Commonwealth of Kentucky
Division for Air Quality

STATEMENT OF BASIS / SUMMARY

Title V / Synthetic Minor, Construction / Operating Permit
Permit: V-25-010
Kentucky Municipal Energy Agency – Energy Center I
1757 AC Slaton Road
Madisonville, KY 42431
3/4/2025
Kayla Thurman, Reviewer

SOURCE ID:	21-107-00212
AGENCY INTEREST:	184265
ACTIVITY:	APE20250001

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SECTION 1 – SOURCE DESCRIPTION

SIC Code and description: 4911, Electric Services

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: Hopkins
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): Acetaldehyde, Acrolein

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

*PTE does not include self-imposed emission limitations.

Description of Facility:
Kentucky Municipal Energy Agency (KYMEA) is a Kentucky Interlocal agency which provides power to participating municipal utilities in the state. The facility, KYMEA – Energy Center I, will consist of four Wartsila reciprocating internal combustion engine (RICE) generators with a site capacity of approximately 75 net megawatts total. The site will provide both continuous and peaking service with the capability of multiple quick stops per day.

SECTION 2 – CURRENT APPLICATION AND EMISSION SUMMARY FORM

Permit Number: V-25-010 Activities: APE20250001

Received: October 25, 2024 Application Complete Date(s): March 4, 2025

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:
On October 25, 2024, the Division for Air Quality received the application for an initial Title V permit under APE20240001. This initial application did not acknowledge PSD limits, despite uncontrolled source-wide PTE being greater than 250 tpy for CO, NO_x, and VOC. The facility decided to request source-wide limits of 225 tpy each for CO, NO_x, and VOC, and request a Title V / Synthetic Minor permit. This application was received on February 24, 2025, under APE20250001. The application includes the following:

- Addition of EUs 01-04, Four 25,574 HP Natural gas-fired engines
- Addition of EU 05, 0.001 MMBtu/hr dew point heater
- Addition of EU 06, 0.02 MMBtu/hr water heater to insignificant activities
- Addition of EU 07, Circuit breakers/switchgears to insignificant activities
- Addition of EU 08, 14 Space heaters to insignificant activities
- Addition of EU 09, Maintenance water tank to insignificant activities.

V-25-010 Emission Summary		
Pollutant	2024 Actual (tpy)	PTE V-25-010 (tpy)
CO	N/A	96.28
NOx	N/A	54.00
PT	N/A	59.30
PM_{10}	N/A	28.34
$PM_{2.5}$	N/A	28.32
SO_2	N/A	1.57
VOC	N/A	87.60
Lead	N/A	2.94E-06
Greenhouse Gases (GHGs)		
Carbon Dioxide	N/A	311,098
Methane	N/A	80.49
Nitrous Oxide	N/A	0.61
CO_2 Equivalent (CO_2e)	N/A	313,291
Hazardous Air Pollutants (HAPs)		
Combined HAPs:	N/A	58.94
1,3-Butadiene	N/A	0.71
2,2,4-Trimethylpentane	N/A	0.66
Acetaldehyde	N/A	14.54
Acrolein	N/A	18.29
Benzene	N/A	1.17
Biphenyl	N/A	0.56
Formaldehyde	N/A	9.84
Hexane; N-Hexane	N/A	2.95
Methanol	N/A	7.34
Toluene	N/A	1.08

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS

Emission Units 01-04 – Natural Gas Fired RICE				
Pollutant	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
NO_x	1.0 g/HP-hr	40 CFR 60, Subpart JJJJ Table 1	4161.6 lb/MMscf; AP-42, Table 3.2-2	Method 7E
CO	2.0 g/HP-hr		323.34 lb/MMscf; AP-42 Table 3.2-2	Method 10
VOC	0.7 g/HP-hr		120.36 lb/MMscf; AP-42 Table 3.2-2	Methods 25A and 18
CO	Reduce emissions by 93% or more	40 CFR 63, Subpart ZZZZ Table 2a, 2.a	323.34 lb/MMscf; AP-42 Table 3.2-2	Method 10

Initial Construction Date: Proposed June 2025

Process Description:
Model: Wartsila 18V50SG 2024 Model Year
Engine Type: 4SLB
Engine Rating: 25,574 HP Each
Fuel Input Capacity: 0.15 MMscf/hr each
Construction Commenced: Proposed June 2025
Primary Fuel: Natural Gas
Control Device: SCR and Oxidation Catalyst

Applicable Regulation:
401 KAR 60:005, Section 2(2)(eeee), 40 CFR 60.4230 through 60.4248, Tables 1 through 4 (Subpart JJJJ), *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines* applies to owners and operators of stationary spark ignition (SI) internal combustion engines (ICE) that commence construction after June 12, 2006 where the stationary SI ICE are manufactured on or after July 1, 2007.

401 KAR 63:002, Section 2(4)(eeee), 40 CFR 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 owners and operators of stationary RICE at a major source of HAP emissions.

Comments:
Emission factors for CO, NO_x, PT, and VOC for engine startup and shutdown are from manufacturer emissions data. PTE for startup and shutdowns accounts for 197.5 hours of startup/shutdown time and assumes all emissions in that 197.5 hours are worst case (cold startup).

Initial performance testing as required by 40 CFR 60, Subpart JJJJ will be used determine an engine specific emission factor for NO_x, CO, and VOC. These emission factors will be used to demonstrate compliance with source-wide emission limits.

Emission factors for at steady state PT, ammonia, formaldehyde, acetaldehyde, acrolein, and methanol are based on manufacturer's emission data.

For CO, NO_x, and VOC at steady state, control efficiency was estimated using the appropriate emission

Emission Units 01-04 – Natural Gas Fired RICE

factor from AP-42 and manufacture emissions test data which measured emissions post-controls.

All other emission factors for startups/shutdowns and steady state are from AP-42, Table 3.2-2.

Compliance with the source-wide 225 tpy limit for CO, NO_x, and VOC is determined by calculating a source wide 12 month rolling total of emissions for each pollutant. To calculate this total, emissions from engine start-up and shutdowns are calculated utilizing the manufacturer's provided emission factors and assuming each startup/shutdown is measured in 30-minute intervals. Emissions from steady state operation are calculated based on monthly natural gas throughput measured in MMscf. This methodology results in emissions from startup/shutdown periods also being accounted for as steady state emissions, as natural gas is combusted during the engine startup/shutdown periods. This results in a conservative estimate of source-wide emissions as emissions from natural gas combustion during startup/shutdown are double counted as a portion of the steady-state emissions.

Emission Unit 05 – Dew Point Heater

Pollutant	Emission Limit or Standard	Regulatory Basis for Emission Limit or Standard	Emission Factor Used and Basis	Compliance Method
PM*	$P \leq 0.50$, $E=2.34$; $0.5<P\leq 30$; $E=3.59P^{0.62}$	401 KAR 59:010, Section 3(2)	7.6 lb/MMscf; AP-42 Table 1.4-2	Compliance is assumed based on emission rates
Opacity	20%	401 KAR 59:010, Section 3(1)(a)	N/A	Visual observation and US EPA Reference Method 9

Initial Construction Date: Proposed June 2025

Process Description:
Equipment: Dew Point Heater
Fuel Input Capacity: 1 MMBtu/hr
Construction Commenced: Proposed June 2025
Primary Fuel: Natural Gas

Applicable Regulation:
401 KAR 63:005, Section 2(4)(iiii), 40 CFR 63.7480 through 63.7575, Tables 1 through 13 (Subpart DDDDD), *National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters* applies to industrial process heaters located at a major source of HAPs.

Comments:
The unit combusts only natural gas, so is defined by 40 CFR 63.7575 as a unit designed to burn gas 1, and is under 5 MMBtu/hr maximum heat capacity. This means it is only subject to the 5-year tune-up requirement of 40 CFR 63, Subpart DDDDD.

All emission factors are from AP-42 Tables 1.4-1, 1.4-2, and 1.4-3.

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, 02, 03, 04	Oxidation Catalyst	NO_x	40 CFR 60.4243(b)(2)(ii)	Initial and every 3 years	Method 7E	1.0 g/HP-hr	TBD	TBD	TBD	TBD
01, 02, 03, 04	Oxidation Catalyst	CO	40 CFR 60.4243(b)(2)(ii)	Initial and every 3 years	Method 10	2.0 g/HP-hr	TBD	TBD	TBD	TBD
01, 02, 03, 04	Oxidation Catalyst	VOC	40 CFR 60.4243(b)(2)(ii)	Initial and every 3 years	Method 25A and 18	0.7 g/HP-hr	TBD	TBD	TBD	TBD
01, 02, 03, 04	Oxidation Catalyst	CO	40 CFR 63.6610(a)	Initial and semiannual	Method 10	Reduce emission of CO by 93% or more	TBD	TBD	TBD	TBD

Footnotes:

SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS

Table A - Group Requirements:

Emission and Operating Limit	Regulation	Emission Unit
225 tpy of NO_x emissions	To preclude 401 KAR 51:017, *Prevention of significant deterioration of air quality*	Source-wide
225 tpy of CO emissions	To preclude 401 KAR 51:017, *Prevention of significant deterioration of air quality*	Source-wide
225 tpy of VOC emissions	To preclude 401 KAR 51:017, *Prevention of significant deterioration of air quality*	Source-wide

Table B - Summary of Applicable Regulations:

Applicable Regulations	Emission Unit
401 KAR 59:010, *New process operations*	EU 05
401 KAR 60:005, Section 2(2)(eeee), 40 CFR 60.4230 through 60.4248, Tables 1 through 4 (Subpart JJJJ), *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*	EU 01, 02, 03, 04
401 KAR 63:002, Section 2(4)(eeee), 40 CFR 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*	EU 01, 02, 03, 04
401 KAR 63:002, Section 2(4)(iiii), 40 CFR 63.7480 through 63.7575, Tables 1 through 13 (Subpart DDDDD), *National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters*	EU 05

Table C - Summary of Precluded Regulations:

Precluded Regulations	Emission Unit
401 KAR 51:017, *Prevention of significant deterioration of air quality*	Source-wide

Air Toxic Analysis
N/A

Single Source Determination
N/A

SECTION 5 – PERMITTING HISTORY

N/A

SECTION 6 – PERMIT APPLICATION HISTORY

N/A

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_{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