

**ALLEGHENY COUNTY HEALTH DEPARTMENT  
AIR QUALITY PROGRAM**

June 29, 2016

**SUBJECT:** Review of Application  
Title V Operating Permit  
NRG Cheswick Generating Station  
Pittsburgh and Porter Street  
Springdale, PA 15144

**RE:** Operating Permit File No. 0054r  
Cheswick Generating Station

**TO:** Sandra L. Etzel  
Chief Engineer

**FROM:** David D. Good  
Air Quality Engineer

**FACILITY DESCRIPTION:**

The NRG Cheswick Generating Station is an electric generating facility located on Pittsburgh and Porter Streets in Springdale, PA. The plant is composed of one main boiler exhausting to one stack, which fires coal or synfuel as the primary fuel and natural gas as an auxiliary fuel for startup and shutdown. Pollution control equipment for the main boiler includes low NO<sub>x</sub> burners with separated overfire air, electrostatic precipitation with flue gas conditioning, selective catalytic reduction, and flue gas desulfurization. On April 20, 2010 the facility received an amended permit for the installation of a flue gas desulfurization unit. After satisfying the requirements of the installation permit, the operating permit, which was issued on December 30, 2010, has been revised to incorporate those conditions, the new requirements under 40 CFR Subpart UUUUU (National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units), and new requirements from the Cross-State Air Pollution Rule (CSAPR). The plant also has a No. 2 oil fired auxiliary boiler which exhausts to a separate stack and has accepted a 10% annual capacity factor on the unit.

The facility is a major source of sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), particulate matter (PM), particulate matter < 10 microns in diameter (PM-10), particulate matter < 2.5 microns in diameter (PM-2.5), carbon monoxide emissions (CO), volatile organic compounds (VOCs) and hazardous air pollutants (HAPs), as defined in section 2101.20 of Article XXI. The facility is also subject to the acid rain regulations and Cross-State Air Pollution Rule (CSAPR) requirements.

The facility consists of the following emission units:

<b>STACK I.D.</b>	<b>SOURCE DESCRIPTION</b>	<b>CONTROL DEVICE(S)</b>	<b>MAXIMUM CAPACITY</b>	<b>FUEL/RAW MATERIAL</b>
S-001	Main Boiler No.1, Tangentially Fired	Low NOx Burners; ESP with Flue Gas Conditioning; SCR	5,500 MMBtu/hr Rated; 6,000 MMBtu/Hr Maximum	Bituminous and Sub-Bituminous Coal; Synfuel ; Natural Gas (Auxiliary Fuel)
S-002	Auxiliary Boiler, No. 2 Fuel Oil Stoker Fired	None	160 MMBtu/Hr	No. 2 Fuel Oil
N/A	Ammonia Storage Tanks (4 Tanks)	Vapor Recovery/ Bottom Loading	42,000 gallons Each Tank	Aqueous Ammonia (19%)
N/A	Coal Handling and Storage	Fugitive Dust Control Measures	Unloading 1800 tons/hr; Conveying 600 tons/hr	Bituminous and Sub-Bituminous Coal; Synfuel
N/A	Ash Handling, Processing, and Storage	Fabric Filters; Wet Suppression	151,110 tons/yr (Fly Ash) 70,000 tons/yr (Bottom Ash)	Fly Ash; Bottom Ash
N/A	Plant Roads	Wet Suppression; Chemical Treatment; Traffic Speed Control	-	-
N/A	Limestone Handling	Fugitive Dust Controls, Minimum Moisture Content & Maximum Silt Content	392,214 Tons Limestone/yr	Limestone
N/A	Gypsum Handling	Fugitive Dust Controls	576,351 Tons Gypsum/yr	Gypsum
A & B	Limestone Day Silos A and B	Baghouse – Each Silo	1 Day FGD Limestone Throughput	Limestone
N/A	Station Cooling Water Cooling Tower (3 Cells)	Mist Eliminator	13,000 gallons per minute	Make-up Water
N/A	Air Compressors	None	465 Hp (each)	Diesel Fuel
N/A	Facility Space Heaters	None	3.25 MMBtu/Hr - combined	No. 1 or No. 2 Fuel Oil
N/A	Storage Tank	None	150,000 gallons	No. 2 Fuel Oil

## **POTENTIAL EMISSION SUMMARY:**

### **POTENTIAL-TO-EMIT (tons/year)**

<b>Pollutant</b>	<b>Main Boiler No. 1</b>	<b>Auxiliary Boiler</b>	<b>Diesel Air Compressor No. 1 &amp; 2</b>	<b>Portable Water Pump</b>	<b>FGD Limestone Handling</b>	<b>FGD Gypsum Handling</b>	<b>Cooling Towers</b>	<b>Total</b>
PM	982	3.3	0.05	0.25	28.08	12.81	0.17	1027.1
PM10	554	3.3	0.05	0.25	8.11	2.77	0.17	568.7
PM2.5	554	3	0.05	0	8	3	0	568.7
SO <sub>2</sub>	13,911	36.50	0.32	0.50	0.00	0.00	0.00	13,948
NO <sub>x</sub>	5,621	32	3	3	0	0	0	5,659
CO	573	2.93	0.72	3.61	0	0	0.75	581.4
VOC	82	0	0.05	0	0	0	0	82.6
HCl	52.56		-	-	-	-	-	52.6
HF	42.7		-	-	-	-	-	42.7
NH <sub>3</sub>	49.5		-	-	-	-	-	49.5
H <sub>2</sub> SO <sub>4</sub>	187.9		-	-	-	-	-	187.9
Mercury	0.0323							0.0323
Lead	0.313	0.002						0.315

#### **Emission Unit Data:**

See Appendix A

#### **Potential and Allowable Emissions:**

Potential emissions were arrived at by the following:

1. Emissions of PM, PM10, PM2.5, lead and sulfuric acid mist are the potential emissions when the FGD unit has a minimum of three out of five spray banks in operation at all times when the main boiler is in operation.
2. PM10, PM2.5 and sulfuric acid mist emissions are based on the maximum results from stack testing (9/1/2011, 6/12/2013, 9/9/2015) +15% (PM10 & PM2.5) and +25% (H<sub>2</sub>SO<sub>4</sub>), as per Installation Permit No. 0054-I004a.
3. NO<sub>x</sub> emissions were derived from the newest RACT analysis performed by ACHD. The hourly emission rate limit while the SCR inlet temperature is operating at  $\geq 600^{\circ}\text{F}$  is 0.10 lb/MMBtu. The hourly emission rate limit while the SCR inlet temperature is operating at  $< 600^{\circ}\text{F}$  is 0.35 lb/MMBtu.
4. CO emissions are based on AP-42, 1.1-3 plus 15% a maximum boiler rating of 5,500 MMBtu/hr and a coal HHV of 12,706 Btu/lb.
5. SO<sub>2</sub> emissions were derived through air dispersion modeling results to comply with the 1-hour SO<sub>2</sub> NAAQS and a 21% reduction of that result to allow a 24-hour averaging period. Preliminary modeling shows that the maximum hourly SO<sub>2</sub> emission rate that would comply with the 1-hour SO<sub>2</sub> NAAQS for the years 2013-2015 is approximately 4,020 lbs/hr. Using information from the EPA Memorandum titled "Guidance for 1-Hour SO<sub>2</sub> Nonattainment Area SIP Submissions", dated April 23, 2015, the Department has selected

a 24-hour averaging period and reduced the maximum hourly SO<sub>2</sub> emission rate from 4,020 lbs/hr to 3,176 lbs/hr. This also reduces the Main Boiler potential annual SO<sub>2</sub> emissions from their current potential of 33,726 tons/year to 13,911 tons/year.

6. As required by the SO<sub>2</sub> Data Requirements Rule, the Permittee shall perform an air dispersion modeling study in which the results of such study shall yield potential emission limits sufficient to demonstrate compliance with the 2012 SO<sub>2</sub> NAAQS. These limits shall be included in an updated Major Source Permit by January 13, 2017. The preliminary modeling results above will be adjusted and incorporated into the permit after the final modeling study results are approved.
7. VOC emissions are based on AP-42, 1.1-19 plus 15% a maximum boiler rating of 5,500 MMBtu/hr and a coal HHV of 12,706 Btu/lb.
8. HF emissions are based on AP-42, 1.1-15 plus 50% a maximum boiler rating of 5,500 MMBtu/hr and a coal HHV of 12,706 Btu/lb with 80% control applied due to the FGD.
9. HCL and Mercury emissions are based on a maximum boiler rating of 5,500 MMBtu/hr and the MATS emission limits.
10. Ammonia emissions were reduced from 3ppm in installation permit IP No. 0054-I002 to 1ppm.

#### **Fugitive emission sources:**

Coal Handling and Storage  
Ash Handling, Processing, and Storage  
Limestone Handling and Storage  
Gypsum Handling  
Ammonia Storage  
Plant Paved and Unpaved Roads

#### **EMISSION SOURCES OF MINOR SIGNIFICANCE:**

1. Minor emission sources (e.g., vents, drains, connectors, etc.) associated with maintenance activities in the boiler and turbine buildings, machine shop, etc.
2. Minor emissions associated with water and wastewater treatment (vents, storage tanks, equipment components, etc.)
3. Vents, drains, and other equipment associated with the storage and distribution of turbine lube oil, fuel oil, waste oil, solvents, acid, caustic, etc.<sup>(1)</sup>
4. Minor emissions associated with building ventilation and air conditioning, and space heaters
5. Minor emissions associated with fire protection equipment

#### **Note:**

(1) The 150,000 gallon No. 2 fuel oil storage tank (T-008) is listed as an insignificant source on the basis that: 1) it is not subject to 40 CFR 60 Subpart Kb since it was constructed prior to the rule applicability date of June 11, 1973; 2) ACHD §2105.12.b does not apply since No. 2 fuel oil has a vapor pressure below the rule applicability threshold of 1.5 psia under actual storage conditions; and 3) VOC emissions from the tank are insignificant at less than 1.0 ton per year.

#### **EMISSION CONTROL:**

The Main Boiler No. 1 is equipped with low NO<sub>x</sub> burners with separated overfire air and selective catalytic reduction (SCR) for control of nitrogen oxides and an electrostatic precipitator (ESP) with flue gas conditioning (FGC) for the control of particulate matter. The SCR system is used to meet the NO<sub>x</sub> budget requirements during the ozone season and may be used to generate allowances to be used at other facilities.

The Main Boiler No. 1 is also equipped with a Flue Gas Desulfurization (FGD) unit. The FGD unit decreases sulfur dioxide (SO<sub>2</sub>) emissions and significantly decreases the facility potential emissions of PM, PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, HCl, HF and sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>).

The Auxiliary Boiler has no emissions control equipment. The aqueous ammonia storage tanks have vapor recovery and bottom loading for the control of ammonia. The coal handling and storage operations utilize wet suppression for the control of particulate matter. The ash handling, processing, and storage operations use wet suppression and fabric filters for the control of particulate matter. Fugitive particulate matter emissions from vehicular traffic on plant paved and unpaved roads are controlled through watering, chemical treatment, and traffic speed control.

### **TESTING/MONITORING REQUIREMENTS:**

#### **Article XXI §2103.12.h.1 and §2108.02**

The permittee shall perform nitrogen oxides, sulfur oxides, ammonia, particulate matter, PM<sub>10</sub>, PM<sub>2.5</sub>, lead, and mercury emissions testing on Main Boiler No. 1 at least once every two years in order to demonstrate compliance with the emission limitations of this permit. The permittee shall perform HCl, HF, SO<sub>3</sub> and H<sub>2</sub>SO<sub>4</sub> emissions testing at least once every 5 years. Such testing shall be conducted in accordance with applicable U.S. EPA approved test methods, Article XXI §2108.02, and as approved by the Department (§2103.12.h.1; §2108.02). The use of properly calibrated and certified CEMS may be used to demonstrate compliance also.

Emission testing at the outlet of the FGD unit shall be conducted as follows:

- 1) Particulate matter shall be determined by EPA Method 5B.
- 2) PM<sub>10</sub> and PM<sub>2.5</sub> shall be determined by EPA Method 5B and Method 202. All of the filterable PM is assumed to be PM<sub>2.5</sub>.
- 3) Nitrogen oxides shall be determined by any of the EPA methods 7 through 7E.
- 4) SO<sub>2</sub> shall be determined by recently calibrated CEMs.
- 5) SO<sub>3</sub> shall be determined by Department approved methods.
- 6) H<sub>2</sub>SO<sub>4</sub> shall be determined by Department by EPA Method 8.
- 7) HCl and HF shall be determined by Department by EPA Method 26A.
- 8) Lead shall be determined by Department by EPA Method 12.
- 9) Mercury emissions shall be determined by a Department-approved test method
- 10) NO<sub>x</sub>, SO<sub>2</sub> and Hg emissions may be determined by recently calibrated CEMs in lieu of reference test methods.
- 11) All emissions tests shall be conducted with the SCR system in maximum routine operation.
- 12) COM and Method 9 opacity observation data shall be recorded during testing and provided as part of the test report.
- 13) Analyses of representative samples of the coal combusted during each run of the test shall be provided as part of the test report. Each analysis shall include but not be limited to proximate and ultimate analyses, chlorine, fluorine, mercury, and lead content; percent sulfur; heating value; ash content; moisture content.

Notations of visible emissions from coal and ash handling and storage shall be performed once per week during normal daylight operations. A trained employee shall record whether any emissions are observed and whether these emissions extend beyond the facility property line.

#### **ACHD RACT Plan Approval Order and Agreement No. 217, Dated March 8, 1996**

Compliance with the Main Boiler No. 1 24-hour and annual nitrogen oxides emission limitations of this permit shall be determined through use of continuous emissions monitoring data. (RACT Order No. 217, Condition 1.3)

## **ACHD Installation Permit No. 0054-I002**

Emissions testing on Main Boiler No. 1 shall be performed annually to demonstrate compliance with the ammonia emissions limitation of 3 ppm<sub>vd</sub> @ 3% O<sub>2</sub> and the corresponding ammonia emission limits in this permit in accordance with Article XXI §2108.02.d and e. (ACHD IP No. 0054-I002, Condition V.A.2.a, issued June 13, 2001). The permittee shall also monitor the catalytic bed inlet gas temperature, ammonia solution injection rate, and the ammonia solution concentration of the selective catalytic reduction (SCR) system and operate and maintain the SCR equipment and monitoring instrumentation in accordance with the manufacturer's specifications and good air pollution control practice (§2105.03, ACHD IP No. 0054-I002, Condition V.A.3, issued June 13, 2001). The aqueous ammonia storage tanks shall be inspected monthly to assure structural integrity of the tanks and that no leaks are present (ACHD IP No. 0054-I002, Condition V.B.3, issued June 13, 2001).

### **40 CFR Part 75, Continuous Emission Monitoring**

For Main Boiler No. 1 the permittee shall install, certify, operate, and maintain continuous emission monitors per Appendix A of 40 CFR §75 and PADEP Source Testing Manual Revision 8 or approved alternative for opacity, SO<sub>2</sub>, NO<sub>x</sub>, and CO<sub>2</sub> emissions. The permittee must also determine and record the heat input for every hour or part of an hour of any fuel that is combusted per Appendix F of Part 75. (40 CFR §75.10-75.14)

### **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" (CAM) were found to be applicable to the Main Boiler No. 1 as a large emission unit for emissions of PM<sub>10</sub>, due to the electrostatic precipitator for particulate control. A CAM plan was submitted to the Department for the continuous monitoring of PM<sub>10</sub>. The Department has determined CAM for PM<sub>10</sub> to be the use of a wet gas particle analyzer correlated to EPA Reference Method 5B measurements. While Main Boiler No. 1 is equipped with low NO<sub>x</sub> burners/selective catalytic reduction system for NO<sub>x</sub> control, 40 CFR §64.2(b)(iii) specifies that the requirements of Part 64 do not apply to Acid Rain Program requirements pursuant to sections 404, 405, 406, 407(a), 407(b), or 410 of the Act. This emission unit is subject to the NO<sub>x</sub> provisions of the Acid Rain Program and is therefore not subject to Part 64 for NO<sub>x</sub> emissions.

Main Boiler No.1 is also equipped with an electrostatic precipitator (ESP) for particulate matter control and the pre-control particulate matter emissions (as PM<sub>10</sub>) exceed 100% of the amount for classification as a major source. The source shall continue to use an ESP with a COM, and continuously monitor and record opacity and ESP operating parameters to comply with the applicable particulate emission limit. The source shall record and report all deviations associated with the operation of this equipment, including corrective action taken to restore compliance, as required pursuant to Part 70 and Article XXI, Parts B and C.

#### **Title IV Acid Rain Program (Title IV Acid Rain Permit, §2103.22.j, and 40 CFR 72 through 40 CFR 78):**

NO<sub>x</sub> emissions from the Main Boiler shall be limited to 0.45 lb/MMBtu (annual average) and SO<sub>2</sub> emissions shall be limited to 16,924 tons/year (plus or minus based on emissions trading). The SO<sub>2</sub>

allowance allocation is reflective of 16,919 tons, as specified at 40 CFR 73.10, Table 2, Phase II Allowance Allocations for calendar years 2010 and beyond, plus an EPA reallocation transfer of five (5) additional tons. The permittee, as of January 1 of each year, shall hold SO<sub>2</sub> allowances in the unit's compliance account not less than the total annual emissions of SO<sub>2</sub> for the previous year (40 CFR §72.9(c)). A Designated Representative for the facility, for the purposes of the Acid Rain Program, must be identified on a certificate of representation form; and this Designated Representative shall certify all Acid Rain Submissions (40 CFR §72.20-72.24).

**CSAPR NO<sub>x</sub> and SO<sub>2</sub> Trading Programs (40 CFR Part 97):**

The permittee shall comply with all requirements of 40 CFR PART 97 (relating to the Cross-State Air Pollution Rule (CSAPR) NO<sub>x</sub> and SO<sub>2</sub> Emissions Programs). The permittee is subject to the standard requirements of 40 CFR § 97.406, 40 CFR § 97.506 and 40 CFR § 97.606.

**National Emissions Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units (40 CFR PART 63 Subpart UUUUU):**

The requirements for 40 CFR Part 63 Subpart UUUUU were found to be applicable for the Main Boiler Unit No. 1. The Subpart regulates emissions of filterable particulate matter or mercury or non-mercury HAP metals; and hydrogen chloride or sulfur dioxide. The terms and conditions can be found in Section V.M of Operating Permit No 0054r. The facility is currently performing quarterly testing for filterable PM and HCl. A continuous emissions monitor for mercury has been in operation since before the first compliance date of April 16, 2015.

**National Emissions Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial and Institutional Boilers and Process Heaters (40 CFR PART 63 Subpart DDDDD):**

The requirements for 40 CFR Part 63 Subpart DDDDD were found to be applicable for the Auxiliary Boiler. The facility has elected to categorize the Auxiliary Boiler as a "limited-use boiler" and has accepted an annual capacity factor of 10% for the unit. The terms and conditions can be found in Section V.B of Operating Permit No 0054r.

**National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (40 CFR PART 63 Subpart ZZZZ):**

The requirements for 40 CFR Part 63 Subpart ZZZZ were found to be applicable for the two (2) Diesel Air Compressors. The facility has elected to designate the two (2) Diesel Air Compressors as "emergency stationary RICE" and has accepted an annual limit of 500 hours of operation for each unit. The terms and conditions can be found in Section V.K of Operating Permit No 0054r.

**ACHD RACT Plan Approval Order and Agreement No. 217:**

Section 2105.06 of Article XXI requires that RACT be applied to all major sources of NO<sub>x</sub>. Plan Approval Order and Agreement Upon Consent Number 217, dated March 8, 1996, submitted to the US EPA as a site specific SIP revision to Allegheny County's portion of the PA SIP, has established the following NO<sub>x</sub> RACT emission limitations for Main Boiler No. 1:

1. 0.5548 lb/MMBtu (24-hour average);
2. 0.45 lb/MMBtu (annual average); and
3. 10,840 tons/year.

### **ACHD 2008 Ozone RACT Permit:**

The 2008 Ozone RACT Permit has gone out to public comment concurrently with the Title V Permit renewal. A RACT analysis was performed on NRG Cheswick's Main Boiler No. 1 and the Auxiliary Boiler. The RACT Analyses used a 4-step process that included 1) identify control options, 2) eliminate technically infeasible control options, 3) evaluate control options for emission reductions and cost effectiveness, and 4) select RACT. The RACT finding was the use of SCR when the inlet temperature is  $\geq 600^{\circ}\text{F}$  at cost effectiveness of \$60/ton. The new RACT NO<sub>x</sub> emission limits are 0.10 lb/MMBtu while the SCR is operating and 0.35 lb/MMBtu when the SCR is not operational due to low inlet temperature. Please see the draft permit No. 0054-I005 and corresponding technical support document for further information.

### **Article XXI, Presumptive RACT Requirements for the Auxiliary Boiler (§2105.06(d)):**

Section 2105.06 of Article XXI requires that RACT be applied to all major sources of NO<sub>x</sub>. The permittee has requested that the existing 160 MMBtu/hour No.2 oil-fired Auxiliary Boiler be limited in annual capacity such that the requirements of Article XXI, §2105.06.d, *Presumptive RACT for Certain NO<sub>x</sub> Sources*, would apply. As such, the annual heat input to the boiler is limited to less than 140,160 MMBtu per consecutive 12-month period. This is equivalent to an annual capacity factor of 10.00%. Therefore, the permittee shall comply with the applicable requirements of §2105.06.d.2 for Presumptive RACT, as well as §2105.06.g for related record keeping. Such requirements are incorporated into the operating permit for this emission unit.

### **ACHD Operating Permit No. 1065009-003-00100, issued December 8, 1981:**

Operating Permit No. 1065009-003-00100 provides for operating approval of Main Boiler. This approval also requires quarterly reporting of monthly average coal sulfur content and ash content; amount of coal fired each month (tons); maximum measured sulfur content of coal for any sample in each month (mixed coal as fired); and a listing of measured opacity exceedances of the 20% opacity limit and the reasons for such. These requirements are incorporated into the major source operating permit.

### **ACHD Operating Permit No. 1065009-003-00600, issued May 2, 1995:**

Operating Permit No. 1065009-003-00600 provides for operating approval of the Auxiliary Boiler. This approval establishes fuel oil sulfur content at 0.2%; hourly and annual pollutant emission limits; and an exemption from the cold start-up reporting requirements pursuant to §2108.01.d. These requirements are incorporated into the major source operating permit, except the annual pollutant emission limits are streamlined as follows:

### **ACHD Installation Permit No. 93-I-0009-C:**

This permit was issued on 11-19-1993 and contains hourly and annual emission limits for all criteria pollutants based on a rating of 5,280 mmBtu/hr. Conditions from this permit which authorized installation of LNCFS II have been incorporated into the Title V Operating Permit.

### **ACHD Installation Permit No. 0054-I002:**

This permit was issued on 6-13-2001 and contains hourly and annual emission limits for NO<sub>x</sub> and ammonia based on a maximum design rating of 5,500 mmBtu/hr. Conditions from this permit which authorized installation of Selective Catalytic Reduction (SRC) have been incorporated into the Title V Operating Permit.



Ammonia slip from the SCR system on Main Boiler No. 1 shall not exceed 3 ppm<sub>vd</sub> @ 3% O<sub>2</sub> when the boiler is operating under steady state conditions and shall not exceed 10 ppm<sub>vd</sub> @ 3% O<sub>2</sub> at any time (ACHD IP No. 0054-I002, Condition V.A.1.b, issued June 13, 2001). Emissions of ammonia shall not exceed 34 lb/hr or 97.4 tons/year where a year is defined as any 12 consecutive months at any time (ACHD IP No. 0054-I002, Condition V.A.1.c). The operating temperature of the SCR catalyst shall not exceed 810°F (ACHD IP No. 0054-I002, Condition V.A.1.d).

The ammonia storage tanks shall not be loaded or unloaded unless the vapor balancing system is in place and operating properly according to manufacturer's specifications at all times during the operation (ACHD IP No. 0054-I002, Condition V.B.1, issued June 13, 2001).

#### **ACHD Installation Permit No. 0054-I004a:**

Installation Permit No. 0054-I004a issued on April 20, 2010, relating to the installation of a Flue Gas Desulfurization (FGD) unit on the main boiler at the Cheswick Generating Station, has been incorporated into the Operating Permit. Flue gas conditioning adds SO<sub>3</sub> to the flue gas stream after the air heater. The addition of SO<sub>3</sub> helps the ash stick to the ESP plates when the station burns low sulfur coal. When the station combusts high sulfur coal, flue gas conditioning is not required. The flue gas conditioning system is operated at the owner's discretion to optimize the performance of the ESP and is based on the coal composition.

#### **ACHD Installation Permit No. 0054-I004b:**

Installation Permit No. 0054-I004b, relating to the installation of a Flue Gas Desulfurization (FGD) unit on the main boiler at the Cheswick Generating Station, has been put out to public comment concurrently with the Title V Permit renewal. The permit has been revised to incorporate emissions testing results of PM<sub>10</sub>, PM<sub>2.5</sub> and Sulfuric Acid Mist Emissions, as per Installation Permit 0054-I004a Condition Nos. V.A.1.i and V.A.1.j. The hourly SO<sub>2</sub> emission limits were reduced to comply with the SO<sub>2</sub> 1-hour NAAQS and the Data Requirements Rule.

#### **ACHD Determinations**

- 9-9-2011 – Approval to temporarily inject coal additives DUSTREAT-CF9156 and WTSCF-914.**
- 5-4-2011 – Approval to temporarily inject Trona and Hydrated Lime.**
- 12-9-2010 – Approval to temporarily operate without FGD.**
- 11-5-09 – Approval to combust up to 35% Powder River Basin coal.**
- 7-20-09 – Approval for fly ash disposal.**
- 4-21-09 – Approval for injecting magnesium hydroxide for slag and SO<sub>3</sub> control.**
- 4-1-09 – Approval to evaporate non-hazardous solution from boiler chemical cleaning.**
- 3-11-08 – Approval to follow latest revision of PaDEP Continuous Source Monitoring Manual.**
- 5-16-07 – Approval for Trona injection testing.**
- 7-30-02 – Approval for the combustion of Synfuel.**
- 11-14-00 – Exemption of IP3 for replacement cooling tower.**

#### **Article XXI, ACHD Pollutant Emission Standards for Combustion (§2104.02, §2104.03)**

Pursuant to Article XXI, the following pollutant emissions standards apply to the facility:

1. Pursuant to Article XXI, §2104.02, particulate matter (PM) emissions from the Main Boiler are limited to 0.008 lb/MMBtu when combusting natural gas only (§2104.02.a.1.A.); and 0.08 lb/MMBtu when combusting coal only or synfuel (§2104.02.a.2.C.). When combusting coal and natural gas concurrently in the Main Boiler, PM emissions shall not exceed the allowable emissions (lb/MMBtu) calculated by the formula in §2104.02.a.3.

Particulate matter emissions from the Auxiliary Boiler are limited to 0.015 lb/MMBtu (§2104.02.a.1.B).

2. Based on maximum fuel feed rates provided by the permittee, the maximum heat input rates to the Main Boiler are 5,500 MMBtu/hr when firing coal/synfuel; and 1,028 MMBtu/hr when firing natural gas. Therefore, pursuant to Article XXI, §2104.03.a.2.D, sulfur dioxide (SO<sub>2</sub>) emissions from the Main Boiler shall be as follows:
  - a. When combusting coal or synfuel (as bituminous coal fines and binder), the SO<sub>2</sub> emissions shall not exceed 2.8 lb/MMBtu; and
  - b. When combusting natural gas, the SO<sub>2</sub> emissions shall be the potential to emit.

Sulfur dioxide emissions from the Auxiliary Boiler shall not exceed the allowable emissions A (in lb/MMBtu) calculated by the formula  $A = 1.7E^{-0.14}$ , where E = actual heat input in MMBtu/hr. At a heat input rate of 160 MMBtu/hr, the Auxiliary Boiler shall not exceed an SO<sub>2</sub> emission rate of 0.835 lb/MMBtu. (§2104.03.a.2.B.)

Streamlining of Auxiliary Boiler Allowable SO<sub>2</sub> Emission Limits:

Permit No. 1065009-003-00600, issued May 2, 1995, limits SO<sub>2</sub> emissions from the auxiliary boiler to not exceed 133.6 lb/hour and 551.5 tons per year based on the formula provided in the preceding paragraph. This notwithstanding, Permit No. 1065009-003-00600 also specifies a No. 2 fuel oil sulfur content of 0.2% by weight. This fuel oil sulfur limit is equivalent to 41.3 lb/hr and 180.8 tons per year, based on an AP-42 emission factor increased by 15%. The source shall comply with the more stringent emission limits, based on a fuel oil sulfur limit of 0.2% by weight.

**Article XXI, ACHD Particulate Matter Emission Limitations for Materials Handling, Processing, and Storage and Plant Roads (§2104.05, §2104.02.c, and §2105.49)**

Pursuant to Article XXI, the following pollutant emissions standards apply to the facility:

1. Particulate matter emissions from coal handling and processing shall not exceed seven (7) pounds in any 60 minute period or 100 pounds in any 24-hour period, except no person shall be required to reduce emissions to a greater degree than 99 percent (§2104.02.b).
2. Particulate matter emissions from coal crushing, grinding, or screening shall not at any time exceed the rate determined by the following formula (§2104.02.c):

$$A \text{ (lb/hr)} = 0.76E^{0.42},$$

where E = emission index = (F) x (W)

F = 20 lbs/ton feed

W = charge rate (tons/hr)

3. The permittee shall conduct coal and ash handling operations in a manner such that emissions from these operations are not visible at or beyond the facility property line at any time, pursuant to §2104.05. The permittee shall also comply with the visible emission standards of §2104.01.a, as specified in the Site Level section of the permit, whereby the opacity of visible emissions from the coal and ash handling operations, excluding uncombined water, do not:
  - a. Equal or exceed an opacity of 20% for a period or periods aggregating more than three (3) minutes in any sixty (60) minute period; or,
  - b. Equal or exceed an opacity of 60% at any time.

4. Coal handling equipment and storage pile wet suppression systems for PM control shall be in operation and control emissions as specified in the Fugitive Dust Emissions Control Plan submitted to the Department, and as delineated in the major source operating permit.
5. The permittee shall take actions to minimize the potential for fugitive emissions from ash handling and vehicular traffic, including but not limited to, the following: (§2105.49)
  - a. The periodic scraping of fine dust from haul roads;
  - b. The use of water sprays and dust suppressants;
  - c. Tarping of trucks leaving the ash loading area;
  - d. Periodic street sweeping of paved roads; and
  - e. Maintain vehicle speed below ten (10) miles per hour.

### **NON-APPLICABLE REQUIREMENTS**

#### **New Source Performance Standards (§2105.05, 40 CFR Part 60)**

The requirements of the following New Source Performance Standards are not included in the major source operating permit as indicated below:

1. The requirements of 40 CFR Part 60 Subpart D (Standards of Performance for Fossil-Fuel-Fired Steam Generators for Which Construction is Commenced After August 17, 1971), Subpart Da (Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978), and Subpart Db (Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units) are not included in the permit for the Main Boiler No.1 and Auxiliary Boiler because these units were constructed in 1970, prior to the construction commencement applicability dates in the regulations, and there have been no modification or reconstruction approvals issued to the source for these units.
2. The requirements of 40 CFR Part 60 Subpart K (Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973 and Prior to May 19, 1978) and Ka (Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978 and Prior to July 23, 1984) are not applicable to the 150,000 gallon No. 2 fuel oil storage tank because No. 2 fuel oil does not meet the definition of a petroleum liquid.
3. The requirements of 40 CFR Part 60 Subpart Y (Standards of Performance for Coal Preparation Plants) are not included in the permit for the facility's coal handling and storage equipment because the equipment was constructed prior to the regulation's construction commencement applicability date of October 24, 1974, and there have been no modification or reconstruction approvals issued to the source for these units.
4. The requirements of 40 CFR Part 60 Subpart HHHH (Emission Guidelines and Compliance Times for Coal-Fired Electric Generating Units) are not included in the permit for the Main Boiler No.1 and Auxiliary Boiler because a state implementation plan for PA's mercury rule was never finalized. The Clean Air Mercury Rule was vacated on February 8, 2008.
5. The requirements of 40 CFR Part 60 Subpart KKKK (Standards of Performance for Stationary Combustion Turbines) are not included in the permit for the Main Boiler No.1 and Auxiliary Boiler because there are no combustion turbines at this site.

### **Risk Management Program (§2104.08, 40 CFR Part 68)**

The aqueous ammonia storage tanks are not subject to the Risk Management Program requirements of 40 CFR Part 68 because the material they store (19% aqueous ammonia) is not a listed regulated material. Additionally, this plant discontinued using chlorine for waste water treatment activities during 1998 and no longer maintains chlorine storage tanks. The plant currently utilizes 1,000 pound totes of bleach for water treatment activities. Therefore, the requirements of Part 68 are not applicable to this source. However, should the facility, as defined in 40 CFR Part 68.3, become subject to Part 68, then the owner or operator shall submit a risk management plan (RMP) by the date specified in Part 68.10 and shall certify compliance with the requirements of Part 68 as part of the facility's annual compliance certification.

### **REGULATED POLLUTANTS WITH NO ESTABLISHED REGULATORY EMISSION LIMITATION:**

Section 2103.12.a.2.B of Article XXI requires that RACT be applied to pollutants regulated by Article XXI without established regulatory emission limitations. RACT for carbon monoxide and volatile organic compound emissions from the Main Boiler No. 1 have been determined to be proper operation and maintenance of the boiler according to accepted combustion practices. RACT for the pollutants emitted from the Auxiliary Boiler have been determined to be proper operation and maintenance of the boiler according to accepted combustion practices. Therefore, the emission limitations for these pollutants will be the maximum potential emissions under proper operation of the boilers as shown in the above emission summary.

### **METHOD OF COMPLIANCE DETERMINATION:**

Compliance with the boiler emission limitations will be demonstrated by compliance with the maximum fuel usage limitations; fuel certifications; periodic emissions testing and continuous monitoring pollutant and opacity, and record keeping and reporting requirements that include inspection, maintenance and repair data, continuous monitoring data, and monthly fuel usage. Compliance with the fugitive particulate matter emission limitations for the coal and ash handling and storage operations and for plant roads will be demonstrated according to the work practice and fugitive dust control measures established in the facility Fugitive Dust Emissions Control Plan. See the Major Source Operating Permit No. 0054 for the specific compliance methods, record keeping and reporting requirements for the facility.

### **RECOMMENDATIONS:**

The facility is in compliance with all applicable regulations of Article XXI and it is recommended that the Operating Permit No. 0054r be issued.

# **APPENDIX A**

## **Emission Unit Data**

## **Emission Unit Data**

**Unit:** **Main Boiler No. 1**  
**Make:** Combustion Engineering  
**Model:** External Combustion Boiler  
**Type:** Bituminous Coal Tangentially Fired Boiler  
**Max. Capacity:** 6,000 MMBtu/hr (5,500 MMBtu/hr rated capacity) when firing coal and synfuel;  
1,028MMBtu/hr when firing natural gas  
**Date installed:** 1970  
**Primary fuel:** Coal or synfuel (bituminous coal fines and binder)  
**Auxiliary Fuels:** Natural Gas  
**Exhaust** Stack No. 1; 2,200,000 acfm at 285-330<sup>0</sup>F  
**Emission controls:** Low NOx Burners with separated overfire air, Electrostatic Precipitator (ESP) with Flue Gas Conditioning, Selective Catalytic Reduction (SCR), and Flue Gas Desulfurization (FGD)

**Unit:** **Auxiliary Boiler**  
**Make:** Riley  
**Model:** External Combustion Boiler  
**Type:** Oil Fired External Combustion Boiler  
**Max. Capacity:** 160 MMBtu/hr  
**Date Installed:** 1970  
**Fuel:** No. 2 Fuel Oil, 0.2% (wt.) sulfur content  
**Exhaust** Stack No.2; 68,850 acfm at 674<sup>0</sup>F  
**Emission controls:** None

**Unit:** **Ammonia Storage Tanks (4)**  
**Type:** Horizontal Fixed-Roof Storage Tanks  
**Capacity:** 42,000 gallons each  
**Date installed:** 2001  
**Emission controls:** Vapor Balancing and Bottom Loading

**Unit:** **Coal Handling and Storage**  
**Process Description:** Coal Barge Unloading, Coal Conveying, Pile Maintenance and Storage, Indoor Storage, and Crushing Operations  
**Capacity:** 230 tons/hour; 2,014,800 tons/year  
**Date installed:** 1970  
**Emission controls:** Wet Suppression

## **Emission Unit Data**

**Unit:** **Ash Handling, Processing, and Storage**  
Process Description: Fly Ash Handling/Processing (Vacuum Pump Discharge Vents, Fly Ash Silo Dust Collectors, Fly Ash Silo Loadout) and Bottom Ash Handling/Processing (Truck Loading/Unloading, Hopper Loading, Conveying, Stacking, Screening, and Storage Pile Wind Erosion)  
Capacity: Approximately 151,110 tons/year Fly Ash; Approximately 70,000 tons/year Bottom ash  
Date installed: 1970  
Emission Controls: Fabric Filters (Fly Ash Vacuum Pump Discharge Vents and Fly Ash Silo Dust Collectors); Wet Suppression Primarily Used for Fugitive Dust Control

**Unit:** **Plant Roads**  
Process Description: Vehicular Traffic of Plant Paved and Unpaved Roads  
Annual Vehicle Miles: Approximately 37,313 (Paved Roads); Approximately 15,100 (Unpaved Roads)  
Emission controls: Wet Suppression, Chemical Treatment, Road Cleaning, and Traffic Speed Enforcement

**Unit:** **Station Cooling Water Cooling Tower**  
Type: Cross flow forced draft design, consisting of three (3) identical cells  
Capacity: 13,000 gallons per minute  
Date installed: 2000 (Replacement of original cooling tower installed 1970)  
Emission controls: Mist Eliminators

**Unit:** **Facility Space Heaters**  
Type: Seven portable torpedo space heaters, four rated at 0.6 MMBtu/hr each; two rated at 0.35 MMBtu/hr each, and one rated at 0.15 MMBtu/hr  
Capacity: 3.25 MMBtu/hr, combined  
Fuel type: Kerosene  
Emission controls: None

## **APPENDIX B**

### **Potential Emissions**

(Detailed emission calculations are contained in the attached spreadsheets)