ALLEGHENY COUNTY HEALTH DEPARTMENT
AIR QUALITY PROGRAM

July 24, 2024

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

Title V Operating Permit File No. 0580-OP24
Major Source Operating Permit Renewal

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_X burners and selective catalytic reduction (SCR) for control of NO_X emissions. The simple cycle combustion turbines fire natural gas and No. 2 fuel oil exclusively and are equipped with water injection for NO_X control and use low sulfur (0.0015% max.) fuel oil for SO_2 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, 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_{10}), nitrogen oxides (NO_X), carbon monoxide (CO) and volatile organic compounds (VOC) and a minor source of sulfur dioxide (SO_2) and hazardous air pollutants (HAPs) as defined in section 2101.20 of Article XXI.

On April 17, 2017, the permittee submitted an application for transfer of ownership from Allegheny Energy Supply Company, LLC to Springdale Energy, LLC.

PERMIT APPLICATION COMPONENTS:

1. Major Source Operating Permit administrative amendment application package, dated January 13, 2022.
2. Installation Permit #0580-I001, issued September 30, 1999 (superseded by #0580-I005).
3. Installation Permit #0580-I002a, issued July 12, 2001, amended June 6, 2002 (superseded by #0580-I005).
4. RACT Installation Permit #0580-I003, issued October 13, 2016 (superseded by #0580-I005).
5. Installation Permit #0580-I004, issued June 24, 2020.
6. RACT Installation Permit #0580-I005, issued concurrently with this permit.

EMISSION 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 #2 fuel oil	S001
AE2	General Electric LM6000PC Simple Cycle Combustion Turbine	Water Injection	424 MMBtu/Hr (nominal)	Natural gas #2 fuel oil	S002
AE3	Siemens Westinghouse Model 501F	Dry Low/NOx Burners /SCR	2,094 MMBtu[1]/Hr	Natural Gas	S003
AE4	Siemens Westinghouse Model 501F	Dry Low/NOx Burners /SCR	2,094 MMBtu[1]/Hr	Natural Gas	S003
AE5	Steam Turbine Electric Generator	None	186 MW	n/a	n/a
EG01	Caterpillar C32 Backup Emergency Generator	None	1,250 kW	Diesel	EG01
EG02	Caterpillar C32 Backup Emergency Generator	None	1,250 kW	Diesel	EG02
G02	Clarke JDFP-06WA Emergency Fire Pump	None	265 BHP	Diesel	n/a
T-2	Aqueous Ammonia	Vapor Balancing and Bottom Loading	24,800 gallons	n/a	n/a
T-3	No. 2 Fuel Storage Tank	None Required	400,000 gallons No. 2 fuel oil	No. 2 Fuel Oil	n/a
CT-2	Cooling Tower	Mist eliminators	148,690 gallons/minute	n/a	S004

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(s): 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 x 10^6 btu/hr normal, 424.4 x 10^6 btu/hr maximum at HHV
Controls: Water injection for NO_X control, low sulfur (0.05% max.) fuel oil for SO_2 control
Instrumentation: CEMS for NO_X, O_2 and fuel flow

Unit:	Combined cycle combustion turbine
I.D.(s):	Unit No. 3 & Unit No.4
Make:	Siemens-Westinghouse
Model	501F
Fuel(s):	Natural gas only
Rating:	209 MWe (net) - 1,884 x 10^6 btu/hr normal, 2,094 x 10^6 btu/hr maximum at HHV
Exhaust:	Heat recovery steam generator (without duct burners) each unit.
Controls:	Dry Low- NO_X 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(s):	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:	3000 ppm

No.2 fuel oil tank

Process Description:	One 400,000 gallon storage tank
Facility ID:	T-3
Contents:	No.2 fuel oil
Control Device(s):	None

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

Emergency Generators EG01 & EG02

Process Description:	Two Caterpillar C32 Diesel Emergency Generators
Facility ID:	EG01 & EG02
Capacity:	1,250 kW
Fuel(s):	Diesel
Control Device(s):	None; Tier 2 Compliant

Emergency Fire Pump Engine G02

Process Description:	Clarke JDFP-06WA Diesel Fire Water Pump

Facility ID: G02
Capacity: 265 BHP
Fuel(s): Diesel
Control Device(s): None

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[1, 4]	Basis
PM	6.6	17.0	17	IP-0580-I005
PM_{10}	6.6	17.0	17	IP-0580-I005
NO_X	41.0	71.0	98	IP-0580-I005
CO	57.0	6.0	115	IP-0580-I005
SO_2	0.3	22.5	6	IP-0580-I005
VOC	5.0	1.0	10	IP-0580-I005
Formaldehyde	1.4		3.3	IP-0580-I005

[1] 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 vd	Each Unit lbs/hr	Combined tons/yr[1]	Basis
PM	0.015		19.0	166	IP-0580-I005
PM_{10}	0.015		19.0	166	IP-0580-I005
NO_X		2.5[2]	20.0[3]	210[4]	IP-0580-I005
CO		10.0[2]	48.0	550	IP-0580-I005
SO_2	0.00286		5.7	53	IP-0580-I005
VOC		2.0[2]	3.8	48	IP-0580-I005
Formaldehyde			0.68	5.7	IP-0580-I005
Sulfuric Acid Mist			0.685	6.0	IP-0580-I005
Ammonia		10.0[2]	28.0	245	IP-0580-I005

[1] A year is defined as any consecutive 12-month period. Annual emissions include emissions during startup and shutdown.

[2] @15% O_2 during any 4-hour time period at or above 70% of full load for NO_X and any 1-hour time at or above 70% of full load for CO and VOC.

[3] Based on a rolling 4-hour average.

[4] Other restrictions effectively limit NO_X 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_X emissions are monitor by CEMs.

Emission Unit EG01 & EG02 Emission Limitations:

Pollutant	lb/hr per Generator	tons/year [1] per Generator	Combined tons/year [1]
$PM_{2.5}$/PM/PM_{10}	0.080	0.020	0.04
NO_X	24.89	6.223	12.45
SO_X	0.018	0.005	0.01
CO	0.843	0.211	0.42
VOC	0.401	0.100	0.20

[1] A year is defined as any consecutive 12-month period.

Cooling Tower:

Pollutant	tons/yr[1]	Basis
PM	4.9	IP-0580-I005
PM_{10}	4.9	IP-0580-I005

[1] A year is defined as any consecutive 12-month period.

Combined Facility Allowable Emissions:

Pollutant	lbs/hr	tons/yr[1]
PM	73.12	187.4
PM_{10}	73.12	187.4
NO_X	182	321.4
CO	210	665.5
SO_2	56.4	59.0
VOC	17.6	58.2
Formaldehyde	2.8	9
Sulfuric Acid Mist	4.16	6
Ammonia	28	245.7

[1] A year is defined as any consecutive 12-month period. Annual emissions include emissions during startup and shutdown.

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_X burners and selective catalytic reduction for control of nitrogen oxides 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_X 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 shall be performed for NO_X and CO emissions on each of the simple cycle turbines every two years in accordance with Article §2108.02.c. The NO_X emission testing requirements may be satisfied by the NO_X 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_X shall be 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_X 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 shall be performed on the combined cycle turbines once every three years for volatile organic compounds, formaldehyde, particulate matter, PM_{10} and $PM_{2.5}$ 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. All testing shall be done in accordance with Article XXI, §2108.02.d. and e.

METHOD OF COMPLIANCE DETERMINATION:

Continuing compliance with the emission limitations of this permit will be reasonably assured by continuous fuel flow monitors on all units, CEMs for NO_X 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. See Permit No. 0580-I005 for the specific conditions for determining compliance with the applicable requirements.

Compliance with the emission standards for the emergency generators will be demonstrated by maintaining records of generator operation and fuel usage as well as supplier certification of sulfur content. See Permit No. 0580-I004 for the specific conditions for determining compliance with the applicable requirements.

REGULATORY APPLICABILITY:

1. **Article XXI Requirements for Issuance:**
   See Title V Operating Permit Application No. 0580, Section 5: Applicable Requirements. 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_X 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_X 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_X emission testing requirements may be satisfied by the NO_X 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_{10} and $PM_{2.5}$ 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. **40 CFR PART 64, "Compliance Assurance Monitoring":**
The requirements of 40 CFR Part 64, "Compliance Assurance Monitoring", were found not to be applicable to this facility. The applicability of acid rain regulations to these units makes them exempt from CAM under section 64.2(b)(iii) of the rule. In addition the applicability of 40 CFR 60, Subpart GG, NO_X & SO_2 emission limits makes these units exempt from CAM under section 64.2(b)(i).

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. The TVOP conditions pertaining to the NSPS are not the same as those contained in the originally issued installation permits 0580-I001 (issued 9/30/99) and 0580-I002a (issued 6/6/02) so as to be consistent with revisions to the regulation. (Federal Register, July 8, 2004, pp.41359 – 41364). Those conditions (including those requiring a NO_X CEM) were not included.

In accordance with the NSPS, the units are required to comply with the following NO_X/SO_x emission limits of §63.332(a)(1) & SO_2 emission limits of §63.333(a).

Units no.1 & no.2 each	Units no.3 & no.4 each
NO_X = 115 ppm_{dv}	NO_X = 109 ppm_{dv}
SO_2 = 150 ppm_{dv}	SO_2 = 150 ppm_{dv}

However, the Installation Permit conditions require emissions that are significantly lower (i.e., 25 ppm NO_X for Units 1 & 2; 2.5 ppm NO_X for Units 3 & 4). Therefore, the IP governs the emissions of these units and the IP conditions have been incorporated into the TVOP.

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 1 & 2) and on June 20, 2003 (Units 3 & 4).

All units must report excess emissions of NO_X & SO_2.

In accordance with the NSPS, the NO_X emission testing requirements for Units No. 3 & No. 4 may be satisfied by the NO_X 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.

40 CFR 60, Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines – CI RICE): This rule is applicable to the emergency generators because the generators commenced construction after July 11, 2005, after the applicability date of the NSPS and were manufactured after April 1, 2006. This includes, but is not limited to the following sections:

- 40 CFR §60.4207(b) – minimum fuel requirements for sulfur content and cetane index (as given in §80.510(b)).
- 40 CFR §60.4211(a) – minimum emissions standards (as given in §89.112).
- 40 CFR §60.4211(c) – engine certification.
- 40 CFR §60.4211(f) – operation limits for non-emergencies.
- 40 CFR §60.4214(b) – use of a non-resettable hour meter

5. **Continuous Emission Monitoring (40 CFR Part 75):**
The NO_X emission testing requirements may be satisfied by the NO_X 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).

40 CFR Part 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines: The emergency generators are subject to 40 CFR 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

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_2e 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_{10}, NO_X, CO, SO_X, 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 NOx and SO_2 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_X Budget Trading Program and CAIR NO_X and SO_2 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. **Reasonably Available Control Technology (RACT):**
Installation Permit 0580-I005 is being issued concurrently with this permit (via case-by-case determination). Annual tune-ups are required in lieu of emissions limitations due to the existing NO_X and VOC limits being more restrictive than Pennsylvania RACT III limits.

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-OP24.

APPENDIX A – EMISSIONS CALCULATIONS

See attached spreadsheet.