

**ALLEGHENY COUNTY HEALTH DEPARTMENT  
AIR QUALITY PROGRAM**

July 24, 2024

**SUBJECT:**     **Springdale Energy, LLC**  
                  198 Butler Street Extension  
                  Springdale, PA 15144

**RACT Installation Permit No. 0580-I005**  
                  Major Source Installation Permit Modification

**TO:**            JoAnn Truchan, P.E.  
                  Program Manager, Engineering

**FROM:**        Bernadette Lipari  
                  Air Quality Engineer

**FACILITY DESCRIPTION:**

The facility in Springdale Township is a commercial electrical power generation facility. The source is composed of two 48 MWe natural gas and No. 2 fuel oil fired simple cycle combustion turbines (Units 1 and 2) which operate as peaking units and two natural gas-fired, combustion turbines (Units 3 and 4) rated at a nominal 188 MWe (2,094 MMBtu/hr, maximum) each. Units 3 and 4 are operated in combined cycle mode through two heat recovery steam generators (HRSGs) without duct burners, one per unit, with an additional 186 MWe generated by an axial flow steam turbine which utilizes the steam produced by the HRSGs. The combined cycle combustion turbines fire natural gas exclusively and are equipped with dry low-NO<sub>x</sub> burners and selective catalytic reduction (SCR) for control of NO<sub>x</sub> emissions. The simple cycle combustion turbines fire natural gas and No. 2 fuel oil exclusively and are equipped with water injection for NO<sub>x</sub> control and use low sulfur (0.0015% max.) fuel oil for SO<sub>2</sub> control. The steam turbine generator uses steam from the heat recovery steam generators and has no fuel supply and no emissions. Additional emission units consist of one 148,690 gallon per minute cooling tower, a 24,800-gallon aqueous ammonia storage tank, a 400,000-gallon No. 2 fuel storage tank, and two 1,250 kW emergency generators, and an emergency fire pump.

The facility is a major source of particulate matter (PM) and particulate matter < 10 microns in diameter (PM<sub>10</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO) and volatile organic compounds (VOC) and a minor source of sulfur dioxide (SO<sub>2</sub>) and hazardous air pollutants (HAPs) as defined in section 2101.20 of Article XXI.

**INSTALLATION PERMIT DESCRIPTION:**

This permit replaces installation permit #0580-I001 and installation permit #0580-I002a, as well as RACT installation permit #0580-I003 and incorporates changes to the requirements for simple cycle turbines Units 1 and 2 (AE1 and AE2) and the requirements for combined cycle turbines Units 3 and 4 (AE3 and AE4). This permit also incorporates the requirements for case-by-case RACT III (2015 Ozone RACT).

Changes to the requirements for turbines AE1 and AE2 include:

1. Clarifying the 424 MMBtu/hr combustion turbine rating to represent a nominal rating,

2. Eliminating the 4,450 hours per year operating restriction due to the use of Part 75-required NO<sub>x</sub> CEMS,
3. Change the short-term NO<sub>x</sub> limit averaging period from a 3-hour to 4-hour average to harmonize with NSPS GG,
4. Establish work practice standards limiting emissions during periods of startup, shutdown, tuning, blackstart testing, and NERC reliability testing,
5. Eliminating biennial NO<sub>x</sub> source testing due to Part 75 NO<sub>x</sub> CEMS, and
6. Clarifying the USEPA Test Methods to evaluate PM and PM<sub>10</sub> compliance.

Changes to the requirements for turbines AE3 and AE4 include:

1. Correct the aqueous ammonia storage tank (T-2) capacity rating to 24,800 gallons,
2. Change the short-term NO<sub>x</sub> limit averaging period from a 3-hour to 4-hour average to harmonize with NSPS GG,
3. Clarify the timing of low-load turndown NO<sub>x</sub> and CO limits only after completion of a full startup sequence and established normal operation,
4. Establishing alternate short-term emission limits during periods of tuning and NERC reliability testing to the startup and shutdown exemption,
5. Clarify the USEPA test methods for particulate matter limits and testing, and

**PERMIT APPLICATION COMPONENTS:**

1. Major Source Operating Permit administrative amendment application package requesting the above noted changes to simple cycle combustion turbines AE1 and AE2 and combined cycle turbines AE3 and AE4, dated January 13, 2022.
2. Installation Permit #0580-I001, issued September 30, 1999.
3. Installation Permit #0580-I002a, issued July 12, 2001, amended June 6, 2002.
4. RACT Installation Permit #0580-I003, issued October 13, 2016.

**EMISSION SOURCES:**

**Table 1: Emissions Sources**

I.D.	SOURCE DESCRIPTION	CONTROL DEVICE(S)	MAXIMUM CAPACITY	FUEL/RAW MATERIAL	STACK I.D.
AE1	General Electric LM6000PC Simple Cycle Combustion Turbine	Water Injection	424 MMBtu/Hr (nominal)	Natural gas No. 2 fuel oil	S001
AE2	General Electric LM6000PC Simple Cycle Combustion Turbine	Water Injection	424 MMBtu/Hr (nominal)	Natural gas No. 2 fuel oil	S002
AE3	Siemens Westinghouse Model 501F	Dry Low/NO <sub>x</sub> Burners /SCR	2,094 MMBtu/Hr	Natural Gas	S003
AE4	Siemens Westinghouse Model 501F	Dry Low/NO <sub>x</sub> Burners /SCR	2,094 MMBtu/Hr	Natural Gas	S003
AE5	Steam Turbine Electric Generator	n/a	186 MW	n/a	n/a
T-2	Aqueous Ammonia Storage Tank	Vapor Balancing and Bottom Loading	24,800 gallons	Aqueous Ammonia	n/a

I.D.	SOURCE DESCRIPTION	CONTROL DEVICE(S)	MAXIMUM CAPACITY	FUEL/RAW MATERIAL	STACK I.D.
CT-2	Cooling Tower	Mist eliminators	148,690 gallons/minute	n/a	S004
G-02	Emergency Fire Pump Engine	n/a	265 bhp	Diesel	n/a

**EMISSION CALCULATIONS:**

Detailed emissions calculations can be found in Appendix A.

**Unit Descriptions (each combustion turbine):**

Unit: Simple cycle combustion turbines  
 I.D.(s): Unit No. 1 & Unit No. 2  
 Make: General Electric  
 Model: LM 6000PC  
 Fuel: Natural gas & No. 2 fuel oil  
 Sulfur content: 0.0015% maximum by weight

*Note: Article XXI, §2104.10.a.1 allows for use of any 0.05% sulfur fuel purchased by the facility before September 1, 2020, so PTE calculations are based on 0.05% sulfur. Any new purchases of fuel oil must be 0.0015% or less.*

Rating: 48 MWe –  $355 \times 10^6$  Btu/hr normal,  $424.4 \times 10^6$  Btu/hr maximum at HHV  
 Controls: Water injection for NO<sub>x</sub> control, low sulfur (0.0015% max.) fuel oil for SO<sub>2</sub> control  
 Instrumentation: CEMS for NO<sub>x</sub>, O<sub>2</sub> and fuel flow

Unit: Combined cycle combustion turbine  
 I.D.(s): Unit No. 3 & Unit No. 4  
 Make: Siemens-Westinghouse  
 Model: 501F  
 Fuel: Natural gas only  
 Rating: 209 MWe (net) -  $1,884 \times 10^6$  btu/hr normal,  $2,094 \times 10^6$  Btu/hr maximum at HHV  
 Exhaust: Heat recovery steam generator (without duct burners) each unit.  
 Controls: Dry Low-NO<sub>x</sub> burners with SCR  
 Instrumentation: CEMs for fuel flow, exhaust gas flow, nitrogen oxides, oxygen and carbon monoxide

Unit: Steam turbine generator (w/o duct burners)  
 I.D.(s): Unit No. 5  
 Fuel: NA  
 Rating: 186 MWe due to steam from the two heat recovery steam generators

**Cooling tower**

Process Description: One multi-cell evaporative cooling tower  
 No. of cells: Six with identical fan stacks  
 Facility ID: CT-2  
 Coolant: Water  
 Control Device(s): Mist eliminators (limit drift to 0.0005% of circulating water flow)  
 Capacity: 148,690 gallon per minute  
 Max. TDS: 3,000 ppm

**Ammonia tank**

Process Description: One 24,800-gallon storage tank  
 Facility ID: T-2  
 Contents: Aqueous Ammonia 29.5%  
 Control Device(s): Vapor Balancing and Bottom Loading

**ALLOWABLE EMISSION SUMMARY:**

**Simple Cycle Combustion Turbine (Unit 1 or Unit 2) - each:**

Pollutant	Each Unit lbs/hr Natural gas	Each Unit lbs/hr Fuel oil	Combined tons/yr <sup>1</sup>	Basis
PM	6.6	17.0	17	Article XXI
PM <sub>10</sub>	6.6	17.0	17	Article XXI
NO <sub>x</sub>	41.0	71.0	98	Mfg. Data
CO	57.0	6.0	115	Mfg. Data
SO <sub>x</sub>	0.3	22.5	6	AP-42+20%
VOC	5.0	1.0	10	Mfg. Data
Formaldehyde	1.4		3.3	AP-42+20%

<sup>1</sup> A year is defined as any consecutive 12-month period. Annual emissions include emissions during startup and shutdown.

**Combined Cycle Combustion Turbine (Unit 3 and Unit 4) - each:**

Pollutant	lbs/mmbtu	ppm <sub>vd</sub>	Each Unit lbs/hr	Combined tons/yr <sup>1</sup>	Basis
PM	0.015		19.0	166	PSD BACT
PM <sub>10</sub>	0.015		19.0	166	PSD BACT
NO <sub>x</sub>		2.5 <sup>2</sup>	20.0 <sup>3</sup>	210 <sup>4</sup>	RACT I
CO		10.0 <sup>2</sup>	48.0	550	PSD BACT
SO <sub>x</sub>	0.00286		5.7	53	PSD BACT
VOC		2.0 <sup>2</sup>	3.8	48	Article XXI BACT
Formaldehyde			0.68	5.7	Vendor Specs
Sulfuric Acid Mist			0.685	6.0	PSD BACT
Ammonia		10.0 <sup>2</sup>	28.0	245	Vendor Specs

<sup>1</sup> A year is defined as any consecutive 12-month period. Annual emissions include emissions during startup and shutdown.

<sup>2</sup>@15% O<sub>2</sub> during any 4-hour time period at or above 70% of full load for NO<sub>x</sub> and any 1-hour time at or above 70% of full load for CO and VOC.

<sup>3</sup> Based on a rolling 4-hour average.

<sup>4</sup> Other restrictions effectively limit NO<sub>x</sub> emissions to 87.6 tpy for each turbine, or 175.2 tpy total. See conditions IV.22 & IV.23 of Installation Permit #0580-I005. However, these restrictions do not take into account startup and shutdown emissions. All NO<sub>x</sub> emissions are monitor by CEMs.

**Cooling Tower:**

Pollutant	tons/yr <sup>1</sup>	Basis
PM	4.9	TVOP 0580 application
PM <sub>10</sub>	4.9	TVOP 0580 application

<sup>1</sup> A year is defined as any consecutive 12-month period.

### **EMISSION CONTROL:**

The two simple cycle combustion turbine Units 1 & 2 are equipped with water injection for control of nitrogen oxides and fire natural gas or low sulfur No. 2 fuel oil (0.0015% maximum sulfur) for control of sulfur oxide emissions. The two combined cycle combustion turbine Units 3 & 4 are equipped with dry low-NO<sub>x</sub> burners and selective catalytic reduction for control of nitrogen oxides control, which is considered LAER/BACT for NO<sub>x</sub>, and they combust pipeline quality natural gas only. The cooling tower is equipped with mist eliminators for control of particulates and the ammonia tank uses vapor balance for emission control.

### **TESTING REQUIREMENTS:**

NO<sub>x</sub> emissions are monitored continuously with a CEM on each of the four units. These CEMs must meet the requirements of §2108.03 and 40 CFR Part 75.

#### Units No. 1 & No. 2

Emission testing is performed for NO<sub>x</sub> and CO emissions on each of the simple cycle turbines every two years in accordance with Article §2108.02.c. The NO<sub>x</sub> emission testing requirements may be satisfied by the NO<sub>x</sub> relative accuracy testing for CEMS systems conducted in accordance with the requirements of 40 CFR Part 75 and the performance test required under §60.8 or the CEMs requirements in 40 CFR Part 75. Testing for NO<sub>x</sub> is performed at each of the following load conditions.

48 MW (100%)

36 MW (75%)

24 MW (50%)

14 MW (30%) or;

At four points in the normal operating range of the gas turbine including the minimum point in the range and peak load.

Testing at the above load points may be waived by the Department if the installed NO<sub>x</sub> CEMS is tested.

Method 20 or any other method acceptable to and approved by the Department shall be used to determine the nitrogen oxides, oxygen concentrations and sulfur dioxide concentration.

The permittee shall determine compliance with the sulfur content of each fuel being fired using ASTM D 2880-71.

#### Units No. 3 & No. 4

Emissions testing is performed on the combined cycle turbines once every three years for volatile organic compounds, formaldehyde, particulate matter, PM<sub>10</sub> and PM<sub>2.5</sub> and annually to demonstrate compliance with the ammonia emissions limitation of 10 ppm and the corresponding ammonia emission limits in lbs/hr and tons/yr in the permit.

### **METHOD OF DEMONSTRATING COMPLIANCE:**

Continuing compliance with the emission limitations of this permit will be reasonably assured by continuous fuel flow monitors on all units, CEMs for NO<sub>x</sub> on all units, CEMS for CO on Units No. 3 & No. 4, the use of natural gas or low sulfur fuel oil in Units No. 1 & No. 2, the use of natural gas only in Units No. 3 & No. 4, and SCR system

monitoring in Units No. 3 & No. 4, along with associated recordkeeping and reporting requirements.

### **REGULATORY APPLICABILITY:**

1. **Article XXI Requirements for Issuance:**

The requirements of Article XXI, Parts B and C for the issuance of major source operating permits have been met for this facility. Article XXI, Part D, Part E & Part H will have the necessary sections addressed individually.

2. **Testing Requirements:**

**Units No. 1 & No. 2**

Emissions testing shall be performed for NO<sub>x</sub> and CO emissions for turbine Units No. 1 & No. 2 every two years in accordance with Article XXI §2108.02.e. U.S. EPA Method 10 shall be used for CO testing. In order to demonstrate compliance with the CO emissions limitations, testing shall be performed while combusting each fuel (natural gas and No. 2 fuel oil) separately. Fuel oil shall be tested to determine the maximum fuel bound nitrogen content on each of the turbines every two years in accordance with Article §2108.02.c. Continuous fuel flow monitors shall be installed and maintained on each unit in accordance with 40 CFR Part 75 Appendix D Chapter 2.1.

Emissions of NO<sub>x</sub> may be determined by the CEMs required in §60.334(b) in lieu of a stack test to determine compliance with the emissions limitation of §2105.06.b.4. NO<sub>x</sub> emission testing requirements may be satisfied by the NO<sub>x</sub> relative accuracy testing for CEMS systems conducted in accordance with the requirements of 40 CFR Part 75 and the performance test required under §60.8 or the alternative manner described in 40 CFR §60.335(b)(7).

**Units No. 3 & No. 4**

Compliance with the nitrogen oxides and sulfur dioxide standards in §60.332 and §60.333(a) to determine the nitrogen oxides, sulfur dioxide, and oxygen concentrations. U.S. EPA Method 20 will be used to determine nitrogen oxides. Continuous fuel flow monitors shall be installed and maintained on each unit in accordance with 40 CFR Part 75 Appendix D Chapter 2.1.

The permittee shall install, operate and maintain continuous emission monitors for nitrogen oxides, oxygen and carbon monoxide on Units 3 & 4. Such monitoring systems shall meet the requirements of §60.334 and 40 CFR Part 75.

The permittee shall perform particulate matter (PM), PM<sub>10</sub> and PM<sub>2.5</sub> emissions testing once every three years. Such testing shall be conducted in accordance with U.S. EPA test methods 5, 201A, and 202 or other method as approved by the Department and Article XXI §2108.02. Particulate matter emissions testing shall be for filterable and condensable particulate matter. Compliance may be determined using the front-half catch of Method 5.

Emissions testing in accordance with Article XXI, §2108.02.d. and e. shall be performed once every three years for volatile organic compounds by EPA Methods 18 & 25 and for formaldehyde by EPA Method 323.

Emissions testing shall be performed annually to demonstrate compliance with the ammonia emissions limitation of 10 ppm and the corresponding ammonia emission limits in accordance with Article XXI, §2108.02.d. and e.

3. **New Source Review/Prevention of Significant Deterioration (NSR/PSD):**

NSR and PSD do not apply because there are no increases to the potential emissions in this permit.

4. **New Source Performance Standards (NSPS):**

**40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines:**

This subpart is applicable to all four units due to each unit having a heat input greater than 10 MMBtu/hr and construction date after October 3, 1977. When installation permits 0580-I001 (issued 9/30/99) and 0580-I002a (issued 6/6/02) were issued, the NSPS had not been promulgated, so those conditions (including those requiring a NO<sub>x</sub> CEM) were not included.

In accordance with the NSPS, the units are required to comply with the following NO<sub>x</sub>/SO<sub>x</sub> emission limits of §63.332(a)(1) & SO<sub>2</sub> emission limits of §63.333(a).

**Units No. 1 & No. 2 each**

NO<sub>x</sub> = 115 ppm<sub>dv</sub>

SO<sub>2</sub> = 150 ppm<sub>dv</sub>

**Units No. 3 & No. 4 each**

NO<sub>x</sub> = 109 ppm<sub>dv</sub>

SO<sub>2</sub> = 150 ppm<sub>dv</sub>

However, the existing Installation Permit conditions require emissions that are significantly lower (i.e., 25 ppm NO<sub>x</sub> for Units No. 1 & No. 2; 2.5 ppm NO<sub>x</sub> for Units No. 3 & No. 4). Those limits are retained in this installation permit.

Units No. 1 & No. 2 each must either continuously monitor the fuel flow rate and the ratio of water to fuel or operate in accordance with the revised NSPS (July 8, 2004) or the alternate monitoring plan approved by EPA Region III on September 11, 2002 (Units No. 1 & No. 2) and on June 20, 2003 (Units No. 3 & No. 4).

All units must report excess emissions of NO<sub>x</sub> & SO<sub>2</sub>.

In accordance with the NSPS, the NO<sub>x</sub> emission testing requirements for Units No. 3 & No. 4 may be satisfied by the NO<sub>x</sub> relative accuracy testing for CEMS systems conducted in accordance with the requirements of 40 CFR Part 75 and the performance test required under §60.8.

**40 CFR 60, Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines – CI RICE):** This rule is not applicable to the emergency fire pump engine G-02 because the unit was installed before the applicability date of the regulation, July 11, 2005.

5. **Continuous Emission Monitoring (40 CFR Part 75):**

The NO<sub>x</sub> emission testing requirements may be satisfied by the NO<sub>x</sub> relative accuracy testing for CEMS systems conducted in accordance with the requirements of 40 CFR Part 75 for all units. Continuous fuel flow monitors shall be installed and maintained on each unit in accordance with 40 CFR Part 75 Appendix D Chapter 2.1.

6. **NESHAP and MACT Standards:**

**40 CFR Part 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines:** This rule is not applicable to the emergency fire pump engine G-02. The generators meet the operational requirements of “emergency stationary RICE” under §63.6640(f), and therefore are not subject to this subpart per §63.6585(f).

7. **Risk Management Plan; CAA Section 112(r):**

The facility is subject to §112(r) of the Clean Air Act due to the storage of aqueous ammonia (29.5% concentration). There is a risk management plan in place at the facility.

8. **Greenhouse Gases (40 CFR Part 98):**

There are presently no Title V applicable requirements for greenhouse gases. Should the facility exceed 25,000 metric tons of CO<sub>2</sub>e in any 12-month period, the facility would be required to submit reports in accordance with 40 CFR Part 98.

9. **Emissions Inventory:**

This facility is required to provide annual Emission Inventory reports per §2108.01.e of Article XXI because this facility has the potential to emit a total of twenty-five (25) or more tons of PM<sub>10</sub>, NO<sub>x</sub>, CO, SO<sub>x</sub>, and VOC.

10. **Acid Rain Program, 40 CFRs 72 Through 78:**

Units No. 1, No. 2, No. 3 and No. 4 are affected units as per §72.6 of 40 CFR Part 72. These units are subject to all applicable conditions of parts 72 through 78 specifically monitoring, recordkeeping and reporting requirements. The units Phase II Acid Rain Permits are incorporated by reference into the Title V Operating Permit.

11. **CAIR NO<sub>x</sub> and SO<sub>2</sub> Trading Programs (40 CFR Part 97 and 25 Pa Code § 145):**

The permittee shall comply with all requirements of 40 CFR Part 97 (relating to Federal NO<sub>x</sub> Budget Trading Program and CAIR NO<sub>x</sub> and SO<sub>2</sub> Trading Programs) and 25 Pa Code §145 (relating to Interstate Pollution Transport Reduction). The permittee is subject to the standard requirements of 40 CFR §97.106, 40 CFR §97.206 and 40 CFR §97.306. The requirements are incorporated by reference in the permit. This program has replaced Pa Code §123.102-123.120 (§2105.100).

12. **Best Available Control Technology (BACT):**

This installation permit replaces existing installation permits #0580-I001 and #0580-I002a, and is therefore for existing equipment. Since there are no operational changes, BACT does not apply. This permit is also being issued to meet the requirements of the 2015 Ozone RACT (RACT III). The Department considers the existing controls and limitations to be RACT for this facility.

**EMISSIONS SUMMARY:**

**Combined Emissions:**

Pollutant	Combined tons/yr <sup>1</sup>
PM	187.4
PM <sub>10</sub>	187.4
NO <sub>x</sub>	309
CO	665
SO <sub>x</sub>	59
VOC	58
Formaldehyde	9
Sulfuric Acid Mist	6
Ammonia	245.7

<sup>1</sup> A year is defined as any consecutive 12-month period.  
Annual emissions include emissions during startup and shutdown.



**RECOMMENDATIONS:**

All applicable Federal, State, and County regulations have been addressed in the permit application. The facility is not subject to the restrictions of §2102.04.k of Article XXI because there have been no Notices of Violation issued for this facility during the last 18 months. The Title V Operating Permit renewal for Springdale Energy, LLC should be approved with the emission limitations, terms and conditions in Permit No. 0580-I005.

**APPENDIX A – EMISSIONS CALCULATIONS**

See attached spreadsheet.