

West Virginia Department of Environmental Protection  
Division of Air Quality

# Fact Sheet



## For Final Renewal Permitting Action Under 45CSR30 and Title V of the Clean Air Act

Permit Number: **R30-09900081-2008**  
Application Received: **October 23, 2007**  
Plant Identification Number: **09900081**  
Permittee: **Appalachian Power Company**  
Facility Name: **Ceredo Generating Station**  
Mailing Address: **Ceredo Generating Station**  
**1662 Walker Branch Road**  
**Huntington, WV 25704**

---

Physical Location: Ceredo, Wayne County, West Virginia  
UTM Coordinates: 365.97 km Easting • 4247.45 km Northing • Zone 17  
Directions: Take the Route 52 exit of I-64 and travel south for a very short distance. Turn left onto Airport Road until you reach the Huntington Testing Building. Then turn left to cross the railroad tracks and then turn immediately right on the Walkers Branch Road. Travel 0.8 miles and then turn right at the 3-way stop sign. Travel approximately 1.0 miles and the site is on the left.

---

### Facility Description

The facility is a 510 megawatt (MW nominal rating) peaking power plant. The facility consists of six identical natural gas-fired turbines (Emission Unit ID# 1E - 6E), a single natural gas-fired fuel gas heater (Emission Unit ID# 7E). The fire pump engine is currently not installed. The operation of the gas turbines is simple-cycle.

Each turbine is a General Electric Model MS 7001EA/PG7121(EA) with a nominal output of 85 MW and a maximum heat input of approximately 1,215 MMBtu/hr HHV. The normal operation of the turbines is between 80% and 100% full load. The turbines are equipped with dry low-NO<sub>x</sub> (DLN) combustors (9ppm of NO<sub>x</sub>) and CO oxidation catalysts. The turbines combust only natural gas.

A single fuel gas heater is generally operated concurrently with the gas turbines. The heater is natural gas-fired, with a heat input capacity of approximately 14.2 MMBtu/hr.

## Emissions Summary

<b>Plantwide Emissions Summary [Tons per Year]</b>		
<b>Regulated Pollutants</b>	<b>Potential Emissions</b>	<b>2006 Actual Emissions</b>
Carbon Monoxide (CO)	241.9	17.449
Nitrogen Oxides (NO <sub>x</sub> )	249.0	15.604
Particulate Matter (PM <sub>10</sub> )	83.5	6.289
Total Particulate Matter (TSP)	83.5	6.289
Sulfur Dioxide (SO <sub>2</sub> )	5.1	0.301
Volatile Organic Compounds (VOC)	14.3	1.16
Hazardous Air Pollutants*	7.45	0.561

*PM<sub>10</sub> is a component of TSP.*

\* None of these HAPs are emitted at major source levels.

### Title V Program Applicability Basis

This facility has the potential to emit 249 tons per year (TPY) of NO<sub>x</sub> and 241.9 TPY of CO. Due to this facility's potential to emit over 100 TPY of a criteria pollutant, Appalachian Power Company is required to have an operating permit pursuant to Title V of the Federal Clean Air Act as amended and 45CSR30. This facility is also subject to 40CFR60 (NSPS) requirements, Title IV (Acid Rain) requirements and Clean Air Interstate Rule (CAIR) Trading Programs requirements, and therefore is required to have an operating permit pursuant to Title V of the Federal Clean Air Act as amended and 45CSR30.

### Legal and Factual Basis for Permit Conditions

The State and Federally-enforceable conditions of the Title V Operating Permits are based upon the requirements of the State of West Virginia Operating Permit Rule 45CSR30 for the purposes of Title V of the Federal Clean Air Act and the underlying applicable requirements in other state and federal rules.

This facility has been found to be subject to the following applicable rules:

Federal and State:	45CSR2	To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers.
	45CSR6	Open burning prohibited.
	45CSR10	To Prevent and Control Air Pollution from the Emission of Sulfur Oxides.
	45CSR11	Standby plans for emergency episodes.
	45CSR13	Permits for Construction, Modification, Relocation and Operation of Stationary Sources.
	45CSR16	Standards of Performance for New Stationary Sources Pursuant to 40CFR60.
	45CSR26	NO <sub>x</sub> Budget Trading.

45CSR30	Operating permit requirement.
45CSR33	Acid Rain Provisions and Permits.
WV Code § 22-5-4 (a) (14)	The Secretary can request any pertinent information such as annual emission inventory reporting.
40C.F.R.60 Subpart Dc	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units
40C.F.R.61	Asbestos inspection and removal.
40C.F.R.64	Compliance Assurance Monitoring (CAM)
40C.F.R.72	Permits Regulations.
40C.F.R.73	Sulfur Dioxide Allowance System Permits Regulation.
40C.F.R.74	Sulfur Dioxide Opt-ins.
40C.F.R.75	Continuous Emissions Monitoring.
40C.F.R.76	Nitrogen Oxides Reduction Program.
40C.F.R.77	Excess Emissions.
40C.F.R.78	Appeals Procedure for Acid Rain Program.
40C.F.R.82 Subpart F	Ozone depleting substances.
40C.F.R.60 Subpart GG	Standards of Performance for Stationary Gas Turbines.

State Only: 45CSR4 No objectionable odors.

Each State and Federally-enforceable condition of the draft Title V Operating Permit references the specific relevant requirements of 45CSR30 or the applicable requirement upon which it is based. Any condition of the draft Title V permit that is enforceable by the State but is not Federally-enforceable is identified in the draft Title V permit as such.

The Secretary's authority to require standards under 40 C.F.R. Part 60 (NSPS), 40 C.F.R. Part 61 (NESHAPs), and 40 C.F.R. Part 63 (NESHAPs MACT) is provided in West Virginia Code §§ 22-5-1 *et seq.*, 45CSR16, 45CSR15, 45CSR34 and 45CSR30.

### Active Permits/Consent Orders

Permit or Consent Order Number	Date of Issuance	Permit Determinations or Amendments That Affect the Permit (if any)
R13-2382B	June 30, 2003	
Appalachian Power Company Phase II Acid Rain Permit	December 22, 2005	
Appalachian Power Company NOx Budget Permit	January 14, 2002	
Appalachian Power	May 25, 2007	

Conditions from this facility's Rule 13 permit(s) governing construction-related specifications and timing requirements will not be included in the Title V Operating Permit but will remain independently enforceable under the applicable Rule 13 permit(s). All other conditions from this facility's Rule 13 permit(s)

governing the source's operation and compliance have been incorporated into this Title V permit in accordance with the "General Requirement Comparison Table B ," which may be downloaded from DAQ's website.

## Determinations and Justifications

There were the following changes since the initial Title V Permit was issued:

- 1) **Administrative Amendment AA01** - Deletion of language in condition 4.2.1. that specifies Appendix D, E, and G reporting requirements of 40 CFR 75. Provides more flexibility as additional reporting options are available in 40 CFR 75, other than the three appendixes specified.
- 2) **Minor Modification MM01** - Deletion of language in condition 4.3.1 specifying compliance testing of all the combustion turbines and deletion of all references to Appendix E reporting of 40 C.F.R. 75; and revision of language in condition 4.4.1 to require monthly calculations instead of calculations every fifteen minutes and mass emissions averaged on a monthly basis instead of an hourly basis.
- 3) **Administrative Amendment AA02** - Incorporating a company name change from Twelvecreek LLC to Appalachian Power Company.

Also, the following changes were done to the Permit during this renewal process:

- 1) The "old" **Phase II Acid Rain Permit** (expired on December 31, 2005) was replaced with the current version of the Permit issued on December 22, 2005 (APPENDIX B of the Title V Permit).
- 2) Added applicable **Clean Air Interstate Rule (CAIR) Trading Programs (45CSR39, 45CSR40, 45CSR41)**. The facility has submitted a CAIR Permit Application in accordance with 45CSR§40-6.1.a.1.

The following Table shows applicability of the Programs:

Unit ID	CAIR NO <sub>x</sub> Annual Trading Program per 45CSR39	CAIR NO <sub>x</sub> Ozone Season Trading Program per 45CSR40	CAIR SO <sub>2</sub> Trading Program per 45CSR41
Unit 01 (1E)	X	X	X
Unit 02 (2E)	X	X	X
Unit 03 (3E)	X	X	X
Unit 04	X	X	X
Unit 05	X	X	X
Unit 06 (6E)	X	X	X

Based on the applicability, the following conditions were added to the Permit:

- 1) Section 3.1.10.- CAIR NO<sub>x</sub> Annual Trading Program.
- 2) Section 3.1.11. - CAIR NO<sub>x</sub> Ozone Season Trading Program.
- 3) Section 3.1.12. - CAIR SO<sub>2</sub> Trading Program.

The CAIR application is attached to the Title V Permit as APPENDIX C and becomes the CAIR permit portion of the Title V Permit.

3) Added APPENDIX D to include **Permit R13-2382 Attachments A, B and C** (recordkeeping forms). On the bottom of each form there is language stating “The Certification of Data Accuracy statement on the reverse side of this form must be completed and signed by a responsible official within fifteen (15) days after the end of the calendar month.” Requirement 3.5.1. of the Title V Permit describes what the certification should include, therefore the “The Certification of Data Accuracy statement” is not included on the backside of the forms.

4) **Requirement 5.4.1.** was revised to streamline least stringent requirement in sections 45CSR2-8.3.c., 45CSR2A-7.1.a.1. (monthly fuel consumption recordkeeping) with more stringent one in section 40CFR60-48c(g) (daily fuel consumption recordkeeping).

5) **40CFR64 Compliance Assurance Monitoring (CAM) Plans** - Ceredo Station has six Pollutant Specific Emission Units (PSEU) - Combustion Turbines (Emission Unit ID's are 1E through 6E) with the add-on control devices (CO Catalysts 1C through 6C). These units are subject to CAM Rule because PTE of each of them has potential to be greater than 100 TPY.

**Basis for the determination:** There is a combined operating hours limit of 15,150 hrs/yr for all six turbines (Requirement 4.1.8.), but the fuel consumption limit of  $12 \times 10^9$  scf per year for all turbines (Requirement 4.1.5.) is the limiting factor for emissions. Since the units have been designated as Low Mass Emitting Units (LMEU's), per 40 CFR 75.19 Table LM-5 for pipeline natural gas, the default Gross Calorific Value (GCV) is 1050 btu/scf. Design capacity of each turbine is 1215 MMBtu/hr. Based on the above, combined hours of operation for all six turbines per year are limited to:

$$12 \times 10^9 \text{ scf/yr} \times 1050 \text{ btu/scf} / (1215 \times 10^6 \text{ btu/hr}) = 10,370.4 \text{ hrs/yr}$$

Hourly pre-controlled emission limit for CO per turbine is 94 lbs/hr. Therefore, average annual PTE for CO per turbine is:

$$(10370.4 \text{ hrs} \times 94 \text{ lbs/hr}) / (2000 \text{ lbs/ton}) / 6 = 81.23 \text{ tons} < 100 \text{ TPY.}$$

However, since there are no individual limits for each turbine, it can not be assumed that the annual PTE equals the average PTE, and that it can not be greater than 100 TPY for any given turbine at any given year, therefore CAM rule is applicable for all turbines.

<b>CAM MONITORING APPROACH CRITERIA FOR COMBUSTION TURBINES 1E through 6E</b>		
<i>Pollutant: CO</i>		
I.	<b>Indicator No. 1</b>	Calculated Turbine Exhaust Temperature Median Corrected by Average (Permit Requirement 4.2.4.)
II.	<u>MONITORING APPROACH</u> used to measure the indicators.	Turbine Exhaust Temperature is measured by 18 thermocouples located at each Turbine Exhaust Diffuser, and then used for calculations.

Appalachian Power Company • Ceredo Electric Generating Station

III.	<p><u>INDICATOR RANGE</u> or the procedures for establishing the indicator range which provides a reasonable assurance of compliance</p>	<p>CO oxidation catalysts provide a minimum 50% of destruction efficiency of the CO emissions (Requirement 4.1.6.). To achieve this destruction efficiency the “calculated Turbine Exhaust Temperature Median Corrected by Average” shall be maintained at or above 865 deg F. An excursion is defined if 1-hour average temperature is below 865 deg F. (Permit Requirement 4.2.5.)</p>
IV.	<p><u>PERFORMANCE CRITERIA</u></p>	
A.	<p><u>SPECIFICATIONS FOR OBTAINING REPRESENTATIVE DATA</u>, such as detector location, installation specifications, and minimum acceptable accuracy</p>	<p>18 Thermocouples are located in each Turbine Exhaust Diffusor. Per the exhaust temperature measurement system manufacturer, higher and lower reading of the thermocouples are automatically rejected, then an average temperature (“AT”) is calculated and compared to the median temperature (“MT”) (value of temperature reading of the numeric center thermocouple as they are arranged from highest to lowest), and the deviation of the average to the median (“AT-MT”) is added to the median temperature to determine the Median Corrected by Average Temperature (“MCAT”) (Permit condition 4.2.4.). Therefore,  <math>MCAT = MT + AT - MT = AT</math>                      As shown above, indicator temperature MCAT equals average turbine exhaust temperature AT, therefore the AT can be used as an indicator for simplicity. But since this monitoring has been performed at the facility for the past 5 years, and MCAT is used as an indicator per system’s manufacturer, it was accepted for CAM plan as well for consistency purposes.</p>
B.	<p><u>VERIFICATION PROCEDURES</u>, including manufacturer’s recommendations, <u>TO CONFIRM THE OPERATIONAL STATUS</u> of the monitoring.</p>	<p>This monitoring is not new and has been performed for the past 5 years as required in condition 4.2.3.b. of the Permit.</p>
C.	<p><u>QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC) PRACTICES</u> that are adequate to ensure the continuing validity of the data, (i.e., daily calibrations, visual inspections, routine maintenance, RATA, etc.)</p>	<p>The thermocouples used in the monitoring system are to be accurate within ±1% in degrees Fahrenheit per thermocouple manufacturers published performance criteria.                      Accuracy of the exhaust temperature measurement system output is obtained by automatic rejection of higher and lower reading thermocouples. The maximum number of thermocouples (out of 18) that may be reading improperly is two. This means that if the temperature spread between two thermocouples exceeds approximately 150 deg (depending on other conditions this can vary), a thermocouple alarm is produced. If this alarm persists for four seconds, the alarm will latch and the alarm message "EXHAUST THERMOCOUPLE TROUBLE" will be displayed, and an inspection, evaluation, and corrective actions are initiated. The turbine will automatically shut down if three thermocouples are</p>
V.	<p><u>MONITORING FREQUENCY</u></p>	<p>Continuous</p>
VI.	<p><u>DATA COLLECTION PROCEDURES</u> that will be used</p>	<p>Data will be collected by electronic data acquisition.                      “Calculated Turbine Exhaust Temperature Median</p>

		Corrected by Average” will be collected every minute (Permit condition 4.4.5.)
VII.	DATA AVERAGING PERIOD for the purpose of determining whether an excursion or exceedance has occurred.	“Calculated Turbine Exhaust Temperature Median Corrected by Average” will be <u>calculated and recorded</u> every "clock"- hour excluding startup and shutdown periods. One-hour results will be compared with an “excursion level” of 865 deg F.

The monitoring approach and indicator range in the Table above is based on "Ceredo Generating Station Expected Camet Oxidation Catalyst Performance" data supplied by catalysts manufacturer (BASF), and also on the stack test results. The test was performed per Requirement 4.3.1. on June 22, 2006. It demonstrated compliance with emission limits set in Requirement 4.1.4., and also compliance with minimal Oxidation Catalysts destruction efficiency of 50% set in Requirement 4.1.6. The following CAM requirements were included with the Permit - 4.2.4., 4.2.5., 4.4.5., 4.5.1.

6) **Requirement 5.4.1.:** Per Company's request, recordkeeping of start-up and shut-down times for Fuel Gas Heater was replaced with recordkeeping of operating hours per day since the unit is small and burns natural gas only. Also it starts-up and shuts down automatically during a day which makes it difficult to keep records of start-up and shut down times ; monitoring of sulfur content requirement was streamlined with the Requirement 4.2.2. for fuel sulfur monitoring for combustion turbines provided that certificate of fuel analysis would include all the information required per 40CFR60.48(f)(4), and also based on fact that gas supply from the Fuel Gas Heater goes directly to the combustion turbines.

**Non-Applicability Determinations**

**Requirements 5.2.1. and 5.3.1.** (visual emissions observations and recordkeeping for Fuel Gas Heater 7S) were deleted based on Section 45CSR2-8.4.b. which exempts natural gas only burning units from requirements of Section 45CSR2-8.1.a. (Testing).

**Request for Variances or Alternatives**

**Requirement 4.2.2.** was revised to include custom schedule for monitoring of nitrogen and sulfur content of fuel (natural gas) burned in six turbines. The change was based on approval letters from EPA : Judith Katz, “Re: Request for Custom Fuel Monitoring Schedule under Subpart GG of NSPS” received on May 11, 2001, and Conniesue B. Oldham received on September 19, 2002.

**Insignificant Activities**

Insignificant emission unit(s) and activities are identified in the Title V application.

**Comment Period**

Beginning Date: March 8, 2008  
 Ending Date: April 9, 2009

All written comments should be addressed to the following individual and office:

Natalya Chertkovsky  
 Title V Permit Writer  
 West Virginia Department of Environmental Protection  
 Division of Air Quality  
 601 57<sup>th</sup> Street, SE  
 Charleston, WV 25304

## Procedure for Requesting Public Hearing

During the public comment period, any interested person may submit written comments on the draft permit and may request a public hearing, if no public hearing has already been scheduled. A request for public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing. The Secretary shall grant such a request for a hearing if he/she concludes that a public hearing is appropriate. Any public hearing shall be held in the general area in which the facility is located.

## Point of Contact

Natalya Chertkovsky  
West Virginia Department of Environmental Protection  
Division of Air Quality  
601 57<sup>th</sup> Street, SE  
Charleston, WV 25304  
Phone: 304/926-0499 ext. 1220 • Fax: 304/926-0478

## Response to Comments (Statement of Basis)

The Company didn't have any comments on the Draft Permit, but few corrections for the Fact Sheet. The following changes were made:

1) Determinations and Justifications section, item 4 - corrected Requirement number from 5.3.2. to 5.4.1.;

2) Determinations and Justifications section, item 5 - in the CAM Monitoring Table (Section IV, C) the phrase "Thermocouples are to be certified by manufacturer to be accurate within  $\pm 1\%$ " was replaced with "The thermocouples used in the monitoring system are to be accurate within  $\pm 1\%$  in degrees Fahrenheit per thermocouple manufacturers published performance criteria" to make it consistent with the Requirement 4.2.4.