, Specify:

9. Number of burners: 1

   Rating: 2.65 million BTU/hr

10. Will preheat be used? ☐ Yes ☒ No

11. Describe method of controlling flame:
    Air assist to provide smokeless combustion.

12. Flare height: 20 ft

13. Flare tip inside diameter: TBD ft

14. Natural gas flow rate to flare pilot flame per pilot light:
    - 1.0 scf/min
    - 60.0 scf/hr

15. Number of pilot lights: 1

    Total 0.06 million BTU/hr

16. Will automatic re-ignition be used?
    ☒ Yes ☐ No

17. If automatic re-ignition will be used, describe the method:
    Pressure detection system opens valve, vapor mixture flows through detonation arrestor to burner, vapor mixture ignited by pilot.

18. Is pilot flame equipped with a monitor? ☒ Yes ☐ No

    If yes, what type?
    - ☐ Thermocouple
    - ☐ Infra-Red
    - ☒ Ultra Violet
    - ☐ Camera with monitoring control room
    - ☐ Other, Describe:

19. Hours of unit operation per year: 8,760 assumed for pilot, hours of displaced vapors are a function of maximum annual production and vessel (truck or railcar) loading rates.

Steam Injection

20. Will steam injection be used? ☐ Yes ☒ No	21. Steam pressure PSIG Minimum Expected: Design Maximum:
22. Total Steam flow rate: LB/hr	23. Temperature: °F
24. Velocity ft/sec	25. Number of jet streams
26. Diameter of steam jets: in	27. Design basis for steam injected: LB steam/LB hydrocarbon
28. How will steam flow be controlled if steam injection is used?	

Characteristics of the Waste Gas Stream to be Burned

29.

Name	Quantity Grains of H_2S/100 ft^3	Quantity (LB/hr, ft^3/hr, etc)	Source of Material
displaced vapors	None	9,625 scf/hr, max	trucks, railcars

30. Estimate total combustible to flare:	1.3 scf/hr	LB/hr or ACF/hr
(Maximum mass flow rate of waste gas)	9,625 scf/hr	scfm

31. Estimated total flow rate to flare including materials to be burned, carrier gases, auxiliary fuel, etc.:
10,825 scf/hr (includes assist air) LB/hr or ACF/hr

32. Give composition of carrier gases:
air with methanol vapors

33. Temperature of emission stream: ambient °F Heating value of emission stream: 275 BTU/ft^3 Mean molecular weight of emission stream: MW = 30 lb/lb-mole	34. Identify and describe all auxiliary fuels to be burned. natural gas: 1,020 BTU/scf BTU/scf BTU/scf BTU/scf
35. Temperature of flare gas: TBD °F	36. Flare gas flow rate: 180 scf/min
37. Flare gas heat content: 275 BTU/ft^3	38. Flare gas exit velocity: TBD scf/min

39. Maximum rate during emergency for one major piece of equipment or process unit: 120 scf/min

40. Maximum rate during emergency for one major piece of equipment or process unit: 30,000 BTU/min

41. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):
None

42. Describe the collection material disposal system:
N/A

43. Have you included ***Flare Control Device*** in the Emissions Points Data Summary Sheet? Yes

44. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING:	RECORDKEEPING:
REPORTING:	TESTING:

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

45. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.
TBD

46. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
98% (preliminary)

47. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment M
Air Pollution Control Device Sheet
(FLARE SYSTEM)

Control Device ID No. (must match Emission Units Table): FLARE02

Equipment Information

1. Manufacturer: TBD

   Model No. TBD

2. Method: ☒ Elevated flare ☐ Ground flare ☐ Other
   Describe

3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.

4. Method of system used: TBD (vendor selection)
   ☐ Steam-assisted ☐ Air-assisted ☐ Pressure-assisted ☐ Non-assisted

5. Maximum capacity of flare:
   13,241 scf/min
   794,477 scf/hr

6. Dimensions of stack:
   Diameter 1.5 ft.
   Height 65 ft.

7. Estimated combustion efficiency:
   (Waste gas destruction efficiency)
   Estimated: 99.7 %
   Minimum guaranteed: TBD %

8. Fuel used in burners:
   ☒ Natural Gas
   ☐ Fuel Oil, Number
   ☐ Other, Specify:

9. Number of burners: 2
   Rating: 225 million BTU/hr

10. Will preheat be used? ☐ Yes ☒ No

11. Describe method of controlling flame:
    TBD (vendor selection)

12. Flare height: 65 ft

13. Flare tip inside diameter: TBD ft

14. Natural gas flow rate to flare pilot flame per pilot light: 1.5 scf/min
    90.0 scf/hr

15. Number of pilot lights: 2
    Total 0.09 million BTU/hr

16. Will automatic re-ignition be used?
    ☐ Yes ☒ No

17. If automatic re-ignition will be used, describe the method:

18. Is pilot flame equipped with a monitor? ☒ Yes ☐ No
    If yes, what type? ☒ Thermocouple ☐ Infra-Red
    ☐ Ultra Violet ☐ Camera with monitoring control room
    ☐ Other, Describe:

19. Hours of unit operation per year: 8,760 assumed for pilot, hours of full operation are otherwise limited to plant startups and malfunction events. See Appendix B for additional information.

Steam Injection

20. Will steam injection be used? ☐ Yes ☐ No TBD (vendor selection)	21. Steam pressure PSIG Minimum Expected: Design Maximum:
22. Total Steam flow rate: LB/hr	23. Temperature: °F
24. Velocity ft/sec	25. Number of jet streams
26. Diameter of steam jets: in	27. Design basis for steam injected: LB steam/LB hydrocarbon
28. How will steam flow be controlled if steam injection is used?	

Characteristics of the Waste Gas Stream to be Burned

29.

Name	Quantity Grains of H_2S/100 ft^3	Quantity (LB/hr, ft^3/hr, etc)	Source of Material
plant startups	none	527.3 lb/hr	syngas
plant equipment trips	none	19,729 lb/hr	syngas
external fire	none	9,624 lb/hr	methanol

30. Estimate total combustible to flare: 527.3 to 19,729 lb/hr LB/hr or ACF/hr
(Maximum mass flow rate of waste gas) 724 scfm

31. Estimated total flow rate to flare including materials to be burned, carrier gases, auxiliary fuel, etc.:
527.3 to 19,729 lb/hr LB/hr or ACF/hr

32. Give composition of carrier gases:
syngas or methanol vapors, depending on SSM scenario

33. Temperature of emission stream: 100 to 500 °F Heating value of emission stream: 7,700 to 11,400 BTU/lb Mean molecular weight of emission stream: MW = 9.5 to 30 lb/lb-mole	34. Identify and describe all auxiliary fuels to be burned. natural gas: 1,020 BTU/scf BTU/scf BTU/scf BTU/scf
35. Temperature of flare gas: TBD °F	36. Flare gas flow rate: 724 scf/min
37. Flare gas heat content: 7,700 to 11,400 BTU/lb	38. Flare gas exit velocity: TBD scf/min
39. Maximum rate during emergency for one major piece of equipment or process unit: 724 scf/min	
40. Maximum rate during emergency for one major piece of equipment or process unit: 3.75 MMBTU/min	

41. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):
None

42. Describe the collection material disposal system:
N/A

43. Have you included ***Flare Control Device*** in the Emissions Points Data Summary Sheet? Yes

44. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING:	RECORDKEEPING:
REPORTING:	TESTING:

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

45. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.
TBD

46. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
99.7% (preliminary)

47. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment N

Supporting Emissions Calculations

MARCELLUS METHANOL
MARSHALL COUNTY, WEST VIRGINIA
SUMMARY OF EMISSIONS

Pollutant CAS No.	PM (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 7446-09-5 (tpy)	NOx (tpy)	CO 630-08-0 (tpy)	VOC (tpy)	CO2e (tpy)	HAP (tpy)		Ammonia 7664-41-7 (tpy)	Arsenic 7440-38-2 (tpy)	Benzene 71-43-2 (tpy)	Beryllium 7440-41-7 (tpy)
POINT EMISSION SOURCES														
STEAM METHANE REFORMER (SMR)	1.97	1.97	1.97	1.18	66.90	19.68	3.94	125,306	1.96		1.39	0.00021	0.0022	0.000012
STARTUP HEATER	0.083	0.083	0.083	0.0063	1.10	0.92	0.060	1,322	0.021		---	0.0000022	0.000023	0.000000131
STORAGE TANKS	---	---	---	---	---	---	2.02	---	2.02		---	---	---	---
PRODUCT LOADOUT (WITH FLARE)	0.029	0.029	0.029	0.0070	0.81	4.39	0.17	1,642	0.17		---	---	---	---
SSM FLARE	0.054	0.054	0.054	0.0130	1.50	8.17	3.09	2,585	---		---	---	---	---
COOLING TOWER	1.10	1.10	1.10	---	---	---	0.37	---	0.37		---	---	---	---
FUGITIVE EMISSION SOURCES														
FUGITIVE EQUIPMENT LEAKS	---	---	---	---	---	---	2.55	---	2.42		---	---	---	---
Point Source Total	**3.23**	**3.23**	**3.23**	**1.21**	**70.30**	**33.16**	**9.65**	**130,854**	**4.54**		**1.39**	**0.00021**	**0.0022**	**0.000013**
Fugitive Source Total	**---**	**---**	**---**	**---**	**---**	**---**	**2.55**	**---**	**2.42**		**---**	**---**	**---**	**---**
Facility Total	**3.23**	**3.23**	**3.23**	**1.21**	**70.30**	**33.16**	**12.20**	**130,854**	**6.96**		**1.39**	**0.00021**	**0.0022**	**0.000013**
Major Source Threshold	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**---**	**25**		**---**	**10**	**10**	**10**

MARCELLUS METHANOL
MARSHALL COUNTY, WEST VIRGINIA
SUMMARY OF EMISSIONS

Pollutant CAS No.	Cadmium 7440-43-9 (tpy)	Chromium 7440-47-3 (tpy)	Cobalt 7440-48-4 (tpy)	Dichlorobenzene 106-46-7 (tpy)	Formaldehyde 50-00-0 (tpy)	n-Hexane 110-54-3 (tpy)	Lead 7439-92-1 (tpy)	Manganese 7439-96-5 (tpy)	Mercury 7439-97-6 (tpy)	Methanol 67-56-1 (tpy)	Naphthalene 91-20-3 (tpy)
POINT EMISSION SOURCES											
STEAM METHANE REFORMER (SMR)	0.0011	0.0015	0.000087	0.0012	0.078	1.87	0.00052	0.00039	0.00027	---	0.00063
STARTUP HEATER	0.0000120	0.0000153	0.00000092	0.0000131	0.00082	0.020	0.0000055	0.0000042	0.0000028	---	0.0000067
STORAGE TANKS	---	---	---	---	---	---	---	---	---	2.02	---
PRODUCT LOADOUT (WITH FLARE)	---	---	---	---	---	---	---	---	---	0.17	---
SSM FLARE	---	---	---	---	---	---	---	---	---	---	---
COOLING TOWER	---	---	---	---	---	---	---	---	---	0.37	---
FUGITIVE EMISSION SOURCES											
FUGITIVE EQUIPMENT LEAKS	---	---	---	---	---	---	---	---	---	2.42	---
Point Source Total	**0.0012**	**0.0015**	**0.000088**	**0.0013**	**0.079**	**1.9**	**0.00052**	**0.00040**	**0.00027**	**2.56**	**0.00064**
Fugitive Source Total	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**2.42**	**---**
Facility Total	**0.0012**	**0.0015**	**0.000088**	**0.0013**	**0.079**	**1.9**	**0.00052**	**0.00040**	**0.00027**	**4.98**	**0.00064**
Major Source Threshold	**10**	**10**	**10**	**10**	**10**	**10**	**5**	**10**	**10**	**10**	**10**

MARCELLUS METHANOL
MARSHALL COUNTY, WEST VIRGINIA
SUMMARY OF EMISSIONS

Pollutant CAS No.	Nickel 7440-02-0 (tpy)	Total POM --- (tpy)	Selenium 7782-49-2 (tpy)	Toluene 108-88-3 (tpy)
POINT EMISSION SOURCES				
STEAM METHANE REFORMER (SMR)	0.0022	0.000092	0.000025	0.0035
STARTUP HEATER	0.000023	0.00000097	0.00000026	0.000037
STORAGE TANKS	---	---	---	---
PRODUCT LOADOUT (WITH FLARE)	---	---	---	---
SSM FLARE	---	---	---	---
COOLING TOWER	---	---	---	---
FUGITIVE EMISSION SOURCES				
FUGITIVE EQUIPMENT LEAKS	---	---	---	---
Point Source Total	**0.0022**	**0.000093**	**0.000025**	**0.0036**
Fugitive Source Total	**---**	**---**	**---**	**---**
Facility Total	**0.0022**	**0.000093**	**0.000025**	**0.0036**
Major Source Threshold	**10**	**10**	**10**	**10**

MARCELLUS METHANOL

MARSHALL COUNTY, WEST VIRGINIA

STEAM METHANE REFORMER (COMBUSTION EMISSIONS)

SOURCE DESCRIPTION

The SMR combusts both process gas and pipeline natural gas. The process gases are high in hydrogen content. Due to the heat content of these fuels, thermal NOx formation is greater than for natural gas combustion. A selective catalytic reduction (SCR) system will be used to control NOx emissions.

OPERATING PARAMETERS

Combustion Unit

Operating Schedule	8,760	hrs/yr	
Fuels		Natural Gas, Process Gases	
Capacity	114.8	MMBtu/hr	composite fuel flow
Fuel HHV	484	Btu/scf	composite fuel
Capacity	236,998	scf/hr	composite fuel flow
Sulfur Content	0.0020	gr/scf	AP42, Table 1.4-2 (natural gas fraction only)
Exhaust Flow	50,329	acfm	40,752 Nm3/hr
Stack Height	135	ft	
Exit Temperature	572	°F	
Exit Diameter	3.94	ft	
Exit Velocity	68.90	ft/s	

EMISSION CALCULATIONS

Criteria Pollutant and GHG Emission Factors for Natural Gas

Pollutant		mg/Nm^3	lb/MMBtu	Emission Factor Source
PM10		5	0.00391	Vendor (lb/MMBtu calculated)
PM2.5		5	0.00391	Vendor (lb/MMBtu calculated)
SO2		3	0.00235	Vendor (lb/MMBtu calculated)
NOx	pre-SCR	600	0.470	Vendor (lb/MMBtu calculated)
NOx	post-SCR	170	0.133	Vendor (lb/MMBtu calculated)
CO		50	0.0391	Vendor (lb/MMBtu calculated)
VOC		10	0.00783	Vendor (lb/MMBtu calculated)
Pb			0.00000103	AP42, Table 1.4-2
CO2	GWP 1		247.7	AP42, Table 1.4-2
CH4	GWP 25		0.00475	AP42, Table 1.4-2
N2O	GWP 298		0.00454	AP42, Table 1.4-2
NH3	5 ppm	3.5	0.00277	Vendor (lb/MMBtu calculated)

Typical Emissions

Typical = Boiler Capacity (114.8 MMBtu/hr) x Emission Factor (lb/MMBtu)

PM10 = *114.8 MMBtu/hr * 0.00391 lbs/MMBtu*
0.45 lbs PM/hr

PM2.5 = *114.8 MMBtu/hr * 0.00391 lbs/MMBtu*
0.45 lbs PM/hr

SO2 = *114.8 MMBtu/hr * 0.00235 lbs/MMBtu*
0.27 lbs SO2/hr

NOx (pre-SCR) = *114.8 MMBtu/hr * 0.470 lbs/MMBtu*
53.91 lbs NOx/hr (pre-SCR)

NOx (controlled) = *114.8 MMBtu/hr * 0.133 lbs/MMBtu*

15.27 lbs NOx/hr

CO = *114.8 MMBtu/hr * 0.0391 lbs/MMBtu*
4.49 lbs CO/hr

VOC = *114.8 MMBtu/hr * 0.00783 lbs/MMBtu*
0.90 lbs VOC/hr

Pb = *114.8 MMBtu/hr * 0.00000103 lbs/MMBtu*
0.00012 lbs Pb/hr

*CO2 = 114.8 MMBtu/hr * 247.7 lbs/MMBtu*
28,440 lb CO2/hr

*CH4 = 114.8 MMBtu/hr * 0.00475 lbs/MMBtu*
0.55 lb CH4/hr

*N2O = 114.8 MMBtu/hr * 0.00454 lbs/MMBtu*
0.52 lb N2O/hr

*CO2e (total) = (28,440 lb CO2/hr * 1 lb CO2e/lb CO2) + (0.54510 lb CH4/hr * 25 lb CO2e/lb CH4) + (0.52140 lb N2O/hr * 298 lb CO2e/lb N2O)*
28,609 lb CO2e/hr

*NH3 = 114.8 MMBtu/hr * 0.00277 lbs/MMBtu*
0.32 lb NH3/hr

Annual Emissions

*Annual = Average (lbs/hr) * 8,760 hrs/yr / 2,000 lbs/ton*

PM10 = *(0.45 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
1.97 TPY Total PM10

PM2.5 = *(0.45 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
1.97 TPY Filterable PM2.5

SO2 = *(0.27 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
1.18 TPY SO2

NOx (pre-SCR) = *(53.91 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
236.11 TPY NOx

NOx (controlled) = *(15.27 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
66.90 TPY NOx 71.7% reduction efficiency

CO = *(4.49 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
19.68 TPY CO

VOC = *(0.90 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
3.94 TPY VOC

Pb = *(0.00012 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
0.00052 TPY Pb

CO2e = *(28,609 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
125,306 TPY CO2e

NH3 = *(0.32 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
1.39 TPY NH3

MARCELLUS METHANOL

MARSHALL COUNTY, WEST VIRGINIA

STEAM METHANE REFORMER (COMBUSTION EMISSIONS)

EMISSIONS SUMMARY

Pollutant	*Typical (lbs/hr)*	*Annual (TPY)*
PM10	0.45	1.97
PM2.5	0.45	1.97
SO2	0.27	1.18
NOx (controlled)	15.27	66.90
CO	4.49	19.68
VOC	0.90	3.94
Pb	0.00012	0.00052
CO2e (total)	28,609	125,306
total HAP	0.45	1.96
NH3	0.32	1.39

TOTAL SPECIATED POLLUTANT EMISSIONS SUMMARY [1]

	lb/MMscf	lb/MMBtu	lb/hr	tpy
HAP	1.89E+00	3.90E-03	4.47E-01	1.96E+00
Organic HAP Speciation				
n-hexane	1.80E+00	3.72E-03	4.27E-01	1.87E+00
formaldehyde	7.50E-02	1.55E-04	1.78E-02	7.79E-02
toluene	3.40E-03	7.02E-06	8.06E-04	3.53E-03
benzene	2.10E-03	4.34E-06	4.98E-04	2.18E-03
dichlorobenzene	1.20E-03	2.48E-06	2.84E-04	1.25E-03
naphthalene	6.10E-04	1.26E-06	1.45E-04	6.33E-04
POM Speciation				
total POM	8.82E-05	1.82E-07	2.09E-05	9.16E-05
2-methylnaphthalene	2.40E-05	4.95E-08	5.69E-06	2.49E-05
phenanthrene	1.70E-05	3.51E-08	4.03E-06	1.76E-05
7,12-dimethylbenz(a)anthracene	1.60E-05	3.30E-08	3.79E-06	1.66E-05
pyrene	5.00E-06	1.03E-08	1.18E-06	5.19E-06
benzo(b,k)fluoranthene	3.60E-06	7.43E-09	8.53E-07	3.74E-06
fluoranthene	3.00E-06	6.19E-09	7.11E-07	3.11E-06
fluorene	2.80E-06	5.78E-09	6.64E-07	2.91E-06
anthracene	2.40E-06	4.95E-09	5.69E-07	2.49E-06
acenaphthene	1.80E-06	3.72E-09	4.27E-07	1.87E-06
acenaphthylene	1.80E-06	3.72E-09	4.27E-07	1.87E-06
benz(a)anthracene	1.80E-06	3.72E-09	4.27E-07	1.87E-06
chrysene	1.80E-06	3.72E-09	4.27E-07	1.87E-06
indeno(1,2,3-cd)pyrene	1.80E-06	3.72E-09	4.27E-07	1.87E-06
3-methylchloranthene	1.80E-06	3.72E-09	4.27E-07	1.87E-06
benzo(a)pyrene	1.20E-06	2.48E-09	2.84E-07	1.25E-06
benzo(g,h,i)perylene	1.20E-06	2.48E-09	2.84E-07	1.25E-06
dibenzo(a,h)anthracene	1.20E-06	2.48E-09	2.84E-07	1.25E-06
Inorganic HAP Speciation				
nickel	2.10E-03	4.34E-06	4.98E-04	2.18E-03
chromium	1.40E-03	2.89E-06	3.32E-04	1.45E-03
cadmium	1.10E-03	2.27E-06	2.61E-04	1.14E-03
manganese	3.80E-04	7.85E-07	9.01E-05	3.94E-04
mercury	2.60E-04	5.37E-07	6.16E-05	2.70E-04
arsenic	2.00E-04	4.13E-07	4.74E-05	2.08E-04
cobalt	8.40E-05	1.73E-07	1.99E-05	8.72E-05
selenium	2.40E-05	4.95E-08	5.69E-06	2.49E-05
beryllium	1.20E-05	2.48E-08	2.84E-06	1.25E-05

MARCELLUS METHANOL
MARSHALL COUNTY, WEST VIRGINIA
STEAM METHANE REFORMER (COMBUSTION EMISSIONS)

REFERENCES/NOTES

1 Emission factors based on EPA AP-42, Section 1.4 *"Natural Gas Combustion"*, July 1998.

MARCELLUS METHANOL
MARSHALL COUNTY, WEST VIRGINIA
STARTUP HEATER

SOURCE DESCRIPTION

The startup heater is a small unit fired with natural gas and will be used to provide heat to the methanol synthesis reactor system during plant startups. The heater is conservatively assumed to operate at full capacity year-round.

OPERATING PARAMETERS

Heater

Operating Schedule	8,760	hrs/yr	
Fuels		Natural Gas	
Capacity	2.55	MMBtu/hr	
Natural Gas HHV	1,020	Btu/scf	AP42, Table 1.4-2
Capacity	2,500	scf/hr	
Sulfur Content	0.0020	gr/scf	AP42, Table 1.4-2
F-Factor	10,610	scf/MMBtu	from 40 CFR 60 Method 19
Exhaust Flow	1,481	acfm	
Exit Temperature	1,050	°F	
Exit Diameter	0.5	ft	
Exit Velocity	126	ft/s	

EMISSION CALCULATIONS

Criteria Pollutant and GHG Emission Factors for Natural Gas

Pollutant		lb/MMBtu	Emission Factor Source
PM10		0.00745	AP42, Table 1.4-2
PM2.5		0.00745	AP42, Table 1.4-2
SO2		0.000560	AP42, Table 1.4-2
NOx		0.0980	AP42, Table 1.4-1
CO		0.0824	AP42, Table 1.4-1
VOC		0.00539	AP42, Table 1.4-2
Pb		0.000000490	AP42, Table 1.4-2
CO2	GWP 1	117.6	AP42, Table 1.4-2
CH4	GWP 25	0.00225	AP42, Table 1.4-2
N2O	GWP 298	0.00216	AP42, Table 1.4-2

Typical Emissions

Typical = Boiler Capacity (2.6 MMBtu/hr) x Emission Factor (lb/MMBtu)

PM10 = *2.6 MMBtu/hr * 0.00745 lbs/MMBtu*
0.0190 lbs PM/hr

PM2.5 = *2.6 MMBtu/hr * 0.00745 lbs/MMBtu*
0.0190 lbs PM/hr

SO2 = *2.6 MMBtu/hr * 0.000560 lbs/MMBtu*
0.001427 lbs SO2/hr

NOx = *2.6 MMBtu/hr * 0.0980 lbs/MMBtu*
0.250 lbs NOx/hr

CO = *2.6 MMBtu/hr * 0.0824 lbs/MMBtu*
0.210 lbs CO/hr

VOC = *2.6 MMBtu/hr * 0.00539 lbs/MMBtu*

0.01375 lbs VOC/hr

Pb = *2.6 MMBtu/hr * 0.000000490 lbs/MMBtu*
0.000001250 lbs Pb/hr

*CO2 = 2.55 MMBtu/hr * 117.6 lbs/MMBtu*
300 lb CO2/hr

*CH4 = 2.55 MMBtu/hr * 0.00225 lbs/MMBtu*
0.00575 lb CH4/hr

*N2O = 2.55 MMBtu/hr * 0.00216 lbs/MMBtu*
0.00550 lb N2O/hr

*CO2e (total) = (300 lb CO2/hr * 1 lb CO2e/lb CO2) + (0.00575 lb CH4/hr * 25 lb CO2e/lb CH4) + (0.00550 lb N2O/hr * 298 lb CO2e/lb N2O)*
302 lb CO2e/hr

Annual Emissions

*Annual = Average (lbs/hr) * 8,760 hrs/yr / 2,000 lbs/ton*

PM10 = *(0.0190 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
0.0832 TPY Total PM10

PM2.5 = *(0.0190 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
0.0832 TPY Filterable PM2.5

SO2 = *(0.001427 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
0.00625 TPY SO2

NOx = *(0.250 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
1.095 TPY NOx

CO = *(0.210 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
0.920 TPY CO

VOC = *(0.01375 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
0.0602 TPY VOC

Pb = *(0.000001250 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
0.00000548 TPY Pb

CO2e = *(302 lbs/hr) * (8,760 hrs/yr) / (2,000 lbs/ton)*
1,322 TPY CO2e

MARCELLUS METHANOL
MARSHALL COUNTY, WEST VIRGINIA
STARTUP HEATER

EMISSIONS SUMMARY

Pollutant	*Typical (lbs/hr)*	*Annual (TPY)*
PM10	0.0190	0.0832
PM2.5	0.0190	0.0832
SO2	0.001427	0.00625
NOx	0.250	1.095
CO	0.210	0.920
VOC	0.01375	0.0602
Pb	0.000001250	0.00000548
CO2e (total)	302	1,322
total HAP	0.00472	0.0207

TOTAL SPECIATED POLLUTANT EMISSIONS SUMMARY [1]

	lb/MMscf	lb/MMBtu	lb/hr	tpy
HAP	1.89E+00	1.85E-03	4.72E-03	2.07E-02
Organic HAP Speciation				
n-hexane	1.80E+00	1.76E-03	4.50E-03	1.97E-02
formaldehyde	7.50E-02	7.35E-05	1.88E-04	8.21E-04
toluene	3.40E-03	3.33E-06	8.50E-06	3.72E-05
benzene	2.10E-03	2.06E-06	5.25E-06	2.30E-05
dichlorobenzene	1.20E-03	1.18E-06	3.00E-06	1.31E-05
naphthalene	6.10E-04	5.98E-07	1.53E-06	6.68E-06
POM Speciation				
total POM	8.82E-05	8.65E-08	2.21E-07	9.66E-07
2-methylnaphthalene	2.40E-05	2.35E-08	6.00E-08	2.63E-07
phenanthrene	1.70E-05	1.67E-08	4.25E-08	1.86E-07
7,12-dimethylbenz(a)anthracene	1.60E-05	1.57E-08	4.00E-08	1.75E-07
pyrene	5.00E-06	4.90E-09	1.25E-08	5.48E-08
benzo(b,k)fluoranthene	3.60E-06	3.53E-09	9.00E-09	3.94E-08
fluoranthene	3.00E-06	2.94E-09	7.50E-09	3.29E-08
fluorene	2.80E-06	2.75E-09	7.00E-09	3.07E-08
anthracene	2.40E-06	2.35E-09	6.00E-09	2.63E-08
acenaphthene	1.80E-06	1.76E-09	4.50E-09	1.97E-08
acenaphthylene	1.80E-06	1.76E-09	4.50E-09	1.97E-08
benz(a)anthracene	1.80E-06	1.76E-09	4.50E-09	1.97E-08
chrysene	1.80E-06	1.76E-09	4.50E-09	1.97E-08
indeno(1,2,3-cd)pyrene	1.80E-06	1.76E-09	4.50E-09	1.97E-08
3-methylchloranthene	1.80E-06	1.76E-09	4.50E-09	1.97E-08
benzo(a)pyrene	1.20E-06	1.18E-09	3.00E-09	1.31E-08
benzo(g,h,i)perylene	1.20E-06	1.18E-09	3.00E-09	1.31E-08
dibenzo(a,h)anthracene	1.20E-06	1.18E-09	3.00E-09	1.31E-08
Inorganic HAP Speciation				
nickel	2.10E-03	2.06E-06	5.25E-06	2.30E-05
chromium	1.40E-03	1.37E-06	3.50E-06	1.53E-05
cadmium	1.10E-03	1.08E-06	2.75E-06	1.20E-05
manganese	3.80E-04	3.73E-07	9.50E-07	4.16E-06
mercury	2.60E-04	2.55E-07	6.50E-07	2.85E-06
arsenic	2.00E-04	1.96E-07	5.00E-07	2.19E-06
cobalt	8.40E-05	8.24E-08	2.10E-07	9.20E-07
selenium	2.40E-05	2.35E-08	6.00E-08	2.63E-07
beryllium	1.20E-05	1.18E-08	3.00E-08	1.31E-07

REFERENCES/NOTES

1 Emission factors based on EPA AP-42, Section 1.4 *"Natural Gas Combustion"*, July 1998.

MARCELLUS METHANOL

MARSHALL COUNTY, WEST VIRGINIA

STORAGE TANKS

SOURCE DESCRIPTION

The facility includes 1 shift tank, 1 off-spec tank, and 1 methanol product storage tank. The shift and off-spec tanks will be vented to atmosphere. The product storage tank will be designed with an internal floating roof. The product storage tank is assumed to handle the full production capacity of the facility. The shift tank and off-spec tank will share the full production capacity of the facility. Because of their identical designs, emissions for only one of the tanks at full production throughput are calculated. These emissions are representative of the combined emissions of both tanks. Emissions are calculated using EPA's TANKS 4.09d software.

OPERATING PARAMETERS

Tank ID. No.	Shift Tank	Off-Spec Tank	Product Storage Tank
Tank Contents	Methanol	Methanol	Methanol
Tank Type	Horizontal	Horizontal	Internal Floating Roof
Tank Diameter (ft)	10.5	10.5	80
Tank Length/Height (ft)	46.5	46.5	40
Tank Capacity (gal)	30,000	30,000	1,260,000
Throughput (gal/yr)	19,423,840	19,423,840	19,423,840
Turnovers per Year	647	647	15
Max Liquid Height (ft)	#N/A	#N/A	#N/A
Avg Liquid Height (ft)	#N/A	#N/A	#N/A
Heated Tank	No	No	No
Underground Tank	No	No	No
Self-Supporting Roof	#N/A	#N/A	Yes
Columns	#N/A	#N/A	#N/A
Effective Column Diameter	#N/A	#N/A	#N/A
Internal Shell Condition	#N/A	#N/A	Light Rust
External Shell Color	White	White	White
External Shell Shade	White	White	White
External Shell Condition	Good	Good	Good
Roof Color	White	White	White
Roof Shade	White	White	White
Roof Paint Condition	Good	Good	Good
Fixed Roof Type	#N/A	#N/A	#N/A
Roof Height (ft)	#N/A	#N/A	#N/A
Roof Slope (ft/ft)	#N/A	#N/A	#N/A
Breather Vent Vacuum (psig)	#N/A	#N/A	#N/A
Breather Vent Pressure (psig)	#N/A	#N/A	#N/A
Primary Seal	#N/A	#N/A	Liquid Mounted
Secondary Seal	#N/A	#N/A	Rim Mounted
Deck Type	#N/A	#N/A	Welded
Deck Fittings	#N/A	#N/A	Typical
Vent Height above grade (ft)	47.5	47.5	41

MARCELLUS METHANOL

MARSHALL COUNTY, WEST VIRGINIA

STORAGE TANKS

Vent Diameter (ft)	0.25	0.25	0.25
Exit Velocity (ft/s)	10	10	10
Nearest Major City	Pittsburgh, PA	Pittsburgh, PA	Pittsburgh, PA
Daily Avg Temp (F)	50.31	50.31	50.31
Annual Avg Max Temp (F)	59.88	59.88	59.88
Annual Avg Min Temp (F)	40.73	40.73	40.73
Avg Wind Speed (mph)	9.08	9.08	9.08
Annual Avg Insolation (Btu/ft2-day)	1,203	1,203	1,203
Atmospheric Pressure (psia)	14.109	14.109	14.109
Liquid Molecular Weight	32.04	32.04	32.04
Vapor Molecular Weight	32.04	32.04	32.04
Liquid Density @ 60F (lb/gal)	6.63	6.63	6.63
Avg Bulk Temp (F)	50.33	50.33	50.33
Avg Annual Surface Temp (F)	51.94	51.94	51.94
Avg Annual Vapor Pressure (psia)	1.113	1.113	1.113
Avg July Surface Temp (F)	74.28	74.28	74.28
Avg July Vapor Pressure (psia)	2.229	2.229	2.229

VOC EMISSION CALCULATIONS [1]

Tank ID. No.	Shift Tank	Off-Spec Tank	Product Storage Tank
EIQ No.			
Standing Loss (lbs/yr)	282.9	included in shift tank	---
Working Loss (lbs/yr)	3522	included in shift tank	---
Rim Seal Loss (lbs/yr)	---	---	15.80
Withdrawal Losses (lbs/yr)	---	---	54.37
Deck Fitting Losses (lbs/yr)	---	---	169.7
Deck Seam Losses (lbs/yr)	---	---	0.00
Total Losses (tons/yr)	1.90	included in shift tank	0.12

METHANOL EMISSION CALCULATIONS [1]

Tank ID. No.	Shift Tank	Off-Spec Tank	Product Storage Tank
Standing Loss (lbs/yr)	282.9	included in shift tank	---
Working Loss (lbs/yr)	3522	included in shift tank	---
Rim Seal Loss (lbs/yr)	---	---	15.80
Withdrawal Losses (lbs/yr)	---	---	54.37
Deck Fitting Losses (lbs/yr)	---	---	169.72
Deck Seam Losses (lbs/yr)	---	---	0.00
Total Losses (tons/yr)	1.90	included in shift tank	0.12

MARCELLUS METHANOL

MARSHALL COUNTY, WEST VIRGINIA

STORAGE TANKS

Emissions Summary

Pollutant	*Average (lbs./hr)*	*Maximum [2] (lbs./hr)*	*Annual (TPY)*
VOC	0.462	0.645	2.02
HAP	0.462	0.645	2.02
Methanol	0.462	0.645	2.02

REFERENCES/NOTES

1 Emissions were calculated using EPA TANKS 4.09d Program.

2 Maximum emissions are based on emissions during the month of July.

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Marcellus Methanol Product Storage Tank IFT
City:	Marshall County
State:	West Virginia
Company:	Marcellus Methanol
Type of Tank:	Internal Floating Roof Tank
Description:	Product Storage Tank for Marcellus Methanol

Tank Dimensions

Diameter (ft):	80.00
Volume (gallons):	1,260,000.00
Turnovers:	15.46
Self Supp. Roof? (y/n):	Y
No. of Columns:	0.00
Eff. Col. Diam. (ft):	0.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Liquid-mounted
Secondary Seal	Rim-mounted

Deck Characteristics

Deck Fitting Category:	Typical
Deck Type:	Welded

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1
Roof Leg or Hanger Well/Adjustable	24
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Pittsburgh, Pennsylvania (Avg Atmospheric Pressure = 14.11 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Marcellus Methanol Product Storage Tank IFT - Internal Floating Roof Tank
Marshall County, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Methyl alcohol	All	51.94	47.06	56.81	50.33	1.1133	N/A	N/A	32.0400			32.04	Option 2: A=7.897, B=1474.08, C=229.13

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Marcellus Methanol Product Storage Tank IFT - Internal Floating Roof Tank
Marshall County, West Virginia

Annual Emission Calcaulations	
Rim Seal Losses (lb):	15.8000
Seal Factor A (lb-mole/ft-yr):	0.3000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.6000
Value of Vapor Pressure Function:	0.0205
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.1133
Tank Diameter (ft):	80.0000
Vapor Molecular Weight (lb/lb-mole):	32.0400
Product Factor:	1.0000
Withdrawal Losses (lb):	54.3691
Number of Columns:	0.0000
Effective Column Diameter (ft):	0.0000
Annual Net Throughput (gal/yr.):	19,479,370.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0015
Average Organic Liquid Density (lb/gal):	6.6300
Tank Diameter (ft):	80.0000
Deck Fitting Losses (lb):	169.7187
Value of Vapor Pressure Function:	0.0205
Vapor Molecular Weight (lb/lb-mole):	32.0400
Product Factor:	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	257.8000
Deck Seam Losses (lb):	0.0000
Deck Seam Length (ft):	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000
Tank Diameter (ft):	80.0000
Vapor Molecular Weight (lb/lb-mole):	32.0400
Product Factor:	1.0000
Total Losses (lb):	239.8878

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1	36.00	5.90	1.20	23.7000
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1	14.00	5.40	1.10	9.2167
Roof Leg or Hanger Well/Adjustable	24	7.90	0.00	0.00	124.8203
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1	12.00	0.00	0.00	7.9000
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	4.0817

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Marcellus Methanol Product Storage Tank IFT - Internal Floating Roof Tank
Marshall County, West Virginia

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Methyl alcohol	15.80	54.37	169.72	0.00	239.89

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Marcellus Methanol Shift Tank Horizontal
City:	Marshall County
State:	West Virginia
Company:	Marcellus Methanol
Type of Tank:	Horizontal Tank
Description:	Marcellus Methanol Shift Tank

Tank Dimensions

Shell Length (ft):	46.50
Diameter (ft):	10.50
Volume (gallons):	30,000.00
Turnovers:	649.31
Net Throughput(gal/yr):	19,479,347.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Pittsburgh, Pennsylvania (Avg Atmospheric Pressure = 14.11 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Marcellus Methanol Shift Tank Horizontal - Horizontal Tank
Marshall County, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Methyl alcohol	All	51.94	47.06	56.81	50.33	1.1133	0.9475	1.3035	32.0400			32.04	Option 2: A=7.897, B=1474.08, C=229.13

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Marcellus Methanol Shift Tank Horizontal - Horizontal Tank
Marshall County, West Virginia

Annual Emission Calcaulations	
Standing Losses (lb):	282.8675
Vapor Space Volume (cu ft):	2,564.6126
Vapor Density (lb/cu ft):	0.0065
Vapor Space Expansion Factor:	0.0609
Vented Vapor Saturation Factor:	0.7635
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	2,564.6126
Tank Diameter (ft):	10.5000
Effective Diameter (ft):	24.9394
Vapor Space Outage (ft):	5.2500
Tank Shell Length (ft):	46.5000
Vapor Density	
Vapor Density (lb/cu ft):	0.0065
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.1133
Daily Avg. Liquid Surface Temp. (deg. R):	511.6051
Daily Average Ambient Temp. (deg. F):	50.3083
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	509.9983
Tank Paint Solar Absorptance (Shell):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,202.9556
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0609
Daily Vapor Temperature Range (deg. R):	19.5141
Daily Vapor Pressure Range (psia):	0.3559
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.1133
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.9475
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	1.3035
Daily Avg. Liquid Surface Temp. (deg R):	511.6051
Daily Min. Liquid Surface Temp. (deg R):	506.7266
Daily Max. Liquid Surface Temp. (deg R):	516.4836
Daily Ambient Temp. Range (deg. R):	19.1500
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.7635
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	1.1133
Vapor Space Outage (ft):	5.2500
Working Losses (lb):	3,521.7601
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.1133
Annual Net Throughput (gal/yr.):	19,479,347.0000
Annual Turnovers:	649.3116
Turnover Factor:	0.2129

Tank Diameter (ft):	10.5000
Working Loss Product Factor:	1.0000

Total Losses (lb):	3,804.6276

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Marcellus Methanol Shift Tank Horizontal - Horizontal Tank
Marshall County, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Methyl alcohol	3,521.76	282.87	3,804.63

TANKS 4.0.9d
Emissions Report - Detail Format
Total Emissions Summaries - All Tanks in Report

Emissions Report for: Annual

Tank Identification				Losses (lbs)
Marcellus Methanol Product Storage Tank IFT	Marcellus Methanol	Internal Floating Roof Tank	Marshall County, West Virginia	239.89
Marcellus Methanol Shift Tank Horizontal	Marcellus Methanol	Horizontal Tank	Marshall County, West Virginia	3,804.63
Total Emissions for all Tanks:				4,044.52

MARCELLUS METHANOL
MARSHALL COUNTY, WEST VIRGINIA
PRODUCT LOADOUT WITH DEDICATED FLARE

SOURCE DESCRIPTION

Product will be loaded to trucks and railcars. A single loading station for each will be constructed. Hourly emissions are based on the maximum loading rates of 400 gpm and 800 gpm for trucks and railcars, respectively, and assume a truck and a railcar can be loaded simultanepously. Annual emissions are based on the maximum potential annual throughput of the facility. Emissions will be controlled with a dedicated flare, which operates only when product is loading; otherwise, the flare pilot operates at all times. The flare has a rated capacity of 2.65 MMBtu/hr and provides 98% control efficiency for VOC emissions during product loading (methanol) into trucks and railcars, which will be in dedicated methanol service.

OPERATING PARAMETERS

Operating Schedule (Pilot)	8,760	hrs/yr	
Operating Schedule (Flare)	809	hrs/yr	maximum, based on truck loading entirely
Operating Schedule (Flare)	405	hrs/yr	minimum, based on railcar loading entirely
Loading Design Thruput (trucks)	24	kgal/hr	assume 400 gpm truck filling rate
Loading Design Thruput (railcars)	48	kgal/hr	assume 800 gpm truck filling rate
Maximum Total Thruput (combined)	72	kgal/hr	assume a truck and a railcar can be loaded simultaneously
Annual Thruput	58,400	MT/yr	160 MT/day
Product Density	332.6	gallons/MT	
Annual Thruput	19,424	kgal/yr	
Methanol Heat Content	9,838	Btu/lb	
Natural Gas HHV	1,020	Btu/scf	AP42, Table 1.4-2
Heat Rate (Pilot)	0.0612	MMBtu/hr	60 scf/hr natural gas
Heat Rate (Flare)	2.65	MMBtu/hr	vendor-specfied
Maximum Potential Annual Heat Rate	23,214	MMBtu/yr	assumes 8760 hours per year
Control Device		Flare	
Control Efficiency	98	%	

EMISSION CALCULATIONS

VOC Loading Emissions [1]

$$L\ (lbs/kgal) = (12.46 \times S \times P \times M)/T$$

where:

L = Loading Loss, lb VOC/kgal of liquid loaded
S = Saturation Factor (AP-42 Table 5.2-1)
P = True Vapor Pressure of Liquid Loaded, psia
M = Molecular Weight of Vapors, lb/lb-mole
T = Temperature of Bulk Liquid Loaded, ^{o}R

The values for P and T were obtained from EPA's TANKS 4.09d emissions calculation software, which calculates the annual average bulk product temperature based on the annual average temperatures for the city of Pittsburgh, Pennsylvania. The saturation factor is based on submerged loading, dedicated vapor balance service for methanol.

Saturation Factor(s)	1	
Annual Thruput	19,424	kgal/yr
Vapor Molecular Weight (MW)	32.04	lb/lb-mole
Product Temperature (T)	509.92	^{o}R
True Vapor Pressure (P)	1.11	psia

VOC Emission Factor

*L = (12.46 * 1.00 * 1.11 psia * 32.04 lb/lb-mole) / 509.9 R*

0.87 lb VOC/kgal

Uncontrolled Emissions

*VOC = 0.87 lb VOC/kgal * 72 kgal /hr*

62.76 lb/hr VOC — maximum potential methanol vapors displaced over an hour

0.62 MMBtu/hr VOC — maximum potential heat rate of methanol vapors displaced over an hour

*VOC = 0.87 lb VOC/kgal * 19,424 kgal/yr*

8.47 tpy VOC

Controlled VOC Emissions

*Maximum 1-hour = 62.76 lbs/hr * (1-98/100) DRE*

1.26 lb/hr VOC — 0.47 lb/MMBtu, calculated VOC emission factor

*Annual = 0.87 lbs/kgal * 19,424 kgal/yr * (1-98/100)/ 2,000 lbs/ton*
0.17 tpy VOC

Combustion Emissions[2]

Emission Factor	GWP	lb/MMBtu	µg/l	
SOx		0.00059		
NOx		0.068		
CO		0.37		
THC		0.14		
PM		0.0024	40	lightly smoking
CO2 (nat. gas)	1	117		40 CFR 98, Tables A-1 & C-1
CH4 (nat. gas)	25	0.0022		40 CFR 98, Tables A-1 & C-2
N2O (nat. gas)	298	0.00022		40 CFR 98, Tables A-1 & C-2
CO2 (methanol)	1	139		EPA Emission Factors for GHG Inventories
CH4 (methanol)	25	0.0022		assume same as natural gas
N2O (methanol)	298	0.00022		assume same as natural gas

Emissions During Flare Operation, Combustion of Methanol Vapors

*Avg = Heat Input (2.65 MMBtu/hr) * Emission Factor (lbs/MMBtu)*

*SOx = 2.65 MMBtu/hr * 0.00059 lb/MMBtu*
0.00156 lb/hr SOx

*NOx = 2.65 MMBtu/hr * 0.068 lb/MMBtu*
0.180 lb/hr NOx

*CO = 2.65 MMBtu/hr * 0.370 lb/MMBtu*
0.98 lb/hr CO

*PM = 2.65 MMBtu/hr * 0.0024 lb/MMBtu*
0.0065 lb/hr PM

*CO2 = 2.65 MMBtu/hr * 139 lb/MMBtu*
367 lb/hr CO2

*CH4 = 2.65 MMBtu/hr * 0.0022 lb/MMBtu*
0.0058 lb/hr CH4

*N2O = 2.65 MMBtu/hr * 0.00022 lb/MMBtu*
0.00058 lb/hr CH4

CO2e (total) = (367 lb CO2/hr x 1 lb CO2e/lb CO2) + (0.01 lb CH4/hr x 25 lb CO2e/lb CH4)
+ (0.001 lb N2O/hr x 298 lb CO2e/lb N2O)
368 lb CO2e/hr

Annual Emissions - Pilot and Flare Operation Combined

*Annual = [Pilot Input (0.061 MMBtu/hr) * EF (lbs/MMBtu)*
*+ Flare Heat Input (23,214 MMBtu/yr) * Emission Factor (lbs/MMBtu)] / 2,000 lbs/ton*

*SO2 = {[0.061 MMBtu/hr * 0.00059 lb/MMBtu * 8,760 hr/yr] + [23,214 MMBtu/yr * 0.00059 lb/MMBtu]} / 2,000 lbs/ton*
0.00699 TPY SOx

*NOx = {[0.061 MMBtu/hr * 0.068 lb/MMBtu * 8,760 hr/yr] + [23,214 MMBtu/yr * 0.068 lb/MMBtu]}/ 2,000 lbs/ton*
0.808 TPY NOx

*CO = {[0.061 MMBtu/hr * 0.37 lb/MMBtu * 8,760 hr/yr] + [23,214 MMBtu/yr * 0.37 lb/MMBtu]} / 2,000 lbs/ton*
4.39 TPY CO

*PM = {[0.061 MMBtu/hr * 0.0024 lb/MMBtu * 8,760 hr/yr] + [23,214 MMBtu/yr * 0.0024 lb/MMBtu]} / 2,000 lbs/ton*
0.0291 TPY PM

*CO2 = {[0.061 MMBtu/hr * 117 lb/MMBtu * 8,760 hr/yr] + [23,214 MMBtu/yr * 139 lb/MMBtu]} / 2,000 lbs/ton*
1,640 TPY CO2

*CH4 = {[0.061 MMBtu/hr * 0.0022 lb/MMBtu * 8,760 hr/yr] + [23,214 MMBtu/yr * 0.0022 lb/MMBtu]} / 2,000 lbs/ton*
0.0262 TPY CH4

*N2O = {[0.061 MMBtu/hr * 0.00022 lb/MMBtu * 8,760 hr/yr] + [23,214 MMBtu/yr * 0.00022 lb/MMBtu]} / 2,000 lbs/ton*
0.00262 TPY N2O

CO2e (total) = (1,640 ton CO2/yr x 1 ton CO2e/ton CO2) + (0.0262 ton CH4/yr x 25 ton CO2e/ton CH4) + (0.00262 ton N2O/yr x 298 ton CO2e/ton N2O)
1,642 TPY CO2e

CO2e (non-biogenic) = CO2e (total)
1,642 TPY CO2e

Emissions Summary (Controlled)

Pollutant	***Maximum (lb/hr)***	***Annual (tpy)***
PM	0.0065	0.0291
SO2	0.00156	0.00699
NOx	0.180	0.808
CO	0.98	4.39
VOC	1.26	0.17
CO2e	368	1,642
methanol	1.26	0.17
HAP	1.26	0.17

REFERENCES/NOTES

1 Based on EPA AP-42, Section 5.2, Transportation and Marketing of Petroleum Liquids, January 1995.
2 Based on EPA AP-42, Section 13.5, Industrial Flares, January 1995. GHG emissions based on 40 CFR 98.

MARCELLUS METHANOL
MARSHALL COUNTY, WEST VIRGINIA
SSM FLARE

SOURCE DESCRIPTION

A flare is used for combusting gases from process startups and upsets. The flare will use natural gas for the pilot. Annual potential emissions assume full year-round operation of the pilot and a conservative estimate of releases from process startups and upsets.

During startups (Scenario 1), the HP Vent (see block diagram) gases are vented to the flare rather than to the SMR. The startup venting duration is expected to be approximately 3 hours. For the purposes of these calculations, a 4-hour duration is assumed.

Two upset scenarios are considered. Scenario 2 involves an upset condition that releases all syngas from the SMR to the flare for a period as long as 48 hours to maintain SMR temperature while downstream equipment is repaired. Scenario 3 involves an external fire that engulfs the reactor and distillation area causing contents of both systems to boil off.

OPERATING PARAMETERS

Operating Schedule (Pilot)	8,760	hrs/yr	
Natural Gas Heat Rate (Pilot)	0.0918	MMBtu/hr	90 scf/hr natural gas
Annual Natural Gas Heat Rate (Pilot)	804	MMBtu/yr	
Natural Gas HHV	1,020	Btu/scf	AP42, Table 1.4-2

	Scenario 1 (startup-syngas)	Scenario 2 (syngas from SMR)	Scenario 3 (methanol from reactors, etc.)
Emergency Release Rate	527.3 lb/hr	19,729 lb/hr	12,845 lb/hr
Release Heat Content	11,416 Btu/lb	11,416 Btu/lb	7,722 Btu/lb
SSM Release Rate	6.0 MMBtu/hr	225.2 MMBtu/hr	99.2 MMBtu/hr
Duration	4 hours	48 hours	0.75 hours
Frequency per year	4 per year	4 per year	0.033 per year (1 in 30 years)
Event Release Estimate	24 MMBtu/event	10,811 MMBtu/event	74.4 MMBtu/event
Annual Release Estimate	96 MMBtu/yr	43,243 MMBtu/yr	2.48 MMBtu/yr
Average Release Estimate	0.011 MMBtu/hr	4.94 MMBtu/hr	0.000283 MMBtu/hr

EMISSION CALCULATIONS

Combustion Emissions[1]

Emission Factor		lb/MMBtu	µg/l	
SO2 (nat. gas)		0.00059		
NOx		0.068		
CO		0.37		
THC		0.14		
PM		0.0024	40	lightly smoking
	GWP			
CO2	1	117		40 CFR 98 Table C-1
CH4	25	0.0022		40 CFR 98 Table C-2
N2O	298	0.00022		40 CFR 98 Table C-2

Emissions During Worst-Case Release Flare Operation (worst-case flare plus pilot)

*Avg = Maximum Heat Input (225.2 MMBtu/hr + 0.0918 MMBtu/hr) * Emission Factor (lbs/MMBtu)*

*SO2 = (225.2 MMBtu/hr + 0.0918 MMBtu/hr) * 0.00059 lb/MMBtu*
0.13 lb/hr SO2

*NOx = (225.2 MMBtu/hr + 0.0918 MMBtu/hr) * 0.068 lb/MMBtu*
15.3 lb/hr NOx

*CO = (225.2 MMBtu/hr + 0.0918 MMBtu/hr) * 0.37 lb/MMBtu*
83.4 lb/hr CO

*PM = (225.2 MMBtu/hr + 0.0918 MMBtu/hr) * 0.0024 lb/MMBtu*
0.552 lb/hr PM

*THC = (225.2 MMBtu/hr + 0.0918 MMBtu/hr) * 0.14 lb/MMBtu*
31.5 lb/hr THC

*CO2 = (225.2 MMBtu/hr + 0.0918 MMBtu/hr) * 117 lb/MMBtu*
26,357 lb/hr CO2

*CH4 = (225.2 MMBtu/hr + 0.0918 MMBtu/hr) * 0.0022 lb/MMBtu*
0.497 lb/hr CH4

*N2O = (225.2 MMBtu/hr + 0.0918 MMBtu/hr) * 0.00022 lb/MMBtu*
0.0497 lb/hr CH4

*CO2e (total) = (26,357 lb CO2/hr * 1 lb CO2e/lb CO2) + (0.50 lb CH4/hr * 25 lb CO2e/lb CH4)*
*+ (0.050 lb N2O/hr * 298 lb CO2e/lb N2O)*
26,384 lb CO2e/hr

Annual Maximum Potential Emissions Estimates (all events plus pilot)

*Annual Emissions = Annual Heat Input (96.3 MMBtu/yr + 43,243 MMBtu/yr + 2.5 MMBtu/yr + 804 MMBtu/yr) * Emission Factor (lbs/MMBtu)*

*SO2 = (44,146 MMBtu/yr) * (0.00059 lb/MMBtu) / (2,000lb/ton)*
0.0130 TPY SO2

*NOx = (44,146 MMBtu/yr) * (0.068 lb/MMBtu) / (2,000lb/ton)*
1.50 TPY NO2

*CO = (44,146 MMBtu/yr) * (0.37 lb/MMBtu) / (2,000lb/ton)*
8.17 TPY CO

*PM = (44,146 MMBtu/yr) * (0.0024 lb/MMBtu) / (2,000lb/ton)*
0.054 TPY PM

*THC = (44,146 MMBtu/yr) * (0.14 lb/MMBtu) / (2,000lb/ton)*
3.09 TPY THC

*CO2 = (44,146 MMBtu/yr) * (117 lb/MMBtu) / (2,000lb/ton)*
2,582 TPY CO2

*CH4 = (44,146 MMBtu/yr) * (0.0022 lb/MMBtu) / (2,000lb/ton)*
0.049 TPY CH4

*N2O = (44,146 MMBtu/yr) * (0.00022 lb/MMBtu) / (2,000lb/ton)*
0.0049 TPY N2O

*CO2e (total) = (2,582 tpy CO2 * 1 lb CO2e/lb CO2) + (0.049 tpy CH4 * 25 lb CO2e/lb CH4)*
*+ (0.0049 tpy N2O * 298 lb CO2e/lb N2O)*
2,585 TPY CO2e

Emissions Summary

Pollutant	*Maximum (lbs./hr)*	*Annual (tpy)*
PM	0.55	0.054
SO2	0.13	0.0130
NOx	15.32	1.50
CO	83.37	8.17
VOC	31.54	3.09
CO2e	26,384	2,585

REFERENCES/NOTES

1 Based on EPA AP-42, Section 13.5, Industrial Flares, January 1995.

MARCELLUS METHANOL
MARSHALL COUNTY, WEST VIRGINIA
COOLING TOWER

SOURCE DESCRIPTION

Cooling for equipment within the facility will be provided by an induced draft cooling tower.

OPERATING PARAMETERS

Operating Schedule	8,760	hrs/yr
Cells	2	
Water Flow (total)	1,001,520	lb/hr cooling water
Water Density	8.346	lb/gal
Water Flow (total)	2,000	gallons/minute (GPM) cooling water
Drift Losses	0.005	%
TDS [1]	5,000	mg/L
Air Flow (total)	1,007,417	lb/hr air flow
Air Exit Temperature	94.4	°F
Air Density	0.07163	lb/ft3
Air Flow (total)	234,400	acfm
Air Flow (each cell)	117,200	acfm
Exit Diameter (each cell)	7.0	ft
Exit Velocity (each cell)	50.8	ft/s

EMISSION CALCULATIONS [1]

PM Emissions

*Drift Loss (gal/hr) = 2,000 GPM * 60 mins/hr * 0.005 %drift*

6.00 gals/hr Drift Loss

Average Emissions

*Average = 6.0 gal/hr loss * 5,000 mg/L * 3.7854 L/gal / 453,600 mg/lb*

0.25 lb PM10/hr

Annual Emissions

*Total = 0.25 lbs/hr * 8,760 hrs/yr / 2,000 lbs/ton*

1.10 TPY PM10

VOC Emissions

SCAQMD Guidance (2006)

Average Emissions

*Average = 2,000 GPM * 0.00144 MGD/GPM * 0.7 lb VOC/MGD / 24 hr/day*

0.08 lb VOC/hr

Annual Emissions

*Total = 0.08 lbs/hr * 8,760 hrs/yr / 2,000 lbs/ton*

0.37 TPY VOC

MARCELLUS METHANOL
MARSHALL COUNTY, WEST VIRGINIA
COOLING TOWER

Emissions Summary

Pollutant	*Average (lbs/hr)*	*Annual (TPY)*	
PM10	0.250	1.10	
PM2.5	0.250	1.10	assume equal to PM10
VOC	0.08	0.37	
HAP [2]	0.08	0.37	

REFERENCES/NOTES

1 Based on facility supplied information.
2 HAP emissions are conservatively assumed to equal VOC (100% methanol).

MARCELLUS METHANOL

MARSHALL COUNTY, WEST VIRGINIA

FUGITIVE VOC EQUIPMENT LEAKS

SOURCE DESCRIPTION

Equipment components in VOC service are subject to 40 CFR Part 60 Subpart VVa; therefore components are monitored monthly. Control effectiveness is allowed for components subject to a monthly LDAR program.

OPERATING PARAMETERS

Operating Schedule 8,760 hrs/yr

EMISSION CALCULATIONS [1]

*Average (Lbs/hr) = Component Count x Emission Factor (lb/hr/source) * (1 - Control Effectiveness/100)*

*Annual (TPY) = Average (lbs VOC/hr) * 8,760 hrs/yr / 2,000 lbs/ton*

Component Type	Service	Component Count	Emission Factors (kg/hr/source) [1]	Weighted Average VOC Content [2]	Subpart VVa Control Effectiveness [3]	VOC Emissions		
						Avg (lbs/hr)	Max (lbs/hr)	Tons/Yr
Valves	Gas/Vapor	222	0.00597	24%	87%	0.09	0.11	0.40
Valves	Light Liquid	70	0.00403	75%	84%	0.07	0.09	0.33
Valves	Heavy Liquid		0.00023		0%	0.00	0.00	0.00
Sealless Valves	Light Liquid		4.90E-07		84%	0.00	0.00	0.00
Sealless Valves	Heavy Liquid		4.90E-07		0%	0.00	0.00	0.00
Flanges/Connectors	Gas/Vapor	802	0.00183	9%	0%	0.30	0.36	1.32
Flanges/Connectors	Light Liquid	107	0.000235	77%	0%	0.04	0.05	0.19
Flanges/Connectors	Heavy Liquid		0.0000328		0%	0.00	0.00	0.00
Sampling Connections	Gas/Vapor	6	0.015	35%	0%	0.07	0.08	0.30
Sampling Connections	Light Liquid		0.015		0%	0.00	0.00	0.00
Sampling Connections	Heavy Liquid		0.015		0%	0.00	0.00	0.00
Pump Seals	Light Liquid		0.0199		69%	0.00	0.00	0.00
Pump Seals	Heavy Liquid		0.00862		0%	0.00	0.00	0.00
Pump Seals, Dual Mech.	Light Liquid	5	7.50E-06	100%	69%	0.00	0.00	0.00
Pump Seals, Dual Mech.	Heavy Liquid		7.50E-06		0%	0.00	0.00	0.00
Agitator Seals	Light Liquid		0.0199		69%	0.00	0.00	0.00
Agitator Seals	Heavy Liquid		0.00862		0%	0.00	0.00	0.00
Compressor Seals, Single	Gas/Vapor	1	0.228	2%	87%	0.00	0.00	0.01
Compressor Seals, Double	Gas/Vapor		7.50E-06		0%	0.00	0.00	0.00
Pressure Relief Valves	Gas/Vapor		0.104		0%	0.00	0.00	0.00
Open-Ended Lines	All	20	0.0017	2%	0%	0.00	0.00	0.01
					TOTAL	**0.58**	**0.70**	**2.55**

MARCELLUS METHANOL

MARSHALL COUNTY, WEST VIRGINIA

FUGITIVE VOC EQUIPMENT LEAKS

Component Type	Service	Component Count	Emission Factors (kg/hr/source) [1]	Weighted Average HAP Content [2]	Subpart VVa Control Effectiveness [3]	HAP Emissions		
						Avg (lbs/hr)	Max (lbs/hr)	Tons/Yr
Valves	Gas/Vapor	222	0.00597	24%	87%	0.09	0.11	0.40
Valves	Light Liquid	70	0.00403	75%	84%	0.07	0.09	0.33
Valves	Heavy Liquid		0.00023		0%	0.00	0.00	0.00
Sealless Valves	Light Liquid		4.90E-07		84%	0.00	0.00	0.00
Sealless Valves	Heavy Liquid		4.90E-07		0%	0.00	0.00	0.00
Flanges/Connectors	Gas/Vapor	802	0.00183	9%	0%	0.28	0.33	1.21
Flanges/Connectors	Light Liquid	107	0.000235	77%	0%	0.04	0.05	0.19
Flanges/Connectors	Heavy Liquid		0.0000328		0%	0.00	0.00	0.00
Sampling Connections	Gas/Vapor	6	0.015	34%	0%	0.07	0.08	0.30
Sampling Connections	Light Liquid		0.015		0%	0.00	0.00	0.00
Sampling Connections	Heavy Liquid		0.015		0%	0.00	0.00	0.00
Pump Seals	Light Liquid		0.0199		69%	0.00	0.00	0.00
Pump Seals	Heavy Liquid		0.00862		0%	0.00	0.00	0.00
Pump Seals, Dual Mech.	Light Liquid	5	7.50E-06	100%	69%	0.00	0.00	0.00
Pump Seals, Dual Mech.	Heavy Liquid		7.50E-06		0%	0.00	0.00	0.00
Agitator Seals	Light Liquid		0.0199		69%	0.00	0.00	0.00
Agitator Seals	Heavy Liquid		0.00862		0%	0.00	0.00	0.00
Compressor Seals, Single	Gas/Vapor	1	0.228	1%	87%	0.00	0.00	0.00
Compressor Seals, Double	Gas/Vapor		7.50E-06		0%	0.00	0.00	0.00
Pressure Relief Valves	Gas/Vapor		0.104		0%	0.00	0.00	0.00
Open-Ended Lines	All	20	0.0017	1%	0%	0.00	0.00	0.00
					TOTAL	**0.55**	**0.66**	**2.42**

Emissions Summary

Pollutant	*Average (lbs/hr)*	*Maximum (lbs/hr)*	*Annual (TPY)*
VOC	0.58	0.70	2.55
HAP	0.55	0.66	2.42
methanol	0.55	0.66	2.42

REFERENCES/NOTES:

1 Table 2-1, SOCMI Average Emission Factors; or Table 2-11, Default-Zero Values: SOCMI Process Units; or Table 5-1, Summary of Equipment Modifications; Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, November 1995. Also, TCEQ guidelines provide refinement of the factor for flanges in liquid service (TCEQ Addendum to RG-360A, October 2008, Table 3).

2 Based on facility heat and mass balance, VOC content of components assumed to be as follows: 2% for SMR components, 30% for reactor components, 100% for distillation components. HAP (methanol) content of components assumed to be as follows: 1% for SMR components, 30% for reactor components, 100% for distillation components.

3 Table 5-2, Control Effectiveness for an LDAR Program at a SOCMI Process Unit, Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, November 1995.

Attachment P

Public Notice

Harrington, Jeff

From: Emily Tenenbaum <etenenbaum@primusge.com>
Sent: Wednesday, October 05, 2016 12:06 PM
To: mdsvecho@gmail.com
Cc: John Doyle; Harrington, Jeff
Subject: Publication of Class I Legal Ad for Primus Green Energy Inc.
Attachments: Primus Legal Notice for Moundsville Echo Oct_5_2016.doc

Dear Moundsville Daily Echo Representative,

Please publish the attached information as a Class I legal advertisement (one time only) in the Monday, October 10, 2016 issue of the *Moundsville Daily Echo*. Please let me know that this has been received and will be published as requested.

Please send the invoice for payment and affidavit of publication to:
Mr. John Doyle
Primus Green Energy, Inc.
219 Homestead Rd.
Hillsborough, NJ 08844

Thank you,

Emily Tenenbaum, PhD
Business Development Manager
Primus Green Energy, Inc.
219 Homestead Rd | Hillsborough, NJ 08844
office: 908-281-6000 ext 145
etenenbaum@primusge.com | www.primusge.com

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Primus Green Energy Inc. has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Construction Permit for a new methanol production facility located on 17595 Energy Road, near Proctor, in Marshall County, West Virginia. The latitude and longitude coordinates are: 39.7282° North, -80.8330° West

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be:
70.30 tons of nitrogen oxides per year;
33.16 tons of carbon monoxide per year;
12.20 tons of volatile organic compounds per year;
3.23 tons of particulate matter per year;
1.21 tons of sulfur dioxide per year;
6.96 tons of total hazardous air pollutants per year;
130,854 tons of carbon dioxide equivalents per year.

Startup of operation is planned to begin on or about the 15th day of February, 2018. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.
Dated this the 10th day of October, 2016.

By: Primus Green Energy, Inc.
Mr. John Doyle
Chief Project Officer
219 Homestead Rd.
Hillsborough, NJ 08844