

**DOMINION VIRGINIA POWER'S RESPONSE TO
PUBLIC COMMENTS ON THE PROPOSED PERMIT
FOR THE WARREN COUNTY POWER STATION PSD PERMIT
DECEMBER 3, 2010**

Introduction

Virginia Electric and Power Company (d/b/a Dominion Virginia Power) (Dominion) is pleased to provide these additional responses to public comments pursuant to 9 VAC 5-80-1773.C. Dominion has applied for a Clean Air Act (CAA) Prevention of Significant Deterioration (PSD) Permit for a nominal 1300 MW natural gas-fired combined cycle power station in Warren County, Virginia. Dominion is committed to full compliance with all applicable air emission regulations and associated limits, as well as the additional requirements included in the specific draft permit language. As stated previously by Pamela Faggert, Chief Environmental Officer for Dominion at the State Air Pollution Control Board's (Board's) public hearing for the draft permit on November 9, 2010, this facility will be at or near the top of the United States Environmental Protection Agency's (EPA's) national clearinghouse list of facilities with the best air pollution control technologies. The facility emissions will be controlled beyond PSD Best Achievable Control Technology (BACT), to levels that are considered to be Lowest Achievable Emissions Rates (LAER), for the primary components of our emissions. Dominion has previously submitted proposed language regarding emissions offsets.

The proposed Warren County Power Station (WCPS or Station) is vitally important for Dominion to continue meeting our obligation to provide safe, reliable, cost effective energy to the growing needs of our customers. The Station directly addresses the increasing customer demand for electricity. The 2010 load forecast produced by PJM (the regional transmission system operator), projects that capacity requirements for the Dominion transmission zone will grow by 5,600 MW from 2010-2019. Dominion's projections in its Integrated Resource Plan filed with the Virginia State Corporation Commission (SCC) show that it will need the natural gas-fueled WCPS to be operational no later than 2015 to meet projected customer demand. Additionally, building this power station is consistent with the Virginia Energy Plan's call for decreased reliance on imported energy and more emphasis on electricity generated in the state to serve native load.

For the reasons cited below, Dominion will not be extensively addressing non-air quality related comments. The CAA provides that a PSD permit may not be issued unless, among other things, “a public hearing has been held with opportunity for interested persons ... to appear and submit written or oral presentations on the air quality impact of such source, alternatives thereto, control technology requirements, and other appropriate considerations[.]” CAA § 165(a)(2). The EPA Environmental Appeals Board has explained that there are two important considerations in responding to comments.

First, it is self-evident that Congress did not intend section 165(a)(2)’s reference to “alternatives” to open the public comment process to matters unrelated to air quality. Thus, the “permitting authority need not respond to comments on alternatives that commenters recommend to achieve objectives unrelated to air quality.” It is sufficient for the permitting authority to merely explain that the comment falls outside the scope of what the public is entitled to raise during the public comment period. We also agree that the permitting authority is not required to “conduct an independent analysis of available alternatives.” Because the CAA contains specific language for permits in nonattainment areas requiring the permit issuer to perform an analysis of alternative sites, sizes, and production processes, among other things, to determine whether the benefits of the proposed source outweigh its costs, and because similar specific language is not included for the issuance of a PSD permit, *compare* 42 U.S.C. § 7503(a)(5) *with id.* § 7475(a), the PSD permit issuer therefore is not required to perform an independent analysis of alternatives...

[EPA] also correctly states that in the PSD context “[t]he extent of [the permitting authority’s] consideration and analysis of alternatives need be no broader than the analysis supplied in public comments.” This conclusion flows naturally from our conclusion that Congress did not require the PSD permit issuer to undertake an independent investigation of alternatives. Indeed, more generally, the permitting regulations do not require the permit issuer’s response to public comments “to be of the same length or level of detail as the comment.” *In re NE Hub Partners*, 7 E.A.D. 561, 583 (EAB 1998). Instead, “[t]he response to comments document must demonstrate that all significant comments were considered.” *Id.*; *see also* 40 C.F.R. § 124.17(a)(2).

In Re Prairie State Generating Company, 13 E.A.D. 1, 29-31 (EAB 2006).

Responses to Comments

- 1. Comment: Dominion should use solar energy, wind energy, other renewable energy sources, demand side management and improved generation efficiency to reduce the need for fossil fueled generation. (Wesley Trindel, SELC)**

Dominion Response:

- Complementing traditional fossil fueled generation, Dominion is developing renewable energy generation to bring greater diversity to our power supplies and reduce greenhouse gas emissions. Renewable energy projects use sources such as solar, wind, and biomass to produce electricity — and protect the environment.
- We are committed to expanding our renewable portfolio to help Virginia meet its 15 percent renewable generation target by 2025 and North Carolina's 12.5 percent renewable target by 2021. The SCC approved Dominion's plan to meet Virginia's Renewable Energy Portfolio Standard Program on May 18, 2010. In addition to our renewable energy projects, Dominion offers customers the choice to purchase Green Power. Virginia Green Power became available to customers in 2009, enabling them to offset all or part of their energy consumption with renewable energy.
- Dominion's renewable energy investments are well aligned with Virginia's new partnership in a Federal Clean Energy Program. For more information see <http://www.dom.com/dominion-virginia-power/powering-virginia/renewable-energy.jsp>.
- Moreover, Dominion is implementing several energy conservation programs that have been approved by the Virginia State Corporation Commission. For more information see <http://www.dom.com/dominion-virginia-power/customer-service/energy-conservation/ec-programs.jsp>.
- While solar and wind are promising technologies for providing energy, WPCS is designed as an intermediate to base load power plant to provide 1300 MW of power, *i.e.*, energy on demand. The intermittent non-dispatchable nature of wind and solar make them unsuitable alternatives to fill the role which WPCS will fill in the Dominion system. Renewables, demand side management, and efficiency, along with WPCS, all play a role in meeting Dominion's plans for providing reliable, safe, and affordable power to its customers while protecting our environment.

2. Comment: Concerns about the increase in size over the original proposal (Steven Bruckner, SELC)

Dominion Response:

- Dominion is working toward reducing the energy deficit in the Commonwealth of Virginia, and increasing the size of a previously permitted location is an environmentally responsible solution. The size of the proposed Station directly addresses a growing customer need for electricity. The 2010 load forecast produced by PJM (the regional transmission system operator), projects that capacity requirements for the Dominion transmission zone will grow by 5,600 MW from 2010 to 2019. Additionally, building this Station is supporting the goals of Virginia's Energy Plan, which calls for decreased reliance on imported energy and more emphasis on electricity generated in the state to serve native load. Virginia ranks only behind California on the amount of energy it imports to meet its energy needs.
- Dominion's 2009 Integrated Resource Plan filed with and approved by the SCC on August 6, 2010 includes the Station coming online by 2015.

3. Comment: The United States Department of the Interior (DOI) is concerned that Virginia Department of Environmental Quality (DEQ) did not provide necessary PLUVUE models until September 24, 2010 in its Staff Analysis and a draft permit until October 7, 2010. (DOI)

Dominion Response:

- Applicable regulations require that the DEQ provide the DOI with a copy of the application promptly after receipt and at least 60 days before the public hearing. Evidence of compliance with this requirement, including the dates of correspondence regarding modeling transmittals, is reflected in a letter from Anita Riggleman to Martha Bogle dated September 3, 2010. It indicates that DEQ forwarded the original application on February 17, 2010, and application amendments on April 29, 2010. Moreover, the record reflects that Dominion, DEQ and the DOI corresponded on modeling issues many times between February 12 and September 2, 2010. The September 3, 2010, letter from DEQ to the DOI, while not required, clearly stated that the public hearing would be held some 64 days later (November 9, 2010) and requested information on impacts to be submitted by October 6. The September 24, 2010 submission was a summary of modeling data, which is not required by the regulations. While the DOI might desire additional time before the public notice on the hearing is sent out to comment on the WCPS application, it is not specified in the regulations, which only require that the DEQ report any analysis provided by the DOI before the notice is sent out and whether the DEQ agrees with it. Virginia's rules regarding DOI participation in the process are identical to those set out by EPA, and EPA has approved Virginia's PSD program in all respects.

- DOI was provided with initial modeling results, including a detailed description of the proposed project, well before 60 days prior to the November 9, 2010, public hearing. In fact, they conducted a review and provided (through Ellen Porter) a discussion of critical nitrogen loading and related deposition issues in a communication to Mike Kiss of DEQ on September 1, 2010 (which was over 60 days prior to the November 9 public hearing).
 - Thus, a chronology of the exchanges of information between the DEQ and DOI confirms that not only did DEQ comply with the applicable requirements, the DOI was fully informed of the application and the development of the draft permit.
 - Consistent with 9 VAC 5-80-1765, the draft permit was provided to the DOI when it became available on or before October 7, 2010.
 - Even though discussions regarding modeling continued through September, these communications with DOI were not part of the permit application, but rather were in response to questions that resulted from their review. This simply concluded a long series of correspondence that began well before the 60-day period.
- 4. Comment: The SELC and others asked the Board to take direct consideration of the permit. (SELC, Others)**

Dominion Response:

- It is our understanding that the DEQ Director has, in his discretion, submitted the permit to the Board for consideration pursuant to Va. Code §10.1-1322.01.F. No further procedures are required under that section for the Board to consider and act on the permit application and draft permit at its December 17, 2010, Board meeting. The agenda published for that meeting shows the Board will consider them at that time.
- 5. Comment: Oral comments at the public hearing held on November 9, 2010, might be construed as requesting a public hearing pursuant to Va. Code §10.1-1322.02. (Alison Teeter)**

Dominion Response:

- The public hearing on this permit was held on November 9, 2010, as required by the PSD regulations. Board Chairman Hullahen Moore and Board Member Richard Langford presided over this hearing. The applicable statute states that where public hearings are mandatory, as is the case here, the public still has an opportunity to request Board consideration of the permit. As noted above, the DEQ Director has submitted this permit to the Board for its consideration.

- 6. Comment: While the DOI agrees with the control technology selected by Dominion, it believes that WCPS could achieve lower emission rates by choosing inherently cleaner combustion turbines. The DOI provides a table indicating emissions on lbs/hr per turbine for Mitsubishi, Siemens and GE equipment (DOI).**

Dominion Response:

- This comment came from a technical support document provided by the DOI. In its letter of November 29, 2010, the DOI stated that the agreed-upon mitigation plan for the proposed project (which includes the MHI turbines) alleviates the DOI's "adverse visibility impact concerns" and would provide a net environmental benefit.
 - The proposed equipment and control technologies go beyond BACT and represent lowest available emission rates (LAER).
 - The emission rates indicated in the chart provided by the DOI are in lbs/hr, but do not reflect the fact that the Mitsubishi equipment produces significantly more power than the Siemens or GE equipment. Thus, to pursue equivalent power additional turbines, and therefore more emissions, would be required. More specifically, Dominion estimates that five GE 7FA.05 turbines would be required to produce the equivalent amount of power as the proposed MHI three-turbine arrangement.
 - For additional information on the selection of the MHI turbines, see Dominion's comments on the PSD permit dated November 24, 2010, at attachment pages 2 through 4.
- 7. Comment: There have been suggestions to adopt a NO_x emission limit of less than 2 ppmvd at 15% O₂ (24-hour average) in addition to the already proposed 2 ppmvd at 15% O₂ (1-hour average) for our WCPS Project.**

Dominion Response:

- We understand that the basis for this suggestion is one vendor's statement that: "SCR systems can reduce the amount of NO_x released by 70 to 95%, depending on the application used and the type of operation it is used on."¹ We do not believe that this statement leads to the conclusion that a combined cycle gas turbine power plant can continuously achieve a NO_x emission limit of less than 2 ppm.
- The WCPS is not able to continuously achieve a NO_x emission level below 2 ppm. Dominion does not believe this limit is achievable and would provide the following considerations for why a 2 ppm NO_x limit is BACT/LAER and is appropriate for the WCPS.

¹ [Selective Catalytic Reduction | How it Works? | Cormetech Inc.](#)

- We understand that there may be concerns that emission limits may be set by pointing to vendor information suggesting that a lower limit may be possible or to test data that show a lower emission rate than the emission limits in the draft permit. This suggestion is seriously flawed because it fails to recognize several aspects of how a BACT analysis is performed in practice and how a plant operates in practice. These arguments have been addressed and rejected by EPA and the federal Courts. That rejection is based on three principles found in the definition of BACT in the CAA.
- First, BACT is determined on a “case-by-case” basis; there is no one-size fits all BACT analysis which takes into account site and project specific factors. BACT must be flexible enough to account for facility-specific characteristics. *Alaska Dep’t Env’tl. Conservation v. EPA*, 540 U.S. 461, 488 (2004) (recognizing that “Congress entrusted state permitting authorities with initial responsibility to make BACT determinations ‘case-by-case’”).
- Second, the BACT limit determined must be “achievable.”² In the vast majority of cases, BACT emission limits are “achievable” if a facility has demonstrated in practice that it can achieve those emission limitations.³ The concept of achievability takes into account the fact that emission rates from an actual operating plant can fluctuate depending on a variety of factors. EAB precedent has recognized margins of safety and safety factors as legitimate mechanisms to account for the uncertainty involved in establishing facility-specific emission limits prior to construction and the collection of actual operating data. *In re Prairie State Generating Co. LLC*, 13 E.A.D. ___, Slip op. at 68-77 (EAB 2007).
- Notably, the available data on the past performance of the selected technology may show that “the control efficiency achievable through the use of the technology may fluctuate, so that it would not always achieve its optimal control efficiency.” *In re Masonite Corp.*, 5 E.A.D. 551, (EAB 1994); *see also In re Pennsauken County, N.J., Res. Recovery Facility*, PSD Appeal No. 88-8, at 5 (Adm’r, Apr. 20, 1989) (Order Denying Review) (selected technology’s control efficiency was known to fluctuate). For this reason, as we explain more fully in the following part of this decision, we have authorized the use of so-called “safety factors” that take into account test method variability, location specific technology variability, and other practical difficulties in operating a particular technology. *See, e.g., In re Knauf Fiber Glass, GmbH*, 9 E.A.D. 1, 15 (EAB 2000) (“There is nothing inherently wrong with setting an emissions limitation that takes into account a reasonable safety factor.”).

² 40 CFR § 52.21(b)(12) (definition of “Best Available Control Technology”).

³*Id.*

- Because of this variability, there is an important distinction between emission rates achieved at a specific time on a specific unit and an emission limitation that a facility must be able to meet continuously over its operating life. In interpreting the federal CAA, the U.S. Court of Appeals for the D.C. Circuit has determined that “achievable” as it relates to BACT emissions limitations determinations must be achievable “under most adverse circumstances which can reasonably be expected to recur”⁴ EPA’s Environmental Appeals Board has reached similar conclusions regarding BACT in prior determinations for PSD permits.

[A]gency guidance and our prior decisions recognize a distinction between, on the one hand, measured “emissions rates,” which are necessary data obtained from a particular facility at a specific time, and on the other hand, the “emissions limitation” determined to be BACT and set forth in the permit, which the facility is required to continuously meet throughout the facility’s life. Stated simply, if there is uncontrollable fluctuation or variability in the measured emission rate, then the lowest measured emission rate will necessarily be more stringent than the “emission limitation” that is “achievable” for that pollution control method over the life of the facility. Accordingly, because the “emission limitation” is applicable for the facility’s life, it is wholly appropriate for the permit issuer to consider, as part of the BACT analysis, the extent to which the available data demonstrate whether the emissions rate at issue has been achieved by other facilities over a long term.⁵

- Consequently, BACT must be set at the lowest feasible emission rate, recognizing that the facility must be in compliance with that limit for the lifetime of the facility on a continuous basis. Moreover, reliance on emission limits established in recent permit reviews based on emissions rates that have been demonstrated in practice over the gamut of normal facility operations is uniformly a more reliable a determination of BACT emission limits than a determination based on emission rates that have been measured over a short-term basis or not at all. BACT emission limits set in recent permits generally reflect the collective judgment and experience of DEQ concerning emissions projection levels that can reasonably be expected to be met continuously over the life of a certain type of facility, considering operational fluctuations, the need for appropriate compliance margins, and expected degradation of equipment over time.
- Third, the CAA contains stringent enforcement provisions and complete compliance is required. It is important to note that the emission limits established for WCPS, even with safety factors, are some of the most stringent in the country. The EAB has previously recognized that where a control technology’s ability to control emissions is known to

⁴ *National Lime Ass’n v. EPA*, 627 F.2d 416, 431 n. 46 (D.C. Cir. 1980).

⁵ *In re: Newmont Nevada Energy Investment, L.L.C.*, 12 E.A.D. 429, 442 (EAB 2005) (order denying review).

fluctuate, setting the emission limit at the highest control efficiency would make violations unavoidable. *In re Masonite Corp*, 5 EAD 560. Based on this analysis, the EAB found no clear error when reviewing emission limits “within the range” of recently permitted BACT limits, and has recognized the permitting authority’s “discretion to set BACT levels that ‘do not necessarily reflect the highest possible control efficiencies but, rather, will allow permittees to achieve compliance on a consistent basis.’” *In re Kendall New Century Dev.*, PSD Appeal No. 03-01, slip op. at 17 (EAB Apr. 29, 2003) (citations omitted). Finally, the EAB has recognized variability between emissions from identical units and control technologies. *Masonite*, 5 E.A.D. at 560.

Further, “[d]ue to characteristics of individual plant processes, we recognize that application of identical technology may not yield identical emission limits.” *In re Knauf Fiber Glass, GmbH*, 8 E.A.D. 121, 143 (EAB 1999); *see also* NSR Manual at B.23 (“Many control techniques, including both add-on controls and inherently lower polluting processes can perform at a wide range of levels.”).

Thus, we have held that a permit writer is not required to set the emissions limit at the most stringent emissions rate that has been demonstrated by a facility using similar emissions control technology. *In re Kendall New Century Dev.*, 11 E.A.D. 40, 52 (EAB 2003). Instead, permit writers retain discretion to set BACT levels that “do not necessarily reflect the highest possible control efficiencies but, rather will allow permittees to achieve compliance on a consistent basis.” *In re Steel Dynamics, Inc.*, 9 E.A.D. 165, 188 (EAB 2000);. *Prairie State* slip op at 72.

- Thus, based on the principles that BACT is case-by-case, achievable and enforceable, the EAB has recognized that BACT will not reflect the lowest limit or measured emission rate at another plant, much less emission levels that have never been measured on an operating plant. With respect to the proposed Station, we submit the following technical information.
- The WCPS is not able to continuously achieve a NO_x emission level below 2 ppm. The requirement in the draft permit to reduce ammonia slip to 2 ppm balances reduction in NO_x and ammonia slip, thus further restricting the ultimate level of NO_x reduction.
- We can find no established BACT or LAER emission limit for NO_x less than 2.0 ppm (1-hour average) that has been “achieved in practice,” as that term is applied in the context of a BACT determination.
- All 2010 permit decisions listed in EPA’s RACT/BACT/LAER Clearinghouse as well as other available comparable permits issued in 2010 confirm that current BACT for combined cycle gas turbines is 2 ppmvd or higher. For example, the California Bay Area Air Quality Management District (BAAQMD) recently investigated the possibility of achieving 1.5 ppm

NO_x. Based on this Investigation, on October 29, 2010, the BAAQMD issued a preliminary determination that 2.0 ppmvd is BACT for combined cycle gas turbines.⁶

- It has not been established or demonstrated that less than 2 ppm can be achieved for any type of turbine, especially over the entire gas turbine operating range. Issues related to mixing of ammonia in the stack gas, and flow and concentration stratification across the exhaust path, become increasingly important at lower NO_x emission limits, especially while operating with an ammonia slip limit of 2 ppm.
- WCPS is designed to utilize duct burners to boost generation during periods of critical load demand. Duct burner operation contributes to an increase in flue gas NO_x levels over and above that generated by the combustion turbine and affects ammonia and NO_x distribution. Therefore the ability for WCPS to continuously meet less than 2ppm NO_x is further constrained.
- If a NO_x emission limit below 2 ppm was achievable at steady state, a 24-hour emission limit would restrict the plant operating flexibility in response to grid demands for rapid load changes to ensure reliability of the Bulk Power System. Operating flexibility is increasingly critical for grid stability with the penetration of intermittent renewable power to the mix of power generation. While the MHI turbine is capable of rapid load changes within good emission performance, the Selective Catalytic Reduction (SCR) ammonia injection control system is highly unlikely to be able to respond quickly enough to ensure compliance with both a limit of less than 2 ppm NO_x limit and a 2 ppm NH₃ limit during rapid load changes. Moreover, the Regional Transmission Operator (PJM) imposes contractual obligations to achieve certain ramp rate capabilities to ensure grid stability and these obligations likely cannot be met with a less than 2 ppm limit.
- WCPS is designed for and is anticipated to operate in Automatic Generator Control (AGC) mode to balance Control Area Generation Error for up to 85% of its operating window. By design, AGC involves the same sort of rapid load changes discussed above related to Grid Stability obligations and the facility will experience the same types of NO_x and NH₃ control system hysteresis overshoots as described above during this operating mode. As a result, a less than 2 ppm limit would likely preclude AGC operation.
- SCR efficiency and combustion turbine performance degradation over time further challenges our ability to achieve such a limit on a long-term basis, especially in the face of a stringent 2 ppm ammonia slip limit.

⁶ Preliminary Determination of Compliance, Oakley Generating Station Contra Costa, California, October 29, 2010, *available at*, <http://www.energy.ca.gov/sitingcases/oakley/documents/index.html>

- A less than 2 ppm NO_x limit is at the limit of continuous in-stack NOX monitoring to determine compliance.
- A limit of less than 2 ppm limit does not adequately accommodate “real-world” conditions within the heat recovery steam generator (HRSG). For instance, at operating temperature of approximately 750 deg F, there is a significant amount of thermal expansion that occurs within the HRSG where the SCR catalyst is located. Thermal cycling is expected to increase in the future as more and more renewable energy is added to the local grid. This thermal cycling tends to damage the seals that prevent gas turbine exhaust from bypassing the catalyst. These seals are typically available for inspection and repair only during annual plant outages. With a NO_x limit of less than 2 ppm, it is likely that more frequent outages will be required to inspect and repair these seals. If additional outages are required specifically to inspect and repair catalyst seals, the economic impact resulting from the downtime in terms of loss revenue from energy sales and capacity payments will be significant.
- Additional NO_x reductions may theoretically be achieved by increasing the amount of catalyst by increasing the depth/size of the catalyst bed in the SCR system. In reality, it would be difficult to achieve any substantial additional reductions, because at the very low NO_x levels that are currently being achieved by SCR additional efforts produce diminishing returns. SCR performance for NO_x control is highly dependent on the NO_x to ammonia reaction stoichiometry. At stoichiometric conditions, there would be just enough ammonia to react with the NO_x with no additional stoichiometric ammonia slip exhausted out the stack. This is further challenged if the unit departs steady state conditions and ramps as required to meet the AGC or grid stability missions previously discussed.
- Lastly, it becomes highly challenging to ensure a uniform distribution of ammonia to NO_x over the entire gas turbine operating range when NO_x concentrations are very low. Increasing the amount/depth of the catalyst would also increase the backpressure on the turbine exhaust and decreasing the efficiency of the turbine resulting in a derate of the unit as well as higher emissions per megawatt of power generated. Moreover, no installation using this approach has been demonstrated in practice. Additionally, temperature variations across the catalyst bed also impact SCR performance. At progressively lower NO_x concentrations, these variations have an increasingly significant impact on maintaining stoichiometric conditions. For all of these reasons, it becomes increasingly difficult to gain additional NO_x reductions as concentrations are driven to extremely low levels simply by increasing the amount of catalyst or the size of the catalyst bed.
- Even if lower emissions could be achieved by increasing the amount of catalyst or the size of the catalyst bed, this approach would have the following other offsetting impacts:

- Ensuring NO_x emissions consistently remain below 2.0 ppm could potentially cause a significant increase in ammonia slip and require a higher ammonia slip permit limit well above our proposed stringent 2 ppm limit. The additional ammonia emissions will offset the benefit of reduced NO_x emissions.
- Implementing a NO_x limit below 2.0 ppm would also likely require an increase in the frequency of catalyst changeouts to maintain compliance. This would have both cost impacts and ancillary environmental impacts, because the old catalyst must be disposed of as hazardous waste, since the larger amount of catalyst needed would generate more spent catalyst to be disposed of, and additional energy and natural resources would be needed to produce the new catalyst.
- A NO_x permit limit below 2.0 ppm limit would also result in additional maintenance, which adds to operating costs and requires maintenance outages during which the Station is unavailable to meet demand. For example, achieving very low NO_x limits would require the seals in the SCR system to be maintained to very tight tolerances to minimize the amount of NO_x that may slip by them. With a NO_x permit limit below 2.0 ppm, it is likely that more frequent outages will be required to inspect and maintain these seals, which adds to the cost and could significantly impact the Station's availability to support the grid.
- Increasing the amount/depth of the catalyst would also significantly increase the backpressure on the turbine exhaust. This has several undesirable effects including decreasing net unit output as more shaft horsepower is consumed in compression versus generation as well as increasing heat rate (decreasing thermal efficiency). This results in a derate of the unit as well as higher emissions per megawatt of power generated.
- The net effect of all these considerations would be to derate the unit well below design within a short period of time. In addition it would likely prevent it from accomplishing its design missions related to:
 - Duct Burner generation during critical load peaks.
 - AGC mode to balance Control Area Generation error.
 - Regional Transmission Operator (PJM) imposed contractual obligations to achieve certain ramp rate capabilities to ensure Bulk Power System Reliability.
- Based on the assessment of data, and on the large number of permitting agencies that have required other similar facilities to limit NO_x emissions to 2.0 ppm averaged over 1 hour, Dominion concluded for WCPS that its NO_x limit of 2.0 ppm limit (1-hour average) should be required as BACT. Further, as this limit is being applied and demonstrably achieved at

other facilities, that fact supports a presumption that it is an achievable limitation at this facility for purposes of BACT. Thus, Dominion concluded, in the case of WCPS, that BACT for NO_x was a limit of 2.0 ppm. We are unaware of any new facts or changed circumstances that would lead to a different conclusion for WCPS.

- 8. Comment: A separate BACT analysis for direct PM_{2.5} controls must be conducted. Having the same PM₁₀ and PM_{2.5} emission limit raises the possibility of unnecessarily high PM_{2.5} emissions. (SELC)**

Dominion Response:

- PM₁₀ was not used as a surrogate for PM_{2.5} in the WCPS permit application and draft permit. Rather, Dominion evaluated PM_{2.5} BACT directly and is fully compliant with all applicable requirements. EPA guidance indicates that all of the particulate emitted from natural gas combustion is PM_{2.5}. EPA therefore considers all of the PM emissions from natural gas combustion to be less than 2.5µm in aerodynamic diameter. There is no distinction between PM₁₀ and PM_{2.5} for this emission unit. Conducting one BACT analysis for PM₁₀/PM_{2.5} is therefore appropriate.
- 9. Comment: An analysis of PM_{2.5} Class I increment consumption at Shenandoah National Park should be conducted. (SELC)**

Dominion Response:

- See Dominion's comments submitted November 24, 2010, pages 8-10, regarding these matters.
- 10. Comment: Emissions from WCPS may cause air quality and aquatic resource concerns within Shenandoah National Park. (multiple commenters)**

Comment: Additional facility in the area will exacerbate problems with existing air quality. (SELC, PEC and others)

Comment: Streams in SNP are already acidic. Deposition will also harm the Chesapeake Bay. (SNP, PEC)

Comment: The modeled nitrogen deposition rates resulting from WCPS emissions are projected to exceed the 0.01 kg/ hectare/year deposition analysis thresholds (DATs) used by DOI to determine whether resources impacts are significant or warrant further analysis. The maximum predicted nitrogen deposition impact at the Park from WCPS is 0.022 kg/ hectare per year. The impacts occur where deposition is a concern because of possible depletion of acid in a neutralizing capacity. (DOI)

Dominion Response:

- The DOI acts as the Federal Land Manager for the Shenandoah National Park. In a November 29, 2010, letter the Acting Assistant Secretary for Fish, Wildlife, and Parks for the DOI stated that the “mutually acceptable emissions reduction plan [] will result in a net environmental benefit at the park, thereby adequately mitigating the WCPS adverse impacts on aquatic resources at the park and alleviating our adverse visibility impact concerns.” Further, the Acting Assistant Secretary of DOI acknowledged that “WCPS will be well-controlled and we commend Dominion for their efforts in this regard.”
- DOI findings are based in part on extensive air quality modeling analyses that were conducted in accordance with Virginia and federal PSD permitting regulations and guidance. These analyses demonstrate full compliance with all applicable NAAQS and PSD increments.
- The agreement with the DOI requires Dominion to permanently retire well over 100% of the WCPS acidic deposition emissions, creating a net environmental benefit. This benefit will not accrue solely to Shenandoah National Park, but rather, will have effects throughout Virginia’s and West Virginia’s portions of the Chesapeake Bay watershed.
- Impacts on acid deposition and visibility from the facility were evaluated as they pertain to Federal Land Manager air quality related values (AQRV) in the affected Class I areas. Potential acid deposition is conservatively modeled using the DATs, which are used to determine whether further analysis is necessary. Exceedance of the DATs does not by itself indicate a problem; it simply means that further review is needed. Moreover, exceedance of the DAT at a single receptor is not a relevant measure because acid deposition is only a problem if it occurs over a watershed, over a long-term, rather than a short-term period.
- In any event, Dominion has agreed with the DOI and DEQ to offset emissions from other sources to mitigate any possible impacts from acid deposition with a conservative analysis that provides mitigation effects over a much larger area than that potentially affected by the project.

11. Comment: DEQ must require that coal unit retirements be specifically identified and made enforceable as a condition of any final PSD permit. (SELC)

Comment: Dominion should be getting offsets from nearby sources (SELC, PEC and others)

Comment: The PSD permit should emphasize that a source fulfilling its obligation under any other regulatory requirement (CAIR, Transport Rule, etc) cannot be used to “count” as an offset. (SELC)

Comment: NO_x offset ratio should be 2:1, not 1.15:1 and should be 3:1 for sources that aren't nearby. (PEC)

Dominion Response:

- In cooperation with the DOI and the DEQ, Dominion has agreed to secure offsets from sources in the region that go well beyond environmental regulations. According to the DOI, these offsets produce a net environmental benefit to the Shenandoah National Park. These offsets will also be beneficial to air quality and aquatic resources in the surrounding region.
- The agreement with the DOI requires that the permit specifies emissions offsets from specific sources and requires retirement of Title IV acid rain allowances. Dominion has offered to mitigate air quality impacts using emissions reductions from other facilities and ceasing emissions of SO₂ and NO_x from its coal-fired North Branch Power Station.

12. Comment: Computer modeling using PLUVUE indicates there would be 73 hours of plume visibility impacts in Shenandoah National Park. There would be consecutive hours of impacts five times and six of the impacts are over the PLUVUE thresholds. These impacts cannot be directly mitigated by emission reductions from other sources. (NPS)

Dominion Response:

- This comment came from a technical support document provided by the DOI. In its letter of November 29, 2010, the DOI stated that the agreed-upon mitigation plan alleviates the DOI's "adverse visibility impact concerns" and would provide a net environmental benefit.
- We note that the PLUVUE II analysis is conservative in many respects. For example, contrast hours are predicted in a conservative manner in that the projected backdrop is blue, white, gray or black. The actual background in Shenandoah Park is a multiple of colors rather than being monochromatic. Therefore, the actual contrast will not be as high as that predicted by a simple review of the PLUVUE II results.
- The PLUVUE II results provide contrast against both terrain and sky backgrounds, and the worst-case results are reported, as well as separate results for both types of background. Due to the elevated nature of the plumes, it is likely that they would be viewed against a sky background. A careful review of the PLUVUE II results for both backgrounds indicate that the modeled plumes would be barely perceptible against a sky background, and that the terrain background results are either not relevant or overstated as noted above.
- The emissions assumed in the PLUVUE II modeling assume peak emissions (including duct firing for all turbines) for each hour of the year, even though the permit conditions do not allow continuous operation in this manner. Therefore, the modeling results overstate the impacts.

- The mitigation offered by the retirement of visibility-affecting emissions from North Branch will provide visibility mitigation with a much larger frequency of hours than the proposed project would potentially cause due to the much higher frequency of northwest winds (from North Branch) than north-northeast winds (from the proposed project). These visibility benefits are substantial and need to be acknowledged as part of the net benefit to the Shenandoah National Park.
- As an additional matter, the DOI suggests that the visibility impacts could be mitigated by switching to Siemens and General Electric equipment. This is not possible since the GE and Siemens turbines do not produce as much power and additional Siemens or GE turbines would be required to provide the design capacity. More specifically, Dominion estimates that five GE 7FA.05 turbines would be required to produce the equivalent amount of power as the proposed MHI three-turbine arrangement.

13. Comment: Even though Warren County is in attainment for all criteria pollutants, neighboring counties are considered non-attainment. As a result, DEQ should require the facility meet LAER. (SELC, PEC and others)

Dominion Response:

- LAER is required of facilities located in non-attainment areas. Warren County is in attainment of all air quality standards, therefore LAER does not apply. BACT applies. Dominion selected the “top” control strategy for NO_x, CO, and VOC emissions from this facility. Other emissions are minimized by the exclusive use of natural gas as fuel. Therefore, the controls and emission limits in the draft PSD permit would qualify as LAER.

14. Comment: Facility emissions could harm agriculture in the surrounding area, particularly grapes and consequently, the wine industry. (PEC)

Dominion Response:

- The PSD regulations require an analysis of the impacts from the proposed facility on soils and vegetation. No adverse impact was determined in the AQRV analysis. Section 9 of the June 2010 air permit application submittal addresses potential impacts to vegetation, as well as impacts to soils, associated growth and toxic air pollutants.
- Modeled emission concentrations were compared against both a range of injury thresholds found in various peer-reviewed research articles that specifically examine effects of different pollutants on vegetation as well as established NAAQS secondary standards. Since the NAAQS secondary standards were set to protect public welfare, including protection against damage to crops and vegetation, comparing the modeled emissions to these standards provides an indication as to whether potential impacts are likely to be significant. For the vegetation analysis, modeled concentrations of NO_x, PM₁₀, and CO were

compared against the vegetation sensitivity thresholds: (1) listed in the screening methodology provided in the EPA's guidance document for soils and vegetation, "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals (EPA 450/2-81-078)," (2) secondary NAAQS, and (3) plant injury thresholds found in Appendix G of the Spiritwood Station PSD permit application found at http://www.greatriverenergy.com/makingelectricity/newprojects/spiritwood_airpermitapp.pdf.

- Dominion compared maximum modeled concentrations from the facility to the lowest (most conservative) concentration of all three sources of information. The results clearly indicate that no adverse impacts will occur to sensitive vegetation as a result of operation of the proposed project. See page 9-2 of September 2010 modeling data.

15. Comment: It is not clear the extent to which PM_{2.5} and NO₂ controls might be undermined by DEQ not requiring an analysis to demonstrate compliance with the annual PM₁₀ NAAQS or a Class I PSD increment analysis for PM_{2.5} and 1-hour NO₂. (SELC)

Dominion Response:

- Dominion conducted an extensive analysis of the annual PM_{2.5} NAAQS and demonstrated compliance by a wide margin. As indicated above, compliance with Class I PM_{2.5} increment was also modeled.
- As noted by the commenter, the annual PM₁₀ standard no longer applies in Virginia and increments have not been established for the new 1-hour NO₂ NAAQS.
- The combination of dry low NO_x burners and SCR is considered LAER.

16. Comment: Power generated by WCPS will be transported to customers well outside of the area impacted by air and water pollution (Wendy Ebersberger)

Dominion Response:

- Electric power generally flows to the closest available connected load.
- Extensive air dispersion modeling has demonstrated that the facility will not cause or contribute to any exceedance of ambient air quality standards.
- Dominion has agreed that the language from Appendix C in the DOI's comment letter dated November 29, 2010 should be incorporated into the PSD permit as an enforceable condition. The DOI has determined that this will result in a net environmental benefit.

17. Comment: Power lines are insufficient and new ones will be required (Wendy Ebersberger)

Dominion Response:

- The Warren facility will interconnect to the existing transmission line at the site. The existing line is suitable, therefore no new transmission lines will be needed.

18. Comment: What is the source of the gas – will Dominion be fracking in the local Marcellus Shale? (Wendy Ebersberger)

Dominion Response:

- The gas will be delivered to the plant by interstate pipeline.

19. Comment: Stack structure will be visible in the surrounding area (PEC)

Dominion Response:

- The stack heights have been approved by Warren County Board of Supervisors in a Conditional Use Permit (CUP) dated July 20, 2010. The approved heights have not changed from the project's original design approved by the Warren County Board of Supervisors on December 21, 2001. The heights of the stacks and other structures at this facility are consistent with regulations promulgated by EPA for Good Engineering Practices to prevent downwash from the facility. These regulations are designed to optimize dispersion and minimize impacts to air quality.