

Commonwealth of Kentucky
Division for Air Quality
STATEMENT OF BASIS / SUMMARY

Title V, Construction/Operating
Permit: V-24-006
Lightning Renewables, LLC - Tri-K RNG
1905 KY Highway 3249
Stanford, KY 40484
May 15, 2024
Walker Reeves, EIT, Reviewer
SOURCE ID: 21-137-00034
AGENCY INTEREST: 180239
ACTIVITY: APE20230001

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SECTION 1 – SOURCE DESCRIPTION

SIC Code and description: 4925, Mixed, Manufactured, or Liquefied Petroleum Gas Production and/or Distribution

Single Source Det. Yes No If Yes, Affiliated Source AI: 2726

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

28 Source Category Yes No If Yes, Category:

County: Lincoln

Nonattainment Area N/A PM₁₀ PM_{2.5} CO NO_x SO₂ Ozone Lead

If yes, list Classification:

PTE* greater than 100 tpy for any criteria air pollutant Yes No

If yes, for what pollutant(s)?

PM₁₀ PM_{2.5} CO NO_x SO₂ VOC

PTE* greater than 250 tpy for any criteria air pollutant Yes No

If yes, for what pollutant(s)?

PM₁₀ PM_{2.5} CO NO_x SO₂ 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:

Lightning Renewables, LLC – Tri-K RNG (Tri-K RNG) is a new source to be co-located at Tri-K Landfill in Stanford, Kentucky. These sources are considered a “single source” for Title V and PSD, and because Tri-K Landfill is required to obtain a Title V permit by 401 KAR 52:020, Section 1(4), Tri-K RNG must also obtain a Title V permit.

Tri-K RNG is a renewable natural gas plant that will receive collected landfill gas (LFG) from the adjacent Tri-K Landfill. The LFG will be treated during the refinement process. Each step of the process allows landfill gas to be destroyed by the thermal oxidizer or back-up flare (EU02). The flare is limited to a maximum heat input of 350,000 MMBtu across all flare modes per rolling 12-month period. No emissions may be vented directly to the atmosphere at any time.

SECTION 2 – CURRENT APPLICATION AND EMISSION SUMMARY FORM

Permit Number: V-24-006

Activities: APE20230001

Received: December 14, 2023

Application Complete Date(s): February 12, 2024

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

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

Description of Action:

The initial application for Tri-K RNG’s Title V permit was received by the Division on December 14, 2023. The application was deemed complete on February 12, 2024.

Tri-K RNG indicated that with this action they would construct a landfill gas to natural gas processing facility adjacent to Tri-K Landfill. The facility includes a thermal oxidizer and flare (EU 02) for control of emissions, an emergency engine (EU 03) for lightning and administrative/control purposes in the event of loss of power, and two LFG condensate storage tanks that are insignificant activities.

Tri-K RNG requested a heat input limit of 350,000 MMBtu per rolling 12-month period on the Back-Up Flare (EU 02).

No LFG can be vented uncontrolled to the atmosphere.

V-23-036 Emission Summary		
Pollutant	PTE V-23-036 (tpy)	Combined Facility PTE* (tpy)
CO	145.07	145.18
NO _x	33.25	33.38
PT	7.25	70.76
PM ₁₀	7.25	46.10
PM _{2.5}	7.25	21.85
SO ₂	8.13	8.13
VOC**	131.20	131.27
Lead	0.00000359	0.00000385
Greenhouse Gases (GHGs)		
Carbon Dioxide	153534	159612
Methane	634	3667
Nitrous Oxide	0.67	0.67
CO ₂ Equivalent (CO ₂ e)	169572	251479
Hazardous Air Pollutants (HAPs)		
Hydrochloric Acid	3.05	3.05

V-23-036 Emission Summary		
Pollutant	PTE V-23-036 (tpy)	Combined Facility PTE* (tpy)
Toluene	6.70	7.64
Xylenes (Total)	2.42	2.76
Combined HAPs:**	19.98	32.01

*Note: The “Combined Facility PTE” includes both emissions from Tri-K RNG and Tri-K Landfill. Because they are considered a “single source” their emissions must be counted together. However, the flare at Tri-K Landfill is not counted toward the combined facility PTE, because the landfill only generates a set quantity of gas, which is accounted for in Tri-K RNG’s operation.

**Note: Emissions of VOC and most HAPs are controlled by the flare or the thermal oxidizer. The permittee must control emissions at all times.

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS

Emission Unit 01 - Renewable Natural Gas Plant & Emission Unit 02 – Back-Up Flare				
Pollutant	Emission Limit or Standard	Regulatory Basis for Emission Limit or Standard	Emission Factor Used and Basis	Compliance Method
Opacity (EU 01)	< 20%	401 KAR 59:010, Section 3(1)(a)	-	Daily qualitative observations and recordkeeping.
PM (EU 01)	Process Weight Rate (P): ≤ 0.5 tons/hour: 2.34 lbs/hr ≤ 30 tons/hour: 3.59P ^{0.62}	401 KAR 59:010, Section 3(2)	AP 42 Table 2.4-5 AP 42 Table 1.4-2	Assumed to be in compliance based on the maximum process weight rate and emission factors provided by the application.
Opacity (EU 02)	< 20%	401 KAR 63:015, Section 3	-	Daily qualitative observations and recordkeeping.

Initial Construction Date: 2024

Process Description:

Emission Unit 01 (EU 01) – Renewable Natural Gas (RNG) Plant

The RNG facility receives LFG from Tri-K Landfill’s gas collection system. The resulting LFG stream is treated, compressed, and injected into local gas distribution or transmission networks.

Emission Unit 02 (EU 02) – Trim Flare

Open flare for use when produced gas is off-spec or during RNG plant outage.

Maximum Capacities:

- EU 01 – RNG Plant: 3,200 scfm LFG
- EU 02 – Trim Flare: 3,520 scfm LFG
- Thermal Oxidizer: 1,600 scfm waste gas

Control Devices for EU 01: Thermal Oxidizer and Flare (EU 02)

Applicable Regulations:

- 401 KAR 53:010**, *Ambient air quality standards*
- 401 KAR 59:010**, *New process operations*, applies to EU 01
- 401 KAR 63:015**, *Flares*, applies to EU 02
- 401 KAR 63:002, Section 2(4)(hhh), 40 C.F.R. 63.1930 through 63.1990, Table 1 (Subpart AAAA)**, *National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills*
- 40 CFR 63.11**, *Control device and work practice requirements*

Comments:

EU 01 & 02 – Emission factors for these units were determined from mass balances, manufacturer guarantees, AP-42 Tables 1.4-1 through 1.4-4 and 40 CFR 98 Tables C-1 and C-2 for fuel usage, and AP-

Emission Unit 01 - Renewable Natural Gas Plant & Emission Unit 02 – Back-Up Flare	
42 Tables 2.4-1, 2.4-2, and 2.4-4 (Draft) for landfill gas destroyed.	
For EU 02, Flare Mode 1 represents the highest MMBtu/hr heat input, but Flare Mode 2 represents the highest methane load to the flare and worst case emissions profile. All emission factor calculations for the flare are normalized using the 1,960 scfm flowrate for Flare Mode 2. Control efficiency for Non Methane Organic Compounds (NMOC) is 99% for the thermal oxidizer and 98% for the flare.	
Emission Unit 02 – Back-Up Flare is limited to a maximum heat input of 350,000 MMBtu across all flare modes per rolling 12-month period.	

Emission Unit 03 – Emergency CI RICE #1				
Pollutant	Emission Limit or Standard	Regulatory Basis for Emission Limit or Standard	Emission Factor Used and Basis	Compliance Method
CO	3.5 g/KW-hr	40 CFR 60.4205(b) referencing 40 CFR 60.4202	See notes.	Based on certified engine or maintenance of engine in a manner consistent with good air pollution control practice for minimizing emissions and an initial performance test
NMHC + NOx	4.0 g/KW-hr	40 CFR 60.4205(b) referencing 40 CFR 60.4202	See notes.	
PM	0.20 g/KW-hr	40 CFR 60.4205(b) referencing 40 CFR 60.4202	See notes.	

Initial Construction Date: 2024

Process Description:
 Cummins DSGAE 4-Stroke CI RICE for emergency administrative use.

Maximum Continuous Rating: 324 HP (242 kW)
 Fuel: Diesel
 Controls: None

Applicable Regulations:
401 KAR 60:005, Section 2(2)(dddd), 40 C.F.R. 60.4200 through 60.4219, Tables 1 through 8 (Subpart IIII), Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, applies to stationary compression ignition (CI) internal combustion engines (ICE).
401 KAR 63:002, Section 2(4)(eee), 40 C.F.R. 63.6580 through 63.6675, Tables 1a through 8, and Appendix A (Subpart ZZZZ), National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, applies to stationary reciprocating internal combustion engines at major or area sources of Hazardous Air Pollutants (HAP).

Comments:
 Emission factors determined from manufacturer specifications, AP-42 Table 3.3-1 and 3.3-2, and 40 CFR 98 Table C-1 and C-2. Emissions estimated at 500 hours/yr to be conservative and account for emergency operation. This engine will not be used for powering plant operations.

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
01	Thermal Oxidizer	VOC & HAP DE and min. combustion chamber temp.	401 KAR 50:055, Section 2(a)	Initial and every 5 years	TBD	N/A	TBD	TBD	TBD	TBD
01	Thermal Oxidizer	H ₂ S ppm	401 KAR 50:045, Section 1	Initial	U.S. EPA Method 15/16; ASTM D4084; ASTM D5504; or Approved Alt.	N/A	TBD	TBD	TBD	TBD
01	Thermal Oxidizer	NMOC	40 CFR 63.1959(b)(2)(iii)(B)	Initial	U.S. EPA Method 25 or 25C; Method 3, 3A, or 3C.	98% reduction or 20-ppmv outlet conc.	TBD	TBD	TBD	TBD
02	None	Methane Concentration	40 CFR 63.1959(b)(2)(iii)(A)	Initial	U.S. EPA Method 3C	N/A	TBD	TBD	TBD	TBD

Footnotes:

SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS

Table A - Group Requirements:

Emission and Operating Limit	Regulation	Emission Unit
N/A		

Table B - Summary of Applicable Regulations:

Applicable Regulations	Emission Unit
401 KAR 53:010, Ambient air quality standards , This regulation contains the primary and secondary ambient air quality standards for sulfur oxides, particulate matter, carbon monoxide, ozone, nitrogen dioxide, lead, hydrogen sulfide, gaseous fluorides, total fluorides, and odors are specified in Appendix A of 401 KAR 53:010.	Site-wide
401 KAR 59:010, New process operations , applies to each affected facility, associated with a process operation, which is not subject to another emission standard with respect to particulates.	EU 01
401 KAR 63:015, Flares , applies to each affected facility which means flares as defined in 401 KAR 63:015, Section 2.	EU 02
401 KAR 60:005, Section 2(2)(dddd), 40 C.F.R. 60.4200 through 60.4219, Tables 1 through 8 (Subpart IIII), Standards of Performance for Stationary Compression Ignition Internal Combustion Engines , applies to stationary compression ignition (CI) internal combustion engines (ICE).	EU 03
401 KAR 63:002, Section 2(4)(hhh), 40 C.F.R. 63.1930 through 63.1990, Table 1 (Subpart AAAA), National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills , applies to each municipal solid waste (MSW) landfill that has accepted waste since November 8, 1987 and is a major source or area source with design capacity greater than 2.5 million megagrams and cubic meters, and has uncontrolled emissions equal to or greater than 50 megagrams per year NMOC. Applies to this source because it is located at a MSW landfill as defined in 40 CFR 63.1990.	EU 01 & EU 02
401 KAR 63:002, Section 2(4)(eee), 40 C.F.R. 63.6580 through 63.6675, Tables 1a through 8, and Appendix A (Subpart ZZZZ), National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines , applies to stationary reciprocating internal combustion engines at major or area sources of Hazardous Air Pollutants (HAP).	EU 03
401 KAR 63:020, Potentially hazardous matter or toxic substances , applies to each affected facility which emits or may emit potentially hazardous matter or toxic substances, provided such emissions are not elsewhere subject to provisions of an administrative regulation of the Division for Air Quality.	T101 & T102

Table C - Summary of Precluded Regulations:

Precluded Regulations	Emission Unit
N/A	

SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS (CONTINUED)

Table D - Summary of Non Applicable Regulations:

Non Applicable Regulations	Emission Unit
N/A	

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 May 15, 2024 of potentially hazardous matter or toxic substances (Benzene, 1,1,1-Trichloroethane) 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

Lightning Renewables, LLC – Tri-K RNG (Tri-K RNG), Source ID #: 21-137-00034 (A.I. #180239), and the adjacent Tri-K Landfill, Source ID #: 21-137-00014 (A.I. #2726), are considered by the Cabinet and the United States Environmental Protection Agency to be a “single source” in determining applicability under 401 KAR 51:017, Prevention of significant deterioration of air quality (PSD) and 401 KAR 52:020, Title V permits. Each source is subject to 401 KAR 52:020 and will be issued individual Title V operating permits. Pursuant to the respective Title V permits, each permittee is responsible and liable for their own violations unless there is a joint cause for the violations.

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
CI RICE	– Compression Ignition Reciprocating Internal Combustion Engine
CO	– Carbon Monoxide
Division	– Kentucky Division for Air Quality
ESP	– Electrostatic Precipitator
GHG	– Greenhouse Gas
HAP	– Hazardous Air Pollutant
HF	– Hydrogen Fluoride (Gaseous)
LFG	– Landfill Gas
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 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
TF	– Total Fluoride (Particulate & Gaseous)
VOC	– Volatile Organic Compounds