

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

Title V, Operating  
PERMIT ID: V-23-038

PPS Power Plant No. 1  
4801 Schneidman Road  
Paducah, KY 42003

November 21, 2023  
Michael Baidy, Reviewer

Source ID: 21-145-00096  
Agency Interest #: 84744  
Activity ID: APE20230001

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## SECTION 1 - SOURCE DESCRIPTION

SIC Code and description: 4911, Electric Services (other electric 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: McCracken

Nonattainment Area  N/A  PM<sub>10</sub>  PM<sub>2.5</sub>  CO  NO<sub>x</sub>  SO<sub>2</sub>  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<sub>10</sub>  PM<sub>2.5</sub>  CO  NO<sub>x</sub>  SO<sub>2</sub>  VOC

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

If yes, for what pollutant(s)?

PM<sub>10</sub>  PM<sub>2.5</sub>  CO  NO<sub>x</sub>  SO<sub>2</sub>  VOC

PTE\* greater than 10 tpy for any single hazardous air pollutant (HAP)  Yes  No

If yes, list which pollutant(s):

PTE\* greater than 25 tpy for combined HAP  Yes  No

\*PTE does not include self-imposed emission limitations.

### Description of Facility:

Paducah Power System (PPS) operates an electric power generation facility in Paducah, KY. The facility is considered a "natural gas peaking power plant" and utilizes natural gas combustion turbines to generate electricity. Emission Units 01 and 02 consist of a total of four natural gas-fired combustion turbines, rated at 313 MMBtu/hr each. Emission Unit 03 is a 1,490 HP John Deere diesel-fueled emergency generator engine. Emission Unit 04 is a 55 HP diesel fire pump engine. The one insignificant activity is an inlet combustion air cooler.

**SECTION 2 – CURRENT APPLICATION AND EMISSION SUMMARY FORM**

Permit Number: V-23-038

Activity: APE20230001

Application Received: 10/12/2023

Application Complete: 12/7/2023

Permit Action:  Initial  Renewal  Significant Rev.  Minor Rev.  Administrative

Construction/Modification Requested?  Yes  No NSR Applicable?  Yes  No

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

**Description of Action:**

Paducah Power System requests a permit renewal with no changes.

V-23-038 Emission Summary				
Pollutant	2022 Actual (tpy)	Previous PTE V-18-033 (tpy)	Change (tpy)	Revised PTE V-23-038 (tpy)
CO	102.89	226.12	0	226.12
NO <sub>x</sub>	70.51	163.17	0	163.17
PT	14.37	31.71	0	31.71
PM <sub>10</sub>	14.37	31.71	0	31.71
PM <sub>2.5</sub>	14.37	31.59	0	31.59
SO <sub>2</sub>	2.27	5.09	0	5.09
VOC	6.05	13.44	0	13.44
Lead	0	0	0	0
Greenhouse Gases (GHGs)				
Carbon Dioxide	83210.17	182356.96	-2.46	182,354.50
Methane	6.28	13.90	0	13.74
Nitrous Oxide	2.26	4.96	0	4.96
CO <sub>2</sub> Equivalent (CO <sub>2</sub> e)	84040.65	184184.12	-6.54	184,177.58
Hazardous Air Pollutants (HAPs)				
Benzene	3.86E-05	2.19E-02	0	2.19E-02
Formaldehyde	5.26E-01	1.15	0	1.15
Toluene	2.09E-05	2.15E-01	0	2.15E-01
Xylenes (Total)	9.70E-06	1.06E-01	0	1.06E-01
Combined HAPs:	5.26E-01	1.67	-0.18	1.49

**SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS**

Emission Unit #01 Two Natural Gas Combustion Turbines Emission Unit #02 Two Natural Gas Combustion Turbines				
Pollutant	Emission Limit or Standard	Regulatory Basis for Emission Limit or Standard	Emission Factor Used and Basis	Compliance Method
NO <sub>x</sub>	25 ppm by volume @ 15% O <sub>2</sub> or 150 ng/J of useful output (1.2 lb/MWh)	40 CFR 60.4320(a) and 40 CFR 60 Subpart KKKK, Table 1	94.86 lb/MMscf (Manufacturer)	NO <sub>x</sub> CEMS
	96 ppm by volume @ 15% O <sub>2</sub> or 590 ng/J of useful output (4.7 lb/MWh) when load < 75% or T < 0°F	40 CFR 60.4320(a) and 40 CFR 60, Subpart KKKK, Table 1		
	225 tons/yr on a 12-month rolling total basis	To preclude 401 KAR 51:017		
SO <sub>2</sub>	110 ng/J (0.90 lb/MWh); or	40 CFR 60.4330(a)(1)	3.06 lb/MMscf (Mass Balance)	Performance Testing
	Fuel content w/ potential in excess of 26 ng/J (0.060 lb/MMBtu)	40 CFR 60.4330(a)(2)		Fuel Analysis
CO	225 tons/yr on a 12-month rolling total basis	To preclude 401 KAR 51:017	138.72 lb/MMscf (Manufacturer)	Monitoring Monthly Fuel Usage

**Initial Construction Date:** Listed by emission unit:

EU 01 – 10/15/2009

EU 02 – 10/15/2009

**Process Description:**

EU 01 consists of a pair of identical turbines internally denoted as EU-01a and EU-01b. The turbines are *Pratt and Whitney Power Systems FT8-3 SwiftPac 60* units rated at 313 MMBtu/hr each at an ambient temperature of 59°F. The turbines are operated in a simple cycle mode with a nominal package output of 60.3 MW at these conditions while utilizing inlet fogging. The control devices are a Low NO<sub>x</sub> burner and a Water Injection System.

EU 02 consists of a pair of identical turbines internally denoted as EU-02a and EU-02b. The turbines are *Pratt and Whitney Power Systems FT8-3 SwiftPac 60* units rated at 313 MMBtu/hr each at an ambient temperature of 59°F. The turbines are operated in a simple cycle mode with a nominal package output of 60.3 MW at these conditions while utilizing inlet fogging. The control devices are a Low NO<sub>x</sub> burner and a Water Injection System.

**Emission Unit #01 Two Natural Gas Combustion Turbines**  
**Emission Unit #02 Two Natural Gas Combustion Turbines**

**Applicable Regulation:**

**40 CFR, Part 75, Continuous Emission Monitoring** is applicable because the emission units utilize a continuous emissions monitoring system (CEMS) to demonstrate NO<sub>x</sub> compliance.

**401 KAR 51:160, NO<sub>x</sub> requirements for large utility and industrial boilers;** In October 1998, the U.S. EPA finalized the “Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone”, commonly called the NO<sub>x</sub> SIP Call. 401 KAR 51:160 was established in response to EPA’s NO<sub>x</sub> SIP Call and the requirement to implement a NO<sub>x</sub> Budget Trading Program (NBP). Beginning in 2009, the NBP was effectively replaced by the ozone season NO<sub>x</sub> program under the Clean Air Interstate Rule.

**401 KAR 51:210, CAIR NO<sub>x</sub> annual trading program**

**401 KAR 51:220, CAIR NO<sub>x</sub> ozone season trading program**

**401 KAR 51:230, CAIR SO<sub>2</sub> trading program**

On May 12, 2005, the U.S. EPA published the Clean Air Interstate Rule (CAIR). CAIR requires states to reduce emissions of nitrogen oxides and sulfur dioxide that contribute significantly to nonattainment and maintenance problems in downwind states with respect to the national ambient air quality standards for fine particulate matter (PM<sub>2.5</sub>) and 8-hour ozone. Kentucky's regulations are codified in 401 KAR 51:210, CAIR NO<sub>x</sub> annual trading program, 401 KAR 51:220, CAIR NO<sub>x</sub> ozone season trading program, and 401 51:230, CAIR SO<sub>2</sub> trading program.

**401 KAR 51:240, Cross-State Air Pollution Rule (CSAPR) NO<sub>x</sub> annual trading program**

**401 KAR 51:250, Cross-State Air Pollution Rule (CSAPR) NO<sub>x</sub> ozone season group 2 trading program**

**401 KAR 51:260, Cross-State Air Pollution Rule (CSAPR) SO<sub>2</sub> group 1 trading program**

These regulations collectively make up the requirements commonly referred to as the Cross-State Air Pollution Rule (CSAPR). The requirements of CSAPR apply to stationary, fossil-fuel-fired boilers serving at any time, on or after January 1, 2005, a generator with nameplate capacity of more than 25MWe producing electricity for sale.

**401 KAR 52:060, Acid rain permits** is applicable to affected sources and units as set forth under 40 CFR 72.6 and incorporates by reference 40 CFR 72 – 78.

**401 KAR 60:005, Section 2(2)(ffff), 40 C.F.R. 60.4300 to 60.4420, Table 1 (Subpart KKKK), Standards of Performance for Stationary Combustion Turbines** is applicable to stationary combustion turbines with a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, based on the higher heating value of the fuel, which commenced construction, modification, or reconstruction after February 18, 2005.

**401 KAR 63:020, Potentially hazardous matter or toxic substances,** is applicable to each affected facility which emits or may emit potentially hazardous matter or toxic substances, 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 63:002, Section 2(4)(dddd), 40 C.F.R. 63.6080 to 63.6175, Tables 1 to 7 (Subpart YYYY), National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines** is not applicable because Paducah Power System is not a major source of HAP emissions [40 CFR 63.6085(b)].

**Emission Unit #01 Two Natural Gas Combustion Turbines**  
**Emission Unit #02 Two Natural Gas Combustion Turbines**

**Precluded Regulations:**

**401 KAR 51:017**, *Prevention of significant deterioration of air quality*; The permit contains federally-enforceable operation and emission limitations to preclude the applicability of 401 KAR 51:017.

**Comments:**

In addition to emission limitations on CO and NOx, Emission Units 01 and 02 are limited to 10,360 hours of operation per year for all turbines combined to preclude the applicability of 401 KAR 51:017.

**Emission Unit #03 Emergency Generator Engine**

**Initial Construction Date:** March 2010

**Process Description:**

Emergency electrical generator that runs on diesel fuel.

**Applicable Regulation:**

**401 KAR 60:005, Section 2(2)(dddd)**, 40 C.F.R. 60.4200 to 60.4219, Tables 1 to 8 (Subpart IIII), *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines* is 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, and are not fire pump engines [40 CFR 60.4200(a)(2)(i)].

**401 KAR 63:002, Section 2(4)(eeee)**, 40 C.F.R. 63.6580 to 63.6675, Tables 1a to 8, and Appendix A (Subpart ZZZZ), *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines* is applicable to stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand. The permittee shall meet the requirements of 40 CFR Part 63 by meeting the requirements of 40 CFR 60, Subpart IIII. No further requirements apply for the engine under 40 CFR Part 63 [40 CFR 63.6590(a)(2)(iii) and 63.6590(c)].

**Comments:**

The facility must monitor and maintain records of hours of operation on a monthly basis.

Manufacturer and model: Cummins Power Generation QST30-G5-NR2

Diesel fueled, 1,490 HP, 3.79 MMBtu/hr.

4 Cycle, 12 Cylinder, 30.4 Liters total displacement, 2.53 L/cyl

<b>Emission Unit #04 Diesel Fire Pump</b>				
<b>Pollutant</b>	<b>Emission Limit or Standard</b>	<b>Regulatory Basis for Emission Limit or Standard</b>	<b>Emission Factor Used and Basis</b>	<b>Compliance Method</b>
NMHC + NO <sub>x</sub>	10.5 g/kw-hr (7.8 g/hp-hr)	40 CFR 60.4205(c) and 40 CFR 60 Subpart III, Table 4	N/A	Purchasing a certified engine and operating according to manufacturer's emission-related specifications
CO	5.0 g/kw-hr (3.7 g/hp-hr)		130.15 lb/Mgal	
PM	0.80 g/kw-hr		42.47 lb/Mgal	

**Initial Construction Date:** March 2010

**Process Description:**

The John Deere 4045DF120 diesel fire pump is an emergency unit.

**Applicable Regulation:**

**401 KAR 60:005, Section 2(2)(dddd)**, 40 C.F.R. 60.4200 to 60.4219, Tables 1 to 8 (Subpart III), *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines* is 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 July 1, 2006, and are certified fire pump engines [40 CFR 60.4200(a)(2)(ii)].

**401 KAR 63:002, Section 2(4)(eeee)**, 40 C.F.R. 63.6580 to 63.6675, Tables 1a to 8, and Appendix A (Subpart ZZZZ), *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines* is applicable to stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand. The permittee shall meet the requirements of 40 CFR Part 63 by meeting the requirements of 40 CFR 60, Subpart III. No further requirements apply for the engine under 40 CFR Part 63 [40 CFR 63.6590(a)(2)(iii) and 63.6590(c)].

**Comments:**

The facility must monitor and maintain records of hours of operation on a monthly basis.  
 John Deere fire pump engine model 4045DF120, 2350 RPM, 55 HP (0.385 MMBtu/hr)

**SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS (CONTINUED)**

**Testing Requirements/Results**

<b>Emission Unit(s)</b>	<b>Control Device</b>	<b>Parameter</b>	<b>Regulatory Basis</b>	<b>Frequency</b>	<b>Test Method</b>	<b>Permit Limit</b>	<b>Test Result</b>	<b>Thruput and Operating Parameter(s) Established During Test</b>	<b>Activity Graybar</b>	<b>Date of last Compliance Testing</b>
01A	Low-NO <sub>x</sub> burners & Water Injection	NO <sub>x</sub>	40 CFR 60 Subpart KKKK	Initial	U.S. EPA Reference Method 7E	25 ppm @ 15% O <sub>2</sub>	23.18 ppm	N/A	CMN20100001	6/17/2010
01B	Low-NO <sub>x</sub> burners & Water Injection	NO <sub>x</sub>	40 CFR 60 Subpart KKKK	Initial	U.S. EPA Reference Method 7E	25 ppm @ 15% O <sub>2</sub>	23.18 ppm	N/A	CMN20100001	6/17/2010
02A	Low-NO <sub>x</sub> burners & Water Injection	NO <sub>x</sub>	40 CFR 60 Subpart KKKK	Initial	U.S. EPA Reference Method 7E	25 ppm @ 15% O <sub>2</sub>	23.18 ppm	N/A	CMN20100001	6/17/2010
02B	Low-NO <sub>x</sub> burners & Water Injection	NO <sub>x</sub>	40 CFR 60 Subpart KKKK	Initial	U.S. EPA Reference Method 7E	25 ppm @ 15% O <sub>2</sub>	23.18 ppm	N/A	CMN20100001	6/17/2010

**Footnotes:**



**SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS**

**Table A - Group Requirements:**

<b>Emission and Operating Limit</b>	<b>Regulation</b>	<b>Emission Unit</b>
10,360 hours/year	To preclude 401 KAR 52:017, <i>Prevention of significant deterioration of air quality</i>	EU 01 & 02
225 tons NO <sub>x</sub> /year	To preclude 401 KAR 52:017, <i>Prevention of significant deterioration of air quality</i>	EU 01 & 02
225 tons CO/year	To preclude 401 KAR 52:017, <i>Prevention of significant deterioration of air quality</i>	EU 01 & 02

**Table B - Summary of Applicable Regulations:**

<b>Applicable Regulations</b>	<b>Emission Unit</b>
401 KAR 51:160, <i>NO<sub>x</sub> requirements for large utility and industrial boilers</i>	EU 01 & 02
401 KAR 51:210, <i>CAIR NO<sub>x</sub> annual trading program</i>	EU 01 & 02
401 KAR 51:220, <i>CAIR NO<sub>x</sub> ozone season trading program</i>	EU 01 & 02
401 KAR 51:230, <i>CAIR SO<sub>2</sub> trading program</i>	EU 01 & 02
401 KAR 51:240, <i>Cross-State Air Pollution Rule (CSAPR) NO<sub>x</sub> annual trading program</i>	EU 01 & 02
401 KAR 51:250, <i>Cross-State Air Pollution Rule (CSAPR) NO<sub>x</sub> ozone season group 2 trading program</i>	EU 01 & 02
401 KAR 51:260, <i>Cross-State Air Pollution Rule (CSAPR) SO<sub>2</sub> group 1 trading program</i>	EU 01 & 02
401 KAR 52:060, <i>Acid rain permits</i>	EU 01 & 02
401 KAR 60:005, Section 2(2)(ffff), 40 C.F.R. 60.4300 to 60.4420, Table 1 (Subpart KKKK), <i>Standards of Performance for Stationary Combustion Turbines</i>	EU 01 & 02
401 KAR 60:005, Section 2(2)(dddd), 40 C.F.R. 60.4200 to 60.4219, Tables 1 to 8 (Subpart IIII), <i>Standards of Performance for Stationary Compression Ignition Internal Combustion Engines</i>	EU 03 & 04
401 KAR 63:002, Section 2(4)(eeee), 40 C.F.R. 63.6580 to 63.6675, Tables 1a to 8, and Appendix A (Subpart ZZZZ), <i>National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines</i>	EU 03 & 04
401 KAR 63:020, <i>Potentially hazardous matter or toxic substances</i>	EU 01 & 02

**Table C - Summary of Precluded Regulations:**

<b>Precluded Regulations</b>	<b>Emission Unit</b>
401 KAR 51:017, <i>Prevention of significant deterioration of air quality</i>	Source-wide

**Table D - Summary of Non Applicable Regulations:**

N/A

**Air Toxic Analysis**

**401 KAR 63:020, *Potentially Hazardous Matter or Toxic Substances***

The Division for Air Quality (Division) has performed modeling using SCREEN View on March 4, 2024 of potentially hazardous matter or toxic substances (Benzene, Formaldehyde, Toluene, Xylenes) 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**

Permit	Permit Type	Activity#	Complete Date	Issuance Date	Summary of Action	PSD/Syn Minor
V-07-023	Initial Permit	APE20070001	8/5/2007	3/17/2008	Initial Construction; Operating Two turbines 445 MMBtu/hr each	Syn Minor
V-07-023 R1	Sig Revision	APE20090001	6/5/2009	10/15/2009	Initial Construction of four N.G. turbines rated 313 MMBtu/hr each	Syn Minor
V-07-023 R2	Minor Revision	APE20100001	2/14/2010	4/9/2010	Emergency Generator Addition and Fire Pump conversion	N/A
V-07-023 R3	Sig Revision	APE2011002	9/7/2011	8/17/2012	Add 40 CFR 60 Subpart KKKK clarification	N/A
V-13-014	Renewal	APE20130001	4/24/2013	10/28/2013	Renewal	N/A
V-18-033	Renewal	APE20180001	5/29/2018	4/15/2019	Renewal	N/A

## **SECTION 6 – PERMIT APPLICATION HISTORY:**

N/A

## **APPENDIX A – ABBREVIATIONS AND ACRONYMS**

AAQS	– Ambient Air Quality Standards
BACT	– Best Available Control Technology
Btu	– British thermal unit
CAM	– Compliance Assurance Monitoring
CO	– Carbon Monoxide
Division	– Kentucky Division for Air Quality
ESP	– Electrostatic Precipitator
GHG	– Greenhouse Gas
HAP	– Hazardous Air Pollutant
HF	– Hydrogen Fluoride (Gaseous)
MSDS	– Material Safety Data Sheets
mmHg	– Millimeter of mercury column height
NAAQS	– National Ambient Air Quality Standards
NESHAP	– National Emissions Standards for Hazardous Air Pollutants
NO <sub>x</sub>	– Nitrogen Oxides
NSR	– New Source Review
PM	– Particulate Matter
PM <sub>10</sub>	– Particulate Matter equal to or smaller than 10 micrometers
PM <sub>2.5</sub>	– Particulate Matter equal to or smaller than 2.5 micrometers
PSD	– Prevention of Significant Deterioration
PTE	– Potential to Emit
SO <sub>2</sub>	– Sulfur Dioxide
TF	– Total Fluoride (Particulate & Gaseous)
VOC	– Volatile Organic Compounds