Commonwealth of Kentucky
Division for Air Quality

STATEMENT OF BASIS / SUMMARY

Conditional Major, Construction/Operating
Permit: F-25-019
Green Mountain Energy, LLC
7545 Noble Road
West Paducah, KY 42086

August 20, 2025
Johnson Luma, Reviewer

SOURCE ID:	21-145-00157
AGENCY INTEREST:	184811
ACTIVITY:	APE20250001

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SECTION 1 – SOURCE DESCRIPTION

SIC Code and description: 2999, Products of Petroleum and Coal, N.E.C.

Single Source Det. ☐ Yes ☒ No If Yes, Affiliated Source AI:

Source-wide Limit ☒ Yes ☐ No If Yes, See Section 4, Table A

28 Source Category ☐ Yes ☒ No If Yes, Category:

County: McCracken
Nonattainment Area ☒ N/A ☐ PM_{10} ☐ $PM_{2.5}$ ☐ CO ☐ NO_X ☐ SO_2 ☐ Ozone ☐ Lead
If yes, list Classification:

PTE* greater than 100 tpy for any criteria air pollutant ☒ Yes ☐ No
If yes, for what pollutant(s)?
☐ PM_{10} ☐ $PM_{2.5}$ ☐ CO ☒ NO_X ☐ SO_2 ☒ VOC

PTE* greater than 250 tpy for any criteria air pollutant ☒ Yes ☐ No
If yes, for what pollutant(s)?
☐ PM_{10} ☐ $PM_{2.5}$ ☐ CO ☐ NO_X ☐ SO_2 ☒ VOC

PTE* greater than 10 tpy for any single hazardous air pollutant (HAP) ☐ Yes ☒ No
If yes, list which pollutant(s):

PTE* greater than 25 tpy for combined HAP ☐ Yes ☒ No

*PTE does not include self-imposed emission limitations.

Description of Facility:
Green Mountain Energy, LLC is proposing to construct a plastics-to-fuel processing facility located in Paducah, Kentucky.

Facility operations will primarily consist of: material handling, plastic pyrolysis reactors, heat exchangers, storage tanks, flares, loading racks, and pipeline equipment.

SECTION 2 – CURRENT APPLICATION AND EMISSION SUMMARY FORM

Permit Number: F-25-019 Activity: APE20240001 & APE20250001

Application(s) Received: 12/6/2024 & 4/24/2025 Application Complete Date(s): 07/01/2025

Permit Action: ☒ Initial ☐ Renewal ☐ Significant Rev ☐ Minor Rev ☐ Administrative
Construction/Modification Requested? ☒Yes ☐No

Previous 502(b)(10) or Off-Permit Changes incorporated with this permit action ☐Yes ☒No

Description of Action:
APE20250001: Initial Conditional Major/Synthetic Minor, Construction/Operating Permit.

Feedstock material comes from a variety of industrial suppliers. 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, off-spec naptha, and off-spec diesel to make a slurry. Slurry is then conveyed toward the pyrolysis reactors, where heat is used to break down the plastic compounds. The non-condensable process gas produced will be used as a fuel to heat the pyrolysis reactors. Condensable components are turned into useful petroleum products and stored and sent off-site as products.

The petroleum products are stored in various tanks. If the product does not meet the required specifications, the material will be stored in off-spec tanks. The tanks will be controlled by flaring. The off-spec materials can be recycled into the process before the pyrolysis reaction. The products are then loaded into trucks, rail, or barge for shipment. Truck and tank loadout operations are controlled by flaring. During any malfunction, process upset, and startup/shutdown period, the non-condensable gases will be flared.

APE20240001:
The initial application was submitted requesting a State-Origin construction/operating permit, but due to PTE for VOC and NO_x exceeding major source thresholds, the facility opted to take a federally enforceable, source-wide limit on VOC and NO_x to prevent applicability of 401 KAR 52:020 (for VOC and NO_x) and 401 KAR 51:017 (for VOC).

F-25-019 Emission Summary	
Pollutant	**PTE F-25-019 (tpy)**
CO	7.79
NOx	180/90*
PT	7.30
PM_{10}	1.97
$PM_{2.5}$	0.98
SO_2	0.015
VOC	476.3/90*
Lead	$3.81x10^{-5}$
Greenhouse Gases (GHGs)	
Carbon Dioxide	9,082
Methane	0.17
Nitrous Oxide	0.017
CO_2 Equivalent (CO_2e)	9,092
Hazardous & Toxic Air Pollutants (HAPs & TAPs)**	
1,4-Dichlorobenzene	$9.13x10^{-5}$
Benzene	0.65
Cadmium, Total (as Cd)	$8.37x10^{-5}$
Chromium	$1.07x10^{-4}$
Cumene	2.6
Cyclohexane (TAP)	0.65
Ethyl Benzene	1.62
Formaldehyde	0.006
Heptane (TAP)	17.2
Hexane; N-Hexane	3.38
Manganese, Total (as Mn)	$2.9x10^{-5}$
Naphthalene	1.95
Nickel, Total (as Ni)	$1.6x10^{-4}$
Nonane (TAP)	0.324
Pentane (TAP)	12.33
Toluene	6.16
1,2,4-Trimethyl Benzene (TAP)	2.6
Xylenes (Total)	6.16
Combined HAPs	22.53

* Emissions are limited by federally-enforceable emission limitations to ensure the source remains below major source thresholds.

** HAPs & TAPs are shown as uncontrolled.

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS

EP-001 (Cooling Tower)				
Pollutant	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
PM	2.34 lb/hr	401 KAR 59:010, Section 3(2)	2.085 lb/10^6 gallons; See comments below for emission factor source	The permittee is assumed to be in compliance based on the information provided in the application.
	20% Opacity	401 KAR 59:010, Section 3(1)(a)	N/A	

Initial Construction Date: 2025 (Proposed)

Description:
Circulation rate: 619 gallons/minute
Solids content: 5,000 mg/l
Equipped with drift eliminator with 0.005% Drift Loss

Applicable Regulation:

401 KAR 59:010, *New process operations*
This regulation is applicable to each affected facility, associated with a process operation, which is not subject to another emission standard with respect to particulates, commenced on or after July 2, 1975.

Comments:
PM emissions from the cooling tower are estimated using manufacturer specifications and calculation methodologies from AP-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 (%). A conservative estimate for the cycles of concentration used to obtain the PM_{total} emission factor for this cooling tower is 10. PM_{10} and $PM_{2.5}$ emission factors are estimated by multiplying the PM_{total} emission factor by the PM_{10} and $PM_{2.5}$ respective mass fractions. The PM_{10} and $PM_{2.5}$ mass fractions were estimated using, "Calculating Realistic PM_{10} emissions from Cooling Towers" by Reisman, J. and Frisbie, G.

HaulRD (Haul Roads)

Initial Construction Date: 2025 (Proposed)

Description:
Maximum Vehicle Miles Traveled/year: 3837.7 miles/year
Road type: Paved

Applicable Regulation:

401 KAR 63:010, *Fugitive Emissions*

This regulation is applicable to each affected facility (apparatus, operation, or road), that emits or could emit fugitive emissions but is not elsewhere subject to an opacity standard within 401 KAR Chapters 50 through 68.

Comments:
PM emissions from the Haul Roads are estimated using calculation methodologies from AP-42, Chapter 13.2.1(1/2011).
First, unmitigated emission factors are calculated individually for PM_{total}, PM_{10}, and $PM_{2.5}$ using an equation that includes lb/vehicle miles traveled (particle size multiplier (AP-42 Table 13.2.1-1)), average vehicle weight in tons, and silt loading value in g/m^2 for paved roads at iron and steel production facilities (AP-42 Table 13.2.1-3).
Next, mitigated emission factors for PM_{total}, PM_{10}, and $PM_{2.5}$ are calculated by multiplying the unmitigated emission factor by ((1 - days of rain greater than or equal to 0.01 inches) / (4 x 365 days/year)). Mitigated emission factors take natural mitigation due to precipitation into consideration and have been used for PTE calculations for this emission unit.

Material Handling Emission Points: EP-005, EP-006, EP-007, EP-009, EP-010, EP-012, EP-013, EP-014, EP-015, EP-016				
Pollutant	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
PM	$P \leq 0.5$; $E = 2.34$ $P > 0.5, \leq 30$; $E = 3.59 \times P^{0.62}$ Where: E = PM in lb/hr; P = process rate in tons/hr	401 KAR 59:010, Section 3(2)	PM_{total} : 0.003 lb/ton $PM_{2.5}$: 0.0011 lb/ton PM_{10} : 0.0011 lb/ton AP-42, Table 11.19.2-2 (See comments below)	Compliance assumed when the control devices are used in conjunction with the associated emission point and properly maintained. (pressure drop monitoring, monthly inspection).
	20% Opacity	401 KAR 59:010, Section 3(1)(a)	N/A	Qualitative Visual observation monthly, U.S. EPA Method 9 if visible emissions are observed or immediate corrective action resulting in no visible emissions.

Initial Construction Date: 2025 (Proposed)

Units	Process Name	Through-put (tons/hr)	Control Method
EP-005	Pneumatic Unloading of Plastic into Silo	16.67	Baghouse (95% Control)
	Pneumatic transfer of Silo into Small Hopper	16.67	
	Supersack Unloading to Screener	0.50	
	Supersack Screener Transfer to Silo (TK-10101)	0.50	
	Oversized Material Box	0.05	None
EP-006	Train 1: Transfer from TK-10101 to Plastic Feed Hopper A/B (TK-12103-A/B))	8.33	Baghouse (95% Control)
EP-007	Train 1: Transfer from TK-10101 to Plastic Feed Hopper A/B (TK-12103-A/B))	8.33	
EP-009	Train 2: Transfer from TK-10101 to Plastic Feed Hopper A/B (TK-12103-A/B))	8.33	
EP-010	Train 2 Transfer from TK-10101 to Plastic Feed Hopper A/B (TK-12103-A/B))	8.33	
EP-012	Train 3: Transfer from TK-12103-A/B to Plastic Slurry Tank (TK-12104-A/B)	8.33	
EP-013	Train 3: Transfer from TK-12103-A/B to Plastic Slurry Tank (TK-12104-A/B)	8.33	
EP-014	Train 4: Transfer from TK-12103-A/B to Plastic Slurry Tank (TK-12104-A/B)	8.33	

Material Handling Emission Points: EP-005, EP-006, EP-007, EP-009, EP-010, EP-012, EP-013, EP-014, EP-015, EP-016				
	EP-015	Train 4: Transfer from TK-12103-A/B to Plastic Slurry Tank (TK-12104-A/B)	8.33	
	EP-016	Train 4: Transfer from TK-12103-A/B to Plastic Slurry Tank (TK-12104-A/B)	8.33	

Applicable Regulation:

401 KAR 59:010, *New process operations*
This regulation is applicable to each affected facility, associated with a process operation, which is not subject to another emission standard with respect to particulates, commenced on or after July 2, 1975.

Comments:
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 (Crushed Stone Processing Operations (lb/Ton) --Conveyor Transfer Point). Plastic was not available; therefore, crushed stone processing was used as a worst case for clean, dry material.

A Baghouse will be used as the control device. 100% capture efficiency and 95% control efficiency has been assumed, as provided by the facility.

For the Oversized Material Box (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, no control is applied.

Plastic Conversion Process: Reactors (R-20001 & R-20002)				
Pollutant	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
Hydrogen Sulfide (H_2S)	10 grains per 100 dscf (165 ppmv) at zero percent oxygen except that sources whose combined process gas stream emission rate totals less than 2 tons/day of H_2S shall either reduce such emissions by 85% or control such emissions such that H_2S in the gas stream emitted into the ambient air does not exceed 10 grains per 100 dscf (165 ppmv) at zero percent oxygen	401 KAR 59:105, Section 3	To be determined via testing	Initial U.S. EPA Method 11 test

Initial Construction Date: 2025 (Proposed)

Equipment	Facility ID	Maximum Input Rate (lb plastic/hr)	Emission Release Points

Plastic Conversion Process: Reactors (R-20001 & R-20002)

R-20001	Primary Reactor	8,333	Process Heaters (BUR-20002 & H-20002); Relief Flare (EP-003)
R-20002	Secondary Reactor	8,333	

Applicable Regulation:

401 KAR 59:105, *New process gas streams*
This regulation is applicable to any process gas stream which is not elsewhere subject to a standard of performance within 401 KAR Chapter 59 with respect to hydrogen sulfide, sulfur dioxide, or carbon dioxide for commencement on or after June 6, 1979. [401 KAR 59:105, Section 1]

401 KAR 63:020, *Potentially hazardous matter or toxic substances*
This regulation is applicable to any emission unit which emits or may emit potentially hazardous matter or toxic substances which may be harmful to humans, animals, and plants, where such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division for Air Quality.

Precluded Regulation:

401 KAR 51:017, *Prevention of significant deterioration of air quality*

401 KAR 52:020, *Title V permits*

Comments:
The non-condensable process gasses generated by R-20001 and/or R-20002 shall be combusted in the Process Heaters (BUR-20002 & H-20002) at all times when R-20001 and/or R-20002 is in operation, except during periods of startup and shutdown, process upset, and maintenance during which times all non-condensable process gasses shall be combusted by the Relief Flare (EP-003).

Although the Plastic Conversion Process is the principal activity for the facility, neither R-20001 (Primary Reactor) nor R-20002 (Secondary Reactor) emits pollutants directly to the atmosphere. Non-condensable gases from the process are burned for heat recovery in the Process Heaters (BUR-20002 & H-20002) or flared in the Relief Flare (EP-003) during periods of malfunction, process upset, and startup/shutdown. Emissions from this activity have been taken into account under the Process Heaters and Relief Flare.

In accordance with 401 KAR 59:105, Section 6(1) the permittee shall conduct an initial performance test to demonstrate compliance with the H_2S emission limitation of 401 KAR 59:105 Section 3. While H_2S has not been demonstrated to be emitted from this process in the application, an initial test is being required to confirm compliance with the 401 KAR 59:105 standard.

This facility does not have an emission standard for Sulfur Dioxide (SO_2) in accordance with 401 KAR 59:105, Section 4 since a source with an SO_2 PTE of less than 100 tpy shall be exempt from this standard. This facility does not have an emission standard for Carbon Monoxide (CO) in accordance with 401 KAR 59:105, Section 5 since a source with a CO PTE of less than 1000 tpy shall be exempt from this standard. [401 KAR 59:105, Section 1(3)]

Plastic Conversion Process: Process Heaters (BUR-20002 & H-20002)				
Pollutant	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
PM	0.50 lb/MMBtu	401 KAR 59:015, Section 4(1)(c)	7.6 lb/MMScf AP-42, Chapter 1, Table 1.4-2	For PM and SO_2 and opacity standards: Compliance is assumed when combusting 100% natural gas. For PM and SO_2 emission standards when combusting process gas: Compliance shall be demonstrated via initial U.S. EPA Method 5 and 6 (respectively) test. For opacity standards when combusting process gas: Compliance shall be demonstrated via daily observation. If after 180 days of daily observation, visual observations may be reduced to weekly.
	20% opacity	401 KAR 59:015, Section 4(2)	N/A	
SO_2	2.48 lbs/MMBtu	401 KAR 59:015, Section 5(1)(c)(2.)(b.)	0.6 lb/MMScf AP-42, Chapter 1, Table 1.4-2	

Initial Construction Date: 2025 (Proposed)

Emission Unit	Facility ID	Heat Capacity (MMBtu/hr)	Fuel Type
B20002	Secondary Reactor Burner (BUR-20002)	3.89	Primary: Non-condensable Process gas Secondary: Natural gas
H20002	Secondary Reactor Heater (H-20002)	12	

Applicable Regulation:

401 KAR 59:015, *New Indirect Heat Exchangers*
This regulation is applicable to indirect heat exchangers having a heat input capacity greater than one (1) million BTU per hour (MMBtu/hr) commenced on or after April 9, 1972 (401 KAR 59:015, Section 2(1)).

401 KAR 63:020, *Potentially hazardous matter or toxic substances*
This regulation is applicable to any emission unit which emits or may emit potentially hazardous matter or toxic substances which may be harmful to humans, animals, and plants, where such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division for Air Quality.

Precluded Regulation:

401 KAR 51:017, *Prevention of significant deterioration of air quality*

401 KAR 52:020, *Title V permits*

Comments:

Plastic Conversion Process: Process Heaters (BUR-20002 & H-20002)

401 KAR 60:005, **Section 2(2)(d)**, 40 C.F.R. 60.40c through 60.48c, (**Subpart DC**), *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*
This regulation does not apply to H20002 nor B20002 as both units meet the definition of "process heater" and therefore are not considered "steam generating units" pursuant to 40 CFR 60.41c.

The non-condensable process gasses generated by R-20001 and/or R-20002 shall be combusted in the Process Heaters (BUR-20002 & H-20002) at all times when R-20001 and/or R-20002 is in operation, except during periods of startup and shutdown, process upset, and maintenance during which times all non-condensable process gasses shall be combusted by the Relief Flare (EP-003). BUR-20002 and H-20002 have the ability to combust natural gas as a backup fuel. The combustion of non-condensable process gas is considered the primary fuel and represents the worst-case emissions profile.

For both BUR-20002 and H-20002 during combustion of the non-condensable process gas:
Process gas emissions will alone be counting towards the maximum potential.
Emission factors for VOC and NOx for process gas combustion are derived from facility provided data on the "Process Gas Stream ID20042".

For VOC, the emission factor is the sum of the given C3, C4, C5, C6, C8, & C9 constituents' (Propane through Nonane) VOC content (lb/MMScf):

$$(2038.8 + 1280.4 + 710.4 + 132.6 + 267 + 1{,}056.6)\frac{lb}{MMScf} = 5{,}485.8\frac{lb}{MMScf}$$

VOC emissions will be controlled at an assumed efficiency of 98%. The Division is requiring the facility to perform testing to further confirm and establish the VOC emission factor and emission control efficiency within 60 days after achieving the maximum production rate at which R-20001 & R-20002 will be operated, but not later than 180 days after the initial start-up of the R-20001 & R-20002 and the associated process units.

For NOx, the emission factor is conservatively estimated from facility provided process gas stream data as follows:

Process Gas Stream		
Constituent	Composition Wt%	Emission Factor (lb/MMscf)
Nitrogen	3.74%	See calculations below; EF_{N2} = 2,244.7
VOC	9.14%	5,485.8

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 emission factor of AP-42 Table 1.4-1, and the emission factor only accounts for thermal and prompt NOx from a gas fired boiler.
Assume 100% of nitrogen content in the process gas is converted to fuel bound NOx:
Assume 90% of fuel bound NOx is NO

Plastic Conversion Process: Process Heaters (BUR-20002 & H-20002)

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 (assumed to equal the value from AP-42 Table 1.4-1) we get an emission factor of:

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

NOx emissions will be controlled by Selective Catalytic Reduction (SCR) at an assumed efficiency of 95%. Within 60 days after achieving the maximum production rate at which R-20001 & R-20002 will be operated, but not later than 180 days after the initial start-up of the R-20001 & R-20002 and the associated process units, the Division is requiring the facility to conduct an initial performance test to establish an uncontrolled nitrogen oxides (NOx) emission factor while combusting 100% process gas (or the highest achievable percentage of process gas), and control efficiency of the SCR.

For all other criteria pollutants and HAPs, emissions are estimated using AP-42 Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4.
Likewise, emission factors for the greenhouse gases are from 40 CFR 98 Tables C1 & C2.

401 KAR 59:015 Emission Limitations:
PM emission limitations in Permit F-25-019 were calculated as follows based on 401 KAR 59:015, Section 4(1)(c):

$$0.9634 \times (12\ \frac{MMBtu}{hr} + 3.89\ \frac{MMBtu}{hr})^{(-0.2356)} = 0.50\ \frac{lb}{MMBtu}$$

SO2 emission limitations in Permit F-25-019 were calculated as follows based on 401 KAR 59:015, Section 5(1)(c)(2.)(b.):

$$7.7223 \times (12\ \frac{MMBtu}{hr} + 3.89\ \frac{MMBtu}{hr})^{(-0.4106)} = 2.48\ \frac{lb}{MMBtu}$$

The Division is requiring the facility to perform testing to establish unit specific PM and SO2 emission factors while combusting 100% process gas (or the highest achievable percentage of process gas) within 60 days after achieving the maximum production rate at which R-20001 & R-20002 will be operated, but not later than 180 days after the initial start-up of the R-20001 & R-20002 and the associated process units.

Initial testing using U.S. EPA Method 23 shall be performed to determine the presence (and concentration if present) of dioxins/furans within 60 days after achieving the maximum production rate at which R-20001 & R-20002 will be operated, but not later than 180 days after the initial start-up of the R-20001 & R-20002 and the associated process units. While dioxins/furans have not been demonstrated to be present in the process gas stream in the application, these compounds can be formed during the pyrolysis of plastics. Therefore, an initial test is being required to determine the presence (if any) and concentration of these compounds.

EP-003 - Relief Flare (FL-05001) & EP-004 - Tank Farm Flare (FL-00502)				
Pollutant	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
PM	PM emissions must not exceed greater than twenty (20) percent opacity for more than three (3) minutes in any one (1) day.	401 KAR 63:015, Section 3	7.6 lb/MMScf AP-42, Table 1.4-2	Daily observation. If after 180 days of daily observation, visual observations may be reduced to weekly.

Initial Construction Date: 2025 (Proposed)

Emission Unit	Facility ID	Heat Capacity of Flare Pilot (MMBtu/hr)	Control Efficiency	Emissions Controlled
EP-003	Relief Flare (FL-05001)	0.1	98%	Process Combustion Upset, Startup & Shutdown, Maintenance, 0.52 MMScf/hr (R-20001 & R-20002; BUR-20002 & H-20002)
EP-004	Tank Farm Flare (FL-00502)			Loading Racks (LOAD), Storage Tanks (Table I & II)

Applicable Regulation:

401 KAR 63:015, *Flares*

401 KAR 63:020, *Potentially hazardous matter or toxic substances*
This regulation is applicable to any emission unit which emits or may emit potentially hazardous matter or toxic substances which may be harmful to humans, animals, and plants, where such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division for Air Quality.

Precluded Regulation:

401 KAR 51:017, *Prevention of significant deterioration of air quality*

401 KAR 52:020, *Title V permits*

Comments:

EP-003 Relief Flare (FL-05001)

The Relief Flare is used to combust the non-condensable process gasses produced within the Reactors during periods of startup and shutdown, process upset, and maintenance. The non-condensable process gasses produced shall always be burned in the Process Heaters (BUR-20002 & H-20002) except during periods of startup and shutdown, process upset, and maintenance.
Because of this, the Relief Flare has four processes:

EP-003 - Relief Flare (FL-05001) & EP-004 - Tank Farm Flare (FL-00502)

Process 1 consists of emissions from the Flare Pilot.

- The Flare Pilot is assumed to operate at 8760 hours/year and runs on natural gas.
- The hourly design rate is calculated by dividing the 0.1 MMBtu/hr heat capacity by the 1020 Btu/scf natural gas heat content to get 9.8×10^{-5} MMScf/hr.
- For criteria pollutants and HAPs from the Flare Pilot process, emission factors are from AP-42 Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4.
- For the greenhouse gases from the Flare Pilot process, emission factors are from 40 CFR 98 Tables C1 & C2.

Process 2 - Emissions from Startup & Shutdown - consists of emissions routed to be released by the Relief Flare during periods when the Process Heaters are starting up or shutting down, and the process gasses that are being produced or have been produced in the Reactors cannot be efficiently burned in the Process Heaters.

- The Startup & Shutdown process is assumed to have a duration of 52 hours/year (26 annual occurrences lasting 2 hours).
- The hourly design rate for this process is given as 0.0069008 MMScf/hr (Volumetric Flow).
- The heat input for this process is given as 6.46 MMBtu/hr.
- A VOC Emission Factor for this process is estimated as 5.6 lb/MMScf from the Emission Inventory Improvement Program (EIIP), Vol. II, Chapter 14.
- The NOx Emission Factor for this process is estimated as 0.0641 lb/MMBtu from the TCEQ guidance documents for flaring low Btu process gas.
- The CO Emission Factor for this process is estimated as 0.5496 lb/MMBtu from the TCEQ guidance documents for flaring low Btu process gas.
- For the remaining criteria pollutants and HAPs emitted during the Startup & Shutdown process, emission factors are taken from AP-42 Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4.
- For the greenhouse gases emitted during the Startup & Shutdown process, emission factors are taken from 40 CFR 98 Tables C1 & C2.

Process 3 - Process Upsets - takes into account emissions that will be routed to the Relief Flare when upsets occur in the Process Heaters and Reactors.

- The Upsets process is assumed to have a duration of 26 hours/year (26 annual occurrences lasting 1 hour).
- For VOC, the process gas VOC Emission Factor of 5,485.8 lb/MMScf is equal to the sum of the listed C3 through C9 composition in lb/MMscf.
- The NOx Emission Factor for this process is estimated as 0.0641 lb/MMBtu from the TCEQ guidance documents for flaring low Btu process gas.
- The CO Emission Factor for this process is estimated as 0.5496 lb/MMBtu from the TCEQ guidance documents for flaring low Btu process gas.
- For the remaining criteria pollutants and HAPs emitted during the Upsets process, emission factors are taken from AP-42 Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4.
- For the greenhouse gases emitted during the Upsets process, emission factors are taken from 40 CFR 98 Tables C1 & C2.

Process 4 - Emissions during Maintenance Events - accounts for emissions that will be routed to the Relief Flare when the Process Heaters used to burn the non-condensable Process Gas are undergoing maintenance.

EP-003 - Relief Flare (FL-05001) & EP-004 - Tank Farm Flare (FL-00502)

In those situations, the Process Gas is sent to be burned via the Relief Flare.

- The Maintenance Events process is assumed to vent to this flare for a duration of 26 hours/year (26 annual occurrences lasting 1 hour).
- This process uses the same gas stream as the Startup and Shutdown Process but has 26 annual occurrences lasting 1 hour instead of 2 hours.
- A VOC Emission Factor for this process is estimated as 5.6 lb/MMScf from the Emission Inventory Improvement Program (EIIP), Vol. II, Chapter 14.
- The NOx emission factor for this process is estimated as 0.0641 lb/MMBtu from the TCEQ guidance documents for flaring low Btu process gas.
- The CO Emission Factor for this process is estimated as 0.5496 lb/MMBtu from the TCEQ guidance documents for flaring low Btu process gas.
- For the remaining criteria pollutants and HAPs emitted during the Maintenance Events process, emission factors are taken from AP-42 Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4.
- For the greenhouse gases emitted during the Maintenance Events process, emission factors are taken from 40 CFR 98 Tables C1 & C2.

EP-004 Tank Farm Flare (FL-005002)

The Tank Farm Flare has 1 process (the Flare Pilot), and controls emissions from the Storage Tanks in Tables I & II as well as the emissions from the Loading Racks (Processes 1-3).

For all criteria pollutants and HAPs emitted from the Flare Pilot process, emission factors are taken from AP-42 Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4 and are in units of lb/MMScf.

For the greenhouse gases emitted during the process, emission factors are taken from 40 CFR 98 Tables C1 & C2 in units of kg/MMBtu and multiplied by a factor of 2.20462 lb/kg then by the natural gas heat content of 1020 Btu/Scf to get lb/MMScf.

Table I Storage Tanks: Tank 12204 & Tank 12209

Initial Construction Date: 2025 (Proposed)

Description Tank Orientations: Horizontal; Tank Type: Internal Floating Roof					
Tank ID	**Product**	**Capacity (gallons)**	**Throughput (gallons/yr)**	**Maximum True Vapor Pressure (psia)**	**Control Device**
Tank 12204	Naphtha Product Tank	37,600	9,307,500	5.06	Tank Farm Flare (EP-004) [98% control efficiency]
Tank 12209	Off-Spec Naphtha Tank	37,600	178,500	5.06	

Applicable Regulation:

40 C.F.R. 60.110c to 60.117c, (**Subpart Kc**), *Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After October 4, 2023*
This regulation applies to each storage vessel with a capacity greater than or equal to 20,000 gallons (gal) (75.7 cubic meters (m^3)) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after October 4, 2023. Vapor pressure must be at least 0.25 psia (1.7 kPa absolute).

401 KAR 63:020, *Potentially hazardous matter or toxic substances*
This regulation is applicable to any emission unit which emits or may emit potentially hazardous matter or toxic substances which may be harmful to humans, animals, and plants, where such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division for Air Quality.

Precluded Regulation:

401 KAR 51:017, *Prevention of significant deterioration of air quality*

401 KAR 52:020, *Title V permits*

Comments:
401 KAR 59:050, *New storage vessels for petroleum liquids*
This regulation does not apply to the Table I Storage Tanks as although the volumetric requirements can be met, the Table I storage tanks will have construction years outside the applicability dates (on or after 1972 and prior to July 24, 1984) of 401 KAR 59:050.

Tank 12204 & Tank 12209 will be equipped with internal floating roofs in addition to their emissions being routed to the Tank Farm Flare (EP-004) at a control efficiency of 98%. The internal floating roofs will be the control methods used to comply with 40 CFR 60, Subpart Kc.

Pollutant emissions from the storage tanks are calculated using tank parameters, material characteristics from SDSs, throughputs based on maximum design loadout capacities, and emission calculation methods from AP-42, Chapter 7.1. VOC is assumed to constitute 100% of pollutant emissions. HAP and TAP emissions were calculated by applying the product speciation ratios from the Green Mountain Energy LLC "Synthetic Petroleum" SDS to the calculated VOC emission factor. Emissions are calculated by using a "total loss" process instead of working and breathing losses.

Table II Storage Tanks: 12203A, 12203B, 12205A, 12205B, 12206, 12208, 12210

Initial Construction Date: 2025 (Proposed)

Description Tank Orientations: Horizontal; Tank Type: Fixed Roof					
Tank ID	**Product**	**Capacity (gallons)**	**Throughput (gallons/yr)**	**Maximum True Vapor Pressure (psia)**	**Control Device**
Tank 12203-A	Naphtha Product Day Tank A	15,220	9,307,500	5.06	Tank Farm Flare (EP-004) [98% control efficiency]
Tank 12203-B	Naphtha Product Day Tank B	15,220	9,307,500	5.06	
Tank 12205-A	Diesel Product Day Tank A	73,430	9,307,500	0.0115	
Tank 12205-B	Diesel Product Day Tank B	73,430	9,307,500	0.0115	
Tank 12206	Diesel Product Tank	709,460	9,307,500	0.0115	
Tank 12208	Residue Product Tank	527,920	2,190,000	0.0000931	
Tank 12210	Off-Spec Diesel Tank	190,160	178,500	0.0115	

Applicable Regulation:

401 KAR 63:020, *Potentially hazardous matter or toxic substances*
This regulation is applicable to any emission unit which emits or may emit potentially hazardous matter or toxic substances which may be harmful to humans, animals, and plants, where such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division for Air Quality.

Precluded Regulation:

401 KAR 51:017, *Prevention of significant deterioration of air quality*

401 KAR 52:020, *Title V permits*

Comments:
401 KAR 59:050, *New storage vessels for petroleum liquids*
This regulation does not apply to the Table II Storage Tanks as although the volumetric requirements can be met, the Table II storage tanks will have construction years outside the applicability dates (on or after 1972 and prior to July 24, 1984) of 401 KAR 59:050.
The Tank Farm Flare (EP-004) will be used to control emissions from these tanks.

Pollutant emissions from these storage tanks are calculated using tank parameters, material characteristics from SDSs, throughputs based on maximum design loadout capacities, and emission calculation methods from AP-42, Chapter 7.1. VOC is assumed to constitute 100% of pollutant emissions. HAP and TAP emissions were calculated by applying the product speciation ratios from the Green Mountain Energy LLC "Synthetic Petroleum" SDS to the calculated VOC emission factor. Emissions are calculated by using a "total loss" process instead of working and breathing losses.

Loading Racks (LOAD) and Barge Loadout (EP-017)

Initial Construction Date: 2025 (Proposed)

Point	Product Loaded	Loading Modes	Throughput (gallons/day)	Throughput (gallons/yr)	Control Device
LOAD (1)	Naphtha	Truck, Rail	25,500	9,307,500	Tank Farm Flare (EP-004) [98% control efficiency]
LOAD (2)	Diesel	Truck, Rail	25,500	9,307,500	
LOAD (3)	Residue (Fuel Oil)	Truck	6,000	2,190,000	
EP-017	Diesel	Barge	25,500	9,307,500	None

Applicable Regulation:

401 KAR 63:020, *Potentially hazardous matter or toxic substances*
This regulation is applicable to any emission unit which emits or may emit potentially hazardous matter or toxic substances which may be harmful to humans, animals, and plants, where such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division for Air Quality.

Precluded Regulation:

401 KAR 51:017, *Prevention of significant deterioration of air quality*

401 KAR 52:020, *Title V permits*

Comments:
The Tank Farm Flare (EP-004) will be used to control emissions from the Loading Racks, with a control efficiency of 98%.

The Barge Loadout (EP-017) will be used to load only diesel, and the activity will be uncontrolled.

Pollutant emissions from loading the resulting 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.

VOC is assumed to constitute 100% of pollutant emissions. HAP and TAP emissions were calculated by applying the product speciation ratios from the Green Mountain Energy LLC “Synthetic Petroleum” SDS to the calculated VOC emission factor for a “worst case” emission profile.

Fugitive Piping Components (FUG)

Initial Construction Date: 2025 (Proposed)

Piping Component	Component Count	Service Type
Valves	30	Light Liquid
Pump Seals	45	Light Liquid
Connectors & Flanges	2297	All

Applicable Regulation:

401 KAR 63:020, *Potentially hazardous matter or toxic substances*
This regulation is applicable to any emission unit which emits or may emit potentially hazardous matter or toxic substances which may be harmful to humans, animals, and plants, where such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division for Air Quality.

Precluded Regulation:

401 KAR 51:017, *Prevention of significant deterioration of air quality*

401 KAR 52:020, *Title V permits*

Comments:
The Fugitive Piping Components will not have a control device for the emissions.

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.
VOC is assumed to constitute 100% of pollutant emissions. HAP and TAP emissions were calculated by applying the product speciation ratios from the Green Mountain Energy LLC “Synthetic Petroleum” SDS to the calculated VOC emission factor.

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS (CONTINUED)

Testing Requirements\Results :

Emission Unit(s)	Control Device	Parameter	Regulatory Basis	Frequency	Test Method	Permit Limit	Test Result	Thruput and Operating Parameter(s) Established During Test	Activity Graybar	Date of last Compliance Testing
Plastic Conversion Process (R-20001 & R-20002); Process Heaters (BUR-20002 & H-20002)	N/A	H_2S	401 KAR 50:045, Section 2	Initial	U.S. EPA Method 11 test	10 grains per 100 dscf (165 ppmv) at 0% oxygen	TBD	TBD	TBD	TBD
	N/A	PM		Initial	U.S. EPA Method 5	0.50 lbs/MMBtu	TBD	TBD	TBD	TBD
	N/A	SO_2		Initial	U.S. EPA Method 6	2.48 lbs/MMBtu	TBD	TBD	TBD	TBD
	SCR	NO_X		Initial; Every 5 Years	U.S. EPA Method 7	90 TPY Source-wide	TBD	TBD	TBD	TBD
	BUR-20002 & H-20002	VOC		Initial; Every 5 Years	U.S. EPA Method 25A	90 TPY Source-wide	TBD	TBD	TBD	TBD
	N/A	Dioxins/ Furans		Initial	U.S. EPA Method 23	N/A	TBD	TBD	TBD	TBD

Footnotes:

SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS

Table A - Group Requirements:

Emission and Operating Limit	Regulation	Emission Unit
90 tpy of NOx emissions	To preclude **401 KAR 52:020**, *Title V permits*	Source-wide
90 tpy of VOC emissions	To preclude **401 KAR 52:020**, *Title V permits* and **401 KAR 51:017**, *Prevention of significant deterioration of air quality*	

Table B - Summary of Applicable Regulations:

Applicable Regulations	Emission Unit
401 KAR 59:010, *New process operations*	EP-001, EP-005, EP-006, EP-007, EP-009, EP-010, EP-012, EP-013, EP-014, EP-015, EP-016
401 KAR 59:015, *New indirect heat exchangers*	B20002, H20002
401 KAR 59:105, *New process gas streams*	Plastic Conversion Process (R-20001 & R-20002)
40 C.F.R. 60.110c through 60.117c, **(Subpart Kc)**, *Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After October 4, 2023*	12204, 12209
401 KAR 63:010, *Fugitive Emissions*	HaulRD
401 KAR 63:015, *Flares*	EP-003, EP-004,
401 KAR 63:020, *Potentially hazardous matter or toxic substances.*	EP-003, EP-004, B20002, H20002, 12203A, 12203B, 12204, 12205A, 12205B, 12206, 12208, 12209, 12210, LOAD, FUG

Table C - Summary of Precluded Regulations:

Precluded Regulations	Emission Unit
401 KAR 51:017, *Prevention of significant deterioration of air quality*	Source-Wide
401 KAR 52:020, *Title V permits*	

Table D - Summary of Non Applicable Regulations:

N/A

SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS (CONTINUED)

Air Toxic Analysis

401 KAR 63:020, *Potentially Hazardous Matter or Toxic Substances*
The Division for Air Quality (Division) has performed modeling using SCREEN View on July 24, 2025 of potentially hazardous matter or toxic substances (Benzene; 1,4-Dichlorobenzene; Formaldehyde; Hexane/N-Hexane; Toluene; Cadmium; Total (as Cd); Chromium; Manganese Total (as Mn); Nickel Total (as Ni); Heptane; Pentane; Xylenes (M,P,O); Cumene; 1,2,4-Trimethylbenzene; Naphthalene; Ethylbenzene; Cyclohexane; and Nonane) that may be emitted by the facility based upon the process rates, material formulations, stack heights and other pertinent information provided by the applicant. Based upon this information, the Division has determined that the conditions outlined in this permit will assure compliance with the requirements of 401 KAR 63:020.

Single Source Determination
N/A

SECTION 5 – PERMITTING HISTORY

None

SECTION 6 – PERMIT APPLICATION HISTORY

None

APPENDIX A – ABBREVIATIONS AND ACRONYMS

AAQS – Ambient Air Quality Standards
BACT – Best Available Control Technology
Btu – British thermal unit
CAM – Compliance Assurance Monitoring
CO – Carbon Monoxide
Division – Kentucky Division for Air Quality
ESP – Electrostatic Precipitator
GHG – Greenhouse Gas
HAP – Hazardous Air Pollutant
HF – Hydrogen Fluoride (Gaseous)
MSDS – Material Safety Data Sheets
mmHg – Millimeter of mercury column height
NAAQS – National Ambient Air Quality Standards
NESHAP – National Emissions Standards for Hazardous Air Pollutants
NO_x – Nitrogen Oxides
NSR – New Source Review
PM – Particulate Matter
PM_{total} – Total Particulate Matter
PM_{10} – Particulate Matter equal to or smaller than 10 micrometers
$PM_{2.5}$ – Particulate Matter equal to or smaller than 2.5 micrometers
PSD – Prevention of Significant Deterioration
PTE – Potential to Emit
SO_2 – Sulfur Dioxide
TAP –Toxic Air Pollutant
TF – Total Fluoride (Particulate & Gaseous)
VOC – Volatile Organic Compounds

APPENDIX B – INDIRECT HEAT EXCHANGER EMISSIONS LIMITATIONS

Summary of All Affected Facilities Used to Determine 401 KAR 59:015 Emission Limits								
EU	**Fuel(s)**	**Capacity (MMBtu/hr)**	**Constructed**	**Basis for PM Limit**	**Total Heat Input Capacity for PM Limit (MMBtu/hr)**	**Basis for SO_2 Limit**	**Total Heat Input Capacity for SO_2 Limit (MMBtu/hr)**	**Notes**
B20002	Primary: Non-condensable Process gas	3.89	2025 (Proposed)	Section 4(1)(c)	15.89	Section 5(1)(c)(c)(2.)(b.)	15.89	
H20002	Secondary: Natural gas	12			15.89		15.89	