



April 26, 2010

Ms. Amy Owens
Director, Valley Regional Office
Virginia Department of Environmental Quality
4411 Early Road
Harrisonburg, VA 22801

Re: Request for Prevention of Significant Deterioration Permit
Virginia Electric and Power Company
Registration No. 81391
AIRS ID No. VA-187-00041

Dear Ms. Owens:

Dominion applied for a Prevention of Significant Deterioration (PSD) air permit in January, 2010 for a combined-cycle power generating facility to be located in Warren County, Virginia. We are responding to Ms. Anita Riggelman's letter of February 17, 2010 requesting additional information regarding our permit application. We are providing the answers to these questions along with any amendments to the equipment specifications for DEQ approval prior to submitting the air quality modeling results.

Following are the DEQ's comments on the initial application and our responses to each.

1. DEQ Comment:

Applicable 40 CFR 63 NESHAPs - Section 4.6 states that potential hazardous air pollutant (HAP) emissions will be below major source thresholds for single and combined HAPs and thus, 40 CFR 63 Subpart ZZZZ (Stationary Reciprocating Internal Combustion Engines) is not applicable. However, Subpart ZZZZ also applies to area sources of HAP emissions. Therefore, 40 CFR 63 Subpart ZZZZ does apply to the Emergency generator and fire water pump.

Response:

Any engines procured for this project will meet the required standards as of their date of manufacture. We acknowledge the applicability of this MACT standard to engines to be installed at this facility.

2. DEQ Comment:

Proposed BACT NO_x Emission Rate- Section 5.2.1.3 of the application states that BACT for NO_x for the proposed combustion turbines is the use of natural gas with dry low NO_x burners and selective catalytic reduction with the proposed emission rate of 2.0 ppmvd @ 15% O₂ as a 3-hour rolling average with or without duct burning. The current permit requires a 1-hour average for the short-term NO_x emission limit. Like the previous BACT determination for the GE and Siemens engines for this facility, several combustion turbines listed on EPA's RACT/BACT/LAER Clearinghouse are required to meet a 2.0 ppmvd limit calculated as a 1-hour average. Please review and provide an analysis of the proposed averaging time for the NO_x emission rate.

Response:

Dominion agrees that the 1-hour average of 2.0 ppmvd @ 15% O₂ is the applicable BACT for this facility.

3. DEQ Comment:

Proposed BACT Emission Rates- Table 5-1 of the Siemens application summarizes the BACT emission rates for the proposed SiemensSGT6-5000F combustion turbines. The proposed Siemens turbines are the same model as those in the current permit. Please explain why the proposed BACT short term emission rates listed in Table 5-1 are higher than the emission rates established in the current permit for PM₁₀, CO, and VOC.

Response:

These differences are a direct result of the evolutionary changes in the combustion turbine industry. There are differences between the technology included in CPV's application and our application. The proposed Siemens SGT6-5000F turbine has been redesigned, resulting in higher output. The emissions rates on a heat input basis have not changed, however, the total emissions increase proportionally with the increased output.

Dominion has corrected the application text to be consistent with the previous application regarding BACT for CO and VOCs. The information previously provided by Dominion for particulates is correct. Siemens has informed Dominion that the previous permit limits do not represent a limit that Siemens will guarantee. Based on discussions with Siemens, the former limits are not achievable with current turbine designs. Furthermore, the total mass and concentration of particulate emissions are higher with Dominion's scenarios because the total duct firing capacity is almost 300 mmBtu/hr greater than that assumed by the previous applicant. Dominion believes that the particulate limits for the Siemens equipment proposed in the application represent BACT for this facility.

4. DEQ Comment:

Facility Load and Proposed BACT Emission Rates- The application suggests that the minimum load the facility will be operating at is 60% (except GE which will be operating at 50% based on the additional information dated February 11, 2010). Please note that if the facility will be operating at a load less than the load indicated in the application, emission information for such additional load scenarios should be provided. Section 5.2.2.3 and Table 5-1 gives two emission rates for CO without duct burning - one rate above 60% load and another rate for at 60% load. Please discuss why there are two emission rates for CO based on facility load but all other pollutants only have one emission rate across all loading scenarios.

Response:

We have acknowledged the typo regarding the GE units in our response to the modeling protocol questions dated February 12, 2010. Updated pages are included with this submittal reflect those corrections.

At this time, except for transient periods during startups and shutdowns, Dominion does not plan to operate the combustion turbines at loads below those shown in the application. The minimum loads were provided by the respective vendors to represent the lowest level of operations at which compliance with the proposed emissions limits can be achieved on a continuous basis.

The reason the CO emissions vary for the Siemens turbines is that Siemens will guarantee 4 ppm out of the turbine (prior to the oxidation catalyst) at loads above 60% and will guarantee 10 ppm at 60%, and no guarantee below 60%. This was not explicitly spelled out in the application, although the data shown are correct.

5. DEQ Comments:

Combustion Turbines and Toxic Air Pollutant Standards- Section 9.3 of the application States that the proposed electric generating units are not subject to the toxic pollutant Standards in 9 VAC 5-60-300 per the exemption listed in 9 VAC 5-60-300 C.7. The Regulations state that the Toxics Rule does not apply to "a generator or boiler that burns only natural gas, #2 fuel oil, #4 fuel oil, #6 fuel oil, propane, or kerosene." The proposed combustion turbines are considered neither a generator nor a boiler by definition. Therefore, the combustion turbines are subject to the toxic pollutant standards in 9 VAC 5-60-300.

Toxic Air Pollutant Modeling Analysis - Section 9.3 of the application states that Table 9-4 contains a listing of the potential HAP emissions for the proposed project and these emissions are compared to the toxic pollutants thresholds for modeling applicability. It appears that Table 9-4 only includes toxic emissions from the Fuel Gas Heater and the Emergency Firewater Pump. Per 9 VAC 5-60-350 C, any modeling analysis "shall include all emissions from the stationary source, including those from sources exempted under 9 VAC 5-60-300 C." Therefore, Table 9-4 needs to be updated to include all toxic pollutant emissions from the proposed project. These totals should then be compared to the toxic pollutant exemption levels to determine modeling applicability for each pollutant. Also, the majority of the toxic exemption levels listed in Table 9-4 is incorrect and N/A is listed for several pollutants although there are established exemption thresholds for these pollutants. Please correct the table and reevaluate whether a modeling analysis is required for each toxic pollutant.

Response:

Both of these are addressed in the revised submittal and associated air quality modeling. Virginia toxic air pollutant modeling analyses must be conducted for acrolein, formaldehyde, cadmium, chromium, and nickel.

6. DEQ Comment:

Control of Volatile Toxic Compounds - Section 5.2.3.3 and Table B-2 shows a 30% reduction in VOC from the combustion turbines based on control by the oxidation catalyst. The controlled and uncontrolled emission rates for toxic pollutants listed on page 16 of the Form 7 application are the same. Dominion can also apply the 30% reduction to the volatile toxic compounds from the combustion turbines.

Response:

We intend for this facility to be a minor source of federal hazardous air pollutants (HAPs) when constructed. Based on revised formaldehyde emissions factors obtained from each of the turbine vendors, the oxidation catalyst will control volatile organic HAPs to achieve minor source levels of emissions. The oxidation catalyst is designed to control carbon monoxide at highly efficient levels. Engineering calculations show that the catalyst is 30% effective in controlling volatile organic compounds (VOCs), including volatile organic HAPs. This level of control enables the facility to be a minor source of HAP emissions.

7. DEQ Comment:

Modeling Protocol and Modeling Analysis - A modeling protocol review by the DEQ Air Quality Assessments Group (AQAG) was sent to Dominion via e-mail on February 2, 2010. This review provided comments to the initial modeling protocol dated January 2010 and received January 11, 2010. A response to comments on the modeling protocol Dated February 11, 2010 and a revised protocol dated February 2010 was received by DEQ on February 15, 2010 via e-mail. The modeling included with the initial application and the revised modeling received February 2, 2010 will not be reviewed at this time. Once the protocol is approved by DEQ AQAG, revised modeling per the approved protocol should then be submitted.

Response:

This comment is acknowledged and is being handled separately. The revised modeling protocol was conditionally approved on March 23, 2010.

8. DEQ Comment:

Emissions Based on Startups, Shutdowns, and Duct Burning - Tables B-3 and B-4 provide the emissions based on various startup, shutdown, and duct burning operating modes. How were the numbers of events (startup, shutdown, and offline) decided upon? How can there be half an event (i.e. 174.5 hot starts)? Please discuss how the operating hours with and without duct burning was determined and how a change in duct burning operating hours and the number of startup and shutdown events will affect the projected worst-case emissions. The permit may need to contain an enforceable condition to limit the startup, shutdown, and offline events to the numbers listed in Table B-3.

Response:

The number of startup events, shutdown events, and time offline were based on the original project as described in Table B-3a of Appendix B of the November 2007 VDEQ Intra-Agency Memorandum (the statement of basis for the last permit revision obtained prior to Dominion's acquisition of this project).

The original project listed 349 hot turbine starts for two turbines or an average of 174.5 hot starts per turbine. This average number of hot starts per turbine was used to estimate maximum annual emissions for affected pollutants. Although the concept of a half an event was not specifically considered, it is possible that a startup could be terminated before completion due an unforeseen event such as an operating problem.

The operating hours with duct burning were set at 6,000 hr/yr at 500 mmBtu/hr for each unit. Dominion will limit fuel consumption from duct burning to an equivalent heat input of no more than 6,000 hr/yr at 500 mmBtu/hr per turbine. Therefore, the emissions presented in the application represent maximum annual emissions.

The annual emissions presented in the application are based on worst-case emissions that reflect either continuous operating for 8,760 hr/yr or the maximum number of startup/shutdown events, whichever is greater. The results of these calculations are shown in the application in Table B-4 which lists emissions for continuous operation, maximum startup/shutdown events, and the worst case.

The number of startup/shutdown events can affect annual emissions as shown in Table B-4. Dominion will use CEMs to monitor CO and NO_x emissions during normal operations as well as startup/shutdown events. The permit for this project should include annual emission limits similar to those in Condition 14 in the original permit. Dominion submits that compliance with annual emission limits is adequate to limit emissions from startup/shutdown events and a limit on the number of events is not necessary.

A numerical limit of startups and shutdowns is not productive in limiting total emissions. Rather, the current permit's philosophy of limiting total emissions and the durations of startups and shutdowns is a practical way of ensuring compliance with air quality standards. This approach has been used in many other permits nationwide for similar facilities and is protective of air quality and the environment.

9. DEQ Comment:

Definitions of Startups and Shutdown – Please provide the definitions of startups (hot, warm, and cold) and shutdown.

Response:

The analysis assumed that the definitions of the various types and durations of startups and shutdowns in the current permit would remain valid, with one exception. The exception is to change the allowable duration of a cold startup from 4.0 hours to 4.2 hours. This would allow a worst-case cold start for all scenarios. We submit the following definitions for startups and shutdowns, to be applied per turbine:

1. Cold Startup - refers to restarts made 72 hours or more after shutdown. Exclusion from the short-term emissions limits for cold startup periods shall not exceed 4.2 hours per occurrence.
2. Warm Startup - refers to restarts made more than 8 but less than 72 hours after shutdown. Exclusion from the short-term emissions limits for warm startup periods shall not exceed 2.1 hours per occurrence.
3. Hot Startup - refers to restarts made 8 hours or less after shutdown. Exclusion from the short-term emissions limits for hot startup periods shall not exceed 1.5 hours per occurrence.
4. Shutdown - refers to the period between the time the turbine load drops below 50 percent operating level and the fuel supply to the turbine is cut. Exclusion from the short-term emissions limits for shutdown shall not exceed 0.5 hours per occurrence.

We also concur with the current permit requirements to minimize the frequency and duration of these events. In fact, these events are generally very expensive in terms of fuel and operating costs. There are built-in incentives to minimize these times while continuing to operate a safe and reliable facility.

10. DEQ Comment:

Formaldehyde Emissions from Combustion Turbines - Table B-5 lists note (g) as 25ppbvd at 15% O₂ based on information provided by GE for dry low NO_x combustion as the emission factor for formaldehyde for all three turbine manufacturers. Please provide documentation and emissions calculations for the formaldehyde emissions from each turbine.

Response:

Dominion contacted each of the turbine manufacturers proposed for this facility. None were willing to guarantee any level of formaldehyde emissions below the current Maximum Achievable Control Technology (MACT) limit for turbines of this type, which is 91 parts per billion (ppb) dry at 15% oxygen when firing natural gas. The vendors were willing to guarantee this level of emissions without controls (i.e., without accounting for the effects of the oxidation catalyst). Combustion turbines must be designed to comply with this level when operating in simple-cycle mode (or they could not be installed in the US without additional air emissions control equipment, which is not practical on large simple-cycle turbines). Therefore, we assumed that the 91 ppb formaldehyde at 15% oxygen level does not require further documentation. As discussed above, we took credit for the effect of the oxidation catalyst on formaldehyde, which is a volatile organic HAP. Our revised application packages use 91 ppb formaldehyde as the basis for emissions calculations for all three manufacturer's scenarios.

11. DEQ Comment:

Auxiliary Boiler Emissions - Section 3.2.1 and Table B-6 lists operating hours per year of the auxiliary boiler as 8,760 hours. However, note (e) under Table B-6 states "operation limited to the equivalent of 4000 hours at maximum firing capacity." Please review and revise accordingly.

Response:

This was a typographical error. The actual operating hours should be 8,760 per year for the auxiliary boiler.

Conclusion

Dominion has worked to answer each of the DEQ's concerns to the fullest extent in this letter and in the revised application text. We respectfully request your concurrence with our responses and with the emissions parameters included in this material as soon as possible so that the air quality modeling can be completed.

If you need any additional information, please contact Andy Gates at (804) 273-2950.

Sincerely,



Robert M. Bisha
Director, Environmental Business Support

Enclosures