



Louisville Metro Air Pollution Control District
 701 West Ormsby Avenue, Suite 303
 Louisville, Kentucky 40203-3137



24 December 2018

Title V Statement of Basis

Source: Zorn Generating Station
 3001 Upper River Road
 Louisville, KY 40207

Owner: Louisville Gas and Electric Company
 220 W. Main Street
 Louisville, KY 40202

Application Documents:	See Table 8	Administratively Complete:	09/04/2018
Draft Permit:	11/08/2018	Proposed Permit:	11/08/2018
Permitting Engineer:	Randy Schoenbaechler	Permit Number:	O-1248-18-TV
Plant ID:	1248	SIC:	4911
		NAICS:	221112

Introduction:

This permit will be issued pursuant to: (1) Regulation 2.16, (2) Title 40 of the Code of Federal Regulations Part 70, and (3) Title V of the Clean Air Act Amendments of 1990. Its purpose is to identify and consolidate existing District and Federal air requirements and to provide methods of determining continued compliance with these requirements.

This is a standard Title V permit renewal. This action also updates the permit format and equipment lists.

Jefferson County is classified as an attainment area for lead (Pb), nitrogen dioxide (NO2), carbon monoxide (CO), particulate matter less than 10 microns (PM10); and particulate matter less than 2.5 microns (PM2.5). The county is a non-attainment area for ozone (O3). This facility is located in the portion of the county that is an attainment area for sulfur dioxide (SO2).

Permit Application Type:

- | | | |
|---|--|--|
| <input type="checkbox"/> Initial issuance | <input type="checkbox"/> Permit Revision | <input checked="" type="checkbox"/> Permit renewal |
| | <input type="checkbox"/> Administrative | |
| | <input type="checkbox"/> Minor | |
| | <input type="checkbox"/> Significant | |

Compliance Summary:

- | | |
|---|---|
| <input checked="" type="checkbox"/> Compliance certification signed | <input type="checkbox"/> Compliance schedule included |
| <input type="checkbox"/> Source is out of compliance | <input checked="" type="checkbox"/> Source is operating in compliance |

I. Source Information

1. **Product Description:** The Louisville Gas & Electric, Zorn Generating Station, Louisville, KY is a peak load electrical generating station.
2. **Process Description:** Louisville Gas & Electric, Zorn Generating Station consists of one natural gas combustion turbine that provides emergency power for Louisville Water Company and peak load electrical power as required for the electrical power grid system.
3. **Site Determination:** There are no other facilities that are contiguous or adjacent and under common control.
4. **Emission Unit Summary:**

Emission Unit	Equipment Description
U1	GT1: one (1) simple cycle combustion turbine, rated capacity 19,400 kW, General Electric, model 5001LA, natural gas fueled with a 300 hp diesel fueled cranking engine GT1ce [with 500 gallon diesel tank (IA)]
IA List	500 gallon Diesel Fuel Storage tank, Lube Oil tank, 50/50 Glycol-water pressurized tank, and Emergency relief vents.

5. **Fugitive Sources:** There are no fugitive emissions at this source.
6. **Permit Revisions:**

Permit No.	Public Notice Date	Issue Date	Change Type	Description/Scope
131-97-TV	10/17/1999	12/22/1999	Initial	Initial Permit Issuance
131-97-TV (R1)	NA	02/10/2002	Admin	Corrected expiration date to 12/17/2004
131-97-TV (R2)	03/25/2009	07/15/2009	Renewal	Renewal, Corrected usage limits for diesel fuel and natural gas, Additional ROs
131-97-TV (R3)	03/06/2014	04/22/2014	Renewal	Renewal
O-1248-18-V	11/08/2018	12/24/2018	Renewal	Standard Renewal, revised permit number from 131-97-TV(R3) to O-1248-18-V, and removed superfluous emergency generator language (IA-EG)

7. Construction Permit History:

NA

8. Permit Renewal-Related Documents

Document Number	Date Received	Description
94021	08/30/2018 09/04/2018	Title V renewal application, administrative completeness review and approval
94862	10/11/2018 10/26/2018	Pre-draft permit sent to company for informal review; Company comments on informal draft

9. Emission Summary:

Pollutant	District Calculated Actual Emissions (tpy) 2017 Data	Pollutant that triggered Major Source Status (based on PTE)
CO	0.13	No
NO _x	0.52	Yes
SO ₂	0.001	No
PM ₁₀	0.0005	No
VOC	0.004	No
Total HAPs	<0.00	No
Single HAP > 1 tpy	None	No

10. Applicable Requirements:

PSD 40 CFR 60 SIP 40 CFR 63
 NSR 40 CFR 61 District-Origin Other

11. Referenced MACT Federal Regulations:

40 CFR 63 Subpart ZZZZ National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

12. Referenced non-MACT Federal Regulations:

None

II. Regulatory Analysis

1. **Acid Rain Requirements:** The source is not subject to the Acid Rain Program.
2. **Stratospheric Ozone Protection Requirements:** Title VI of the CAAA regulates ozone depleting substances and requires a phase-out of their use. This rule applies to any facility that manufactures, sells, distributes, or otherwise uses any of the listed chemicals. This source does not manufacture, sell, or distribute any of the listed chemicals. The source's use of listed chemicals is that in fire extinguishers, chillers, air conditioners and other HVAC equipment.
3. **Prevention of Accidental Releases 112(r):** The source does not manufacture, process, use, store, or otherwise handle one or more of the regulated substances listed in 40 CFR Part 68, Subpart F, and District Regulation 5.15, *Chemical Accident Prevention Provisions*, in a quantity in excess of the corresponding specified threshold amount. Source stated in letter that a Risk Management Plan (RMP) is not required for this facility.
4. **40 CFR Part 64 Applicability Determination:** Louisville Gas & Electric, Zorn Station is not subject to 40 CFR Part 64 *Compliance Assurance Monitoring for Major Stationary Sources*, because the source does not have any control devices on any of their equipment.
5. **Basis of Regulation Applicability**
 - a. **Plantwide**
 - i. LG&E Zorn Station is a potential major source for NO_x and Greenhouse Gases emissions. The source elected to have a plant-wide limit of less than 100 ton/yr of NO_x to avoid a NO_x RACT. Regulation 2.16 - *Title V Operating Permits* establishes requirements for major sources.
 - ii. The source is subject to a plant-wide NO_x limit of less than 100 tons during any twelve (12) consecutive month period.
 - iii. Regulations 5.00, 5.01, 5.20, 5.21, 5.22, and 5.23 (STAR Program) establishes requirements for environmental acceptability of toxic air contaminants (TACs) and the requirement to comply with all applicable emission standards. LG&E Zorn submitted TAC Environmental Acceptability Demonstration to the District on February 5, 2007, March 25, 2008, and April 3, 2012. Compliance with the STAR EA Goals was demonstrated in the source's EA Demonstrations. Category 1 and 2 TACs generated by the uncontrolled combustion of diesel fuel in the diesel cranking engine, cannot exceed the Cat 1 and 2 TAC de minimis levels. The TAC emissions from the combustion of natural gas, liquefied petroleum gas, methane (including landfill gas), or propane are considered to be "de minimis emissions" by the District. [Regulation 5.21, section

2.7]. There has been no new construction or modifications after July 1, 2005, therefore, the company did not have to demonstrate compliance with Category 3 and 4 TACs.

- iv. Regulation 2.16, section 4.1.9.1 and 4.1.9.2 requires monitoring and record keeping to ensure ongoing compliance with the terms and conditions of the permit. The owner or operator shall maintain all the required records for a minimum of 5 years and make the records readily available to the District upon request.
- v. Regulation 2.16, section 4.3.5, requires stationary sources for which a Title V is issued shall submit an annual compliance certification by April 15 of the following calendar year. In addition, as required by Regulation 2.16, section 4.1.9.3, the source shall submit compliance reports at least every six months to show compliance with the permit. Compliance reports and compliance certifications shall be signed by a responsible official and shall include a certification statement per Regulation 2.16, section 3.5.11.

b. Emission Unit U1: Turbine generator engines GT1

i. Equipment:

Emission Point	Description	Applicable Regulation	Basis for Applicability
E1	GT1: one (1) simple cycle combustion turbine, General Electric, model 5001LA, 19,400 kW, natural gas fueled with a 300 hp diesel fueled cranking engine GT1ce [with 500 gallon diesel tank (IA)] Installed 1969	STAR 6.42 40 CFR 63 Subpart ZZZZ	Regulations 5.00, 5.01, 5.20, 5.21, 5.22, and 5.23 are applicable to any process or process equipment at a stationary source that emits a TAC. Regulation 6.42 establishes the requirements for Reasonably Available Control Technology (RACT) determination, demonstration, and compliance for Volatile Organic Compound (VOC) and Nitrogen Oxides (NOx) emitting facilities for new or renewed operating permit applications. Existing black start RICE engines that emit HAPs at area sources are subject to 40 CFR 63 Subpart ZZZZ.

ii. Standards/Operating Limits

1) HAP

- (a) 40 CFR 63 Subpart ZZZZ, sections 63.6595, 6603,

6605, 6625, and 6640 establish emission standards and operation requirements for the owner or operator or manufacturer of stationary CI RICE.

- (b) 40 CFR 63 Subpart YYYY is not applicable, because the source is not a major source for HAP emissions.

2) **NO_x**

- (a) Regulation 6.42 establishes the RACT requirements for NO_x emitting facilities. The source requested a plantwide limit of less than 100 ton/yr for NO_x, to avoid establishing a NO_x RACT Plan.
- (b) The emission standards of 40 CFR 60 Subpart GG are not applicable, because the unit was existing prior to October 3, 1977.

3) **TAC**

- (a) See Plantwide section above.

iii. **Monitoring and Record keeping**

1) **HAP**

- (a) 40 CFR Subpart ZZZZ, sections 63.6625 and 6655 establish monitoring and record keeping requirements for the stationary CI RICE.

iv. **Reporting**

1) **HAP**

- (a) 40 CFR Subpart ZZZZ, section 63.6640 establish reporting requirements for the stationary CI RICE.

III. Other Requirements

1. **Temporary Sources:** The source did not request to operate any temporary facilities.
2. **Short Term Activities:** The source did not report any short term activities.
3. **Emissions Trading:** NA
4. **Alternative Operating Scenarios:** The source did not request any operational flexibility.
5. **Compliance History:**
none
6. **Calculation Methodology:**

Emissions are calculated by multiplying the throughput (ton, MMCF, gallons, etc) or hours of operation of the equipment by the appropriate emission factor and 1 minus any control device's efficiency. The following emission factors and calculation methodology shall be used unless other methods or emission factors are approved in writing by the District.

Natural Gas: The emission factor conversions are based on the average natural gas heating value (HHV) of 1020 Btu/scf. The conversion of AP-42 emission factors from (lb/MMBtu) to (lb/10⁶ scf) are calculated by multiplying by 1020 (AP-42, 3.1-1 footnote c).

Diesel: The emission factor conversions are based on the average distillate oil heating value of 139 MMBtu/10³ gallons. The conversion of AP-42 emission factors from (lb/MMBtu) to (lb/10³ gallon) are calculated by multiplying by 139 (AP-42, 3.1-1 footnote f).

As an alternative to using published AP-42, table 3.1-1, notes c and f, fuel heat content factors, the owner or operator may use the average yearly heat content based on actual data or vendor certified fuel data.

The AP-42, table 3.1-1 emission factors may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to the average heating value, as stated in note b of AP-42, table 3.1-1.

Emission Unit U1: Combustion Turbines GT1

Emission Unit 1 Natural Gas Emission Factors for Combustion Turbines GT1

Emission Source	Pollutant	Natural Gas Emission Factor			Emission Factor Source
		lb/10 ⁶ scf natural gas combusted		lb/MMBtu natural gas combusted	
		Uncontrolled	Controlled		
E1	NO _x	326	326	0.3200	AP-42, 3.1-1
	CO	84	84	0.0820	AP-42, 3.1-1
	PM total	0.52	0.52	5.1E-04	Sum of factors for PM condensable and PM ₁₀ filterable
	PM condensable	0.32	0.32	3.1E-04	Roy Huntley, EPA ¹
	PM ₁₀ filterable	0.20	0.20	2.0E-04	Roy Huntley, EPA
	PM _{2.5} filterable	0.11	0.11	1.1E-04	Roy Huntley, EPA
	SO ₂	0.67	0.67	0.00068	AP-42, 3.1-2a, h ²
	VOC	2.14	2.14	0.0021	AP-42, 3.1-2a
	NH ₃	3.26	3.26	0.0032	EPA Web FIRE

$$E = (X)(EF \text{ lb}/10^6 \text{ scf})(1 \text{ ton}/2000 \text{ lb.})$$

Where: E = emissions (tons)

X = the amount of natural gas combusted (10⁶ scf)

[AP-42 EF (lb/MMBtu) converted to (lb/10⁶ scf natural gas combusted)]

Emission Unit 1 Natural Gas Combustion HAP/TAC Emission Factors for Combustion Turbines GT1

Emission Source	Individual HAP/TAC	CAS	Natural Gas Emission Factor			Emission Factor Source
			lb/10 ⁶ scf natural gas combusted		lb/MMBtu natural gas combusted	
			Uncontrolled	Controlled		
E1	1,3-Butadiene	106-99-0	4.39E-04	4.39E-04	4.30E-07	AP-42, 3.1-3
	Acetaldehyde	75-07-0	4.08E-02	4.08E-02	4.00E-05	AP-42, 3.1-3
	Acrolein	107-02-8	6.53E-03	6.53E-03	6.40E-06	AP-42, 3.1-3
	Benzene	71-43-2	1.22E-02	1.22E-02	1.20E-05	AP-42, 3.1-3
	Ethylbenzene	100-41-4	3.26E-02	3.26E-02	3.20E-05	AP-42, 3.1-3
	Formaldehyde)	50-00-00	7.24E-01	7.24E-01	7.10E-04	AP-42, 3.1-3
	Naphthalene	91-20-3	1.33E-03	1.33E-03	1.30E-06	AP-42, 3.1-3

¹ The revised PM emission factors are from: "EPA's Emission Inventory and Analysis Group guidance 3/30/2012".

² AP-42 3.1-2a h: All sulfur in the fuel is assumed to be converted to SO₂. S = percent sulfur in fuel. The sulfur percent is 7 ppm per company submittal on 10/26/2018.

Emission Source	Individual HAP/TAC	CAS	Natural Gas Emission Factor			Emission Factor Source
			lb/10 ⁶ scf natural gas combusted		lb/MMBtu natural gas combusted	
			Uncontrolled	Controlled		
Propylene Oxide	75-56-9	2.96E-02	2.96E-02	2.90E-05	AP-42, 3.1-3	
Toluene	108-88-3	1.33E-01	1.33E-01	1.30E-04	AP-42, 3.1-3	
Xylene	1330-20-7	6.53E-02	6.53E-02	6.40E-05	AP-42, 3.1-3	

$$E_{(HAP)} = (X)(EF \text{ lb}/10^6 \text{ scf})(1 \text{ ton}/2000 \text{ lb.})$$

Where: E_(HAP) = emissions (tons)

X = the amount of natural gas combusted (10⁶ scf)

[AP-42 EF (lb/MMBtu) converted to (lb/10⁶ scf natural gas combusted)]

Emission Unit 1 Diesel Emission Factors for Combustion cranking engine for GT1

Emission Source	Pollutant	Diesel Fuel Emission Factor			Emission Factor Source
		lb/gallon diesel fuel combusted		lb/MMBtu diesel fuel combusted	
		Uncontrolled	Controlled		
E1 cranking engine	NO _x	6.13E-01	6.13E-01	4.41	AP-42, 3.3-1
	CO	1.32E-01	1.32E-01	0.95	AP-42, 3.3-1
	PM total	4.31E-02	4.31E-02	0.31	AP-42, 3.3-1, b
	PM condensable	4.31E-02	4.31E-02	0.31	AP-42, 3.3-1, b
	PM ₁₀ filterable	4.31E-02	4.31E-02	0.31	AP-42, 3.3-1
	PM _{2.5} filterable	4.31E-02	4.31E-02	0.31	AP-42, 3.3-1, b
	SO ₂	4.03E-02	4.03E-02	0.290	AP-42, 3.3-1
	VOC	5.00E-02	5.00E-02	0.36	AP-42, 3.3-1 (Sum of TOC emission factors)

$$E = (X)(EF \text{ lb}/\text{gallon})(1 \text{ ton}/2,000 \text{ lb})$$

Where: E = emissions (tons) annually

X = the amount of diesel fuel (gallons) combusted annually

Emission Unit 1 Diesel Combustion HAP/TAC Emission Factors for Combustion cranking engine for GT1

Emission Source	Individual HAP/TAC	CAS	Diesel Fuel Emission Factor			Emission Factor Source
			lb/gallon diesel fuel combusted		lb/MMBtu diesel fuel combusted	
			Uncontrolled	Controlled		
E1	Benzene	71-43-2	1.30E-04	1.30E-04	9.33E-04	AP-42, 3.3-2
	Toluene	108-88-3	5.68E-05	5.68E-05	4.09E-04	AP-42, 3.3-2
	Xylenes	1330-20-7	3.96E-05	3.96E-05	2.85E-04	AP-42, 3.3-2
	1,3-Butadiene	106-99-0	5.43E-06	5.43E-06	3.91E-05	AP-42, 3.3-2
	Formaldehyde	50-00-00	1.64E-04	1.64E-04	1.18E-03	AP-42, 3.3-2
	Acetaldehyde	75-07-0	1.07E-04	1.07E-04	7.67E-04	AP-42, 3.3-2
	Acrolein	107-02-8	1.28E-05	1.28E-05	9.25E-05	AP-42, 3.3-2
	Poly aromatic hydrocarbons (PAH)					
	Naphthalene	91-20-3	1.18E-05	1.18E-05	8.48E-05	AP-42, 3.3-2
	Acenaphthylene	203-96-8	7.03E-07	7.03E-07	5.06E-06	AP-42, 3.3-2
	Acenaphthene	83-32-9	1.97E-07	1.97E-07	1.42E-06	AP-42, 3.3-2
	Fluorene	86-73-7	4.06E-06	4.06E-06	2.92E-05	AP-42, 3.3-2
	Phenanthrene	85-01-8	4.08E-06	4.08E-06	2.94E-05	AP-42, 3.3-2
	Anthracene	120-12-7	2.60E-07	2.60E-07	1.87E-06	AP-42, 3.3-2
	Fluoranthene	206-44-0	1.06E-06	1.06E-06	7.61E-06	AP-42, 3.3-2
	Pyrene	129-00-0	6.64E-07	6.64E-07	4.78E-06	AP-42, 3.3-2
	Benzo(a)anthracene	56-55-3	2.33E-07	2.33E-07	1.68E-06	AP-42, 3.3-2
	Chrysene	218-01-9	4.90E-08	4.90E-08	3.53E-07	AP-42, 3.3-2
	Benzo(b)fluoranthene	205-99-2	1.38E-08	1.38E-08	9.91E-08	AP-42, 3.3-2
	Benzo(k)fluoranthene	205-82-3	2.15E-08	2.15E-08	1.55E-07	AP-42, 3.3-2
Benzo(a)pyrene	50-32-8	2.61E-08	2.61E-08	1.88E-07	AP-42, 3.3-2	
Indeno (1,2,3-cd) pyrene	193-39-5	5.21E-08	5.21E-08	3.75E-07	AP-42, 3.3-2	
Dibenz(a,h)anthracene	53-70-3	8.10E-08	8.10E-08	5.83E-07	AP-42, 3.3-2	

Emission Source	Individual HAP/TAC	CAS	Diesel Fuel Emission Factor			Emission Factor Source
			lb/gallon diesel fuel combusted		lb/MMBtu diesel fuel combusted	
			Uncontrolled	Controlled		
Benzo(g,h,i)perylene		191-24-2	6.79E-08	6.79E-08	4.89E-07	AP-42, 3.3-2
Total PAH			2.34E-05	2.34E-05	1.68E-04	AP-42, 3.3-2

$$E_{(HAP)} = (X)(EF \text{ lb/gallon})(1 \text{ ton}/2,000 \text{ lb})$$

Where: $E_{(HAP)}$ = HAP emissions (tons) annually

X = the amount of diesel fuel (gallons) combusted annually

Emission Unit Insignificant Activities List

Emission Unit Insignificant Activities List Emission Factors

Emission Source	Pollutant	Emission Factor Source
IE1	VOC	Emissions accounted for in the working losses for the storage tanks below using AP-42 evaporative losses.
IE2	VOC	Emissions accounted for in the working losses for the storage tanks below using AP-42 evaporative losses.
IE3	VOC	Emissions accounted for in the working losses for the storage tanks below using AP-42 evaporative losses.

7. Insignificant Activities

Equipment	Qty	PTE (tpy)	Regulation Basis
IE1 - Diesel Fuel Storage tank, 500 gallons [supplies GT1ce, cranking engine] (See U1)	1	VOC = 5.57E-7	Regulation 1.02, Appendix A
IE2 - Lube Oil tank	1	VOC = 5.0E-6	Regulation 1.02, Appendix A
IE3 - 50/50 Glycol-water pressurized tank	1	VOC = 5.0E-6	Regulation 1.02, Appendix A
IE4 - Emergency relief vents	1	NA	Regulation 1.02, Appendix A

- 1) Insignificant activities identified in District Regulation 1.02, Appendix A, may be subject to size or production rate disclosure requirements pursuant to Regulation 2.16 section 3.5.4.1.4.
- 2) Insignificant activities identified in District Regulation 1.02, Appendix A shall comply with generally applicable requirements as required by Regulation 2.16 section 4.1.9.4.

- 3) The Insignificant Activities Table is correct as of the date the permit was proposed for review by U.S. EPA, Region 4.
- 4) Emissions from Insignificant Activities shall be reported in conjunction with the reporting of annual emissions of the facility as required by the District.
- 5) The owner or operator shall submit an updated list of insignificant activities that occurred during the preceding year pursuant to Regulation 2.16 section 4.3.5.3.6.
- 6) The owner or operator may elect to monitor actual throughputs for each of the insignificant activities and calculate actual annual emissions, or use Potential to Emit (PTE) to be reported on the annual emission inventory.
- 7) The District has determined pursuant to Regulation 2.16 section 4.1.9.4 that no monitoring, record keeping, or reporting requirements apply to the insignificant activities listed, except for the equipment that has an applicable regulation and permitted under an insignificant activity (IA) unit.