Commonwealth of Kentucky
Division for Air Quality

STATEMENT OF BASIS / SUMMARY

Title V, Construction / Operating
Permit: V-23-025 R1
Owensboro RNG, LLC
7772 KY Route 815
Owensboro, KY 42301
March 8, 2024
Walker Reeves, EIT, Reviewer

SOURCE ID:	21-059-00269
AGENCY INTEREST:	178066
ACTIVITY:	APE20230002

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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: 973

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

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

County: Daviess
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:
Owensboro RNG, LLC is a new source to be co-located at West Daviess County Landfill in Owensboro, Kentucky. These sources are considered a "single source" for Title V and PSD, and because West Daviess County Landfill is required to obtain a Title V permit by 401 KAR 52:020, Section 1(4), Owensboro RNG must also obtain a Title V permit. However, due to the source-wide emission limitations on HAPs, for other regulatory applicability determinations, the facility is considered a true minor source of all non-HAP regulated air pollutants and a conditional major source of HAPs.

Owensboro RNG, LLC is a renewable natural gas plant that will receive collected landfill gas (LFG) from the adjacent West Daviess County Landfill. The LFG will be treated during the refinement process. Each step of the process allows landfill gas to be destroyed by either the candlestick flare (EU 02) or the thermal oxidizer. No emissions may be vented directly to the atmosphere at any time.

SECTION 2 – CURRENT APPLICATION AND EMISSION SUMMARY FORM

Permit Number: V-23-025 R1 Activities: APE20230002

Received: December 4, 2023 Application Complete Date(s): February 2, 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:
With this revision, Owensboro RNG requested a 2,000 hour/year limit on operation of EU 02 – LFG Flare which will only be used to purge process lines and therefore operate at a lower level than previously anticipated. This limit reduces the site-wide PTE below the major source threshold for CO as defined in 401 KAR 52:001 and ensures the site remains an area source for all pollutants. Additionally, the facility added two SI RICEs for providing power to the facility.

V-23-025 R1 Emission Summary					
Pollutant	**2023 Actual* (tpy)**	**Previous PTE V-23-025 (tpy)**	**Change (tpy)**	**Revised PTE V-23-025 R1 (tpy)**	**Combined Facility PTE** (tpy)**
CO	0	83.66	+15.10	98.76	98.79
NO_X	0	25.10	+17.82	42.92	43.31
PT	0	0.92	-0.29	0.63	0.64
PM_{10}	0	0.92	+0.64	1.56	1.57
$PM_{2.5}$	0	0.92	+0.64	1.56	1.57
SO_2	0	8.88	-3.37	5.51	5.51
VOC***	0	55.50	-10.29	45.21	46.34
Lead	0	0.00001	0	0.00001	0.00001
Greenhouse Gases (GHGs)					
Carbon Dioxide	0	117,595	-44,311	73,284	86,632
Methane	0	2,136	-825	1,311	7,980
Nitrous Oxide	0	0.59	-0.34	0.25	0.25
CO_2 Equivalent (CO_2e)	0	171,166	-65,025	106,141	286,206
Hazardous Air Pollutants (HAPs)					
Hydrochloric Acid	0	3.43	-1.33	2.10	2.10
Toluene	0	7.53	-2.87	4.66	6.76
Xylenes (Total)	0	2.71	-1.03	1.68	2.44
Combined HAPs***	0	22.45	-2.68	19.77	25.06

*Note: The facility has not commenced operation at the time of this revision.
**Note: The "combined Facility PTE" includes both emissions from Owensboro RNG and West Daviess County Landfill. Because they are considered a "single source" their emissions must be counted together. However, the flare at West Daviess County Landfill is not counted toward the combined facility PTE, because the landfill only generates a set quantity of gas, which is accounted for in the worst case of EU 01's thermal oxidizer and EU 02's operation. These values also take into account the operating limit on the flare.
***Note: Emissions of VOCs and most HAPs are controlled by the flare or the thermal oxidizer. The permittee must control emissions at all times. Additionally, Combined HAPs are limited to 17.31 tons/year to preclude major source status of combined HAPs.

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS

Emission Unit 01 - Renewable Natural Gas Plant & Emission Unit 02 - LFG 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: 2023

Process Description:
Emission Unit 01 (EU 01) – Renewable Natural Gas (RNG) Plant
The RNG facility receives LFG from West Daviess County Landfill's gas collection system. In the event that the RNG facility is entirely offline, LFG from the landfill is not accepted by the RNG plant and is routed to the landfill's flare for destruction. Waste gas from the Pressure Swing Adsorption (PSA) system is routed to the thermal oxidizer for destruction.

Emission Unit 02 (EU 02) – LFG Flare
EU 02 may receive off-spec gas from several points in the process. If the plant is unable to accept additional gas, the remainder may be routed to the flare for destruction.

Maximum Capacities:
EU 01 – RNG Plant: 2,000 scfm LFG
EU 02 – LFG Flare: 2,000* scfm LFG
Thermal Oxidizer: 2,000* 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*

Emission Unit 01 - Renewable Natural Gas Plant & Emission Unit 02 - LFG Flare
Comments: EU 01 & 02 – Emission factors for these units were determined from manufacturer's specifications, 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-42 Tables 2.4-1 and 2.4-2 (Draft & Final) for landfill gas destroyed. Waste gas directed to the thermal oxidizer is 4.8% methane per the specifications for the unit. Control efficiency for Non Methane Organic Compounds (NMOC) is 98% for both thermal oxidizer and flare. Facility requested an operating limit of 2,000 hours/year for EU 02. *The thermal oxidizer and flare are both rated for a maximum capacity of 2,500 scfm gas, but the facility is only capable of accepting 2,000 scfm of landfill gas at this time.

Emission Unit 03 - Jenbacher NG Generator #1 & Emission Unit 04 - Jenbacher NG Generator #2				
Pollutant	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
NOx	1.0 g/HP-hr	40 CFR 60, Subpart JJJJ, Table 1	See comments.	Performance testing, monitoring, recordkeeping, and reporting.
CO	2.0 g/HP-hr			
VOC	0.7 g/HP-hr			

Initial Construction Date: 2024

Process Description:
Two Spark-Ignition RICEs.

Model: Jenbacher
Maximum Rating: 1721 HP, each
Fuel: Natural gas
Controls: None
Construction Commenced: 2024

Applicable Regulations:
401 KAR 60:005, Section 2(2)(eeee), 40 C.F.R. 60.4230 through 60.4248, Tables 1 through 4 (Subpart JJJJ), *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*
401 KAR 63:002, Section 2(4)(eeee), 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*

Comments:
Emission factors were determined for each of the generators from AP-42 Table 3.2-2, 40 CFR 98 Table C-1 and C-2, and the manufacturer's certification of meeting 40 CFR 60 Subpart JJJJ.

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_2S 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
03 & 04	None	NO_x, CO, & VOC g/HP-hr	40 CFR 60.4244	Immediately upon startup of engine*	40 CFR 60.4244(a) - (f)	In g/HP-hr NO_x: 1.0, CO: 2.0, VOC: 0.7	TBD	TBD	TBD	TBD

Footnotes:
*Note: This test is not required if the permittee purchases a certified engine.

SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS

Table A - Group Requirements:

Emission and Operating Limit	Regulation	Emission Unit
17.31 tpy of combined HAPs	To preclude major source status for combined HAPs	Source-wide

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 60:005, Section 2(2)(eeee), 40 C.F.R. 60.4230 through 60.4248, Tables 1 through 4 (Subpart JJJJ), *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines,* applies to each stationary SI ICE that commenced construction after June 12, 2006.	EU 03 & EU 04
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 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)(eeee), 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 each stationary RICE located at a major or area source of HAP emissions.	EU 03 & EU 04

Table C - Summary of Precluded Regulations:

Precluded Regulations	Emission Unit
N/A	

Table D - Summary of Non Applicable Regulations:

Non Applicable Regulations	Emission Unit
N/A	

Air Toxic Analysis

N/A

Single Source Determination

Owensboro RNG, LLC, Source ID #: 21-059-00269 (A.I. #178066), and the adjacent West Daviess County Landfill, Source ID #: 21-059-00193 (A.I. #973), 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

Permit	Permit Type	Activity#	Complete Date	Issuance Date	Summary of Action	PSD/Syn Minor
V-23-025	Initial	APE20230001	6/27/2023	12/4/2023	Initial Construction and Operating Permit	N/A

SECTION 6 – PERMIT APPLICATION HISTORY

Permit Number: V-23-025 Activities: APE20230001

Received: May 31, 2023 Application Complete Date(s): June 27, 2023

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 Owensboro RNG's state-origin permit was received by the Division on May 31, 2023. On June 19, 2023, Owensboro RNG was issued a Notice of Deficiency for additional information. The requested documentation, including a revised AI form requesting a Title V permit and single source determination, was submitted on June 23, 2023 and the application was deemed complete on June 27, 2023.

Owensboro RNG indicated that with this action they would construct a landfill gas to natural gas processing facility adjacent to West Daviess County Landfill. The facility includes a thermal oxidizer and flare (EU 02) for control of emissions. The facility does not include any insignificant activities.

No LFG can be vented uncontrolled to the atmosphere.

V-23-025 Emission Summary		
Pollutant	**PTE V-23-025 (tpy)**	**Combined Facility PTE* (tpy)**
CO	83.66	83.69
NO_X	25.10	25.49
PT	0.92	0.92
PM_{10}	0.92	0.92
$PM_{2.5}$	0.92	0.92
SO_2	8.88	8.88
VOC	55.50	56.63
Lead	0.00001	0.00001
Greenhouse Gases (GHGs)		
Carbon Dioxide	117595.06	130942.81
Methane	2135.85	8804.55
Nitrous Oxide	0.59	0.59
CO_2 Equivalent (CO_2e)	171165.96	351231.12
Hazardous Air Pollutants (HAPs)		
Hydrochloric Acid	3.4	3.4

V-23-025 Emission Summary		
Pollutant	**PTE V-23-025 (tpy)**	**Combined Facility PTE* (tpy)**
Toluene	7.5	9.6
Xylenes (Total)	2.7	3.5
Combined HAPs:**	22.45	27.74

*Note: The "combined Facility PTE" includes both emissions from Owensboro RNG and West Daviess County Landfill. Because they are considered a "single source" their emissions must be counted together. However, the flare at West Daviess County Landfill is not counted toward the combined facility PTE, because the landfill only generates a set quantity of gas, which is accounted for in the worst case of EU 01's thermal oxidizer and EU 02's operation.
**Note: Emissions of most HAPs are controlled by the flare or the thermal oxidizer. The permittee must control emissions at all times. Additionally, Combined HAPs are limited to 17.31 tons/year to preclude major source status of combined HAPs.

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)
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
PSA – Pressure Swing Adsorption
PSD – Prevention of Significant Deterioration
PTE – Potential to Emit
SI RICE – Spark Ignition Recirprocating Internal Combustion Engine
SO_2 – Sulfur Dioxide
TF – Total Fluoride (Particulate & Gaseous)
VOC – Volatile Organic Compounds