Commonwealth of Kentucky
Division for Air Quality

STATEMENT OF BASIS / SUMMARY

Title V/Title I - PSD, Construction/Operating
Permit: V-25-006
East Kentucky Power Cooperative, Inc. – Liberty Station
528 Carr Sasser Road
Liberty, KY 42539

January 21, 2025
Dakota Ross and Kayla Thurman, Reviewer

SOURCE ID:	21-045-00050
AGENCY INTEREST:	183908
ACTIVITY:	APE20240001

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SECTION 1 – SOURCE DESCRIPTION

SIC Code and description: 4911, Electric Services (Fossil Fuel Power Generation)

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: Casey
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, Formaldehyde, & Methanol

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

*PTE does not include self-imposed emission limitations.

Description of Facility:
East Kentucky Power Cooperative, Inc. – Liberty Station is a Reciprocating Internal Combustion Engine (RICE) power generation facility.

SECTION 2 – CURRENT APPLICATION AND EMISSION SUMMARY FORM

Permit Number: V-25-006 Activities: APE20240001

Received: September 20, 2024 Application Complete Date(s): November 13, 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:
Initial permit for the construction and operation of a proposed Reciprocating Internal Combustion Engine (RICE) electric generation facility at a greenfield site near Liberty, Kentucky.

V-25-006 Emission Summary	
Pollutant	PTE V-25-006 (tpy)
CO	379.10
NO_X	672.88
PT	256.61
PM_{10}	256.46
$PM_{2.5}$	256.43
SO_2	11.13
VOC	295.73
H_2SO_4	2.48
Lead	6.53E-6
Greenhouse Gases (GHGs)	
Carbon Dioxide	1,030,860
Methane (28 GWP)	33.92
Nitrous Oxide (265 GWP)	4.15
Sulfur Hexaflouride (23,500 GWP)	1.59E-3
CO_2 Equivalent (CO_2e)	1,032,947
Hazardous Air Pollutants (HAPs)	
Acetaldehyde	27.02
Acrolein	34.33
Formaldehyde	12.71
Hexane; N-Hexane	2.05
Methanol	13.77
Combined HAPs:	96.63

I. Emissions

A. Project PSD Significance

In the application to construct and operate a greenfield facility, East Kentucky Power calculated the potential air pollutants emitted by the new source. The new equipment is expected to be a source of these regulated NSR pollutants: NO_X, CO, VOC, SO_2, PM, PM_{10}, $PM_{2.5}$, H_2SO_4, lead (Pb), and GHGs.

The East Kentucky Power project will be located in Casey County, Kentucky, designated by the U.S. EPA as Unclassifiable/Attainment for all criteria pollutants in accordance with 40 CFR 81.318. Therefore, under the federal New Source Review permitting program, Prevention of Significant Deterioration (PSD) requirements apply to the proposed facility and the application has been reviewed accordingly.

Potential to emit for pollutants at this facility were calculated based on emission factors obtained from U.S. EPA's AP-42, *Compilation of Air Pollutant Emission Factors,* engineering estimates, mass balances, and manufacturer's specifications. Based on these emission factors, and the assumption of a 24 hour, 7 days a week, 52 weeks a year operation (8,760 hours per year) for most units, the potential emissions of regulated NSR pollutants, NO_X, CO, VOC, PM, PM_{10}, and $PM_{2.5}$ exceed the 250 tons major source threshold, and GHGs exceed the 75,000 ton significant emission rate threshold.

The potential increases in emissions of regulated NSR pollutants from the new facility have been calculated and are presented in the following table. A discussion of each pollutant, sources, calculation assumptions and source of emission factors used follows.

Table A-1, Project PSD Significance

Pollutant	PTE (tpy)	Major Source Threshold/ Significant Emission Rate Increase in tpy	PSD Significant Emissions Increase?
NO_X	672.88	250*	Yes
CO	379.10	250*	Yes
VOC	295.73	250*	Yes
SO_2	11.13	40	No
PM	256.61	250*	Yes
PM_{10}	256.46	250*	Yes
$PM_{2.5}$	256.43	250*	Yes
H_2SO_4	2.48	7	No
Pb	6.53E-6	0.6	No
GHGs (CO_2e)	1,032,947	75,000	Yes

* Because NO_X, CO, VOC, PM, PM_{10}, and $PM_{2.5}$ exceed the major source threshold of 250 tpy (making the source PSD major), all other pollutants are compared to the Significant Emission Rate (SER).

B. Nitrogen Oxides (NO_X) Emissions

NO_X emissions originate from the combustion of fossil fuels.

EUs 01-01 through 01-12 12 Wärtsilä Compression Ignition RICE:

NO_X is formed by combustion of the air/fuel mixture for a RICE engine at high temperatures.

During the combustion process, NO_X is formed via the oxidation of fuel bound nitrogen as well as via the oxidation of nitrogen in the combustion air. The temperatures within the flame zone of a RICE are at sufficient levels to form the fuel bound and thermal NO_X from the fuel-bound nitrogen and combustion air nitrogen. During combustion, mostly nitrogen oxide (NO) is formed. NO reacts to form nitrogen dioxide (NO_2). NO_X refers to the combination of NO and NO_2.

Each RICE is a dual fuel unit capable of combusting natural gas or ultra-low sulfur fuel oil (ULSFO). NO_X emissions from combusting either fuel are controlled using selective catalytic reduction (SCR). During startup and shutdown conditions, it is assumed that NO_X emissions are uncontrolled due to required flue gas temperature for proper SCR operation. Manufacturer supplied NO_X emission factors from natural gas combustion, ULSFO combustion and startup/shutdown conditions are shown in Table A-2, found under the **SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS** entry for EUs 01-01 through 01-12:

The permittee has proposed operational limits of no more than 100 days (2,400 hours) operation on ULSFO per engine and no more than 5 startups and 5 shutdowns per day, per engine. Using the manufacturer supplied NO_X emission factors, an SCR control efficiency of 80% during steady state operations, and the operational limitations proposed by the facility, NO_X PTE is calculated to be 55.82 tpy per engine, or 669.88 tpy from the fleet of 12.

EU 02 Natural Gas Preheater
NO_X emissions are calculated using EPA's AP-42 Table 1.4-1 for small boilers with low NO_X burners and adjusting the value to the facility specific natural gas heat content of 1,063 Btu/scf. NO_X PTE is calculated to be 0.65 tpy.

EU 03 Diesel Emergency Generator Engine
NO_X emissions are calculated using manufacturer supplied data. 500 hours of annual operation were assumed for the purposes of calculating potential to emit. NO_X PTE is calculated to be 2.07 tpy.

EU 04 Diesel-Fired Emergency Fire Pump Engine
NO_X emissions are calculated using manufacturer supplied data. 500 hours of annual operation were assumed for the purposes of calculating potential to emit. NO_X PTE is calculated to be 0.27 tpy.

<u>NO_X PSD Significance</u>
The emissions calculations, using the planned throughputs and accepted emission factors for each piece of equipment show potential source-wide NO_X emissions are estimated to be 672.88 tpy. This emission rate exceeds the PSD major stationary source threshold of 250 tpy. Since the major stationary source threshold for NO_X is exceeded, a BACT analysis for NO_X is required for each piece of equipment that emits NO_X. Establishment of a BACT limit for the emission of NO_X for each emission point that emits NO_X is also required. Refer to the BACT Analysis for NO_X, below, for a discussion of the BACT for NO_X.

C. Carbon Monoxide (CO) Emissions

CO is formed due to some of the fuel remaining unburned during the combustion process in RICE units. When incomplete combustion occurs, the unburned carbon in the fuel is oxidized to form CO instead of CO_2. Temperature in the combustion zone and residence time are key factors for CO emissions.

EUs 01-01 through 01-12 12 Wärtsilä Compression Ignition RICE:
Each RICE is a dual fuel unit capable of combusting natural gas or ultra-low sulfur fuel oil (ULSFO). CO emissions from combusting either fuel are controlled using oxidation catalyst technology (OxCat). During startup and shutdown conditions, it is assumed that CO emissions are uncontrolled due to required flue gas temperature for proper catalyst functionality. Manufacturer supplied CO emission factors from natural gas combustion, ULSFO combustion and startup/shutdown conditions are shown in Table A-2, found under the **SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS** entry for EUs 01-01 through 01-12:

The permittee has proposed operational limits of no more than 100 days (2,400 hours) operation on ULSFO per engine and no more than 5 startups and 5 shutdowns per day, per engine. Using the manufacturer supplied CO emission factors, an OxCat control efficiency of 85% during steady state operations, and the operational limitations proposed by the facility, CO PTE is calculated to be 31.45 tpy per engine, or 377.41 tpy from the fleet of 12.

EU 02 Natural Gas Preheater
CO emissions are calculated using EPA's AP-42 Table 1.4-1 for small boilers and adjusting the value to the facility specific natural gas heating value of 1,063 btu/scf. CO PTE is calculated to be 1.10 tpy.

EU 03 Diesel Emergency Generator Engine
CO emissions are calculated using manufacturer supplied data. 500 hours of annual operation were assumed for the purposes of calculating potential to emit. CO PTE is calculated to be 0.49 tpy.

EU 04 Diesel-Fired Emergency Fire Pump Engine
CO emissions are calculated using manufacturer supplied data. 500 hours of annual operation were assumed for the purposes of calculating potential to emit. CO PTE is calculated to be 0.11 tpy.

CO PSD Significance
The emissions calculations, using the planned throughputs and accepted emission factors for each piece of equipment, show potential source-wide CO emissions are estimated to be 379.10 tpy. This emission rate exceeds the PSD major stationary source threshold of 250 tpy. Since the major stationary source threshold for CO is exceeded, a BACT analysis for CO is required for each piece of equipment that emits CO. Establishment of a BACT limit for the emission of CO for each emission point that emits CO is also required. Refer to the BACT Analysis for CO, below, for a discussion of the BACT for CO.

D. Volatile Organic Compounds (VOC) Emissions
VOC emissions originate from the incomplete combustion of fossil fuels, and the storage and transmission of fuels. Temperature and residence time are also drivers to VOC formation.

EUs 01-01 through 01-12 12 Wärtsilä Compression Ignition RICE:
Each RICE is a dual fuel unit capable of combusting natural gas or ultra-low sulfur fuel oil (ULSFO). VOC emissions from combusting either fuel are controlled using oxidation catalyst technology (OxCat). During startup and shutdown conditions, it is assumed that VOC emissions are uncontrolled due to required flue gas temperature for proper catalyst functionality. Manufacturer supplied VOC emission factors from natural gas combustion, ULSFO combustion and startup/shutdown conditions are shown in Table A-2, found under

the **SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS** entry for EUs 01-01 through 01-12:

The permittee has proposed operational limits of no more than 100 days (2,400 hours) operation on ULSFO per engine and no more than 5 startups and 5 shutdowns per day, per engine. Using the manufacturer supplied VOC emission factors, an OxCat control efficiency of 77% during steady state operations, and the operational limitations proposed by the facility, VOC PTE is calculated to be 24.60 tpy per engine, or 295.15 tpy from the fleet of 12.

EU 02 Natural Gas Preheater
VOC emissions are calculated using EPA's AP-42 Table 1.4-2 and adjusting the value to the facility specific natural gas heating value of 1,063 btu/scf. VOC PTE is calculated to be 0.07 tpy.

EU 03 Diesel Emergency Generator Engine
VOC emissions are calculated using manufacturer supplied data. 500 hours of annual operation were assumed for the purposes of calculating potential to emit. VOC PTE is calculated to be 0.02 tpy.

EU 04 Diesel-Fired Emergency Fire Pump Engine
VOC emissions are calculated using manufacturer supplied data. 500 hours of annual operation were assumed for the purposes of calculating potential to emit. VOC PTE is calculated to be 0.02 tpy.

EU 06-01 &06-02 Ultra Low Sulfur Fuel Oil Storage Tanks
VOC emissions are calculated using parameters provided by the facility and EPA's TANKS Emissions Estimation Software, Version 4.09D. VOC PTE from both breathing and working losses is calculated to be 0.37 tpy.

EU 07 Fugitive Piping Components
VOC emissions are calculated using component types and numbers provided by the facility, site specific natural gas content weight percentages, and EPA-453/R-95-017 Protocol for Equipment Leak Emission Estimates Table 2-4. VOC PTE is calculated to be 0.10 tpy.

EU 09-01, 09-02, 09-03 Lube Oil Tanks
VOC emissions are calculated using parameters provided by the facility and EPA's TANKS Emissions Estimation Software, Version 4.09D. VOC PTE from both breathing and working losses is calculated to be 0.003 TPY per tank.

VOC PSD Significance
The emissions calculations, using the planned throughputs and accepted emission factors for each piece of equipment, show potential source-wide VOC emissions are estimated to be 295.73 tpy. This emission rate exceeds the PSD major stationary source threshold of 250 tpy. Since the major stationary source threshold for VOC is exceeded, a BACT analysis for VOC is required for each piece of equipment that emits VOC. Establishment of a BACT limit for the emission of VOC for each emission point that emits VOC is also required. Refer to the BACT Analysis for VOC, below, for a discussion of the BACT for VOC.

E. Particulate Matter ($PM/PM_{10}/PM_{2.5}$) Emissions

Particulate matter emissions are a combination of filterable and condensable particulate matter. Emissions of filterable particulate matter from RICE units result from fuel impurities and incomplete combustion of fossil fuels. Condensable particulate emissions from RICE are primarily generated by the reaction of SO_2 and SO_3 with the SCR and OxCat that forms ammonia sulfate. The movement of vehicles on facility roadways also results in particulate matter emissions.

EUs 01-01 through 01-12 12 Wärtsilä Compression Ignition RICE:
Each RICE is a dual fuel unit capable of combusting natural gas or ultra-low sulfur fuel oil (ULSFO). It was assumed that PM= PM_{10}=$PM_{2.5}$. Manufacturer supplied PM/PM_{10}/$PM_{2.5}$ emission factors from natural gas combustion, ULSFO combustion and startup/shutdown conditions are shown in Table A-2, found under the **SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS** entry for EUs 01-01 through 01-12:

The permittee has proposed operational limits of no more than 100 days (2,400 hours) operation on ULSFO per engine and no more than 5 startups and 5 shutdowns per day, per engine. Using the manufacturer supplied PM/PM_{10}/$PM_{2.5}$ emission factors and the operational limitations proposed by the facility, PM/PM_{10}/$PM_{2.5}$ PTE is calculated to be 21.36 tpy per engine, or 256.29 tpy from the fleet of 12.

EU 02 Natural Gas Preheater
PM/PM_{10}/$PM_{2.5}$ emissions are calculated using EPA's AP-42 Table 1.4-2 and adjusting the value to the facility specific natural gas heating value of 1,063 btu/scf. It was assumed that PM= PM_{10}=$PM_{2.5}$. PM/PM_{10}/$PM_{2.5}$ PTE is calculated to be 0.10 tpy.

EU 03 Diesel Emergency Generator Engine
PM/PM_{10}/$PM_{2.5}$ emissions are calculated using manufacturer supplied data. 500 hours of annual operation were assumed for the purposes of calculating potential to emit. It was assumed that PM= PM_{10}=$PM_{2.5}$. PM/PM_{10}/$PM_{2.5}$ PTE is calculated to be 0.02 tpy.

EU 04 Diesel-Fired Emergency Fire Pump Engine
PM/PM_{10}/$PM_{2.5}$ emissions are calculated using manufacturer supplied data. 500 hours of annual operation were assumed for the purposes of calculating potential to emit. It was assumed that PM= PM_{10}=$PM_{2.5}$. PM/PM_{10}/$PM_{2.5}$ PTE is calculated to be 0.01 tpy.

EU 05 Paved Roadways
PM/PM_{10}/$PM_{2.5}$ emissions are calculated using vehicle mean weights and miles traveled as provided by the facility and AP-42 13.2.1 Equation 2. 50% control was applied for the use of wet suppression. PM/PM_{10}/$PM_{2.5}$ PTE are calculated to be 0.18, 0.04, and 0.009 tpy respectfully.

PM/PM_{10}/$PM_{2.5}$ PSD Significance
The emissions calculations, using the planned throughputs and accepted emission factors for each piece of equipment, show potential source-wide PM/PM_{10}/$PM_{2.5}$ emissions are estimated to be 256.61, 256.46. and 256.43 tpy, respectively. This emission rate exceeds the PSD major stationary source threshold of 250 tpy. Since the major stationary source threshold for PM/PM_{10}/$PM_{2.5}$ is exceeded, a BACT analysis for PM/PM_{10}/$PM_{2.5}$ is required for each piece of equipment that emits PM/PM_{10}/$PM_{2.5}$. Establishment of a BACT limit for the emission of PM/PM_{10}/$PM_{2.5}$ for each emission point that emits PM/PM_{10}/$PM_{2.5}$ is also required. Refer to the BACT Analysis for PM/PM_{10}/$PM_{2.5}$, below, for a discussion of the BACT limits for PM/PM_{10}/$PM_{2.5}$.

F. Greenhouse Gas (GHG) Emissions

GHG emissions originate from the combustion of fossil fuels, fugitive leaks from natural gas piping, and leakage from circuit breakers.

EUs 01-01 through 01-12 12 Wärtsilä Compression Ignition RICE:
GHG emissions were calculated using emission factors from 40 CFR Part 98, Subpart C, Tables C-1 & C-2. GHG (CO_2e) PTE is calculated to be 85,913 tpy per engine, or 1,030,960 tpy from the fleet of 12.

EU 02 Natural Gas Preheater
GHG emissions were calculated using emission factors from 40 CFR Part 98, Subpart C, Tables C-1 & C-2. GHG (CO_2e) PTE is calculated to be 1,559 tpy.

EU 03 Diesel Emergency Generator Engine
GHG emissions were calculated using emission factors from 40 CFR Part 98, Subpart C, Tables C-1 & C-2. GHG (CO_2e) PTE is calculated to be 201 tpy.

EU 04 Diesel-Fired Emergency Fire Pump Engine
GHG emissions were calculated using emission factors from 40 CFR Part 98, Subpart C, Tables C-1 & C-2. GHG (CO_2e) PTE is calculated to be 56 tpy.

EU 07 Fugitive Piping Components
GHG emissions are calculated using component types and numbers provided by the facility, site specific natural gas content weight percentages, and EPA-453/R-95-017 Protocol for Equipment Leak Emission Estimates Table 2-4. GHG (CO_2e) PTE is calculated to be 170 tpy.

EU 08 Circuit Breakers
GHG emissions are calculated using the Sulfur Hexafluoride (SF_6) leak rate BACT limitation of 0.5% by weight annually. GHG (CO_2e) PTE is calculated to be 36 tpy.

GHG PSD Significance
The emissions calculations, using the planned throughputs and accepted emission factors for each piece of equipment, show potential source wide GHG (CO_2e) emissions are estimated to be 1,032,947 tpy CO_2e. This emission rate exceeds the PSD significant emission rate threshold of 75,000 tpy CO_2e. Since the SER for GHG (CO_2e) is exceeded, a BACT analysis for GHG (CO_2e) is required for each piece of equipment that emits GHG (CO_2e). Establishment of a BACT limit for the emission of GHG (CO_2e) for each emission point that emits GHG (CO_2e) is also required. Refer to the BACT Analysis for GHG (CO_2e), below, for a discussion of the BACT for GHG (CO_2e).

II. BACT Analysis

The following is a summary of the various BACT analyses, and the limits and requirements attributed to each emission unit. This discussion is separated into parts, on a per pollutant basis, following a top-down approach. At the beginning of each pollutant section, will be an overview of the control technologies and methods reviewed for that pollutant. In an effort to identify all potentially applicable emission control technologies, a broad range of sources were searched, including:

- EPA's RACT/BACT/LAER Clearinghouse (RBLC) database
- Federal and State NSR permits and BACT determinations for similar sources
- Engineering experience with similar control applications
- Review of technical reports, journals, and air pollution control seminars.

The technology summary will be followed by a summary of the BACT limit for each unit on a per pollutant basis. Some units will be grouped together for convenience. For each emission unit that has the potential to emit the pollutant, technically infeasible options are eliminated, remaining control technologies are ranked, options that provide the best control are evaluated to determine economic feasibility, and BACT is selected. The permit has requirements to ensure the BACT limits are federally enforceable. Section 3 of this document outlines the testing, monitoring, recordkeeping, and reporting requirements needed to demonstrate compliance with the BACT limits for each emission unit.

A. BACT analysis for NO_X

Technologies Reviewed:

Water/Steam Injection
Water or steam injection involves the injection of water or steam into the primary combustion zone. This reduces the combustion temperature, thereby reducing the formation of thermal NO_X. Direct water injection can theoretically reduce emissions of NO_X from RICE by as much as 40%. However, the added water usage results in additional economic, energy, and environmental impacts.

Lean-Burn Combustion Technology
Lean-burn combustion technology reduces NO_X emissions due to lower combustion temperatures associated with lean burning on spark-ignition natural gas-fired RICE. With lean burn technology, the air/fuel ratio is lowered by premixing air and natural gas prior to being burned in the engine cylinders, resulting in lower combustion temperatures.

Low-NO_X Combustion Technology
Low NO_X combustion technology can be applied to reduce the formation of NO_X by reducing flame temperature. Low-NO_X combustion technology in RICE consists of several practices, including late fuel injection start, high compression ratio, optimized combustion chamber, optimized fuel injection rate, early inlet valve closing, and high boost pressure.

Non-Selective Catalytic Reduction Technology (NSCR)
The NSCR catalyst facilitates low temperature reduction of NO_X into nitrogen to suppress thermal NO_X formation. NSCR technology is primarily applied to rick-burn, spark ignited, stationary natural gas-fired engines.

Selective Catalytic Reduction Technology (SCR)
SCR technology uses a catalyst bed to control NO_X emissions. The system is located within the flue gas ductwork and an ammonia/urea injection system is upstream of the of the catalyst bed. The NO_X reacts with the ammonia and oxygen to form nitrogen and water, For SCR with urea injection, the ammonia reacting with the NO_X is produced as a result of the hydrolysis of the urea in the flue gas.

Good Combustion Practices
Good combustion practices such as minimizing combustion temperature and reducing excess oxygen can help limit NO_X formation. However, a balance must be achieved to avoid resulting in increased CO formation.

i. EUs 01-01 through 01-12 12 Wärtsilä Compression Ignition RICE:

Decision Summary:
Consistent with the BACT evaluation conducted and submitted by EKPC, the Division determines the use of SCR technology, lean burn/low-NO_X combustion technology, and good combustion practices, in addition to limiting startups and shutdowns to 5 each day for each engine, constitutes BACT for NO_X. The following BACT standards apply to each of the affected facilities (EU01-01 through 01-12):

Pollutant	BACTs	NO_X Emission Limitation			Compliance Demonstration
		3-Hour Block Average (Excluding Startups and Shutdowns)		12-Month Rolling Total (Applies During All Operations)	
		When Combusting Natural Gas	When Combusting ULSFO		
NO_X	SCR, Lean Burn/Low-NO_X Combustion, Good Combustion Practices, Limit Startups and Shutdowns to 5 per day per engine	3.19 lb/hr (0.057 g/HP-hr)	20.10 lb/hr (0.36 g/HP-hr)	55.59 TPY	U.S. EPA Reference Method 7E or 320; CPMS

Technologies:
The following technologies were reviewed for the above sources: Water/Steam Injection, Lean-Burn Combustion Technology, Low-NO_X Combustion Technology, Non-Selective Catalytic Reduction Technology (NSCR), and Selective Catalytic Reduction (SCR).

Analysis:
NSCR technology requires exhaust gas conditions with less than 0.5% oxygen and is therefore only applicable for rich-burn RICE. NSCR is considered technically infeasible. Water/steam injection would require an injection rate of 50 to 60% of the fuel consumption to achieve a theoretical 40% reduction of NO_X. High quality water would be needed to avoid damaging the engine. For these reasons, water/steam injection is considered infeasible due to environmental and energy impacts. SCR as a post-combustion control along with combustion control of lean-burn and low-NO_X technologies have been selected as BACT for these units.

Startup and Shutdown BACT Analysis:
The SCR system will not be operational during the entire duration of startup and shutdown events due to the required flue gas temperatures for proper SCR operation. Proper operating procedures /good combustion practices are selected as BACT during startup and shutdown events. Additionally, BACT limitations of no more than 5 startup and 5 shutdown event per day per engine are proposed.

ii. EU 02 Natural Gas Preheater
Decision Summary:
Consistent with the BACT evaluation conducted and submitted by EKPC, the Division determines the use of Low NO_X burners and good combustion practices constitute BACT for the natural gas preheater. The following BACT standards apply to each of the affected facilities (EU02):

Emission Point	BACTs	BACT Limit for NO_X	Compliance Demonstration
02	Low NO_X Burners; Good Combustion Practices	0.049 lb/MMBtu	Combustion of pipeline quality natural gas

Technologies:
The following technologies were reviewed for the above source: proper heater design, proper combustion practices/controls, low NO_X burners, ultra-low NO_X burners, and SCR.

Analysis:
SCR can be applied as a post combustion control for some larger gas-fired heaters but is not feasible for application to a small gas-fired heater such as the proposed gas preheater. A review of the RBLC database found that no gas-fired heaters less than 10 MMBtu/hr have post combustion NO_X controls. Therefore, low-NO_X burners and good combustion practices are selected as BACT for this unit.

iii. EUs 03 and 04 Diesel-Fired Emergency Units
Decision Summary:
Consistent with the BACT evaluation conducted and submitted by EKPC, the Division determines BACT for the units consists of engines certified to meet the requirements of 40 CFR Part 60, Subpart IIII and good combustion practices. The following BACT standards apply to each of the affected facilities (EUs 03 & 04):

Emission Point	BACT	BACT Limit for NO_X	Compliance Demonstration
03	Installation of certified engines and good combustion practices	6.2 g/KW-hr (4.7 g/HP-hr)	Engine Certification and operating according to manufacturer specifications
04		3.8 g/KW-hr (2.9 g/HP-hr)	

Analysis:
Due to the small quantity of emissions associated with the emergency units, and the emergency nature of operation of the units, a “top-down” BACT analysis has not been conducted. While post-combustion NO_X controls (like SCR) are technically feasible to emergency engines, the costs associated to reduce such a small amount of NO_X would be prohibitive. In addition, the operation of this equipment will be limited to emergency events and required routine testing. Therefore, engines certified to meet the requirements of 40 CFR Part 60 Subpart IIII and good combustion practices are selected as BACT for these units.

B. BACT analysis for CO

Technologies Reviewed:

Oxidation Catalyst Technology (OxCat)
OxCat technology consists of a catalyst bed comprised of precious metals the promotes the oxidation of CO to CO_2 without the use of additional reaction accelerants (such as ammonia or urea with SCR for NO_X control).

Non-Selective Catalytic Reduction Technology (NSCR)
NSCR technology uses a catalyst reaction to reduce NO_X, CO, and hydrocarbons to water, carbon dioxide, and nitrogen. NSCR technology is primarily applied to rich-burn, spark-ignited RICE.

Good Combustion Practices
Good combustion practices include the optimization of air/fuel mixture and combustion temperature to allow the oxidation of the fuel carbon to CO_2 instead of CO. Higher combustion temperatures tend to reduce CO formation but may result in higher NO_X formation.

i. EUs 01-01 through 01-12 12 Wärtsilä Compression Ignition RICE:

Decision Summary:
Consistent with the BACT evaluation conducted and submitted by EKPC, the Division determines the use of OxCat technology and good combustion practices constitutes BACT for CO. The following BACT standards apply to each of the affected facilities (EU01-01 through 01-12):

Pollutant	BACTs	CO Emission Limitation			Compliance Demonstration
		3-Hour Block Average (Excluding Startups and Shutdowns)		12-Month Rolling Total (Applies During All Operations)	
		When Combusting Natural Gas	When Combusting ULSFO		
CO	OxCat; GCOP	4.85 lb/hr (0.09 g/HP-hr)	6.99 lb/hr (0.10 g/HP-hr)	31.29 TPY	US EPA Reference Method 10 or 320; CPMS

Technologies:
The following technologies were reviewed for the above sources: Oxidation catalyst Technology (OxCat), Non-Selective Catalytic Reduction Technology (NSCR), and Good Combustion Practices.

Analysis:
NSCR technology requires exhaust gas conditions with less than 0.5% oxygen and is therefore only applicable for rich-burn RICE. NSCR is considered technically infeasible. OxCat as a post-combustion control along with good combustion practices have been selected as BACT for these units.

Startup and Shutdown BACT Analysis:
The OxCat system will not be operational during the entire duration of startup and shutdown events due to the required flue gas temperatures for proper catalyst functionality. Proper operating procedures /good combustion practices are selected as BACT during startup and shutdown events. Additionally, BACT limitations of no more than 5 startup and 5 shutdown event per day per engine are proposed.

ii. EU 02 Natural Gas Preheater
Decision Summary:
Consistent with the BACT evaluation conducted and submitted by EKPC, the Division determines good combustion practices constitutes BACT for this CO for this unit. The following BACT standards apply to each of the affected facilities (EU02):

Emission Point	BACT	BACT Limit for CO	Compliance Demonstration
02	Good combustion practices	0.082 lb/MMBtu	Combustion of pipeline quality natural gas

Analysis:
A review of the RBLC database found that no gas-fired heaters less than 100 MMBtu/hr have post combustion CO controls. Therefore, good combustion practices are selected as BACT for this unit.

iii. EUs 03 and 04 Diesel-Fired Emergency Units
Decision Summary:
Consistent with the BACT evaluation conducted and submitted by EKPC, the Division determines BACT for the units consists of engines certified to meet the requirements of 40 CFR Part 60, Subpart IIII and good combustion practices. The following BACT standards apply to each of the affected facilities (EUs 03 & 04):

Emission Point	BACT	BACT Limit For CO	Compliance Demonstration
03	Installation of certified engines and good combustion practices	3.5g/KW-hr (2.6 g/HP-hr)	Engine certification and operation according to manufacturer specifications
04			

Analysis:
Due to the small quantity of emissions associated with the emergency units, and the emergency nature of operation of the units, a “top-down” BACT analysis has not been conducted. While post-combustion CO controls (like OxCat) are technically feasible to emergency engines, the costs associated to reduce such a small amount of CO would be prohibitive. In addition, the operation of this equipment will be limited to emergency

events and required routine testing. Therefore, engines certified to meet the requirements of 40 CFR Part 60 Subpart IIII and good combustion practices are selected as BACT for these units.

C. <u>BACT analysis for VOC</u>

Technologies Reviewed:

<u>Oxidation Catalyst Technology (OxCat)</u>
OxCat technology consists of a catalyst bed comprised of precious metals that promotes the oxidation of VOC to CO_2 and water.

<u>Good Combustion Practices</u>
Ensuring complete combustion occurs reduces VOC formation. Temperature and residence time are also drivers to VOC formation.

<u>Leakless Technology</u>
Leakless technology utilizes a leakless design to eliminate valve and flange leaks. This is typically used on piping systems that transport very toxic or hazardous materials due to the high cost and maintenance of the equipment.

<u>Leak Detection and Repair (LDAR)</u>
LDAR programs identify leaking components as those measured at 500 ppm above the background value and are typically implemented on a quarterly basis.

<u>Remote Sensing Technology</u>
Remote sensing is considered an equivalent to LDAR and uses infrared technology to detect leaks.

<u>Audio/Visual/Olfactory (AVO) Detection</u>
AVO programs include the addition of mercaptans, which can be detected by odor at a level under 500 ppm. Larger leaks can be detected visually or audibly. AVO monitoring is performed regularly by plant personnel during normal activities.

i. EUs 01-01 through 01-12 12 Wärtsilä Compression Ignition RICE:

Decision Summary:
Consistent with the BACT evaluation completed and submitted by EKPC, the Division has determined that OxCat and good combustion practices constitute BACT for these units. The following BACT standards apply to each of the affected facilities (EU01-01 through 01-12):

Pollutant	**BACTs**	**VOC Emission Limitation**			**Compliance Demonstration**
		3-Hour Block Average (Excluding Startups and Shutdowns)		12-Month Rolling Total (Applies During All Operations)	
		When Combusting Natural Gas	When Combusting ULSFO		
VOC	OxCat, GCOP	4.81 lb/hr (0.09 g/HP-hr)	8.01 lb/hr (0.14 g/HP-hr)	24.42 TPY	US EPA Reference Method 25A; CPMS

Technologies:
The following technologies were reviewed for the above sources: Oxidation catalyst Technology (OxCat) and Good Combustion Practices.

Analysis:
OxCat as a post-combustion control along with good combustion practices have been selected as BACT for these units.

Startup and Shutdown BACT Analysis:
The OxCat system will not be operational during the entire duration of startup and shutdown events due to the required flue gas temperatures for proper catalyst functionality. Proper operating procedures /good combustion practices are selected as BACT during startup and shutdown events. Additionally, BACT limitations of no more than 5 startup and 5 shutdown event per day per engine are proposed.

ii. EU 02 Natural Gas Preheater

Decision Summary:
Consistent with the BACT evaluation completed and submitted by EKPC, the Division has determined that proper design and operation along with good combustion practices constitute BACT for this unit. The following BACT standards apply to each of the affected facilities (EU02):

Emission Point	BACT	BACT Limit for VOC	Compliance Demonstration
02	Good combustion practices	0.005 lb/MMBtu	Combustion of pipeline quality natural gas

Analysis:
A review of the RBLC database found that no gas-fired heaters less than 100 MMBtu/hr have post combustion CO controls. Therefore, good combustion practices are selected as BACT for this unit.

iii. EUs 03 and 04 Diesel-Fired Emergency Units

Decision Summary:
Consistent with the BACT evaluation completed and submitted by EKPC, the Division has determined that BACT for these units consists of engines certified to meet the requirements of 40 CFR Part 60, Subpart IIII and good combustion practices. The following BACT standards apply to each of the affected facilities (EUs 03 & 04):

Emission Point	BACT	BACT Limit for VOC	Compliance Demonstration
03	Installation of certified engines and good combustion practices	0.17 g/kW-hr (0.12 g/HP-hr)	Engine certification and operation according to manufacturer specifications
04		0.10 g/kW-hr (0.08 g/HP-hr)	

Analysis:
While post-combustion VOC controls (like OxCat) are technically feasible to emergency engines, the costs associated to reduce such a small amount of VOC would be prohibitive. In addition, the operation of this equipment will be limited to emergency events and required routine testing Therefore, engines certified to meet the requirements of 40 CFR Part 60, Subpart IIII and good combustion practices are selected as BACT for these units.

iv. EUs 06-1 & 06-2 Ultra Low Sulfur Fuel Oil Storage Tanks
Decision Summary:
Consistent with the BACT evaluation completed and submitted by EKPC, the Division determines that installation of a submerged fill pipe and overfill/spill protection in each tank constitutes BACT for these units (EUs 06-1 & 06-2).

Analysis:
Due to the small amount of VOC potentially emitted from these units, a "top down" BACT analysis was not completed for these units. Due to the low vapor pressure of ULSFO, no control techniques have been applied for tanks storing fuel oil. The use of a submerged fill pipe and overfill/spill protection are selected as BACT for these units.

v. EUs 07 Fugitive Piping Components
Decision Summary:
Consistent with the BACT analysis completed and submitted by EKPC, the Division determines that an AVO program constitutes BACT for this unit (EUs 07).

Analysis:
Leakless technology is typically applied to piping systems carrying very toxic or hazardous materials, not natural gas. Due to mercaptans present in pipeline quality natural gas, AVO will allow plant personnel to monitor for leaks much more frequently than LDAR or remote sensing technology. Therefore, the development and implementation of an AVO leak detection plan is selected as BACT for this unit.

vi. EUs 09-1, 09-2, 09-3 Lube Oil Tanks
Decision Summary:
The Division has determined that installation of overfill and spill protection constitute BACT for these units (EUs 09-01, 09-02, and 09-03).

Analysis:
Due to the low vapor pressure of number 2 fuel oil, no control techniques have been applied for tanks storing fuel oil. The use of overfill/spill protection are selected as BACT for these units.

D. BACT analysis for PM/PM_{10}/$PM_{2.5}$

Technologies Reviewed:
Low Sulfur/"Clean" Fuels
Most of the PM in RICE exhaust is generated from the sulfur in the fuels. Using low sulfur fuels reduces PM emissions.

Fabric Filter/Baghouse
A fabric filter or baghouse uses filters that usually come in the form of cylindrical fabric bags to remove particulate matter from the contaminated gas stream by depositing the particles on the fabric. Typical industrial applications for fabric filters does not include use on RICE.

Electrostatic Precipitator (ESP)
ESP removes particulate matter from a gas stream by using electrical energy to charge particles that are then attracted to collector plates. Ideally, particles will have moderate electric resistivity.

Good Combustion Practices
Good combustion practices to minimize incomplete combustion will result in reduced PM emissions.

Wet Suppression
Wet suppression involves the use of water or suitable chemicals to prevent PM from becoming airborne.

i. EUs 01-01 through 01-12 12 Wärtsilä Compression Ignition RICE:

Decision Summary:
Consistent with the BACT evaluation conducted and submitted by EKPC, the Division has determined that the use of low sulfur/clean fuels and good combustion practices constitute BACT for these units. The following BACT standards apply to each of the affected facilities (EU01-01 through 01-12):

Pollutant	**BACTs**	**$PM/PM_{10}/PM_{2.5}$ Emission Limitation**			**Compliance Demonstration**
		3-Hour Block Average (Excluding Startups and Shutdowns)		12-Month Rolling Total (Applies During All Operations)	
$PM/PM_{10}/PM_{2.5}$ (Filterable + Condensable)	Low sulfur / clean fuels; GCOP	When Combusting Natural Gas	When Combusting ULSFO	21.30 TPY	US EPA Reference Method 5 (filterable) and 202 (condensable);
		3.88 lb/hr (0.07 g/HP-hr)	5.60 lb/hr (0.10 g/HP-hr)		

Analysis:
Post-combustion controls like fabric filters and ESP are typically employed for sources with higher particulate loadings. While they may be technically feasible, they have not been applied to commercial RICE units and are not practical. The use of pipeline quality natural gas (0.5 gr sulfur/100 dscf) and ULSFO (15 PPM sulfur by weight) along with good combustion practices have been selected as BACT for these units.

ii. EU 02 Natural Gas Preheater
Decision Summary:
Consistent with the BACT evaluation conducted and submitted by EKPC, the Division has determined that good combustion practices and the use of pipeline quality natural gas constitute BACT for this unit. The following BACT standards apply to each of the

affected facilities (EU02):

Emission Point	BACT	BACT Limit for PM/PM_{10} $/PM_{2.5}$	BACT Limit Averaging Period	Compliance Demonstration
02	Good combustion practices	0.0075 lb/MMBtu	N/A	Fuel analysis and maintain records of sulfur content of fuel combusted

Analysis:
Post-combustion control technologies are not applied to natural gas-fired heaters. A review of the RBLC database found no add on PM controls for natural gas-fired heaters. The use of pipeline quality natural gas and good combustion practices are selected as BACT for this unit.

iii. EUs 03 and 04 Diesel-Fired Emergency Units
Decision Summary:
Consistent with the BACT evaluation conducted and submitted by EKPC, the Division has determined that BACT for these units consists of engines certified to meet the standards of 40 CFR Part 60, Subpart IIII, good combustion practices, and the use of low sulfur fuel. The following BACT standards apply to each of the affected facilities (EUs 03 & 04):

Emission Point	BACT	BACT Limit for PM/PM_{10} $/PM_{2.5}$	Compliance Demonstration
03	Installation of certified engines and good combustion practices	0.20 g/kW-hr (0.15 g/HP-hr)	Engine certification and operation according to manufacturer specifications
04			

Analysis:
Post-combustion controls like fabric filters and ESP are typically employed for sources with higher particulate loadings. While they may be technically feasible, they have not been applied to commercial RICE units and are not practical. In addition, the operation of this equipment will be limited to emergency events and required routine testing. Therefore, engines certified to meet the requirements of 40 CFR Part 60, Subpart IIII, the use of low sulfur fuels, and good combustion practices are selected as BACT for these units.

iv. EU05 Paved Roadways
Decision Summary:
Consistent with the BACT evaluation conducted and submitted by EKPC, the Division has determined that the use of paved roadways and dust mitigation/suppression

constitute BACT for this unit. The following BACT standards apply to each of the affected facilities (EU05):

- Meet the requirements of 401 KAR 63:010 *Fugitive emissions*, to take reasonable precautions to prevent particulate matter from becoming airborne including but not limited to wet suppression.

Analysis:
Potential fugitive emissions of PM from haul roads are mitigated by installing paved roadways rather than unpaved and by taking reasonable precautions such as wet suppression and sweeping, to prevent the any particulate matter from becoming airborne. Therefore, complying with the requirements of 401 KAR 63:010 Fugitive emissions is selected as BACT for this unit.

E. BACT analysis for GHGs[5]

Technologies Reviewed:

Energy Efficient Design
Wärtsilä 18V50DF dual-fuel RICE technology proposed by EKPC are designed to provide the highest level of efficiency available for large internal combustion engines. The engines maintain high efficiency under full-load and partial-load operations.

Low Carbon Fuels
Natural gas is the lowest carbon fuel generally available for power production. Use of natural gas is inherent in the proposed project and is the primary fuel. EKPC proposes the use of ULSFO when the availability of natural gas is limited.

The firing or co-firing of hydrogen with natural gas can further reduce GHG emissions, and has been evaluated on large combustion units (such as turbines and utility boilers), but has not been employed in practice and has not been applied to RICE.

Oxidation Catalyst Technology (OxCat)
OxCat technology consists of a catalyst bed comprised of precious metals that promotes the oxidation of CH_4 to CO_2 and water.

Carbon Capture and Sequestration (CCS)
CCS is the process of capturing CO_2 emitted, drying and compressing the CO_2, and then transporting to a long-term storage or conversion.

i. EUs 01-01 through 01-12 12 Wärtsilä Compression Ignition RICE:

Decision Summary:
Consistent with the BACT evaluation conducted and submitted by EKPC, the Division has determined that the use of OxCat technology, low-carbon fuels, and good combustion practices comprise BACT for the unit. The following BACT standards apply to each of the affected facilities (EU01-01 through 01-12):

Emission Unit	BACTs	BACT Limit for GHG	Averaging Period	Compliance Demonstration
01-01 through 01-12	OxCat; Low-carbon fuel; GCOP	85,300 tpy	12-Month Rolling Total, (Applies During All Operations)	CPMS

Technologies:
The following technologies were reviewed for the above sources: Energy Efficient Design, Low Carbon Fuels, Oxidation Catalyst Technology (OxCat), and Carbon Capture and Sequestration (CCS).

Analysis:
While the transport requirements to support CCS are technically feasible, a suitable area in proximity to the Liberty Station project with sufficient capacity has not been demonstrated. Furthermore, CCS has not yet been demonstrated as a feasible option for CO_2 mitigation from RICE. As such, CCS is deemed technically infeasible for the Liberty Station RICE units. Likewise, the firing or cofiring of hydrogen with natural gas has not been applied to RICE engines nor is commercially available and is deemed technically infeasible. The use of OxCat technology, as selected for CO and VOC BACT, along with the energy efficient design of the Wärtsilä 18V50DF dual-fuel RICE and the use of natural gas as a primary fuel have been selected as BACT for these units.

ii. **EU 02 Natural Gas Preheater**
Decision Summary:
Consistent with the BACT evaluation conducted and submitted by EKPC, the Division has determined that proper design and combustion practices along with the use of pipeline quality natural gas constitute BACT for this unit. The following BACT standards apply to each of the affected facilities (EU02):

Emission Unit	BACT	BACT Limit for GHG	Compliance Demonstration
02	Good combustion practices	118 lb/MMBtu	Combustion of pipeline quality natural gas

Analysis:
CCS is not considered technically feasible for natural gas-fired heaters. The use of pipeline quality natural gas and good combustion practices are selected as BACT for this unit.

iii. **EUs 03 and 04 Diesel-Fired Emergency Units**
Decision Summary:
Consistent with the BACT evaluation conducted and submitted by EKPC, the Division has determined that BACT for these units consists of engines certified to meet the

standards of 40 CFR Part 60, Subpart IIII, good combustion practices. The following BACT standards apply to each of the affected facilities (EUs 03 & 04):

Emission Point	BACT	BACT Limit for $PM/PM_{10}/PM_{2.5}$	Compliance Demonstration
03	Installation of certified engines and good combustion practices	163 lb/MMBtu	Engine certification and operation according to manufacturer specifications
04			

Analysis:
Based on a review of the RBLC database for emergency engines, the only feasible method for controlling GHG emissions is proper engine design and good combustion practices. Therefore, engines certified to meet the requirements of 40 CFR Part 60, Subpart IIII and good combustion practices are selected as BACT for these units.

vii. EU 07 Fugitive Piping Components
Decision Summary:
The following BACT standards apply to each of the affected facilities (EU 07):

- Implement an audio/visual/olfactory (AVO) leak detection program for the purpose of detecting leaks of natural gas.

Analysis:
Due to mercaptans present in pipeline quality natural gas, AVO will allow plant personnel to monitor for leaks much more frequently than LDAR or remote sensing technology. Therefore, the development and implementation of an AVO leak detection plan is selected as BACT for this unit.

viii. EU 08 Circuit Breakers
Decision Summary:
The following BACT standards apply to each of the affected facilities (EU 08):

- Installation of circuit breakers designed with an annual leak rate of 0.5% SF_6 by weight
- Installation of circuit breakers with a leak detection and alarm system

Analysis:
The only applicable technology to reduce GHGs from circuit breakers is prevention/minimization of leaks. While GHG-free circuit breakers do exist, they are only available in lower rating applications than those proposed by EKPC. The use of state-of-the-art enclosed technology with a leak detection system with an alarm to indicate the presence of a leak or leaks are selected as BACT for this unit.

III. Air Quality Impact Analysis

A. *Screening Methodology*

The incremental increases in ambient pollutant concentrations associated with the EKPC Liberty Station RICE Generation project have been estimated through the use of a dispersion model (AERMOD). The submitted demonstration adheres to applicable guidelines in the United States Environmental Protection Agency (USEPA) Guideline on Air Quality Models (GAQM, 40 CFR Appendix W, May 2017), other applicable guidance, and followed the methodology presented in the Air Dispersion Modeling Protocol approved by KDAQ on September 13, 2024.

Model simulations for short-term and annual-averaged CO, NO_2, PM_{10}, and $PM_{2.5}$ emissions are performed with the AERMOD model using the 5-year meteorological database. The highest predicted impacts (H1H) were used as the design concentrations in the Significant Impact Level (SIL) analyses, while the design concentrations for the NAAQS and PSD increment analyses followed the form of the NAAQS and PSD increment for each applicable pollutant and averaging time. Each pollutant is being assessed against the SIL for the NAAQS: the maximum value over 5 years for each applicable time averaging period is compared to the appropriate SIL.

Significant Impact Levels (SILs)

Pollutant	Averaging Period	Modeled Concentration ($\mu g/m^3$)	Significant Impact Level ($\mu g/m^3$)	SIL Exceeded & Additional Modeling Required?	Significant Monitoring Concentrations ($\mu g/m^3$)	Significant Monitoring Concentration Exceeded?[1]
CO	1-hour	139.51	2000	No	-	-
	8-hour	64.81	500	No	575	No
PM_{10}	24-hour	2.97	5	No	10	No
	Annual	0.23	1	No	-	-
$PM_{2.5}$	24-hour	2.62	1.2	Yes	4	No
	Annual	0.15	0.13	Yes	-	-
NO_2	1-hour	221.57	7.5	Yes	-	-
	Annual	171	1	Yes	14	Yes

[1]The applicant may propose that the reviewing authority considers the use of existing monitoring data if appropriate justification is provided. EKPC Liberty proposed the use of representative regional background data to satisfy this requirement as necessary.

B. *Background Concentrations*

Representative background concentrations were added to the maximum predicted concentrations so that small sources that were not explicitly modeled are included in the NAAQS and KYAAQS assessment. Background concentrations are based on ambient monitoring data collected for the most recent three-year period available (2021 through 2023). This period is determined to be the most representative for use in the modeling analysis. Since all of the criteria pollutants are not monitored at one location, data from several monitoring locations are utilized.

Representative Background Concentrations

Monitoring Location	Site ID	Data Collection Period	Pollutant	Averaging Period	Basis of Design Value	Design Value
Campbell County	21-037-3002	2021-2023	NO_2	1-hour	Average of the three year 98th percentile	51.7 $\mu g/m^3$
				Annual	Annual Mean	15 $\mu g/m^3$
Grayson Lake, Carter County	21-043-0500	2021-2023	$PM_{2.5}$	24-hour	Average of the three year 98th percentile	18.9 $\mu g/m^3$
				Annual	Average of three year annual averages	6.9 $\mu g/m^3$
Grayson Lake, Carter County	21-043-0500	2021-2023	PM_{10}	24-hour	2nd high	34.3 $\mu g/m^3$
Mackville, KY	21-229-9991	2021-2023	Ozone	8-hour	3 year 4th high maximum 8-hour average	63 ppb
Mammoth Cave	21-061-0501	2021-2023	CO	1-hour	2nd high	863 $\mu g/m^3$
				8-hour		805 $\mu g/m^3$

C. *Cumulative NAAQS Analyses*

NAAQS analyses, using five years of meteorological data, were performed for 1-hour and annual NO_2; 24-hour PM_{10}; and 24-hour and annual $PM_{2.5}$. The NO_2 project impacts were conducted using Tier I for NOx conversion, which assumes 100% conversions of NO_X to NO_2. The NAAQS analyses were carried out by modeling facility-wide EKPC Liberty source parameters and emission rates; modeling off-property source inventory for the surrounding area; and adding the representative background concentrations to modeled concentrations for comparison with the NAAQS.

NAAQS Modeling Results

Pollutant	Averaging Period	Modeled Concentration ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Max EKPC Liberty Contribution ($\mu g/m^3$)
$PM_{2.5}$	24-hour	1.58	18.9	20.08	35	N/A
	Annual	.146	6.9	7.1	9	N/A
NO_2	1-hour	192.82	Included	192.82[1]	188	.00021[2]
	Annual	2.4	15.0	17.4	100	N/A

[1]The 1-hour NO2 NAAQS Analysis involved temporal pairing of monitored and modeled concentrations consistent with recent EPA guidance. Maximum impacts shown include the background concentration (192.82 $\mu g/m^3$). The 1-hour and annual average background concentrations are based on ambient monitoring data from the Campbell County, Kentucky site (Site ID 21-037-3002) for the three-year period from 2021 to 2023.

[2]Source contribution does not include background (.0021 $\mu g/m^3$).

D. Class II Increment Analysis

In addition, a PSD Class II increment modeling analysis using five years of meteorological data was performed for annual NO_2, 24-hr and annual PM_{10}, and 24-hour and annual $PM_{2.5}$. The demonstration includes increment consuming and expanding EKPC Liberty source parameters and emission rates, as well as increment consuming and expanding off-property sources, if applicable.

Class II Increments

Pollutant	Averaging Period	Modeled Concentration (μg/m³)	PSD Class II Increment Standard (μg/m³)
$PM_{2.5}$	24 hour	2.62	9
	Annual	1.46	4
$PM_{2.5}$[1] (secondary)	24 hour	2.96[1]	9
	Annual	1.62[1]	4
NO_2	Annual	1.71	25

[1]Secondary PM2.5 concentrations estimated using the default KDAQ MERP values.

E. Secondary $PM_{2.5}$ and Ozone Formation

The Division has addressed secondary pollutant impacts and provided a state-specific guidance (November 13, 2024) on the application of EPA's Modeled Emission Rates for Precursors (MERPs) Tier-1 demonstration tool. This guidance was used to assess secondary formation of ozone and $PM_{2.5}$ for this project. A MERP represents a level of precursor emissions that is not expected to contribute significantly to concentrations of ozone or secondarily formed $PM_{2.5}$.

MERPs are used to determine if proposed emission increases from a facility will result in primary and secondary impacts. NOx, SO_2, $PM_{2.5}$, and VOC emissions from the project must be included in the analysis. If the project emissions from all relevant pollutants are below the SER, no further analysis is required. If the project emissions from any of the relevant emissions are above the SER, a Tier 1 demonstration is required. The Tier 1 demonstration consists of a SILs analysis and, if needed, a cumulative analysis. The analysis must be below the NAAQS for each precursor in order to pass.

EKPC Liberty Emission for MERPs Analysis

Precursor	Emissions (tpy)	SER (tpy)
NO_X	670	40
SO_2	12.2	40
$PM_{2.5}$	256	10
VOC	294	40

The values below represent the highest maximum predicted EKPC Liberty project concentrations over the five modeling years.

SIL Modeling Results for $PM_{2.5}$ MERPs Analysis

Pollutant	Project Modeled Concentration (μg/m³)
Annual $PM_{2.5}$	0.146
Daily $PM_{2.5}$	2.62

The highest modeled concentration for all sources, including nearby sources, for annual and 24-hour primary $PM_{2.5}$ NAAQS are as follows:

NAAQS and PSD Increment Modeling Results for MERP*s* Analysis

Pollutant	Project + Nearby NAAQS Source Impacts (μg/m^3)	Project + Nearby PSD Increment Source Impacts (μg/m^3)
Annual $PM_{2.5}$	0.146	0.162
Daily $PM_{2.5}$	2.62	2.96

The background concentrations for ozone and $PM_{2.5}$ annual / 24-hour are as follows:

Background Concentrations for MERPs Analysis

Pollutant	Background Concentrations	Monitor ID
Ozone	63	21-229-9991
Annual $PM_{2.5}$	18.9	21-043-0500
Daily $PM_{2.5}$	6.9	

If the result of the SIL Analysis is greater than 1, a cumulative analysis is required for that precursor. If the result is less than s1, a cumulative analysis is not required. The SIL analysis results for ozone and PM2.5 are as follows:

MERPs SIL Analyses

Pollutant	Analysis Results	Less than 1?
Ozone	4.1	No
Annual $PM_{2.5}$	.146	Yes
Daily $PM_{2.5}$	2.62	No

The table below shows the cumulative analysis results for ozone and $PM_{2.5}$.

MERP Cumulative NAAQS Analysis

Precursor	Analysis	NAAQS	Below NAAQS?
Ozone	67.1	70 ppb	Yes
Annual $PM_{2.5}$	7.1	9 μg/m^3	Yes
Daily $PM_{2.5}$	20.8	35 μg/m^3	Yes

Summary of the PSD Increment analysis results is as follows:

MERPs PSD Increment Analysis

Precursor	Analysis	PSD INC	Below PSD INC?
Annual $PM_{2.5}$	.162	4 μg/m^3	Yes
Daily $PM_{2.5}$	2.96	9 μg/m^3	Yes

F. ***Class I MERPS Analysis***

The project related increase of NO_2, PM_{10}, and $PM_{2.5}$, were evaluated against the Class I SILs by applying the AERMOD dispersion model receptors at the maximum spatial extent (50 km from the Project site to receptor). The maximum-modeled concentrations at the 50 km receptors are less than the Class I SILs for all pollutants and averaging periods.

Class I SIL Analysis with AERMOD at 50 km

Pollutant	Averaging Period	Modeled Concentration at 50 km ($\mu g/m^3$)	Class I SIL	% of SIL
PM_{10}	24-hour	0.16	0.32	51%
	Annual	0.012	0.16	4%
$PM_{2.5}$[1]	24-hour	0.16	0.27	40%
	Annual	0.012	0.03	12%
NO_2	Annual	0.022	0.10	17%
(1) The results of the screening modeling for increment only show the results from direct modeling of PM2.5 emissions.				

In order to assess the total $PM_{2.5}$ impacts (primary and secondary) at the Class I area, the USEPA approved distance-dependent technique was used. In this case, the MERPs values were calculated based on the concentrations from a hypothetical stack at a specific distance representative of the distance between the Project and the Class I area.

In order to evaluate the impact of EKPC's emissions of $PM_{2.5}$ precursors on $PM_{2.5}$ Class I increment, EKPC has applied the approach recommended in the GAQM using the Modeled Emission Rates for Precursors (MERPs). This procedure was used to determine whether proposed increases in the $PM_{2.5}$ precursors (NO_X and SO_2) for the 24-hour averaging period will result in impacts using the following equation:

$$\frac{Max\ PM2.5\ Modeled\ Impact}{PM2.5\ Class\ I\ SIl} + \frac{SO2\ Emission\ Rate}{SO2\ MERP} + \frac{NOX\ Emission\ Rate}{NOx\ MERP} < 1$$

If the initial screening analysis value is greater than 1, then a cumulative analysis must be performed to assess Class I $PM_{2.5}$ increment consumption. The total primary and secondary 24-hour $PM_{2.5}$ impact for Class I increment screening is calculated as follows:

$$\frac{0.16}{0.27} + \frac{12.2}{1500} + \frac{670}{2449} = 0.87\ \mu g/m^3$$

For the $PM_{2.5}$ annual analysis, the same methodology for assessing the Class II secondary $PM_{2.5}$ impact was used for the Class 1 analysis, resulting in a secondary impact of 0.016 $\mu g/m^3$ for the annual averaging period for the Class I increment screening. The total impact was then calculated by adding the direct $PM_{2.5}$ modeled impact for the annual averaging period as follows:

$$0.012 \mu g/m3 + 0.016\ \mu g/m3 = 0.028\ \mu g/m3$$

With the calculated value for the 24-hour averaging period being less than 1, primary and secondary $PM_{2.5}$ emissions from the proposed sources at Liberty Station will not cause or contribute to a violation of the 24-hour Class I increment standard for $PM_{2.5}$ in the Mammoth Cave Class I area. Likewise, as the calculated value for the annual averaging period is less than the Class I SIL of 0.03 $\mu g/m^3$, EKPC Liberty Station will not cause or contribute to a violation of the annual Class I increment standard for $PM_{2.5}$ in the Mammoth Cave Class I area. Therefore, no further analysis of $PM_{2.5}$ is required for Class I increment.

G. <u>*Class I Area Analysis*</u>

Class I area impacts are addressed if the proposed project has an impact that exceeds the screening threshold as described by Federal Land Managers' (FLM) Air Quality Related Values Work Group (FLAG) guidance. In this guidance, the sum of the proposed project emissions (in tpy) of SO_2, NOx, PM_{10} and H_2SO_4 is divided by the distance to the Class I area and compared to the value of 10. This ratio is known as Q/D. If Q/D is 10 or less, the project is considered to have a negligible impact on the Class I area. If the Q/D value is greater than 10, then further analysis to evaluate impacts in the Class I area is warranted.

There are four Class I areas within 300 km of the EKPC Liberty Station casting facility: Mammoth Cave, which is the closest at 95.5km, followed by Great Smokey Mountains 213.5km, Joyce Kilmer-Slickrock 228.3km, Cohutta Wilderness 265.5km, and Shining Rock 285.1km. The sum of emissions (SO_2, NOx, PM_{10} and H_2SO_4) for the proposed project is 2099 tpy. The calculated Q/D for the proposed project relative to Mammoth Cave NP is 22; which is above the FLM screening level of 10.

Class I Area Q/D Screening Analysis

Pollutant	Project Emissions (tpy)	Q/D Analysis
NO_2	1753	
SO_2	12	
PM_{10}	331	
H_2SO_4	3	
Total	2099	
AREA	95.5	22

The screening threshold of 10 is exceeded for Mammoth Cave National Park. Therefore, an AQRV analysis is required for Mammoth Cave. None of the other Class I areas within 300 km of EKPC Liberty Station exceeded the screening threshold.

In order to perform the AQRV analysis, EKPC conducted modeling using the Lakes Environmental CALPUFF modeling system to evaluate impacts from the proposed source on visibility and acid deposition in the Mammoth Cave Class I area. For the Class I AQRV analysis, the following EPA-approved versions of the CALPUFF modeling system were used:

• CALPUFF Version 5.825, Level 151215
• CALPOST Version 6.221, Level 080724
• POSTUTIL Version 1.56, Level 070627

CALPUFF was used to assess annual wet and dry deposition of sulfur and nitrogen compounds on the Class I area using emissions of NO_X and SO_2 from the proposed new sources. The amount of sulfur and nitrogen deposition were then converted to units of kg/ha/yr and compared to the Deposition Analysis Thresholds (DATs) established by the NPS and US Fish and Wildlife Service (USFWS). The screening DAT threshold established by these agencies is 0.010 kg/ha/yr.

Results of S and N Deposition Analysis for Mammoth Cave National Park

Total S Deposition – Mammoth Cave National Park						
Modeled Year	**Average Annual S Deposition ug/m²/s**	**Multiplier to Convert to kg/ha/hour**	**Number of Hours in Met Data**	**Average Annual S Deposition kg/ha/yr**	**DAT kg/ha/yr**	**Percent of DAT**
2001	2.82E-07	3.60E-02	8735	8.9E-05	0.01	0.9%
2002	4.33E-07	3.60E-02	8735	1.36E-04	0.01	1.4%
2003	8.18E-08	3.60E-02	8735	2.57E-05	0.01	0.3%
Total N Deposition – Mammoth Cave National Park						
Modeled Year	**Average Annual N Deposition ug/m²/s**	**Multiplier to Convert to kg/ha/hour**	**Number of Hours in Met Data**	**Average Annual N Deposition kg/ha/yr**	**DAT Threshold kg/ha/yr**	**Percent of DAT Threshold**
2001	1.15E-05	3.60E-02	8735	3.63E-03	0.01	33.4%
2002	1.73E-05	3.60E-02	8735	5.43E-03	0.01	54.3%
2003	1.06E-05	3.60E-02	8735	3.34E-03	0.01	33.4%

As these tables show, total sulfur and nitrogen deposition resulting from maximum emissions of subject pollutants from EKPC Liberty Station are well below the DATs for both sulfur and nitrogen. Therefore, the proposed EKPC Liberty Station project will not cause adverse impacts due to sulfur and nitrogen deposition from project emissions in the Mammoth Cave Class I area.

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS

Emission Units 01-01 through 01-12	12 Wärtsilä Compression Ignition RICE			
Pollutant	**Emission Limit or Standard (Each Engine)**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
CO	4.85 lb/hr (0.09 g/HP-hr)[AC]	401 KAR 51:017	See Table A-2 in **Comments** section below	Initial and annual testing, operation of SCR and OxCat control technology, CPMS, monitoring hours of operation on each fuel and monitoring number of daily startups and shutdowns.
	6.99 lb/hr (0.10 g/HP-hr)[BC]			
	31.29 TPY[D]			
	Reduce by 70% or more; or limit formaldehyde in the exhaust to 580 ppbvd @ 15% O_2	40 CFR part 63 subpart ZZZZ Table 2a Item 3. a.		
NO_X	3.19 lb/hr (0.057 g/HP-hr)[AC]	401 KAR 51:017		
	20.10 lb/hr (0.36 g/HP-hr)[BC]			
	55.59 TPY[D]			
	2.58 g/KW-hr	40 CFR 60.4204(c)(3)(ii)		
PM	3.88 lb/hr (0.07 g/HP-hr)[AC]	401 KAR 51:017		
	5.60 lb/hr (0.10g/HP-hr)[BC]			
	21.30 TPY[D]			
	0.15 g/KW-hr; or reduce PM emissions by 60% or more	40 CFR 60.4204(c)(4)]		
VOC	4.81 lb/hr (0.09 g/HP-hr)[AC]	401 KAR 51:017		
	8.01 lb/hr (0.14 g/HP-hr)[BC]			
	24.42 TPY[D]			
GHGs (CO_2e)	85,300 TPY[D]	401 KAR 51:017	Factors from 40 CFR Part 98 Subpart C for the respective fuel. [CH_4 GWP=28; N_2O GWP=265]	Good Combustion Practices Plan
A	When combusting natural gas			
B	When combusting ultra-low sulfur fuel oil			
C	Based on a 3-hour block average (excluding startups and shutdowns)			
D	Based on a 12-month rolling total (applies during all operations)			

Emission Units 01-01 through 01-12 12 Wärtsilä Compression Ignition RICE

Initial Construction Date: Proposed April 2026

Process Description:

Make/Model:	Wärtsilä 18V50DF
Nominal Power Rating:	18.3 MW (25,234 HP) (each)
Primary Fuel:	Pipeline Quality Natural Gas with Ultra Low Sulfur Fuel Oil Pilot
Secondary Fuel:	Ultra Low Sulfur Fuel Oil
Maximum Heat Input:	150 MMBtu/hr/engine
Maximum Engine Speed:	514 RPM
Control Devices:	Selective Catalytic Reduction (90% control of NO_X) Oxidation Catalyst (85% control of CO; 77% control of VOCs)

Applicable Regulations:

401 KAR 51:017, *Prevention of significant deterioration of air quality* (applies to CO, NO_X, $PM/PM_{10}/PM_{2.5}$, VOC, and GHG emissions), applicable to construction of a new major stationary source that commences construction after September 22, 1982, and locates in an area designated attainment or unclassifiable under 42 U.S.C. 7407(d)(1)(A)(ii)and(iii).

401 KAR 60:005, Section 2(2)(dddd) 40 CFR 60.4200 through 60.4219, Tables 1 through 8 (**Subpart IIII**), *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*, applicable to owners and operators of stationary compression ignition internal combustion engines that commence construction after July 11, 2005, where the engines are manufactured after April 1, 2006.

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*, applicable to owners and operators of stationary RICE at a major or area source of HAP emissions.

401 KAR 52:060, *Acid rain permits*, incorporating the Federal Acid Rain provisions as codified in **40 CFR Parts 72 to 78,** is applicable as the units are new units that do not meet the criteria of 40 CFR 72.6(b). Once constructed, the units will be exempt from the Acid Rain program under 40 CFR 72.7(a) as the units each serve a generator with a total nameplate capacity less than 25MWe, burn fuel that does not include coal or coal-derived fuel, and burn gaseous fuel with an annual average sulfur content of 0.05% or less by weight.

Non-applicable Regulations:

401 KAR 60:005, Section 2(2)(eeee) 40 CFR 60.42300 through 60.4219, Tables 1 through 4 (**Subpart JJJJ**), *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*, is not applicable as the units use liquid fuel (diesel) for compression and gaseous fuel (natural gas) as the primary fuel at an annual average ratio of greater than 2 parts diesel fuel to 100 parts total fuel on an energy equivalent basis and therefore are not spark ignition engines.

401 KAR 60:005, Section 2(2)(jjjj) 40 CFR 60.5508 through 60.5580, Tables 1 through 3 (**Subpart TTTT**), *Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units*, is not applicable to reciprocating internal combustion engines.

40 CFR Part 60, Subpart TTTTa, *Standards of Performance for Greenhouse Gas Emissions for Modified Coal-Fired Steam Electric Generating Units and New Construction and Reconstruction Stationary Combustion Turbine Electric Generating Units* is not applicable as each engine serves a generator where the effective generation capacity is 25 MW or less.

Emission Units 01-01 through 01-12 — 12 Wärtsilä Compression Ignition RICE

40 CFR Part 64, *Compliance Assurance Monitoring (CAM)*, is not applicable as the units are subject to emission standards proposed after November 15, 1990 (subparts IIII & ZZZZ) and are subject to a continuous compliance determination method (CPMS) in a part 70 or 71 permit.

40 CFR Part 97, *Federal NO_X budget Trading Program, CAIR NO_X and SO_2 Trading Programs, CSAPR NO_X and SO_2 Trading Programs, and Texas SO_2 Trading Program* does not apply as the units serve generators with a nameplate capacity less than 25 MWe and the facility is not located in Texas.

Comments:
Permit shield was requested in application received 9/20/2024 (APE20240001).

The facility requested the permit only include the portion of 40 CFR 60.4204(c)(4) including the 0.15 g/kW-hr limit, as that is the limit they intend to comply with.

The permittee is limited to 100 days (2,400 hrs) of operation on ULSFO per engine as well as no more than 5 startups and 5 shutdowns per day per engine.

The permittee shall combust only pipeline quality natural gas with a sulfur content of 0.5 gr/100 dscf or below; or ultra-low sulfur fuel oil (ULSFO) with a sulfur content not exceeding 15 ppm by weight.

Emissions from EUs 01-01 through 01-12 were calculated using manufacturer supplied data for steady-state operation on natural gas and ULSFO, cold, warm, and hot startups, and shutdowns on either fuel as shown in Table A-2. Max PTE was calculated assuming 265 days (6,360 hrs) operation on natural gas and 100 days (2,400 hrs) of operation on ULFO. One cold start and four warm starts as well as five shutdowns per day per engine were included in potential to emit calculations to stay conservative.

***Table A-2*, Wärtsilä Compression Ignition RICE Manufacturer Emission Factors**

Fuel	Operating State	NO_X Emissions	CO Emissions	VOC Emissions	PM/PM10/ PM2.5 Emissions	Units
Natural Gas	Steady State*	226.06	229.14	148.2	27.5	lb/MMscf
	Cold Startup	20	19	3	4	lb/each
	Warm Startup	14	16	1.9	4	
	Hot Startup	9	11	1.7	4	
	Shutdown	0.06	0.09	0.09	0.06	
ULSFO	Steady State*	182.24	42.25	31.58	5.08	lb/Mgal
	Cold Startup	105	8	4	6	lb/each
	Warm Startup	77	7	3.5	6	
	Hot Startup	61	6	3	6	
	Shutdown	0.4	0.12	0.15	0.09	

* Does not account for SCR or OxCat control

<table>
<tr><th colspan="5">Emission Unit 02 Natural Gas Preheater</th></tr>
<tr><th>Pollutant</th><th>Emission Limit or Standard</th><th>Regulatory Basis for Emission Limit or Standard</th><th>Emission Factor Used and Basis</th><th>Compliance Method</th></tr>
<tr><td>CO</td><td>0.082 lb/MMBtu</td><td rowspan="3">401 KAR 51:017</td><td>87.54 lb/ MMscf [AP-42 Table 1.4-1 (adjusted to 1063 Btu/scf)]</td><td rowspan="8">Compliance with BACT emission limitations is demonstrated via the use of pipeline quality natural gas, good combustion practices, fuel sulfur content and by meeting the requirements of Subpart DDDDD.

Compliance with 401 KAR 59:015 limits is assumed based on natural gas combustion</td></tr>
<tr><td>NO_X</td><td>0.049 lb/MMBtu</td><td>52.11 lb/ MMscf [AP-42 Table 1.4-1 (adjusted to 1063 Btu/scf)]</td></tr>
<tr><td rowspan="2">$PM=PM_{10}=PM_{2.5}$</td><td>0.0075 lb/ MMBtu</td><td rowspan="2">7.92 lb/MMscf [AP-42 Table 1.4-2 (adjusted to 1063 Btu/scf)]</td></tr>
<tr><td>0.10 lb/MMBtu</td><td>401 KAR 59:015, Section 4(1)(b)</td></tr>
<tr><td>VOC</td><td>0.005 lb/MMBtu</td><td rowspan="2">401 KAR 51:017</td><td>5.73 lb/MMscf [AP-42 Table 1.4-2 (adjusted to 1063 Btu/scf)]</td></tr>
<tr><td>GHGs (CO_2e)</td><td>118 lb/MMBtu</td><td>CO_2:124,368 lb/MMscf
CH_4: 2.34 lb/MMscf
N_2O: 0.23 lb/MMscf
[40 CFR Part 98 Subpart C Tables C-1 & C-2]</td></tr>
<tr><td>Opacity</td><td>20% Opacity</td><td>401 KAR 59:015, Section 4(2)</td><td>N/A</td></tr>
<tr><td>SO_2</td><td>0.8 lb/MMBtu</td><td>401 KAR 59:015, Section 5(1)(b)1.</td><td>1.56 lb/MMscf [AP-42 Table 1.4-2 (adjusted to 1063 Btu/scf)]</td></tr>
</table>

Initial Construction Date: Proposed April 2026

Process Description:

Maximum Rated Capacity:	3.04 MMBtu/hr
Fuel:	Natural Gas

Applicable Regulation:

401 KAR 51:017, *Prevention of significant deterioration of air quality* (for CO, NO_X, $PM/PM_{10}/PM_{2.5}$, VOC, and GHG), applicable to construction of a new major stationary source that commences construction after September 22, 1982, and locates in an area designated attainment or unclassifiable under 42 U.S.C. 7407(d)(1)(A)(ii)and(iii).

Emission Unit 02 Natural Gas Preheater
401 KAR 59:015, *New Indirect Heat Exchangers*, 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 63:002, Section 2(4)(iiii)**, 40 C.F.R 63.7480 through 63.7575, Tables 1 through 13, **(Subpart DDDDD)**, *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters,* applicable to industrial, commercial, or institutional boiler or process heater located at, or is part of, a major source of HAP. **Non-applicable Regulation:** **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,* is not applicable to steam generating units with a maximum design heat input capacity less than 2.9 MW (10 MMBtu/hr). **Comments:** Permit shield was requested in the application submitted on 9/20/2024 (APE20240001) Potential greenhouse gas emission estimates utilize emission factors from Tables C-1 and C-2 in 40 CFR part 98. All other potential emissions are calculated using AP-42 chapter 1.4 emission factors. Potential emissions of all pollutants have been adjusted for the facility specific natural gas heat content of 1,063 Btu/scf.

Emission Unit 03 Diesel -Fired Emergency Generator Engine				
Pollutant	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
NO_X + NMHC	6.4 g/kW-hr (6.2 g/kW-hr NO_X BACT + 0.17 g/kW-hr VOC BACT)	40 CFR 60.4205(b) and 401 KAR 51:017	6.4 g/kW-hr [40 CFR 60 Subpart IIII Limit]	Compliance is demonstrated by purchasing a certified engine and operating according to the requirements of 40 CFR 60, Subpart IIII
CO	3.5 g/kW-hr		1.17 g/kW-hr [Manufacturer Data]	
PM=PM_{10} =$PM_{2.5}$	0.20 g/kW-hr		0.07 g/KW-hr [Manufacturer Data]	
GHGs (CO_2e)	163 lb/MMBtu	401 KAR 51:017	CO_2: 22,179 lb/Mgal CH_4: 0.90 lb/Mgal N_2O: 0.18 lb/Mgal [40 CFR 98 Tables C-1 & C-2]	Assumed based on emission factors for diesel fuel from 40 CFR 98, Subpart C

Initial Construction Date: Proposed April 2026

Process Description:
Diesel-Fired Emergency Generator Engine
Engine Rating: 762 HP (nominal)

Applicable Regulation:
401 KAR 51:017, *Prevention of significant deterioration of air quality* (applied to CO, NO_X, $PM/PM_{10}/PM_{2.5}$, VOC, and GHG emissions), applicable to construction of a new major stationary source that commences construction after September 22, 1982, and locates in an area designated attainment or unclassifiable under 42 U.S.C. 7407(d)(1)(A)(ii)and(iii).

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*, applicable to owners and operators of stationary compression ignition (CI) internal combustion engines (ICE) that commence construction after July 11, 2005, where the stationary CI ICE are manufactured after April 1, 2006.

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 Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*, applicable to owners and operators of stationary reciprocating internal combustion engines (RICE) at a major or area source of HAP emissions. This stationary RICE is a new emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions; therefore, the permittee does not have to meet the requirements of this subpart and of 40 CFR 63, Subpart A except for the initial notification requirements of 40 CFR 63.6645(f). [40 CFR 60.6590(b)(1)(i)]

Comments:
The permittee shall comply with the emission standards for new nonroad CI engines in 40 CFR Part 60,

Emission Unit 03 Diesel -Fired Emergency Generator Engine
Subpart IIII, for all pollutants, for the same model year and maximum engine power.

Emission Unit 04 Diesel-Fired Emergency Fire Pump Engine				
Pollutant	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
NO_X + NMHC	4.0 g/kW-hr (3.8 g/kW-hr NO_X BACT + 0.10 g/kW-hr VOC BACT)	40 CFR 60.4205(c) and 401 KAR 51:017	3.62 1.3 g/kW-hr [Manufacturer Data]	Compliance is demonstrated by purchasing a certified engine and operating according to the requirements of 40 CFR 60, Subpart IIII
CO	3.5 g/kW-hr		1.3 g/kW-hr [Manufacturer Data]	
PM=PM_{10} =$PM_{2.5}$	0.20 g/kW-hr		0.12 g/kW-hr [Manufacturer Data]	
GHGs (CO_2e)	163 lb/MMBtu	401 KAR 51:017	CO_2: 22,179 lb/Mgal CH_4: 0.90 lb/Mgal N_2O: 0.18 lb/Mgal [40 CFR 98 Tables C-1 & C-2]	Assumed based on emission factors for diesel fuel from 40 CFR 98, Subpart C

Initial Construction Date: Proposed April 2026

Process Description:

Engine Rating:	197 HP (nominal)
Fuel:	Ultra Low Sulfur Fuel Oil

Applicable Regulation:

401 KAR 51:017, *Prevention of significant deterioration of air quality* (applied to CO, NO_X, $PM/PM_{10}/PM_{2.5}$, VOC, and GHG emissions), applicable to construction of a new major stationary source that commences construction after September 22, 1982, and locates in an area designated attainment or unclassifiable under 42 U.S.C. 7407(d)(1)(A)(ii)and(iii).

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,* applicable to owners and operators of stationary compression ignition (CI) internal combustion engines (ICE) that commence construction after July 11, 2005, where the stationary CI ICE are manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after April 1, 2006.

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 Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines,* applicable to owners and operators of stationary reciprocating internal combustion engines (RICE) at a major or area source of HAP emissions. This engine is a new emergency stationary RICE with a site rating of less than 500 brake HP located at a major source of HAP

Emission Unit 04 Diesel-Fired Emergency Fire Pump Engine

emissions; therefore, the fire pump engine meets the requirements of this subpart by meeting the requirements of 40 CFR 60, Subpart IIII.

Comments:
The permittee shall comply with the emission standards for new nonroad CI engines in 40 CFR Part 60, Subpart IIII, for all pollutants, for the same model year and maximum engine power.

Emission factors for CO, NO_X, PT, PM_{10}, $PM_{2.5}$, and VOC come from manufacturer emissions data. The SO_2 emission factor is calculated from the sulfur content of ULSFO (percent weight) and density of ULSFO. Emission factors for CO_2, CH_4, and N_2O are from 40 CFR Part 98, Subpart C Tables C-1 and C-2. All other emission factors are from AP-42, chapter 3.

Emission Unit 05 Paved Roadways

Pollutant	Emission Limit or Standard	Regulatory Basis for Emission Limit or Standard	Emission Factor Used and Basis	Compliance Method
PM	No discharge of visible fugitive dust emissions beyond property line for more than 5 minutes during any 60 minute observation period or more than 20 minutes during any 24 hour period	401 KAR 63:010, Section 3(2) 401 KAR 51:017	See **Comments**	Take reasonable precautions to prevent particulate matter from becoming airborne. U.S. EPA Reference Method 22 if fugitive dust emissions observed beyond lot line of property

Initial Construction Date: Proposed April 2026

Process Description:
Plant Paved Roadways used as Haul Roads
Control Equipment: Wet suppression as needed.

Applicable Regulation:
401 KAR 51:017, *Prevention of significant deterioration of air quality* (applied to PM/PM_{10}/$PM_{2.5}$ emissions), applicable to construction of a new major stationary source that commences construction after September 22, 1982, and locates in an area designated attainment or unclassifiable under 42 U.S.C. 7407(d)(1)(A)(ii)and(iii).

401 KAR 63:010, *Fugitive emissions*, applicable to each apparatus, operation, or road that emits or could emit fugitive emissions not elsewhere subject to an opacity standard within 401 KAR 50 through 68.

Comments:
Emissions from EU 05 were calculated using AP-42 13.2.1 methodology for paved haul roads. Equation 2 was used to adjust for precipitation assuming 120 days/year with precipitation > 0.01 inch. A silt loading factor of 0.6 was used (roads with < 500 vehicles per day). Mean vehicle weights and miles traveled as supplied by the facility as well as the calculated emission factors are shown below:

Emission Unit 05 Paved Roadways

Truck Type	Mean Vehicle Weight (tons)	Miles/yr	Emission Factors (lb/ VMT)		
			PM	PM_{10}	$PM_{2.5}$
ULSFO	36.275	2,217.6	0.247	0.049	0.012
Urea	27.65	734.5	0.187	0.037	0.009
Lube Oil	30.125	193.05	0.205	0.041	0.010

Due to the small amount of PM PTE from this unit (less than 0.2 tpy) a "top down" BACT analysis has not been performed. It is proposed that the permittee meet the requirements of 401 KAR 63:010, Fugitive emissions (including but not limited to wet suppression as needed) as BACT for this unit.

Emission Unit 06-01 & 06-02 Ultra Low Sulfur Fuel Oil Storage Tanks

Initial Construction Date: Proposed April 2026

Process Description:
2 - 635,000 gallon (nominal) storage tanks for ultra-low sulfur fuel oil; vapor pressure less than 1.7 kPa; submerged fill pipe.

Applicable Regulation:
401 KAR 51:017, *Prevention of significant deterioration of air quality* (applied to VOC emissions), applicable to construction of a new major stationary source that commences construction after September 22, 1982, and locates in an area designated attainment or unclassifiable under 42 U.S.C. 7407(d)(1)(A)(ii)and(iii).

401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applicable to each affected facility which emits or may emit potentially hazardous matter or toxic substances (matter which may be harmful to the health and welfare of humans, animals, and plants, including, but not limited to, antimony, arsenic, bismuth, lead, silica, tin, and compounds of such materials), provided such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division for Air Quality.

Non-Applicable Regulation:
401 KAR 59:050, *New storage vessels for petroleum liquids*, is not applicable to storage vessels greater than 40,000 gallons commenced on or after July 24, 1984. Additionally, ULSFO is not considered a petroleum liquid under 401 KAR 59:050 Section 2. (3).

40 CFR 60.110c-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,* is not applicable to storage vessels that only store volatile organic liquids with a maximum true vapor presser less than 0.25 psia (1.7 kPa absolute).

Comments:
A permit shield was requested in the application submitted on 9/20/2024 (APE20240001)
Emission factors for working and breathing losses were calculated using TANKS4.0.9d

Emission Unit 07 Natural Gas Fugitive Piping Components

Initial Construction Date: Proposed April 2026

Process Description:

Piping Component	Component Count
Valves	125
Connectors (flanges)	219
Pressure Relief Valves	13
Sampling Connections	2

NOTE - The pipeline equipment count listed above reflects an estimated count of the equipment as of the date of issuance of this permit but is not intended to limit the permittee to the exact numbers specified. The permittee may add or remove pipeline equipment without a permit revision as long as the equipment continues to comply with the applicable requirements listed below and the changes do not result in a significant increase in emissions on potential to emit.

Applicable Regulation:
401 KAR 51:017, *Prevention of significant deterioration of air quality* (applied to VOC and GHG emissions), applicable to construction of a new major stationary source that commences construction after September 22, 1982, and locates in an area designated attainment or unclassifiable under 42 U.S.C. 7407(d)(1)(A)(ii)and(iii).

401 KAR 63:020, *Potentially hazardous matter or toxic substances,* applicable to each affected facility which emits or may emit potentially hazardous matter or toxic substances (matter which may be harmful to the health and welfare of humans, animals, and plants, including, but not limited to, antimony, arsenic, bismuth, lead, silica, tin, and compounds of such materials), provided such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division for Air Quality.

Comments:
Emissions are calculated using the component counts shown above (as supplied by the facility), component leak rates from EPA-453/R-95-017 Protocol for Equipment Leak Emission Estimates Table 2-4, and natural gas composition weight percents (92.1% CH_4, 0.54% CO_2, & 1.3% non-ethane/methane VOC)
.

Emission Unit 08 Circuit Breakers

Pollutant	Emission Limit or Standard	Regulatory Basis for Emission Limit or Standard	Emission Factor Used and Basis	Compliance Method
GHGs (SF_6)	Annual leakage rate shall not exceed 0.5 percent by weight	401 KAR 51:017	0.29 lb/circuit breaker [BACT Limitation]	Monthly inspections and maintenance

Initial Construction Date: Proposed April 2026

Process Description:
Eleven Circuit Breakers Containing Sulfur Hexafluoride (SF_6) [Enclosed Pressure Design]

Emission Unit 08 Circuit Breakers

Applicable Regulation:
401 KAR 51:017, *Prevention of significant deterioration of air quality* (applied to GHG emissions), applicable to construction of a new major stationary source that commences construction after September 22, 1982, and locates in an area designated attainment or unclassifiable under 42 U.S.C. 7407(d)(1)(A)(ii)and(iii).

Comments:
Emissions are calculated by multiplying the total number of circuit breakers (11), weight of the SF_6 in each circuit breaker (58 lbs), and the annual BACT weight percent emission limitation of not more than 0.5% leakage. The GWP of SF_6 used was 23,500 from 40 CFR Part 98 Subpart A Table A-1, as published January 1, 2025.

Emission Unit 09-1, 09-2, 09-3 Lube Oil Storage Tanks

Initial Construction Date: Proposed April 2026

Process Description:
09-1: New Lube Oil Tank - 12,520 gal
09-2: Waste Lube Oil Tank – 8,250 gal
09-3: Service Lube Oil Tank – 8,250 gal

Applicable Regulation:
401 KAR 51:017, *Prevention of significant deterioration of air quality* (applied to VOC emissions), applicable to construction of a new major stationary source that commences construction after September 22, 1982, and locates in an area designated attainment or unclassifiable under 42 U.S.C. 7407(d)(1)(A)(ii)and(iii).

401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applicable to each affected facility which emits or may emit potentially hazardous matter or toxic substances (matter which may be harmful to the health and welfare of humans, animals, and plants, including, but not limited to, antimony, arsenic, bismuth, lead, silica, tin, and compounds of such materials), provided such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division for Air Quality.

Non-applicable Regulation:
401 KAR 59:050, *New storage vessels for petroleum liquids*, is not applicable as no 2 fuel oil is not considered a petroleum liquid under 401 KAR 59:050 Section 2. (3).

40 CFR 60.110c-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,* is not applicable to storage vessels that only store volatile organic liquids with a maximum true vapor presser less than 0.25 psia (1.7 kPa absolute).

Comments:
Emissions were calculated using TANKS4.0.9d

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
01-01 through 01-12 (Each)	SCR	NO_X	401 KAR 51:017[6]	Initial and annually	U.S. EPA Method 7	3.19 lb/hr [0.057 g/HP-hr][2 4]				
						20.10 lb/hr [0.36 g/HP-hr][3 4]				
						55.59 tpy[5]				
			40 CFR 60.4204(c)(3)(ii)			2.58 g/kW-hr				
	OxCat	CO	401 KAR 51:017[6]	Initial and semiannually[1]	U.S. EPA Method 10	4.85 lb/hr [0.09 g/HP-hr][2 4]				
						6.99 lb/hr [0.10 g/HP-hr][3 4]				
						31.29 tpy[5]				

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
			40 CFR part 63 subpart ZZZZ Table 2a Items 3.a. and 3. b.			Reduce by 70% or more				
	OxCat	VOC	401 KAR 51:017[6]	Initial and annually	U.S. EPA Method 18	4.81 lb/hr [0.09 g/HP-hr][2 4]				
						8.01 lb/hr (0.14 g/HP-hr) [3 4]				
						24.42 tpy[5]				
	N/A	$PM/PM_{10}/PM_{2.5}$	401 KAR 51:017[6]	Initial and annually	U.S. EPA Method 5	3.88 lb/hr [0.07 g/HP-hr][2 4]				
						5.60 lb/hr (0.10 g/HP-hr) [3 4]				
						21.30 tpy[5]				
			40 CFR 60.4204(c)(4)			Reduce by 60% or more or 0.15 g/kW-hr [0.11 g/HP-hr]				

Footnotes:

[1.] After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.

[2.] When combusting natural gas

[3.] When combusting ULSFO

[4.] 3-Hour block average (excluding startups and shutdowns)

[5.] Applies during all operations (including startup and shutdown)

[6] For the purpose of demonstrating compliance with BACT Limits under 401 KAR 51:017, initial testing shall be completed on each engine. Subsequent testing shall be conducted on 3 engines that have each operated on natural gas, in any calendar year, at the next annual testing event such that each engine is tested at least twice in a 5 year period.

SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS

Table A - Group Requirements:
N/A

Table B - Summary of Applicable Regulations:

Applicable Regulations	Emission Unit
401 KAR 51:017, *Prevention of significant deterioration of air quality*	01-01 through 01-12, 02, 03, 04, 05, 06-01 & 06-02, 07, 08
401 KAR 59:015, *New indirect heat exchangers*	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*	01-01 through 01-12, 03, 04
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 Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*.	01-01 through 01-12, 03, 04
401 KAR 63:002, Section 2(4)(iiii), 40 C.F.R 63.7480 through 63.7575, Tables 1 through 13, **(Subpart DDDDD)**, *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters*	02
401 KAR 63:010, *Fugitive emissions*	05
401 KAR 63:020, *Potentially hazardous matter or toxic substances*	06-01, 06-02, 07, 09-01, 09-02, & 09-03
401 KAR 52:060, *Acid rain permits* incorporating the Federal Acid Rain provisions as codified in **40 CFR Parts 72 to 78**	01-01 through 01-12

Table C - Summary of Precluded Regulations:

N/A

SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS (CONTINUED)

Table D - Summary of Non Applicable Regulations:

Non Applicable Regulations	Emission Unit
401 KAR 59:050, *New storage vessels for petroleum liquids*	EUs 06-01 & 06-02
401 KAR 60:005, Section 2(2)(eeee) 40 CFR 60.42300 through 60.4219, Tables 1 through 4 (**Subpart JJJJ**), *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*	EUs 01-01 through 01-12
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*	02
40 CFR Part 64, *Compliance Assurance Monitoring (CAM)*	01-01 through 01-12
401 KAR 60:005, Section 2(2)(jjjj) 40 CFR 60.5508 through 60.5580, Tables 1 through 3 (**Subpart TTTT**), *Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units*	01-01 through 01-12
40 CFR Part 60, Subpart TTTTa, *Standards of Performance for Greenhouse Gas Emissions for Modified Coal-Fired Steam Electric Generating Units and New Construction and Reconstruction Stationary Combustion Turbine Electric Generating Units*	01-01 through 01-12

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 October 13, 2025 of potentially hazardous matter or toxic substances (Hexane; N-Hexane) 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

N/A

SECTION 6 – PERMIT APPLICATION HISTORY

N/A

APPENDIX A – ABBREVIATIONS AND ACRONYMS

AAQS	– Ambient Air Quality Standards
AQRV	– Air Quality Related Values
ARM2	– Ambient Radio Method 2
AVO	– Audio/Visual/Olfactory
BACT	– Best Available Control Technology
BPIP	– Building Profile Input Program
Btu	– British thermal unit
CAM	– Compliance Assurance Monitoring
CCS	– Carbon Capture and Sequestration
CH_4	– Methane
CI	– Compression Ignition
CO	– Carbon Monoxide
CO_2	– Carbon Dioxide
CO_2e	– Carbon Dioxide Equivalent
CPMS	– Continuous Parameter Monitoring System
CSAPR	– Cross State Air Pollution Rule
DAT	– Deposition Analysis Threshold
DEM	– Digital Elevation Model
Division	– Kentucky Division for Air Quality
Dscf	– Dry Standard Cubic Foot
EKPC	– East Kentucky Power Cooperative
EPA	– Environmental Protection Agency
ESP	– Electrostatic Precipitator
EU	– Emission Unit
FLAG	– Federal Land Manager's Air Quality Related Values Workgroup
FLM	– Federal Land Manager
FS	– Forest Service
g	– Gram
GAQM	– Guidance on Air Quality Models
GEP	– Good Engineering Practice
GHG	– Greenhouse Gas
GIS	– Gas Insulated Switch
gr	– Grain
GUI	– Graphical User Interface
H_2SO_4	– Sulfuric Acid
HAP	– Hazardous Air Pollutant
HF	– Hydrogen Fluoride (Gaseous)
HHV	– Higher Heating Value
HNO_4	– Nitric Acid
hp	– Horsepower
hr	– Hour
ICE	– Internal Combustion Engine
ISR	– In-stack Ratio
IWAQM	– Interagency Workgroup on Air Quality Modeling
K	– Kelvin
KAR	– Kentucky Administrative Regulation

KDAQ – Kentucky Division for Air Quality
KYAAQS– Kentucky Ambient Air Quality Standard
km – kilometer
kPa – kilopascal
kV – kilovolt
kW – kilowatt
LAER – Lowest Achievable Emission Rate
lb – pound
LCC – Lambert Conformal Conic
LDAR – Leak Detection and Repair
LHV – Lower Heating Value
LNB – Low-NO_X Burner
m – meter
m/s – Meter per Second
MACT – Maximum Achievable Control Technology
MECL – Minimum Emission Compliance Load
MERPs – Modeled Emission Rates for Precursors
MMBtu – Million British Thermal Units
mmHg – Millimeter of mercury column height
MMScf – Million Standard Cubic Feet
MW – Megawatt
NAAQS – National Ambient Air Quality Standards
NAD83 – North American Datum 1983
NED – National Elevation Database
NESHAP – National Emissions Standards for Hazardous Air Pollutants
NG – Natural Gas
N_2O – Nitrous Oxide
NO_X – Nitrogen Oxides
NPS – National Park Service
NSCR – Non-selective Catalytic Reduction
NSPS – New Source Performance Standards
NSR – New Source Review
O_3 – Ozone
OLM – Ozone Limiting Method
OxCat – Oxidation Catalyst
Pb – Lead
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
ppb – Parts per Billion
ppm – Parts per Million
ppmv – Parts per Million by Volume
PSC – Public Service Commission
PSD – Prevention of Significant Deterioration
PTE – Potential to Emit
PVMRM – Plume Volume Molar Ratio Method
R&D – Research and Development
RBLC – RACT/ BACT/ LAER Clearinghouse

RICE – Reciprocating Internal Combustion Engine
rpm – Revolutions per Minute
RSL – Regional Screening Levels
scf – Standard Cubic Feet
SCR – Selective Catalytic Reduction
SDS – Safety Data Sheet
SER – Significant Emission Rate
SF_6 – Sulfur Hexafluoride
SIA – Significant Impact Area
SIL – Significant Impact Level
SO_2 – Sulfur Dioxide
SO_4 – Sulfate
SOA – Secondary Organic Aerosols
TF – Total Fluoride (Particulate & Gaseous)
THQ – Target Hazard Quotient
tpy – Tons per Year
TR – Target Risk
ULSFO – Ultra Low Sulfur Fuel Oil
USFWS – U.S. Fish and Wildlife Services
USGS – U.S. Geological Survey
UTM – Universal Transverse Mercator
VISTAS –Visibility Improvement State and Tribal Association of the Southeast
VOC – Volatile Organic Compounds