



COMMONWEALTH of VIRGINIA

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February 2, 2010

Mr. Robert M. Bisha
Director, Environmental Business Support
Dominion Resources Services, Inc.
5000 Dominion Boulevard
Glen Allen, Virginia 23060

Re: Warren County Combined-Cycle Project
Modeling Protocol Review (via e-mail)

Dear Mr. Bisha:

This letter acknowledges the receipt of the air quality modeling protocol dated January 2010 for Dominion's proposed Warren County Combined-Cycle Project to be located in Warren County, Virginia. The Virginia Department of Environmental Quality (DEQ) Air Quality Assessments Group (AQAG) has completed its review of the proposed modeling methodology and has the following comments:

Section 2.2 Process Description

The protocol indicates the proposed facility has the potential to emit 100 tons per year or more of the regulated pollutant particulate matter having an aerodynamic diameter equal to or less than 2.5 microns (PM_{2.5}). Therefore, PM_{2.5} would also be subject to PSD review.

Section 2.3.1 Criteria Pollutant Emissions

1. The permit may need to contain an enforceable condition to limit the hours of operation as specified in the protocol for the diesel-fired emergency generator and diesel-fired fire-water pump.
2. The Table 2-1 column heading "*Maximum Hourly Emission Rates (lb/hr)*" contains footnotes (1) and (2). However, the inclusion of footnote (2) in the column heading can be confusing since it is applicable only to the inlet turbine chiller and not all of the auxiliary equipment in the table. Therefore, it would appear to be more appropriate to include footnote (2) with the inlet turbine chiller emission unit entry.

3. The modeling protocol contains the following statement in a few sections:

“Therefore, the proposed facility will be subject to PSD review and applicable PSD modeling for NO_x, CO, H₂SO₄, and PM₁₀.”

This statement is confusing because there is no applicable PSD modeling requirement for sulfuric acid (H₂SO₄). Please clarify.

Section 2.3.2 Toxic Air Pollutant Emissions

The protocol states *“the electric generating units proposed by Dominion are not subject to the toxic pollutant standards in 9 VAC 5-60-300.”* Additionally, *“the fire-water pump engine and fuel gas heater are the two sources potentially subject to toxics modeling.”* The determination of which sources at the facility are subject to the requirements of 9 VAC 5 Chapter 60, Article 5 - Emission Standards for Toxic Pollutants from New and Modified Source (i.e., state air toxics rule) will be made by the DEQ Valley Regional Office (VRO). Regardless whether or not a specific emission unit (e.g., electric generating units) at an affected facility is exempt from the state air toxics rule, any modeling analysis *“shall include all emissions from the stationary source, including those from sources exempted under 9 VAC 5-60-300 C,”* per 9 VAC 5-60-350 C.

Section 3.1 Background Discussion

The protocol states the facility is a major source for H₂SO₄. However, the maximum potential annual emissions presented in the protocol for H₂SO₄ are 9.55 tons per year which are below the applicable PSD major source threshold but above its applicable PSD significant emission rate. Therefore, the facility is not a major source for H₂SO₄ but the H₂SO₄ emissions are subject to PSD review.

Section 3.2 Source Data

1. Emission rates and stack source parameters are subject to VRO approval. These parameters will be verified against the permit application. Changes to these rates or parameters may require a reanalysis of air quality impacts.
2. Please specify the maximum rated heat input in million British thermal units per hour (MMBtu/hr) for each proposed combustion unit.
3. A comparison of the hourly emission rates in Table 3-2 to Table 2-1 reveals a few inconsistencies. For example, the carbon monoxide (CO) emission rate for the auxiliary boiler in Table 3-2 is 3.17 lb/hrs versus 3.26 lb/hr in Table 2-1. It is imperative that the contents of the protocol are consistent and accurate. Please review and make any necessary revisions.
4. The title for Table 3-2 contains footnote (1). However, text for footnote (1) is not provided. Please clarify.

5. The modeling protocol suggests the minimum load the facility will be operating at is 60%. Modeling of additional load scenarios below 60% may be necessary if it is anticipated that the facility will be operating at a load(s) less than 60%. The range of loads modeled should conform to the guidance contained in Section 8.1.2(a) of 40 CFR Part 51, Appendix W - Guideline on Air Quality Models (GAQM).
6. The AQAG is aware that simulating startup and shutdown conditions from the proposed facility using existing regulatory models is difficult. Specifically, startup and shutdown conditions are transient in nature and are not handled well by steady-state air quality models. Nevertheless, startup and shutdown operations, including the estimated emissions, must be addressed in the protocol and final report.
7. It is recommended that the values in Tables 3-3, 3-5 and 3-7 be highlighted to assist in the identification of the source for the values presented in Tables 3-4, 3-6 and 3-8, respectively.
8. Please include the heat input for the combustion turbines for each scenario presented in Tables 3-3, 3-5 and 3-7.

Section 3.3 Model Selection

1. Please provide a detailed explanation for the selection of the 0.05 parts per million (ppm) background ozone concentration. It appears that an annual average ozone concentration of 53 parts per billion (ppb) was used for the previous PLUVUE II analysis and hourly ozone values (OZONE.DAT in CALPUFF) were used in the Class I deposition analysis.
2. Please explain the nitrogen and sulfur deposition calculation in more detail. It is unclear how the nitrogen deposition will be calculated using the transformation equation. It appears that it may be necessary to calculate hourly concentrations for input to the equation. Please also explain how the sulfur deposition will be calculated using the AERMOD concentrations.
3. Please provide the reference for the first-order transformation equations presented for the daytime and nighttime nitrogen deposition.
4. Please specify the proposed meteorological station that will be used to calculate the annual average 10-meter wind speed (u) in the first-order transformation equations for the daytime and nighttime nitrogen deposition.
5. The protocol states the following:

“The screening distance is determined by adding the permitted short-term emissions from proposed routine (non-emergency) point sources for $SO_2 + NO_X + PM_{10} + H_2SO_4$. The sum of these emissions for the scenario with the highest emissions is not expected to exceed 600 tons per year, based upon information provided in Section 2.”

A review of the information provided in Section 2 appears to indicate the Mitsubishi combustion turbine scenario would slightly exceed 600 tons per year.

6. The range for the stability category (S) in the nitrate transformation rate equation for daytime conditions is from 2 to 6 and not 1 to 6 as indicated in the protocol per the *Interagency Workgroup On Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts (December 1998)*. Stability category 2 includes stability classes A and B.

Section 3.4 Meteorological Data for AERMOD and PLUVUE

1. The following statement "*Within each 2-minute period, the ASOS system stores 24 5-minute averages.*" appears to have a typographical error. Please review and make the necessary revisions.
2. Please provide an explanation why the 30-year precipitation data set proposed to be used for determining the monthly surface moisture condition input to AERSURFACE is from Plains 2NNE, Virginia and not Dulles International Airport (IAD).
3. The title of Figure 3-7 states the 1-kilometer radius circle is around the Reading Spaatz Field while the actual figure presents a 1-kilometer radius circle around the proposed facility location. Please correct this error.

Section 3.6 Receptor Grid and AERMAP Processing

1. The AQAG recommends 25-meter receptor spacing along the facility's ambient air boundary (e.g., fence line) for the Class II receptor grid. In addition, it is suggested that 50-meter receptor spacing be used within 1 kilometer of the facility instead of 500 meters as proposed in the protocol. Also, it is recommended that refined modeling be conducted using 50-meter receptor spacing in the event that any maximum impact occurs beyond the initial 50-meter receptor grid.
2. The applicant shall specify the geodetic datum used to generate all coordinates contained in the modeling analysis. The current protocol does not reference any coordinates or datum.
3. The protocol should clearly document the source of elevation data used for the AERMOD application, including the resolution and geodetic datum. The elevation data used should be based on the highest resolution available from the United States Geological Survey (USGS).
4. According to the AERMAP User's Guide (USEPA, 2004c), the elevation data array and domain boundary must include all terrain features that exceed a 10% elevation slope from any given receptor. The final modeling report shall include a description of how this guidance was addressed.

5. The most recent version of the AERMOD Implementation Guide (March 19, 2009) encourages the use of elevation data from the National Elevation Dataset (NED) developed by the USGS instead of the Digital Elevation Model (DEM) in AERMAP. While AERMAP still supports terrain elevations in the DEM format, problems can exist with the DEM data such as incorrect geo-referencing information for entire DEM files and elevations that reflect the tops of buildings and trees. The use of NED data is expected to prevent these problems. Therefore, DEQ requests the applicant use NED data, where possible, in the modeling analysis.

Section 3.7.1 Class II Area SIL Analysis

The AQAG is unclear about the modeling requirements for H₂SO₄ since it is unaware of a significant impact level (SIL) for this pollutant. Please explain.

Section 3.7.2 Compliance with Class II Area Ambient Air Quality Standards and PSD Increments

1. The protocol indicates that for the cumulative NAAQS analyses all major sources of the applicable pollutant from nearby source inventories obtained from the appropriate state agencies will be included. The cumulative NAAQS analyses should include all nearby sources, regardless whether or not it is a major source, that cause a significant concentration gradient in the vicinity of the proposed facility (see Section 8.2.3 of 40 CFR Part 51, Appendix W (GAQM)).
2. The analysis of PM₁₀ emissions with respect to the annual NAAQS of 50 µg/m³ presented in Table 3-14 is no longer required because the standard has been revoked.

Section 3.8.1 Class I Area SIL Analysis

1. The protocol states the proposed SILs in Table 3-16 for the Class I area modeling are based on the proposed values contained in the July 23, 1996 Federal Register. A comparison of the SILs from the July 23, 1996 Federal Register to the SILs presented in Table 3-16 of the protocol identified discrepancies. For example, the 24-hour PM₁₀ SIL from the Federal Register is 0.3 µg/m³ versus 0.32 µg/m³ in Table 3-16. Please provide an explanation for the discrepancies.
2. Please provide an explanation for the asterisks contained in the column headings "3-hour", "24-hour" and "Annual" for Table 3-16.

Section 4.2 Pre-construction Monitoring Waiver Request

1. A facility may propose to be exempt from preconstruction monitoring if its source-only modeled impacts are below the significant monitoring concentrations. This analysis is subject to review and approval by the AQAG. Alternatively, if the facility cannot be exempted from the preconstruction monitoring requirement based on modeling, the

applicant may propose use of existing monitoring data. It is required that the applicant make the appropriate justification for use of existing data to the AQAG.

The fulfillment of the preconstruction monitoring requirement can be met in the following ways:

- Existing ambient data may be used if the AQAG determines that these data are representative and can establish the attainment status of a particular region.
 - Establishment of a site-specific monitoring network.
2. The need for post-construction monitoring will be addressed as part of DEQ's comprehensive application review and draft permit development. DEQ reserves the right to include this requirement in the PSD permit should it be deemed necessary.

Section 4.3.2 Refinement of Emission Data and Permit File Review

Please provide additional details on the proposed inventory screening methodology. This should include the origin of the screening technique and how this approach will result in an inventory that encompasses nearby sources that cause a "significant concentration gradient" as described in the GAQM.

Section 5.4 Soils and Vegetation Analysis

Soil Assessment

The protocol contains the following statement:

"These counties were chosen because the project site is within Warren County, and Clarke, Frederick and Shenandoah Counties are either within a 10 km radius of the project site or will be used to represent typical soil type within Shenandoah National Park (Shenandoah County)."

It is unclear what the intent of "(Shenandoah County)" is at the end of this statement. There is no portion of Shenandoah County that lies within Shenandoah National Park. Therefore, "(Shenandoah County)" should be removed from the end of this statement.

Section 5.5 PM_{2.5} NAAQS Compliance Analysis

The protocol states the proposed PM_{2.5} SILs for the PSD Class I modeling are based on the proposed Option 3 values contained in the September 21, 2007 Federal Register (72 FR 54139-54140). A review of the September 21, 2007 Federal Register indicates the 24-hour and annual PSD Class I modeling SILs should be 0.07 µg/m³ and 0.06 µg/m³, respectively, instead of 0.7 µg/m³ and 0.6 µg/m³ as presented.

Section 5.7 Conversion of NO to NO₂

The annual default value of 0.75 that may be necessary for the applicant to use for the Tier 2 analysis in the multi-tiered approach to estimate maximum annual NO₂ concentrations is located in Section 5.2.4(c) of 40 CFR Part 51, Appendix W (GAQM) and not Section 6.3.2(c) as referenced in the protocol.

Section 6.0 Submittal of Analysis Results

As stated in the protocol, all input and output files (e.g., AERMOD, BPIP-PRIME, AERMET, AERMAP, PLUVUE, pre-processing and post-processing files), including any 3rd party software project files (e.g., BEEST, Lakes, Trinity, utility programs) shall be provided to DEQ in electronic format.

General Comments

1. The proposed facility would be a major source of PM_{2.5} since it has the potential to emit 100 tons per year or more of this pollutant based on the protocol.
2. There are a number of instances throughout the protocol where NO_x is referred to as an ambient air quality standard or increment rather than nitrogen dioxide (NO₂). For example, there is a SIL for NO₂ as opposed to NO_x which is specified in Table 3-1.
3. DEQ would prefer that the phrase “nearby source inventory” be used in lieu of “background source inventory” for the title of Section 4.3 and when discussing the cumulative modeling analysis. The use of “nearby source” for such an analysis is consistent with 40 CFR Part 51, Appendix W (GAQM) and this would help minimize confusion with the phrase “background concentration.”
4. The AQAG strongly recommends that the applicant receive concurrence from VRO on its control technology review (e.g., Best Available Control Technology (BACT)) and all modeled scenarios and emission rates prior to submitting the final air quality analysis. Prior approval usually helps minimize delays in the modeling review and the overall project.
5. The final modeling report shall include graphics (e.g., contour maps) that show the extent of the air quality impacts and shall utilize a base map that is readily understandable by the general public. Each map should also clearly identify the proposed plant location relative to these air quality impacts.
6. The final report should include a readable scaled map (i.e., not a copy) of all source locations and buildings and include the property boundary. Any design changes to structures prior to or after issuance of the permit may require additional modeling. DEQ encourages the applicant to also submit a Geographic Information System (GIS) shape file of the property line and structures if available.

7. A copy of **all Class I and Class II modeling correspondence** throughout the duration of this project should be provided to the AQAG, VRO, USEPA Region III and the appropriate Federal Land Manager (FLM) technical contacts listed in the Attachment.

Please submit a copy of the revised modeling protocol to the AQAG, VRO, USEPA Region III and the FLM technical contacts listed in the Attachment. Please feel free to contact me at (804) 698-4460 or Michael.Kiss@deq.virginia.gov if you have any questions. Thank you for your cooperation with this matter.

Sincerely,



Michael F. Kiss
Coordinator, Air Quality Assessments Group

Attachment – Contact Information

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ATTACHMENT
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