

**ALLEGHENY COUNTY HEALTH DEPARTMENT
AIR QUALITY PROGRAM**

December 16, 2010

SUBJECT: Review of Application Renewal
Title V Operating Permit
Allegheny Energy Supply Co., L.L.C.
Butler Street Extension
Springdale, PA 15144

RE: Operating Permit File No. 0580
Electric utility

TO: Sandra L. Etzel
Air Pollution Control Manager

FROM: David D. Good
Air Pollution Control Engineer II

FACILITY DESCRIPTION:

The Allegheny Energy Plant is a commercial electrical power generation facility. The source is composed of two 44 MW natural gas & no.2 fuel oil fired simple cycle combustion turbines, two nominal 175 MW natural gas-fired combined cycle combustion turbines each with a heat recovery steam generator and one 186 MW steam turbine generator. 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 (0.05% max.) fuel oil for SO₂ 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 and a 12,000 gallon aqueous ammonia storage tank.

The facility is a major source of particulate matter (PM) and particulate matter < 10 microns in diameter (PM₁₀), nitrogen oxides (NO_x), carbon monoxide (CO) and volatile organic compounds (VOC) and a minor source of sulfur dioxide (SO₂) and hazardous air pollutants (HAPs) as defined in section 2101.20 of Article XXI.

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:	0.05% maximum by weight
Rating:	44 MW – 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: Natural gas only
Rating: 175 MW - $1,884 \times 10^6$ 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-NOx 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 MW 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 500,000 gallon storage tank (not installed)
Facility ID: T-2
Contents: No.2 fuel oil
Control Device(s): None

Ammonia tank

Process Description: One 12,000 gallon storage tank
Facility ID: T-2
Contents: Aqueous Ammonia.
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 ^{1, 4}	Basis
PM	6.6	17.0	17	IP-0580-I001
PM10	6.6	17.0	17	IP-0580-I001
NOx	41.0	71.0	98	IP-0580-I001
CO	57.0	6.0	115	IP-0580-I001
SO2	0.3	22.5	6	IP-0580-I001
VOC	5.0	1.0	10	IP-0580-I001
Formaldehyde	1.4		3.3	IP-0580-I001

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	0.012		19.0	166	IP-0580-I002a
PM10	0.012		19.0	166	IP-0580-I002a
NOx		2.5 ²	20.0 ³	210	IP-0580-I002a
CO		10.0 ²	48.0	550	IP-0580-I002a
SO2	0.00286		5.7	53	IP-0580-I002a
VOC			3.8	48	IP-0580-I002a
Formaldehyde			0.68	5.7	IP-0580-I002a
Sulfuric Acid Mist			0.685	6.0	IP-0580-I002a
Ammonia		10.0 ²	28.0	245	IP-0580-I002a

Cooling Tower:

Pollutant	lbs/hr	tons/yr ¹	Basis
PM	1.12	4.9	IP-0580-I002a
PM10	1.12	4.9	IP-0580-I002a

Combined Facility Allowable Emissions:

Pollutant	lbs/hr	tons/yr ¹
PM	73.12	187.9
PM10	73.12	187.9
NOx	182	308
CO	210	665
SO2	56.4	59
VOC	17.6	58
Formaldehyde	4.16	9
Sulfuric Acid Mist	0.685	6.0
Ammonia	28	245

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

² @ 15% O₂ during any three hour time period at or above 70% of full load for NO_x and any one-hour time at or above 70% of full load for CO.

³ Based on a rolling 3-hour average

⁴ A year is defined as any consecutive 12-month period. Maximum operating hours each turbine are 4,450 hours per year.

EMISSION CONTROL:

The two simple cycle combustion turbines are equipped with water injection for control of nitrogen oxides and fire natural gas or low sulfur no.2 fuel oil (0.05% maximum sulfur) for control of sulfur oxide emissions. The two combined cycle combustion turbines 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:

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. Testing for NO_x shall be performed at each of the following load conditions.

1. 48MW(100%)
2. 36MW(75%)
3. 24MW(50%)
4. 14MW(30%) or;
5. 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.

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, PM10 and PM2.5 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.

In addition, the NO_x emissions are monitored continuously with a CEM on each of the 4 units. These CEMs must meet the requirements of §2108.03 and 40 CFR Part 75.

APPLICABLE REQUIREMENTS:

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.

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 & SO₂ emission limits makes these units exempt from CAM under section 64.2(b)(i).

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).

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) & SO₂ emission limits of §63.333(a).

<u>Units no.1 & no.2 each</u>	<u>Units no.3 & no.4 each</u>
NO _x = 99 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 IPs govern 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 & SO₂.

National Emission Standards for Hazardous Air Pollutants (NESHAPS):

The facility is a minor source of hazardous air pollutants and no NESHAPs apply.

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.

CAIR NO_x and SO₂ 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 SO₂ 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).

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 3 & 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.

RECOMMENDATIONS:

The facility is in compliance with all applicable regulations of Article XXI and it is recommended that the Operating Permit No. 0580 be issued.