

COMMONWEALTH OF PENNSYLVANIA
 Department of Environmental Protection
 May 24, 2012

SUBJECT: Review of Operating Permit Renewal Application
 FirstEnergy Generation, LLC
 Bruce Mansfield Power Station
 Shippingport, Butler County

TO: Air Quality Permit File: TVOP-04-00235

FROM: Barbara Hatch, PE *BPH*
 Facilities Permit Chief
 Air Quality Control

THROUGH: *MW* Mark Wayner, PE
 Program Manager
 Air Quality Control

BACKGROUND

FirstEnergy Generation LLC. operates the Bruce Mansfield (BM) Station, located in Shippingport, Beaver County. The Bruce Mansfield plant consists of three 850 megawatt pulverized coal-fired boilers. The Plant was first constructed in the 1970s with Unit 1 beginning commercial operation in 1976, followed by Unit #2 in 1977 and Unit #3 in 1980. Construction on Units #1 & #2 was initiated on June 12, 1971, prior to the applicability date of August 17, 1971, established in 40 CFR 60, Subpart D. Therefore, only Unit #3 is subject to the requirements of Subpart D. Units #1 and #2 exhaust through a 950-foot stack and Unit #3 exhausts through a 600-foot stack. Units #1 and #2 are equipped with a wet venturi scrubber for sulfur dioxide (SO₂) and particulate matter (PM) control, low-nitrogen oxide (NO_x) burners (LNB), separate over-fired air (SOFA), selective catalytic reduction (SCR) for NO_x control, and a sodium bisulfite injection system (SBS) for SO₃/opacity. Unit #3 is equipped with an electrostatic precipitator (ESP) followed by a horizontal weir scrubber for PM and SO₂ control. Unit #3 is also controlled with SCR, low-NO_x burners, over-fired air, and the SBS system. Other sources at this facility include three oil-fired auxiliary boilers each rated at 248 mmbtu/hr, two diesel generators, material storage and handling equipment, and other smaller sources.

PAST APPROVALS/RFDS/DEMINIMIS CHANGES

Plan Approval PA-04-00235A was issued on February 24, 1998, to allow FirstEnergy (Pennsylvania Power Company) to construct a Forced Oxidation Gypsum (FOG) Plant at the Bruce Mansfield Station. The FOG plant is designed to convert the waste generated by Bruce Mansfield's Flue Gas Desulfurization systems (largely calcium sulfite hemihydrate (CaSO₃•½H₂O)) to wallboard quality synthetic gypsum (calcium sulfate dihydrate (CaSO₄•2H₂O)), which is used by a nearby wallboard plant. Testing of the FOG plant was completed after construction was complete, and it was determined that SO₂ emissions from this source were of minor significance. No conditions from

this Plan Approval have been included in the TVOP, and the source has been included in the list of Miscellaneous Sources.

Plan Approval PA-04-00235B was issued on March 26, 2001 to authorize the installation of Selective Catalytic Reduction (SCR) on Units #1 and #2 for reduction of NOx emissions. SCR was used to help BM achieve compliance with NOx Budget Rules. Operation of the SCR on Units #1 and #2 is seasonal, and not required. Conditions from PA-04-00235B were included in the initial TVOP as Alternative Operations for Units #1 and #2.

Plan Approval PA-04-00235C was issued on February 10, 2003 to authorize the installation of SCR on Unit #3, again to reduce NOx emissions and assist in compliance with the NOx Budget Rule. Operation of the SCR on Unit #3 is seasonal, and not required. Conditions from PA-04-00235C have been added to this renewal TVOP as an Alternative Operation for Unit #3.

Plan Approval PA-04-00235D was issued on January 10, 2003 to authorize the installation of SBS injection systems on Units #1, #2 and #3. The facility had been experiencing elevated opacity; it was determined that high levels of SO₃ in the stacks were likely contributing to this problem. After extensive study, the SBS injection was chosen as the optimal method to reduce opacity. The conditions from PA-04-00235D have been included in this renewal TVOP.

The following Requests for Determination (RFDs) and de minimis emission increases as authorized by PA Code Title 25 §127.449 have been processed since the initial TVOP was issued.

	Description	Outcome
RFD-04-00235	Expansion of FOG Plant	Exempted 8/27/2004
RFD-04-00235A	Unit 2 Scrubber Efficiency Improvements/High Pressure Steam Path Turbine Replacement Project	Exempted 5/10/2006
RFD-04-00235B	Unit 3 Scrubber Efficiency Improvements/High Pressure Steam Path Turbine Replacement Project	Exempted 7/23/2007
RFD-04-00235C	Installation of 0.25 mmbtu/hr TOU on Thiosulfite Storage Tank for H ₂ S Control	Exempted 10/12/2010
Demin-04-00235D	Trial of Anti-Slagging Compound	Exempted 2/11/2011
RFD-04-00235E	Replace Coal Crusher and Conveyor	Exempted 5/6/2011

EMISSIONS

This facility has the potential to emit the following type and quantity of air contaminants (on an annual basis): 2,356 tons of carbon monoxide, 49,452 tons of nitrogen oxides, 62,519 tons of sulfur oxides, 10,452 tons of particulate matter, 3.0 tons of volatile organic compounds, 42 tons of ammonia, 5,766 tons of hazardous air pollutants, including 5,115 tons of hydrochloric acid, 639.3 tons of hydrofluoric acid, 1.79 tons of lead, and 707 pounds of mercury, and 21,534,178.5 tons of carbon dioxide equivalents (greenhouse gases). For the calendar year 2011, company reported actual emissions as shown in Table 1 and Table 2 below.

Table 1

SOURCE	CRITERIA POLLUTANTS (2011 Actuals, Tons per Year)					
	CO	NOx	PM10	SOx	VOC	Lead
Unit #1	626	4,397	238	5,936	0.7	0.3
Unit #2	632	3,255	244	7,037	0.7	0.2
Unit #3	551	3,899	262	8,224	0.6	0.1
Aux Boiler 1 (Inactive)	N/A	N/A	N/A	N/A	N/A	N/A
Aux Boiler 2 (Inactive)	N/A	N/A	N/A	N/A	N/A	N/A
Diesel Generator 1 (Inactive)	N/A	N/A	N/A	N/A	N/A	N/A
Fugitive Dust	N/A	N/A	12	N/A	N/A	N/A

Table 2

SOURCE	OTHER POLLUTANTS (2011 Actuals, Tons per Year)									
	Arsenic	Chromium	Formal- dehyde	HCl	HF	Manga- nese	Mercury	Nickel	Selenium	Ammonia
Units #1, #2 and #3	0.6	0.8	0.9	177.3	28.4	0.9	0.1	0.7	2.2	13.8

REGULATORY ANALYSIS

The applicability of the following regulations has been considered for this facility.

40 CFR 63, Subpart UUUUU—National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units

The applicability of 40 CFR 63 Subpart UUUUU - National Emission Standards for Hazardous Air Pollutants emitted from coal- and oil-fired electric utility steam generating units (EGUs) (as defined in § 63.10042 of this subpart) has been evaluated. On February 16, 2012 (77FR9304), EPA promulgated the final rule.

The three coal-fired boilers at the Bruce Mansfield station meet the definition of fossil-fired electric utility steam generating units (EGUs) as defined in § 63.10042: *Fossil fuel-fired* means an electric

utility steam generating unit (EGU) that is capable of combusting more than 25 MW of fossil fuels. To be “capable of combusting” fossil fuels, an EGU would need to have these fuels allowed in its operating permit and have the appropriate fuel handling facilities on-site or otherwise available (e.g., coal handling equipment, including coal storage area, belts and conveyers, pulverizers, etc.; oil storage facilities). In addition, fossil fuel-fired means any EGU that fired fossil fuels for more than 10.0 percent of the average annual heat input during any 3 consecutive calendar years or for more than 15.0 percent of the annual heat input during any one calendar year after the applicable compliance date. A condition requiring permittee to comply with all of the applicable requirements of 40 CFR 63, Subpart UUUUU has been added to the TVOP.

40 CFR 63, Subpart DDDDD—National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters

Finalized on March 21, 2011, 40 CFR 63, Subpart DDDDD applies to ICI boilers and process heaters located at facilities that are major for hazardous air pollutants (HAPs). On May 18, 2011, however, EPA delayed the effective date of this rule “until such time as judicial review is no longer pending or until the EPA completes its reconsideration of the rules, whichever is earlier. (76 FR 28662). The applicability this rule of has been evaluated assuming that there are there will be no substantive changes to the rule when the effective dates are established.

The Bruce Mansfield facility is major for HAPs, and operates 3 industrial boilers rated at 248 mmbtu/hr each. As established in RACT, the TVOP limits the operation of these boilers to no more than 5% of total capacity, which is 438 hours per year. In accordance with the definitions found at 40 CFR 63.7575, a limited-use boiler as one that burns any amount of solid, liquid, or gaseous fuels, has a rated capacity of greater than 10 MMBtu per hour heat input, and has a federally enforceable limit of no more than 876 hours per year of operation. A 150 hp Maintenance Building Boiler rated at less than 10 mmbtu/hr is also operated at this site. All four boilers are subject to the applicable requirements of 40 CFR 63, Subpart DDDDD.

The Subpart DDDDD requirements for limited-use boilers and all new and existing units with a heat input capacity less than 10 mmbtu/hr are the same. The rule establishes a work practice standard instead of numeric emission limits for these sources. As specified in §63.7540, the operator will be required to perform a tune-up for each unit once every 2 years. In accordance with the recordkeeping requirements of 40 CFR 63.7575(d), operator must keep records of monthly fuel use by each boiler or process heater, including the type(s) of fuel and amount(s) used, and keep records of monthly hours of operation by each boiler. These requirements have been added to the TVOP.

40 CFR 63, Subpart ZZZZ—National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

The applicability of 40 CFR 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for stationary reciprocating internal combustion engines (RICE) located at major and area

sources of HAP emissions has been evaluated. Finalized on June 15, 2004, this subpart establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

The Bruce Mansfield facility includes two diesel generators which are RICE. The Station is also a major source of HAPs. Since both engines were installed before December 19, 2002, they are existing stationary RICE under § 63.6590(a)(i). However, both of these engines are also emergency engines. Subpart ZZZZ, §63.6590(b)(3) states “an existing compression ignition stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions ... does not have to meet the requirements of this subpart (ZZZZ) and subpart A of this Part (63). No initial notification is necessary.” In order to demonstrate that the engines are exempt from ZZZZ, records must be kept to show that the engines meet the definition of “emergency stationary RICE.” A requirement to install a non-resettable hour meter on the engine to verify hours of operation has been added to the Operating Permit.

Title 25 Pa Code Sections §§145.201-145.233, Subchapter D

The applicability of 25 Pa Code Sections §§145.201-145.233, Subchapter D (related to CAIR NOx and SO2 Trading Programs) has been evaluated. These sections were adopted by PA DEP on April 11, 2008 and became effective on April 12, 2008. These rules addressed the requirements of EPA’s Clean Air Interstate Rule (CAIR) with some requirements specific to emission sources in Pennsylvania. These conditions superseded the requirements in both the PA Code and also the Federal Code of Regulations which comprised the default CAIR program for Pennsylvania. The requirements in this subchapter, as well as the remaining applicable federal requirements, are known as “PA CAIR.” EPA announced final acceptance of these requirements as a revision to the State Implementation Plan (SIP) for the Commonwealth of Pennsylvania on December 10, 2009.

On December 23, 2008, the US Court of Appeals for the DC Circuit decided that EPA had exceeded its authority under the Clean Air Act in adopting CAIR. The court decision remanded the CAIR rule, and required EPA to develop a rule within a reasonable time, under court guidelines to replace it. However, the CAIR rule was not vacated by this decision. Until the CAIR was replaced, its implementation, including review of modifications of the federal requirements allowed by states, would continue. This allowed EPA to review and approve the requirements for PA CAIR after the date that the CAIR Rule was remanded.

On July 6, 2011, EPA finalized the Cross-State Air Pollution Rule (“CSAPR” or “Transport Rule”) which was intended to replace CAIR and achieve greater reasonable progress towards the goal of achieving natural visibility conditions in Class I areas than the source-specific BART, in those states covered by the Transport Rule. Within this proposed rule, EPA stated that it anticipates the Transport Rule will result in greater emission reductions overall than CAIR. This rule had an effective date of January 1, 2012 and replaced the requirements of PA specific CAIR. However, the United States Court of Appeals for the D.C. Circuit issued an order granting a motion to stay

CSAPR on December 30, 2011. Per this order, "*Respondent [EPA] is expected to continue administering the Clean Air Interstate Rule pending the court's resolution of these petitions for review.*" Final action has not yet been taken on these proposals. Therefore, at this time the Pennsylvania specific rule for CAIR remains in effect and CAIR NOx and SO2 Trading Programs of 25 Pa Code Subchapter D, Sections §§145.201-145.223 and 40 CFR Part 97 Federal NOx Budget Trading Program and CAIR NOx and SO2 Trading Program have been incorporated into the Title V Operating Permit.

Due to the applicability of 25 Pa Code Sections §§145.201-145.233, Subchapter D, the NOx allowance requirements 25 Pa Code Sections §§123.101-123.121 and The NOx Budget Trading Program in 25 Pa Code Sections §§ 145.1- 145.100 Subchapter A has been removed from the TVOP.

40 CFR 51, Subpart P – Protection of Visibility

The applicability of the requirements of 40 CFR 51 Subpart P-Protection of Visibility has been evaluated. The goal of these rules is to minimize the effects of certain units on visibility in Class I areas. The Regional Haze regulation in 40 CFR 51.308(e) requires state implementation plans (SIPs) to contain emission limits representing Best Available Retrofit Technology (BART) for certain facilities that may reasonably be anticipated to cause or contribute to visibility impairment at a Class I area. The BART requirements apply to units that were in existence on August 7, 1977 but were not in operation before August 7, 1962 that have the potential to emit more than 250 tons per year of a visibility impairing pollutant. Visibility impairing pollutants include: NOx, SO2, PM10, and PM2.5. VOC and NH3 may be visibility-impairing pollutants; however the Department has determined that modeling tools to assess the visibility impacts from VOC and NH3 adequately are not available at this time. The BART requirements only apply to facilities in 26 specific categories listed in the Clean Air Act. DEP developed BART analyses for each BART-eligible source in this Region. Bruce Mansfield was included among these. BART for EGUs for NOx and SO2 was determined to be the continued operation of scrubbers. DEP conducted a BART determination for the Bruce Mansfield facility and determined that BART would be the continued compliance with the PA Code Title 25 § 123.11 particulate matter emissions of 0.1 lb/mmBtu. DEP submitted a proposed BART SIP revision to EPA in 2010, and EPA's approval is expected May 31, 2012.

40 CFR Part 98, Mandatory Greenhouse Gas Reporting

This part was promulgated on October 30, 2009. Per 40 CFR 98.2(a), the Greenhouse Gas (GHG) reporting requirements and related monitoring, recordkeeping, and reporting requirements of this part apply to the owners and operators of any facility that is located in the United States and that meets the requirements of either paragraph (a)(1), (a)(2), or (a)(3) of this section. Electricity generation units that are subject to the Acid Rain Program are identified in 40 CFR 98.2(a)(1) of this section. Units at the Bruce Mansfield Station are subject to the Acid Rain Program, therefore the facility is subject to this part. The station is subject to the Greenhouse Gas Reporting Requirements

of 40 CFR Part 98 Subpart C and Subpart D-Electricity Generation for the calendar year 2010 and later years.

However, public comments to the Greenhouse Gas Mandatory Reporting Rule (GHG MRR) questioned whether the requirements of this rule met the definitions of “applicable requirement” found at 40 CFR 70.2 and 71.2. The commentators requested that USEPA confirm their interpretation of the regulations. The EPA provided the following response: “As currently written, the definition of “applicable requirement” in 40 CFR 70.2 and 71.2 does not include a monitoring rule such as today’s action, which is promulgated under CAA sections 114(a)(1) and 208.” The preamble of the final version of the GHG MRR, located at 74 Fed Reg 209, pp. 56287-56288, states that the GHG MRR is not considered an “applicable requirement” under the Title V Operating Permit program. Therefore, this Subpart, while an obligation for the Bruce Mansfield Station, is not considered an applicable condition for this Title V Operating Permit.

Greenhouse Gas Tailoring Rule

This rule refers to the revisions of 40 CFR 52.21 promulgated in May 2010. The revised regulations establish a process for conducting Prevention of Significant Deterioration (PSD) reviews, including Best Available Control Technology (BACT) determinations for control of greenhouse gases (GHG) when a new source or a modification to an existing source results in emissions of GHGs in excess of certain thresholds. Since May, 2010, there have not been any modifications to the Bruce Mansfield facility that triggered a GHG PSD review.

40 CFR 64 - Compliance Assurance Monitoring (CAM)

The applicability of the CAM Rule has been evaluated. Under the CAM regulations, facilities are required to prepare and submit monitoring plans for certain emissions units along with the submittal of the first TVOP renewal application, if applicable. CAM Plans are intended to provide an on-going and reasonable assurance of compliance with emission limits for sources that utilize active control devices. Under the general applicability criteria, this regulation applies to emission units at Title V facilities, that have a source specific emission limit, and that use a control device to achieve compliance with an emission limit and whose pre-controlled emission levels exceed the major source thresholds under the Title V operating permit program.

Units #1, #2 and #3 are located at a TV facility, have emission limits for SO_x, NO_x and PM, and use add-on control devices to achieve compliance with these emission limits. Even after controls, all three units are major for NO_x, SO_x and PM₁₀. In the renewal application received in 2007, FirstEnergy proposed monitoring of scrubber parameters as CAM. However, since that time, all three units were equipped with Continuous Particulate Monitors (CPMs) for tracking emissions of particulate matter. The NO_x, SO_x and PM CEMS constitute CAM for NO_x, SO_x and PM emissions from Units #1, #2 and #3. Therefore, a separate CAM plan has not been included in the renewal TVOP.

40 CFR 68 Subpart B Risk Management Plans

This rule outlines requirements for risk management plans pursuant to Section 112(r) of the Clean Air Act. Applicability of the subpart is determined based on the type and quantity of extremely hazardous chemicals stored at a facility. Permittee uses anhydrous ammonia in the SCR Systems installed on Units #1, #2 and #3. Anhydrous ammonia for the SCR systems is stored in a total of five 46,700 gallon pressurized storage tanks.

In accordance with 40 CFR § 68.130, Table 1, the storage onsite of more than 10,000 pounds of anhydrous ammonia makes this facility subject to the Chemical Accident Prevention Provisions found at 40 CFR Part 68. Therefore, in accordance with 40 CFR § 68.10(a)(3), the owner/operator shall comply with all applicable requirements of 40 CFR Part 68. At this time, DEP has not received delegation from EPA of this program. Owner/operator is required to submit a Risk Management Plan developed in accordance with 40 CFR 68, Subpart G to both DEP and EPA.

Testing Requirements

For the initial Title V permit issuance (circa, 1996) periodic monitoring for compliance with the particulate emission standards of 0.1 pounds per MMBtu established at Pa Code Title 25 § 123.11(a)(3) was typically accomplished through stack testing at least once during the term of permit (every five years). In accordance with the final report issued by DEP on December 22, 2010 entitled "Evaluation of Total Particulate Matter Emissions From Coal-Fired Electric Generation Units," the Department now requires stack testing to demonstrate compliance with the allowable particulate rate from coal-fired EGU boilers to be conducted at least every two years. This requirement has been added to the proposed Operating Permit, along with standardized EGU testing language.

With the promulgation of a PM_{2.5} standard, and the development of a refined test method (OTM-028) for fine particulate, the Department wanted information regarding PM_{2.5} emissions from the largest sources of PM_{2.5}; coal-fired and waste coal-fired electric generating units (EGUs). On January 30, 2009, the owners/operators of 34 coal-fired electric generating units (EGU) and waste coal-fired power plants were notified in writing requesting that source testing for condensable and filterable particulates should be completed by June 30, 2009. The Bruce Mansfield facility was included. Results of data collected as indicate that: CFB EGUs are averaging total particulate at 0.024 lbs/MMBTU with the filterable portion at 0.016 lb/MMBtu (68% of total) and the condensable portion at .008 lb/MMBtu (32% of total), pulverized coal fired EGUs without scrubber controls are averaging 0.114 lb/MMBtu for total particulate with 0.041 lb/MMBtu for the filterable portion (36% of total) and 0.073 lb/MMBtu for the condensable portion (64%), and pulverized coal-fired EGUs with scrubber controls are averaging 0.037 lb/MMBtu for total particulate with 0.025 lb/MMBtu for the filterable portion (67% of total) and 0.012 lb/MMBtu for the condensable portion (33%).

To provide additional quantification of filterable plus condensable particulate emissions, I recommend that testing for filterable PM10, filterable PM2.5 and condensable particulate also be performed every two years. This additional particulate testing requirement also has been added to the proposed Operating Permit. This condition requires testing for filterable PM10, filterable PM2.5, and condensable particulate emissions, also at intervals of every two years, using EPA Test Methods 201A and 202, or Department approved equivalent.

PA Code Title 25 § 121 through 145

Pennsylvania regulations related to fugitive emissions, particulate matter emissions, sulfur compound emissions, odor emissions, open burning and RACT, among others, apply to this facility and are included in the TVOP renewal.

CONCLUSIONS AND RECOMMENDATIONS

On May 22, 2007, the Department received from FirstEnergy a renewal Title V Operating Permit Application for the continued operation of three coal-fired boilers at their facility located in Shippingport Boro, Beaver County. FirstEnergy complied with the municipal notification requirements contained in 25 Pa. Code §127.413: municipal notification was received by Shippingport Borough and by Beaver County on May 23, 2007. A fee of \$750 was included as required under 25 Pa. Code §127.704 (b)(3). The application was determined to be administratively complete on July 18, 2007.

On March 22, 2012, a compliance inspection was performed by Mr. Richard Kilpatrick, Air Quality Specialist. Mr. Kilpatrick did not note any violations at time of his inspection.

The proposed Title V Operating Permit will be submitted to FirstEnergy for their review, along with a notice to be published in the local newspaper for three separate days. The Notice of Intent to Issue the permit will be published in the Pa. Bulletin for a 30 day comment period. The proposed operating permit and memo will also be submitted to EPA for a 45 day comment period.

It is my recommendation based on my review that the Title V Operating Permit renewal for the Bruce Mansfield facility be issued.