VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Valley Regional Office

INTRA-AGENCY MEMORANDUM

4411 Early Road - P. O. Box 3000 Harrisonburg, VA 22801-3000

Permit Writer	*-signed original-*		**Date**	*June 13, 2014*
Air Permit Manager	*-signed original-*		**Date**	*June 13, 2014*
Memo To	Air Permit File			
Facility Name	Virginia Electric and Power Company – Warren County Power Station			
Registration Number	81391			
County-Plant I.D.	187-0041			
UTM Coordinates (Zone 17)	744.61	**Easting (km)**	4317.04	**Northing (km)**
Elevation (feet)	570			
Distance to Nearest Class I Area (select one)	7.1	**SNP (km)**	187	**JRF (km)**
FLM Notification Required (Y/N)	Y			
AIRS Classification (A, SM, B)	A	**Before permit action**	A	**After permit Action**
Pollutants for Which the Source is Title V Major	NO_x, CO, PM-10, PM-2.5, VOC, GHG	**Before permit action**	NO_x, CO, PM-10, PM-2.5, VOC, GHG	**After permit Action**
PSD Major Source (Y/N)	Y	**Before permit action**	Y	**After permit Action**
Pollutants for Which The Source is PSD Major	NO_x, CO, PM-10, PM-2.5, VOC, H_2SO_4	**Before permit action**	NO_x, CO, PM-10, PM-2.5, VOC, H_2SO_4	**After permit Action**

I. Introduction

The Virginia Electric and Power Company – Warren County Power Station (Dominion) is a combined-cycle electric power generating facility located at the Warren Industrial Park, in Warren County. The facility has a nominal generating capacity of 1280 megawatts (MW) at ISO (International Organization for Standardization) conditions.

Dominion is authorized to operate the electric power generating facility under a Prevention of Significant Deterioration (PSD) permit issued on December 17, 2010, as amended October 24, 2013. This permit allows the facility to operate three combined cycle power generating units. The October 24, 2013 permit amendment allowed changes in the auxiliary equipment at the facility.

On September 3, 2013, the Virginia Department of Environmental Quality (DEQ), Valley Regional Office (VRO), received a permit application from Dominion dated August 29, 2013. The permit application requests changes to the sulfur content of the natural gas. Supplemental information regarding particulate matter emissions was received via electronic mail on November 7, 2013, and December 3, 2013; supplemental information regarding modeling, dated January 9, 2014, was received on January 14, 2014. The permit application was deemed complete on January 14, 2014. A detailed description of this request is in Section II, below.

The permit application fee was processed by the Treasurer of Virginia on September 12, 2013.

II. Emission Unit(s) / Process Description(s)

Dominion is currently permitted to operate the following natural gas-fired equipment under the PSD permit dated December 17, 2010, as amended October 24, 2013:

- three combined-cycle power generating units (T-1, T-2, & T-3) where each unit includes the following emission units:
    - one Mitsubishi natural gas-fired combustion turbine (CT) generator, Model M501 GAC, rated at 299,600 kW and 2,996 million Btu per hour heat input (MMBtu/hr); and
    - one heat recovery steam generator (HRSG) with supplementary natural gas-fired duct burners (DB), each duct burner with a design rating of 500 MMBtu/hr when firing natural gas;
- one natural gas-fired auxiliary boiler, rated at 47.6 MMBtu/hr (B-1); and
- one natural gas-fired fuel gas heater, rated at 24.0 MMBtu/hr(GH-1).

The facility proposes changes to the sulfur content limitation for natural gas in the PSD permit dated December 17, 2010, as amended October 24, 2013. The facility proposes to increase the permitted sulfur content of the natural gas. The current permit limits the maximum sulfur content of the natural gas to 0.0003 percent by weight (i.e., 0.1 grain or less of total sulfur per 100 standard cubic feet).

Columbia Gas Transmission, LLC (Columbia Gas) owns and operates an interstate natural gas pipeline company with an extensive pipeline network throughout multiple regions of the United States. Columbia Gas has been contracted by Dominion to provide natural gas to the Warren County Power Station through a new pipeline, which is connected to the existing Columbia Gas pipeline.

Columbia Gas provided Dominion with natural gas sulfur content data from locations in the distribution system that are representative of, or would influence the quality of the natural gas delivered to the Warren County Power Station.

In addition to the data provided by Columbia Gas, samples of the natural gas were taken near the Warren County Power Station and analyzed to determine the sulfur content of the natural gas in the pipeline at the time of sampling. Samples of the natural gas, in addition to the data provided, indicate a wide distribution of sulfur contents, many of which are greater than the currently permitted sulfur contents. Information and sample data is provided as part of the Dominion application. A statistical analysis of the natural gas content is provided in Table 1:

Table 1: Natural Gas Sulfur Content Statistical Analysis

Influence	Percentile Value (gr/100 scf)		
	90%	**95%**	**99%**
Columbia – Marcellus	0.397	0.465	0.596
Columbia – Minor Region	0.286	0.337	0.450
Columbia – Current / Strasburg Samples	0.224	0.290	0.459
Transco – Odorized	0.394	0.402	0.417
Average	0.325	0.374	0.481

Based on the data, the facility has requested the permitted sulfur content of the natural gas be changed to the following:

- A short-term sulfur limit equivalent to 0.50 gr/100 scf, based on an average of the 99th percentile values; and
- A 12-month rolling average equivalent to 0.32 gr/100 scf, based on an average of the 90th percentile values.

There are no changes to the fuel throughputs for the natural gas-fired equipment as part of this permit action.

Pollutants of concern from the proposed changes to the sulfur content of the natural gas are sulfur dioxide (SO_2) and sulfuric acid mist (H_2SO_4). Emissions of SO_2 from

combustion turbines are a result of oxidation of fuel sulfur. Sulfuric acid mist emissions (SO_3/H_2SO_4) result from oxidation of fuel sulfur as well as oxidation of SO_2 by the duct burners and catalysts used for NO_x, CO, and VOC control. The amount of SO_2 and sulfuric acid mist formation is directly proportional to the amount of sulfur present in the fuel.

The increase of sulfur in the natural gas also has the potential to effect emissions of particulate matter (PM, PM-10, and PM-2.5) through the formation of sulfates and H_2SO_4; the facility submitted supplemental information via electronic mail on November 7, 2013 addressing the effect of the sulfur content on emissions of particulate matter. The submitted information provides predicted emissions compiled by the manufacturer based on the design of the turbines under various operating scenarios. In addition to the predicted emissions, the facility also provided the assessments in conjunction with stack test data from two similar facilities (Bear Garden, located in Buckingham County, Virginia, Registration Number 32004; and Fairless Power Station located in Fairless Hill Pennsylvania) showing the predicted and observed filterable PM emissions are not affected by the natural gas sulfur content. The supplemental information supports the facility's assertion that the current particulate matter emission (PM-10 and PM-2.5) limitations can still be met with the increased natural gas sulfur content, and the approach used to estimate particulate emissions in the PSD permit, dated December 17, 2010, as amended October 24, 2013, will still account for the particulate matter from the sulfur increase. There are no proposed changes to the particulate matter emission limitations in the permit. The permit (dated December 17, 2010, as amended October 24, 2013) requires stack testing for PM-10 and PM-2.5 emissions; the required stack testing provides a means of demonstrating compliance with the particulate matter emission limitations. The stack testing requirements are discussed in Section VIII below.

III. Regulatory Review

A. 9 VAC 5 Chapter 80, Article 6 - Minor New Source Review

The emission units are under construction and have not been operated. Hence, the proposed changes to the sulfur content of the natural gas will be reviewed as a re-evaluation of the initial minor New Source Review. Only emissions of SO_2 and H_2SO_4 are changing as a result of this permit action; only those emissions are evaluated for minor NSR permitting applicability.

As shown in Section III.B (below), emissions of H_2SO_4 exceed the Prevention of Significant Deterioration (PSD) significance thresholds, and are therefore evaluated under the PSD program in accordance with 9 VAC 5-80-1100 H.

Only SO2 is considered for minor NSR permitting applicability as there are no changes to emissions for other pollutants (PM10, PM2.5, CO, NOx and VOC) and these pollutants continue to be subject to PSD.

A complete analysis of the minor NSR permitting applicability for all other pollutants is available as part of the 12/17/2010 PSD engineering analysis, and the 10/24/2013 minor NSR/PSD engineering analyses.

The uncontrolled emission rate increase (UER) of criteria pollutants to determine minor New Source Review (NSR) permitting applicability is evaluated for the proposed permit action. The UER for criteria pollutants is evaluated as the sum of the new uncontrolled (NU) emissions minus the sum of current uncontrolled (CU) emissions. Since the equipment has not operated the CU emissions are conservatively assumed equal to zero. The difference between the sum of the NU emissions and the sum of the CU emissions are compared to the exemption levels in 9 VAC 5-80-1105 C for new sources.

NU emissions of SO_2 for minor NSR applicability are based on the conversion of the sulfur from the fuel to SO_2, assuming a 100 percent conversion rate as a conservative estimate. NU emissions from the affected equipment are also calculated as the worst case emissions. NU emission calculations assume operation of each unit for 8760 hours per year with a natural gas sulfur content of 20 grains per 100 dry standard cubic feet.

The UER calculations are shown in Table 2 below:

Table 2: Minor NSR Uncontrolled Emission Rate Increase Calculations

Pollutant	NU (tons/yr)	CU (tons/yr)	UER (tons/yr)	Exemption Rate * (tons/yr)	Exempt from Minor NSR Permitting?
SO_2	258.85	0	258.85	40	*No*

* Exemption rates taken from 9 VAC 5-80-1105 C for new sources.

As shown in Table 2, the UER for the project triggers minor NSR permitting for SO_2. Detailed calculations are provided in Attachment A.

B. 9 VAC 5 Chapter 80, Article 8 - PSD Major New Source Review

Applicability of Article 8 permitting requirements to the project is evaluated in accordance with 9 VAC 5-80-1605, on a pollutant-specific basis. 9 VAC 5 Chapter 80 Article 8 defines "significant" emissions increase levels for several regulated pollutants; pollutants for which the proposed net emissions increase or the potential to emit exceeds significant levels are subject to PSD review.

Since the emission units are under construction and have not begun to operate, the proposed project is evaluated as update/re-evaluation of initial PSD evaluation. Since sulfur dioxide (SO_2) and sulfuric acid mist (H_2SO_4) are the only pollutants affected by the proposed project, only these pollutants were evaluated[1]. There are

[1] The increase of sulfur in the natural gas also has the potential to effect emissions of particulate matter (PM, PM-10, and PM-2.5) through the formation of sulfates and H_2SO_4; the facility submitted supplemental information via

no changes to emissions for other pollutants (PM10, PM2.5, CO, NOx and VOC) and PSD evaluation for these pollutants during the initial PSD evaluation remains valid (see engineering memo associated with initial PSD Permit issued on 12/17/2010, and the 10/24/2013 amendment).

Potential to Emit (PTE) emissions are calculated for each unit based on the permitted throughputs, which will remain unchanged following the proposed fuel change, and the revised allowable fuel sulfur content. Baseline Actual Emissions (BAE) are assumed equal to zero. The discussion below provides a summary of the calculation methods for the PTE calculations for Article 8 permitting applicability.

Hourly emissions from each combustion source (Ref. T-1, T-2, T-3, B-1, and GH-1) are based on the proposed short-term natural gas sulfur limit, equivalent to 0.50 gr/100 scf. The short-term natural gas sulfur limit is equivalent to the average of the 99th percentile sampling values.

Annual emissions from each combustion source are based on the proposed 12-month rolling average natural gas sulfur limit, equivalent to 0.32 gr/100 scf. The 12-month rolling average natural gas sulfur limit is equivalent to the average of the 90th percentile sampling values.

Specific information for the calculation of each type combustion source is provided in the Attachment B.

Combined Cycle Turbines

Detailed calculations are provided in Attachment B. Hourly and annual emissions for the combined cycle turbines (T-1, T-2 and T-3) are shown in Table4.

Table 4: Emissions from Combined Cycle Turbines (T-1, T-2, T-3)

Pollutant	Individual Turbine		Three Turbines Combined	
	(lbs/hr)	(tons/yr)	(lbs/hr)	(tons/yr)
SO_2	4.89	13.09	14.67	39.28
H_2SO_4	4.39	10.18	13.16	30.54

Combined emissions for the proposed changes are provided in Table 6 below.

electronic mail on November 7, 2013 addressing the effect of the sulfur content on emissions of particulate matter. The supplemental information supports the facility's assertion that the current particulate matter emission (PM-10 and PM-2.5) limitations can still be met with the increased natural gas sulfur content, and the approach used to estimate particulate emissions in the PSD permit, dated December 17, 2010, as amended October 24, 2013 (including air quality analyses to address NAAQS, visibility and other air quality related values), will still account for the particulate matter from the sulfur increase. The supplemental information addressing particulate emissions is included in Attachment F. Please note that the updated modeling includes PM-2.5 secondary emissions associated with the increase of sulfur content of the natural gas (See Attachment E for the updated modeling report).

Auxiliary Boiler and Fuel Gas Heater

Detailed calculations are provided in Attachment B. Hourly and annual emissions for the auxiliary boiler (B-1) and fuel gas heater (GH-1) are shown in Table 5.

Table 5: Emissions from Auxiliary Boiler and Fuel Gas Heater (B-1 and GH-1)

Pollutant	Auxiliary Boiler (B-1)		Fuel Gas Heater (GH-1)	
	(lbs/hr)	(tons/yr)	(lbs/hr)	(tons/yr)
SO2	6.66E-02	1.87E-01	3.36E-02	9.41E-02
H_2SO_4	5.10E-03	1.43E-02	2.57E-03	7.21E-03

Combined Emissions

A summary of combined estimated annual emissions from the proposed changes, showing the contribution from each emission unit, is shown in Table 6.

Table 6: Facility –wide Emissions Summary

Pollutant	PTE (tons/yr)	BAE (tons/yr)	NEI = PTE – BAE (tons/yr)	Significance Levels (tons/yr)	Significant?
SO2	39.56	0	39.56	40	No
H_2SO_4	30.57	0	30.57	7	Yes

Emissions of SO_2 are less than the significance levels and are therefore not subject to PSD review as a result of the proposed changes to the sulfur content of the natural gas.

Although emissions of SO_2 are not subject to PSD review as a result of the Actual-to-Potential Net Emissions Increase calculation, in accordance with the definition of significance in 9 VAC 5-80-1615, an impact analysis is required for any actual emissions increase from a source located within 10 kilometers (km) of a Class I federal area for comparison with the significance threshold of 1 $\mu g/m^3$. Since the facility is approximately 7.1 km from the Shenandoah National Park (SNP), an impact analysis is required for the proposed project. The facility submitted Class I Area PSD Modeling for SO2 emissions; this modeling used AERMOD and was based on the SO2 emissions associated with the increase in natural gas fuel sulfur content change. The modeling analysis demonstrated that the proposed project does not have an impact equal to or greater than 1 $\mu g/m^3$ on a 24-hour basis in the Shenandoah National Park. The modeling results indicate that the highest 24-hour predicted concentration at any receptor within the Shenandoah National Park is 0.93 $\mu g/m^3$; therefore the proposed project does not trigger PSD review for SO_2.

Similar to the initial PSD review, potential emissions of sulfuric acid mist (H_2SO_4) following the proposed project exceed the significance levels in 9 VAC

5-80-1615 C as shown in Table 6 above. As a result of this, the facility is required to submit an updated BACT analysis and revised air quality analyses for sulfur deposition. The updated BACT analysis is described in Section IV. The revised air quality analyses are described in Section VI.

Please refer to Section XIII for details concerning Federal Land Manager (FLM) review of the proposed changes.

The existing PSD permit will be amended as per Significant Amendment procedures specified in 9VAC5-80-1955. As described above, the BACT for H_2SO_4 is evaluated under the significant amendment procedures.

C. 9 VAC 5 Chapter 80, Article 7 – New and Reconstructed Major Sources of HAP

Total potential HAP emissions from the facility prior to the changes are 21.8 tons per year; the single HAP having the highest PTE is hexane at 6.6 tons per year. Major source thresholds for HAPs are 10 tons per year for an individual HAP or 25 tons per year total HAPs. Accordingly, Dominion - Warren is not a major source of HAP; the facility is an area source of HAP.

There are no HAP emission increases associated with this permit action. Therefore, 9 VAC 5 Chapter 80, Article 7 requirements are not applicable.

D. 9 VAC 5 Chapter 50, Part II, Article 5 – NSPS

Combustion Turbines (Ref. T-1, T-2, T-3)
40 CFR 60, Subpart KKKK, Standards of Performance for Stationary Combustion Turbines applies to the combustion turbines (Ref. T-1, T-2, T-3). All requirements from the Subpart are included in the already included in the permit; there are no changes to the Subpart requirements with this permit action.

Auxiliary Boiler (Ref. B-1) and Fuel Gas Heater (Ref. GH-1)
40 CFR 60, Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units applies to the auxiliary boiler (Ref. B-1) and fuel gas heater (Ref. GH-1). The applicable requirements from the regulation have already been incorporated into the permit there are no changes to the Subpart requirements with this permit action.

There are no additional NSPS that apply to the equipment at the facility.

E. 9 VAC 5 Chapter 60, Part II, Article 1 - NESHAPS

Currently, there are no NESHAPS that apply to the equipment at the Warren County Power Station.

F. 9 VAC 5 Chapter 60, Part II, Article 2 - MACT

Combustion Turbines (Ref. T-1, T-2, T-3)
40 CFR 63, Subpart YYYY, National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines does not apply to the combustion turbines at Dominion Warren, as the facility is not a major source of HAPs.

Auxiliary Boiler (Ref. B-1) and Fuel Gas Heater (Ref. GH-1)
40 CFR 63, Subpart JJJJJJ, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers at Area Sources does not apply to the boiler (Ref. B-1) and fuel gas heater (Ref. GH-1). The units are not subject to the MACT in accordance with 40 CFR 63.11195 (e).

There are no additional MACT standards that apply to the facility.

G. 9 VAC 5 Chapter 40, Part II – Existing Source Regulations

9 VAC 5 Chapter 40, Article 1 – Visible Emissions and Fugitive Dust/Emissions (Rule 4-1) is applicable to the facility; however the PSD permit provides more stringent requirements than the existing emissions standards in Rule 4-1.

9 VAC 5 Chapter 40 Article 8 – Fuel Burning Equipment (Rule 4-8) is applicable to the boilers and generators at the facility; however the PSD permit provides more stringent requirements than the existing emissions standards in Rule 4-8.

IV. Best Available Control Technology Review (BACT): 9 VAC 5-50-280 for PSD and 9 VAC 5-50-260 for Minor New Source Review

PSD permit review includes a rigorous analysis of Best Available Control Technology (BACT). PSD applicants are required to provide a "top down" analysis of all technically and economically feasible control technologies. The applicant is required to employ the most stringent level of control that cannot be demonstrated to be either technically or economically infeasible. Economic feasibility takes into consideration the cost of controls required at similar recently permitted facilities.

PSD BACT: Sulfuric Acid Mist Emissions

Sulfuric acid mist emissions (SO_3/H_2SO_4) result from oxidation of fuel sulfur as well as oxidation of SO_2 by the duct burners and catalysts used for NO_x, CO, and VOC control. Sulfuric acid mist emissions (SO_3/H_2SO_4) are based on an eight percent conversion of SO_2 to SO_3 by the combustion turbines and duct burners.

Emissions of SO_2 from the auxiliary boiler and fuel gas heater are a result of oxidation of fuel sulfur. Sulfuric acid mist emissions (SO_3/H_2SO_4) are based on a five percent conversion of SO_2 to SO_3 by the boiler and heater.

The use of flue gas desulfurization is not technically feasible because the SO_2 emissions from the proposed combustion turbines are two orders of magnitude lower than emission rates achievable using flue gas desulfurization.

The only technically feasible method for sulfuric acid mist emission control is the use of low sulfur fuels. The use of pipeline natural gas is the top level of control for H_2SO_4; emissions of H_2SO_4 vary based upon the sulfur content of the natural gas supply as shown in Table 1. The amount of sulfuric acid mist formation is directly proportional to the amount of sulfur present in the fuel. The applicant proposes to use only natural gas in to control sulfuric acid mist emissions. DEQ considers the proposed limit and the use of natural gas as a fuel acceptable as BACT for sulfuric acid mist.

Dominion proposed the following sulfuric acid mist emission rates based on a natural gas heating value of 1,020 Btu/scf for each of the Mitsubishi M501 GAC combustion turbines:

Sulfuric Acid Mist
- 0.00066 lb/MMBtu without duct burner firing
- 0.0013 lb/MMBtu with duct burner firing

Emissions for the auxiliary boiler (B-1)* are:

Sulfuric Acid Mist
- 0.0051 lb/hr
- 0.014 tons/yr

Emissions for the fuel gas heater (GH-1)* are:

Sulfuric Acid Mist
- 0.0026 lb/hr
- 0.0072 tons/yr

* Since emissions of H_2SO_4 are each below 0.5 tons per year for the auxiliary boiler and fuel gas heater, emission limitations for the pollutants are not included in the permit, per DEQ policy.

It should be noted that SO_2 emissions are not subject to PSD review (as indicated in Section III.B); however, SO_2 emissions are subject to State BACT in accordance with 9 VAC 5-50-260. State BACT for SO_2 is the use of low-sulfur pipeline natural gas, and the short-term, hourly and annual emission limits established above.

The use of each duct burner (DB1, DB2, and DB3) is limited to 6,000 hours of operation per year. The hourly limitation, supported through recordkeeping for each duct burner (DB1, DB2, and DB3) establishes a means to demonstrate compliance with the emission limitations contained in the permit.

State BACT: Sulfur Dioxide Emissions

Emissions of SO_2 from combustion turbines are a result of oxidation of fuel sulfur.

The use of flue gas desulfurization is not technically feasible because the SO_2 emissions from the proposed combustion turbines are two orders of magnitude lower than emission rates achievable using flue gas desulfurization.

The only technically feasible method for SO_2 emission control is the use of low sulfur fuels. The use of pipeline natural gas is the top level of control for SO_2; emissions of SO_2 vary based upon the sulfur content of the natural gas supply as shown in Table 1. The amount of SO_2 formation is directly proportional to the amount of sulfur present in the fuel. The applicant proposes to use only natural gas in the CTs, auxiliary boiler, and fuel gas heater to control SO_2. DEQ considers the proposed limit and the use of natural gas as a fuel acceptable as BACT for SO_2.

Dominion proposed the following SO_2 emission rates based on a natural gas heating value of 1,020 Btu/scf for each of the Mitsubishi M501 GAC combustion turbines:

SO_2
- 0.0014 lb/MMBtu
- 4.89 lb/hr

Emissions for the auxiliary boiler (B-1)* are:

SO_2
- 0.066 lb/hr
- 0.19 tons/yr

Emissions for the fuel gas heater (GH-1)* are:

SO_2
- 0.0034 lb/hr
- 0.094 tons/yr

* Since emissions of SO_2 are each below 0.5 tons per year for the auxiliary boiler and fuel gas heater, emission limitations for the pollutants are not included in the permit, per DEQ policy.

It should be noted that SO_2 emissions are not subject to PSD review (as indicated in Section III.B); however, SO_2 emissions are subject to State BACT in accordance with 9 VAC 5-50-260.

As previously mentioned, the use of each duct burner (DB1, DB2, and DB3) is limited to 6,000 hours of operation per year. The hourly limitation, supported through recordkeeping for each duct burner (DB1, DB2, and DB3) establishes a means to demonstrate compliance with the emission limitations contained in the permit.

V. Summary of Permitted Allowable Emissions (Increases or Decreases)

A summary of the combined previously permitted emissions of SO_2 and H_2SO_4 are compared to the proposed emissions of SO_2 and H_2SO_4 is provided in the following table; detailed calculations are provided in Attachment D.

Table 7: Summary of Changes in Emissions

Pollutant	Previously Permitted (12/17/10 Permit, as amended 10/24/13)		Proposed Project		Change in Emissions	
	(lbs/hr)	(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)	(tons/yr)
SO_2	2.99	12.39	14.80	39.57	+11.81	+27.17
H_2SO_4	2.69	9.51	13.17	30.57	+10.48	+21.06

VI. Dispersion Modeling

The facility submitted a copy of the air quality modeling report and air quality modeling files, dated January 9, 2014, and received by the VRO on January 14, 2014; electronic copies of the modeling report and modeling files were submitted to the Office of Air Quality Assessments (AQA) on January 10, 2014. The AQA reviewed the facility's modeling report and associated modeling files, and provided a technical review on January 21, 2014. The AQA report determined that the updated results of the air quality analyses for the facility, for both Class I and Class II PSD areas, demonstrate compliance with all applicable state and federal air quality standards. A copy of the facility's modeling report, the AQA's modeling memo, and the modeling files were sent to the Federal Land Managers for review on January 21, 2014. On February 20, 2014, John Notar of the National Park Service indicated by email that NPS concurs with DEQ's conclusion that sulfuric acid deposition within SNP resulting from the proposed change is below the FLAG Deposition Analysis Threshold (DAT) and concludes "Therefore, the NPS agrees with the State of Virginia to allow the increase in the sulfur content of the natural gas fired by the Warren County Power Station."

A copy of the AQA's dispersion modeling report is included as Attachment E; the facility's modeling report and modeling files are included in the permit application package.

VII. Boilerplate Deviations

The Skeleton NSR (Dec. 2009), Generic NSR (Feb. 2012) boilerplates were used to amend the permit. There are no deviations from the boilerplates.

Condition numbers listed below reflect the current permit action. The following changes were made to the PSD permit dated December 17, 2010, as amended October 24, 2013:

Table 8: Summary of Changes to Permit

Condition:	Change:
All Conditions	The regulatory citations in the permit were updated.
All Conditions	The Minor NSR and PSD conditions were split into separate sections of the permit.
Introduction	The permit application date and supplemental information dates were added to the Introduction.
Condition 5	A new PSD BACT condition was added for sulfuric acid mist emissions from the combustion turbines. Sulfuric acid mist emissions shall be controlled through the use of pipeline natural gas.
Condition 14	A new PSD BACT condition was added for sulfuric acid mist emissions from the auxiliary boiler and fuel gas heater. Sulfuric acid mist emissions shall be controlled through the use of pipeline natural gas.
Condition 15	The fuel sulfur content of the natural gas was changed for the combustion turbines (CT-1, CT-2, CT-3) and duct burners (DB1, DB2, DB3). The pipeline natural gas shall not exceed: a sulfur content of 0.00096 percent by weight (i.e., 0.32 grains per 100 dry standard cubic feet) on a 12-month rolling average basis, and a sulfur content of 0.0015 percent by weight (i.e., 0.50 grains per 100 dry standard cubic feet), at any time.
Condition 18	The short-term emission limitation for H_2SO_4 was revised to reflect the change in sulfur content of the natural gas. Additional compliance language was added to clarify how compliance with the limitations is shown. There are no changes to the short-term emission limitations for other pollutants.
Condition 19	The annual emission limitation for H_2SO_4 was revised to reflect the change in sulfur content of the natural gas. Additional compliance language was added to clarify how compliance with the limitations is shown. There are no changes to the annual emission limitations for other pollutants.
Condition 21	A condition was added limiting the operation of each duct burner (DB1, DB2, & DB3) to no more than 6,000 hours per year, calculated monthly as the sum of each consecutive 12-month period.

Condition:	Change:
Condition 42	The fuel sulfur content of the natural gas was changed for the auxiliary boiler (B-1) and the fuel gas heater (GH-1). The pipeline natural gas shall not exceed a sulfur content of 0.00096 percent by weight (i.e., 0.32 grains per 100 dry standard cubic feet) on a 12-month rolling average basis and shall not exceed a sulfur content of 0.0015 percent by weight (i.e., 0.50 grains per 100 dry standard cubic feet), at any time.
Condition 58	A recordkeeping condition was added requiring the facility to keep records of the annual hours of operation of each duct burner (DB1, DB2, & DB3) calculated monthly as the sum of each consecutive 12-month period
Condition 72 Condition 73	State BACT for SO2 emissions from the combustion turbines (CT-1, CT-2, and CT-3), duct burners (DB1, DB2, and DB3), auxiliary boiler (B-1), and fuel gas heater (GH-1) is established as the use of pipeline natural gas.
Condition 74 Condition 75	The short-term and annual emission limits of SO2 were moved to a minor NSR section of the permit.

VIII. Compliance Demonstration

There are no changes to the compliance demonstrations (stack testing, fuel testing, continuous emission monitoring, or recordkeeping) established in the permit.

IX. Title V Review - 9 VAC 5 Chapter 80, Article 1

The facility is currently classified as a Title V major source; after this permit action, the facility will continue to be classified as a Title V major source. The facility's potential to emit of NOx, CO, VOC, PM-10, and PM-2.5 exceed the applicable Title V major source thresholds. A brief summary of the Title V emissions is provided in Table 9; a detailed summary of the Title V emissions is available in Attachment C.

Table 9: Title V Summary

Pollutant	Total (tons/yr)	Title V?
NO_x	327.8	**Yes**
CO	368.8	**Yes**
SO_2	39.6	No
VOC	238.4	**Yes**
PM-10	214.2	**Yes**
PM-2.5	213.8	**Yes**
H_2SO_4	30.6	No
Lead	2.2E-02	No
GHG (Mass)	5,407,165	**Yes**
GHG (CO_2e)	5,412,358	**Yes**

The facility remains subject to the permitting requirements of 9 VAC 5 Chapter 80, Article 3.

Dominion is required by Virginia regulations to obtain a federal operating permit under Title V of the Clean Air Act. The regulations require that Dominion submit a Title V permit application no later than one year after startup of the facility.

X. Site Suitability

Not applicable to the proposed permit action.

XI. Public Participation Requirements

Applicant Informational Briefing

The changes to the permit are subject to the significant amendment requirements to a PSD permit in accordance with 9 VAC 5-80-1955 C. The proposed project is subject to the public participation requirements of 9 VAC 5-80-1775. Dominion is required to notify the public of the proposed changes and conduct a briefing.

The public notice of the proposed changes was approved by the DEQ prior to publication. As required the notice appeared in the *Warren Sentinel* on October 17, 2013, at least 30 days in advance of the public briefing. The public briefing was held by the applicant on November 18, 2013, at the North Warren Volunteer Fire Department located at 89 Rockland Road in Front Royal, Virginia.

Public Comment Period

The public comment period, which runs for at least 45 days and at least 15 days after the public hearing, began on April 10, 2014 and ended on May 27, 2014. The public notice appeared in the *Northern Virginia Daily* on April 10, 2014. All comments received were recorded, reviewed, and a Response to Comments document was prepared.

Public Hearing

In accordance with 9 VAC 5-80-1775 E, VRO held a public hearing to accept comments on the air quality impact of the proposed source, alternatives to the source, the control technology required, and other appropriate considerations on May 12, 2014 at the Warren County Community Center, located at 538 Villa Avenue in Front Royal, Virginia. A legal advertisement for the hearing was published in the *Northern Virginia Daily* newspaper on April 10, 2014.

Seven persons attended the hearing. Two of the attendees offered testimony and one of those submitted a set of written comments, which were also read as testimony; the written comments were entered into the record by DEQ.

Documents Concerning Public Comment Period
Copies of the documents used in development of the draft permit were available for review at VRO. The draft permit and draft engineering analysis were also accessible from DEQ's website during the public comment period.

Response to Comments
During the public comment period, a total of one written and two oral comments were received. The written comment consisted of comments from the facility in support of the project. All comments and a recording of the public hearing are in the permitting file.

A response to comments document was prepared at the conclusion of the public comment period and is provided as Attachment G.

Board Consideration
During the public hearing, one commenter requested consideration of the draft PSD permit by Air Pollution Control Board (Board).

In accordance with the requirements of 9 VAC 5-80-25 C, upon completion of the public comment period on the permit action, DEQ Director shall review all timely requests for direct consideration of permit actions by the Board. The regulations at 9 VAC 5-80-25 establish the criteria by which requests for direct consideration by the board shall be evaluated:

1. That there is a significant public interest in the issuance, denial, amendment, or revocation of the permit in question as evidenced by receipt of a minimum of 25 individual requests for board consideration;
2. That the requesters raise substantial, disputed issues relevant to the issuance, denial, amendment, or revocation of the permit in question; and
3. That the action requested by the interested party is not on its face inconsistent with, or in violation of, the Virginia Air Pollution Control Law, federal law or any regulation promulgated there under.

A single request for direct consideration by the Board does not constitute a significant public interest in the issuance of the permit, nor were there raised any substantial issues relevant to the amendment of the permit in question. Therefore, the request for board consideration does not meet the regulatory requirements in accordance with 9 VAC 5-80-1775 G and 9 VAC 5-80-25 C.

The Request for Board Consideration Memorandum was approved by James Golden, Deputy Director for Operations, and is provided as part of Attachment G.

XII. Permit Fee

The permit application fee was processed on September 12, 2013.

XIII. Other Considerations

Federal Land Managers

The following table shows the distances between the proposed plant site and the closest Class I areas:

Table 10: Distance of proposed plant from Class I areas (km)

Class I area	Distance from proposed plant (km)
Shenandoah National Park (SNP)	7.1
Dolly Sods Wilderness Area (West Virginia)	100
Otter Creek Wilderness Area (West Virginia)	122
James River Face Wilderness Area	187

Because of Dominion-Warren's proximity to SNP (see Table 10), a protected Class I area, DEQ has worked with the Federal Land Managers (FLMs) whose responsibility it is to oversee such areas. In accordance with the Memorandum of Understanding between DEQ and SNP and the Jefferson National Forest, both the National Park Service (NPS) and U.S. Forest Service (USFS) were provided copies of Dominion - Warren's permit application and supplemental addenda, the Class I and Class II modeling analyses, and the AQA's dispersion modeling report. Since the proposed permit action is a significant amendment to the PSD permit, the proposed permit modification is not subject to the 60-day FLM review prescribed by 9 VAC 5-80-1765 B.

However, in accordance with other provisions in 9 VAC 5-80-1765, the Federal Land Manager (FLM) has been kept apprised of the proposal throughout the stages of evaluation. DEQ informed the FLM concerning the anticipated receipt of the application from Dominion Warren following Dominion's notification to DEQ. A copy of the permit application was provided to the National Park Service, the Forestry Service, and the Fish and Wildlife Service via email on 10/2/2013. A copy of DEQ's Initial Letter of Determination (ILOD) was provided to the FLM via email on 10/2/2013. The FLM was notified of the applicant informational briefing conducted November 18, 2013, by Dominion Warren and attended by DEQ staff. The FLM was consulted during the preparation of the protocol for air quality analyses related to the proposal. Specifically, an initial conference call between Dominion Warren, DEQ air modeling and regional staff, and the National Park Service, the Forestry Service, and the Fish and Wildlife Service was held on August 27, 2013. The National Park Service, the Forestry Service, and the Fish and Wildlife Service were provided copies via email of the air quality analysis protocols and the final reports. In an email dated February 20, 2014, John Notar of NPS concurred with DEQ's conclusion, based on the air quality analysis that predicted acid deposition in SNP due to the revised emissions resulting from the proposed changes is below the FLAG Deposition Analysis Threshold (DAT) used to assess acid deposition impacts.

The FLM was notified (via email dated April 9, 2014) of the public comment period for the draft permit. No comments were received from the FLM during the public comment period.

Environmental Protection Agency (EPA)
The EPA was provided a copy of the application and Initial Letter of Determination (ILOD) on October 2, 2013. EPA was provided a copy of the draft permit and was notified of the public comment period on April 9, 2014. The EPA discussed the draft permit during a conference call with the DEQ on May 6, 2014. No written comments were received from the EPA during the public comment period.

The EPA will be notified and provided a copy of the final permit determination upon permit issuance.

Changes to the Draft Permit
The following changes were made to the draft permit as a result of the public comment period:

- The permit condition cross-references were updated in Conditions 17, 62, and 67 to correct typographical errors.
- During the public comment period the EPA verbally noted that there were no limitations on the use of the duct burners in the draft permit during a conference call with the DEQ on May 6, 2014. A new condition limiting the use of each duct burner (DB1, DB2, and DB3) was added to the permit (Condition 21). The use of each duct burner (DB1, DB2, and DB3) is limited to 6,000 hours of operation per year. The hourly limitation, supported through recordkeeping for each duct burner (DB1, DB2, and DB3) establishes a means to demonstrate compliance with the emission limitations contained in the permit. In addition, a new recordkeeping condition (Condition 58.c) requiring the facility to keep records of the annual hours of operation of each duct burner (DB1, DB2, & DB3) was also added to the permit. The annual hours of operation shall be calculated monthly as the sum of each consecutive 12-month period.

There were no other changes to the draft permit.

Associated Permit Actions
There are no other significant considerations for this permit, and no other changes to the existing emission units. Please review the engineering memos/checklists associated with the following permits for the discussion on previous permit actions:

Table 11: Summary of Associated Permit Actions

CEDS Application Number	Permit Issuance Date	Permit Type
7	12/17/2010	NSR/PSD
8	2/15/2013	Title IV
9	10/24/2013	NSR/PSD Significant Amendment

IX. Recommendations

Recommend issuance of significant amendment to the PSD permit.

Attachments:
Attachment A: Minor New Source Review Permitting Applicability Calculations
Attachment B: Prevention of Significant Deterioration Calculations – Criteria Pollutants
Attachment C: Title V Emissions Summary
Attachment D: Comparison of Emission Increases and Decreases
Attachment E: Office of Air Quality Assessments Dispersion Modeling Report
Attachment F: Supplemental Information Addressing Particulate Matter Emissions
Attachment G: Response to Comments