3 December 2024

Kentucky Division for Air Quality
Attn: Permit Support Section
803 Schenkel Lane
Frankfort, Kentucky 40601

Re: ***New State Origin Permit***
Green Mountain Energy
Paducah, Kentucky

To Whom It May Concern:

This letter is intended to supplement our request for a construction of a new plastics to fuel processing facility located in Paducah, Kentucky. The following information is presented to:

- Describe the processed process at the facility;
- Provide the basis for our estimates of emissions from the emission units and to summarize the emission estimates; and
- Provide our assessment of the permitting and regulatory requirements that we believe will apply under the State Permit program.

We hope that this information will assist your staff in their review of this application and in the preparation of the draft permit and Technical Support Document.

Project Description

Green Mountain Energy proposes to install a new plastics to fuel processing facility. This process utilizes hard to recycle plastic materials as feedstock to generate useful petroleum products. The Green Mountain Energy facility will consist of the following equipment:

- Plastic Pneumatic Unloading Operation;
- Plastic Storage Silo (TK-10101);
- Supersak Unloading Operation;
- Screener (X-10102);
- Overs Box;
- Two Transfer Lines from Silo (TK-10101) to Feed Hoppers A/B (TK-12103-A/B)

- Two Transfer Lines from Plastic Feed Hoppers (TK-12103-A/B) to Two Plastic Slurry Tanks (TK-12104-A/B);
- One Primary Reactor (R-20001);
- One Secondary Reactor (R-20002);
- Secondary Reactor Heater (H-200002);
- Secondary Reactor Burner (BUR-20002);
- Two Naphtha Product Day Tanks (TK-12203A/B);
- One Naphtha Product Storage Tank (TK-12204);
- Two Diesel Product Day Tanks (TK-12205A/B);
- One Diesel Product Storage Tank (TK-12206);
- One Residue Product Tank (TK-12208);
- One Off-Spec Naphtha Tank (TK-12209);
- One Off-Spec Diesel Tank (TK-12210);
- Product Loading Racks:
    - Diesel (Truck, Rail, Barge)
    - Naphtha (Truck, Rail)
    - Fuel Oil (Residue) (Truck)
- Cooling Tower; and
- Two Flares (Pilot, Relief).

A detailed description of the process for the proposed facility is provided below.

Feedstock material comes from a variety of suppliers that if not processed at the proposed facility, would be disposed of in a landfill. These materials are brought to the Green Mountain Energy facility where they undergo a quality control evaluation and are then sorted into process feedstock. The plastic feedstock is mixed with water and off-spec naptha and off-spec diesel to make a slurry.

The slurry is then conveyed toward the pyrolysis reactors, where heat is used to break down the plastic compounds. Condensable components are turned into useful petroleum products and stored and sent off-site as products.

The petroleum products are stored in Day Tanks (Two Naptha Day Tanks and Two Diesel Day Tanks) before going to one Naptha Product Storage Tank and one Diesel Product Storage Tank. There is also one Residue (Fuel Oil) Product Storage Tank. If the product does not meet the required specifications, the material will be stored in either one Off-Spec Naptha Tank or one Off-Spec Diesel Tank. The tanks are controlled by Tank Farm Flare (EP-004). The off-spec materials can be recycled into the process before the pyrolysis reaction.

After the Product Storage Tanks, the products will be loaded into trucks, rail, or barge for shipment. Truck and Tank loadout operations will be controlled by Relief Flare (EP-003).

The non-condensable process gas is routed to the secondary reactor heater, which will use the process gas as a fuel heat the pyrolysis reactor. During any malfunction, process upset, and startup/shutdown period, the non-condensable gases will pass through the Relief Flare (EP-003).

Emission Calculation Methodology

The Green Mountain Energy facility is a source of regulated air pollutants, including carbon monoxide (CO), nitrogen oxides (NO_X), filterable particulate matter (PM), filterable PM less than 10 microns in aerodynamic diameter (PM_{10}), filterable PM less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$), condensable PM, sulfur dioxide (SO_2), volatile organic compounds (VOC), and hazardous air pollutants (HAPs). Emissions of all regulated pollutants are below the respective major source thresholds. The facility-wide potential emissions from the Green Mountain Energy facility are summarized in the tables below:

	Uncontrolled Emissions (tons/yr)									
Emission Unit	Filterable PM	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC	Organic HAPs	Metal HAPs	Total HAPs
Tanks							9.99			
Material Handling	0.89	0.33	0.33							
Process Combustion	0.13	0.52	0.52	0.04	6.82	5.93	5.73	0.16	0.00	0.16
Fugitive Losses							0.42			
Product Loading Racks							53.77	3.13		
Cooling Tower	0.34	0.19	0.00							
Pilot Flare	1.59E-03	6.36E-03	6.36E-03	0.06	0.05	5.02E-04	4.61E-03	1.58E-03	4.59E-06	1.58E-03
Relief Flare				0.24	2.07		9.72			0.26
Paved Roads	5.33	1.07	0.26							
Total	6.69	2.11	1.11	0.34	8.94	5.93	79.64	3.30	0.00	0.42

Emission Unit	Controlled Emissions (tons/yr)									
	Filterable PM	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC	Organic HAPs	Metal HAPs	Total HAPs
Tanks							0.20			
Material Handling	0.04	0.02	0.02							
Process Combustion	0.13	0.52	0.52	0.04	6.82	5.93	5.73	0.16	0.00	0.16
Fugitive Losses							0.42			
Product Loading Racks							1.08	0.06		
Cooling Tower	0.34	0.19	0.00							
Pilot Flare	1.06E-03	4.24E-03	4.24E-03	0.06	0.05	3.35E-04	3.07E-03	1.05E-03	3.06E-06	1.05E-03
Relief Flare				0.24	2.07		9.72			0.26
Paved Roads	5.33	1.07	0.26							
Total	5.85	1.80	0.80	0.34	8.94	5.93	17.16	0.23	0.00	0.42

Detailed emissions are included in Attachment A.

Tanks

Emissions from the storage tanks are calculated using tank parameters, material characteristics from SDSs, throughputs based on maximum design loadout capacities, and emission calculations from AP-42, Chapter 7.1.

Material Handling

Material handling operations at Green Mountain Energy include the following:

- One pneumatic transfer line into the plastic silo
- One pneumatic transfer line from the silo into a small hopper
- One gravity-fed supersack unloading operation onto a screener
- One gravity-fed transfer from screener to plastic silo
- One gravity-fed transfer from screener to overs box (for oversized material)
- Two Trains from Plastic Silo to Plastic Feed Hoper
- Two Trains from Plastic Feed Hopper to Plastic Slurry Tank

Emissions for material handling are based on the number of transfers, number of lines, throughput, and an AP-42 emission factor from Table 11.19.2-2 for crushed stone processing. Plastic was not available; therefore, crushed stone processing was used as a worst case for clean, dry material.

For the overs box, a conservative 10% of the amount transferred from supersak to overs box was assumed to be emitted due to the over size of the material.

Process Combustion

Process gas generated from the pyrolysis reactors is used during normal process operation. During process upsets, maintenance, or startup and shutdown, process gas is combusted in the Relief Flare. Parameters of the process gas have been developed from gas analyses and categorization at other associated R&D facilities.

Potential emissions are based on the hours of operation and respective emission factors for process gas combustion in the Process Heaters and the fare. The potential emission calculations include three scenarios: Operating Scenario 1 where natural gas supplies the fuel for the process heaters, Operating Scenario 2 where process fuel gas supplies 80% of the fuel for the process heaters and natural gas supplies the remaining 20% of the fuel, and operating scenario 3 where process fuel supplies 100% of the fuel for the process heaters. In each of these scenarios, Green Mountain Energy has included startup events, shutdown events, process upsets, and maintenance activities that would result in sending process gas to the flare. Emissions from the flare scenarios are described below under the Flare subsection. To be conservative, it is assumed that the worst-case fuel is combusted 8760 hrs/yr in the Process Heater. This is 100% natural gas for all pollutants except for VOC and 100% process gas for VOC.

Fugitive Losses

Green Mountain Energy provided design component counts for all valves, pump seals, connectors and flanges. Emissions were calculated using emissions factors from Table 2-3, Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, November 1995, non-methane organic compounds. The HAP speciation is based on the Process Gas composition.

Product Loading Racks

Green Mountain Energy can load out the following materials:

- Diesel (Truck, Rail, Barge)
- Naphtha (Truck, Rail)
- Residue (Fuel Oil) (Truck)

Emissions from loading petroleum products were estimated using methodologies from AP-42, Chapter 5.2 for transportation of petroleum liquids. Green Mountain Energy provided the potential material loadout numbers that were based on the facility design parameters. The loading loss emission factor was calculated as follows:

$L_L = 12.46 \times (S \times P \times M) / T$

Where:

L_L = Loading loss, pounds per 1000 gallons of liquid loaded
S = saturation factor from 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 (^{0}R)

The loading loss emission factor is multiplied by the potential throughput of product loaded. Green Mountain Energy will load naptha, diesel, and fuel oil to truck or rail and direct unloading operations to a flare, as control. The flare will meet a minimum 95% control efficiency. Green Mountain Energy will also load out diesel to barge. This operation will be uncontrolled.

The worst-case scenario is splash loading into a clean Tank. Therefore, potential emissions are based on assuming that all of the production at Green Mountain Energy is naphtha loaded into a clean tank. HAP emissions are based on the assumed that the last worst-case product transported from the source would be motor gasoline.

Cooling Tower

PM emissions from cooling towers are estimated using manufacturer specifications and calculation methodologies from A-42, Chapter 13.4. The manufacturer specifications indicate the type of draft, flow, and circulating water rate (gpm). AP-42 provides typical total dissolved solids (TDS) and typical drift loss rate (%). The PM_{10} and $PM_{2.5}$ mass fractions were estimated using, "Calculating Realistic PM10 Emissions from Cooling Towers," by Reisman, J. and Frisbie, G.

Flares

The emissions from the pilot light on the flare was from AP-42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3 and the maximum heat input capacity of the pilot light.

The emissions from combusting the process emissions from startup and shutdown, upset, and maintenance scenarios was based on the following assumptions:

- Startup and Shutdown Scenario – Only Natural Gas fuel vented to flare assuming full material flow rate of NG Distribution stream occurring once every four weeks for 2 hours, for a total of 52 hours per year.
- Upset Conditions –Process Gas fuel vented to flare assuming full material flow rate of Reactor and Process streams occurring once every four weeks for 1 hours, for a total of 26 hours per year.
- Maintenance Scenario – Only Natural Gas fuel vented to flare assuming full material flow rate of NG Distribution stream occurring once every four weeks for 1 hour, for a total of 26 hours per year.

Paved Roads

Fugitive dust emissions are calculated using the methodologies from AP-42, Chapter 13.2.1, as well as vehicle traffic information (vehicles per day, weight of vehicle, distance traveled, etc.).

Permit Level Determination

As shown in the potential to emit table above, facility-wide potential emissions are less than the major source threshold. Therefore, the appropriate permit level for the Green Mountain Energy facility is a State Origin Permit.

Regulatory Review

Green Mountain Energy will be subject to certain federal and state regulations. This section summarizes the applicable air permitting requirements and regulations that pertain to the Green Mountain Energy facility.

Federal Regulations

- ***40 CFR Part 60 Subpart Kc, Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced October 4, 2023:*** Subpart Kc applies to storage tanks with capacities greater than 20,000 gallons with a vapor pressure greater than 0.25 psia. TK-12204 (Naphtha Product Tank), and TK-12209 (Off-Spec Naphtha Tank), are subject to Subpart Kc. The tanks are controlled by a flare that will reduce emissions by at least 98% to comply with the requirements of Subpart Kc.

State Regulations

- ***401 KAR 59:010(3)(1)(a), Opacity:*** This regulation limits the opacity from all control devices and stacks associated with any facility to 20%. Green Mountain Energy will ensure compliance with this regulation.

- ***401 KAR 59:010(3)(3)(2), Mass Standard:*** Emissions from a control device or stack are limited to 2.34 lb/hr for processes with a throughput less than 0.5 tons per hour. Processes with throughputs greater than 0.5 tons per hour and less than or equal to 30 tons per hour, allowable emissions (lb/hr) are calculated using the following equation:
  $E = 3.59P^{0.62}$ where E = allowable emissions (lb/hr) and P = throughput (ton/hr).
  The material handling operations at Green Mountain Energy are subject to this regulation. Baghouses are used on the material handling operations, with the exception of the overage box, to comply with this regulation. Dust collection is not required on the overage box.

- ***401 KAR 59:050(3)(2), New Storage Vessels for Petroleum Liquids:*** All tanks with a capacity greater than 580 gallons with a true vapor pressure greater than 1.5 psia shall be equipped with a permanent submerged fill pipe.

- ***401 KAR 59:105(3), New Process Gas Streams, Standards for Hydrogen Sulfide:*** The process gas stream shall not exceed 10 gr/100 dscf (165 ppmv) at 0% oxygen.

- ***401 KAR 59.105(5), New Process Gas Streams, Standards for Carbon Monoxide:*** Emissions of CO in a process gas stream or waste gas stream are prohibited unless the gasses are burned at 1,300^{0}F for 0.5 seconds or greater. Green Mountain Energy does not have CO emissions in their process gas stream.

- ***401 KAR 63:010(3)(1), Fugitive Emissions:*** A person shall not cause, suffer, or allow any material to be handled, processed, transported, or stored; a building or its appurtenances to be constructed, altered, repaired, or demolished; or a road to be used without taking reasonable precaution to prevent particulate matter from becoming airborne. Green Mountain Energy will, when possible:
    - Use water or suitable chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of land
    - Apply and maintain asphalt, oil, water, or suitable chemicals on roads, materials stockpiles, and other surfaces that can create airborne dusts
    - Install and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials, or the use of water sprays or other measures to suppress the dust emissions during handling. Adequate containment methods shall be employed during sandblasting or other similar operations
    - Cover, at all times while in motion, open bodied trucks transporting materials likely to become airborne
    - Maintain paved roadways in cleaned condition

- ***401 KAR 63:010(3)(2), Fugitive Emissions:*** Green Mountain Energy will not allow visible fugitive dust emissions beyond the facility property line for more than five minutes during any sixty-minute observation period or more than 20 minutes of emissions during any 24 hour period.

- ***401 KAR 63:010(3)(3), Fugitive Emissions:*** Green Mountain Energy shall minimize dust, fumes, gases, mist, odorous matter, and vapors from escaping from a building or equipment in a manner and amount that would cause a nuisance. If a nuisance or violation of an administrative regulation would occur, the secretary may require treatment or destruction of air contaminants before discharge to the open air.

- ***401 KAR 63.015, Flares, Standards of Particulate Matter:*** Green Mountain Energy shall limit opacity from the flares to less than 20%.

- ***401 KAR 63:020, Potentially Hazardous Matter or Toxic Substances:*** Green Mountain Energy shall not emit any potentially hazardous matter or toxic substances in quantities or duration that would be harmful to the health and welfare of humans, animals, and plants.

Supplemental Information

- **Attachment A – Emission Calculations**
- **Attachment B – Application Forms**
  - **KYDEP Forms 7007AI**
  - **KYDEP Forms 7007B**
  - **KYDEP Forms 7007J**
  - **KYDEP Forms 7007N**
  - **KYDEP Forms 7007HH**
- **Attachment C – Facility Layout**
- **Attachment D – Process Flow Diagram**
- **Attachment E – Site Location Map**

If you have any further questions, please contact me at (304) 579-0933 or Holly Argiris of ERM at (317) 816-7301.

Sincerely,

Bob Downey
Operations Manager

Enc.

Cc: Holly Argiris, ERM
Jeff Twaddle, ERM

ATTACHMENT A: EMISSION CALCULATIONS

GREEN MOUNTAIN ENERGY
STORAGE TANK EMISSION CALCULATIONS

EP-003	Flare Control Efficiency	98%								Uncontrolled VOC		Controlled VOC	
Tank ID	Stream ID	Product	Tank Description	Tank Construction	Tank Capacity (gal)	Tank Dimensions	Design Temperature	Design Pressure[1]	Throughput (gal/yr)	(lb/yr)	(ton/yr)	(lb/yr)	(ton/yr)
TK-12203-A	30021	Naphtha Product Day Tank A	Shop Fabricated	CS	15,220 gallon	12 ft DIA x 18 ft T/T	250°F	2 psig	9,307,500	253.30	0.13	5.07	0.00
TK-12203-B	30021	Naphtha Product Day Tank B	Shop Fabricated	CS	15,220 gallon	12 ft DIA x 18 ft T/T	250°F	2 psig	9,307,500	253.30	0.13	5.07	0.00
TK-12204	30021	Naphtha Product Tank	API 650, Field Erected, Floating Roof	CS	37,600 gallon	20 ft DIA x 16 ft T/T	250°F	2 psig	9,307,500	5470.90	2.74	109.42	0.05
TK-12205-A	30051	Diesel Product Day Tank A	Field Fabricated, API 650	CS	73,430 gallon	25 ft DIA x 20 ft T/T	250°F	2.5 psig	9,307,500	2227.30	1.11	44.55	0.02
TK-12205-B	30051	Diesel Product Day Tank B	Field Fabricated, API 650	CS	73,430 gallon	25 ft DIA x 20 ft T/T	250°F	2.5 psig	9,307,500	2227.30	1.11	44.55	0.02
TK-12206	30051	Diesel Product Tank	API 650, Field Erected	CS	709,640 gallon	53 ft DIA x 43 ft T/T	250°F	1 psig	9,307,500	8497.10	4.25	169.94	0.08
TK-12208	30052	Residue Product Tank	API 650, Field Erected Equipped with heated coil	CS	527,920 gallon	48 ft DIA x 39 ft T/T	276°F	1 psig	2,190,000	499.60	0.25	9.99	0.00
TK-12209	30021	Off-Spec Naphtha Tank	API 650, Field Erected, Floating Roof	CS	37,600 gallon	20 ft DIA x 16 ft T/T	250°F	2 psig	178,500	125.10	0.06	2.50	0.00
TK-12210	30051	Off-Spec Diesel Tank	API 650, Field Erected	CS	190,160 gallon	34 ft DIA x 28 ft T/T	250°F	2 psig	178,500	419.40	0.21	8.39	0.00
Total										19973.30	9.99	399.47	0.20

[1] This is the design pressure of the tank, not the vapor pressure of the material stored in the tank.

GREEN MOUNTAIN ENERGY
FACILITY-WIDE EMISSIONS SUMMARY

Emission Unit	Uncontrolled Emissions (tons/yr)									
	Filterable PM	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC	Organic HAPs	Metal HAPs	Total HAPs
Tanks							9.99			
Material Handling	0.89	0.33	0.33							
Process Combustion	0.13	0.52	0.52	6.82	5.73	0.04	5.93	0.16	0.00	0.16
Fugitive Losses							0.42			
Product Loading Racks							53.77	3.13		
Cooling Tower	0.34	0.19	0.00							
Pilot Flare	1.06E-03	4.24E-03	4.24E-03	0.06	0.05	3.35E-04	3.07E-03	1.05E-03	3.06E-06	1.05E-03
Relief Flare				0.24	2.07		9.72			0.26
Paved Roads	5.33	1.07	0.26							
Total	6.69	2.11	1.11	7.12	7.84	0.04	79.84	3.30	0.00	0.42

Emission Unit	Controlled Emissions (tons/yr)									
	Filterable PM	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC	Organic HAPs	Metal HAPs	Total HAPs
Tanks							0.20			
Material Handling	0.04	0.02	0.02							
Process Combustion	0.13	0.52	0.52	6.82	5.73	0.04	5.93	0.16	0.00	0.16
Fugitive Losses							0.42			
Product Loading Racks							1.08	0.06		
Cooling Tower	0.34	0.19	0.00							
Pilot Flare	1.06E-03	4.24E-03	4.24E-03	0.06	0.05	3.35E-04	3.07E-03	1.05E-03	3.06E-06	1.05E-03
Relief Flare				0.24	2.07		9.72			0.26
Paved Roads	5.33	1.07	0.26							
Total	5.85	1.80	0.80	7.12	7.84	0.04	17.36	0.23	0.00	0.42

GREEN MOUNTAIN ENERGY
MATERIAL HANDLING EMISSION CALCULATIONS

Emission Unit	Process	Conveyor Discharge ID	Number Transfers	Number of Lines	PM Emission Factor (lb/ton)	PM10/PM2.5 Emission Factor (lb/ton)	Control Efficiency %	Maximum Conveyor Throughput (tons/hr)	Maximum Potential to Emit PM		Maximum Potential to Emit PM10/PM2.5		Maximum Potential to Emit PM		Maximum Potential to Emit PM10/PM2.5	
									(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
EP-005	Pneumatic Unloading of Plastic into Silo	TK-10101	1	1	0.003	0.0011	95%	16.67	0.05	0.22	0.02	0.08	2.50E-03	1.10E-02	9.17E-04	4.02E-03
	Pneumatic transfer of Silo into Small Hopper		1	1	0.003	0.0011	95%	16.67	0.05	0.22	0.02	0.08	2.50E-03	1.10E-02	9.17E-04	4.02E-03
	Supersack Unloading to Screener	X-10102	1	1	0.003	0.0011	95%	0.50	0.00	0.01	0.00	0.00	7.50E-05	3.29E-04	2.75E-05	1.20E-04
	Supersack Screener Transfer to Silo (TK-10101)	TK-10101	1	1	0.003	0.0011	95%	0.50	0.00	0.01	0.00	0.00	7.50E-05	3.29E-04	2.75E-05	1.20E-04
Internal	Overs Box	Overs Box	1	1	0.003	0.0011	0%	0.05	1.50E-04	6.57E-04	5.50E-05	2.41E-04	7.50E-06	3.29E-05	2.75E-06	1.20E-05
EP-006 & EP-007 (Train #1) EP-009, EP-010 (Train #2) EP-012, EP-013 (Train #3) EP-014, EP-015 Train #4)	Transfer from TK-10101 to Plastic Feed Hopper A/B (TK-12103-A/B)	TK-12103-A/B	1	2	0.003	0.0011	95%	8.33	0.05	0.22	0.02	0.08	2.50E-03	1.10E-02	9.17E-04	4.02E-03
	Transfer from TK-12103-A/B to Plastic Slurry Tank (TK-12104-A/B)	TK-12104-A/B	1	2	0.003	0.0011	95%	8.33	0.05	0.22	0.02	0.08	2.50E-03	1.10E-02	9.17E-04	4.02E-03
Total									**0.20**	**0.89**	**0.07**	**0.33**	**1.02E-02**	**4.45E-02**	**3.72E-03**	**1.63E-02**

Note:
Emission Factor from conveyor transfer point, SCC-3-05-020-06, AP-42, Table 11.19.2-2 (August 2004), Emission Factor for Crushed stone processing used as a worst case for clean, dry material.
Assume a conservative 10% of the amount transferred from super sack to overs boxes due to over size of material.

Emissions (lb/hr) = Throughput (tons/hr) x Number of Transfers x Number of Lines x Emission Factor (lb/ton)
Emissions (tons/yr) = PTE (lb/hr) x 8760 hrs/hr x 1 ton/2000 lbs
Controlled Emissions = Uncontrolled Emissions x (1 - Control Efficiency)

GREEN MOUNTAIN ENERGY
PROCESS EMISSION CALCULATIONS

Equipment ID	Equipment Name	Equipment Type	Capacity (MMBtu/hr)
BUR-20002	Secondary Reactor Heater Burner	Burner	3.89
H-20002	Secondary Reactor Heater	Heater	12.00
Total			**15.89**

Process Gas Stream ID20042				
Constituent	**Heat Content (Btu/scf)**	**Composition (wt%)**	**MW**	**VOC Content (lb/MMscf)**
water		1.31%	18.015	
hydrogen			2.016	
nitrogen		3.74%	28.014	
oxygen		0.99%	31.999	
argon		0.05%	39.948	
carbon dioxide		0.52%	40.01	
nitrogen dioxide			46.006	
sulfur dioxide			64.065	
C1	1010	73.87%	16.043	44322
C2	1783	10.01%	30.07	6006
C3	2500	3.40%	44.097	2038.8
C4	3225	2.13%	58.123	1280.4
C5	3981	1.18%	72.15	710.4
C6	4667	0.22%	86.177	132.6
C8	6260	0.45%	114.231	267
C9	6996.5	1.76%	128.258	1056.6
Stream Composition	**1286.85**			**5485.8**

1. Natural Gas Only

Heat Input Capacity MMBtu/hr	HHV mmBtu / mmscf	Potential Throughput MMCF/yr
15.9	1020	136.5

	Pollutant						
	PM*	PM10*	direct PM2.5*	SO2	NOx	VOC	CO
Emission Factor in lb/MMCF	1.9	7.6	7.6	0.6	100 **see below	5.5	84
Potential Emission in tons/yr	0.13	0.52	0.52	0.04	6.82	0.38	5.73

2. Normal Operation (Process Fuel Gas Combustion: 80% Natural Gas Combustion 20%)

	Heat Input Capacity MMBtu/hr	HHV mmBtu / mmscf	Potential Throughput MMCF/yr
20% Natural Gas Demand	3.2	1020	27.3

	Pollutant						
	PM*	PM10*	direct PM2.5*	SO2	NOx	VOC	CO
Emission Factor in lb/MMCF	1.9	7.6	7.6	0.6	100 **see below	5.5	84
Potential Emission in tons/yr	0.03	0.10	0.10	0.01	1.36	0.08	1.15

	Heat Input Capacity MMBtu/hr	HHV mmBtu / mmscf	Potential Throughput MMCF/yr
80% Process Gas Demand	12.7	1287	86.5

	Pollutant						
	PM*	PM10*	direct PM2.5*	SO2	NOx	VOC	CO
Emission Factor in lb/MMCF	1.9	7.6	7.6	0.6	100 **see below	5.5	84
	0.08	0.33	0.33	0.03	4.33	n/a	3.63
Site Specific Emission Factors (lb/MMscf) VOC						5486	
Potential Emissions in tons/yr (off gas combustion fraction only)						4.75	
Potential Emission in tons/yr (80% Offgas + 20% NG)	0.11	0.43	0.43	0.03	5.69	4.82	4.78

3. 100% Process Fuel Gas Combustion

	Heat Input Capacity MMBtu/hr	HHV mmBtu / mmscf	Potential Throughput MMCF/yr
100% Process Gas Demand	15.9	1287	108.2

	Pollutant						
	PM*	PM10*	direct PM2.5*	SO2	NOx	VOC	CO
Emission Factor in lb/MMCF	1.9	7.6	7.6	0.6	100 **see below	5.5	84
	0.10	0.41	0.41	0.03	5.41	n/a	4.54
Site Specific Emission Factors (lb/MMscf) VOC, CO - process fuel gas composition data from source						5486	
Potential Emissions in tons/yr (off gas combustion fraction only)						5.93	
Potential Emission in tons/yr (100% Offgas)	0.10	0.41	0.41	0.03	5.41	5.93	4.54

4. Total Potential to Emit

	Pollutant						
	PM*	PM10*	direct PM2.5*	SO2	NOx	VOC	CO
Potential to Emit in tons/yr	1.9	7.6	7.6	0.6	100	5.5	84
NG only	**0.13**	**0.52**	**0.52**	**0.04**	**6.82**	0.38	**5.73**
NG with 80% process fuel gas	0.11	0.43	0.43	0.03	5.69	4.82	4.78
100% process fuel gas	0.10	0.41	0.41	0.03	5.41	**5.93**	4.54
PTE (worst-case)	**0.13**	**0.52**	**0.52**	**0.04**	**6.82**	**5.93**	**5.73**

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.
PM2.5 emission factor is filterable and condensable PM2.5 combined.
**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology
All emission factors are based on normal firing.
MMBtu = 1,000,000 Btu
MMCF = 1,000,000 Cubic Feet of Gas
Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03
Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,020 MMBtu
Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

5. Hazardous Air Pollutants (HAPs)

	AP-42 EF NG (lb/MMCF)	HAP EF Process Fuel Gas (lb/MMCF)	Scenario 1 100% Natural Gas	Scenario 2 80% Process Fuel Gas: 20% NG		Scenario 3 100% Process Gas	Worse-Case PTE
			HAP PTE 100% NG (tons/yr)	HAP PTE 20% NG (tons/yr)	HAP PTE 80% Process Gas (tons/yr)	Total Scenario 2 (tons/yr)	HAP PTE 100% Process Gas (tons/yr)	(tons/yr)
Organic HAPs								
Benzene	2.10E-03	2.10E-03	1.43E-04	2.87E-05	9.09E-05	0.00	0.00	1.43E-04
Dichlorobenzene	1.20E-03	1.20E-03	8.19E-05	1.64E-05	5.19E-05	6.83E-05	6.49E-05	8.19E-05
Formaldehyde	7.50E-02	7.50E-02	5.12E-03	1.02E-03	3.24E-03	4.27E-03	4.06E-03	5.12E-03
n-Hexane	1.80E+00	2.16	1.23E-01	2.46E-02	9.35E-02	1.18E-01	1.17E-01	1.23E-01
Toluene	3.40E-03	3.40E-03	2.32E-04	4.64E-05	1.47E-04	0.00	0.00	2.32E-04
Xylene		0.66	0.00E+00	0.00E+00	2.86E-02	0.03	0.04	3.57E-02
Inorganic HAPs								
Cadmium	1.10E-03	1.10E-03	7.51E-05	1.50E-05	4.76E-05	6.26E-05	2.05E-07	7.51E-05
Chromium	1.40E-03	1.40E-03	9.55E-05	1.91E-05	6.06E-05	7.97E-05	2.61E-07	9.55E-05
Lead	5.00E-04	5.00E-04	3.41E-05	6.82E-06	2.16E-05	2.85E-05	9.31E-08	3.41E-05
Manganese	3.80E-04	3.80E-04	2.59E-05	5.19E-06	1.64E-05	2.16E-05	7.08E-08	2.59E-05
Nickel	2.10E-03	2.10E-03	1.43E-04	2.87E-05	9.09E-05	1.20E-04	3.91E-07	1.43E-04
Total HAPs			**1.29E-01**	**2.58E-02**	**0.13**	**0.15**	**0.16**	**0.16**

GREEN MOUNTAIN ENERGY
FUGITIVE EMISSION CALCULATIONS

VOC

Component	Service Type	Component Count	Emission Factor (kg/hr/source)	Potential to Emit	
				(lb/hr)	(tons/yr)
Valves	Light Liquid	30	4.30E-05	2.84E-03	1.24E-02
Pump Seals	Light Liquid	45	5.40E-04	5.35E-02	2.34E-01
Connectors and Flanges	All	2297	8.00E-06	4.04E-02	1.77E-01
Total					**4.24E-01**

Notes:
Design component counts provided by source.
Emission factor source: Table 2-3, Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, November 1995, non-methane organic compounds.

Methodology:
PTE (lb/hr) = Component Count (lb/hr) = Component Count x Emission Factor (kg/hr/source) x 2.2 (lb/kg)
PTE (tons/yr) = PTE (lb/hr) x 8760 (hrs/yr) x 1 ton/2000 lbs

HAPs	lb/MMCF	HAP (wt%)	HAP Emissions (tons/yr)
Benzene	2.10E-03	0.00%	8.11E-06
Dichlorobenzene	1.20E-03	0.00%	4.63E-06
Formaldehyde	7.50E-02	0.07%	2.90E-04
n-Hexane	2.16E+00	1.97%	8.34E-03
Toluene	3.40E-03	0.00%	1.31E-05
Xylene	6.60E-01	0.60%	2.55E-03
VOC	5485.80		

Note: HAP PTE from NC Gas Composition tab

Methodology
HAP Fraction by Weight = HAP EF From Process Combustion (lb/MMscf)/(1 - 98% Combustion Efficiency)/VOC Content of Process Stream (lb/MMscf)
HAP PTE (tons/yr) = VOC PTE (tons/yr) x HAP Fraction by Weight

GREEN MOUNTAIN ENERGY
LOADOUT EMISSION CALCULATIONS

Emissions from loading petroleum products can be estimated using the following expression (Eqn 1, Chapter 5.2, AP-42, June 2008):

L_L = 12.46 SMP/T

Where:	L_L =	Loading Loss (lb VOC/kgal)	
	S =	1.45	worst case, splash loading, clean Tank (Table 5.2-1, AP-42)
	T =	538	deg R, ambient temperature
	M =	vapor molecular weight, Table 7.1-2, AP-42	
	P =	true vapor pressure, psia, at temperature T	

VOC VOC Control Efficiency: 98%

Emission Point	Product	Annual Throughput (gal/day)	Annual Throughput (gal/yr)	M (g/g-mol)	P (psia)	L_L	VOC PTE (tons/yr)	Limited Throughput (gal/yr)	Limited VOC Before Controls (tons/yr)	VOC PTE After Issuance (tons/yr)
	Naphtha	25500	9,307,500	68	5.06	11.55	53.7732453	9,307,500	53.77	1.08
	Diesel	25500	9,307,500	130	1.15E-02	5.02E-02	0.23364044			
	Heavy	6000	2,190,000	190	9.31E-05	5.94E-04	0.00065046			
EP-003	**Total**						54.01		53.77	1.08

HAP HAP Control Efficiency: 98%

HAP	HAP/VOC (wt%)	Potential to Emit		
		Uncontrolled (tons/yr)	After Issuance (tons/yr)	After Issuance (lb/kgal)
Benzene	0.90%	0.49	0.01	2.08E-03
Cumene	0.10%	0.05	1.08E-03	2.31E-04
Ethylbenzene	0.10%	0.05	1.08E-03	2.31E-04
n-Hexane	1.60%	0.86	0.02	3.70E-03
Naphthalene	0.50%	0.27	5.38E-03	1.16E-03
Toluene	1.30%	0.70	0.01	3.00E-03
2,2,4=Trimethylpentane	0.80%	0.43	0.01	1.85E-03
Xylenes	0.50%	0.27	5.38E-03	1.16E-03
Total HAPs		**3.13**	**0.06**	

Notes:
Source: Table3-2 Gasoline HAP Vapor Profile, Technical Guidance - Stage II Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities, Vol. I: Chapters, EPA 450/3-01-022a, Nov 1991.
The HAP profile is used because emissions from truck loading operations are determined by the vapors from the last product transported, motor gasoline s a worst case for this source.
Vapor pressure calculations based on Equation 1-24, AP-42, Section 7.1.3: P = exp [A-(B/T)]

Methodology:
Uncontrolled VOC PTE (tons/yr) = Annual Throughput (gal/yr) /1,000 (gal/kgal) x L_L (lb/kgal) x 1 ton/2,000 lbs
Uncontrolled HAP PTE (tons/yr) = Uncontrolled VOC PTE (tons/yr) x HAP/VOC (wt%)
Limited VOC PTE Before Controls (tons/yr) = Limited Throughput (gal/yr) / 1,000 gal/kgal) x L_L (lb/kgal) x 1 ton/2,000 lbs
VOC PTE After Issuance (tons/yr) = Limited VOC PTE Before Controls (tons/yr) x (1 - VOC Control Efficiency)
HAP PTE After Issuance (tons/yr) = Limited VOC Before Controls (tons/yr) x HAP/VOC wt% x (1 - HAP Control Efficiency)
PTE After Issuance (lb/kgal) = PTE After Issuance (tons/yr) x 2,000 lb/ton / [Limited Throughput (gal/yr) / 1,000 gal/kgal)]

GREEN MOUNTAIN ENERGY
COOLING TOWER EMISSION CALCULATIONS

Emission Unit ID	Emission Unit	Description	Circulation Rate (GPM)	Drift Factor (%)	Solids Content (mg/l)	Pollutant	Mass Fraction (%)	Annual Emissions (TPY)
EP-001	Cooling Tower	Max Design Circulation Rate of Cooling Tower	619	0.0050%	5,000	PM	100%	0.34
						PM_{10}	55.84%	0.19
						$PM_{2.5}$	0.21%	0.00

Methodology:
PM10 and PM2.5 mass fractions were estimated using, "Calculating Realistic PM10 Emissions from Cooling Towers," by Reisman, J. and Frisbie, G.
PM emissions (lb/hr) = Q (GPM) x 60 min/hr x 8.34 lb/gallon x solids concentration (mg/l / 1E06) x Drift % / 100
PM Emissions (TPY) = PM Emissions (lb/hr) x 4.38 ton-hr/lb-yr
PM10/2.5 = PM Emissions (TPY) x mass %

GREEN MOUNTAIN ENERGY
PILOT FLARE EMISSION CALCULATIONS

Emission Point	Description	Unit Capacity (MMBtu/hr)	Total (MMBtu/hr)
EP-003	Relief Flare (FL-05001)	6.50E-02	0.07
EP-004	Tank Farm Flare (FL-00502)	6.50E-02	0.07

Heat Input Capacity MMBtu/hr	HHV mmBtu/mmscf	Potential Throughput MMCF/yr
0.1	1020	1.1

	Pollutant						
	PM*	PM10*	direct PM2.5*	SO2	NOx	VOC	CO
Emission Factor in lb/MMCF	1.9	7.6	7.6	0.6	100 **see below	5.5	84
Potential Emission in tons/yr	0.00	0.00	0.00	0.00	0.06	0.00	0.05

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.
PM2.5 emission factor is filterable and condensable PM2.5 combined.
**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology

All emission factors are based on normal firing.
MMBtu = 1,000,000 Btu
MMCF = 1,000,000 Cubic Feet of Gas
Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03
Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,020 MMBtu
Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

Hazardous Air Pollutants (HAPs)

	HAPs - Organics					
	Benzene	Dichlorobenzene	Formaldehyde	Hexane	Toluene	**Total - Organics**
Emission Factor in lb/MMcf	2.1E-03	1.2E-03	7.5E-02	1.8E+00	3.4E-03	
Potential Emission in tons/yr	1.2E-06	6.7E-07	4.2E-05	1.0E-03	1.9E-06	**0.00**

	HAPs - Metals					
	Lead	Cadmium	Chromium	Manganese	Nickel	**Total - Metals**
Emission Factor in lb/MMcf	5.0E-04	1.1E-03	1.4E-03	3.8E-04	2.1E-03	
Potential Emission in tons/yr	2.8E-07	6.1E-07	7.8E-07	2.1E-07	1.2E-06	**3.1E-06**
					Total HAPs	**1.05E-03**
					Worst HAP	**1.00E-03**

Methodology is the same as above.
The five highest organic and metal HAPs emission factors are provided above.
Additional HAPs emission factors are available in AP-42, Chapter 1.4.

GREEN MOUNTAIN ENERGY
RELIEF FLARE EMISSION CALCULATIONS

Event	Startup and Shutdown to Flare	Upset to Flare	Maintenance to Flare
Stream	NG Distribution	Reactor Vent and Process Vents	NG Distribution
Stream ID	20041	20005, 20009, 20050	20041
Mass Flow (lb/hr)[1]	306.7	54452.14	306.7
Volumetric Flow (MMscf/hr)[2]	0.0069008	0.5198641	0.00690078
Heat Input (MMBtu/hr)[3]	6.46	256.82	6.46
Duration (Hours)[1]	2	1	1
Annual Occurrences (Times/yr)[1]	26	26	26
Hours of Operation)[4]	52	26	26
VOC Flare EF (lb/MMscf)[5]	5.6	5.6	5.6
NOx Flare EF (lb/MMBtu)[6]	0.0641	0.0641	0.0641
CO Flare EF (lb/MMBtu)[6]	0.5496	0.5496	0.5496

Notes:
1. Mass flow rates, duration, and annual occurrences estimated using full material flow rates as applicable and occurring once every four weeks.
2. Volumetric Flow (MMscf/hr) = Mass Flow (lb/hr) / Vapor Density at 425 deg C (lb/scf) / 10^6 (scf/MMscf)
3. Heat Input (MMBtu/hr) = Mass Flow (lb/hr) x Gas Heating Value (Mmbtu/lb)
4. For Flare Operation: Hours of Operation = Duration (Hours) x Annual Occurrences. Process gas is assumed to be combusted in process heaters for all remaining time.

Pollutant	Flare Startup and Shutdown Potential Emissions		Flare Upset Potential Emissions		Flare Maintenance Potential Emissions		Total Potential Emissions	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
VOC	0.25	0.00	747.67	9.72	0.25	0.00	748.17	9.72
NOx	0.83	0.02	16.46	0.21	0.41	0.01	17.70	0.24
CO	7.10	0.18	141.15	1.83	3.55	0.05	151.80	2.07

Note: Normal Process Operation Process Heater Emissions are Reported on the Process Combustion tab.

HAPs	lb/MMCF	HAP (wt%)	HAP Emissions (tons/yr)
Benzene	2.10E-03	0.00%	1.86E-04
Dichlorobenzene	1.20E-03	0.00%	1.06E-04
Formaldehyde	7.50E-02	0.07%	6.65E-03
n-Hexane	2.16E+00	1.97%	1.91E-01
Toluene	3.40E-03	0.00%	3.01E-04
Xylene	6.60E-01	0.60%	5.85E-02
VOC	5485.80		
Total HAP			**2.57E-01**

GREEN MOUNTAIN ENERGY
FUGITIVE PAVED ROADWAY EMISSION CALCULATIONS

Paved Roads at Industrial Site
The following calculations determine the amount of emissions created by paved roads, based on 8,760 hours of use and AP-42, Ch 13.2.1 (1/2011).

Vehicle Information (provided by source)

Type	Maximum number of vehicles per day	Number of one-way trips per day per vehicle	Maximum trips per day (trip/day)	Maximum Weight of Loaded Vehicle (tons/trip)	Total Weight driven per day (ton/day)	Maximum one-way distance (feet/trip)	Maximum one-way distance (mi/trip)	Maximum one-way miles (miles/day)	Maximum one-way miles (miles/yr)
Vehicle (entering plant with full load) (one-way trip)	34.0	1.0	1.0	40.0	40.0	21199	4.015	4.0	1465.5
Vehicle (leaving plant with full load) (one-way trip)	60.0	1.0	1.0	40.0	40.0	6537	1.238	1.2	451.9
Vehicle (entering plant with no load) (one-way trip)	60.0	1.0	1.0	25.0	25.0	6537	1.238	1.2	451.9
Vehicle (leaving plant with no load) (one-way trip)	34.0	1.0	1.0	25.0	25.0	21199	4.015	4.0	1465.5
		Totals	**4.0**		**130.0**			**10.5**	**3834.7**

Average Vehicle Weight Per Trip = 32.5 tons/trip
Average Miles Per Trip = 2.63 miles/trip

Unmitigated Emission Factor, Ef = [k * (sL)^0.91 * (W)^1.02] (Equation 1 from AP-42 13.2.1)

	PM	PM10	PM2.5	
where k =	0.011	0.0022	0.00054	lb/VMT = particle size multiplier (AP-42 Table 13.2.1-1)
W =	32.5	32.5	32.5	tons = average vehicle weight
sL =	9.7	9.7	9.7	g/m^2 = silt loading value for paved roads at iron and steel production facilities - Table 13.2.1-3)

Taking natural mitigation due to precipitation into consideration, Mitigated Emission Factor, Eext = E * [1 - (p/4N)] (Equation 2 from AP-42 13.2.1)
Mitigated Emission Factor, Eext = Ef * [1 - (p/4N)]
where p = 120 days of rain greater than or equal to 0.01 inches (see Fig. 13.2.1-2)
N = 365 days per year

	PM	PM10	PM2.5	
Unmitigated Emission Factor, Ef =	3.030	0.606	0.1488	lb/mile
Mitigated Emission Factor, Eext =	2.781	0.556	0.137	lb/mile

Process	Mitigated PTE of PM (tons/yr)	Mitigated PTE of PM10 (tons/yr)	Mitigated PTE of PM2.5 (tons/yr)	Unmitigated PTE of PM (tons/yr)	Unmitigated PTE of PM10 (tons/yr)	Unmitigated PTE of PM2.5 (tons/yr)
Vehicle (entering plant) (one-way trip)	2.04	0.41	0.10	2.22	0.44	0.11
Vehicle (leaving plant) (one-way trip)	0.63	0.13	0.03	0.68	0.14	0.03
Vehicle (entering plant) (one-way trip)	0.63	0.13	0.03	0.68	0.14	0.03
Vehicle (leaving plant) (one-way trip)	2.04	0.41	0.10	2.22	0.44	0.11
Totals	**5.33**	**1.07**	**0.26**	**5.81**	**1.16**	**0.29**

Methodology

Total Weight driven per day (ton/day)	= [Maximum Weight of Loaded Vehicle (tons/trip)] * [Maximum trips per day (trip/d
Maximum one-way distance (mi/trip)	= [Maximum one-way distance (feet/trip) / [5280 ft/mile]
Maximum one-way miles (miles/day)	= [Maximum trips per year (trip/day)] * [Maximum one-way distance (mi/trip)]
Average Vehicle Weight Per Trip (ton/trip)	= SUM[Total Weight driven per day (ton/day)] / SUM[Maximum trips per day (trip/d
Average Miles Per Trip (miles/trip)	= SUM[Maximum one-way miles (miles/day)] / SUM[Maximum trips per year (trip/day)]
Unmitigated PTE (tons/yr)	= [Maximum one-way miles (miles/yr)] * [Unmitigated Emission Factor (lb/mile)] * (ton/2000 lbs)
Mitigated PTE (tons/yr)	= [Maximum one-way miles (miles/yr)] * [Mitigated Emission Factor (lb/mile)] * (ton/2000 lbs)

Abbreviations

PM = Particulate Matter
PM10 = Particulate Matter (<10 um)
PM2.5 = Particle Matter (<2.5 um)
PTE = Potential to Emit

ATTACHMENT B: APPLICATION FORMS

Division for Air Quality

300 Sower Boulevard

Frankfort, KY 40601

(502) 564-3999

DEP7007AI

Administrative Information

___ Section AI.1: Source Information

___ Section AI.2: Applicant Information

___ Section AI.3: Owner Information

___ Section AI.4: Type of Application

___ Section AI.5: Other Required Information

___ Section AI.6: Signature Block

___ Section AI.7: Notes, Comments, and Explanations

Additional Documentation

___ Additional Documentation attached

Source Name: **Green Mountain Energy**

KY EIS (AFS) #: **21-**

Permit #:

Agency Interest (AI) ID:

Date: **10/22/2024**

Section AI.1: Source Information

Physical Location Address:	**Street:**	7545 Noble Road				
	City:	West Paducah	**County:**	McCracken	**Zip Code:**	42086
Mailing Address:	**Street or P.O. Box:**	Green Mountain Energy, 4460 Salt Spring Drive				
	City:	Ferndale	**State:**	WA	**Zip Code:**	98248

Standard Coordinates for Source Physical Location

Longitude: 37.12754 (decimal degrees) **Latitude:** -88.74735 (decimal degrees)

Primary (NAICS) Category: All Other Petroleum and Coal Products Manufacturing **Primary NAICS #:** 324199

#

Classification (SIC) Category: (Products of Petroleum and Coal, N.E.C. **Primary SIC #:** 2999

Briefly discuss the type of business conducted at this site: The facility will convert different feeds (coal, plastics, fuels) into fuel using thermal treatment followed by pryolysis.

Description of Area Surrounding Source: ☑ Rural Area ☐ Industrial Park ☐ Residential Area ☐ Urban Area ☑ Industrial Area ☐ Commercial Area

Is any part of the source located on federal land? ☐ Yes ☑ No

Number of Employees: 55

Approximate distance to nearest residence or commercial property: *500'*

Property Area: **15 acres**

Is this source portable? ☐ Yes ☑ No

What other environmental permits or registrations does this source currently hold or need to obtain in Kentucky?

NPDES/KPDES:	☐ Currently Hold	☑ Need	☐ N/A
Solid Waste:	☐ Currently Hold	☑ Need	☐ N/A
RCRA:	☐ Currently Hold	☑ Need	☐ N/A
UST:	☐ Currently Hold	☐ Need	☑ N/A

Type of Regulated Waste Activity:

☐ Mixed Waste Generator ☑ Generator ☐ Recycler ☐ Other: _____

☐ U.S. Importer of Hazardous Waste ☐ Transporter ☐ Treatment/Storage/Disposal Facility ☑ N/A

Section AI.2: Applicant Information

Applicant Name: Green Mountain Energy

Title: (if individual)

Mailing Address: **Street or P.O. Box:** 4460 Salt Spring Drive
City: Ferndale **State:** WA **Zip Code:** 98248

Email: (if individual) bob@newrangepower.com

Phone: 304-579-0933

Technical Contact

Name: Robert Downey

Title: President

Mailing Address: **Street or P.O. Box:** 4460 Salt Spring Drive
City: Ferndale **State:** WA **Zip Code:** 98248

Email: bob@newrangepower.com

Phone: 304-579-0933

Air Permit Contact for Source

Name: Robert Downey

Title: President

Mailing Address: **Street or P.O. Box:** 4460 Salt Spring Drive
City: Ferndale **State:** WA **Zip Code:** 98248

Email: bob@newrangepower.com

Phone: 304-579-0933

Section AI.3: Owner Information

☐ **Owner same as applicant**

Name: Green Mountain Energy

Title:

Mailing Address:
Street or P.O. Box: 4460 Salt Spring Drive
City: Ferndale **State:** WA **Zip Code:** 98248

Email: bob@newrangepower.com

Phone: 304-579-0933

List names of owners and officers of the company who have an interest in the company of 5% or more.

Name	Position

Section AI.4: Type of Application

Current Status: ☐ Title V ☐ Conditional Major ☐ State-Origin ☐ General Permit ☐ Registration ☑ None

Requested Action: *(check all that apply)*

☐ Name Change ☐ Initial Registration ☐ Significant Revision ☐ Administrative Permit Amendment
☐ Renewal Permit ☐ Revised Registration ☐ Minor Revision ☐ Initial Source-wide OperatingPermit
☐ 502(b)(10)Change ☐ Extension Request ☐ Addition of New Facility ☐ Portable Plant Relocation Notice
☐ Revision ☐ Off Permit Change ☐ Landfill Alternate Compliance Submittal ☐ Modification of Existing Facilities
☐ Ownership Change ☐ Closure

Requested Status: ☐ Title V ☐ Conditional Major ☑ State-Origin ☐ PSD ☐ NSR ☐ Other: _____

Is the source requesting a limitation of potential emissions? ☐ Yes ☑ No

Pollutant:	Requested Limit:	Pollutant:	Requested Limit:
☐ Particulate Matter		☐ Single HAP	
☐ Volatile Organic Compounds (VOC)		☐ Combined HAPs	
☐ Carbon Monoxide		☐ Air Toxics (40 CFR 68, Subpart F)	
☐ Nitrogen Oxides		☐ Carbon Dioxide	
☐ Sulfur Dioxide		☐ Greenhouse Gases (GHG)	
☐ Lead		☐ Other	

For New Construction:

Proposed Start Date of Construction: *(MM/YYYY)* 04/2025

Proposed Operation Start-Up Date: *(MM/YYYY)* 10/2026

For Modifications:

Proposed Start Date of Modification: *(MM/YYYY)*

Proposed Operation Start-Up Date: *(MM/YYYY)*

Applicant is seeking coverage under a permit shield. ☐ **Yes** ☑ **No**

Identify any non-applicable requirements for which permit shield is sought on a separate attachment to the application.

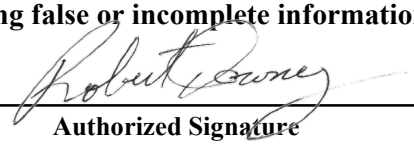
Section AI.5 Other Required Information

Indicate the documents attached as part of this application:

- [ ] DEP7007A Indirect Heat Exchangers and Turbines
- [x] DEP7007B Manufacturing or Processing Operations
- [ ] DEP7007C Incinerators and Waste Burners
- [ ] DEP7007F Episode Standby Plan
- [x] DEP7007J Volatile Liquid Storage
- [ ] DEP7007K Surface Coating or Printing Operations
- [ ] DEP7007L Mineral Processes
- [ ] DEP7007M Metal Cleaning Degreasers
- [x] DEP7007N Source Emissions Profile
- [ ] DEP7007P Perchloroethylene Dry Cleaning Systems
- [ ] DEP7007R Emission Offset Credit
- [ ] DEP7007S Service Stations
- [ ] DEP7007T Metal Plating and Surface Treatment Operations
- [ ] DEP7007V Applicable Requirements and Compliance Activities
- [ ] DEP7007Y Good Engineering Practice and Stack Height Determination
- [ ] DEP7007AA Compliance Schedule for Non-complying Emission Units
- [ ] DEP7007BB Certified Progress Report
- [ ] DEP7007CC Compliance Certification
- [ ] DEP7007DD Insignificant Activities
- [ ] DEP7007EE Internal Combustion Engines
- [ ] DEP7007FF Secondary Aluminum Processing
- [ ] DEP7007GG Control Equipment
- [x] DEP7007HH Haul Roads
- [ ] Confidentiality Claim
- [ ] Ownership Change Form
- [ ] Secretary of State Certificate
- [x] Flowcharts or diagrams depicting process
- [ ] Digital Line Graphs (DLG) files of buldings, roads, etc.
- [x] Site Map
- [x] Map or drawing depicting location of facility
- [ ] Safety Data Sheet (SDS)
- [ ] Emergency Response Plan
- [ ] Other: _____

Section AI.6: Signature Block

I, the undersigned, hereby certify under penalty of law, that I am a responsible official*, and that I have personally examined, and am familiar with, the information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the information is on knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false or incomplete information, including the possibility of fine or imprisonment.



Authorized Signature

12/3/2024

Date

Robert Downey

Type or Printed Name of Signatory

President

Title of Signatory

*Responsible official as defined by 401 KAR 52:001.

Section AI.7: Notes, Comments, and Explanations

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
(502) 564-3999

DEP7007B

Manufacturing or Processing Operations

___ Section B.1: Process Information
___ Section B.2: Materials and Fuel Information
___ Section B.3: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI, DEP7007N, DEP7007V, and DEP7007GG.
___ Attach a flow diagram
___ Attach SDS

Source Name: **Green Mountain Energy**
KY EIS (AFS) #: **21-**
Permit #:
Agency Interest (AI) ID:
Date: **10/22/2024**

Section B.1: Process Information

Emission Unit #	Emission Unit Name	Describe Emission Unit	Process ID	Process Name	Manufacturer	Model No.	Proposed/Actual Date of Construction Commencement *(MM/YYYY)*	Is the Process Continuous or Batch?	Number of Batches per 24 Hours *(if applicable)*	Hours per Batch *(if applicable)*
R-20001/R-20002	Pyrolysis Reaction	Plastic to Fuel	R-20001/R-20002	Pyrolysis Reaction	TBD	TBD	04/2025	Continuous		

Section B.2: Materials and Fuel Information

**Maximum yearly fuel usage rate only applies if applicant request operating restrictions through federally enforceable limitations.*

Emission Unit #	Emission Unit Name	Name of Raw Materials Input	Maximum Quantity of Each Raw Material Input		Total Process Weight Rate for Emission Unit *(tons/hr)*	Name of Finished Materials	Maximum Quantity of Each Finished Material Output		Fuel Type	Maximum Hourly Fuel Usage Rate		Maximum Yearly Fuel Usage Rate		Sulfur Content *(%)*	Ash Content *(%)*
				(Specify Units/hr)				*(Specify Units/hr)*			*(Specify Units)*		*(Specify Units)*		
R-20001/R-200002	Pyrolysis Reaction	Plastic	8333	lb/hr	8.33	Fuel	8979.84	lb/hr	Naptha, Diesel, Fuel Oil					0	0
		Water	8333	lb/hr											

Section B.3: Notes, Comments, and Explanations

Division for Air Quality

300 Sower Boulevard

Frankfort, KY 40601

(502) 564-3999

DEP7007J

Volatile Liquid Storage

___ Section J.1: General Information

___ Section J.2: Tank Description

___ Section J.3: Gasoline Plants and Terminals

___ Section J.4: Loading Rack(s)

___ Section J.5: Equipment Leaks

___ Section J.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI, DEP7007N, DEP7007V, and DEP7007GG.

___ SDS attached

Source Name: **Green Mountain Energy**

KY EIS (AFS) #: **21-**

Permit #:

Agency Interest (AI) ID:

Date: **10/22/2024**

Section J.1: General Information

Emission Unit #	Emission Unit Name	Emission Unit Description	Proposed/Actual Date of Construction Commencement *(MM/YYYY)*	Date of modification/ reconstruction	Control Device ID	Stack ID
TK-12203-A	TK-12203-A	Naptha Product Day Tank A	Apr-25		Tank Farm Flare	EP-004
TK-12203-B	TK-12203-B	Naptha Product Day Tank B	Apr-25		Tank Farm Flare	EP-004
TK-12204	TK-12204	Naptha Product Tank	Apr-25		Tank Farm Flare	EP-004
TK-12205-A	TK-12205-A	Diesel Product Day Tank A	Apr-25		Tank Farm Flare	EP-004
TK-12205-B	TK-12205-B	Diesel Product Day Tank B	Apr-25		Tank Farm Flare	EP-004
TK-12206	TK-12206	Diesel Product Tank	Apr-25		Tank Farm Flare	EP-004
TK-12208	TK-12208	Residue Product Tank	Apr-25		Tank Farm Flare	EP-004
TK-12209	TK-12209	Off-Spec Naptha Tank	Apr-25		Tank Farm Flare	EP-004
TK-12210	TK-12210	Off-Spec Diesel Tank	Apr-25		Tank Farm Flare	EP-004

Section J.2: Tank Description

Emission Point #: EP-004

Emission Point Name: Tank Farm Flare

Tank ID#: TK-12203-A, TK-12203-B

Date Installed:

List Applicable Regulations: 59:050(3)(2), 63:015

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Naptha	9,307,500	6.55	68	100%	250°F	250°F	5.06	5.06

J.2B: Tank Data:

Tank Capacity: *(gallons)* 15,220 **Shell Height/ Length:** *(ft)* 18 **Shell Diameter:** *(ft)* 12 **Tank Turnovers per Year:** _____

Tank Orientation: ☑ Horizontal ☐ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* _____ Average Liquid Height: *(ft)* _____

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☑ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** _____ ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** _____ psig

Is Tank Heated?: ☐ Yes ☐ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** _____ psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
TK-12203-A/TK-12203B	Naptha	Controlled Breathing and Working Losses	5.07 lb/yr/tank	Annual	Emission Master

Section J.2: Tank Description

Emission Point #: EP-004

Emission Point Name: Tank Farm Flare

Tank ID#: TK-12204

Date Installed:

List Applicable Regulations: 59:050(3)(2), 63:015, 40 CFR Part 60 Subpart Kc

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Naptha	9,307,500	6.55	68	100%	250°F	250°F	5.06	5.06

J.2B: Tank Data:

Tank Capacity: *(gallons)* 37,600 **Shell Height/ Length:** *(ft)* 16 **Shell Diameter:** *(ft)* 20 **Tank Turnovers per Year:** _____

Tank Orientation: ☑ Horizontal ☐ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* _____ Average Liquid Height: *(ft)* _____

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☐ Fixed Roof ☑ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** _____ ft

Is Tank Underground?: ☐ Yes ☐ No **Roof Condition:** ☐ Good ☐ Poor **Vacuum Setting:** _____ psig

Is Tank Heated?: ☐ Yes ☐ No **Shell Condition:** ☐ Good ☐ Poor **Pressure Setting:** _____ psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☑ Good ☐ Poor

Roof Paint Condition: ☑ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
TK-12204	Naptha	Controlled Breathing and Working Losses	109.42 lb/yr	Annual	Emission Master

Section J.2: Tank Description

Emission Point #: EP-004

Emission Point Name: Tank Farm Flare

Tank ID#: TK-12205-A, TK-12205B

Date Installed:

List Applicable Regulations: 59:050(3)(2), 63:015

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Diesel	9,307,500	7.09	130	100%	250°F	250°F	1.15e-02	1.15e-02

J.2B: Tank Data:

Tank Capacity: *(gallons)* 73,430 **Shell Height/ Length:** *(ft)* 20 **Shell Diameter:** *(ft)* 25 **Tank Turnovers per Year:** _____

Tank Orientation: ☑ Horizontal ☐ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* _____ Average Liquid Height: *(ft)* _____

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☑ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** _____ ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** _____ psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** _____ psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
TK-12205-A, TK-12205B	Diesel	Controlled Breathing and Working Losses	44.55 lb/yr/tank	Annual	Emission Master

Section J.2: Tank Description

Emission Point #: EP-004

Emission Point Name: Tank Farm Flare

Tank ID#: TK-12206

Date Installed:

List Applicable Regulations: 59:050(3)(2), 63:015

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Diesel	9,307,500	7.09	130	100%	250°F	250°F	1.15e-02	1.15e-02

J.2B: Tank Data:

Tank Capacity: *(gallons)* 709,640 **Shell Height/ Length:** *(ft)* 43 **Shell Diameter:** *(ft)* 54 **Tank Turnovers per Year:** _____

Tank Orientation: ☑ Horizontal ☐ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* _____ Average Liquid Height: *(ft)* _____

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☑ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** _____ ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** _____ psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** _____ psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
TK-12206	Diesel	Controlled Breathing and Working Losses	169.94 lb/yr	Annual	Emission Master

Section J.2: Tank Description

Emission Point #: EP-004

Emission Point Name: Tank Farm Flare

Tank ID#: TK-12208

Date Installed:

List Applicable Regulations: 59:050(3)(2), 63:015

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Residue	2,190,000	7.09	190	100%	250°F	250°F	9.31e-05	9.31e-05

J.2B: Tank Data:

Tank Capacity: *(gallons)* 527,920 **Shell Height/ Length:** *(ft)* 39 **Shell Diameter:** *(ft)* 48 **Tank Turnovers per Year:** _____

Tank Orientation: ☑ Horizontal ☐ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* _____ Average Liquid Height: *(ft)* _____

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☑ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** _____ ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** _____ psig

Is Tank Heated?: ☑ Yes ☐ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** _____ psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
TK-12208	Diesel	Controlled Breathing and Working Losses	2.5	Annual	Emission Master

Section J.2: Tank Description

Emission Point #: EP-004

Emission Point Name: Tank Farm Flare

Tank ID#: TK-12209

Date Installed:

List Applicable Regulations: 59:050(3)(2), 63:015, 40 CFR Part 60 Subpart Kc

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Naptha	178,500	6.55	68	100%	250°F	250°F	5.06	5.06

J.2B: Tank Data:

Tank Capacity: *(gallons)* 37,600 **Shell Height/ Length:** *(ft)* 16 **Shell Diameter:** *(ft)* 20 **Tank Turnovers per Year:** _____

Tank Orientation: ☑ Horizontal ☐ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* _____ Average Liquid Height: *(ft)* _____

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☐ Fixed Roof ☑ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☐ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** _____ ft

Is Tank Underground?: ☐ Yes ☐ No **Roof Condition:** ☐ Good ☐ Poor **Vacuum Setting:** _____ psig

Is Tank Heated?: ☐ Yes ☐ No **Shell Condition:** ☐ Good ☐ Poor **Pressure Setting:** _____ psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
TK-12209	Naptha	Controlled Breathing and Working Losses	2.50 lb/yr	Annual	Emission Master

Section J.2: Tank Description

Emission Point #: EP-004

Emission Point Name: Tank Farm Flare

Tank ID#: TK-12210

Date Installed:

List Applicable Regulations: 59:050(3)(2), 63:015

J.2A: Stored Liquid Data:

Single or Multi-Component Liquid Name(s)	Maximum Annual Throughput *(gal/yr)*	Liquid Density *(lb/gal)*	Molecular Weight of Single or Multi-Component Liquid	Percent Composition of Multi-Component Liquid(s)	Temperature *(°F)*		Vapor Pressure *(psia)*	
					Minimum	Maximum	Minimum	Maximum
Diesel	178,500	7.09	130	100%	250°F	250°F	1.15e-02	1.15e-02

J.2B: Tank Data:

Tank Capacity: *(gallons)* 190,160 **Shell Height/ Length:** *(ft)* 28 **Shell Diameter:** *(ft)* 34 **Tank Turnovers per Year:** _____

Tank Orientation: ☑ Horizontal ☐ Vertical If Vertical, provide Maximum Liquid Height: *(ft)* _____ Average Liquid Height: *(ft)* _____

Shell Color/Shade: ☐ Red ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Roof Color: ☐ Slack ☐ White ☐ Light Gray ☐ Medium Gray ☐ Aluminum Specular ☐ Aluminum Diffuse ☐ Other: _____

Tank Type: ☑ Fixed Roof ☐ Internal Floating Roof ☐ External Floating Roof ☐ Pressure Tank

J.2C: For Fixed Roof Tanks:

Roof Type: ☐ Dome ☑ Flat ☐ Cone **Dome/Cone Height:** _____ ft **Average Vapor Space Height:** _____ ft

Is Tank Underground?: ☐ Yes ☑ No **Roof Condition:** ☑ Good ☐ Poor **Vacuum Setting:** _____ psig

Is Tank Heated?: ☐ Yes ☑ No **Shell Condition:** ☑ Good ☐ Poor **Pressure Setting:** _____ psig

J.2D: For All Internal Floating Roof Tanks:

Rim Seal Description: ☐ Vapor Mounted Primary ☐ Vapor Mounted Primary plus Secondary Seal ☐ Shoe Mounted ☐ Liquid Mounted Primary ☐ Liquid Mounted Primary plus Secondary Seal ☐ Shoe Mounted plus Secondary Seal

Secondary Seal: ☐ Rim Mounted ☐ Shoe Mounted ☐ None

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined **External Shell Condition:** ☐ Good ☐ Poor

Roof Paint Condition: ☐ Good ☐ Poor **Self Supporting Roof?** ☐ Yes ☐ No

Number of Support Columns: _____ **Effective Column Diameter:** _____ ft

J.2E: Deck Data for Internal Floating Roofs:

Length of Deck Seam: _____ ft

Deck Type: ☐ Bolted ☐ Welded

Type of Deck Fitting:
☐ Access Hatch ☐ Ladder Well ☐ Sample Pipe ☐ Sample Well ☐ Vacuum Breaker
☐ Column Well ☐ Roof Leg ☐ Hanger Well ☐ Stub Drain ☐ Automatic Gauge Float Well

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover or fabric seal, adjustable or fixed roof leg/hanger well and number)

J.2F: For All External Floating Roof Tanks:

Rim Seal Description:
☐ Vapor Mounted Primary ☐ Vapor Mounted Primary Rim Secondary Seal ☐ Vapor Mounted Prmary with Weather Shield
☐ Liquid Mounted Primary ☐ Liquid Mounted Primary Rim Secondary Seal ☐ Liquid Mounted Primary with Weather Shield
☐ Shoe Mounted Primary ☐ Shoe Mounted Primary Rim Secondary Seal ☐ Shoe Mounted Primary Shoe Secondary

Internal Shell Condition: ☐ Light Rust ☐ Dense Rust ☐ Gunite-lined

Tank Type: ☐ Riveted ☐ Welded

Roof Type: ☐ Pontoon Roof ☐ Double Deck Roof

J.2G: Deck Data for External Floating Roof Tanks:

Type of Deck Fitting:
☐ Access Hatch ☐ Gauge Hatch ☐ Sample Well ☐ Roof Leg ☐ Vacuum Breaker
☐ Guide Pole ☐ Gauge Float ☐ Roof Drain ☐ Rim Vent ☐ Other

Design of each deck fitting:
(diameter sizes, bolted or gasket covers, sliding cover, unslotted or slotted guide pole well, adjusted or fixed roof leg and number of each design)

J.2H: Emissions Data:

Attach SDS/Composition Analysis for Each Component Listed

Process ID	Component Name	Process Name (e.g. Breathing, Working, Cleaning, Flashing Loss(es))	Lost Emissions *(lb/1000 gal)*	Frequency of Occurrence	Determination Methodology for Each Type of Loss*
TK-12210	Diesel	Controlled Breathing and Working Losses	8.39 lb/yr	Annual	Emission Master

Section J.3: Gasoline Plants and Terminals

Indicate the percentage of one or more of the following modes of transportation for incoming liquid and outgoing liquid:

	Tank Truck	Trailer	Railcar	Pipeline	Marine Tank	Barge	Other (Specify)
Incoming Liquid Material:							
Outgoing Liquid Material:	0		100%			100%	

For Gasoline Dispensing Facilities (GDF) only:

Is the loading of gasoline storage tanks at a GDF located at an area source of hazardous air pollutants as defined in 40 CFR 63.2? ☐ Yes ☐ No

Is there the dispensing of gasoline from a fixed storage tank at a GDF into a portable tank for the on-site delivery and subsequent dispensing into gasoline-fueled equipment? ☐ Yes ☐ No

Maximum monthly throughput in gallons: _____

For Bulk Gasoline Plants Only:

Is the maximum calculated design throughput less than 20,000 gallons (75,700 liters) per day? ☐ Yes ☐ No

Is gasoline loaded into cargo tanks for transport to gasoline dispensing facilities? ☐ Yes ☐ No

For Bulk Gasoline Terminals Only:

Is the maximum calculated design throughput equal to or greater than 20,000 gallons (75,700 liters) per day? ☐ Yes ☐ No

Is the terminal located at an area source of hazardous air pollutants as defined in 40 CFR 63.2?	☑ Yes	☐ No
Does the facility load from marine tank vessel loading operations at all loading berths less than 1.6 billion liters (10 M barrels) of gasoline annually and of less than 32 billion liters (200 M barrels) of crude oil annually?	☐ Yes	☐ No
Does the terminal handle any reformatted or oxygenated gasoline containing methyl tertbutyl ether (MTBE), CF?	☐ Yes	☐ No

Indicate the type of vapor control device utilized: ☑ Incinerator ☐ Adsorber ☐ Other

Section J.4: Loading Rack(s)

Emission Point #: _____

Emission Point Name: _____

Loading Rack ID#: _____

Product Type	Number of Lanes/Rack	Number of risers/loading arms per rack	Does the petroleum storage capacity exceed 300,000 barrels? *(Y/N)*	Time required to load standard size tanker *(minutes)*	Barge/Pipeline Unloading Rate *(barrels/hr)*	Barge/Pipeline Unloading Rate *(barrels/yr)*	Maximum Loaded *(gal/hr)*	Maximum Loaded *(gal/yr)*	Stack ID	Control Device ID
Diesel	3	TBD	N	TBD	TBD	TBD	TBD	9,307,500	-003, EP-0	Tank Farm Flare
Naptha	3	TBD	N	TBD	TBD	TBD	TBD	9,307,500	-003, EP-0	Tank Farm Flare
Residue	1	TBD	N	TBD	TBD	TBD	TBD	2,190,000	-003, EP-0	Tank Farm Flare

Section J.5: Equipment Leaks

Emission Point #: _____

Emission Point Name: _____

This section is to be completed for all components of Volatile Liquid Storage Systems that may have leaks.

Equipment Type	Indicate the number of each type of equipment for this emission point		Emission Factor *(lb/SCC units)*		Source of Emission Factor	Total Emissions *(lb/yr)*
	Gasoline	Other (diesel, kerosene, etc.)	Gasoline	Other		
Valves		30		9.46E-05	Table 2-3, Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, November 1995, non-methane organic compounds	24.86
Pumps		45		1.19E-03	Table 2-3, Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, November 1995, non-methane organic compounds	468.31
Connectors		2297		1.76E-05	Table 2-3, Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, November 1995, non-methane organic compounds	354.14
Risers/Loading-Arm Valves						
Open-ended Lines						
Other						

Section J.6: Notes, Comments, and Explanations

Equipment Leaks are for entire facility.

Diesel can loadout to Tanker, Rail or Barge. Tanker and Rail are controlled by Tank Farm Flare. Barge Loadout is uncontrolled. Naptha loaded out to Tanker or Barge and controlled by Tank Farm Flare. Residue loaded out to Tanker only and controlled by Tank Farm Flare.

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
(502) 564-3999

DEP7007N

Source Emissions Profile

__ Section N.1: Emission Summary
__ Section N.2: Stack Information
__ Section N.3: Fugitive Information
__ Section N.4: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: Green Mountain Energy
KY EIS (AFS) #: 21-
Permit #:
Agency Interest (AI) ID:
Date: 10/22/2024

N.1: Emission Summary

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
EP-001	Cooling Tower	EP-001	Cooling Tower			EP-001		PM		AP-42	0.00%	0.00%			0.34	0.34
EP-001	Cooling Tower	EP-001	Cooling Tower			EP-001		PM10		AP-42	0.00%	0.00%			0.19	0.19
EP-001	Cooling Tower	EP-001	Cooling Tower			EP-001		PM2.5		AP-42	0.00%	0.00%			0.001	0.001
EP-0003	Loading Rack + Process Combustion	Loading Rack + Process	Loading Rack + Process	Relief Flare		EP-0003		VOC		Mass Balance	100%	95%			69.42	16.73
EP-0003	Loading Rack + Process Combustion	Loading Rack + Process	Loading Rack + Process	Relief Flare		EP-0003		PM		Mass Balance	0%	0%			0.13	0.13
EP-0003	Loading Rack + Process Combustion	Loading Rack + Process	Loading Rack + Process	Relief Flare		EP-0003		PM10/PM2.5		Mass Balance	0%	0%			0.52	0.52
EP-0003	Loading Rack + Process Combustion	Loading Rack + Process	Loading Rack + Process	Relief Flare		EP-0003		SO2		Mass Balance	0%	0%			0.04	0.04
EP-0003	Loading Rack + Process Combustion	Loading Rack + Process	Loading Rack + Process	Tank Farm Flare		EP-0003		NOx		Mass Balance	0%	0%			6.82	6.82

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
(502) 564-3999

DEP7007N

Source Emissions Profile

__ Section N.1: Emission Summary
__ Section N.2: Stack Information
__ Section N.3: Fugitive Information
__ Section N.4: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name:

KY EIS (AFS) #: **21-**

Permit #:

Agency Interest (AI) ID:

Date:

N.1: Emission Summary

Emission Unit #	Emission Unit Name	Process ID	Process Name	Control Device Name	Control Device ID	Stack ID	Maximum Design Capacity *(SCC Units/hour)*	Pollutant	Uncontrolled Emission Factor *(lb/SCC Units)*	Emission Factor Source (e.g. AP-42, Stack Test, Mass Balance)	Capture Efficiency *(%)*	Control Efficiency *(%)*	Hourly Emissions		Annual Emissions	
													Uncontrolled Potential *(lb/hr)*	Controlled Potential *(lb/hr)*	Uncontrolled Potential *(tons/yr)*	Controlled Potential *(tons/yr)*
EP-0003 EP-004	Process Combustion	Process Combustion	Process Combustion	Relief Flare		EP-003		CO		Mass Balance	0%	0%			5.73	5.73
EP-0004	Storage Tanks	Tanks	Tanks	Tank Farm Flare		EP-004		VOC		AP-42	100.00%	95.00%			9.99	0.2
EP-005	Material Handling	Material Handling	Material Handling	Baghouse		EP-005		PM		AP-42	100.00%	95.00%	0.1	5.15E-03	0.45	2.26E-02
EP-005	Material Handling	Material Handling	Material Handling	Baghouse		EP-005		PM10/PM2.5		AP-42	100.00%	95.00%	0.04	4.72E-04	0.17	8.27E-07
EP-006, EP0007, EP-009, EP-	Material Handling	Material Handling	Material Handling	Baghouse		EP-006, EP0007, EP-009		PM		AP-42	100.00%	95.00%	0.1	5.00E-03	0.44	2.19E-02
EP-006, EP0007, EP-009, EP-	Material Handling	Material Handling	Material Handling	Baghouse		EP-006, EP0007, EP-009		PM10/PM2.5		AP-42	100.00%	95.00%	0.04	1.83E-03	0.16	8.03E-03
	Overs Box	Overs Box	Overs Box	N/A	N/A	Int.		PM		Enginering Estimate	0%	0%	1.50E-04	6.57E-04	7.50E-06	3.29E-05
	Overs Box	Overs Box	Overs Box	N/A	N/A	Int.		PM10/PM2.5		Enginering Estimate	0%	0%	5.50E-05	2.75E-06	2.41E-04	1.20E-05
	Fugitive Components	Fugitive Components	Fugitive Components	N/A	N/A	Int.		VOC		EPA	0%	0%	9.67E-02	9.67E-02	4.24-.01	4.24E-01

Section N.2: Stack Information

UTM Zone:

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(° F)*	Exit Velocity *(ft/sec)*
EP-001	Cooling Tower	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
EP-003	Relief Flare, Tank Loadout, Rail Loadout, Process Combustion Upset	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
EP-004	Tank Farm Flare	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
EP-005	Pneumatic Unloading Into Silo, Pneumatic Transfer Into Hopper, Supersack Unloading to Screner, Screener Transfer to Silo	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
EP-006	Transfer from Silo to Plastic Feed Hopper	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
EP-007	Transfer from Silo to Plastic Feed Hopper	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
EP-009	Transfer from Silo to Plastic Feed Hopper	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
EP-010	Transfer from Silo to Plastic Feed Hopper	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
EP-012	Transfer from Feed Hopper to Plastic Slury Tank	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Section N.2: Stack Information

UTM Zone:

Stack ID	Identify all Emission Units (with Process ID) and Control Devices that Feed to Stack	Stack Physical Data			Stack UTM Coordinates		Stack Gas Stream Data		
		Equivalent Diameter *(ft)*	Height *(ft)*	Base Elevation *(ft)*	Northing *(m)*	Easting *(m)*	Flowrate *(acfm)*	Temperature *(° F)*	Exit Velocity *(ft/sec)*
EP-013	Transfer from Feed Hopper to Plastic Slury Tank	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
EP-014	Transfer from Feed Hopper to Plastic Slury Tank	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
EP-015	Transfer from Feed Hopper to Plastic Slury Tank	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
EP-017	Barge Loadout	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Section N.3: Fugitive Information

UTM Zone:

Emission Unit #	Emission Unit Name	Process ID	Area Physical Data		Area UTM Coordinates		Area Release Data	
			Length of the X Side *(ft)*	Length of the Y Side *(ft)*	Northing *(m)*	Easting *(m)*	Release Temperature *(°F)*	Release Height *(ft)*
Overs Box	Over Box	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Section N.4: Notes, Comments, and Explanations

Division for Air Quality

300 Sower Boulevard
Frankfort, KY 40601
(502) 564-3999

DEP7007HH

Haul Roads

_____ Section HH.1: Haul Roads

_____ Section HH.2: Yard Area

_____ Section HH.3: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI, DEP7007N and DEP7007V

___ SDS for dust suppressant

Source Name: **Green Mountain Energy**

KY EIS (AFS) #: **21-** _____

Permit #: _____

Agency Interest (AI) ID: _____

Date: **10/22/2024**

Section HH.1: Haul Roads

HH.1A Unpaved Haul Roads:

Average Number of Days in a Year with 0.01 inches of Precipitation (P): _____ Days

Mean Vehicle Weight (W): _____ Tons

Surface Material Silt Content (s): _____ %

Haul Road Length: _____ Miles

Maximum Vehicle Miles Traveled in a Year: _____ Miles

Describe the dust control method for unpaved haul road(s):
(If dust control suppressants will be utilized, attach the approved Safety Data Sheet(s), as applicable.)

Emission factor: _____

HH.1B Paved Haul Roads:

Average Number of Days in a Year with 0.01 inches of Precipitation (P): 120 Days

Mean Vehicle Weight (W): 32.5 Tons

Road Surface Silt Loading (sL): 9.7 (G/M^2)

Haul Road Length: 2.63 Miles

Maximum Vehicle Miles Traveled in a Year: 3837.7 Miles

Describe the dust control method for paved haul road(s):
(If dust control suppressants will be utilized, attach the approved Safety Data Sheet(s), as applicable.)

Section HH.2: Yard Area (Aggregate Handling And Storage Piles):

Average Number of Days in a Year with 0.01 inches of Precipitation (P): Days

Mean Wind Speed (U): MPH

Material Moisture Content (M): %

Describe the dust control method for yard area:
(If dust control suppressants will be utilized, attach the approved Safety Data Sheet(s), as applicable.)

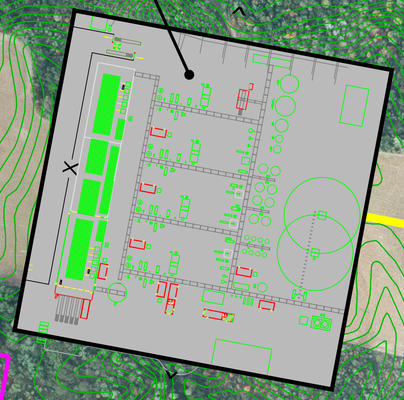
Section HH.3: Notes, Comments, and Explanations

ATTACHMENT C: FACILITY LAYOUT DRAWING

EX-1.0

Attachment C: Facility Layout Drawing

PROPOSED SITE AREA (15 AC+/-)



PROPOSED PIPE SUPPORTS AND LOADING CELL

FLOODWAY (SCALED FROM FEMA MAP)

CN MAINLINE

CONCEPT ONLY
PRELIMINARY NOT FOR CONSTRUCTION

N

GRAPHIC SCALE
0 200 400 600

REFERENCE DRAWINGS

REV	DATE	REVISION	BY	CKD	ENG/APPD

PROPOSED SITE AREA
FOR REZONING

SCH SERVICES,LLC WEST PADUCAH, KY

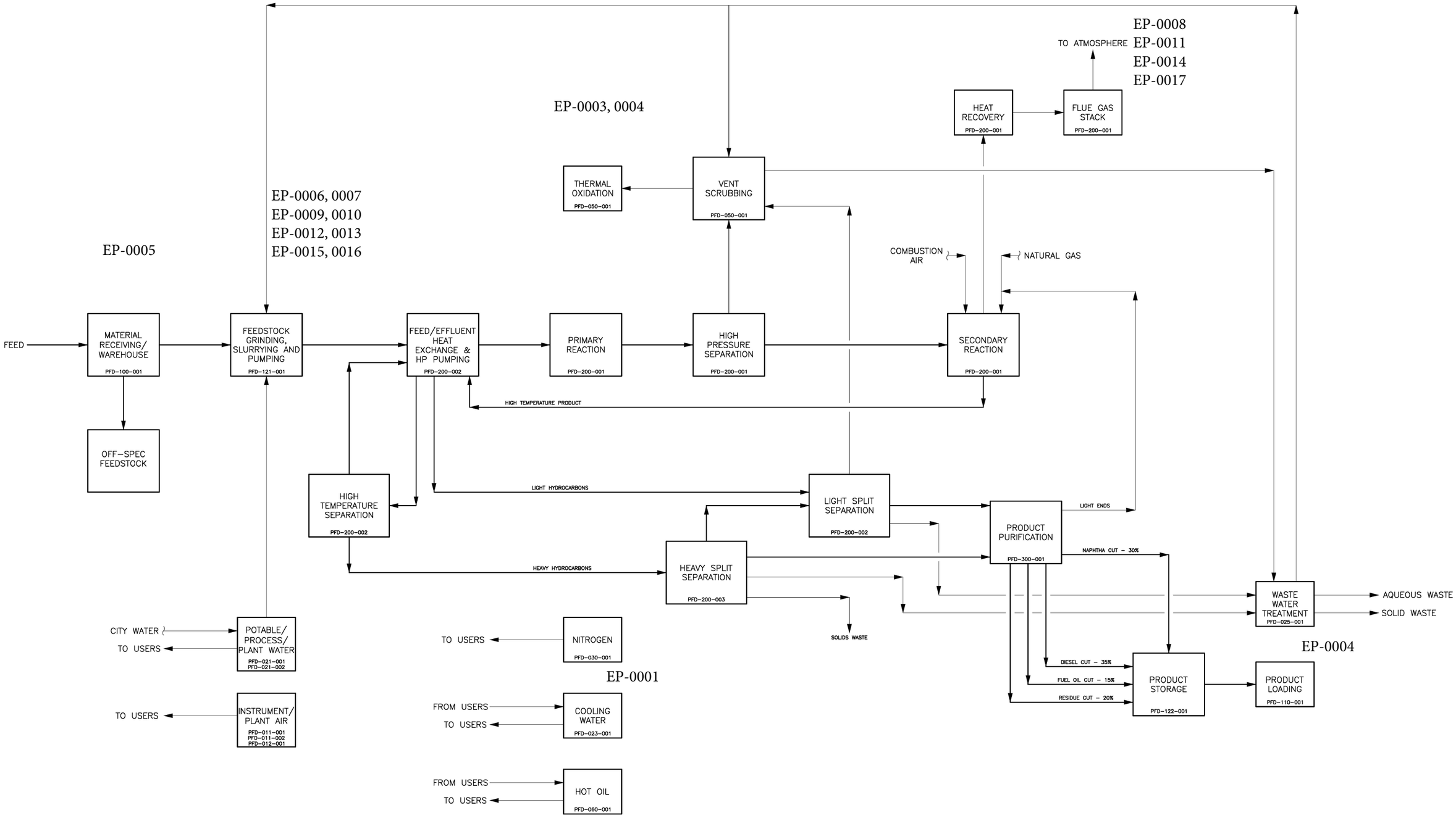
CES CORNETTE ENGINEERING SERVICES USA, LLC

SCALE:
DATE: 8/23/24

EXHIBIT 1.0

ACAD CIVIL 3D 2017 CONCEPT EXHIBIT 2/7/24

ATTACHMENT D: PROCESS FLOW DIAGRAM



NOTES:

12/08/23
PRELIMINARY

NOT FOR CONSTRUCTION
DATE: 12/08/23

REVISIONS					
REV	DATE	DESCRIPTION	BY	CKD	APP
B	12/08/23	ISSUED FOR INFORMATION	JT	JWS	CDT
A	10/31/23	ISSUED FOR INFORMATION	JT	CDT	CDT

GMP GLOBAL MANAGEMENT PARTNERS

NEW RANGE POWER

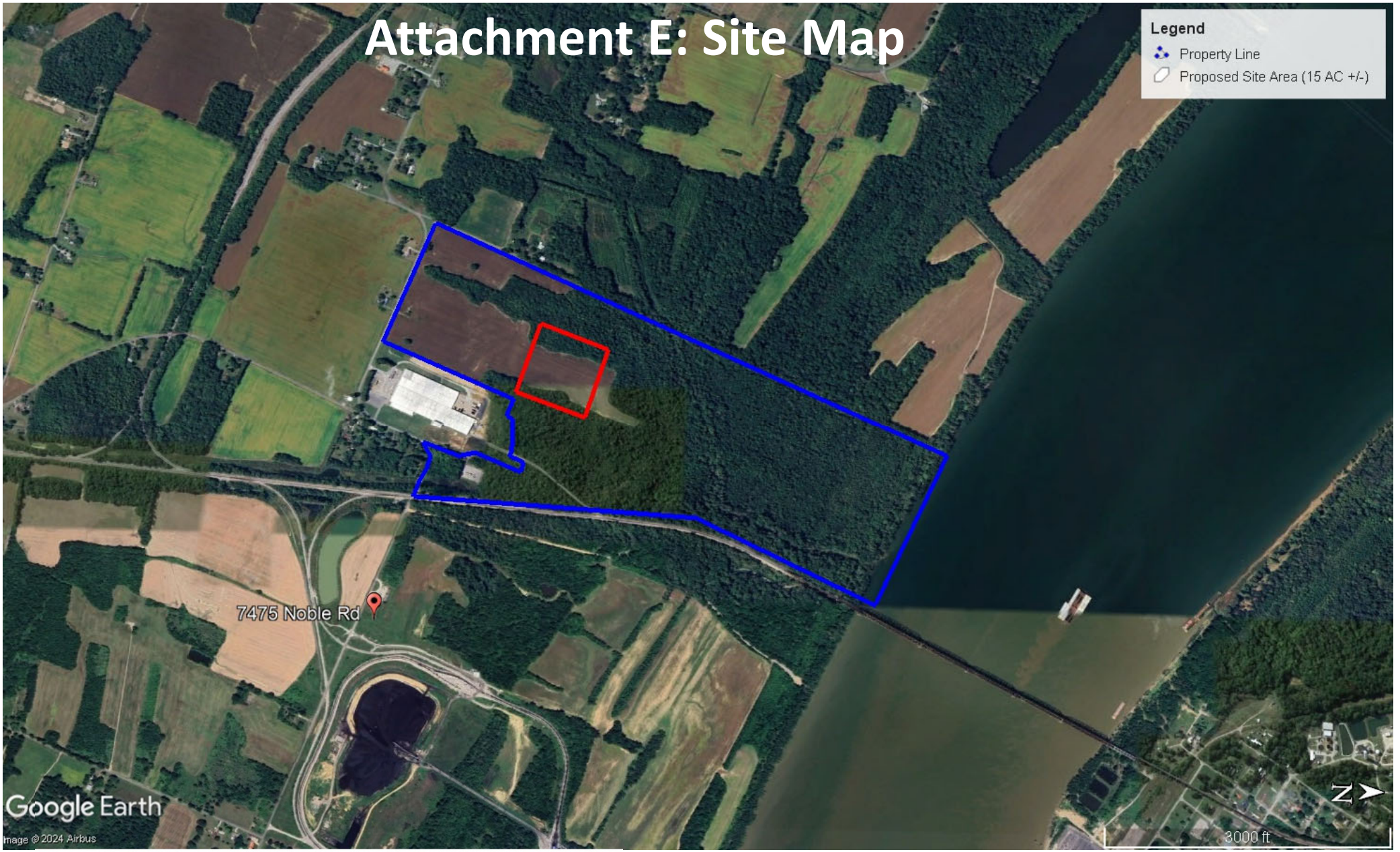
NEW RANGE POWER
HYDROLYTIC PYROLYSIS
100 TPD FEED
PADUCAH, KENTUCKY
Drawn By: JT Date: 10/25/23

OVERALL PLANT BLOCK FLOW DIAGRAM

BFD-000-001 Rev. B

ATTACHMENT E: SITE LOCATION MAP

Attachment E: Site Map



ERM

Green Mountain Energy
7475 Noble Road
West Paducah, KY 42086

Section AI.4: Type of Application

Current Status: ☐ Title V ☐ Conditional Major ☐ State-Origin ☐ General Permit ☐ Registration ☑ None

Requested Action: *(check all that apply)*

☐ Name Change	☐ Initial Registration	☐ Significant Revision	☐ Administrative Permit Amendment
☐ Renewal Permit	☐ Revised Registration	☐ Minor Revision	☐ Initial Source-wide OperatingPermit
☐ 502(b)(10)Change	☐ Extension Request	☐ Addition of New Facility	☐ Portable Plant Relocation Notice
☐ Revision	☐ Off Permit Change	☐ Landfill Alternate Compliance Submittal	☐ Modification of Existing Facilities
☐ Ownership Change	☐ Closure		

Requested Status: ☐ Title V ☑ Conditional Major ☐ State-Origin ☐ PSD ☐ NSR ☐ Other: _____

Is the source requesting a limitation of potential emissions? ☑ Yes ☑ No

Pollutant:	Requested Limit:	Pollutant:	Requested Limit:
☐ Particulate Matter		☐ Single HAP	
☑ Volatile Organic Compounds (VOC)	<100 tpy	☐ Combined HAPs	
☐ Carbon Monoxide		☐ Air Toxics (40 CFR 68, Subpart F)	
☑ Nitrogen Oxides	< 100 tpy	☐ Carbon Dioxide	
☐ Sulfur Dioxide		☐ Greenhouse Gases (GHG)	
☐ Lead		☐ Other	

For New Construction:

Proposed Start Date of Construction: *(MM/YYYY)* 04/2025

Proposed Operation Start-Up Date: *(MM/YYYY)* 10/2026

For Modifications:

Proposed Start Date of Modification: *(MM/YYYY)*

Proposed Operation Start-Up Date: *(MM/YYYY)*

Applicant is seeking coverage under a permit shield. ☐ **Yes** ☑ **No**

Identify any non-applicable requirements for which permit shield is sought on a separate attachment to the application.

Section AI.5 Other Required Information

Indicate the documents attached as part of this application:

- [ ] DEP7007A Indirect Heat Exchangers and Turbines
- [x] DEP7007B Manufacturing or Processing Operations
- [ ] DEP7007C Incinerators and Waste Burners
- [ ] DEP7007F Episode Standby Plan
- [x] DEP7007J Volatile Liquid Storage
- [ ] DEP7007K Surface Coating or Printing Operations
- [ ] DEP7007L Mineral Processes
- [ ] DEP7007M Metal Cleaning Degreasers
- [x] DEP7007N Source Emissions Profile
- [ ] DEP7007P Perchloroethylene Dry Cleaning Systems
- [ ] DEP7007R Emission Offset Credit
- [ ] DEP7007S Service Stations
- [ ] DEP7007T Metal Plating and Surface Treatment Operations
- [ ] DEP7007V Applicable Requirements and Compliance Activities
- [ ] DEP7007Y Good Engineering Practice and Stack Height Determination
- [ ] DEP7007AA Compliance Schedule for Non-complying Emission Units
- [ ] DEP7007BB Certified Progress Report
- [ ] DEP7007CC Compliance Certification
- [ ] DEP7007DD Insignificant Activities
- [ ] DEP7007EE Internal Combustion Engines
- [ ] DEP7007FF Secondary Aluminum Processing
- [ ] DEP7007GG Control Equipment
- [x] DEP7007HH Haul Roads
- [ ] Confidentiality Claim
- [ ] Ownership Change Form
- [ ] Secretary of State Certificate
- [x] Flowcharts or diagrams depicting process
- [ ] Digital Line Graphs (DLG) files of buldings, roads, etc.
- [x] Site Map
- [x] Map or drawing depicting location of facility
- [ ] Safety Data Sheet (SDS)
- [ ] Emergency Response Plan
- [ ] Other: _____

Section AI.6: Signature Block

I, the undersigned, hereby certify under penalty of law, that I am a responsible official*, and that I have personally examined, and am familiar with, the information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the information is on knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false or incomplete information, including the possibility of fine or imprisonment.

Robert Downey	04/23/2025
Authorized Signature	**Date**
Robert Downey	President
Type or Printed Name of Signatory	**Title of Signatory**

*Responsible official as defined by 401 KAR 52:001.

Outlook

RE: Green Mountain Energy Initial air permit application

From Ross, Dakota D (EEC) <dakota.ross@ky.gov>
Date Wed 3/26/2025 12:57 PM
To Holly Argiris <Holly.Argiris@erm.com>; Bob Downey <bob@newrangepower.com>
Cc Luma, Johnson (EEC) <johnson.luma@ky.gov>; Patil, Durga D (EEC) <Durga.Patil@ky.gov>; Bittner, Zachary P (EEC) <Zachary.Bittner@ky.gov>

Does Friday from 11:30 to 12:30 EST work for everyone?

Holly,

The largest issue is concerning emissions from the "pyrolysis" process itself. The Division understands the facility is proposing burning all of the process gas in the heaters and relief flare, but the Division in unaware of a requirement for facility to do so. As such, the Division believes PTE should be calculated assuming all process gas is vented to the atmosphere. Given the VOC content provided in the gas stream analysis on page 14/80 of the application, The Division believes that uncontrolled PTE of VOC will likely exceed 250 TPY and therefore is recommending the source apply for a Conditional Major, Synthetic Minor permit, under 401 KAR 52:030, to limit emissions to not more than 90 tpy to preclude 401 KAR 52:020 Title V permits and 401 KAR 51:017 Prevention of significant deterioration of air quality.

Additional issues include:

- The use of the AP-42 chapter 1.4 EF for NOx when combusting process gas. The Division believes that the high nitrogen content of the process gas (3.74% from page 14/80) may potentially result in the formation of a significant amount of fuel-bound NOx emissions when combusted in the heaters/ relief flare rendering the NG EFs from AP-42 an underestimate.
- Clarification on the SCR, is it controlling emissions directly from the second reactor or emissions from combusting process gas?
- SDS or laboratory analysis of the products being produced to aid in estimating HAP emissions from equipment fugitives, product storage, and loading
- Stack data so that the Division can perform air toxics modeling on the units subject to 401 KAR 63:020
- A number of less crucial questions and comments that will be shared following our meeting.

Thank you,

Dakota Ross, P.E.
Environmental Engineer Supervisor
Chemical Section
Division for Air Quality
300 Sower Blvd
Frankfort, KY 40601
(502) 782 - 6479

From: Holly Argiris <Holly.Argiris@erm.com>
Sent: Wednesday, March 26, 2025 11:21 AM
To: Ross, Dakota D (EEC) <dakota.ross@ky.gov>; Bob Downey <bob@newrangepower.com>
Cc: Luma, Johnson (EEC) <johnson.luma@ky.gov>; Patil, Durga D (EEC) <Durga.Patil@ky.gov>
Subject: RE: Green Mountain Energy Initial air permit application

Dakota,

We are available tomorrow afternoon and Friday before 3:00 EST. If either of these times work for you, please schedule the meeting at your convenience.

Can you please provide a list of the additional information needed and any concerns that you may have so that we can start gathering the information prior to the call?

Thank you.

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Holly Argiris
Senior Managing Consultant

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Suite 560W | Indianapolis IN 46240
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M +1 317 413 1559

erm.com

From: Ross, Dakota D (EEC) <dakota.ross@ky.gov>
Sent: Wednesday, March 26, 2025 9:14 AM
To: Holly Argiris <Holly.Argiris@erm.com>; Bob Downey <bob@newrangepower.com>
Cc: Luma, Johnson (EEC) <johnson.luma@ky.gov>; Patil, Durga D (EEC) <Durga.Patil@ky.gov>
Subject: RE: Green Mountain Energy Initial air permit application

EXTERNAL MESSAGE

Good Morning,

The Division would like to set up a meeting to discuss some concerns with, and the need for more information on the Green Mountain Energy air permit application. Please provide some dates and times that would work for the facility.

Thank you,

Dakota Ross, P.E.
Environmental Engineer Supervisor
Chemical Section
Division for Air Quality
300 Sower Blvd
Frankfort, KY 40601
(502) 782 - 6479

From: Holly Argiris <Holly.Argiris@erm.com>
Sent: Tuesday, March 18, 2025 10:21 AM
To: Ross, Dakota D (EEC) <dakota.ross@ky.gov>; Patil, Durga D (EEC) <Durga.Patil@ky.gov>
Cc: Luma, Johnson (EEC) <johnson.luma@ky.gov>; Bob Downey <bob@newrangepower.com>
Subject: RE: Green Mountain Energy Initial air permit application

Dakota,

Please see the attached PFD with location of the SCR (updates made in red). We would like to request that the PFD not be made public due to the sensitive nature of the information that we are sharing with you.

Thank you.

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From: Ross, Dakota D (EEC) <dakota.ross@ky.gov>
Sent: Tuesday, March 18, 2025 7:23 AM
To: Holly Argiris <Holly.Argiris@erm.com>; Patil, Durga D (EEC) <Durga.Patil@ky.gov>
Cc: Luma, Johnson (EEC) <johnson.luma@ky.gov>; Bob Downey <bob@newrangepower.com>
Subject: RE: Green Mountain Energy Initial air permit application

EXTERNAL MESSAGE

Thanks Holly,

Would you happen to have an updated process flow diagram showing the location of the SCR? The PFD in the application is dated 10/25/23.

Thank you,

Dakota

From: Holly Argiris <Holly.Argiris@erm.com>
Sent: Friday, March 14, 2025 7:55 AM
To: Ross, Dakota D (EEC) <dakota.ross@ky.gov>; Patil, Durga D (EEC) <Durga.Patil@ky.gov>
Cc: Luma, Johnson (EEC) <johnson.luma@ky.gov>; Bob Downey <bob@newrangepower.com>
Subject: RE: Green Mountain Energy Initial air permit application

Dakota,

I have completed the requested form. The majority of the information is not currently known and will be provided after equipment manufacturer has been selected and the model is known.

If you need anything further, please let me know.

Thank you.

Holly Argiris
Senior Managing Consultant

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From: Ross, Dakota D (EEC) <dakota.ross@ky.gov>
Sent: Thursday, March 13, 2025 7:16 AM
To: Holly Argiris <Holly.Argiris@erm.com>; Patil, Durga D (EEC) <Durga.Patil@ky.gov>
Cc: Luma, Johnson (EEC) <johnson.luma@ky.gov>; Bob Downey <bob@newrangepower.com>
Subject: RE: Green Mountain Energy Initial air permit application

EXTERNAL MESSAGE

Holly,

Thank you for the quick response, The Division will review and continue processing the permit application. In the meantime could you please provide a complete DEP7007GG form (attached) for the control devices that will be used at the facility.

Thank you,

Dakota Ross, P.E.
Environmental Engineer Supervisor
Chemical Section
Division for Air Quality
300 Sower Blvd
Frankfort, KY 40601
(502) 782 - 6479

From: Holly Argiris <Holly.Argiris@erm.com>
Sent: Wednesday, March 12, 2025 2:25 PM
To: Ross, Dakota D (EEC) <dakota.ross@ky.gov>; Patil, Durga D (EEC) <Durga.Patil@ky.gov>
Cc: Luma, Johnson (EEC) <johnson.luma@ky.gov>; Bob Downey <bob@newrangepower.com>
Subject: RE: Green Mountain Energy Initial air permit application

Dakota,

The following information is provided in response to the information request from your office on 3/10/2025. If you have any questions regarding the information supplied, please feel free to contact me at (317) 816-7301.

- Is all of the plastic processed from industrial sources? What types of plastic are being processed?
  - Yes, all plastic is from industrial sources
  - Plastic being processed is HDPE (High Density Polyethylene), PDPE (Low Density Polyethylene), and PP (Polypropylene)

- Please provide an applicability review of various incinerator regulations (AAAA, Eb, etc.) and applicability of 40 CFR Part 60 Subpart RRRa and NNNa:

  - The incinerator regulations (40 CFR Part 60, Subpart AAAA, Eb, etc.) are applicable to sources that combust municipal solid waste. The reactors at Green Mountain Energy are not incinerators because there is no combustion source. The reactors use heat from the hot oil system and pressure. The process is a reforming process, not incineration. Therefore, the incinerators rules will not apply to Green Mountain Energy. KDEP discussed including a record keeping requirement through state regulation that would require Green Mountain Energy to maintain records of weight of plastic processed and name and address of the purchaser of the feedstock. The incinerator regulations include an exemption for units with capacities less than 250 tons/day. However, because the design capacity is less than 250 tons/day, maintaining records of throughput and purchaser is not necessary. Therefore, because the reactors are not incinerators and the design throughput is less than 250 tons/day, the incinerator rules or requirements should not be included in the permit.

  - KDEP is also considering the NSPS regulations for Synthetic Organic Chemical Manufacturing Industry for Distillation Units and Reactors (40 CFR 60, Subpart NNNa and RRRa). Both of these regulations exempt vent streams going to a fuel gas system. The regulations define a fuel gas system as " the offsite and onsite piping and flow and pressure control system that gathers gaseous stream(s) generated by onsite operations, may blend them with other sources of gas, and transports the gaseous stream for use as fuel gas in combustion devices or in in-process combustion equipment such as furnaces and gas turbines either singly or in combination." The gaseous stream generated at the facility is used to fuel the heat treatment process on-site. The stream is piped to feed the heat exchangers and hot oil heaters that are used in reactors to convert the plastic to fuel at the facility.

- Clarification on components C1 through C9 of the process gas stream:
  The components C1 through C9 are provided based on a composition analysis from Flint Hills Laboratory conducted in July 2023:

	#6 (mole %)	#9 (mole %)	HAP (Y/N)
Methane	0.4729	0.0255	N
Ethene	0.0660	0.0034	N
Ethyne	0.0003		N
Ethane	0.0248	0.0017	N
Propene	0.0336	0.0020	N

Propane	0.0032	0.0004	N
Propadiene	0.0001		N
Iso-Butane	0.0004		N
Iso-Butene	0.0041	0.0003	N
1-Butene	0.0042	0.0003	N
Butadiene	0.0061	0.0003	Y
n-Butane	0.0006	0.0001	N
cis-2-Butene	0.0023	0.0001	N
trans-2-Butene	0.0012	0.0001	N
Iso-Pentane	0.0003	0.0001	N
1-Pentene	0.0014	0.0001	N
2-Methyl-2-Butene	0.0008		N
n-Pentane	0.0026	0.0002	N
cis-2-Pentene	0.0030	0.0002	N
n-Hexane	0.0028	0.0002	Y

- How was the loading rack throughput established.
  Throughput was based on the potential production capacity of the facility. The calculations do state limited throughput; however, the throughput provided is potential throughput. Emissions were based on a worst-case scenario that would result in the highest production of volatiles (12% naptha cut).

- Confirm if there is an SCR for NOx control, and if so please quantify uncontrolled NOx PTE as the application states only 0.34 TPY of NOx.
  Yes, there is an SCR controlling emissions from the secondary reactor. Prior to entering the SCR, the emission stream has a mass flow of 28,805.6 lb/hr and a 0.009wt% NOx concentration. Uncontrolled NOx emissions from this process are 11.36 tons/yr.

- Provide any additional gas composition analysis, product formulations, lab test data, test data at similar facilities, engineering flowcharts, etc. that may be beneficial in quantifying emissions from the process "pyrolysis" reactors.
  The only emissions from the pyrolysis reactors are from non-routine emission events (startup/shutdown, upset, and maintenance events) and fugitive losses from leaks. These emissions are quantified in the Relief Flare and Fugitive Losses tabs in the emission calculations that were previously submitted. The HAP emissions submitted were conservatively estimated to be the same as that of natural gas except for hexane and toluene. As shown in the composition table above, toluene was not present in the gaseous stream. Hexane is present; however, the quantities present in the gaseous stream are less than what was used in the emission calculations provided.

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From: Ross, Dakota D (EEC) <dakota.ross@ky.gov>
Sent: Monday, March 10, 2025 12:56 PM
To: Holly Argiris <Holly.Argiris@erm.com>; Patil, Durga D (EEC) <Durga.Patil@ky.gov>
Cc: Luma, Johnson (EEC) <johnson.luma@ky.gov>
Subject: RE: Green Mountain Energy Initial air permit application

EXTERNAL MESSAGE

Holly,

Thanks for being available at such short notice. Below is a high level list of what was discussed and the questions the Division is still seeking an answer for:

- Is all of the plastic processed from industrial sources? What types of plastic are being processed? (I think you said 99% HDPE?)
- Various incinerator regulations (AAAA, Eb, etc.) contain requirements exempting pyrolysis units at plastic recycling facilities.
- Please evaluate the potential applicability of 40 CFR Part 60 RRRa and NNNa.
- Please provide clarification on components C1 through C9 of the process gas stream.
- Please provide clarification on the "limited throughput" of the loading racks
- Please confirm if there is an SCR for NOx control, and if so please quantify uncontrolled NOx PTE as the application states only 0.34 TPY of NOx.
- Please provide any additional gas composition analysis, product formulations, lab test data, test data at similar facilities, engineering flowcharts, etc. that may be beneficial in quantifying emissions from the process "pyrolysis" reactors.

Thank you!

Dakota Ross, P.E.
Environmental Engineer Supervisor
Chemical Section
Division for Air Quality
300 Sower Blvd
Frankfort, KY 40601
(502) 782 – 6479

From: Holly Argiris <Holly.Argiris@erm.com>
Sent: Monday, March 10, 2025 9:59 AM
To: Patil, Durga D (EEC) <Durga.Patil@ky.gov>
Cc: Ross, Dakota D (EEC) <dakota.ross@ky.gov>; Luma, Johnson (EEC) <johnson.luma@ky.gov>
Subject: RE: Green Mountain Energy Initial air permit application

Good morning. I can make either today at 11:30 or tomorrow between 10 and 12 work. Please let me know your preferene.

Thank you.

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From: Patil, Durga D (EEC) <Durga.Patil@ky.gov>
Sent: Monday, March 10, 2025 7:36 AM
To: Holly Argiris <Holly.Argiris@erm.com>
Cc: Ross, Dakota D (EEC) <dakota.ross@ky.gov>; Luma, Johnson (EEC) <johnson.luma@ky.gov>
Subject: RE: Green Mountain Energy Initial air permit application

Good morning:
Would you be available for some follow-up questions on your responses at 11:30 am (EST) today or between 10-noon (EST) tomorrow. If in the afternoon (EST), then we are available on Wednesday only. Please suggest an option.
Our questions will relate to reactor process and testing emissions profile from the stacks.

Thanks
Durga Patil

From: Holly Argiris <Holly.Argiris@erm.com>
Sent: Monday, March 3, 2025 5:55 PM
To: Patil, Durga D (EEC) <Durga.Patil@ky.gov>
Cc: Bob Downey <bob@newrangepower.com>; Luma, Johnson (EEC) <johnson.luma@ky.gov>; Bittner, Zachary P (EEC) <Zachary.Bittner@ky.gov>; Jeff Twaddle <Jeff.Twaddle@erm.com>
Subject: FW: Green Mountain Energy Initial air permit application
Importance: High

Durga,

Please see our responses to your questions below. Our responses are in red font following your original request.

In addition to the original request, you had also requested a PFD that showed the material handling operation, specifically the details of the multiple trains. Please see the attached Material Handling PFD.

If you need anything further, please let me know.

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From: Patil, Durga D (EEC) <Durga.Patil@ky.gov>
Sent: Wednesday, February 12, 2025 8:52 AM
To: Holly Argiris <Holly.Argiris@erm.com>; bob@newrangepower.com
Cc: Luma, Johnson (EEC) <johnson.luma@ky.gov>; Bittner, Zachary P (EEC) <Zachary.Bittner@ky.gov>
Subject: Green Mountain Energy Initial air permit application

Good morning:
As discussed yesterday over the phone, here are some the queries that the Division needs information/clarification on, in order to proceed with review of the permit application submitted 12/6/2024 for an initial State origin permit.

- A completed DEP 7007 V form for each emission unit at the source.

  See attached forms.

- The project description refers to processing of hard to recycle plastic materials as feedstock to generate useful petroleum products, please provide a description of the reactor process, manufacturer name, temperatures/phases involved.

  Raw materials are brought on-site in super saks via train where they will be unloaded via fork truck. A pneumatic transfer system will convey the plastic into a large Silo. A second pneumatic conveying system will transfer the plastic from the large Silo to smaller hoppers on each reactor train. The plastic will be metered, along with water, into a slurry tank, and then pumped to a Slurry Feed grinder to reduce particle size. This slurry feed will go to the reactors. The feed slurry will be pre-heated using excess heat from the final reactor product stream. The pre-heated slurry will enter the Primary Reactor. The Primary Reactor is a multiple tube reactor using Hot Oil to keep the material at the reaction temperature of 500 degF. The reactant will be separated using a Gas/Oil Separator to remove water before entering the next reactor. The vapor phase will be sent to the water recovery area. The organic phase is sent to the Secondary Reactor. The aqueous phase will be sent to the Primary Feed/Product Interchanger for heat recovery.

  The Secondary Reactor is a tubular reactor with a fired heater system needed to drive the reaction temperature to 1000 degF. The reactor will have a Hot Oil Heater, SCR for emissions control, and a combustion air blower and combustion air pre-heater to recover heat from the flue gas before it is exhausted. The material from the Secondary Reactor will be sent to the Secondary Feed/Product Interchanger for additional heat recovery before flashed in the Product Flash Tank to form a light HC vapor stream and a heavy HC liquid stream. The heavy HC stream will go to the Product Purification area. The vapor stream will go to a Condenser and will be decanted in a Low Pressure Oil/Gas Separator. The non-condensed material will be sent to the fired heater burner for energy recovery, the organic phase will be sent to Product Purification, and the aqueous phase will be sent to water recovery.

  Chemex plans to use heat exchangers for the reactors. A specific vendor has not been selected yet.

  The following summarizes the conditions of the reactors:

	Reactor 1 (Primary)	Reactor 2 (Secondary)
Feed	Plastic/Water Slurry (50:50)	Plastic/Water Slurry (50:50)
Pressure (psig)	1,000	500
Temperature (degF)	500	1,000
Phase	Organic (sent to Secondary Reactor) Aqueous (sent to Primary Feed/Product Interchanger)	Liquid Heavy HC Stream (sent to Product Purification) Vapor (Sent to Condenser)

- The DEP AI form shows different feed stock (coal, plastics, fuels) to be used, however the rest of the application shows plastics as feed stock. Is there coal being used and what is the particle size of the as received plastics.

  The facility plans to utilize only plastic as the feed stock. Other feeds (coal, feeds, etc.) have been utilized at the R&D facility. We have removed all feeds besides plastic at this time and will revise the permit should additional feeds be used in the future.

- Please discuss the applicability of 401 KAR 59:020 and 401 KAR 59:021 to the reactors.

  401 KAR 59:020 is not applicable to the reactors because 59:020 is applicable to new incinerators that are defined as “any furnace used in the process of burning was for the purpose of reducing the volume of the waste be removing combustible matter.” The purpose of the reactor is to take a plastic/water slurry feed and through a hydrolyisis and heat integration reaction create a usable fuel.

  401 KAR 59:021 is not applicable to the reactors because 59:021 is applicable to new municipal solid waste incinerators that are defined as “a device that combust material, which if included in the waste stream would be municipal solid waste.” Municipal solid waste is a “household solid waste and commercial solid waste.” The reactors are not incinerators. They are using fuels and process heat to heat the reactors, not a solid waste that would meet the definition of municipal solid waste.

- Please discuss the applicability of 40 CFR 60, Subpart E and Subpart EEEE.

  40 CFR Part 60 Subpart E does not apply because the reactors are not furnaces used in the process of burning solid waste or for the purpose of reducing the volume of the waste by removing combustible matter as defined at 40 CFR 60.51.

  40 CFR Part 60 Subpart EEEE does not apply because the reactors are not very small municipal waste combustion units or institutional waste incineration units as defined in 60.2977.

- Please provide details of the process of separation (high temperature, heavy split/light split and product purification) is that a distillation process, if so would it be subject to 40 CFR 60, Subpart GGGa (if using coal)

  The feed from the Secondary Reactor feeds into a Light Split Condenser and then to a Product Flash Tank. The heavy HC stream will go to the Product Purification area. The vapor stream will go to a Condenser and will be decanted in a Low Pressure Oil/Gas Separator. The non-condensed material will be sent to the fired heater burner for energy recovery, the organic phase will be sent to Product Purification, and the aqueous phase will be sent to water recovery.

  In the Product Purification Step, the material is fed through a light end removal column. The condensed material will be separated further into naphtha, diesel, and distillate using naptha recovery column reboiler, naptha product cooler and light end removal condensers. The non-condensed material will be send to the fired heater burner for energy recovery.

  The requirements of the New Source Performance Standard for Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006, 40 CFR 60, Subpart GGGa (326 IAC 12), are not included in the permit, since the source is not engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of petroleum or through redistillation, cracking or reforming of unfinished petroleum derivatives.

- With respect to page 3 of 6 of the DEP 7007 N form, all stack information has be shown as TBD, please provide an engineering estimate of the stack parameters based on the production capacity.

  Stack parameters will be provided as soon as they are known. Parameters are still TBD at this point.

- The naphtha loadout out to a tanker or barge is controlled by the tank farm flare…. Is that a requirement from a regulation or part of the operational design.

  40 CFR Part 62 Subpart Y: National Emission Standards for Marine Tank Vessel Loading Operations does not apply to marine tank vessel loading operations of commodities with vapor pressures less than 10.3 kPa at standard conditions. The materials loaded out have vapor pressures less than 10.3kPa at standard conditions. There are no NSPS applicable to barge loading operations. Therefore, there are no regulations that require use of the flare as part of the operational design.

- For the Emissions Master emission factor for the tanks, would it possible to provide just the input and output data.

  The following table summarizes the input and outputs for the tanks calculations. We've also attached the Tanks Emissions Masters report for your review.

Tank ID	Stream ID	Product	Tank Description	Tank Construction	Tank Capacity (gal)	Tank Dimensions	Design Temperature	Design Pressure
TK-12203-A	30021	Naphtha Product Day Tank A	Shop Fabricated	CS	15,220 gallon	12 ft DIA x 18 ft T/T	250°F	2 psig
TK-12203-B	30021	Naphtha Product Day Tank B	Shop Fabricated	CS	15,220 gallon	12 ft DIA x 18 ft T/T	250°F	2 psig
TK-12204	30021	Naphtha Product Tank	API 650, Field Erected, Floating Roof	CS	37,600 gallon	20 ft DIA x 16 ft T/T	250°F	2 psig
TK-12205-A	30051	Diesel Product Day Tank A	Field Fabricated, API 650	CS	73,430 gallon	25 ft DIA x 20 ft T/T	250°F	2.5 psig
TK-12205-B	30051	Diesel Product Day Tank B	Field Fabricated, API 650	CS	73,430 gallon	25 ft DIA x 20 ft T/T	250°F	2.5 psig
TK-12206	30051	Diesel Product Tank	API 650, Field Erected	CS	709,640 gallon	53 ft DIA x 43 ft T/T	250°F	1 psig
TK-12208	30052	Residue Product Tank	API 650, Field Erected Equipped with heated coil Hot Oil Heating Medium	CS	527,920 gallon	48 ft DIA x 39 ft T/T	276°F	1 psig
TK-12209	30021	Off-Spec Naphtha Tank	API 650, Field Erected, Floating Roof	CS	37,600 gallon	20 ft DIA x 16 ft T/T	250°F	2 psig
TK-12210	30051	Off-Spec Diesel Tank	API 650, Field Erected	CS	190,160 gallon	34 ft DIA x 28 ft T/T	250°F	2 psig
Total								

- The DEP7007N form shows only emissions of CO from the process reactor with the source of emission factor being mass balance, please provide more details of the mass balance, testing at another facility etc. In addition there should be other criteria pollutants and HAPs being emitted from the process which are controllable by the flare but not identified . The DEP 7007 N form has no uncontrolled emission factor shown in the table, only the hourly and annual emissions, please provide the uncontrolled emission factors for each pollutant for the reactor process.

  The DEP7007N form provided uncontrolled and controlled VOC, PM, PM10, PM2.5, SO2, NOx, and CO emissions. HAP emissions were not listed in the form, but were included in the attached inventory. The emission factors were included as well in the inventory. Parameters of the process gas have been developed from gas analyses and categorization at the R&D facility in Glasgow, KY. The facility is exempt from requiring air permitting. The emission factors for all criteria pollutants except for VOC were assumed to be the same as natural gas. The emission factor for VOC is 5468 lb/MMcf. The emission factor for all HAPs were assumed to be the same as natural gas with the exception of n-Hexane and Xylene. The emission factor for n-Hexane is 2.16 lb/MMccf and the emission factor for Xylene is 0.666 lb/MMcf.

- The block flow diagram on page 78/80 of the application shows a vent scrubber, please provide description of the scrubber including scrubbant liquid, pollutants being scrubbed out with control efficiency and manufacturer name.

  This information will be provided in a separate email.

Thanks

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DEP7007V

Applicable Requirements and Compliance Activities

___ Section V.1: Emission and Operating Limitation(s)

___ Section V.2: Monitoring Requirements

___ Section V.3: Recordkeeping Requirements

___ Section V.4: Reporting Requirements

___ Section V.5: Testing Requirements

___ Section V.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: _____

KY EIS (AFS) #: 21- _____

Permit #: _____

Agency Interest (AI) ID: _____

Date: _____

Section V.1: Emission and Operating Limitation(s)

Emission Unit #	Emission Unit Description	Applicable Regulation or Requirement	Pollutant	Emission Limit (if applicable)	Voluntary Emission Limit or Exemption (if applicable)	Operating Requirement or Limitation (if applicable)	Method of Determining Compliance with the Emission and Operating Requirement(s)
TK-12003-A/B	Naphtha Product Day Tank A/B	401 KAR 59:050(3)(2)	VOC		Equipped with Flare to Reduce VOC Emissions by 98%	Tank Equipped with Permanent Submerged Fill Pipe	**Visual Observation**
TK-12204	Naphtha Product Tank	40 CFR Part 60 Subpart Kc 401 KAR 59:050(3)(2)	VOC	Reduce VOC Emissions by 98%		Tank Equipped with Permanent Submerged Fill Pipe. Routed through closed vent system to a	Visual Observation of Pipe
TK-12205-A/B	Diesel Product Day Tank A/B	401 KAR 59:050(3)(2)	VOC		Equipped with Flare to Reduce VOC Emissions by 98%	Tank Equipped with Permanent	Visual Observation of Pipe
TK-12006	Diesel Product Tank	401 KAR 59:050(3)(2)	VOC		Equipped with Flare to Reduce VOC Emissions by 98%	Tank Equipped with Permanent	Visual Observation of Pipe
TK-12208	Residue Product Tank	401 KAR 59:050(3)(2)	VOC		Equipped with Flare to Reduce VOC Emissions by 98%	Tank Equipped with Permanent	Visual Observation of Pipe

Emission Unit #	Emission Unit Description	Applicable Regulation or Requirement	Pollutant	Emission Limit (if applicable)	Voluntary Emission Limit or Exemption (if applicable)	Operating Requirement or Limitation (if applicable)	Method of Determining Compliance with the Emission and Operating Requirement(s)
TK-12209	Off-Spec Naphtha Tank	40 CFR Part 60 Subpart Kc 401 KAR 59:050(3)(2)	VOC	Reduce VOC Emissions by 98%	Equipped with Flare to Reduce VOC Emissions by 98%	Tank Equipped with Permanent Submerged Fill Pipe	Visual Observation of Pipe
TK-12210	Off-Spec Diesel Tank	401 KAR 59:050(3)(2)	VOC		Equipped with Flare to Reduce VOC Emissions by 98%	Tank Equipped with Permanent	Visual Observation of Pipe

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Applicable Requirements and Compliance Activities

___ Section V.1: Emission and Operating Limitation(s)
___ Section V.2: Monitoring Requirements
___ Section V.3: Recordkeeping Requirements
___ Section V.4: Reporting Requirements
___ Section V.5: Testing Requirements
___ Section V.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: _____

KY EIS (AFS) #: 21- _____

Permit #: _____

Agency Interest (AI) ID: _____

Date: _____

Section V.1: Emission and Operating Limitation(s)

Emission Unit #	Emission Unit Description	Applicable Regulation or Requirement	Pollutant	Emission Limit (if applicable)	Voluntary Emission Limit or Exemption (if applicable)	Operating Requirement or Limitation (if applicable)	Method of Determining Compliance with the Emission and Operating Requirement(s)
EP-001	Cooling Tower	N/A	PM/PM10/PM2.	N/A	N/A	N/A	N/A
EP-003	Relief Flare (FL-05001)	401 KAR 59:105(3)	H2S	10 gr/100 dscf	N/A	N/A	Fuel Records
EP-003	Relief Flare (FL-05001)	401 KAR 59.105(5)	CO	0			Fuel Records
EP-003	Relief Flare (FL-05001)	401 KAR 63.015	Opacity	20%			VE Observations
EP-004	Tank Farm Flare (FL-00502	401 KAR 59:105(3)	H2S	10 gr/100 dscf	N/A	N/A	Fuel Records
EP-004	Tank Farm Flare (FL-00502	401 KAR 59.105(5)	CO	0			Fuel Records
EP-004	Tank Farm Flare (FL-00502	401 KAR 63.015	Opacity	20%			VE Observations

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DEP7007V

Applicable Requirements and Compliance Activities

___ Section V.1: Emission and Operating Limitation(s)
___ Section V.2: Monitoring Requirements
___ Section V.3: Recordkeeping Requirements
___ Section V.4: Reporting Requirements
___ Section V.5: Testing Requirements
___ Section V.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: _____

KY EIS (AFS) #: 21- _____

Permit #: _____

Agency Interest (AI) ID: _____

Date: _____

Section V.1: Emission and Operating Limitation(s)

Emission Unit #	Emission Unit Description	Applicable Regulation or Requirement	Pollutant	Emission Limit (if applicable)	Voluntary Emission Limit or Exemption (if applicable)	Operating Requirement or Limitation (if applicable)	Method of Determining Compliance with the Emission and Operating Requirement(s)
EP-005	nuematic Unloading into S	401 KAR 59:010(3)(3)(2)	PM/PM10/PM2.	E=3.59P^0.62	N/A	N/A - Dust Collection Not required to meet Emission limit.	Emission Calculation
EP-006/EP-007	nsfer from Silo to Feed Ho	401 KAR 59:010(3)(3)(2)	PM/PM10/PM2.	E=3.59P^0.62	N/A	N/A - Dust Collection Not required to meet Emission limit.	Emission Calculation
EP-009/EP-010	nsfer from Silo to Feed Ho	401 KAR 59:010(3)(3)(2)	PM/PM10/PM2.	E=3.59P^0.62	N/A	N/A - Dust Collection Not required to meet Emission limit.	Emission Calculation
EP-012/EP-012	r from Feed Hopper to Slu	401 KAR 59:010(3)(3)(2)	PM/PM10/PM2.	E=3.59P^0.62	N/A	N/A - Dust Collection Not required to meet Emission limit.	Emission Calculation
EP-014/EP-015	r from Feed Hopper to Slu	401 KAR 59:010(3)(3)(2)	PM/PM10/PM2.	E=3.59P^0.62	N/A	N/A - Dust Collection Not required to meet Emission limit.	Emission Calculation

Emission Unit #	**Emission Unit Description**	**Applicable Regulation or Requirement**	**Pollutant**	**Emission Limit** (if applicable)	**Voluntary Emission Limit or Exemption** (if applicable)	**Operating Requirement or Limitation** (if applicable)	**Method of Determining Compliance with the Emission and Operating Requirement(s)**

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DEP7007V
Applicable Requirements and Compliance Activities

___ Section V.1: Emission and Operating Limitation(s)
___ Section V.2: Monitoring Requirements
___ Section V.3: Recordkeeping Requirements
___ Section V.4: Reporting Requirements
___ Section V.5: Testing Requirements
___ Section V.6: Notes, Comments, and Explanations

Additional Documentation

___ Complete DEP7007AI

Source Name: _____
KY EIS (AFS) #: 21- _____
Permit #: _____
Agency Interest (AI) ID: _____
Date: _____

Section V.1: Emission and Operating Limitation(s)

Emission Unit #	Emission Unit Description	Applicable Regulation or Requirement	Pollutant	Emission Limit (if applicable)	Voluntary Emission Limit or Exemption (if applicable)	Operating Requirement or Limitation (if applicable)	Method of Determining Compliance with the Emission and Operating Requirement(s)
R-20001/R-20002	Pyrolysis Reaction	401 KAR 59:105(3)	H2S	10 gr/100 dscf	N/A	N/A	Fuel Records
R-20001/R-20002	Pyrolysis Reaction	401 KAR 59.105(5)	CO	0	N/A	N/A	Fuel Records
R-20001/R-20002	Pyrolysis Reaction	401 KAR 63:020	s/Toxic Substa	N/A	N/A	Limit emissions to quantities or durations that would not be harmful to the healt and welfare of humans, animals and plants	Emission Calculation

Emission Unit #	Emission Unit Description	Applicable Regulation or Requirement	Pollutant	Emission Limit (if applicable)	Voluntary Emission Limit or Exemption (if applicable)	Operating Requirement or Limitation (if applicable)	Method of Determining Compliance with the Emission and Operating Requirement(s)
EP-003	Loading Rack	401 KAR 59:010(3)(3)(2)	PM/PM10/PM2.	E=3.59P^0.62	N/A	N/A - Dust Collection Not required to meet Emission limit.	Emission Calculation
EP-014/EP-015	r from Feed Hopper to Slu	401 KAR 59:010(3)(3)(2)	PM/PM10/PM2.	E=3.59P^0.62	N/A	N/A - Dust Collection Not required to meet Emission limit.	Emission Calculation
	Fugitive Components	401 KAR 63:010(3)(3)	VOC	N/A	N/A	Limit fumes, gases, odoros matter, and	Best Management Practices
	Fugitive Roadways	R 63:010(3)(1), Fugitive E	PM/PM10/PM2.	N/A	N/A	Maintain paved roadways in a cleaned	Best Management Practices

Section V.2: Monitoring Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
TK-12003-A/B	Naphtha Product Day Tank A/B	VOC	401 KAR 59:050(3)(2)		
TK-12204	Naphtha Product Tank	VOC	40 CFR Part 60 Subpart Kc 401 KAR 59:050(3)(2)	VOC	Annual Visual Inspection, Annual LEL Monitoring and Measurements of vapors within the internal floating roof storage vessel. Install and operate a backpresssure regulator valve.
TK-12205-A/B	Diesel Product Day Tank A/B	VOC	401 KAR 59:050(3)(2)		
TK-12006	Diesel Product Tank	VOC	401 KAR 59:050(3)(2)		
TK-12208	Residue Product Tank	VOC	401 KAR 59:050(3)(2)		
TK-12209	Off-Spec Naphtha Tank	VOC	40 CFR Part 60 Subpart Kc 401 KAR 59:050(3)(2)	VOC	Annual Visual Inspection, Annual LEL Monitoring and Measurements of vapors within the internal floating roof storage vessel. Install and operate a backpresssure regulator valve.
TK-12210	Off-Spec Diesel Tank	VOC	401 KAR 59:050(3)(2)		

Section V.2: Monitoring Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
EP-001	Cooling Tower	PM/PM10/PM2.5	N/A	N/A	N/A
EP-003	Relief Flare (FL-05001)	H2S	401 KAR 59:105(3)	N/A	N/A
EP-003	Relief Flare (FL-05001)	CO	401 KAR 59.105(5)	N/A	N/A
EP-003	Relief Flare (FL-05001)	Opacity	401 KAR 63.015	Opacity	VE Observation
EP-004	Tank Farm Flare (FL-00502)	H2S	401 KAR 59:105(3)	N/A	N/A
EP-004	Tank Farm Flare (FL-00502)	CO	401 KAR 59.105(5)	N/A	N/A
EP-004	Tank Farm Flare (FL-00502)	Opacity	401 KAR 63.015	Opacity	VE Observation

Section V.2: Monitoring Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
EP-005	Pnuematic Unloading into Silo	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-006/EP-007	Transfer from Silo to Feed Hopper	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-009/EP-010	Transfer from Silo to Feed Hopper	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-012/EP-012	Transfer from Feed Hopper to Slurry Tank	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-014/EP-015	Transfer from Feed Hopper to Slurry Tank	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A

Section V.2: Monitoring Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Monitored	Description of Monitoring
R-20001/R-20002	Pyrolysis Reaction	H2S	401 KAR 59:105(3)	N/A	N/A
R-20001/R-20002	Pyrolysis Reaction	CO	401 KAR 59.105(5)	N/A	N/A
R-20001/R-20002	Pyrolysis Reaction	HAPs/Toxic Substances	401 KAR 63:020	N/A	N/A
EP-003	Loading Rack	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-014/EP-015	Transfer from Feed Hopper to Slurry Tank	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
0	Fugitive Components	VOC	401 KAR 63:010(3)(3)	N/A	N/A
0	Fugitive Roadways	PM/PM10/PM2.5	401 KAR 63:010(3)(1), Fugitive Emissions	N/A	N/A

Section V.3: Recordkeeping Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Recorded	Description of Recordkeeping
TK-12003-A/B	Naphtha Product Day Tank A/B	VOC	401 KAR 59:050(3)(2)		
TK-12204	Naphtha Product Tank	VOC	40 CFR Part 60 Subpart Kc 401 KAR 59:050(3)(2)		Dimensions of tank showing storage capacity, record of VOL currently stored, inspection records, LEL monitoring event, make and model of the backpressure valve, date of installation and inlet rating. CMS Monitoring Plan. Leak records. VE observations.
TK-12205-A/B	Diesel Product Day Tank A/B	VOC	401 KAR 59:050(3)(2)		
TK-12006	Diesel Product Tank	VOC	401 KAR 59:050(3)(2)		
TK-12208	Residue Product Tank	VOC	401 KAR 59:050(3)(2)		
TK-12209	Off-Spec Naphtha Tank	VOC	40 CFR Part 60 Subpart Kc 401 KAR 59:050(3)(2)		Dimensions of tank showing storage capacity, record of VOL currently stored, inspection records, LEL monitoring event, make and model of the backpressure valve, date of installation and inlet rating. CMS Monitoring Plan. Leak records. VE observations.
TK-12210	Off-Spec Diesel Tank	VOC	401 KAR 59:050(3)(2)		

Section V.3: Recordkeeping Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Recorded	Description of Recordkeeping
EP-001	Cooling Tower	PM/PM10/PM2.5	N/A	N/A	N/A
EP-003	Relief Flare (FL-05001)	H2S	401 KAR 59:105(3)	H2S Content	Fuel Record
EP-003	Relief Flare (FL-05001)	CO	401 KAR 59.105(5)	CO Content	Fuel Record
EP-003	Relief Flare (FL-05001)	Opacity	401 KAR 63.015	N/A	N/A
EP-004	Tank Farm Flare (FL-00502)	H2S	401 KAR 59:105(3)	H2S Content	Fuel Record
EP-004	Tank Farm Flare (FL-00502)	CO	401 KAR 59.105(5)	CO Content	Fuel Record
EP-004	Tank Farm Flare (FL-00502)	Opacity	401 KAR 63.015	N/A	N/A

Section V.3: Recordkeeping Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Recorded	Description of Recordkeeping
EP-005	Pnuematic Unloading into Silo	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-006/EP-007	Transfer from Silo to Feed Hopper	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-009/EP-010	Transfer from Silo to Feed Hopper	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-012/EP-012	Transfer from Feed Hopper to Slurry Tank	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-014/EP-015	Transfer from Feed Hopper to Slurry Tank	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A

Section V.3: Recordkeeping Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Recorded	Description of Recordkeeping
R-20001/R-20002	Pyrolysis Reaction	H2S	401 KAR 59:105(3)	N/A	N/A
R-20001/R-20002	Pyrolysis Reaction	CO	401 KAR 59.105(5)	N/A	N/A
R-20001/R-20002	Pyrolysis Reaction	HAPs/Toxic Substances	401 KAR 63:020	N/A	N/A
EP-003	Loading Rack	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-014/EP-015	Transfer from Feed Hopper to Slurry Tank	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
0	Fugitive Components	VOC	401 KAR 63:010(3)(3)	N/A	N/A
0	Fugitive Roadways	PM/PM10/PM2.5	401 KAR 63:010(3)(1), Fugitive Emissions	N/A	N/A

Section V.4: Reporting Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Reported	Description of Reporting
TK-12003-A/B	Naphtha Product Day Tank A/B	VOC	401 KAR 59:050(3)(2)		
TK-12204	Naphtha Product Tank	VOC	40 CFR Part 60 Subpart Kc 401 KAR 59:050(3)(2)		Initial Notification Report, Notification for Gap Measurement Inspection, Notification for Filling and Refilling Tank, Semiannual Compliance Report
TK-12205-A/B	Diesel Product Day Tank A/B	VOC	401 KAR 59:050(3)(2)		
TK-12006	Diesel Product Tank	VOC	401 KAR 59:050(3)(2)		
TK-12208	Residue Product Tank	VOC	401 KAR 59:050(3)(2)		
TK-12209	Off-Spec Naphtha Tank	VOC	40 CFR Part 60 Subpart Kc 401 KAR 59:050(3)(2)		Initial Notification Report, Notification for Gap Measurement Inspection, Notification for Filling and Refilling Tank, Semiannual Compliance Report
TK-12210	Off-Spec Diesel Tank	VOC	401 KAR 59:050(3)(2)		

Section V.4: Reporting Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Reported	Description of Reporting
EP-001	Cooling Tower	PM/PM10/PM2.5	N/A	N/A	N/A
EP-003	Relief Flare (FL-05001)	H2S	401 KAR 59:105(3)	N/A	N/A
EP-003	Relief Flare (FL-05001)	CO	401 KAR 59.105(5)	N/A	N/A
EP-003	Relief Flare (FL-05001)	Opacity	401 KAR 63.015	N/A	N/A
EP-004	Tank Farm Flare (FL-00502)	H2S	401 KAR 59:105(3)	N/A	N/A
EP-004	Tank Farm Flare (FL-00502)	CO	401 KAR 59.105(5)	N/A	N/A
EP-004	Tank Farm Flare (FL-00502)	Opacity	401 KAR 63.015	N/A	N/A

Section V.4: Reporting Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Reported	Description of Reporting
EP-005	Pnuematic Unloading into Silo	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-006/EP-007	Transfer from Silo to Feed Hopper	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-009/EP-010	Transfer from Silo to Feed Hopper	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-012/EP-012	Transfer from Feed Hopper to Slurry Tank	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-014/EP-015	Transfer from Feed Hopper to Slurry Tank	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A

Section V.4: Reporting Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Reported	Description of Reporting
R-20001/R-20002	Pyrolysis Reaction	H2S	401 KAR 59:105(3)	N/A	N/A
R-20001/R-20002	Pyrolysis Reaction	CO	401 KAR 59.105(5)	N/A	N/A
R-20001/R-20002	Pyrolysis Reaction	HAPs/Toxic Substances	401 KAR 63:020	N/A	N/A
EP-003	Loading Rack	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-014/EP-015	Transfer from Feed Hopper to Slurry Tank	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
0	Fugitive Components	VOC	401 KAR 63:010(3)(3)	N/A	N/A
0	Fugitive Roadways	PM/PM10/PM2.5	401 KAR 63:010(3)(1), Fugitive Emissions	N/A	N/A

Section V.5: Testing Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Tested	Description of Testing
TK-12003-A/B	Naphtha Product Day Tank A/B	VOC	401 KAR 59:050(3)(2)		
TK-12204	Naphtha Product Tank	VOC	40 CFR Part 60 Subpart Kc 401 KAR 59:050(3)(2)	Visible Emissions	Internal Floating Roof LEL testing, Opacity observations, Flare instrument monitoring testing
TK-12205-A/B	Diesel Product Day Tank A/B	VOC	401 KAR 59:050(3)(2)		
TK-12006	Diesel Product Tank	VOC	401 KAR 59:050(3)(2)		
TK-12208	Residue Product Tank	VOC	401 KAR 59:050(3)(2)	Visible Emissions	Internal Floating Roof LEL testing, Opacity observations, Flare instrument monitoring testing
TK-12209	Off-Spec Naphtha Tank	VOC	40 CFR Part 60 Subpart Kc 401 KAR 59:050(3)(2)		
TK-12210	Off-Spec Diesel Tank	VOC	401 KAR 59:050(3)(2)		

Section V.5: Testing Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Tested	Description of Testing
EP-001	Cooling Tower	PM/PM10/PM2.5	N/A	N/A	N/A
EP-003	Relief Flare (FL-05001)	H2S	401 KAR 59:105(3)	N/A	N/A
EP-003	Relief Flare (FL-05001)	CO	401 KAR 59.105(5)	N/A	N/A
EP-003	Relief Flare (FL-05001)	Opacity	401 KAR 63.015	N/A	N/A
EP-004	Tank Farm Flare (FL-00502)	H2S	401 KAR 59:105(3)	N/A	N/A
EP-004	Tank Farm Flare (FL-00502)	CO	401 KAR 59.105(5)	N/A	N/A
EP-004	Tank Farm Flare (FL-00502)	Opacity	401 KAR 63.015	N/A	N/A

Section V.5: Testing Requirements

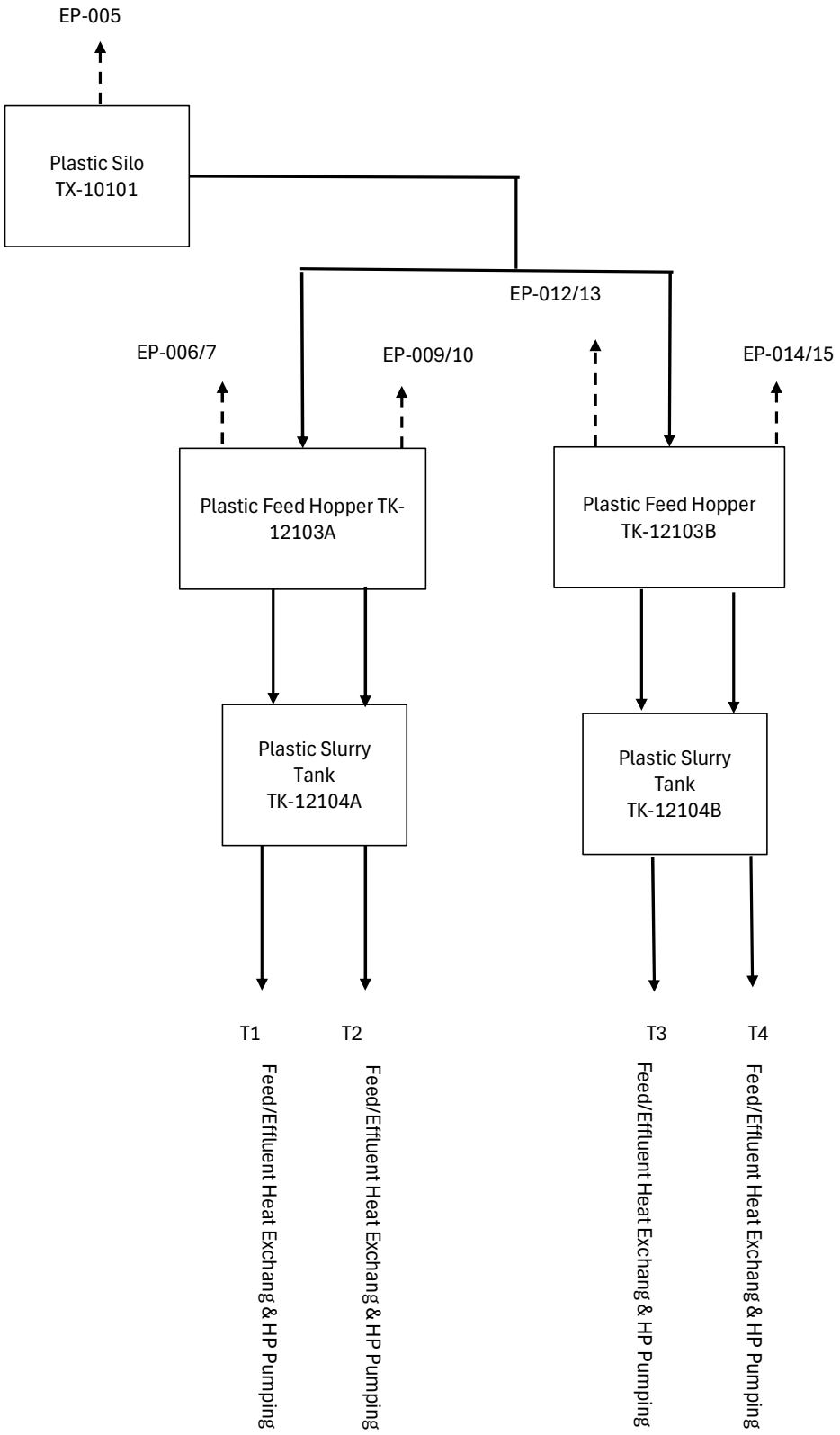
Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Tested	Description of Testing
EP-005	Pnuematic Unloading into Silo	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-006/EP-007	Transfer from Silo to Feed Hopper	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-009/EP-010	Transfer from Silo to Feed Hopper	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-012/EP-012	Transfer from Feed Hopper to Slurry Tank	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-014/EP-015	Transfer from Feed Hopper to Slurry Tank	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A

Section V.5: Testing Requirements

Emission Unit #	Emission Unit Description	Pollutant	Applicable Regulation or Requirement	Parameter Tested	Description of Testing
R-20001/R-20002	Pyrolysis Reaction	H2S	401 KAR 59:105(3)	N/A	N/A
R-20001/R-20002	Pyrolysis Reaction	CO	401 KAR 59.105(5)	N/A	N/A
R-20001/R-20002	Pyrolysis Reaction	HAPs/Toxic Substances	401 KAR 63:020	N/A	N/A
EP-003	Loading Rack	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
EP-014/EP-015	Transfer from Feed Hopper to Slurry Tank	PM/PM10/PM2.5	401 KAR 59:010(3)(3)(2),	N/A	N/A
0	Fugitive Components	VOC	401 KAR 63:010(3)(3)	N/A	N/A
0	Fugitive Roadways	PM/PM10/PM2.5	401 KAR 63:010(3)(1), Fugitive Emissions	N/A	N/A

Section V.6: Notes, Comments, and Explanations

Material Handling Process Flow



Title Page

Product:
Process:
Process Cycle Time: 366 days
Final Product Amount: 59848961 gal
Evaluation Date: 7/12/2024
File Name: C:\Users\austin.lindsey\Documents\Projects 2024\Chemex Tanks\Chemex Storage Tanks.emm
Connected Database: C:\Users\austin.lindsey\Documents\Projects 2024\Chemex Tanks\Emaster
Calculation type: MACT98
Condenser Calc. type: Single Stage
Charge Calc. type: Initial Composition
Material Balance: No Emissions Subtracted
Last Saved User: austin.lindsey
Last Saved Time: 8:22:15 AM, 7/15/2024
Comment:

Defined Activities

1) [Storage] TK-12203
2) [Storage] TK-12205
3) [Storage] TK-12208
4) [Storage] TK-12209
5) [Storage] TK-12210
6) [Storage] TK-12206
7) [Storage] TK-12204

1: Storage Tank Activity

Title: TK-12203
Start Date: 1/1/2024
End Date: 12/31/2024
Elapsed Time: 366.0 days
Vent ID:
Noncondensable: Air @ 0 scfh Saturation: 100% Pressure: 748.1088 mmHg
Using Monthly Avg. Temp.
Location: Kentucky, Paducah Volume Throughput: 5241035 gal
Crude Oil Factor-Kc: 1

Vessel Name: TK-12203-A
Void Vol.: 15,924.76 gal Work Vol.: 12,739.8 gal
No Control Devices

Final Contents 12739.8 gal 78675.8587 lb 4.47 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mmHg)	W[i]	X[i]	A[i]	X*Vp*A (mmHg)
Naptha - Petroleum	78675.8587	4.8599	1.0	1.0	1	4.8599

Emissions From last Vessel: TK-12203-A

[Non Condensables]	Effective Vp (mmHg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
Air	743.2734	452.6636	13113.6638	1.4929

[Condensables]	(mmHg)	(lb-mole)	(lb)	(lb/hr)
Naptha - Petroleum	4.8355	2.9449	253.2589	0.0288

2: Storage Tank Activity

Title: TK-12205
Start Date: 1/1/2024
End Date: 12/31/2024
Elapsed Time: 366.0 days
Vent ID:
Noncondensable: Air @ 0 scfh Saturation: 100% Pressure: 748.1088 mmHg
Using Monthly Avg. Temp.
Location: Kentucky, Paducah Volume Throughput: 18031730 gal
Crude Oil Factor-Kc: 1

Vessel Name: TK-12205-A
Void Vol.: 79,737.29 gal Work Vol.: 63,789.8 gal
No Control Devices

Final Contents 63789.8 gal 452498.6918 lb 4.47 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mmHg)	W[i]	X[i]	A[i]	X*Vp*A (mmHg)
Diesel Fuel	452498.6918	3.2343	1.0	1.0	1	3.2343

Emissions From last Vessel: TK-12205-A

[Non Condensables]	Effective Vp (mmHg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
Air	741.05	1798.6564	52107.0758	5.932

[Condensables]	(mmHg)	(lb-mole)	(lb)	(lb/hr)
Diesel Fuel	7.0588	17.133	2227.2877	0.2536

3: Storage Tank Activity

Title: TK-12208
Start Date: 1/1/2024
End Date: 12/31/2024
Elapsed Time: 366.0 days
Vent ID:
Noncondensable: Air @ 0 scfh Saturation: 100% Pressure: 748.1088 mmHg
Using Monthly Avg. Temp.
Location: Kentucky, Paducah Volume Throughput: 1.3102405e7 gal
Crude Oil Factor-Kc: 1

Vessel Name: TK-12208
Void Vol.: 572,482.66 gal Work Vol.: 457,989.4 gal
No Control Devices

Final Contents 457989.4 gal 3248789 lb 4.47 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mmHg)	W[i]	X[i]	A[i]	X*Vp*A (mmHg)
Fuel Oil	3248789	0.1608	1.0	1.0	1	0.1608

Emissions From last Vessel: TK-12208

[Non Condensables]	Effective Vp (mmHg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
Air	747.6909	5003.7437	144958.4548	16.5026

[Condensables]	(mmHg)	(lb-mole)	(lb)	(lb/hr)
Fuel Oil	0.418	2.7972	499.5859	0.0569

4: Storage Tank Activity

Title: TK-12209
Start Date: 1/1/2024
End Date: 12/31/2024
Elapsed Time: 366.0 days
Vent ID:
Noncondensable: Air @ 0 scfh Saturation: 100% Pressure: 748.1088 mmHg
Using Monthly Avg. Temp.
Location: Kentucky, Paducah Volume Throughput: 100513 gal
Crude Oil Factor-Kc: 1

Vessel Name: TK-12209
Void Vol.: 37,600 gal Work Vol.:
No Control Devices

Final Contents 30080 gal 185761.9295 lb 121.11 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mmHg)	W[i]	X[i]	A[i]	X*Vp*A (mmHg)
Naptha - Petroleum	185761.9295	259.6209	1.0	1.0	1	259.6209

Emissions From last Vessel: TK-12209

[Non Condensables]	Effective Vp (mmHg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
[Condensables]	(mmHg)	(lb-mole)	(lb)	(lb/hr)
Naptha - Petroleum	4.8599	1.4551	125.1394	0.0142

5: Storage Tank Activity

Title: TK-12210
Start Date: 1/1/2024
End Date: 12/31/2024
Elapsed Time: 366.0 days
Vent ID:
Noncondensable: Air @ 0 scfh Saturation: 100% Pressure: 748.1088 mmHg
Using Monthly Avg. Temp.
Location: Kentucky, Paducah Volume Throughput: 100513 gal
Crude Oil Factor-Kc: 1

Vessel Name: TK-12210
Void Vol.: 206,006.31 gal Work Vol.: 164,805 gal
No Control Devices

Final Contents 164805.0 gal 1169059 lb 4.47 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mmHg)	W[i]	X[i]	A[i]	X*Vp*A (mmHg)
Diesel Fuel	1169059	3.2343	1.0	1.0	1	3.2343

Emissions From last Vessel: TK-12210

[Non Condensables]	Effective Vp (mmHg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
Air	740.7909	326.5621	9460.5043	1.077

[Condensables]	(mmHg)	(lb-mole)	(lb)	(lb/hr)
Diesel Fuel	7.318	3.226	419.377	0.0477

6: Storage Tank Activity

Title: TK-12206
Start Date: 1/1/2024
End Date: 12/31/2024
Elapsed Time: 366.0 days
Vent ID:
Noncondensable: Air @ 0 scfh Saturation: 100% Pressure: 748.1088 mmHg
Using Monthly Avg. Temp.
Location: Kentucky, Paducah Volume Throughput: 18031730 gal
Crude Oil Factor-Kc: 1

Vessel Name: TK-12206
Void Vol.: 769,635.98 gal Work Vol.: 615,708.78 gal
No Control Devices

Final Contents 615708 gal 4367580 lb 4.47 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mmHg)	W[i]	X[i]	A[i]	X*Vp*A (mmHg)
Diesel Fuel	4367580	3.2343	1.0	1.0	1	3.2343

Emissions From last Vessel: TK-12206

[Non Condensables]	Effective Vp (mmHg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
Air	741.0598	6871.4854	199066.9306	22.6624

[Condensables]	(mmHg)	(lb-mole)	(lb)	(lb/hr)
Diesel Fuel	7.0491	65.3625	8497.1188	0.9673

7: Storage Tank Activity

Title: TK-12204
Start Date: 1/1/2024
End Date: 12/31/2024
Elapsed Time: 366.0 days
Vent ID:
Noncondensable: Air @ 0 scfh Saturation: 100% Pressure: 748.1088 mmHg
Using Monthly Avg. Temp.
Location: Kentucky, Paducah Volume Throughput: 5241035 gal
Crude Oil Factor-Kc: 1

Vessel Name: TK-12204
Void Vol.: 37,600 gal Work Vol.:
No Control Devices

Final Contents 30080 gal 185761.9295 lb 121.11 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mmHg)	W[i]	X[i]	A[i]	X*Vp*A (mmHg)
Naptha - Petroleum	185761.9295	259.6209	1.0	1.0	1	259.6209

Emissions From last Vessel: TK-12204

[Non Condensables]	Effective Vp (mmHg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
[Condensables]	(mmHg)	(lb-mole)	(lb)	(lb/hr)
Naptha - Petroleum	4.8599	63.6152	5470.9032	0.6228

Summary Page

Emissions for (Unspecified Vent):

	CAS	Avg. Rate	Max. Rate	Total Weight
Air	132259-10-0	47.667 lb/hr	22.6624 lb/hr	418706.6293 lb
Diesel Fuel	68334-30-5	1.2686 lb/hr	0.9673 lb/hr	11143.7834 lb
Fuel Oil	-	0.0569 lb/hr	0.0569 lb/hr	499.5859 lb
Naptha - Petroleum	8030-30-6	0.6659 lb/hr	0.6228 lb/hr	5849.3015 lb

Total emissions for all vents:

	CAS	Avg. Rate	Max. Rate	Total Weight
Air	132259-10-0	47.667 lb/hr	22.6624 lb/hr	418706.6293 lb
Diesel Fuel	68334-30-5	1.2686 lb/hr	0.9673 lb/hr	11143.7834 lb
Fuel Oil	-	0.0569 lb/hr	0.0569 lb/hr	499.5859 lb
Naptha - Petroleum	8030-30-6	0.6659 lb/hr	0.6228 lb/hr	5849.3015 lb

Division for Air Quality

300 Sower Boulevard

Frankfort, KY 40601

(502) 564-3999

DEP7007GG

Control Equipment

Additional Documentation

___ Complete Sections GG.1 through GG.12, as applicable

___ Attach manufacturer's specifications for each control device

___ Complete DEP7007AI

Source Name: _____

KY EIS (AFS) #: **21-** _____

Permit #: _____

Agency Interest (AI) ID: _____

Date: _____

Section GG.1: General Information - Control Equipment

Control Device ID #	Control Device Name	Cost	Manufacturer	Model Name/ Serial #	Date Installed	Inlet Gas Stream Data For All Control Devices					Inlet Gas Stream Data For Condensers, Adsorbers, Afterburners, Incinerators, Oxidizers Only			Equipment Operational Data For All Control Devices		
						Temperature (°F)	Flowrate (scfm @ 68°F)	Average Particle Diameter (μm)	Particle Density (lb/ft^3) or Specific Gravity	Gas Density (lb/ft^3)	Gas Moisture Content (%)	Gas Composition	Fan Type	Pressure Drop Range (in. H_2O)	Pollutants Collected/ Controlled	Pollutant Removal (%)
F-10101	Feedstock Silo Vent	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	PM/PM10/ PM2.5	95%
F-12103-A/B	Plast Feed Hopper Vent A/B	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	PM/PM10/ PM2.5	95%
R-20003	SCR	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	NOx	TBD
FL-05001	Relief Flare	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	VOC, HAPs	98%
FL-05002	Tank Farm Flare	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	VOC, HAPs	98%

Section GG.2: Flare Source Information

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Flare	Type of Flare (e.g. steam-assisted, air-assisted, nonassisted)	Process Gas Flowrate *(acfm)*	Net Heating Value of Stream(s) (Btu/scf)	Removal Efficiency *(%)*	Flare Rated Capacity *(MMBtu/hr)*
FL-05001	Tanks, Loading Operations, Process Upset (SSM, Process Upset, Maintenance)		0.95	1287	98%	0.07
FL-05002	Tanks		0.95	1287	98%	0.07

Section GG.3: Cyclone

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Cyclone	Identify Number of Cyclones: Single or Multiple	Identify Type: High-Efficiency, Conventional, or High-Throughput	Inlet Height *(ft)*	Inlet Width *(ft)*	Bottom Cone Height *(ft)*	Body Height *(ft)*	Body Diameter *(ft)*	Dust Outlet Tube Diameter *(ft)*	Gas Outlet Tube Diameter *(ft)*	Vortex Finder Height *(ft)*

Section GG.4: Electrostatic Precipitator (ESP)

Control Device ID #	Identify all Emission Units and Control Devices that Feed to ESP	Identify Type: Dry negative corona, Wet negative corona or Wet positive corona	Number of Stages	Number of Plates per Stage	Plate Spacing *(in)*	ESP Total Width *(ft)*	ESP Total Height *(ft)*	Collection Plate Height *(ft)*	Length of Collection Plate *(ft)*	Particle Migration (Drift) Velocity *(specify units)*	Particle Resistivity *(specify units)*	Primary and Secondary Voltage Across Plates *(volts)*	Primary and Secondary Current *(amperes)*

Section GG.5: Scrubber

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Scrubber	Identify Type of Scrubber: Venturi, Packed Bed, Spray Tower, or Other (specify)	For Venturi Scrubbers:	For Packed Bed Scrubbers:		For Spray Towers:		Identify Type of Flow: Concurrent, Countercurrent, or Crossflow	Length in Direction of Gas Flow *(ft)*	Cross-Sectional Area *(ft^2)*	Venturi Throat Velocity *(ft/s)*	Mist Eliminator			Scrubbing Liquid			
			Identify Throat Type: Fixed or Adjustable	Identify Packing Type	Packing Height *(in)*	Number of Nozzles	Nozzle Pressure *(psig)*					Identify Type: Mesh or Vane	Cross-Sectional Area *(ft^2)*	Pressure Drop *(in. H_2O)*	Chemical Composition	Flowrate *(gal/min)*	Fresh Liquid Makeup Rate *(gal/min)*	Describe Disposal Method of Scrubber Effluent

Section GG.6: Filter

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Filter	Identify Type of Filter Unit: Baghouse, Cartridge Collector, or Other (specify)	Identify Type of Filtering Material: Fabric, Paper, Synthetic, or Other (specify)	Total Filter Area (ft^2)	Effective Air-to-Filter Ratio ($acfm/ft^2$)	Continuous Monitoring Instrumentation (e.g. COMS, BLDS, none)	Additional Materials Introduced into the Control System (e.g. lime, carbon)		Identify Cleaning Method: Shaker, Pulse Air, Reverse Air, Pulse Jet, or Other (specify)	Identify Gas Cooling Method: Ductwork, Heat Exchanger, Bleed-in Air, Water Spray, or Other (specify)	For Ductwork:		For Bleed-in Air:	For Water Spray:
							Material	Injection Rate (lb/hr)			Length (ft)	Diameter (ft)	Flowrate (scfm @ 68°F)	Flowrate (gal/min)
F-10101	Feedstock Silo	Bin Vent Filter	TBD	TBD	TBD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
F-12103-A/B	Plast Feed Hopper A/B	Ben Vent Filter	TBD	TBD	TBD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Section GG.7: Afterburner/Incinerator/Oxidizer

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Afterburner/Incinerator/ Oxidizer	Identify Type: Afterburner, Incinerator, Oxidizer, or Other (specify)	Number of Burners	Burner Rating *(BTU/hr)*	Dimensions of Combustion Chamber *(specify units)*	Residence Time *(sec)*	Combustion Chamber Temperature *(° F)*	Type of Catalyst (if applicable)	Type of Heat Exchanger (if applicable)	Auxiliary Fuel							Composition and Quantities of Combusted Waste
										Identify Fuel Type	Higher Heating Value *(MMBtu/scf)*	Hourly Fuel Usage *(scf/hr)*	% Sulfur (Maximum)	% Sulfur (Average)	% Ash (Maximum)	% Ash (Average)	
N/A																	

Section GG.8: Adsorber

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Adsorber	Identify Adsorbate	Identify Adsorbent: Activated carbon, Activated alumina, Silica Gel, Synthetic Polymers, Zeolite, or Other (specify)	Dimensions of Each Bed				Type of Regeneration: Replacement, Steam, or Other (specify)	Regeneration Time *(minutes)*	Method of Regeneration: Alternate Use of Beds, Source Shutdown, or Other (specify)	Time On-line Before Regeneration *(minutes)*
				Thickness in Direction of Gas Flow *(in)*	Cross-Sectional Area *(in^2)*	Weight of Adsorbent per Bed *(lb)*	Number of Beds				
N/A											

Section GG.9: Condenser

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Condenser	Identify Type of Condenser: Spray Tower, Jet Ejector, Barometric, Single-Pass Shell-and-Tube, or Multi-Pass Shell-and-Tube (if multi-pass, indicate number of passes)	Identify Type of Coolant: Water, Brine, Liquid Nitrogen, CFC/HFC, or Other (specify)	Coolant Temperature		Coolant Liquid Flowrate *(gpm)*	Coolant Gas Flowrate *(scfm @ 68 °F)*	Condensing Surface Area *(specify units)*	Outlet Gas Temperature *(°F)*	Outlet Gas Composition
				Inlet *(°F)*	Outlet *(°F)*					
N/A										

Section GG.10: Selective Catalytic Reduction (SCR) / Selective Non-catalytic Reduction (SNCR)

Control Device ID #	Identify all Emission Units and Control Devices that Feed to SCR/SNCR	Type (SCR/SNCR)	Gas Composition	Injection Grid Design (e.g. honeycomb)	Design Temperature Range		Reagent			Maximum Design Ammonia Slip *(ppm)*	SCR Only			
											Catalyst			
					Min *(°F)*	Max *(°F)*	Type	Injection Rate			Composition	Volume *(ft^3)*	Weight *(lb)*	Replacement Schedule
								Min *(lb/hr)*	Max *(lb/hr)*					
R-20003	Hot Oil System	SCR	See Process Gas Composition from Emission Calcs	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Section GG.11: Other Control Equipment

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Control Equipment	**Type of Control Equipment** (provide description and a diagram with dimensions)

Section GG.12: Notes, Comments, and Explanations

ANDY BESHEAR
GOVERNOR

REBECCA W. GOODMAN
SECRETARY

ANTHONY R. HATTON
COMMISSIONER

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601
TELEPHONE: 502-564-2150
TELEFAX: 502-564-4245

March 28, 2025

Mr. Robert Downey,
President
Green Mountain Energy
4406 Salt Spring Drive,
Ferndale, WA 98248

RE: Request for State-Origin, Construction/Operating Permit for a Products of Petroleum and Coal, N.E.C. Facility
Permittee Name: Green Mountain Energy
Source ID: 21-145-00157
Agency Interest: 184811
Activity: APE20240001

Mr. Downey,

The Division for Air Quality requires additional information in order to process the above referenced application for permitting determination.

1. The Division has determined that the pyrolysis reaction process is an emission unit with emissions (process gas) that are being controlled by various means (relief flare, burning in process heaters). Uncontrolled PTE, used to determine permit type, should be calculated assuming all process gas is emitted directly to the atmosphere, unless there is a requirement to control. Using the VOC content provided on page 14/80 of the application and the amount of process gas combusted in the heaters and relief flare, results in an uncontrolled VOC PTE as shown below. $Uncontrolled\ VOC = 5{,}485.8\ \frac{lb\ VOC}{MMscf} * \left(108.2\ \frac{MMscf}{year} + \left(0.5198\ \frac{MMscf}{hr} * 26\ \frac{hr}{year}\right)\right) * \frac{1\ ton}{2000\ lb} \approx 334\ TPY$
   Please calculate uncontrolled emissions of all pollutants from the pyrolysis reaction process, prior to being sent to the heaters or relief flare.

2. As shown above, uncontrolled VOC PTE potentially exceeds the 100 TPY threshold of a criteria pollutant allowed by 401 KAR 52:040 State origin permits and the 250 TPY threshold under the Prevention of Significant Deterioration program. The Division

therefore recommends the source to apply for a permit under 401 KAR 52:030 Federally enforceable permits for nonmajor sources, requesting voluntary emissions limitations to preclude the applicability of 401 KAR 52:020 Title V permits and 401 KAR 51:017 Prevention of significant deterioration of air quality by limiting emissions to less than or equal to 90 TPY. Which may be accomplished by requiring all process gas be combusted in BUR-20002 & H-20002 except during non-routine emission events when it will be combusted by the relief flare.

3. In the email received on 3/12/25, sent by Holly Argiris, it was stated "The only emissions from the pyrolysis reactors are from non-routine emission events (startup/shutdown, upset, and maintenance events) and fugitive losses from leaks". Additionally, it was stated "there is an SCR controlling emissions from the Secondary Reactor". A few questions concerning the SCR:
    a. Is the SCR only operational during non-routine emission events or will the Secondary Reactor be venting to the SCR at all times?
    b. Is the SCR directly controlling emissions from the secondary reactor or NOx emissions from the combustion of the process gas in BUR-20002 & H-20002?

4. The Division has determined that uncontrolled NOx emissions from combusting process gas should be calculated with respect to the nitrogen content of the fuel, and that using emission factors from AP-42 Chapter 1.4 for natural gas combustion is not appropriate for a fuel with such high nitrogen content. Page 14/80 of the application shows the gas stream has a nitrogen content of 3.74% which could potentially result in significant formation of fuel-bound NOx when the process gas is combusted in BUR-20002 & H-20002 or the relief flare. Please provide an updated emission factor and justification and provide updated calculations for the uncontrolled NOx emissions from the combustion of process gas in BUR-20002 & H-20002 and the relief flare.

5. Please provide an SDS or laboratory analysis to show the composition of each product manufactured and stored at the facility (Naphtha, Diesel, Residue Product, Off-spec Diesel, Off-spec Naphtha).

6. Please provide stack information for all units, so that the Division can perform Air Toxics Modeling to determine compliance with 401 KAR 63:020, Potentially hazardous matter or toxic substances.

7. Please provide a complete DEP 7007GG form listing all the control devices utilized by the facility including the vent scrubber. What pollutants are being controlled by the vent scrubber, and is the process gas being scrubbed prior to being combusted?

8. Are BUR-20002 & H-20002 boilers that will be subject to 401 KAR 59:015 New indirect heat exchangers and 40 CFR 60 Subpart Dc? Additionally, please confirm that the only Burners/Heaters on site are those associated with the Secondary Reactor (equipment IDs: BUR-20002 & H-20002).

9. The PFD makes note of EP-0008, EP-0011, and EP-0016, but no additional information is provided in the application. Do these EPs have emissions that need to be accounted for? Similarly, there is no mention of EP-0002 in the application or PFD.

10. Please provide emission calculations for EP-0017 Barge Loadout and confirm that diesel is the only product that can be loaded by barge.

11. The Division notes that both tanks (Tank 12204 (Naphtha Product Tank) and Tank 12209 (Off-Spec Naphtha Tank)) subject to 40 CFR 60 Subpart Kc have an internal floating roof and are controlled by the tank farm flare (EP-004). Which part of the design was selected to comply with 40 CFR 60, Subpart Kc [60.112c]?

12. Notes 5 and 6 (page 19/80) for emission factors of VOC NOx and CO for the relief flare are missing. Please provide those notes along with any additional information on how the emission factors were derived.

13. Page 19/80 of the application shows that the relief flare is controlling the same gas stream for the startup and shutdown process and maintenance process. Why are the hourly emissions double for the startup and shutdown process? Additionally, please confirm the relief flare is only used during non-routine events and the tank farm flare is used to control emissions from product storage and product loading.

14. When using AP-42 Chapter 1.4 emission factors to calculate the PTE from combusting process gas in BUR-20002 and H-20002 please adjust the emission factor to account for the increased heating value of the process gas by multiplying the AP-42 emission factor by the ratio between the site-specific heating value to the average heating value.

We request that you submit the information as soon as possible, but no later than April 11, 2025.

Please submit your response to Dakota Ross via the Permit Review Branch eForms portal. The portal can be accessed from https://dep.gateway.ky.gov/eForms/Main/Dashboard.aspx. If additional questions arise as the review proceeds, we will contact you. If you have questions regarding this request, please contact Johnson Luma at (502) 782-1751 or by email at Johnson.Luma@ky.gov.

Sincerely,

Recoverable Signature

Zachary Bittner, P.E.
Permit Review Branch Manager
Division for Air Quality

Signed by: Zachary Bittner

Outlook

Green Mountain NOx calculations

From Ross, Dakota D (EEC) <dakota.ross@ky.gov>

Date Tue 4/1/2025 9:42 AM

To Bob Downey <bob@newrangepower.com>; Holly Argiris <Holly.Argiris@erm.com>; Jeff Twaddle <Jeff.Twaddle@erm.com>

Cc Patil, Durga D (EEC) <Durga.Patil@ky.gov>; Luma, Johnson (EEC) <johnson.luma@ky.gov>; Bittner, Zachary P (EEC) <Zachary.Bittner@ky.gov>

1 attachment (81 KB)

Green Mountain NOx Calculations Final.pdf;

Good morning,

Attached are the preliminary NOx calculations performed by the Division.

Thanks,

Dakota Ross, P.E.
Environmental Engineer Supervisor
Chemical Section
Division for Air Quality
300 Sower Blvd
Frankfort, KY 40601
(502) 782 - 6479

Process gas stream as provided (Page 14/80)		
Constituent	Composition Wt%	Lb/MMscf
Nitrogen	3.74%	???
VOC	9.14%	5485.8

Total Gas Stream weight= $\frac{5485.8\frac{lb}{MMScf}}{9.14\%} = 60{,}020\frac{lb}{MMScf}$

Nitrogen lb/MMscf = $60{,}020\ \frac{lb}{MMScf} * 3.74\% = 2{,}244.7\ \frac{lb\ N_2}{MMScf}$

AP-42 1.4.3, Emissions - Nitrogen Oxides, states: "Due to the characteristically low fuel nitrogen content of natural gas, NOx formation through the fuel NOx mechanism is insignificant."

Assume no fuel bound NOx is accounted for in the 100 lb/MMScf EF of AP-42 Table 1.4-1 and the EF only accounts for thermal and prompt NOx from a gas fired boiler.

Assume 100% of nitrogen content in the fuel is converted to NOx:

Assume 90% of NOx is NO

Assume 10% is NO2

$$2{,}244.7\ \frac{lb\ N_2}{MMScf} * \left(90\%\ NO * \frac{30\ MW\ NO}{28\ \ MW\ N_2} + 10\%\ NO_2 * \frac{46\ MW\ NO_2}{28\ MW\ N_2}\right) = 2{,}533.3\frac{lb\ NO_X}{MMScf}$$

Adding back on thermal and prompt NOx we get an emission factor of:

$$2{,}533.3\frac{lb\ NO_X}{MMScf} + 100\frac{lb\ NO_X}{MMScf} = 2{,}633.3\ \frac{lb\ NO_X}{MMScf}$$

Uncontrolled PTE from the process heaters:

$$2{,}633.3\ \frac{lb\ NO_X}{MMscf} * 108.2\frac{MMscf}{year} * \frac{1\ ton}{2000\ lb} = 142.46\frac{tons\ NO_X}{year}$$

1. The Division has determined that the pyrolysis reaction process is an emission unit with emissions (process gas) that are being controlled by various means (relief flare, burning in process heaters). Uncontrolled PTE, used to determine permit type, should be calculated assuming all process gas is emitted directly to the atmosphere, unless there is a requirement to control. Using the VOC content provided on page 14/80 of the application and the amount of process gas combusted in the heaters and relief flare, results in an uncontrolled VOC PTE as shown below. $Uncontrolled\ VOC = 5{,}485.8\ \frac{lb\ VOC}{MMscf} * (108.2\ \frac{MMscf}{year} + (0.5198 \frac{MMscf}{hr} * 26\ \frac{h}{year})) * \frac{1\ ton}{2000\ lb} \approx 334\ TPY$

Please calculate uncontrolled emissions of all pollutants from the pyrolysis reaction process, prior to being sent to the heaters or relief flare.

The only pollutant from the pyrolysis reaction that is controlled is VOCs.

The uncontrolled VOC emissions would be equated as follows:

5,486 lb VOC/MMscf x 108.2 MMscf/yr x 1 ton/2000 lbs = 296.72 tons/yr

If it is assumed that all emissions from the reaction are uncontrolled, the emissions that were added from the relief flare (0.5198 MMscf/hr x 26 hrs) into the emission calculations you provided would not be added to the total emissions because all emissions were assumed to be emitted from the reactor.

2. As shown above, uncontrolled VOC PTE potentially exceeds the 100 TPY threshold of a criteria pollutant allowed by 401 KAR 52:040 State origin permits and the 250 TPY threshold under the Prevention of Significant Deterioration program. The Division therefore recommends the source to apply for a permit under 401 KAR 52:030 Federally enforceable permits for nonmajor sources, requesting voluntary emissions limitations to preclude the applicability of 401 KAR 52:020 Title V permits and 401 KAR 51:017 Prevention of significant deterioration of air quality by limiting emissions to less than or equal to 90 TPY. Which may be accomplished by requiring all process gas be combusted in BUR-20002 & H-20002 except during non-routine emission events when it will be combusted by the relief flare.

   We do not agree that the uncontrolled, potential emissions are greater than 100 tons per year because the pyrolysis reaction process is not designed to exhaust during normal operation. The process gas generated from the pyrolysis reactors are combusted in the process heaters during normal operation. However, to keep the permitting process progressing. Green Mountain agrees to a permit condition that would require all process gases be combusted in BUR-20002 & H-20002 except during routine emission events when it will be combusted by the relief flare.

3. In the email received on 3/12/25, sent by Holly Argiris, it was stated “The only emissions from the pyrolysis reactors are from non-routine emission events (startup/shutdown, upset, and maintenance events) and fugitive losses from leaks”. Additionally, it was stated “there is an SCR controlling emissions from the Secondary Reactor”. A few questions concerning the SCR:
   a. Is the SCR only operational during non-routine emission events or will the Secondary Reactor be venting to the SCR at all times?

      The Secondary Reactor will vent to the SCR during all times.

   b. Is the SCR directly controlling emissions from the secondary reactor or NOx emissions from the combustion of the process gas in BUR-20002 & H-20002?

      The SCR is controlling emissions from the combustion of the process gas in BUR-20002 & H-20002. The secondary reactor uses fuel gas and natural gas as

fuel and is treated by the SCR.

4. The Division has determined that uncontrolled NOx emissions from combusting process gas should be calculated with respect to the nitrogen content of the fuel, and that using emission factors from AP-42 Chapter 1.4 for natural gas combustion is not appropriate for a fuel with such high nitrogen content. Page 14/80 of the application shows the gas stream has a nitrogen content of 3.74% which could potentially result in significant formation of fuel-bound NOx when the process gas is combusted in BUR-20002 & H-20002 or the relief flare. Please provide an updated emission factor and justification and provide updated calculations for the uncontrolled NOx emissions from the combustion of process gas in BUR-20002 & H-20002 and the relief flare.

   We do not agree that the uncontrolled, potential emissions are greater than 100 tons per year because the pyrolysis reaction process is not designed to exhaust during normal operation. However, to keep the permitting process progressing, Green Mountain agrees to a permit condition that would require all process gases be controlled by SCR to keep NOx emissions less than 100 tpy. There will be analytical data soon to validate the NOx emissions from the reaction, but in the interim, Green Mountain agrees to use the NOx emission calculations provided by KDEP.

5. Please provide an SDS or laboratory analysis to show the composition of each product manufactured and stored at the facility (Naphtha, Diesel, Residue Product, Off-spec Diesel, Off-spec Naphtha).

   Final SDSs will be available in the next few weeks. These will be provided as soon as they are available.

   The following is the gas analysis done on the process gas:

Methane	74.98%
Ethene	10.46%
Ethyne	0.05%
Ethane	3.93%
Propene	5.33%
Propane	0.51%
Propadiene	0.02%
Iso-Butane	0.06%
Iso-Butene	0.65%
1-Butene	0.67%
Butadiene	0.97%
n-Butane	0.10%

cis-2-Butene	0.36%
trans-2-Butene	0.19%
Iso-Pentane	0.05%
1-Pentene	0.22%
2-Methyl-2-Butene	0.13%
n-Pentane	0.41%
cis-2-Pentene	0.48%
n-Hexane	0.44%

6. Please provide stack information for all units, so that the Division can perform Air Toxics Modeling to determine compliance with 401 KAR 63:020, Potentially hazardous matter or toxic substances.

   This information is still pending.

7. Please provide a complete DEP 7007GG form listing all the control devices utilized by the facility including the vent scrubber. What pollutants are being controlled by the vent scrubber, and is the process gas being scrubbed prior to being combusted?

   Form DEP 7007GG was previously submitted. All control devices, including the SCR (R-20003) were included in the form. The form is attached for your reference. Process gas is not being scrubbed prior to being combusted.

8. Are BUR-20002 & H-20002 boilers that will be subject to 401 KAR 59:015 New indirect heat exchangers and 40 CFR 60 Subpart Dc? Additionally, please confirm that the only Burners/Heaters on site are those associated with the Secondary Reactor (equipment IDs: BUR-20002 & H-20002).

   BUR-20002 is not subject to 40 CFR Part 60 Subpart Dc because its heat input capacity is less than 10 MMBtu/hr. It is the only unit that is a burner.

   H-20002 is a heat exchanger separate from the burner; therefore, it is not subject to 40 CFR Part 60 Subpart Dc.

9. The PFD makes note of EP-0008, EP-0011, and EP-0016, but no additional information is provided in the application. Do these EPs have emissions that need to be accounted for? Similarly, there is no mention of EP-0002 in the application or PFD.

   EP-0002 is the emission point associated with the wastewater treatment plant. This is a vent for the oily water system. No emissions are expected from this vent.

   EP-0008, EP-0011, EP-0014, and EP-0017 are emission points from the flue gas stack to the atmosphere.

EP-016 is an emission point from Train #4: Transfer from TK-12103-A/B to Plastic Slurry Tank (TK-12104-A/B).

10. Please provide emission calculations for EP-0017 Barge Loadout and confirm that diesel is the only product that can be loaded by barge.

    The following table summarizes the emissions from the Barge Loadout:

Emission Point	Product	Annual Throughput (gal/day)	Annual Throughput (gal/yr)	M (g/g-mol)	P (psia)	L_L	VOC PTE (tons/yr)
EP-0017 (Barge Loadout)	Diesel	25500	9,307,500	130	1.15E-02	1.73E-02	0.08

    The updated emission calculations are attached for your review. Please note that the Barge Loadout is based on the assumption that all potential product produced would be loaded out via barge. The only material that is planned for barge loadout is diesel and it will not be controlled by a flare.

    The emissions summary provided with the application presented the worst-case scenario of assuming that all potential product produced would be naphtha loaded out via splash loading into a clean tank. This remains true as the potential emissions from loading out naphtha are 53.77 tons/yr, uncontrolled, and 1.08 tons/yr, controlled. This is greater than the potential uncontrolled emissions from barge loadout of diesel at 0.23 tons/yr.

11. The Division notes that both tanks (Tank 12204 (Naphtha Product Tank) and Tank 12209 (Off-Spec Naphtha Tank)) subject to 40 CFR 60 Subpart Kc have an internal floating roof and are controlled by the tank farm flare (EP-004). Which part of the design was selected to comply with 40 CFR 60, Subpart Kc [60.112c]?

    Green Mountain Energy will use the internal floating roof to comply with 40 CFR Part 60 Subpart Kc.

12. Notes 5 and 6 (page 19/80) for emission factors of VOC NOx and CO for the relief flare are missing. Please provide those notes along with any additional information on how the emission factors were derived.

    The missing notes should read as follows:

    5.) Emission factor taken from Emission Inventory Improvement Program (EIIP), Vol. II, Chapter 14 (https://www.epa.gov/sites/default/files/2015-08/documents/ii14_july2001.pdf)

    6.) Emission factor taken from TCEQ guidance documents for low Btu. https://www.tcep.texas.gov/assets/public/comm_exec/pubs/ng/ng360/ng36011/appendix_a.pdf

13. Page 19/80 of the application shows that the relief flare is controlling the same gas stream for the startup and shutdown process and maintenance process. Why are the hourly emissions double for the startup and shutdown process? Additionally, please confirm the relief flare is only used during non-routine events and the tank farm flare is used to control emissions from product storage and product loading.

    The hourly emissions for the startup and shutdown emissions are the same as the flare maintenance hourly emissions. The annual emissions for startup and shutdown emissions are twice that of the flare maintenance emissions due to the estimated duration occurrence of the emits.

    The relief flare is used to control the non-routine events (startup/shutdown, process upset, and maintenance). The tank farm flare is used to control emissions from the tank farm, as well as non-routine emissions.

14. When using AP-42 Chapter 1.4 emission factors to calculate the PTE from combusting process gas in BUR-20002 and H-20002 please adjust the emission factor to account for the increased heating value of the process gas by multiplying the AP-42 emission factor by the ratio between the site-specific heating value to the average heating value.

    Emission calculations have been revised and included for your reference.

Division for Air Quality

300 Sower Boulevard

Frankfort, KY 40601

(502) 564-3999

DEP7007GG

Control Equipment

Additional Documentation

___ Complete Sections GG.1 through GG.12, as applicable

___ Attach manufacturer's specifications for each control device

___ Complete DEP7007AI

Source Name: _____

KY EIS (AFS) #: **21-** _____

Permit #: _____

Agency Interest (AI) ID: _____

Date: _____

Section GG.1: General Information - Control Equipment

Control Device ID #	Control Device Name	Cost	Manufacturer	Model Name/ Serial #	Date Installed	Inlet Gas Stream Data For All Control Devices					Inlet Gas Stream Data For Condensers, Adsorbers, Afterburners, Incinerators, Oxidizers Only			Equipment Operational Data For All Control Devices		
						Temperature (°F)	Flowrate (scfm @ 68°F)	Average Particle Diameter (μm)	Particle Density (lb/ft^3) or Specific Gravity	Gas Density (lb/ft^3)	Gas Moisture Content (%)	Gas Composition	Fan Type	Pressure Drop Range (in. H_2O)	Pollutants Collected/ Controlled	Pollutant Removal (%)
F-10101	Feedstock Silo Vent	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	PM/PM10/ PM2.5	95%
F-12103-A/B	Plast Feed Hopper Vent A/B	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	PM/PM10/ PM2.5	95%
R-20003	SCR	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	NOx	TBD
FL-05001	Relief Flare	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	VOC, HAPs	98%
FL-05002	Tank Farm Flare	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	VOC, HAPs	98%

Section GG.2: Flare Source Information

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Flare	Type of Flare (e.g. steam-assisted, air-assisted, nonassisted)	Process Gas Flowrate *(acfm)*	Net Heating Value of Stream(s) (Btu/scf)	Removal Efficiency *(%)*	Flare Rated Capacity *(MMBtu/hr)*
FL-05001	Tanks, Loading Operations, Process Upset (SSM, Process Upset, Maintenance)		0.95	1287	98%	0.07
FL-05002	Tanks		0.95	1287	98%	0.07

Section GG.3: Cyclone

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Cyclone	Identify Number of Cyclones: Single or Multiple	Identify Type: High-Efficiency, Conventional, or High-Throughput	Inlet Height *(ft)*	Inlet Width *(ft)*	Bottom Cone Height *(ft)*	Body Height *(ft)*	Body Diameter *(ft)*	Dust Outlet Tube Diameter *(ft)*	Gas Outlet Tube Diameter *(ft)*	Vortex Finder Height *(ft)*

Section GG.4: Electrostatic Precipitator (ESP)

Control Device ID #	Identify all Emission Units and Control Devices that Feed to ESP	Identify Type: Dry negative corona, Wet negative corona or Wet positive corona	Number of Stages	Number of Plates per Stage	Plate Spacing *(in)*	ESP Total Width *(ft)*	ESP Total Height *(ft)*	Collection Plate Height *(ft)*	Length of Collection Plate *(ft)*	Particle Migration (Drift) Velocity *(specify units)*	Particle Resistivity *(specify units)*	Primary and Secondary Voltage Across Plates *(volts)*	Primary and Secondary Current *(amperes)*

Section GG.5: Scrubber

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Scrubber	Identify Type of Scrubber: Venturi, Packed Bed, Spray Tower, or Other (specify)	For Venturi Scrubbers:	For Packed Bed Scrubbers:		For Spray Towers:		Identify Type of Flow: Concurrent, Countercurrent, or Crossflow	Length in Direction of Gas Flow *(ft)*	Cross-Sectional Area *(ft^2)*	Venturi Throat Velocity *(ft/s)*	Mist Eliminator			Scrubbing Liquid			
			Identify Throat Type: Fixed or Adjustable	Identify Packing Type	Packing Height *(in)*	Number of Nozzles	Nozzle Pressure *(psig)*					Identify Type: Mesh or Vane	Cross-Sectional Area *(ft^2)*	Pressure Drop *(in. H_2O)*	Chemical Composition	Flowrate *(gal/min)*	Fresh Liquid Makeup Rate *(gal/min)*	Describe Disposal Method of Scrubber Effluent

Section GG.6: Filter

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Filter	Identify Type of Filter Unit: Baghouse, Cartridge Collector, or Other (specify)	Identify Type of Filtering Material: Fabric, Paper, Synthetic, or Other (specify)	Total Filter Area (ft^2)	Effective Air-to-Filter Ratio ($acfm/ft^2$)	Continuous Monitoring Instrumentation (e.g. COMS, BLDS, none)	Additional Materials Introduced into the Control System (e.g. lime, carbon)		Identify Cleaning Method: Shaker, Pulse Air, Reverse Air, Pulse Jet, or Other (specify)	Identify Gas Cooling Method: Ductwork, Heat Exchanger, Bleed-in Air, Water Spray, or Other (specify)	For Ductwork:		For Bleed-in Air:	For Water Spray:
							Material	Injection Rate (lb/hr)			Length (ft)	Diameter (ft)	Flowrate (scfm @ 68°F)	Flowrate (gal/min)
F-10101	Feedstock Silo	Bin Vent Filter	TBD	TBD	TBD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
F-12103-A/B	Plast Feed Hopper A/B	Ben Vent Filter	TBD	TBD	TBD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Section GG.7: Afterburner/Incinerator/Oxidizer

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Afterburner/Incinerator/ Oxidizer	Identify Type: Afterburner, Incinerator, Oxidizer, or Other (specify)	Number of Burners	Burner Rating *(BTU/hr)*	Dimensions of Combustion Chamber *(specify units)*	Residence Time *(sec)*	Combustion Chamber Temperature *(° F)*	Type of Catalyst (if applicable)	Type of Heat Exchanger (if applicable)	Auxiliary Fuel							Composition and Quantities of Combusted Waste
										Identify Fuel Type	Higher Heating Value *(MMBtu/scf)*	Hourly Fuel Usage *(scf/hr)*	% Sulfur (Maximum)	% Sulfur (Average)	% Ash (Maximum)	% Ash (Average)	
N/A																	

Section GG.8: Adsorber

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Adsorber	Identify Adsorbate	Identify Adsorbent: Activated carbon, Activated alumina, Silica Gel, Synthetic Polymers, Zeolite, or Other (specify)	Dimensions of Each Bed				Type of Regeneration: Replacement, Steam, or Other (specify)	Regeneration Time *(minutes)*	Method of Regeneration: Alternate Use of Beds, Source Shutdown, or Other (specify)	Time On-line Before Regeneration *(minutes)*
				Thickness in Direction of Gas Flow *(in)*	Cross-Sectional Area *(in^2)*	Weight of Adsorbent per Bed *(lb)*	Number of Beds				
N/A											

Section GG.9: Condenser

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Condenser	Identify Type of Condenser: Spray Tower, Jet Ejector, Barometric, Single-Pass Shell-and-Tube, or Multi-Pass Shell-and-Tube (if multi-pass, indicate number of passes)	Identify Type of Coolant: Water, Brine, Liquid Nitrogen, CFC/HFC, or Other (specify)	Coolant Temperature		Coolant Liquid Flowrate *(gpm)*	Coolant Gas Flowrate *(scfm @ 68 °F)*	Condensing Surface Area *(specify units)*	Outlet Gas Temperature *(°F)*	Outlet Gas Composition
				Inlet *(°F)*	Outlet *(°F)*					
N/A										

Section GG.10: Selective Catalytic Reduction (SCR) / Selective Non-catalytic Reduction (SNCR)

Control Device ID #	Identify all Emission Units and Control Devices that Feed to SCR/SNCR	Type (SCR/SNCR)	Gas Composition	Injection Grid Design (e.g. honeycomb)	Design Temperature Range		Reagent			Maximum Design Ammonia Slip *(ppm)*	SCR Only			
											Catalyst			
					Min *(°F)*	Max *(°F)*	Type	Injection Rate			Composition	Volume *(ft^3)*	Weight *(lb)*	Replacement Schedule
								Min *(lb/hr)*	Max *(lb/hr)*					
R-20003	Hot Oil System	SCR	See Process Gas Composition from Emission Calcs	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Section GG.11: Other Control Equipment

Control Device ID #	Identify all Emission Units and Control Devices that Feed to Control Equipment	**Type of Control Equipment** (provide description and a diagram with dimensions)

Section GG.12: Notes, Comments, and Explanations

GREEN MOUNTAIN ENERGY, LLC

SAFETY DATA SHEET

Revision date 10/28/2024

1. IDENTIFICATION

Product Name	Synthetic Natural Gas
Synonym	SNG
Product code	002OCT024
Chemical family	
Recommended use	Fuel Gas
Restrictions on use	Non known
Manufacturer, Importer, or Responsible Party Name and Address	Green Mountain Energy 4460 Saltspring Dr Ferndale, WA 98248
SDS Information	1-304-579-0933 (M-F; 8-5 EST)
24 Hour Emergency Telephone	CHEMTREC: 1-800-424-9300 (CCN# 13740)

2. HAZARD IDENTIFICATION

Physical Hazards: Flammable Gas Category 1
Gases Under Pressure Compressed Gas Category 1

Health Hazards: Simple Asphyxiant

Label Elements:

Danger
Extremely flammable gas
Contains gas under pressure
may explode if heated
May displace oxygen and cause rapid suffocation

Appearance Clear Gas (Colorless) **Physical State** Gas **Odor** None

---

Precautionary Statements
Keep away from unintended heat
sparks, open flames and hot surfaces
No smoking
Leaking gas fire: Do not extinguish, unless leak can be stopped safely
Eliminate all ignition sources if safe to do so
Protect from sunlight
Store in a well-ventilated place.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Composition Information

Name	CAS Number	% Concentration
Methane	74-82-8	75-85
Ethane	74-84-0	11-15
Propane	74-98-6	5-7
I-Butane	75-28-5	<1
n-Butane	106-97-8	1-2
Carbon Dioxide	124-38-9	<0.5
Nitrogen	7727-37-9	2-3
Neopentane	463-82-1	<0.1
I-Pentane	109-66-0	<0.1
n-Pentane	109-66-0	<0.1

The listed concentrations are approximate ranges. Odorant, at trace amounts, may be comprised of some or all of the following components and/or blends thereof: Tetrahydrothiophene, tertiary-Butyl Mercaptan and/or other mercaptans.

4. FIRST AID MEASURES

First aid measures

General advice — In case of accident or if you feel unwell, seek medical advice immediately (show directions for use or safety data sheet if possible).

Inhalation — If respiratory symptoms occur, remove to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult have qualified personnel administer oxygen. Get medical attention.

Skin contact — Not known to be a skin irritant. Skin absorption is unlikely. Good practice to wash any chemical from skin.

Eye contact — If irritation or redness develops from exposure, flush eyes with clean water. Seek medical attention if symptoms persist.

Ingestion — This product is a gas. Under normal atmospheric conditions, ingestion is unlikely.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media — Carbon dioxide, dry chemical, or halon. Water may be ineffective on flames but useful for other purposes; including cooling heated surfaces or preventing the creation of static electricity.

Specific hazards arising from the chemical — Gas is extremely flammable and may readily be ignited by static charge, sparks and flames. A hazard from re-ignition and explosion exists if the flame is extinguished without stopping flow of gas and/or cooling surroundings and eliminating ignition source. Gas may travel a considerable distance to a source of ignition and flash back. Combustion may produce carbon dioxide and water

	with trace amounts of carbon monoxide, nitrogen oxides, sulfur oxides, aldehydes and soot
Hazardous combustion products	Carbon monoxide and other products of incomplete combustion.
Explosion data	
Sensitivity to mechanical impact:	No
Sensitivity to static discharge:	Yes
Special protective equipment and precautions for firefighters	For fires involving this material, do not enter any enclosed or confined space without proper protective equipment, including, but not limited to, self-contained breathing apparatus. Use approved gas detectors in confined spaces.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, Protective equipment, and Emergency procedures	Keep away from flames and chemical oxidants. Eliminate all sources of ignition and in emergency ensure gas supply is shut off. Do not breathe gas. Use non-sparking tools and explosion-proof electrical equipment when working around gas. Ventilate area and allow to evaporate. Stay upwind and away from any accidental releases. Isolate immediate hazardous area and keep unauthorized personnel out. Appropriate protective equipment should be worn as conditions warrant. Before entering storage tanks and confined areas check the atmosphere for oxygen content and flammability.
Environmental precautions	Report spill as required by local and federal regulations.
Methods and materials for containment and clean up	Notify local authorities in accordance with all applicable regulations.

7. HANDLING AND STORAGE

Safe handling precautions	Work involving gas should be done by qualified professionals. Use non-sparking tools and explosion-proof electrical equipment. Ground container and transfer equipment to eliminate static electric sparks. Before entering storage tanks and confined areas, check the atmosphere for oxygen content and flammability. Purging of gas lines, blow-downs and other planned releases of natural gas should only be performed by qualified gas professionals. Such gas release operations should only be performed in well-ventilated areas or by safely venting the contents of gas lines and equipment to the outside atmosphere away from people, animals, structures and sources of ignition. All possible ignition sources should be extinguished before and during such operations. Do not release the contents of a gas line into a confined space.
Storage conditions	Store in cool, dry, well-ventilated areas, away from sources of heat, ignition and direct sunlight. Do not allow temperatures in cylinder storage area to exceed 52°C (125°F). Isolate from oxidizers such as oxygen, chlorine, or fluorine. Use a check valve or trap in the discharge line to prevent hazardous backflow. Post “No Smoking or Open Flame” signs in storage and use areas. Protect tanks that

are stored in the open against extremes of weather and from ground dampness to prevent rusting. Empty containers retain product residues. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. Outdoor or detached storage is preferred.

Odor Fade Under certain conditions, the distinctive odorant to natural gas may be diminished or lost so that it cannot be smelled. Gas detection equipment should be used, particularly when working in confined areas. Do not rely on sense of smell alone to determine if there is a gas leak or if gas is otherwise present.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Name	Exposure Limit	NIOSH IDLH
Methane 74-82-8	None Established	None Established
Ethane 74-84-0	None Established	None Established
Propane 74-98-6	1000 ppm TWA OSHA PEL 1000 ppm TWA Cal/OSHA PEL	2100 ppm
I-Butane 75-28-5	1000 ppm 15 minutes STEL	TWA: 1900 mg/m³ 10 hours. TWA: 800 ppm 10 hours.
n-Butane 106-97-8	800 ppm TWA OSHA PEL 800 ppm TWA Cal/OSHA PEL	None Established
Carbon Dioxide 124-38-9	5000 ppm TWA OSHA PEL 5000 ppm TWA Cal/OSHA PEL 5000 ppm TWA, 30,000 ppm STEL ACGIH TLV	STEL: 54000 mg/m³ 15 minutes. STEL: 30000 ppm 15 minutes
Neopentane 463-82-1	600 ppm (1,800 mg/m^3) TWA 750 ppm (2,250 mg/m^3) STEL	1,000 ppm (2,950 mg/m^3) TWA
I-Pentane 109-66-0	600 ppm (1,800 mg/m^3) TWA 750 ppm (2,250 mg/m^3) STEL	1,000 ppm (2,950 mg/m^3) TWA
n-Pentane 109-66-0	600 ppm (1,800 mg/m^3) TWA 750 ppm (2,250 mg/m^3) STEL	1,000 ppm (2,950 mg/m^3) TWA

Engineering measures If the recommended exposure limit is exceeded increased mechanical, non-sparking ventilation such as local exhaust may be required.

Eye protection Wear safety glasses when handling cylinders or when exposure to high pressure gas

Skin and body protection Work gloves are recommended for general usage. Wear flame retardant clothing in potentially flammable areas.

Respiratory protection If exposure limits are exceeded or if oxygen levels are unknown or deficient, use a NIOSH approved supplied air respirator. Selection of respiratory protection depends on the contaminant type, form and concentration. Select in accordance with OSHA 29 CFR 1910.134/CCR, Title 8, Section 5144, GISO and good Industrial Hygiene practice.

Other	Wear protective clothing if needed to avoid prolonged skin contact. Suitable washing facilities should be available in the work area. Explosion proof equipment should be used.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Colorless gas or liquid.
Physical State	Vapor or liquid
Color	None
Odor	Often odorless in its natural state. A distinctive warning odorant is added to give it the characteristic unpleasant odor often associated with natural gas. However, the gas odor may not be detectable by smell because of an impaired sense of smell, when the odor is masked by other odors in the area, or because the odorant has been lost due to Odor Fade.
Odor Threshold	No data available

Property	**Values (method)**
pH	Not applicable
Melting Point / Freezing Point	No data available.
Initial Boiling Point / Boiling Range	-259^{o} F/-162^{o}C (methane).
Flash Point	Flammable gas
Evaporation Rate	No data available.
Flammability (solid, gas)	Gaseous state
Flammability Limit in Air (%):	
Upper Flammability Limit:	15% in volume in air.
Lower Flammability Limit:	4.5% in volume in air.
Explosion Limits	No data available.
Vapor Pressure	Not applicable.
Vapor Density	(air=1) 0.57 - 0.62
Specific Gravity / Relative Density	0.57-0.62
Water Solubility	3.5 mL/100 mL water at 62.6 ^{o}F/17^{o}C.
Partition Coefficient	Not applicable.
Autoignition Temperature	1170^{o}F /632^{o}C minimum ignition temp, in air for methane.
Decomposition Temperature	No data available.
Kinematic Viscosity	No data available.
VOC Content (%)	100 %.

10. STABILITY AND REACTIVITY

Reactivity	The product is non-reactive under normal conditions
Chemical stability	Stable
Possibility of hazardous reactions	Heat will increase the pressure of gas in cylinders and may cause an explosion.
Conditions to avoid	Heat, sparks flames and all sources of ignition.
Incompatible materials	Strong oxidizing agents including, chlorine, chlorine dioxide, bromine pentafluoride, nitrogen trifluoride, liquid oxygen and oxygen difluoride.

Hazardous decomposition products	Combustion may produce carbon dioxide and water with trace amounts of carbon monoxide, nitrogen oxides, sulfur oxides, hydrocarbons, aldehydes, and soot.

11. TOXICOLOGICAL INFORMATION

Potential short-term adverse effects from overexposures

Inhalation	Simple asphyxiant. At high concentrations, inhalation can cause symptoms of oxygen deprivation (asphyxiation), which includes shortness of breath, drowsiness, headaches, confusion, decreased coordination, visual disturbances and vomiting, which are reversible when exposure ceases. Continued exposure, however, can lead to hypoxia (inadequate oxygen), unconsciousness and death. Ethane and propane have been shown to cause cardiac sensitization in some studies in laboratory animals. When gas is incompletely combusted, hazardous by-products can be produced such as carbon monoxide, which can cause carbon monoxide poisoning), and other potentially harmful substances.
Eye Irritation	Not expected to cause eye irritation
Skin Irritation	Not expected to cause skin irritation
Sensitization	None of the components are skin or respiratory sensitizers.
Chronic Effects	None known
Carcinogenicity	None of the components listed in Section 3 are regulated as a carcinogen by OSHA, IARC or NTP.

12. ECOLOGICAL INFORMATION

Ecotoxicity	Methane: 96 hr LC50 fish 27.98 mg/L (estimate). Ethane: 96 hr LC50 fish 27.98 mg/L (estimate). Propane: 96 hr LC50 fish 27.98 mg/L (estimate). Carbon Dioxide: 96 hr LC50 Oncorhynchus mykiss 35 mg/L. Nitrogen: No data available.
Persistence and Degradability	The product is easily biodegradable.
Bioaccumulation Potential	The product is not bioaccumulating.
Mobility in Environment	This is a volatile substance, which may spread in the atmosphere.
Other Adverse Effects	Natural gas is expected to readily evaporate and not cause adverse effects on the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Disposal: Recycle container. Dispose in accordance with all local, state and federal regulations.

14. TRANSPORT INFORMATION

DOT

UN/Identification No:	UN 1971
UN Proper Shipping Name:	Natural Gas, Compressed
Transport Hazard Class(es):	2.1
Packing Group:	N/A
Environmental Hazard	No

Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code): Not applicable Special precautions: None known.

15. REGULATORY INFORMATION

Regulatory Information

CERCLA Hazardous Substances (Section 103)/RQ: This product is not subject to CERCLA reporting requirements as it is sold. Many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

EPA SARA 311 Hazard Classification: Acute Health, Fire Hazard, Pressure Hazard.

SARA 313: This product contains the following chemicals subject to Annual Release Reporting Requirements Under SARA Title III, Section 313 (40 CFR 372): None.

California Safe Drinking Water and toxic Enforcement Act of 1986 (Proposition 65): This product may contains a material or materials which is/are known by the State of California to cause cancer, birth defects or other reproductive harm.

US EPA Toxic Substances Control Act: All of the components of this product are listed on the TSCA inventory.

16. OTHER INFORMATION

Prepared by Product Safety

Revision Notes

Revision date 10/28/2024

Disclaimer

Natural gas is obtained from a number of sources and composed of a mixture of chemical compounds which can vary depending on the source of the gas. The information contained in this document was compiled from sources believed to be reliable. Though the information contained herein is believed to be accurate as of the date this Safety Data Sheet was created, it may be incomplete or otherwise incorrect. The information applies only to the specific material listed and may not be valid for this material if it is used in combination with any other material or is not used as intended. It is the user's responsibility to satisfy himself/herself/itself as to the suitability and completeness of this information for his/her/its own particular use, and for his/her/its safety and the safety of the public, the environment and workers. This document is not intended to convey legal advice. Users should consult all applicable federal, state and local statutes, codes, ordinances, rules, regulations and standards relative to the use, storage, transportation and hazards of natural gas. The information contained in this document is provided without warranty, express or implied. If errors in the information provided herein are discovered, please report them promptly to Southern California Gas Company.

GREEN MOUNTAIN ENERGY, LLC

SAFETY DATA SHEET

Revision date 10/25/2024

1. IDENTIFICATION

Product Name	Synthetic Petroleum
Synonym	Gasoline/Fuel Oil Mix; Synthetic L:ight Sweet Crude Oil; Petroleum Impacted Material; Petroleum distillates
Product code	001OCT024
Chemical family	Hydrocarbon Mixture
Recommended use	Light Sweet Crude blend stock
Restrictions on use	All others.
Manufacturer, Importer, or Responsible Party Name and Address	Green Mountain Energy 4460 Saltspring Dr Ferndale, WA 98248
SDS Information	1-304-579-0933 (M-F; 8-5 EST)
24 Hour Emergency Telephone	CHEMTREC: 1-800-424-9300 (CCN# 13740)

2. HAZARD IDENTIFICATION

OSHA Regulatory Status

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Classification

Acute toxicity - Inhalation (Dusts/Mists)	Category 4
Skin corrosion/irritation	Category 2
Germ cell mutagenicity	Category 1B
Carcinogenicity	Category 1A
Reproductive toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Specific target organ toxicity (repeated exposure)	Category 2
Aspiration toxicity	Category 1
Acute aquatic toxicity	Category 2
Chronic aquatic toxicity	Category 2

Hazards Not Otherwise Classified (HNOC)
Static accumulating flammable liquid

Label Elements

Flammable liquids Category 1

Danger

EXTREMELY FLAMMABLE LIQUID AND VAPOR
May accumulate electrostatic charge and ignite or explode
May be fatal if swallowed and enters airways
Harmful if inhaled
Causes skin irritation
May cause respiratory irritation
May cause drowsiness or dizziness

May cause genetic defects
May cause cancer
Suspected of damaging fertility or the unborn child
May cause damage to organs (thymus, liver, bone marrow) through prolonged or repeated exposure
Toxic to aquatic life with long lasting effects

Appearance Clear yellow liquid **Physical State** Liquid **Odor** Hydrocarbon

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Precautionary Statements - Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools.
Take precautionary measures against static discharge
Do not breathe mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection
Wash hands and any possibly exposed skin thoroughly after handling
Avoid release to the environment

Precautionary Statements - Response
If exposed, concerned or you feel unwell: Get medical attention
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
If skin irritation occurs: Get medical attention
Wash contaminated clothing before reuse
If inhaled: Remove person to fresh air and keep at rest in a position comfortable for breathing
Call a poison center or doctor if you feel unwell
If swallowed: Immediately call a poison center or doctor
Do NOT induce vomiting
In case of fire: Use water spray, fog or regular foam for extinction
Collect spillage

Precautionary Statements - Storage
Store in a well-ventilated place. Keep container tightly closed
Keep cool
Store locked up
Precautionary Statements - Disposal
Dispose of contents/container at an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synthetic Petroleum is a mixture of varying proportions of gasoline, No. 1 fuel oil, and No. 2 fuel oil. Synthetic Petroleum contains paraffins, cycloparaffins, olefins and aromatic hydrocarbons having hydrocarbon chain lengths

predominantly in the range of four to twenty carbons. May contain small amounts of other additives (>0.02%) which are not considered hazardous at the concentrations used.

Composition Information

Name	CAS Number	% Concentration
No. 2 Diesel Fuel	68476-34-6	0-100
Kerosine (petroleum)	8008-20-6	0-100
Gasoline	86290-81-5	0-100
Heptane (mixed isomers)	142-82-5	2-26.5
Pentane (mixed isomers)	78-78-4	0-19
Butane (mixed isomers)	106-97-8	0-14
Hexane Isomers (other than n-Hexane)	107-83-5	1-12
Ethyl Alcohol	64-17-5	0-11
Toluene	108-88-3	3-9.5
Xylene (mixed isomers)	1330-20-7	0-9.5
n-Hexane	110-54-3	0-5.0
Cumene	98-82-8	0-4.0
1,2,4 Trimethylbenzene	95-63-6	0-4.0
Naphthalene	91-20-3	0-3.0
Ethylbenzene	100-41-4	0-2.5
Benzene	71-43-2	0-1.0
Cyclohexane	110-82-7	0-1.0
Octane (mixed isomers)	111-65-9	0-1.0
Nonane (mixed isomers)	111-84-2	0-0.5

All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

4. FIRST AID MEASURES

First aid measures

General advice — In case of accident or if you feel unwell, seek medical advice immediately (show directions for use or safety data sheet if possible).

Inhalation — Remove to fresh air. If not breathing, utilize bag valve mask or other form of barrier device to institute rescue breathing. If breathing is difficult, ensure airway is clear, give oxygen and continue to monitor. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). Keep affected person warm and at rest. Get immediate medical attention.

Skin contact — Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. Place contaminated clothing in closed container until cleaned or discarded. If clothing is to be laundered, inform the person performing the operation of contaminant's hazardous properties. Destroy contaminated, non-chemical resistant footwear. May be absorbed through the skin in harmful amounts. Get medical attention if irritation persists. Any injection injury from high pressure equipment should be evaluated immediately by a physician as potentially serious (See NOTES TO PHYSICIAN).

Eye contact — Flush immediately with large amounts of water for at least 15 minutes. Gently remove contacts while flushing. Eyelids should be held away from the eyeball to ensure thorough rinsing. Gently remove contacts while flushing. Get medical attention if irritation persists.

Ingestion	Do not induce vomiting because of danger of aspirating liquid into lungs, causing serious damage and chemical pneumonitis. If spontaneous vomiting occurs, keep head below hips, or if patient is lying down, turn body and head to side to prevent aspiration and monitor for breathing difficulty. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest. Get immediate medical attention.

Most important signs and symptoms, both short-term and delayed with overexposure

Adverse effects	Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. May cause nausea, vomiting, diarrhea, and signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Aspiration hazard. May cause coughing, chest pains, shortness of breath, pulmonary edema and/or chemical pneumonitis. Repeated or prolonged skin contact may cause drying, reddening, itching and cracking. Prolonged or repeated exposure may cause adverse effects to the thymus, liver and bone marrow.

Indication of any immediate medical attention and special treatment needed

Notes to physician	INHALATION: This material (or a component) sensitizes the myocardium to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided. SKIN: Leaks or accidents involving high-pressure equipment may inject a stream of material through the skin and initially produce an injury that may not appear serious. Only a small puncture wound may appear on the skin surface but, without proper treatment and depending on the nature, original pressure, volume, and location of the injected material, can compromise blood supply to an affected body part. Prompt surgical debridement of the wound may be necessary to prevent irreversible loss of function and/or the affected body part. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES. INGESTION: This material represents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam or water spray can be used. For large fires, water spray, fog or foam can be used. Firefighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.
Unsuitable extinguishing media	Do not use straight water streams to avoid spreading fire.
Specific hazards arising from the chemical	This product has been determined to be an extremely flammable liquid per the OSHA Hazard Communication Standard and should be handled accordingly. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge, or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail. May accumulate electrostatic charge and ignite or

	explode. For additional fire related information, see NFPA 30 or the Emergency Response Guidebook 128.
Hazardous combustion products	Smoke, carbon monoxide, and other products of incomplete combustion.
Explosion data	
Sensitivity to mechanical impact:	No
Sensitivity to static discharge:	Yes
Special protective equipment and precautions for firefighters	Firefighters should wear full protective clothing and positive-pressure self-contained breathing apparatus (SCBA) with a full face-piece, as appropriate. Avoid using straight water streams. Water may be ineffective in extinguishing low flash point fires, but can be used to cool exposed surfaces. Avoid excessive water spray application. Water spray and foam must be applied carefully to avoid frothing and from as far a distance as possible. Keep run-off water out of sewers and water sources.
Additional firefighting tactics	FIRES INVOLVING TANKS OR CAR/TRAILER LOADS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after the fire is out. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles: if this is impossible, withdraw from area and let fire burn. EVACUATION: Consider initial downwind evacuation for at least 1000 feet. If tank, rail car or tank truck is involved in a fire, ISOLATE for 5280 feet (1 mile) in all directions; also, consider initial evacuation of 5280 feet (1 mile) in all directions.

NFPA	Health 1	Flammability 3	Instability 0	Special Hazard -

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources. All contaminated surfaces will be slippery.
Protective equipment	Use personal protection measures as recommended in Section 8.
Emergency procedures	Advise authorities and National Response Center (800-424-8802) if the product has entered a water course or sewer. Notify local health and pollution control agencies, if appropriate.
Environmental precautions	Ethanol in gasoline phase seperates in contact with water. Monitor downstream for dissolved ethanol or other appropriate indicators. Avoid release to the environment. Avoid subsoil penetration.

Methods and materials for containment	Contain liquid with sand or soil. Prevent spilled material from entering storm drains, sewers, and open waterways.
Methods and materials for cleaning up	Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids. Recover and return free product to proper containers. When recovering free liquids ensure all equipment is grounded and bonded. Use only non-sparking tools.

7. HANDLING AND STORAGE

Safe handling precautions

NEVER SIPHON THIS PRODUCT BY MOUTH. Use appropriate grounding and bonding practices. Static accumulating flammable liquid. Bonding and grounding may be insufficient to eliminate the hazard from static electricity. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Vapors may travel along the ground or be moved by ventilation. Flashback may occur along vapor trails. No smoking. Use only non-sparking tools. Avoid breathing fumes, gas, or vapors. Use only with adequate ventilation. Avoid repeated and prolonged skin contact. Use personal protection measures as recommended in Section 8. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water. Do not cut, drill, grind or weld on empty containers since explosive residues may remain. Refer to applicable EPA, OSHA, NFPA and consistent state and local requirements.
Hydrocarbons are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering, pumping at high flow rates or loading and transfer operations. If this charge reaches a sufficiently high level, sparks can form that may ignite the vapors of flammable liquids. Sudden release of hot organic chemical vapors or mists from process equipment operating under elevated temperature and pressure, or sudden ingress of air into vacuum equipment may result in ignition of vapors or mists without the presence of obvious ignition sources. Nozzle spouts must be kept in contact with the containers or tank during the entire filling operation.
Portable containers should never be filled while in or on a motor vehicle or marine craft. Containers should be placed on the ground. Static electric discharge can ignite fuel vapors when filling non-grounded containers or vehicles on trailers. The nozzle spout must be kept in contact with the container before and during the entire filling operation. Use only approved containers.

A buildup of static electricity can occur upon re-entry into a vehicle during fueling especially in cold or dry climate conditions. The charge is generated by the action of dissimilar fabrics (i.e., clothing and upholstery) rubbing across each other as a person enters/exits the vehicle. A flash fire can result from this discharge if sufficient flammable vapors are present. Therefore, do not get back in your vehicle while refueling.

Cellular phones and other electronic devices may have the potential to emit electrical charges (sparks). Sparks in potentially explosive atmospheres (including fueling areas such as gas stations) could cause an explosion if sufficient flammable vapors are present. Therefore, turn off cellular phones and other electronic devices when working in potentially explosive atmospheres or keep devices inside your vehicle during refueling.

High-pressure injection of any material through the skin is a serious medical emergency even though the small entrance wound at the injection site may not initially appear serious. These injection injuries can occur from high-pressure equipment such as paint spray or grease or guns, fuel injectors, or pinhole leaks in hoses or hydraulic lines and should all be considered serious. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES (See First Aid Section 4).

Storage conditions Store in properly closed containers that are appropriately labeled and in a cool, well-ventilated area. Do not store near an open flame, heat or other sources of ignition.

Incompatible materials Strong oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Name	ACGIH TLV	OSHA PELS	NIOSH IDLH
No. 2 Diesel Fuel 68476-34-6	100 mg/m3 TWA Skin - potential significant contribution to overall exposure by the cutaneous route	--	--
Kerosine (petroleum) 8008-20-6	200 mg/m3 TWA Skin - potential significant contribution to overall exposure by the cutaneous route	--	--
Gasoline 86290-81-5	300 ppm TWA 500 ppm STEL		
Heptane (mixed isomers) 142-82-5	400 ppm TWA 500 ppm STEL	TWA: 500 ppm TWA: 2000 mg/m3	750 ppm
Pentane (mixed isomers) 78-78-4	1000 ppm TWA	--	--
Butane (mixed isomers) 106-97-8	1000 ppm STEL	--	1600 ppm
Hexane Isomers (other than n-Hexane) 107-83-5	500 ppm TWA 1000 ppm STEL	--	--
Ethyl Alcohol 64-17-5	1000 ppm STEL	TWA: 1000 ppm TWA: 1900 mg/m3	3300 ppm
Toluene 108-88-3	20 ppm TWA OTO - potential to cause hearing impairment alone or in combination with noise	TWA: 200 ppm Ceiling: 300 ppm	500 ppm
Xylene (mixed isomers) 1330-20-7	100 ppm TWA 150 ppm STEL	TWA: 100 ppm TWA: 435 mg/m3	900 ppm
n-Hexane 110-54-3	50 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 500 ppm TWA: 1800 mg/m3	1100 ppm

Cumene 98-82-8	5 ppm TWA	TWA: 50 ppm TWA: 245 mg/m3 Skin	900 ppm
1,2,4 Trimethylbenzene 95-63-6	25 ppm TWA	--	--
Naphthalene 91-20-3	10 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 10 ppm TWA: 50 mg/m3	250 ppm
Ethylbenzene 100-41-4	20 ppm TWA	TWA: 100 ppm TWA: 435 mg/m3	800 ppm
Benzene 71-43-2	0.5 ppm TWA 2.5 ppm STEL Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 1 ppm STEL: 5 ppm TWA: 10 ppm (applies to industry segments exempt from the benzene standard) (see 29 CFR 1910.1028)	500 ppm
Cyclohexane 110-82-7	100 ppm TWA	TWA: 300 ppm TWA: 1050 mg/m3	1300 ppm
Octane (mixed isomers) 111-65-9	300 ppm TWA	TWA: 500 ppm TWA: 2350 mg/m3	1000 ppm
Nonane (mixed isomers) 111-84-2	200 ppm TWA	--	--

Notes: No further information available.

Engineering measures Local or general exhaust required in an enclosed area or when there is inadequate ventilation. Use mechanical ventilation equipment that is explosion-proof.

Personal protective equipment

Eye protection Use goggles or face-shield if the potential for splashing exists.

Skin and body protection Use nitrile rubber, Viton® or PVA gloves for repeated or prolonged skin exposure. Glove suitability is based on workplace conditions and usage. Contact the glove manufacturer for specific advice on glove selection and breakthrough times.

Respiratory protection Use a NIOSH approved organic vapor chemical cartridge or supplied air respirators when there is the potential for airborne exposures to exceed permissible exposure limits or if excessive vapors are generated. Observe respirator assigned protection factors (APFs) criteria cited in federal OSHA 29 CFR 1910.134. Self-contained breathing apparatus should be used for fire fighting.

Hygiene measures Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Clear yellow liquid
Physical State	Liquid
Color	Yellow
Odor	Hydrocarbon
Odor Threshold	No data available

Property	**Values (method)**
pH	Not applicable
Melting Point / Freezing Point	No data available.
Initial Boiling Point / Boiling Range	24-343 °C / 75-650 °F (ASTM D86)
Flash Point	-42.8 °C / -45 °F (gasoline)
Evaporation Rate	No data available.
Flammability (solid, gas)	Not applicable.
Flammability Limit in Air (%):	
Upper Flammability Limit:	7.6
Lower Flammability Limit:	1.4 (gasoline)
Explosion Limits	No data available.
Vapor Pressure	7.8-15 psi (ASTM D4818)
Vapor Density	3-4 (air=1) (gasoline)
Specific Gravity / Relative Density	0.75-0.82
Water Solubility	No data available.
Partition Coefficient	No data available.
Autoignition Temperature	280 °C / 536 °F (gasoline)
Decomposition Temperature	No data available.
Kinematic Viscosity	No data available.
VOC Content (%)	No data available.

10. STABILITY AND REACTIVITY

Reactivity	The product is non-reactive under normal conditions
Chemical stability	The material is stable at 70°F (21°C), 760 mmHg pressure.
Possibility of hazardous reactions	None under normal processing.
Hazardous polymerization	Will not occur.
Conditions to avoid	Excessive heat, sources of ignition, open flame.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	None known under normal conditions of use. However, use in an area without adequate ventilation may result in hazardous levels of carbon monoxide and carbon dioxide.

11. TOXICOLOGICAL INFORMATION

Potential short-term adverse effects from overexposures

Inhalation	Harmful if inhaled. May cause irritation of respiratory tract. May cause drowsiness or dizziness. Breathing high concentrations of this material in a confined space or by intentional abuse can cause irregular heartbeats which can cause death.
Eye contact	Exposure to vapor or contact with liquid may cause mild eye irritation, including tearing, stinging, and redness.
Skin contact	Irritating to skin. Effects may become more serious with repeated or prolonged contact. May be absorbed through the skin in harmful amounts.
Ingestion	May be fatal if swallowed or vomited and enters airways. May cause irritation of the mouth, throat and gastrointestinal tract.

Acute toxicological data

Name	Oral LD50	Dermal LD50	Inhalation LC50
No. 2 Diesel Fuel 68476-34-6	> 5000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	>1 - <5 mg/L (Rat) 4 h
Kerosine (petroleum) 8008-20-6	> 5000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.28 mg/L (Rat) 4 h
Gasoline 86290-81-5	14000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.2 mg/L (Rat) 4 h
Heptane (mixed isomers) 142-82-5	--	3000 mg/kg (Rabbit)	103 g/m3 (Rat) 4 h
Pentane (mixed isomers) 78-78-4	--	--	450 mg/L (Mouse) 2 h
Butane (mixed isomers) 106-97-8	--	--	658 mg/L (Rat) 4 h
Hexane Isomers (other than n-Hexane) 107-83-5	> 5000 mg/kg (Rat)	--	--
Ethyl Alcohol 64-17-5	> 5000 mg/kg (Rat)	--	124.7 mg/L (Rat) 4 h
Toluene 108-88-3	> 2000 mg/kg (Rat)	8390 mg/kg (Rabbit)	12.5 mg/L (Rat) 4 h
Xylene (mixed isomers) 1330-20-7	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.04 mg/L (Rat) 4 h
n-Hexane 110-54-3	15000 mg/kg (Rat)	3000 mg/kg (Rabbit)	48000 ppm (Rat) 4 h
Cumene 98-82-8	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 20 mg/L (Rat) 6 h
1,2,4 Trimethylbenzene 95-63-6	3280 mg/kg (Rat)	> 3160 mg/kg (Rabbit)	18,000 mg/m3 (Rat) 4 h
Naphthalene 91-20-3	533 mg/kg (Mouse)	> 2000 mg/kg (Rabbit)	> 340 mg/m3 (Rat) 1 h
Ethylbenzene 100-41-4	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	17.2 mg/L (Rat) 4 h
Benzene 71-43-2	> 2000 mg/kg (Rat)	> 5000 mg/kg (Rabbit)	> 20 mg/l (Rat) 4 h
Cyclohexane 110-82-7	> 5000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	13.9 mg/L (Rat) 4 h
Octane (mixed isomers) 111-65-9	>2000 mg/kg (Rat)	--	118 g/m3 (Rat) 4 h

Nonane (mixed isomers) 111-84-2	--	--	17 mg/L (Male rat) 4 h

Immediate and delayed effects as well as chronic effects from short and long-term exposure

Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage (so-called Petrol Sniffer's Encephalopathy), delirium, seizures, and sudden death have been reported from repeated overexposure to some hydrocarbon solvents, naphthas, and gasoline.

GASOLINE: Gasoline blending streams, or naphthas, may be fatal if swallowed and enter the airway. Vapors may be irritating if inhaled. Altered mental state, drowsiness, dizziness, peripheral motor neuropathy, irreversible brain damage (gasoline sniffer's neuropathy), delirium, seizures, and sudden death have been reported from repeated exposure or overexposure. Lifetime exposure of laboratory mice and rats to wholly-vaporized unleaded gasoline produced an increased incidence of liver tumors in female mice at the highest exposure concentration and α-2 urinary globulin-mediated kidney tumors in male rats. Lifetime repeated application of various gasoline blending streams or naphthas to the skin of mice caused an irritation-dependent increased incidence of skin tumors. These tumors occur through a mechanism of questionable human relevance.

PENTANE and BUTANE: Laboratory animal studies indicate exposure to extremely high levels (1-10 vol.% in air) may cause cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

ETHANOL: Repeated ingestion of ethanol can result in alcohol abuse, causing behavioral changes, memory loss, impaired judgement, decreased appetite, irregular heartbeats, and decreased fertility. Prolonged and repeated ingestion of ethanol has also been associated with cancers of the mouth, pharynx, esophagus and liver. Ethanol ingestion by pregnant women can cause miscarriage, low birth weight, premature birth and fetal alcohol syndrome. In males, acute and chronic alcohol ingestion may affect gonadal hormone levels. It may also affect the liver, kidney, brain, blood and cardiovascular system.

TOLUENE: Inhalation abuse of toluene at high concentrations has been associated with adverse effects on the liver, kidney and nervous system, and can cause nervous system depression, cardiac arrhythmias, and death. Studies of workers indicate long-term exposure may be related to impaired color vision and hearing. Some studies of workers suggest long-term exposure may be associated with neurobehavioral and mental functional changes. Laboratory animal studies indicate some changes in reproductive organs after exposure to high airborne concentrations, but no significant effects on mating performance or reproduction were observed. Positive findings include small increases in minor skeletal and visceral malformations and developmental delays following maternal exposure to high concentrations. Adverse effects on the liver, kidney, thymus and nervous system of laboratory animal were observed after very high levels of prolonged and repeated exposure.

XYLENE: Overexposure to airborne xylene may cause upper respiratory tract irritation, headache, cyanosis, blood serum changes, nervous system damage and narcosis. Impaired neurological function has been reported in workers exposed to solvents including xylene. Laboratory animal studies have shown evidence of impaired hearing after prolonged exposure high airborne concentrations. Laboratory animal studies suggest some changes in reproductive organs after exposure to high airborne concentrations of xylene without an effect on reproduction. Skeletal and visceral malformations, developmental delays, and increased fetal resorptions were observed in laboratory animals after extremely high airborne concentrations with evidence of maternal toxicity. Adverse effects on the liver, kidney, and bone marrow were observed in laboratory animals after prolonged and repeated exposure to high airborne concentrations of xylene.

N-HEXANE: Short-term overexposure to n-hexane vapor may cause headache, nausea, vomiting, dizziness, lightheadedness, loss of consciousness, coma, and even death in humans. Respiratory effects of overexposure may include nose, throat, and lung irritation, coughing, wheezing, and shortness of breath. Direct and prolonged contact with liquid may cause dryness and redness of the skin. Long-term or repeated overexposure to n-hexane

can cause peripheral nerve damage. Initial signs are numbness of the fingers and toes. Motor/muscle weakness can occur in the digits, but may also involve muscles of the arms, forearms, and thighs. Onset of these signs may be delayed for several months to a year after initial exposure. Repeated and sustained inhalation exposure to high vapor concentrations of n-hexane resulted in degenerative changes in the testes and reduced sperm count in male laboratory rats.

CUMENE: High airborne concentrations of cumene may cause irritation of the eyes, skin, and respiratory tract. Excessive exposures may cause central nervous system effects. Lifetime inhalation exposure of mice to cumene resulted in lung tumors in both males and females and liver tumors in females. Rats similarly exposed to cumene exhibited male-specific kidney tumors.

1,2,4-TRIMETHYLBENZENE: Contact with eyes can cause serious eye irritation, redness, and pain. Brief inhalation exposure to high vapor concentrations may cause respiratory irritation. Overexposure by inhalation and ingestion can cause confusion, dizziness, drowsiness, headache, vomiting, cough, and sore throat. Long-term overexposure has been associated with asthmatic bronchitis. Direct prolonged skin contact can cause irritation, redness and dry skin.

NAPHTHALENE: Excessive exposure to naphthalene may cause nausea, vomiting, diarrhea, blood in the urine, and a yellow color to the skin. Lifetime inhalation exposure of laboratory rodents to naphthalene resulted in cancers of the respiratory tract in male and female rats. A small increase in cancer of the lung was observed in female mice, but no evidence of lung cancer was observed in male mice. Long-term exposure to excessive airborne naphthalene concentrations may result in destruction of red blood cells, a condition referred to as hemolytic anemia.

ETHYLBENZENE: Lifetime exposure studies of rodents to ethylbenzene reported elevated kidney tumors in male and female rats exposed to the highest concentration tested. Tumors of the lungs were elevated in male mice and in the livers of females exposed at the highest concentration tested. Effects on the liver, kidney, lung, thyroid, and pituitary of these animals as well. Laboratory animal studies (rats) demonstrated hearing loss in combination with exposure to noise.

BENZENE: Benzene exposure may cause skin, eye and respiratory irritation. Excessive exposures may cause central nervous system effects. Numerous studies of workers exposed to airborne benzene for prolonged or repeated periods show strong evidence that overexposure can cause cancer of the blood, AML (acute myeloid leukemia), along with other disorders indicating damage to the blood forming organs including aplastic anemia, leukopenia, thrombocytopenia, and the development of myelodysplastic syndrome. Some studies of pregnant women occupationally exposed to benzene suggest associations with an increased risk of miscarriage, stillbirth, reduced birth weight, and gestational age. Prolonged and repeated exposure to benzene has induced chromosomal aberrations in circulating human lymphocytes, in bone marrow cells of laboratory animals, and in sperm cells of both humans and laboratory animals.

CYCLOHEXANE: Cyclohexane may be fatal if swallowed and enters the airways. Short-term exposure to excessive concentrations can irritate the nose and throat, and cause coughing, wheezing, headache, dizziness, nausea, vomiting, lightheadedness, drowsiness, and unconsciousness. Repeated and prolonged contact with liquid may cause drying and cracking of the skin.

CARBON MONOXIDE: Chemical asphyxiant with no warning properties (such as odor). At 400-500 ppm for 1 hour headache and dyspnea may occur. If activity is increased, symptoms of overexposure may include nausea, irritability, increased respiration, tinnitus, sweating, chest pain, confusion, impaired judgement, dizziness, weakness, drowsiness, ataxia, irregular heart beat, cyanosis and pallor. Levels in excess of 1000 ppm can result in collapse, loss of conciousness, respiratory failure and death. Extremely high concentrations (12,800 ppm) can cause immediate unconsciousness and death in 1-3 minutes. Repeated anoxia can lead to central nervous system damage and peripheral neuropathy, with loss of sensation in the fingers, amnesia, and mental deterioration and

possible congestive heart failure. Damage may also occur to the fetus, lung, liver, kidney, spleen, cardiovascular system and other organs.

COMBUSTION ENGINE EXHAUST: Lifetime inhalation studies with laboratory animals exposed to gasoline engine exhaust did not produce any carcinogenic effects in mice, rats, or hamsters. Laboratory animal skin painting studies of gasoline engine exhaust condensates/extracts produced an increase in tumors.

DIESEL EXHAUST: Chronic inhalation studies of whole diesel engine exhaust in mice and rats produced a significant increase in lung tumors. Combustion of kerosine and/or diesel fuels produces gases and particulates which include carbon monoxide, carbon dioxide, oxides of nitrogen and/or sulfur and hydrocarbons. Significant exposure to carbon monoxide vapors decreases the oxygen carrying capacity of the blood and may cause tissue hypoxia via formation of carboxyhemoglobin.

MIDDLE DISTILLATES, PETROLEUM: Petroleum middle distillates have produced skin tumors in mice after repeated and prolonged skin contact. Additional studies indicated prolonged skin irritation contributes to tumor development. Repeated dermal exposures to high concentrations in test animals resulted in reduced litter size and weight, and increased fetal resorptions at doses toxic to the mother. Inhalation exposure to high concentrations resulted in respiratory tract irritation, lung changes/infiltration/accumulation, and reduction in lung function. Repeated dermal application of petroleum gas oils resulted in decreased liver, thymus, and spleen weights, and altered bone marrow function. Microscopic alterations included liver hypertrophy and necrosis, decreased hematopoiesis and lymphocyte depletion. Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage (so-called Petrol Sniffer's Encephalopathy), delirium, seizures, and sudden death have been reported from repeated overexposure to some hydrocarbon solvents, naphthas, and gasoline.

Adverse effects related to the physical, chemical and toxicological characteristics

Signs and symptoms	Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. May cause nausea, vomiting, diarrhea, and signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Aspiration hazard. May cause coughing, chest pains, shortness of breath, pulmonary edema and/or chemical pneumonitis. Repeated or prolonged skin contact may cause drying, reddening, itching and cracking. Prolonged or repeated exposure may cause damage to organs.
Acute toxicity	Harmful if inhaled.
Skin corrosion/irritation	Irritating to skin.
Serious eye damage/eye irritation	None known.
Sensitization	Not expected to be a skin or respiratory sensitizer.
Mutagenic effects	May cause genetic defects.
Carcinogenicity	May cause cancer.

Name	**ACGIH (Class)**	**IARC (Class)**	**NTP**	**OSHA**
No. 2 Diesel Fuel 68476-34-6	Confirmed animal carcinogen (A3)	Not Classifiable (3)	Not Listed	Not Listed
Kerosine (petroleum) 8008-20-6	Confirmed animal carcinogen (A3)	Not Classifiable (3)	Not Listed	Not Listed

Gasoline 86290-81-5	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Not Listed	Not Listed
Ethyl Alcohol 64-17-5	Confirmed animal carcinogen (A3)	Alcoholic Beverages Carcinogenic to humans (1)	Alcoholic Beverage Consumption Known to be human carcinogen	Not Listed
Toluene 108-88-3	Not classifiable (A4)	Not classifiable (3)	Not Listed	Not Listed
Xylene (mixed isomers) 1330-20-7	Not classifiable (A4)	Not classifiable (3)	Not Listed	Not Listed
Cumene 98-82-8	Not Listed	Possible human carcinogen (2B)	Reasonably anticipated to be a human carcinogen	Not Listed
Naphthalene 91-20-3	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Reasonably anticipated to be a human carcinogen	Not Listed
Ethylbenzene 100-41-4	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Not Listed	Not Listed
Benzene 71-43-2	Confirmed human carcinogen (A1)	Carcinogenic to humans (1)	Known to be human carcinogen	Known carcinogen

Reproductive toxicity Suspected of damaging fertility or the unborn child.

Specific Target Organ Toxicity (STOT) - single exposure May cause drowsiness or dizziness. May cause respiratory irritation.

Specific Target Organ Toxicity (STOT) - repeated exposure May cause damage to organs (thymus, liver, bone marrow) through prolonged or repeated exposure.

Aspiration hazard May be fatal if swallowed or vomited and enters airways.

12. ECOLOGICAL INFORMATION

Ecotoxicity This product should be considered toxic to aquatic organisms, with the potential to cause long lasting adverse effects in the aquatic environment.

Name	Fish	Crustacea	Algae/aquatic plants
No. 2 Diesel Fuel 68476-34-6	96-hr LC50 = 35 mg/l Fathead minnow (flow-through)	48-hr EL50 = 6.4 mg/l Daphnia magna	--
Kerosine (petroleum) 8008-20-6	96-hr LL50 = 18-25 mg/l Fish	48-hr EL50 = 1.4-21 mg/l Invertebrates	72-hr EL50 = 5.0-11 mg/l Algae
Gasoline 86290-81-5	96-hr LC50 = 11 mg/l Rainbow trout (static)	48-hr LC50 = 7.6 mg/l Daphnia magna	72-hr EC50 = 56 mg/l Algae

Heptane (mixed isomers) 142-82-5	96-hr LC50 = 375 mg/L Tilapia	--	--
Pentane (mixed isomers) 78-78-4	96-hr LC50 = 3.1 mg/L Rainbow trout	48-hr EC50 = >1 - <10 mg/L Daphnia magna	--
Ethyl Alcohol 64-17-5	96-hr LC50 >1,000 mg/l Rainbow trout (static) 96-hr LC50 >100 mg/l Fathead minnow (static)	48-hr LC50 > 1,000 mg/l Daphnia magna	--
Toluene 108-88-3	96-hr LC50 <= 10 mg/l Rainbow trout	48-hr EC50 = 5.46-9.83 mg/l Daphnia magna 48-hr EC50 = 11.5 mg/l Daphnia magna (Static)	72-hr EC50 = 12.5 mg/l Algae
Xylene (mixed isomers) 1330-20-7	96-hr LC50 = 8 mg/l Rainbow trout	48-hr LC50 = 3.82 mg/l Daphnia magna	72-hr EC50 = 11 mg/l Algae
n-Hexane 110-54-3	96-hr LC50 = 2.5 mg/l Fathead minnow	--	--
Cumene 98-82-8	96-hr LC50 = 6.04-6.61 mg/l Fathead minnow (Flow-through) 96-hr LC50 = 2.7 mg/l Rainbow trout (semi-static)	48-hr EC50 = 7.9-14.1 mg/l Daphnia magna (static)	72-hr EC50 = 2.6 mg/l Algae
1,2,4 Trimethylbenzene 95-63-6	96-hr LC50 = 7.19-8.28 mg/l Fathead minnow (flow-through)	48-hr EC50 = 6.14 mg/L Daphnia magna	--
Naphthalene 91-20-3	96-hr LC50 = 0.91-2.82 mg/l Rainbow trout (static) 96-hr LC50 = 1.99 mg/l Fathead minnow (static)	48-hr LC50 = 1.6 mg/l Daphnia magna	--
Ethylbenzene 100-41-4	96-hr LC50 = 4 mg/L Rainbow trout	48-hr EC50 = 1-4 mg/L Daphnia magna	72-hr EC50 = 1.7-7.6 mg/l Algae
Benzene 71-43-2	96-hr LC50 = 5.3 mg/l Rainbow trout (flow-through)	48-hr EC50 = 8.76-15.6 mg/l Daphnia magna (Static)	72-hr EC50 = 29 mg/l Algae
Cyclohexane 110-82-7	96-hr LC50 = 3.96-5.18 mg/l Fathead minnow	48-hr EC50 = 1.7-3.5 mg/L Bay shrimp	72-hr EC50 = 500 mg/l Algae
Octane (mixed isomers) 111-65-9	--	48-hr LC50 = 0.38 mg/l Daphnia magna	--
Nonane (mixed isomers) 111-84-2	--	48-hr LC50 = 0.64 mg/l Daphnia magna	

Persistence and degradability Expected to be inherently biodegradable. The presence of ethanol in this product may impede the biodegradation of benzene, toluene, ethylbenzene and xylene in groundwater, resulting in elongated plumes of these constituents.

Bioaccumulation Has the potential to bioaccumulate.

Mobility in soil May partition into air, soil and water.

Other adverse effects No information available.

13. DISPOSAL CONSIDERATIONS

Description of waste residues This material may be a flammable liquid waste.

Safe handling of wastes Handle in accordance with applicable local, state, and federal regulations. Use personal protection measures as required. Use appropriate grounding and bonding practices. Use only non-sparking tools. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. No smoking.

Disposal of wastes / methods of disposal The user is responsible for determining if any discarded material is a hazardous waste (40 CFR 262.11). Dispose of in accordance with federal, state and local regulations.

Contaminated packaging disposal Empty containers should be completely drained and then discarded or recycled, if possible. Do not cut, drill, grind or weld on empty containers since explosive residues may be present. Dispose of in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT

UN/Identification No:	UN 3295
UN Proper Shipping Name:	Hydrocarbons, Liquid, N.O.S.
Transport Hazard Class(es):	3
Packing Group:	II

IATA

UN/Identification No:	UN 3295
UN Proper Shipping Name:	Hydrocarbons, Liquid, N.O.S.
Transport Hazard Class(es):	3
Packing Group:	II
ERG code:	3H

IMDG

UN/Identification No:	UN 3295
UN Proper Shipping Name:	Hydrocarbons, Liquid, N.O.S.
Transport Hazard Class(es):	3
Packing Group:	II
EmS No:	F-E, S-E
Marine Pollutant:	Yes

15. REGULATORY INFORMATION

Regulatory Information

US TSCA Chemical Inventory This product and/or its components are listed on the TSCA Chemical Inventory or are exempt.

Canada DSL/NDSL Inventory This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

EPA Superfund Amendment & Reauthorization Act (SARA)

SARA Section 302 This product does not contain any component(s) included on EPA's Extremely Hazardous Substance (EHS) List above the de minimis threshold.

SARA Section 304 This product may contain component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	Hazardous Substances RQs
Toluene 108-88-3	1000 lb 454 kg
Xylene (mixed isomers) 1330-20-7	100 lb 45.4 kg
n-Hexane 110-54-3	5000 lb 2270 kg
Cumene 98-82-8	5000 lb 2270 kg
Ethylbenzene 100-41-4	1000 lb 454 kg
Benzene 71-43-2	10 lb 4.54 kg
Cyclohexane 110-82-7	1000 lb 454 kg

SARA Section 311/312 The following EPA hazard categories apply to this product:

Flammable
Hazard Not Otherwise Classified (HNOC)-Physical
Skin corrosion or irritation
Germ cell mutagenicity
Carcinogenicity
Reproductive toxicity
Specific target organ toxicity
Aspiration hazard

SARA Section 313 This product may contain component(s), which if in exceedance of the de minimus threshold, may be subject to the reporting requirements of SARA Title III Section 313 Toxic Release Reporting (Form R).

Name	CERCLA/SARA 313 Emission reporting
Toluene 108-88-3	1.0 % de minimis concentration
Xylene (mixed isomers) 1330-20-7	1.0 % de minimis concentration
n-Hexane 110-54-3	1.0 % de minimis concentration
Cumene 98-82-8	0.1 % de minimis concentration
1,2,4 Trimethylbenzene 95-63-6	1.0 % de minimis concentration
Naphthalene 91-20-3	0.1 % de minimis concentration
Ethylbenzene 100-41-4	0.1 % de minimis concentration
Benzene 71-43-2	0.1 % de minimis concentration
Cyclohexane 110-82-7	1.0 % de minimis concentration

U.S. State Regulations

California Proposition 65 This product can expose you to chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm.

Name	California Proposition 65
No. 2 Diesel Fuel 68476-34-6	Engine exhaust, Carcinogen, initial date 10/01/90
Gasoline 86290-81-5	Unleaded (wholly vaporized), Carcinogen, initial date 04/01/88 Engine exhaust, Carcinogen, initial date 10/01/90
Ethyl Alcohol 64-17-5	Alcoholic beverages, Carcinogen, initial date 4/29/11 Developmental toxicity, initial date 10/1/87 Associated with alcohol abuse, Carcinogen, initial date 7/1/88
Toluene 108-88-3	Developmental toxicity, initial date 01/01/91
n-Hexane 110-54-3	Male reproductive toxicity, initial date 12/15/17
Cumene 98-82-8	Carcinogen, initial date 04/06/10
Naphthalene 91-20-3	Carcinogen, initial date 04/19/2002
Ethylbenzene 100-41-4	Carcinogen, initial date 06/11/04
Benzene 71-43-2	Carcinogen, initial date 02/27/87 Male developmental toxicity, initial date 12/26/97

For more information, go to www.P65Warnings.ca.gov.

State Right-To-Know Regulations The following component(s) of this material are identified on the regulatory lists below:

Name	New Jersey Right-To-Know	Pennsylvania Right-To-Know	Massachusetts Right-To-Know
No. 2 Diesel Fuel 68476-34-6	Listed	Listed	Not Listed
Kerosine (petroleum) 8008-20-6	Listed	Listed	Listed
Gasoline 86290-81-5	Listed	Listed	Listed
Heptane (mixed isomers) 142-82-5	Listed	Listed	Listed
Pentane (mixed isomers) 78-78-4	Listed	Listed	Listed
Butane (mixed isomers) 106-97-8	Listed	Listed	Listed
Hexane Isomers (other than n-Hexane) 107-83-5	Listed	Listed	Listed
Ethyl Alcohol 64-17-5	Listed	Listed	Listed
Toluene 108-88-3	Listed	Listed	Listed
Xylene (mixed isomers) 1330-20-7	Listed	Listed	Listed

n-Hexane 110-54-3	Listed	Listed	Listed
Cumene 98-82-8	Listed	Listed	Listed
1,2,4 Trimethylbenzene 95-63-6	Listed	Listed	Listed
Naphthalene 91-20-3	Listed	Listed	Listed
Ethylbenzene 100-41-4	Listed	Listed	Listed
Benzene 71-43-2	Listed	Listed	Listed
Cyclohexane 110-82-7	Listed	Listed	Listed
Octane (mixed isomers) 111-65-9	Listed	Listed	Listed
Nonane (mixed isomers) 111-84-2	Listed	Listed	Listed

16. OTHER INFORMATION

Prepared by Toxicology & Product Safety

Revision Notes

Revision date 10/25/2024

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is intended as guidance for safe handling, use, processing, storage, transportation, accidental release, clean-up and disposal and is not considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.