COMMONWEALTH OF VIRGINIA
Department of Environmental Quality

Intra-Agency Memorandum

DATE: June 11, 2014

SUBJECT: Engineering Evaluation of a amendment to a Nonattainment Area Major New Source Review (NAA-MNSR) and Prevention of Significant Deterioration (PSD) Permit Application dated May 12, 2014 Submitted by Green Energy Partners / Stonewall, LLC Registration No. 73826

TO: Thomas A Faha, Director, Northern Regional Office

FROM: Thomas Valentour, Environmental Specialist Senior, Northern Regional Office

AIR PERMIT MANAGER REVIEW: 6/25/14

REGIONAL DIRECTOR REVIEW:

I. Executive Summary

On April 30, 2013, DEQ issued Green Energy Partners / Stonewall, LLC (GEP) a combined Prevention of Significant Deterioration & Non-Attainment Major New Source Review Permit to construct and operate a combined-cycle electric power generating facility in Loudoun County with a nominal generating capacity of 750 megawatts (MW) at ISO (International Organization for Standardization) conditions.

On May 12, 2014, GEP submitted to DEQ a permit amendment request for an increase in the diameter of the two (2) Siemens combustion turbine/heat recovery steam generator (HRSG) stacks from 18.5 feet in diameter to 21.5 feet in diameter. The permittee also requested a reduction in the heat content in the Siemens HRSG duct burners from 450 million British thermal units (MMBtu/hr) to 430 MMBtu/hr for the Siemens turbines option.

Through review of the revised air quality analyses, DEQ concluded that the new facility design will not result in significant ambient air impact changes from the original design.

II. Introduction and Background

On May 12, 2014, the Northern Regional Office of the Department of Environmental Quality (NRO-DEQ) received an application dated May 12, 2014, from Green Energy Partners / Stonewall, LLC (GEP/S) for an amendment to their April 30, 2013 NAA-MNSR/PSD/Minor NSR permit to construct and operate a combined-cycle electric generating facility in Loudoun County. GEP/S has requested that the proposed amendment increase the combined cycle combustion turbine and Heat Recovery Steam Generator (HRSG) stack diameter of both Siemens turbine units from 18.5 feet to 21.5 feet. The Siemens manufacturer has also reduced the maximum rated heat input capacity of the HRSG duct burners from 450 MMBtu/hr to 430 MMBtu/hr. There are no proposed changes to the GE Turbine options with this permit amendment request.

The April 30, 2013 NAA-MNSR/PSD/Minor NSR permit had been amended once before to reduce the HRSG stach height on both combustion turbines from 140 feet above grade to 130 feet above grade to satisfy the concerns of the Federal Aviation Administration that the taller stacks would interfere with the weather radar systems at the Leesburg Airport. Green Energy submitted a revised modeling protocol for the reduced stack height that indicated that the project would not change any emissions. The permit amendment was issued on May 31, 2013.

A. Site Information

The proposed site for Green Energy Partners / Stonewall, LLC (GEP/S) is a 101-acre parcel, approximately south-southeast of the Town of Leesburg airport and north of the Dulles Toll Road, and adjacent Gant Lane and Cochran Mill Road.

The address for the facility is 20077 Gant Lane, Leesburg, Virginia 20175. The UTM coordinates of the proposed site are 279.7435 kilometers (km) Easting and 4326.0578 km Northing. The project will be located at a base elevation of 320 feet above mean sea level.

There is gently rolling terrain with wetlands, forest and undeveloped land around the proposed site.

B. Project Summary

Green Energy Partners / Stonewall, LLC applied for a permit amendment to increase the stack diameter of the two Siemens combustion turbine (CT) generator exhaust stacks from 18.5 feet to 21.5 feet due to the Siemens manufacturer's model specifications. Siemens also changed the maximum rated heat input capacity of the duct burners on the heat recovery steam generators from 450 MMBtu/hr to 430 MMBtu/hr. The applicant

generators from 450 MMBtu/hr to 430 MMBtu/hr. The applicant submitted a revised application with the new information, and a modeling analysis that reflect the changes.

The application also included an increase in annual greenhouse gas (GHG) emissions of 10,060 tons, and an increase in the heat input capacity of the Siemens turbines by 16 million British thermal units (MMBtu/hr). This increase in the turbines maximum heat capacity did not cause an increase in any criteria pollutants, and PM, PM-10, PM2.5, and VOC were reduced.

III. Regulatory Review and Considerations

Modeling Results

The proposed stack diameter increase to the facility's Siemens turbine option was evaluated for any change in impacts to or exceedance of the National Ambient Air Quality Standards (NAAQS) from the original proposed stack diameter to the new increased stack diameter. The air quality modeling analyses results show compliance with all applicable NAAQS and PSD increments. Since there were no exceedances, the emission limits set in the April 30, 2013 permit were not changed. The DEQ's air quality modeling analyses technical review memorandum (May 23, 2014) is included as Attachment A.

GHG emissions will not increase by an amount equal to or greater than 75,000 TPY CO_2e, and as a result, GHGs are not "subject to permitting" at the time of the modification

A. 9 VAC 5-80-1100 *et seq.* (Article 6) - Minor New Source Review

The proposed stack diameter increase and reduced heat input capacity of the Siemens HRSG duct burners does not trigger permitting under Article 6, since the project does not result in an increase in uncontrolled emissions. Since the facility is currently permitted, in part, under Article 6, the requested changes meet the criteria of a minor amendment under 9 VAC 5-80-1280.

B. 9 VAC 9 VAC 5 Chapter 80, Part II, Article 8 – PSD Major New Source Review and Article 9 – Nonattainment Area Major New Source Review

thresholds associated with this request. Based on the information in GEP's May 12, 2014 submittal, the DEQ agrees that the project is a minor amendment to the PSD permit.

Beginning on July 1, 2011, greenhouse gases (GHG) is a pollutant that must be considered for regulation as a "regulated NSR pollutant" for projects that occur at any stationary source. GHG is subject to regulation under the PSD program if the project occurs at a stationary source with a potential to emit (PTE) 100,000 tons of CO_2 equivalents (CO_2e) per year and the project causes an increase in CO_2e of at least 75,000 tons per year. CO_2e is the emission rate of each GHG species multiplied by its respective global warming potential (GWP) from 40 CFR Part 98.

The facility emits greenhouse gasses from the combustion turbines. This stack diameter increase will cause a potential increase of 9,924 tons per year which is below the 75,000 ton per year permitting threshold for a modification.

IV. Public Participation

Public Comment

There were no changes to the PSD/NANSR permit conditions or emission factors needed based on the results of the modeling analyses. Furthermore, all the criteria of 9 VAC 5-80-1280 (Article 6, mNSR), 9 VAC 5-80-1945 (Article 8, PSD) and 9 VAC 5-80-2220 (Article 9, Non-Attainment) are satisfied such that the permit amendment request may be processed as a minor amendment for each of these permit programs. As such, the public participation requirements do not extend to minor permit amendments. Additionally, there was no public comment on the air quality analyses that was performed as part of the original draft permit action.

Consequently, DEQ deems that there is no need for public participation for this proposed permit action.

V. Recommendation

Approval to proceed with issuing the permit amendment.

Attachments

Attachment A: . DEQ Air Quality Modeling Analysis Memorandum (May 23, 2014)

ATTACHMENT A:

DEQ Air Quality Modeling Analysis Memorandum (May 23, 2014)

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Office of Air Quality Assessments

629 East Main Street, Richmond, VA 23219
8th Floor
804/698-4000

To: James LaFratta, Air Permit Manager (NRO)

From: Mike Kiss, Director - Office of Air Quality Assessments (AQA)

Date: May 23, 2014

Subject: Virginia Department of Environmental Quality (DEQ) Technical Review of the Air Quality Analyses for the Proposed Changes to the Green Energy Partners/Stonewall, LLC Natural Gas-Fired Electric Generating Facility in Loudoun County, Virginia (Stonewall Combined-Cycle Project)

Copies: Bobby Lute

I. Project Background

Green Energy Partners/Stonewall, LLC was issued a minor amendment by the DEQ on May 31, 2013 to their Prevention of Significant Deterioration (PSD)/Non-Attainment New Source Review permit dated April 30, 2013 to construct and operate a 750 megawatt (MW) natural gas-fired electric generating facility on an approximately 101-acre parcel located south-southeast of the Town of Leesburg Airport and north of the Dulles Greenway in Loudoun County, Virginia. The permitted facility, called the Stonewall Combined-Cycle Project, will consist of two identical natural gas-fired only combined-cycle turbines, each with its own duct-fired heat recovery steam generator (HRSG), one steam turbine generator, a 10-cell mechanical draft cooling tower, a natural gas-fired only auxiliary boiler, a natural gas-fired only fuel heater, a diesel-fired emergency generator and fire water pump, two distillate fuel oil storage tanks, and circuit breakers. Green Energy Partners/Stonewall, LLC has proposed the installation of either General Electric (7FA.05) or Siemens (SGT6-5000F5) turbines.

Green Energy Partners/Stonewall, LLC submitted an air permit application dated May 2014, for a change to the maximum rated input heat capacity of each Siemens combined-cycle turbine with its own duct-fired heat recovery steam generator (HRSG) and some associated stack

parameters. The application also included revised Class I and Class II ambient air quality analyses that reflected the proposed changes.

The Washington, D.C. MSA, including Loudoun County, is currently designated as nonattainment for the 1997 annual particulate matter having an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$). However, the current air quality in the region is significantly below the 1997 annual $PM_{2.5}$ NAAQS.

The facility's permit application for the proposed changes addressed the following two possible $PM_{2.5}$ scenarios because the area will not be formally reclassified during the review of the permit application:

- The area is nonattainment for $PM_{2.5}$.
- The area is eventually re-designated as attainment for $PM_{2.5}$.

As a result, an air quality analysis was also performed for $PM_{2.5}$ to demonstrate that the projected $PM_{2.5}$ emissions from the proposed facility will not cause or significantly contribute to a violation of any applicable $PM_{2.5}$ NAAQS.

The following is a summary of the AQA's review of the revised air quality analyses for the Stonewall Combined-Cycle Project for both Class I and Class II PSD areas. The worst-case impacts from all operating loads, including startup and shutdown operations, are presented in this memorandum.

II. Modeling Methodology

The Class I and Class II air quality modeling analyses conform to 40 CFR Part 51, Appendix W - Guideline on Air Quality Models and were performed in accordance with their respective previously approved modeling methodology. The air quality model used for the Class I area analysis was the EPA-approved regulatory version of the CALPUFF modeling system at the time of the original application. The CALPUFF modeling system is the preferred model for long-range transport applications and is contained in Appendix W of 40 CFR Part 51. The air quality model used for the Class II area analysis was the most recent version of the AERMOD modeling system (Version 13350). The AERMOD modeling system is the preferred EPA-approved regulatory model for near-field applications and is also contained in Appendix W of 40 CFR Part 51.

Additional details on the modeling methodology can be found in the applicable sections of Green Energy Partners/Stonewall, LLC's air permit application submittals dated November 2012, May 2013, and May 2014, respectively.

III. Modeling Results

A. Class II Area - Preliminary Modeling Analysis

A preliminary modeling analysis for criteria pollutants was conducted in accordance with PSD regulations to predict the maximum ambient air impacts. The preliminary analysis modeled emissions from the proposed facility only to determine whether or not the impacts were above the applicable significant impact levels (SILs). For those pollutants for which maximum predicted impacts were less than the SIL, no further analyses was required (i.e., predicted maximum impacts less than SILs are considered insignificant and of no further concern). For impacts predicted to be equal to or greater than the SIL, a more refined air quality modeling analysis (i.e., full impact or cumulative impact analysis) is required to assess compliance with the NAAQS and PSD increment.

The emissions associated with six (6) representative operating loads for the General Electric turbine option and four (4) representative operating loads for the Siemens turbine option were modeled, as well as their startup/shutdown emissions. Tables 1 and 2 below show the maximum predicted ambient air concentrations for the General Electric and Siemens turbine options, respectively.

Table 1
Class II Preliminary Modeling Analysis Results vs. Significant Impact Levels
General Electric Turbines

Pollutant	Averaging Period	Maximum Predicted Concentration From Proposed Facility ($\mu g/m^3$)	Class II Significant Impact Level ($\mu g/m^3$)
NO_2	1-hour	77.90	7.5
	Annual	0.99	1
PM_{10}	24-hour	4.01	5
	Annual	0.39	1
$PM_{2.5}$	24-hour	2.33	1.2
	Annual	0.21	0.3
CO	1-hour	2,506.56	2,000
	8-hour	154.52	500

Table 2
Class II Preliminary Modeling Analysis Results vs. Significant Impact Levels
Siemens Turbines

Pollutant	Averaging Period	Maximum Predicted Concentration From Proposed Facility ($\mu g/m^3$)	Class II Significant Impact Level ($\mu g/m^3$)
NO_2	1-hour	77.68	7.5
	Annual	0.99	1
PM_{10}	24-hour	3.20	5
	Annual	0.38	1
$PM_{2.5}$	24-hour	1.61	1.2
	Annual	0.20	0.3
CO	1-hour	673.12	2,000
	8-hour	48.46	500

The modeling results for NO_2 (annual averaging period), PM_{10} (24-hour and annual averaging periods), $PM_{2.5}$ (annual averaging period), and CO (8-hour averaging period) were less than the applicable SILs for both turbine options. Also, the modeling results for CO (1-hour averaging period) for the Siemens turbine option only were less than the applicable SIL. Therefore, a full impact analysis for these pollutants and averaging periods was not required. Furthermore, the additional pollution from this facility would not cause or contribute to a violation of any applicable NAAQS or PSD increment for all pollutants and averaging periods with impacts below the applicable SILs. A $PM_{2.5}$ increment analysis is not required because the proposed source is located in a nonattainment area.

A full impact analysis for demonstrating NAAQS compliance for CO (1-hour averaging period, General Electric turbine option only), NO_2 (1-hour averaging period), and $PM_{2.5}$ (24-hour averaging period) was conducted because the preliminary modeling analysis results exceeded the applicable SILs. Additionally, a full impact analysis for demonstrating NAAQS compliance was conducted for $PM_{2.5}$ (annual averaging period) at the request of DEQ even though the facility's predicted impact was below the SIL. This was done to provide additional assurance of NAAQS compliance in the Washington, D.C. MSA.

Although the facility's predicted $PM_{2.5}$ (24-hour averaging period) impact from the preliminary modeling analysis exceeded the applicable SIL, a full impact analysis for demonstrating compliance with the $PM_{2.5}$ PSD increment was not conducted because the facility does not consume PSD increment for $PM_{2.5}$ since it is located in an area classified as nonattainment for $PM_{2.5}$ and it is not considered a major source for $PM_{2.5}$. In addition, there were no other pollutants with an applicable PSD increment that required a full impact analysis to be conducted.

B. Class II Area – Cumulative Impact Modeling Analysis

The cumulative impact analysis described below only consisted of an analysis to assess compliance with the NAAQS for CO (General Electric turbine option only), NO_2, and $PM_{2.5}$ for the indicated averaging periods. As previously indicated, an analysis was not required to be conducted to assess compliance with the PSD increments. It is important to note that the cumulative impact modeling results can sometimes be less than the "source only" modeling results in Tables 1and 2 of this memorandum. This is due to the fact that source only modeling uses the maximum concentration to determine significance, whereas the cumulative modeling results reflect the form of the air quality standard. For example, the following criteria must be met to attain the NAAQS:

- CO (1-hour) - Not to be exceeded more than once per year.
- NO_2 (1-hour) - To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed the standard.
- $PM_{2.5}$ (24-hour) - To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed the standard.
- $PM_{2.5}$ (annual) - To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed the standard.

NAAQS Analysis

The NAAQS analysis included emissions from the proposed source, emissions from existing sources from Virginia, West Virginia, and Maryland, and representative ambient background concentrations of NO_2, $PM_{2.5}$, and CO. The results of the analysis are presented in Tables 3 and 4 for the General Electric and Siemens turbine options, respectively, and demonstrate compliance with the applicable NAAQS.

Table 3
NAAQS Modeling - Cumulative Impact Results
General Electric Turbines

Pollutant	Averaging Period	Total Modeled Concentration ($\mu g/m^3$)	Ambient Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
NO_2	1-hour	110.04	47	157.04	188
CO	1-hour	2,434.36	2,530	4,964.36	40,000
$PM_{2.5}$	24-hour	2.96	20	22.96	35
	Annual	0.44	9.5	9.94	12

Table 4
NAAQS Modeling - Cumulative Impact Results
Siemens Turbines

Pollutant	Averaging Period	Total Modeled Concentration ($\mu g/m^3$)	Ambient Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
NO_2	1-hour	94.79	57.53	152.32	188
$PM_{2.5}$	24-hour	2.18	20	22.18	35
	Annual	0.43	9.5	9.93	12

NAAQS and PSD Increment Analyses Conclusions

Based on AQA's review of the Class II modeling analysis conducted by Green Energy Partners/Stonewall, LLC, assuming DEQ's regional office processing the permit application approved all of the emission estimates and associated stack parameters for the modeled scenarios, the proposed changes to the Stonewall Combined-Cycle Project do not cause or significantly contribute to a predicted violation of any applicable NAAQS or Class II area PSD increment.

Toxics Analysis

The source is subject to the state toxics regulations at 9 VAC 5-60-300 et al. An analysis was conducted in accordance with the regulations and the predicted concentrations for each toxic pollutant were below their respective Significant Ambient Air Concentrations (SAAC). Tables 5 and 6 summarize the toxic pollutant modeling analysis results for the General Electric and Siemens turbine options, respectively.

Table 5
Toxics Analysis Maximum Predicted Concentrations
General Electric Turbines

Toxic Pollutant	Averaging Period	Maximum Modeled Concentration From Project ($\mu g/m^3$)	SAAC ($\mu g/m^3$)
Acrolein	Annual	1.10E-04	0.46
Formaldehyde	1-hour	3.20E-01	62.5
	Annual	5.10E-03	2.4
Cadmium	1-hour	2.63E-03	2.5
	Annual	6.00E-05	0.1
Chromium	1-hour	3.35E-03	2.5
	Annual	7.00E-05	0.1
Nickel	1-hour	5.03E-03	5
	Annual	1.10E-04	0.2

Table 6
Toxics Analysis Maximum Predicted Concentrations
Siemens Turbines

Toxic Pollutant	Averaging Period	Maximum Modeled Concentration From Project ($\mu g/m^3$)	SAAC ($\mu g/m^3$)
Acrolein	Annual	1.00E-04	0.46
Formaldehyde	1-hour	3.18E-01	62.5
	Annual	4.94E-03	2.4
Cadmium	1-hour	2.49E-03	2.5
	Annual	5.00E-05	0.1
Chromium	1-hour	3.17E-03	2.5
	Annual	7.00E-05	0.1
Nickel	1-hour	4.75E-03	5
	Annual	1.00E-04	0.2

Additional Impact Analysis

As part of the revised Class II area analysis required by DEQ, additional impact analyses were performed to assess the impacts from the proposed facility on visibility, vegetation and soils, and the potential for and impact of secondary growth. These analyses are discussed below.

Visibility

A screening modeling analysis using the VISCREEN model was conducted to assess the potential for visual plume impacts in Class II areas within 50 kilometers (km) of the project site. A review of National Parks and other potential areas of interest near the project site was conducted. It was determined that Manassas National Battlefield Park is the closest area of potential interest. Manassas National Battlefield Park is approximately 23 km southeast of the project site.

The visibility screening modeling approach followed guidance provided in EPA's *Workbook for Plume Visual Impact Screening and Analysis (Revised) (October 1992; EPA-454/R-92-023)*. The two visibility metrics that were evaluated in the VISCREEN modeling analysis are:

- **Plume contrast (|C|)**: Contrast can be defined at any wavelength as the relative difference in the intensity (called spectral radiance) between the viewed object (e.g., plume) and its background (e.g., sky). Plume contrast results from an increase or decrease in light transmitted from the viewing background through the plume to the observer.
- **Plume perceptibility (ΔE)**: A parameter used to characterize the perceptibility of a plume on the basis of the color difference between the plume and a viewing background such as the sky, a cloud, or a terrain feature.

The VISCREEN results were developed for the worst-case normal operating scenario. All results were below the significance criteria in the nearest Class II area. Therefore, the plume is expected to be imperceptible against the background sky and the terrain in the Manassas National Battlefield Park.

The visibility in the area near the proposed facility will be protected by operational requirements, such as air pollution controls and clean burning fuels, and stringent limits on visible emissions that are incorporated into the draft permit.

Vegetation and Soils

An analysis on sensitive vegetation types with significant commercial or recreational value was conducted. The analysis compared maximum predicted concentrations from the proposed facility against a range of injury thresholds found in various peer-reviewed research articles as well as criteria contained in the EPA document *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals (EPA, 1980)*. Tables 7 and 8 show the maximum modeled concentrations for NO_2, PM_{10}, and CO for the General Electric and Siemens turbine options, respectively, were all below the respective thresholds (i.e., the minimum reported levels at which damage or growth effects to vegetation may occur). As a result, no adverse impacts on vegetation are expected.

Table 7
Comparison of Vegetation Sensitivity Thresholds to Maximum Modeled Concentrations from the Stonewall Combined-Cycle Project
General Electric Turbines

Pollutant	Averaging Period	Maximum Modeled Concentration From Proposed Facility ($\mu g/m^3$)	Sensitive Vegetation Threshold ($\mu g/m^3$)
NO_2	1-hour	15.46	280
	4-hour	101.00	3,760
	1-month	1.38	564
	Annual	0.99	94
PM_{10}	24-hour	4.01	150
CO	1-week	23.29	1,800,000

Table 8
Comparison of Vegetation Sensitivity Thresholds to Maximum Modeled Concentrations from the Stonewall Combined-Cycle Project
Siemens Turbines

Pollutant	Averaging Period	Maximum Modeled Concentration From Proposed Facility ($\mu g/m^3$)	Sensitive Vegetation Threshold ($\mu g/m^3$)
NO_2	1-hour	15.57	280
	4-hour	92.12	3,760
	1-month	1.38	564
	Annual	0.99	94
PM_{10}	24-hour	3.20	150
CO	1-week	20.56	1,800,000

The impact of the emissions on soils in the vicinity of the proposed project was evaluated. The soil type was determined from data collected from the United States Department of Agriculture's Natural Resources Conservation Service (NRCS) Soil Survey Geographic (SSGUGO) database and the NRCS Web Soil Survey tool. The soil types within Loudoun County, Virginia and Montgomery County, Maryland were examined.

The predominant soil types for Loudon County are a variety of silt loams. In Montgomery County, the predominate soil types are also a variety of silt loams, with some small areas of sandy loams.

The soil types in these counties are generally considered to have a moderate to high buffering capacity and have adequate capacity to absorb acidic deposition without changing the soil pH. Based on the soil types and quantity of emissions from the proposed project, no adverse impact on local soils is anticipated.

Growth

The work force for the proposed facility is expected to range from 600 to 700 jobs during various phases of the construction. It is expected that a significant regional construction force is already available to build the proposed facility. Therefore, it is anticipated that no new housing, commercial, or industrial construction will be necessary to support the Stonewall Combined-Cycle Project during the two-year construction schedule. The proposed facility will also require approximately 25 to 30 permanent positions. It is assumed that individuals that already live in the region will perform a number of these jobs. No new housing requirements are expected for any new personnel moving to the area. In addition, due to the small number of new individuals expected to move into the area to support the Stonewall Combined-Cycle Project and the existence of some commercial activity in the area, new commercial construction would not be necessary to support the permanent work force. Additionally, no significant level of industrial related support will be necessary for the Stonewall Combined-Cycle Project. Therefore, industrial growth is not expected.

Based on the growth expectations discussed above, no new significant emissions from secondary growth during the construction and operation phases of the Stonewall Combined-Cycle Project are anticipated.

C. Class I Area Modeling Analysis

The FLMs are provided reviewing authority of Class I areas that may be affected by emissions from a proposed source by the PSD regulations and are specifically charged with protecting the Air Quality Related Values (AQRVs) within the Class I areas. The closest Class I area to the proposed facility is Shenandoah National Park (SNP). It is approximately 57 km from the proposed facility. The other Class I areas within 300 km of the proposed facility, but located at a distance greater than 57 km, are Dolly Sods Wilderness Area, Otter Creek Wilderness Area, James River Face Wilderness Area, and Brigantine National Wildlife Refuge.

Modeling guidance contained in the *Federal Land Managers' Air Quality Related Values Work Group (FLAG) Phase I Report – Revised (2010)* provides screening criteria for determining whether a source may be excluded from performing a Class I area AQRV

modeling analysis. The FLMs may consider excluding a source from modeling if its total SO_2, NO_X, PM_{10}, and H_2SO_4 annual emissions (in tons per year, based on 24-hour maximum allowable emissions) divided by the distance (in km) from the Class I area is less than or equal to 10. The sum of the emissions for the proposed facility is not expected to exceed approximately 317.2 tons per year (tpy), which corresponds to the sum of the emissions that was included in the permitted facility's previous permit application submittals. Therefore, the FLAG 2010 screening criteria for SNP is 5.6 (317.2 tpy/57 km). The screening criteria for all other Class I areas is less than 5.6 because these areas are located at a distance greater than 57 km. The USFS, the FWS, and the NPS each had previously stated in separate e-mails that an AQRV analysis was not required since the project is not expected to show any significant additional impacts to AQRVs.

However, even though an AQRV analysis was not required to be conducted, an analysis to assess compliance with the Class I PSD increments for PM_{10} and NO_2 was required. Note that an analysis to assess compliance with the $PM_{2.5}$ PSD increment was not conducted because the facility does not consume PSD increment for $PM_{2.5}$ since it is located in an area classified as nonattainment for $PM_{2.5}$ and it is not considered a major source for $PM_{2.5}$. A preliminary modeling analysis for PM_{10} and NO_2 was conducted to determine whether or not the predicted maximum ambient air impacts in the closest Class I area (i.e., SNP) were above the Class I SILs. This analysis was limited to only SNP because the impacts will be higher relative to the other Class I areas since its proximity to the proposed facility is nearly 100 km closer than the other Class I areas. The emissions used in the Class I area modeling were the same as those used for the Class II area modeling. A more refined air quality modeling analysis (i.e., cumulative impact analysis) would be required to assess compliance with the Class I PSD increments for impacts predicted to be equal to or above the Class I SIL. No additional air quality analysis would be required for pollutants when the proposed project's impacts were less than the SIL.

Tables 9 and 10 below present the proposed facility's maximum predicted ambient air concentrations for PM_{10} and NO_2 for the General Electric and Siemens turbine options, respectively, in Shenandoah National Park.

Table 9
Summary of Maximum Predicted Concentrations from the Proposed Facility in Shenandoah National Park
General Electric Turbines

Pollutant	Averaging Period	Maximum Predicted Concentration From Proposed Facility ($\mu g/m^3$)	Class I Significant Impact Level ($\mu g/m^3$)
PM_{10}	24-hour	0.1129	0.3
	Annual	0.0029	0.2
NO_2	Annual	0.0025	0.1

Table 10
Summary of Maximum Predicted Concentrations from the Proposed Facility in Shenandoah National Park
Siemens Turbines

Pollutant	Averaging Period	Maximum Predicted Concentration From Proposed Facility ($\mu g/m^3$)	Class I Significant Impact Level ($\mu g/m^3$)
PM_{10}	24-hour	0.0986	0.3
	Annual	0.0025	0.2
NO_2	Annual	0.0024	0.1

The modeling results for NO_2 (annual averaging period) and PM_{10} (24-hour and annual averaging periods) were less than the applicable SILs for both turbine options. Therefore, a cumulative impact analysis to assess compliance with the Class I PSD increments was not required for these pollutants and their averaging periods.

Summary of Class I Area Analysis

Based on AQA's review of the Class I area modeling analyses, the proposed changes to the Stonewall Combined-Cycle Project do not cause or significantly contribute to a predicted violation of any applicable Class I area PSD increment.