



# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF ENVIRONMENTAL QUALITY

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July 16, 2014

Mr. Gener Gotiangco, P.E.  
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Dear Mr. Gotiangco:

We have received and reviewed your letter dated May 27, 2014, responding to our Initial Letter of Determination (ILOD) regarding the PSD permit application for the CPV Smyth Generation project in Smyth County. The comments in your letter have been evaluated, with our response noted for your review. The DEQ response is underlined and referenced below per your numbered comment on the original ILOD comment (as dated March 5, 2014). Comments from both the ILOD and the CPV Smyth response will be summarized and paraphrased for brevity.

### Comment #1

Our original comment was that the applicability of Article 6 permitting and best available control technology (BACT) requirements for the same for SO<sub>2</sub> should be based on the calculation of uncontrolled emissions, and that the evaluation of Article 8 (major source PSD) BACT requirements for SO<sub>2</sub> using controlled emissions in the application appears to be correct. The response by CPV Smyth includes an evaluation of uncontrolled SO<sub>2</sub> emissions, also including a reduction of sulfur content of the natural gas to 0.3 grains per 100 standard cubic feet (scf), an item addressed later in DEQ's ILOD letter. Section 3.3 of the CPV Smyth application is revised with this evaluation and a tabulation of uncontrolled SO<sub>2</sub> emissions, which totals 18.8 tons per year for all sources for the proposed project. The existing Table 3-3 of the application is also revised to reflect the lower sulfur content of the natural gas, resulting in a total of 16.3 tons per year of controlled SO<sub>2</sub> emissions.

We concur with the evaluation and tabulation of uncontrolled SO<sub>2</sub> emissions, with resulting facility uncontrolled emissions of 18.8 tons per year below the corresponding Article 6 permitting applicability threshold of 40 tons per year for a new source. DEQ also concurs with the calculation of 16.3 tons per year of controlled SO<sub>2</sub> emissions.

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Comment #2

This ILOD comment noted that the determination of SO<sub>2</sub> emissions (and also H<sub>2</sub>SO<sub>4</sub> and particulate matter PM-10/PM-2.5 emissions in the February 2014 application are based on a maximum natural gas sulfur content of 0.5 grains per 100 standard cubic feet (gr/100 scf). The ILOD stated that this did not represent BACT in Virginia for this project, as an existing power plant in this region has been permitted at significantly lower levels of sulfur in the pipeline natural gas serving as fuel. The CPV response refers to information presented later on this subject in the ILOD, and notes that recent PSD permits in Virginia have included natural gas sulfur limits ranging from 0.1 gr/100 scf for Dominion's Warren County power station and the Greene Energy Partners/Stonewall PSD permits, to 0.4 gr/100 scf in the permit for Dominion's Brunswick County power station. Consequently, CPV Smyth lowered its proposed controlled emissions for SO<sub>2</sub>, H<sub>2</sub>SO<sub>4</sub> and PM/PM-10/PM-2.5, on the basis of a 0.3 gr/100 scf sulfur content of natural gas.

Virginia DEQ concurs with the CPV Smyth response and proposal to base controlled emissions of the noted pollutant parameters on 0.3 gr/100 scf as the sulfur content of the natural gas.

Comment #3

Our third comment requested inclusion of short-term emission rates for sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>) and particulate matter PM-10/PM-2.5 in Table 3-1 of the application, and noted that expected PM-10 and PM-2.5 emissions must include both the filterable and condensable fractions. The CPV Smyth response incorporates revised references to lower short-term emission rates for particulate matter (but not H<sub>2</sub>SO<sub>4</sub>), as previously noted on the basis of the lower 0.3 gr/100 scf sulfur content of the natural gas. It goes on to state that the revised short-term emission rate of 0.0032 lb/MMBtu for PM/PM-10/PM-2.5 without duct firing (0.0046 lb/MMBtu with duct firing), is consistent with limits established in the Dominion Brunswick County and the Green Energy Partners/Stonewall LLC permits. CPV Smyth's response concludes by noting that the PM/PM-10/PM-2.5 emission rates include both the filterable and condensable fractions.

We accept the proposed particulate lb/MMBtu revisions, but reiterate our comment in the ILOD that eventual particulate matter limits for the combustion turbines and duct burners will be expressed as PM-10 and PM-2.5 (filterable and condensable), based on the size of expected particulate emissions for these units. Typically, DEQ applies PM limits as the filterable fraction only, which may be applicable for the diesel engines, in addition to PM-10/PM-2.5 limits. The 0.0056 lb/MMBtu emission rate cited for H<sub>2</sub>SO<sub>4</sub> is higher than originally proposed, and higher than the rates for all noted Virginia PSD permits.

Comment #4

The fourth ILOD comment stated that hourly operating restrictions listed for sources such as duct burners (3000 hours), auxiliary boiler (4000 hours), and the emergency generator and fire pump (500 hours each), must be incorporated as operational limitations in the PSD permit. It also noted that annual emissions must also include start-up and shutdown

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emissions for sources. CPV Smyth replies that this is addressed in the application, and that start-up and shutdown emissions are included in the annual totals for the turbines.

Virginia DEQ acknowledges that start-up and shutdown emissions are addressed in the February 2014 application, and understands that CPV Smyth will accept operational limitations to include restricting operating hours for the pertinent emissions sources and scenarios.

#### Comment #5

This comment deals with expected emissions from smaller sources not addressed in the application and potential PSD permit limitations and requirements for the same. The ILOD comments requested clarification as to emissions from storage tanks, including the 19% aqueous ammonia storage tank for the selective catalytic reduction (SCR) emissions control system, and other storage tanks such as for diesel fuel. They also sought information as to emissions from inlet cooling and compression systems for the combustion turbines, and leakage of SF<sub>6</sub> as greenhouse emissions (CO<sub>2e</sub>) from circuit breakers at the proposed facility. CPV Smyth responds that the aqueous ammonia will be stored in a sealed tank with a pressure relief valve and that displaced vapors during filling will be returned to the delivery vehicle, with no significant losses expected from the storage tank. It notes that there will be a 6,000 gallon storage tank for diesel fuel, and states that an evaluation for it with EPA's TANKS software yields results of 2 pounds per year of VOC breathing losses for the tank. The response also indicates that no emissions are expected from the operation of inlet air compressors and inlet air cooling equipment for the combustion turbines. CPV Smyth concludes by stating that the type and SF<sub>6</sub> capacity of the circuit breakers have not been selected and probably will not be prior to issuance of a PSD permit, but does propose a SF<sub>6</sub> leakage rate of 1% by year.

While the 1% leakage rate for the circuit breakers is proposed as BACT for SF<sub>6</sub> greenhouse gas emissions, the capacity of the proposed circuit breakers will be required eventually to develop the draft PSD permit. This is to allow for the imposition of not only a leakage rate requirement, but to also calculate CO<sub>2e</sub> emissions limits for the circuit breakers, as with the Dominion Brunswick County and Green Energy Partners/Stonewall PSD permits. In addition, a 0.5% annual leakage rate may represent BACT for the circuit breakers. This leakage rate is proposed as BACT in the PSD application for a 525 MW combined-cycle turbine power plant submitted to West Virginia for Moundsville Power, LLC. The basis for this proposal in the December 2013 application is an EPA technical paper, and the breakers will have a total SF<sub>6</sub> capacity of 1,025 pounds. The information on the storage tanks and inlet compressors and chillers is acknowledged.

#### Comment #6

This addresses aspects of two comments in the ILOD in respect to requirements for air dispersion modeling of ambient air impacts of expected emissions from the proposed project. One ILOD comment noted that dispersion modeling was not included in the February 2014 application, and that it must eventually be submitted and must also include an evaluation of total facility emissions for the toxic pollutants (Federal

hazardous air pollutants) exceeding the exemption levels of Virginia's air toxics regulations. The application originally identified these air toxic pollutants as acrolein, formaldehyde and cadmium. A subsequent ILOD comment identified nickel as an additional air toxics parameter requiring evaluation of ambient air impacts through dispersion modeling. The response notes that the modeling will be provided under separate cover and will include all sources of acrolein, formaldehyde, cadmium and nickel emissions.

DEQ acknowledges and concurs with the CPV Smyth response.

Comment #7

The seventh ILOD comment addressed BACT for carbon monoxide emissions, and requested that CPV Smyth evaluate their BACT proposal of 2.0 ppm (1-hr at 15% O<sub>2</sub>) in terms of stringency versus the BACT limits established in the PSD permits for Dominion's Warren County and Brunswick County plants. The Warren County and Brunswick County limits are 1.5 ppmvd at 15% O<sub>2</sub> as a 3-hr rolling average without duct firing, 2.4 ppmvd at 15% O<sub>2</sub> as a 3-hr rolling average with duct firing. Short term emissions limits for Virginia PSD permits are typically set to be consistent with the reporting of 3-hour stack test results. The 2.0 ppm limit proposed for CPV Smyth would apply with or without duct firing. CPV Smyth's response notes that its BACT proposal for CO emissions is based on the performance of the Alstom GT24 combustion turbine, which it presents as providing an inherent advantage in reducing annual CO emissions from startup and shutdown modes of operation. The response states the Alstom GT24 has a Low Load Operation (LLO) mode allowing "operation down to 10% combined cycle power plant load" using both combustion turbine generators and the steam turbine generator, while meeting the proposed BACT limit at steady-state operation. CPV Smyth contends that this mode of operation allows for a reduction in the number of startups and shutdowns with consequent higher emission rates, which factor into higher total annual CO emissions. It notes that these annual CO emissions are significantly lower than for other combustion turbine models, including the Mitsubishi M501 GAC turbine for the Warren and Brunswick County PSD permits, and the General Electric GE 7FA.05 and Siemens SGT65000F5 turbines as choices for the Green Energy Partners/Stonewall permit. Finally, CPV Smyth contends that the 2.0 ppm limit (with and without duct firing) as a 1-hour average, is equivalent to the 3-hour average limits for the Warren and Brunswick County permits, along with the Green Energy Partners/Stonewall (2.0 ppmvd at 15% O<sub>2</sub> as a 3-hr average with and without duct firing). The original application CPV Smyth application notes on page 5-6 that "BACT will be demonstrated on a continuous basis through the application of a CEMS to monitor CO and O<sub>2</sub> concentrations and calculate the emission rate in units of the BACT emission limit."

We concur with CPV Smyth's position that BACT for carbon monoxide is represented by an emission rate of 2.0 ppmvd at 15% O<sub>2</sub> as a 1-hr average (with and without duct firing), and annual CO emissions corresponding to transitional CO emissions (lbs/event) tabulated on page 7 of the CPV Smyth response (88.0 lb for shutdown/warm start, 64.0 lb

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for shutdown/hot start, and 54.8 lb for transition/LLO/transition) and the permit application.

Comment #8

This ILOD comment, following the approach of the previous comment, requested that CPV Smyth evaluate the stringency of their proposed BACT 1-hour average emission limits for VOC in regard to the 3-hour average VOC limits established for recent PSD permits in Virginia. Both CO and VOC will be controlled by the same oxidation catalyst, with the BACT discussion for VOC also centered on the resulting emission levels. CPV Smyth proposes a limit of 1.0 ppm at 15% O<sub>2</sub> without duct firing and 2.0 ppm at 15% O<sub>2</sub> with duct firing (both 1-hour average). The PSD permits for Dominion's Warren County and Brunswick County plants both have limits of 0.7 ppmvd at 15% O<sub>2</sub> as a 3-hour rolling average without duct firing, and 1.6 ppmvd at 15% O<sub>2</sub> as a 3-hour rolling average with duct firing. The CPV Smyth response is also patterned somewhat on that of the previous comment on carbon monoxide. It presents a table comparing emissions of transitional events such as startup, shutdown and transitions (to and from LLO mode for the proposed Alstom GT24 turbines), and states that annual VOC emissions for startup and shutdown events will be lower than expected emissions for Dominion's Warren County and Brunswick County plants. The response contends that the short-term emissions limits proposed for CPV Smyth are more stringent than the lower 3-hour average limits for the Warren and Brunswick County plants, but concludes that it could not adopt these lower values as 1-hour averages. The short-term limits in the Dominion PSD permits are typical of those in Virginia in order to be consistent with stack testing requirements and reporting of results for the same.

The position of the DEQ in regard to the CPV Smyth response for VOC differs from that for carbon monoxide. A continuous monitoring system will not be available to assess VOC emissions, as with the CEMS for carbon monoxide. Expected annual VOC emissions for the proposed CPV Smyth combustion turbines and duct burners for the heat recovery steam generators (HRSGs) are also higher than the permit limits for the General Electric GE 7FA.05 option for the nominal 750 MW Green Energy Partners/Stonewall project. Although the Green Energy Partners/Stonewall project is in an ozone nonattainment area, the 31.0 ton/yr VOC emissions of the GE turbine option are lower than the 50 ton/yr threshold trigger for nonattainment permitting and are subject to BACT requirements. Dominion's Brunswick County plant will also use Alstom HRSGs with its combustion turbines and consequently should be comparable to CPV Smyth for duct burner firing. For these reasons, DEQ contends that BACT for VOC emissions should also include 3-hour average limits equivalent to those for the Warren and Brunswick County plants, in addition to the 1-hour limits proposed as BACT for CPV Smyth. Both the 1-hour and 3-hour sets of limits can be evaluated from stack testing results. An initial stack test requirement for VOC emissions (in addition to other parameters) is a standard PSD permit requirement in Virginia for this type source.

Comment #9

Our ninth ILOD comment addressed proposed sulfur dioxide (SO<sub>2</sub>), sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>), and particulate matter (PM/PM-10/PM-2.5) emissions, and noted that these emissions levels must be revised downward proportionately in concert with a reduction in the sulfur content limit for the natural gas as discussed in previous ILOD comments. The CPV Smyth response notes per previous discussion that proposed permit limits for SO<sub>2</sub>, H<sub>2</sub>SO<sub>4</sub> and PM/PM-10/PM-2.5 have been revised in concert with a change to 0.3 gr/100 scf as the maximum sulfur content of the natural gas. However, the response proposes to demonstrate compliance through stack testing for the three noted pollutant parameters, and states that NSPS Subpart KKKK does not require monitoring of the sulfur content of the natural gas.

While we have previously agreed with CPV Smyth's proposal to revise the maximum annual average sulfur content of the natural gas to 0.3 gr/100 scf, monitoring of the sulfur content of the natural gas will be required in the permit to demonstrate compliance with this value, as in other Virginia permits. This concentration is based on Virginia BACT, and not on NSPS Subpart KKKK requirements. Initial stack tests will also be required to evaluate compliance with the SO<sub>2</sub>, H<sub>2</sub>SO<sub>4</sub>, and PM/PM-10/PM-2.5 emissions limits.

Comment #10

This ILOD comment references Section 5.2.4 of the application, and requests revision of the proposed PM/PM-10/PM-2.5 BACT emissions limits in proportion to a reduction in the sulfur content of the natural gas, as discussed with the comment above. The CPV Smyth response addresses this item as noted above for comments 3 and 9, with proposed PM/PM-10/PM-2.5 short-term emission rates of 0.0032 lb/MMBtu without duct firing, 0.0046 lb/MMBtu with duct firing, and 11.9 lb/hr for all operating conditions.

The Department acknowledges and concurs with the lb/MMBtu values of the CPV Smyth response, but believes the 11.9 lb/hr figure is only applicable as a maximum rate with duct firing. The original application notes 9.4 lb/hr of emissions without duct firing in Section 5.2.4, which should be reduced to 7.26 lb/hr in conjunction with the 0.0032 lb/MMBtu emission rate and the lower sulfur content of the natural gas. The reduced annual emissions of 36.0 tons per year for each combustion turbine noted in the revised Table 3-3 and page 12 of the Form 7 application (attached to the response), also do not seem to be consistent with an emission rate of 11.9 lb/hr for all operating conditions. Properly revised particulate matter emissions rates should be eventually incorporated into Section 5.2.4 of the application in order for it to be complete.

Comment #11

Our comment again addressed the need to reduce proposed BACT emissions limits such as H<sub>2</sub>SO<sub>4</sub> in regard to also reducing the sulfur content of the natural gas. It also notes that a continuous emission monitoring system (CEMS) or alternative method per 40 CFR 75 will be required to monitor SO<sub>2</sub> emissions to meet acid rain program monitoring requirements. The CPV response states that the proposed project will be subject to the

Acid Rain program and will comply with the monitoring requirements of 40 CFR 75, as noted in Section 4.7 of the application. It also references the response to the third comment in regard to revisions to H<sub>2</sub>SO<sub>4</sub> emissions on the basis of 0.3 gr/100 scf as the sulfur content of the natural gas.

DEQ has previously noted its concurrence with the proposed limit of 0.3 gr/100 scf as an annual average limit for the sulfur content of the natural gas. However, as also previously noted, we believe the proposed 0.0056 lb/MMBtu H<sub>2</sub>SO<sub>4</sub> emissions limit in the CPV response to the third comment to be in error. Perhaps it is a transcription error, with 0.00056 lb/MMBtu as the intended value.

#### Comment #12

This ILOD comment and the corresponding Section 5.2.8 of the application submittal both address BACT for greenhouse gases. The ILOD comment notes that the application does not provide a heat rate value in Btu/kW-hr for comparison to other projects, and does not provide a greenhouse BACT emission rate on the basis of net power output for the proposed facility, as an adjunct to its proposal of 888 lb CO<sub>2</sub>e/MW-hr on a gross output basis over a 12-month period. It also seeks justification for this limit exceeding the 840 lb/MW-hr limit on a similar basis for Ohio's Oregon Clean Energy Center, and contends that the CPV Smyth proposal is likely higher than the BACT limit for the Footprint Salem Harbor Development Project of 895 lb CO<sub>2</sub>e/MW-hr on a net basis of power delivered to the grid. In addition, DEQ staff presented information on a PSD greenhouse gas permit application for Alstom GT24 combustion turbines for the FGE Power project in Westbrook, Texas, at a meeting at the Southwest Regional Office (SWRO) to discuss the ILOD on March 28, 2014. This meeting included a request by DEQ for the application to include cost data for its evaluation of the feasibility of carbon capture and storage options. The CPV Smyth response states that the net heat rates at maximum load operating scenarios (incorporating a 12% system degradation factor) are 7,586 Btu/Kw-hr (-10°F with duct firing) and 7,341 Btu/kW-hr (59°F without duct firing). CPV Smyth indicates that its proposed BACT limit is equivalent to 891 lb CO<sub>2</sub>e/MW-hr on a net basis, as the parasitic load for plant operation for the proposed project is less than 0.3% of gross electrical output at full load. The response contends that the BACT limit for the Oregon Clean Energy Center is based on Siemens SCC6-8000H combustion turbines, noted as larger and "slightly" more efficient than the Alstom GT24 "F class" turbines proposed for the CPV Smyth project. In conjunction, it cites the EPA Environmental Appeals Board decision in the La Paloma case regarding PSD permitted combustion turbine options, for which CPV Smyth ascribes the conclusion that "minor differences in BACT emission rates for different turbine models are acceptable." Subsequent developments since the March SWRO meeting for the FGE Power project are addressed, with the indication that the draft PSD greenhouse BACT limit for this permit is 889 lb CO<sub>2</sub>e/MW-hr on a gross output basis. Finally, the response includes additional cost data for carbon capture and storage, providing support for its conclusion that such a control option is not economically feasible for the proposed CPV Smyth project.

We acknowledge the response for net heat rate values and receipt of additional cost data for evaluation of carbon capture and storage feasibility. DEQ accepts CPV Smyth's statement that its proposed BACT limit is equivalent to 891 lb CO<sub>2</sub>e/MW-hr on a net output basis, and we plan to include that limit in the draft PSD permit as a complement to a limit based on gross electrical output. A number of questions remain in regard to the proposed 888 lb CO<sub>2</sub>e/MW-hr limit on the basis of gross output. Typically, parasitic load for a combined-cycle plant is presumed to be on the order of 2% of gross electrical output. Such a factor applied to the 891 lb/MW-hr value above, would correspond to a limit of about 874 lb CO<sub>2</sub>e/MW-hr on a gross output basis. A similar value can also be derived by taking design data presented for the Alstom GT24 combustion turbines in the FGE Power application, weighting for the proposed 5760 hours of operation without duct burners and 3000 hours with duct burners, and then applying a 12% degradation factor. We believe a limit on this order on a gross output basis could be achievable. Such a limit would also more closely align with the 840 lb/MW-hr limit proposed for the similar 800 MW Oregon Clean Energy Center, and the discussion of "minor" differences in BACT emission rates in the La Paloma decision by the Environmental Appeals Board. Narrative for this decision describes a 2.6% difference in limits on a gross output basis as a minor difference in the performance of the permitted turbine model options.

Comment #13

The ILOD comment noted that startup, shutdown and malfunction emissions must be included in the annual emissions reported for the combustion turbines, and that expected annual fuel consumption for the turbines be provided on page 7 of the DEQ Form 7, and be inclusive of startups. It also states that CEMS for CO<sub>2</sub> will be required for the facility. The CPV Smyth response states that the project will meet 40 CFR Part 75 requirements as noted in the application and will include CEMS for NO<sub>x</sub>, CO, CO<sub>2</sub> and ammonia. It goes on to state that startup, shutdown, malfunction, and transitional LLO emissions are included in the totals of potential annual emissions. An amended page 7 of DEQ Form 7 is included in the response letter with maximum annual fuel consumption for the combustion turbines. CPV Smyth proposes to limit the duration of noted transitional modes of operation, as opposed to limiting fuel throughput for events such as startups, consistent with recent PSD permits for power plants in Virginia.

Virginia DEQ acknowledges and concurs with the response by CPV Smyth, and reiterates that fuel throughput limits in the PSD permit will be on an annual basis.

Comment #14

Nitrogen oxides BACT emissions limits and ammonia slip emissions from the required selective catalytic reduction (SCR) control system are the subject of this ILOD comment. The BACT limit for NO<sub>x</sub> to be applied as 2 ppmvd at 15% O<sub>2</sub> as a 1-hour average does not appear to be a matter of controversy, along with the required control technology. Proposed ammonia slip emissions are in contention, and are addressed later under comment #17.

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Comment #15

This comment addresses information that must be provided, which is noted “to be determined” on the pages of the Virginia DEQ Form 7 Air Permit Application? It states that information such as equipment manufacturer, type and model number will be required before the application can be considered complete. The ILOD comment goes on to note that a number of corrections need to be made on the DEQ Form 7 application pages, serving as an appendix to the PSD permit application. These include latitude and longitude or UTM coordinates for the plant location, expected natural gas consumption for the combustion turbines, the Form 7 page for storage tanks with an indication as to emission losses, revisions to toxic/HAP emissions on page 13 of the form, and potential emissions of SF<sub>6</sub> as leakage from circuit breakers added to page 15 of the Form 7 application. The CPV Smyth response states that work is in progress on providing the information noted to be determined on the respective application pages. It notes a number of missing pieces of information, including the emergency generator and fire pump engine make and model, SCR and oxidation catalyst make and model, and retention times and pressure drops for the SCR and oxidation catalyst. Revised pages 5 and 7 of the DEQ application form are attached to the response letter, including the maximum natural gas consumption at the expected operating hours of the proposed emissions sources. CPV Smyth indicates again in its response that there will be negligible emissions losses from the aqueous ammonia storage tank due to the configuration of the tank and its pressure relief valve and filling procedure by tanker truck. Results are included for an evaluation with EPA’s TANKS 4.0 software for the proposed 6,000 gallon diesel fuel storage tank, which indicates VOC emission losses of only 2.12 pounds per year. The response also contends that expected annual air toxics emissions are calculated correctly and that revisions to page 13 of Form 7 are not required. Finally, CPV Smyth again contends that SF<sub>6</sub> emissions as leakage from the circuit breakers is not required for page 15 of DEQ Form 7, and that BACT for the circuit breakers involves only a limited leakage rate without the need to calculate expected emissions.

As we have previously stated, information noted “to be developed” will be required for the draft PSD permit package that serves as reference for the public notice, briefing and hearing process. We append such equipment information with the notation, “or equivalent,” to provide some flexibility for the permittee. At a minimum, this information must include a manufacturer name (or names) and a rating. We acknowledge the receipt of revised pages 5 and 7 of the Form 7, and the information on expected storage tank emissions. However, information on air toxics is still required for page 13 of Form 7, and SF<sub>6</sub> emissions must still be provided for page 15 of the application form. Air toxics emissions from sources other than the combustion turbines need to be added to page 13, and SF<sub>6</sub> emission limits as CO<sub>2</sub>e will be established for the circuit breakers, in addition to a limit on the leakage rate from the same. Also as stated previously, BACT for this may well be a 0.5% leakage rate, as proposed in PSD permit applications for power plants in both Moundsville, West Virginia, and FGE Power in Westbrook, Texas.

Comment #16

The ILOD comment noted differences in tabulation of air toxics emissions (HAP emissions in Virginia) in Appendix B of the February 2014 application submittal. It states that uncontrolled air toxics emissions must be used to determine if Virginia's hourly and annual exemption thresholds are exceeded for the respective air toxics parameters. Modeling is required for those air toxics exceeding these exemption levels, and the ILOD indicates that recent Virginia PSD permit evaluations have included dispersion modeling and state-only enforceable emission limits for acrolein, cadmium, chromium, formaldehyde, and nickel. Selection of emission factors in the application's air toxics evaluation is questioned, including the use of the CARB emission factor of 0.00011 lb/MMBtu for formaldehyde emissions from the combustion turbines, instead of the emission factor of 0.00071 lb/MMBtu from EPA's AP-42 compilation. Finally, the ILOD indicates that incorrect toxics exemption levels are used in the application submittal for nickel and chromium. The CPV Smyth response states that potential air toxics emissions were recalculated on an uncontrolled basis as noted in the response to comment #6, in order to determine applicability of Virginia's air toxics regulatory requirements. This revision indicates nickel as an additional air toxics parameter exceeding exemption levels, consequently requiring dispersion modeling. CPV Smyth contends that the CARB emission factor for formaldehyde is more reflective of more recent combustion turbine models firing natural gas, and that the EPA AP-42 emission factor is too conservative.

Virginia DEQ concurs with CPV Smyth that air dispersion modeling and state-only enforceable facility emissions limits are required for acrolein, cadmium, formaldehyde, and nickel. All emissions of these pollutants from the proposed facility must be evaluated in the modeling, as we have stated previously. Although EPA's April 2000 AP-42 emission factor for formaldehyde has an "A" rating, we accept the use of the CARB emission factor in the evaluation, based partly on similar emissions values for the compound used for Alstom GT24 turbines and duct burners in the development of the PSD permit by the state of Texas for the FGE Power project in Westbrook.

Comment #17

This final DEQ comment on technical aspects of the application indicates significant concern with ammonia slip from the SCR control system in regard to pollution prevention with a PM-2.5 precursor and odor concerns. The potential annual ammonia slip emissions of 130.3 tons listed for CPV Smyth are noted by the ILOD as considerably higher than with recently permitted combined-cycle turbine power projects in Virginia. It also notes that a 2 ppmvd limit for ammonia slip emissions is included in the PSD permit for Dominion's Warren County power plant, and that the 130.3 tons of expected ammonia slip emissions are significantly higher than for another larger Dominion facility recently permitted for Brunswick County. The 2 ppmvd limit is noted as typical, with Virginia regulations cited as requiring the application of best available control technology for odor concerns. The CPV Smyth response states that its proposed 5 ppm ammonia slip

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is equivalent to emissions addressed in recent PSD permits issued by DEQ for the Greene Energy Partners/Stonewall LLC and Dominion Brunswick County projects. It states that this 5 ppm concentration is also protective in regard to odor concerns, citing a 5 ppm to 50 ppm range as an ammonia odor recognition threshold from EPA and OSHA sources. The response indicates that the annual value of 130.3 tons of ammonia slip is based on Alstom vendor data, and also includes a calculation approach to verify the same using Method 19 of EPA's Appendix A Test Methods (response notes Appendix B) to 40 CFR Part 60 Performance Specifications. Method 19 is a test method for the determination of removal efficiency for SO<sub>2</sub> and particulate matter, SO<sub>2</sub>, and NO<sub>x</sub> emission rates. The CPV Smyth response presents calculations using equations from Method 19 and F<sub>d</sub> (ratio of the gas volumes of combustion products less water to the heat content for natural gas) of 8,710 dscf/MMBtu from Table 2 of the method, and calculates an ammonia emission rate of 13.4 pounds per hour with this approach. It states that this confirms the Alstom "guaranteed" emission rate of 13.2 pounds per hour for ammonia slip.

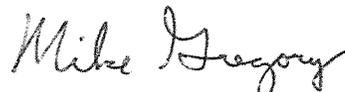
DEQ contends that limits on ammonia slip emissions of 2 ppmvd on a steady-state basis and 5 ppmvd on a non-steady-state basis as a pollution prevention requirement in the PSD permit would be appropriate. This requirement is included in the PSD permit for Dominion's Warren County plant, and Dominion commits to meeting the same ammonia slip emissions in their application for the PSD permit for their Brunswick County plant. As noted in the ILOD, expected ammonia slip emissions from the larger 1400 MW Brunswick County plant are significantly lower than the CPV Smyth proposal. The Brunswick County PSD application lists expected emissions for each combustion turbine as 9.32 lb/hr with duct burner firing, 7.96 lb/hr without duct burner firing, and 122.4 tons per year for the proposed facility. The use of the calculation approach for ammonia slip emissions based on Method 19 appears problematic, as the ammonia is not involved in the combustion process and is introduced after the CO oxidation catalyst, which further changes products of combustion. In any case, vendor emissions guarantees are typically conservative and are not a dominant basis for setting BACT and/or PSD emissions limits in Virginia.

Comment #18

Receipt of executed Local Governing Body Certification Form acknowledged.

Please let us know of any comments you may have on these issues at your earliest possible convenience. If you have any questions, you can call me at (276) 676-4834.

Sincerely,



Mike Gregory  
Environmental Engineer Senior

cc: Allen Newman