Article 6 Air Quality Impact Analyses Report for the Chesterfield Energy Reliability Center

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VIRGINIA ELECTRIC AND POWER COMPANY
Chesterfield County, Virginia

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List of Acronyms and Abbreviations

°F	degree Fahrenheit
$\mu g/m^3$	microgram per cubic meter
AAQS	ambient air quality standards
ACFM	actual cubic feet per minute
AERMAP	AERMOD terrain preprocessing program
AERMET	AERMOD meteorological preprocessing program
AERMIC	AMS/EPA Regulatory Model Improvement Committee
AERMOD	AERMIC model
AIG	AERMOD Implementation Guide
AMS	American Meteorological Society
BEEST	Providence Engineering and Environmental Group, LLC, BEEST suite
Bhp	brake-horsepower
BPIP	Building Profile Input Program
BPIPPRM	BPIP for PRIME
CAQT	Critical Air Quality Threshold
CERC	Chesterfield Energy Reliability Center
CFR	Code of Federal Regulations
CPS	Chesterfield Power Station
CT	Combustion turbine
Dominion	Virginia Electric and Power Company, d/b/a Dominion Energy Virginia (formerly d/b/a Dominion Virginia Power)
DLN	Dry Low NOx
ECT	Environmental Consulting & Technology, Inc.
EPA	U.S. Environmental Protection Agency
fps	feet per second
ft	feet
GAQM	Guideline for Air Quality Models
GCP	Good combustion practice
GeoTIFF	geospatial tagged image file format
GEP	good engineering practice
HAP	hazardous air pollutant
HHV	higher heating value
hr/yr	hour per year
km	Kilometer
kWe	kilowatt-electric
lb/hr	pound per hour
m	meter
MECL	Minimum Emission Compliance Load
MERP	Modeled Emission Rate for Precursors
MMBtu/hr	million British thermal units per hour
MRLC	Multi-Resolution Land Characteristics Consortium
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
NEI	National Emissions Inventory

List of Acronyms and Abbreviations (Continued, Page 2 of 2)

NERC	North American Electric Reliability Corporation
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NSR	new source review
NWS	National Weather Service
PM_{10}	particulate matter less than or equal to 10 microns in diameter
ppb	part per billion
ppm	part per million
PRIME	plume rise model enhancements
PSD	prevention of significant deterioration
SAAC	Significant Ambient Air Concentrations
SCR	selective catalytic reduction
SER	significant emissions rate
SIP	state implementation plan
SO_2	sulfur dioxide
SUSD	startup/shutdown
tpy	ton per year
USGS	U.S. Geological Survey
VA	Virginia
VAC	Virginia Administrative Code
VDEQ	Virginia Department of Environmental Quality

1.0 Introduction

1.1 Project Overview

Virginia Electric and Power Company, d/b/a Dominion Energy Virginia (Dominion, formerly d/b/a Dominion Virginia Power), is proposing to install the Chesterfield Energy Reliability Center (CERC or Project) at the existing Chesterfield Power Station (CPS). CERC will consist of four dual fuel simple-cycle combustion turbines (CT) firing primarily pipeline quality natural gas, as well as having the capability to fire No. 2 fuel oil with a maximum sulfur content of 15 ppm (fuel oil). Additionally, the CTs will be capable of operating on an advanced gaseous fuel blend consisting of natural gas with up to 10% hydrogen (H_2 fuel blend).

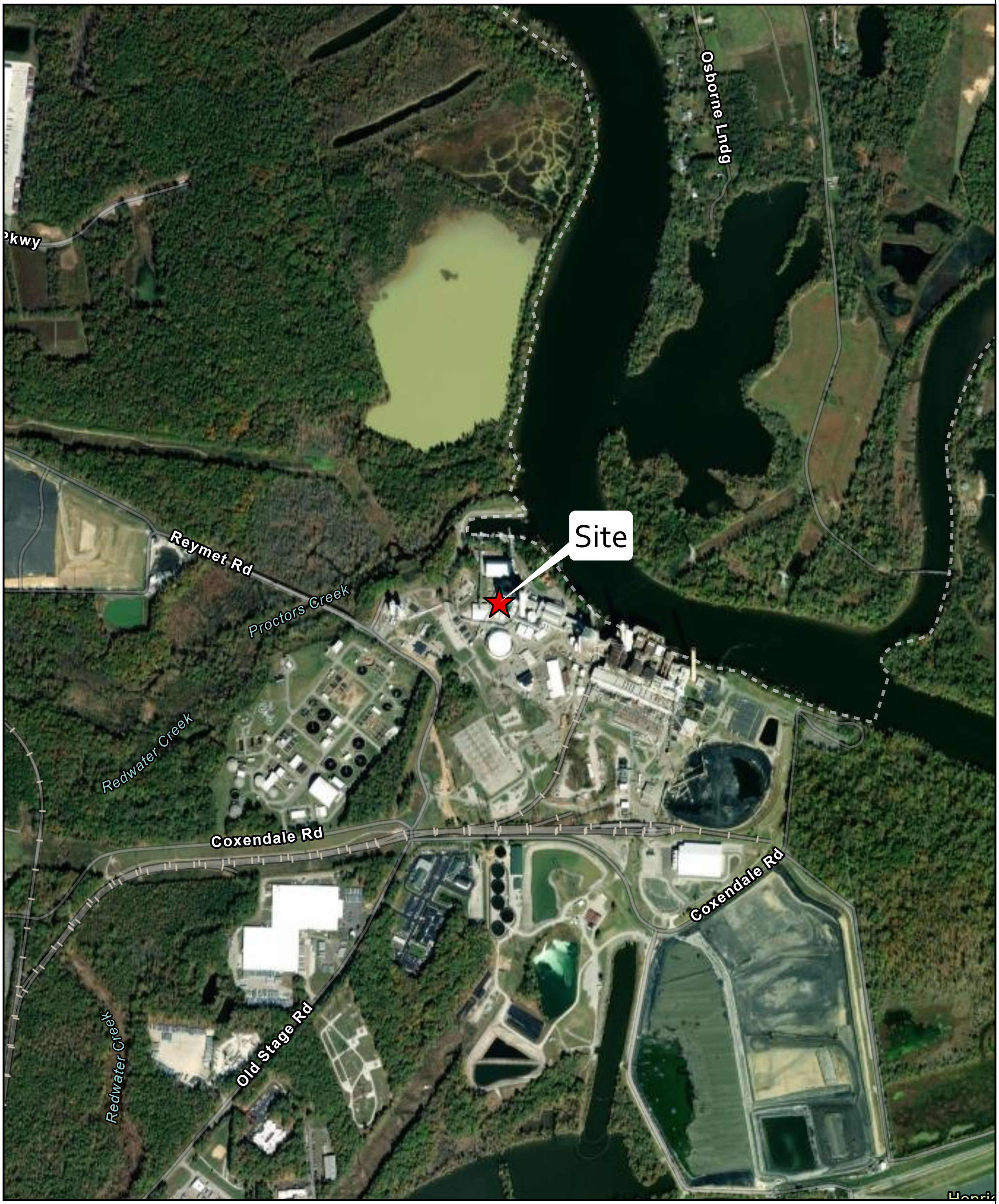
The Project will be considered a “major modification” under Title I of the Clean Air Act (CAA). Dominion is applying to the Virginia Department of Environmental Quality (VDEQ) for a prevention of significant deterioration (PSD) and minor stationary source air construction permit, as required by VDEQ. VDEQ has U.S. Environmental Protection Agency (EPA) state implementation plan (SIP)-approved PSD and minor stationary source air construction permit programs.

An application addressing the permitting requirements specified by VDEQ under the Virginia State Air Pollution Control Board Regulations for the Control and Abatement of Air Pollution, Title 9, Agency 5, Chapter 80, found in the Virginia Administrative Code (VAC) at 9 VAC 5-80 was submitted August 1, 2023 and amended on August 20, 2024, September 26, 2024, March 3, 2025, and May 9, 2025.

This Air Quality Impact Analyses Report is being submitted in support of the Article 6 Minor New Source Permit application.

1.2 Project Location

The Project will be constructed in Chesterfield County approximately 6 km northeast of Chester, Virginia, at the existing CPS, which is located at 500 Coxendale Road. The approximate central location of the Project is 288,719.92 mE, 4,140,193.24 mN NAD 83 datum and in Zone 18 (37°23'3.98"N, 77°23' 11.25"W). Figures 1-1 and 1-2 present an aerial and a topographical map of the site region, respectively. Appendix A contains a site plan showing the plant property, adjacent roadways, and source locations.



Site

N

0 1,000 2,000

Feet

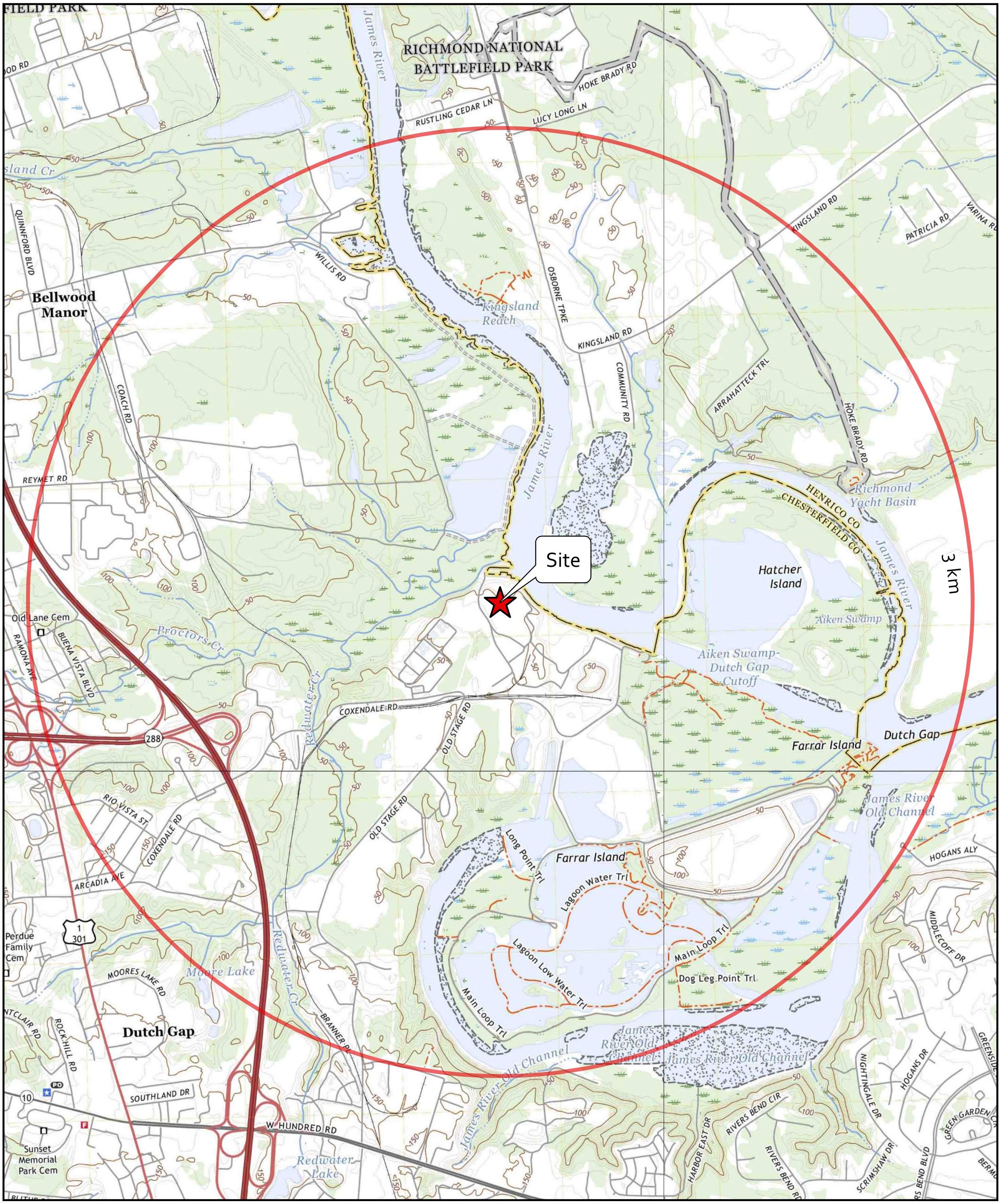
Base Layer: Esri Basemap Imagery, 2024

Figure 1-1
Site Location Map

Chesterfield County, Virginia

Date: 2/24/2025

ECT



Site

3-km Radius

N

0 1.5 3

Kilometers

Base Layer: USGS Topographic Quad Drewrys Bluff, Chester, Dutch Gap, & Hopewell, 2022

Figure 1-2
Topographic Map

Chesterfield County, Virginia

Date: 2/24/2025

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1.3 Overview of Methodology

The effects on ambient pollutant concentrations are estimated using a dispersion model applied in conformance to applicable guidelines. The methodology applied for these analyses is based on policies and procedures contained in the US EPA Guideline on Air Quality Models (GAQM, 40 CFR Part 51, Appendix W) and direction from the VDEQ's modeling staff.

Key elements of the analyses are as follows:

- Air quality modeling analyses for the Project sources for nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter less than or equal to 10 microns in diameter (PM_{10}) for comparison to the National Ambient Air Quality Standards (NAAQS);
- The averaging periods to be evaluated include 1-hour NO_2, Annual NO_2, 1-hour SO_2, 3-hour SO_2, Annual SO_2[1], and 24-hour PM_{10};
- Air quality modeling analyses for toxic pollutants for the Project sources that exceeded their respective Virginia (VA) air toxic exemption emission rates for comparison to their VA Significant Ambient Air Concentrations (SAACs);[2]
- Use of the latest version of AERMOD (v24142) with the regulatory default options to estimate air quality impacts;
- Use of five (5) years of meteorological data provided by VDEQ and processed using the most recent version of AERMET (v24142); and
- Use of a comprehensive receptor grid to capture the maximum off-site impacts from maximum operations of the Project consistent with VDEQ guidelines.

Section 2 contains a description of the Project emissions. Section 3 presents a detailed description of the modeling approach used in evaluating air quality impacts of the Project including model selection criteria, good engineering practice stack height determination, refined modeling analyses, and ambient air quality compliance. Section 4 presents the results of the analyses. Section 5 contains the conclusion to the air impact analyses. Appendix A contains the site plan. Appendix B

[1] On December 10, 2024, the U.S. EPA revised the secondary NAAQS for SO_2 to an annual standard of 10 parts per billion (ppb), averaged over 3 years.
[2] Although air toxics modeling was performed, please note that it was not required. As discussed in Section 4.0 of the Application, the Project combustion sources are all subject to NESHAP and thus exempt from the requirements of 9 VAC 5-60-300 et seq. by 9 VAC 5-60-300 C.4, while the remaining sources are below the applicable emission rate thresholds in 9 VAC 5-60-300 C.1. Therefore, the Project is exempt from Virginia's Air Toxics regulation.

provides the modeling support data. Appendix C provides the background concentration monitor support data.

2.0 Project Emissions

This section describes several aspects of the Project that are relevant for the air quality impact analyses conducted in support of the air permit application including the Project components and emissions.

2.1 Project Emission and Source Characteristics

2.1.1 Overall Methodology

The air dispersion modeling was conducted with emissions rates and flue gas exhaust characteristics (flow rate and temperature) expected to represent the worst-case parameters among the range of possible values for each of the proposed operating scenarios considered for the Project.

The following subsections present stack parameters and emissions for the combustion turbines (CTs), emergency generators, and fuel gas heaters.

2.1.2 Simple-Cycle Combustion Turbine

2.1.2.1 Normal Operation

Based on current Project design parameters, Dominion has applied for a permit that will allow annual operation of each CT for 3,240 hours, of which 750 hours may be on fuel oil. Since CT emission rates and flue gas characteristics for a given CT load vary as a function of ambient temperature, data was derived for the following ambient temperatures and load scenarios for the proposed CT:

- Ambient temperatures (107, 98, 59, 29, and -10°F).
- Natural gas: Five operating loads (100 percent (with and without evaporative cooling), 80 percent, 70 percent, 50 percent, and minimum emission compliance load (MECL).
- Fuel oil: Four operating loads (100 percent (with and without evaporative cooling), 80 percent, 70 percent, and MECL).

For each CT load in the modeling, the highest pollutant-specific emissions rate coupled with the lowest exit temperature and exit velocity enveloped across all ambient temperatures were selected to represent the worst case dispersion for each short-term load scenario.

The natural gas exit temperature and exit velocity associated with 100 percent load were used for the annual averaging period analyses for both natural gas only and dual fuel operations. Emissions representing worst case annual potential to emit were used. The potential annual emissions are based on the following:

- Natural Gas Only: 3,240 hours per year at 100 percent load with an additional 500 Startup/Shutdown (SUSD) events; and
- Dual Fuel: 2,490 hr/yr on natural gas and 750 hr/yr on fuel oil at 100% load with an additional 380 SUSD events on natural gas and 120 SUSD events on fuel oil.

Tables 2-1 and 2-2 summarize worst-case emissions parameters for the CT over the five operating loads for natural gas and four operating loads for fuel oil.

Table 2-1. Worst-Case Data for Proposed Natural Gas-Fired Simple-cycle Turbine Operation

Parameter		100%	80%	70%	50%	MECL
Stack height (ft)		125	125	125	125	125
Stack diameter (ft)		24.5	24.5	24.5	24.5	24.5
Exit temperature (°F)		850.0	850.0	850.0	850.0	850.0
Exit velocity (fps)		117.32	99.66	92.43	81.33	67.52
Pollutant emissions per CT (lb/hr)						
	NO_2	23.30	19.00	17.20	14.10	10.30
	SO_2‡	8.20	6.70	6.10	5.00	3.70
	PM_{10}‡	19.70	16.50	16.40	15.40	14.40

‡ Based on maximum natural gas short-term sulfur content of 1.0 gr S/100 scf
Source: ECT, 2025.

Table 2-2. Worst-Case Data for Proposed Fuel Oil-Fired Simple-cycle Turbine Operation

Parameter		100%	80%	70%	MECL
Stack height (ft)		125	125	125	125
Stack diameter (ft)		24.5	24.5	24.5	24.5
Exit temperature (°F)		850.0	850.0	850.0	850.0
Exit velocity (fps)		127.01	110.83	105.20	94.81
Pollutant emissions per CT (lb/hr)					
	NO_2	47.90	39.70	36.50	30.50
	SO_2	4.50	3.70	3.40	2.90
	PM_{10}	44.80	44.80	45.00	44.60

Source: ECT, 2025.

2.1.2.2 Startup/Shutdown Operation

Startup/shutdown (SUSD) modeling was conducted for the pollutants with short-term averaging periods that have elevated emissions combined with lower plume rise during SUSD conditions. The pollutants and averaging periods evaluated include 1-hour NO_2, 1-hour SO_2, 3-hour SO_2, and 24-hour PM_{10}.

For the SUSD scenarios, two stacks (same stack location) were used in the model to represent each scenario and the associated averaging period. One stack represents the SUSD event, which is less than an hour (30 minutes), and the other stack represents normal operation emissions during the balance of time for the associated averaging period. Emission rates were calculated for each stack (SUSD and Normal operation) and then source grouped to get a total impact for both stacks for the full averaging period. SUSD emissions are based on the SUSD lb/event emissions data provided by the turbine vendor. Since emissions are higher for startup operations than for shutdown, the more conservative startup case was modeled. For the "normal operation stack," the worst-case load identified in the load analysis runs was used for the balance of the averaging period when it is not in startup mode. Tables 2-3 and 2-4 summarize the emissions rates for each pollutant for all startup scenarios. All loads were modeled for the annual averaging period. Additional information is included in Appendix B.

Table 2-3. Summary of Modeled Stack Parameters and Emissions Rates for Natural Gas-Fired Simple-cycle Turbine

Scenario	Units	Startup				Worst Case Load		
		1-hour Average Period Parameters	3-hour Average Period Parameters	24-hour Average Period Parameters	Annual Average Period Parameters	1-hour Average Period Parameters	3-hour Average Period Parameters	24-hour Average Period Parameters
Estd. average flow rate*	ACFM	1,909,878	1,909,878	1,909,878	1,909,878	3,318,527	3,318,527	1,909,878
Estd. average stack temp.	°F	850.0	850.0	850.0	850.0	850.0	850.0	850.0
NO_2	lb	52.00				11.65		
SO_2	lb	4.00	1.33			4.10	6.83	
PM_{10}	lb			0.17				14.10
NO_2**	ton				18.03			
SO_2**	ton				1.10			

*Estimated flow rates calculated based on data provided by GE.
**Annual emissions based on 500 startups and shutdowns on natural gas per year.
Source: Dominion, 2025.
ECT, 2025.

Table 2-4. Summary of Modeled Stack Parameters and Emissions Rates for Fuel Oil-Fired Simple-cycle Turbine

Scenario	Units	Startup					Worst Case Load		
		1-hour Average Period Parameters	3-hour Average Period Parameters	24-hour Average Period Parameters	Annual Average Period Parameters (Dual Fuel - NG)	Average Period Parameters (Dual Fuel- FO)	1-hour Average Period Parameters	3-hour Average Period Parameters	24-hour Average Period Parameters
Estd. average flow rate*	ACFM	2,681,806	2,681,806	2,681,806	1,909,878	2,681,806	3,592,619	3,592,619	2,681,806
Estd. average stack temp.	°F	850.0	850.0	850.0			850.0	850.0	850.0
NO_2	lb	143.00					23.95		
SO_2	lb	2.00	0.67				2.25	3.75	
PM_{10}	lb			0.88					43.67
NO_2**	ton				13.70	12.30			
SO_2**	ton				0.84	0.14			

*Estimated flow rates calculated based on data provided by GE.
**Annual emissions based on 380 startups and shutdowns on natural gas per year and 120 startups and shutdowns on fuel oil per year.
Source: Dominion, 2023.
ECT, 2025.

2.2 Auxiliary Sources

Since the performance data for the auxiliary equipment are not affected by ambient conditions, only one set of parameters was modeled (i.e., stack parameters and emissions rates associated with 100-percent load).

The emergency diesel generators are expected to operate no more than 1 hour in a 24-hour period per unit and 100 hr/yr per unit (operability testing) under non-emergency conditions, and no more than 500 hr/yr total. The 1-hour NO_2 and 1-hour SO_2 modeled emission rates were based on the annualized emissions associated with 100 hours of operability testing. The 24-hour PM_{10} and 3-hour SO_2 modeled emissions were based on operating 1 hour within the averaging period. The modeled annual emissions rates were based on 500 hr/yr for the assessment of annual modeled averaging periods. Table 2-5 provides stack parameters and emissions rates for the emergency diesel generators.

The fuel gas heater will be in operation any time a CT is operating on natural gas. The 18.8-MMBtu/hr fuel gas heater will consist of two burners, with a separate exhaust stack for each burner. The fuel gas heater is being permitted to operate up to 8,760 hr/yr. Table 2-5 presents short-term and annual emissions rates.

Table 2-5. Source Parameters and Criteria Pollutant Emissions Rates for Emergency Equipment

Fuel oil-Fired Source	Stack Height (ft)	Stack Diameter (ft)	Exit Temperature (°F)	Exit Velocity (fps)	Emissions					
					NO_2		SO_2			PM_{10}
					1-Hour (lb/hr)	Annual (tpy)	1-Hour (lb/hr)	3-Hour (lb/hr)	Annual (tpy)	24-Hour (lb/hr)
Emergency generators (per unit)	18	2	862.8	479.6	0.395¥	8.64*	0.001¥	0.0174‡	0.013*	0.075§
Fuel Gas Heater (per stack)	30	2	823.0	12.2	0.100	0.453	0.010	0.010	0.048	0.070

* Based on 500 hours per year
‡ Emission rate based on operating 1-hour in a 3-hour period
§ Emission rate based on operating 1-hour in a 24-hour period
¥The 1-hour NO_2 and 1-hour SO_2 modeled emission rates were based on the annualized emissions associated with 100 hours of operability testing
Source: ECT, 2025.

2.2.1 Secondary Sources

In addition to the Project's fuel gas heater, the natural gas suppliers will have fuel gas heaters that will be in operation any time natural gas is being supplied for the CTs. As they support the Project they are included as secondary sources in the analyses. There will be three heaters described as follows:

- one (1) 4 MMBtu heater
- two (2) 22 MMBtu heaters

Each heater will consist of two burners, with a separate exhaust stack for each burner. All three heaters are presumed to operate up to 8,760 hr/yr. Table 2-6 presents short-term and annual emissions rates.

Table 2-6. Source Parameters and Criteria Pollutant Emissions Rates for Secondary Fuel Gas Heaters (Per Stack)

Fuel Gas Heater	Stack Height (ft)	Stack Diameter (ft)	Exit Temperature (°F)	Exit Velocity (fps)	Emissions					
					NO_2		SO_2			PM_{10}
					1-Hour (lb/hr)	Annual (tpy)	1-Hour (lb/hr)	3-Hour (lb/hr)	Annual (tpy)	24-Hour (lb/hr)
4 -MMBtu/hr	30	1	300.0	8.1	0.0220	9.64E-02	2.35E-03	2.35E-03	1.03E-02	0.014
22 -MMBtu/hr	30	2	823.0	12.2	0.120	0.530	0.013	0.013	5.67E-02	0.077

Stack parameters and emissions are provided on a per stack basis.
Source: ECT, 2025.

3.0 Air Quality Impact Assessment Methodology

The Article 6 dispersion modeling analyses were conducted for the Project under direction received from VDEQ's Modeling Section. The following subsections present the procedures used for assessing ambient air impacts from the Project's emissions, and the standards to which the predicted impacts were compared.

3.1 Model Selection Discussion

The most recent version of EPA's AERMOD model (currently v24142) was used for predicting ambient impacts for each modeled pollutant.

3.2 Ambient Air Quality Standards

Modeled design value concentrations of criteria pollutants were used to demonstrate that the Project, in addition to existing ambient concentrations of pollutants, will not cause a violation of any NAAQS. The values of the NAAQS that were addressed for NO_2, SO_2, and PM_{10} are shown in Table 3-1. Maximum modeled concentrations of the applicable toxic pollutants were compared with their respective SAACs identified in the VA Air Toxics Rule, shown in Table 3-2.

Table 3-1. National Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$)
NO_2	1-Hour	188
	Annual	100
SO_2	1-Hour	196
	3-Hour	1,300
	Annual	26
PM_{10}	24-Hour	150

Source: 9VAC5-30
US EPA

Table 3-2. VA Significant Ambient Air Concentrations (SAAC)

Pollutant	Averaging Period	SAAC ($\mu g/m^3$)
Acrolein	1-hour	17.25
	Annual	0.46
Formaldehyde	1-hour	62.50
	Annual	2.40
Arsenic	1-hour	10
	Annual	0.4
Beryllium	1-hour	0.1
	Annual	0.004
Cadmium	1-hour	2.5
	Annual	0.1
Chromium	1-hour	2.5
	Annual	0.1
Lead	1-hour	7.5
	Annual	0.3
Manganese	1-hour	250
	Annual	10
Mercury	1-hour	2.5
	Annual	0.1
Nickel	1-hour	5
	Annual	0.2
Selenium	1-hour	10
	Annual	0.4

Source: 9VAC5-60 Article 5

3.3 Meteorological Data

Guidance for air quality modeling recommends the use of one year of onsite meteorological data or five years of representative off-site meteorological data. Dominion used representative off-site meteorological data available from the National Weather Service (NWS) for the period of 2019-2023 in the analyses. The Surface meteorological data was collected at the NWS station at the Richmond International Airport, which is approximately 9 miles NNE from the site, and the upper air data from Sterling, Virginia. The meteorological data was provided by VDEQ and generated using the most recent version of AERMET (24142). Table 3-3 summarizes identifying and location information for the Richmond and Sterling stations.

Table 3-3. Meteorological Data Used in Running AERMET

Meteorological Site	Latitude	Longitude	Base Elevation (meters)
Richmond International Airport	37.5115	-77.3234	50
Sterling Virginia	38.9800	-77.4700	85

Source: ECT, 2025.

3.4 Receptor Grids

A comprehensive Cartesian receptor grid extending out to approximately 10 kilometers (km) from the Project was used in the analyses to assess the maximum ground-level concentration of each air contaminant.

The Cartesian receptor grid consists of the following receptor spacing, per VDEQ modeling guidance:

- Fence Line Receptors—Receptors placed on the Project fence line spaced 25 meters apart.
- Extra Fine Receptors— Receptors at 50-meter spacings starting at the fence line and extending to approximately 1,000 meters.
- Fine Receptors—Receptors at 100-meter spacings starting 1,000 meters from the Project fence line receptors and extending to approximately 3,000 meters.
- Medium Receptors—Receptors at 250-meter spacings starting at 3,000 meters and extending to approximately 10,000 meters.

AERMAP was used to define ground elevations and hill scales for each receptor. The property boundary was used as the boundary to determine ambient air. The property boundary will be fenced, and no receptors were placed within this boundary.

3.5 Building Downwash

The stack heights for Project emission sources will comply with Good Engineering Practice (GEP) stack height regulations.

While the GEP stack height rules address the maximum stack height that can be employed in a dispersion modeling analysis, stacks having heights lower than GEP stack height can potentially result in higher downwind concentrations due to building downwash effects. AERMOD evaluates the effects of building downwash based on the plume rise model enhancements (PRIME) building downwash algorithms. For the Project ambient impact analysis, the complex downwash analysis implemented by AERMOD was performed using the current version of EPA's Building Profile Input Program (BPIP) for PRIME (BPIPPRM) (Version 04274 dated September 30, 2004). The EPA BPIPPRM program was used to determine the area of influence for each building/structure, whether a particular stack is subject to building downwash, the area of influence for directionally dependent building downwash, and to generate the specific building dimension data required by the model.

3.6 Background Concentrations

For the NAAQS air quality analyses, representative background concentrations were included for NO_2, SO_2, and PM_{10}, which was provided by VDEQ. Table 3-4 summarizes the air quality data from the monitoring stations that were used for background concentrations. A discussion of the rationale for the selected background monitors is provided in Appendix C.

Table 3-4. Summary of Background Concentrations

Pollutant	Averaging Period	Background Concentration* (µg/m^3)	Station ID	Station Location	Distance from Project (km)	
NO_2	1-hour	Season-hour-day	51-036-0002	Shirley Plantation	12.1	SE
	Annual	7.5				
SO_2	1-hour	7.9	51-036-0002	Shirley Plantation	12.1	SE
	3-hour	8.9				
	Annual	0.8				
PM_{10}	24-hour	24	51-670-0010	Carter Woodson Middle School	13.5	SSE

* Background concentration for all pollutants and averaging periods are for 2022-2024.
Source: ECT, 2025

3.7 Offsite Source Inventory

VDEQ provided the inventory of nearby sources to include in the NAAQS analyses. The facilities included in the cumulative modeling are provided in the electronic modeling files.

4.0 Modeling Results

Three (3) criteria pollutants, NO_2, SO_2 and PM_{10}, were modeled for the Article 6 analyses. The background concentrations (described in Section 3.6) and nearby offsite sources (described in Section 3.7) have been combined with the appropriate model design values, using the sum of these values for comparison to the NAAQS. Additionally, eleven (11) toxic pollutants were modeled for the Article 6 analysis. The maximum modeled concentrations of toxic pollutants have been compared directly to the VA SAACs.

4.1 Load Analysis Results

The Project was modeled for different worst-case turbine load scenarios (see Section 2). The results of the turbine load analyses are provided in Table 4-1 and Table 4-2. The worst-case scenario for each short-term pollutant and averaging period was used for blending in the subsequent startup/shutdown NAAQS analyses. For annual, startup/shutdown emissions were paired with each load scenario.

Table 4-1.Load Analysis Results – Natural Gas

Load Scenario	Maximum Modeled Concentration by Pollutant and Averaging Period ($\mu g/m^3$)					
	NO_2 (Tier 1)		SO_2			PM_{10}
	1-hr	Annual	1-hr	3-hr	Annual	24-hr
100	**4.10**	0.0149	**1.44**	**1.35**	0.00192	1.14
80	3.91	0.0168	1.38	1.23	0.00214	1.57
70	3.79	0.0170	1.34	1.20	0.00219	1.76
50	3.47	**0.0174**	1.23	1.16	**0.00227**	2.00
MECL	2.92	0.0167	1.05	1.06	0.00218	**2.24**

Source: ECT, 2025.

Table 4-2. Load Analysis Results – Fuel Oil

Load Scenario	Maximum Modeled Concentration by Pollutant and Averaging Period (μg/m³)					
	NO_2 (Tier 1)		SO_2			PM_{10}
	1-hr	Annual (Dual Fuel)	1-hr	3-hr	Annual (Dual Fuel)	24-hr
100	**7.71**	0.0177	**0.72**	**0.69**	0.00199	2.37
80	7.39	0.0196	0.69	0.64	0.00219	3.26
70	7.15	**0.0199**	0.67	0.61	0.00223	3.86
MECL	6.59	0.0195	0.63	0.56	**0.00224**	**4.55**

Source: ECT, 2025.

4.2 NAAQS Analysis Results

A cumulative modeling analysis was conducted for 1-hour and annual NO_2, 1-hour, 3-hour and annual SO_2, and 24-hour PM_{10}. In addition to the Project and secondary sources, nearby offsite sources have been included in the cumulative modeling analysis, as explained in Section 3.7. Background concentrations (Section 3.6) were also combined with the modeled design value concentrations before comparison to the NAAQS.

The results of the cumulative NAAQS analysis are provided in Tables 4-3 through 4-5 below. The short-term NAAQS results are provided in Table 4-3, for natural gas operation, and Table 4-4, for fuel oil operation. The annual NAAQS results are provided in Table 4-5 for natural gas only and for dual fuel operations. As shown in the tables, the NAAQS are not exceeded for any compound for any of the modeled scenarios. This demonstrates that the Project will not cause or contribute to exceedances of the 1-hour and annual NO_2, 1-hour, 3-hour and annual SO_2, and 24-hour PM_{10} NAAQS; therefore, the Project will not adversely impact the public health or welfare.

Table 4-3. Short-term NAAQS Results – Natural Gas

Pollutant	Averaging Period	Maximum Modeled Concentration (μg/m³)	Monitored Background Concentration (μg/m³)	Maximum Total Concentration (μg/m³)	NAAQS (μg/m³)	Percentage of NAAQS (%)
NO_2	1-hour	169.82*		169.82	188	90.33
SO_2	1-hour	136.73	7.9	144.63	196	73.79
	3-hour	84.88	8.9	93.78	1,300	7.21
PM_{10}	24-hour	32.73	24	56.73	150	37.82

* 1-hour NO_2 background concentrations for hour of the day by season (μg/m³) provided by VDEQ were included in the model.
Source: ECT, 2025.

Table 4-4. Short-term NAAQS Results – Fuel Oil

Pollutant	Averaging Period	Maximum Modeled Concentration (µg/m^3)	Monitored Background Concentration (µg/m^3)	Maximum Total Concentration (µg/m^3)	NAAQS (µg/m^3)	Percentage of NAAQS (%)
NO_2	1-hour	169.83*		169.83	188	90.34
SO_2	1-hour	136.71	7.9	144.61	196	73.78
	3-hour	84.87	8.9	93.77	1,300	7.21
PM_{10}	24-hour	32.73	24	56.73	150	37.82

* 1-hour NO_2 background concentrations for hour of the day by season (µg/m^3) provided by VDEQ were included in the model.
Source: ECT, 2025.

Table 4-5. Annual NAAQS Results

Pollutant	Annual Operating Scenario	Maximum Modeled Concentration (µg/m^3)	Monitored Background Concentration (µg/m^3)	Maximum Total Concentration (µg/m^3)	NAAQS (µg/m^3)	Percentage of NAAQS (%)
NO_2	Natural Gas Only	11.86	7.5	19.36	100	19.36
	Dual Fuel	11.86	7.5	19.36	100	19.36
SO_2	Natural Gas Only	4.32	0.8	5.12	26	19.69
	Dual Fuel	4.32	0.8	5.12	26	19.69

Note:
-Natural Gas only results are based on each CT operating 3,240 hours per year on natural gas with an additional 500 SUSD events on natural gas at each load scenario.
-Dual Fuel results are based on each CT operating 2,490 hr/yr on natural gas and 750 hr/yr on fuel oil with an additional 380 SUSD events on natural gas and 120 SUSD events on fuel oil at each load scenario.
Source: ECT, 2025.

4.3 Air Toxic Model Results[3]

An air toxics modeling analysis was conducted for the toxic pollutants where the Project emissions exceeded their respective VA air toxic exemption emission rates for 1-hour and annual emissions. (See Table B-24 in Appendix B of the Air Permit Application.) Both Project sources and existing Chesterfield Power Station sources were included in the modeling. The highest modeled concentration for each toxic pollutant was compared with their respective SAAC.

[3] As previously noted, the Project is exempt from the Virginia Air Toxics Regulation and therefore air toxics modeling was not required.

A summary of the 1-hour and annual air toxic analyses is presented in Tables 4-6 and 4-7, respectively. The results show there are no exceedances of 1-hour and annual SAACs.[4] Therefore, the Project demonstrates that it will not adversely affect human health.

Table 4-6. Air Toxic 1-hour Model Results

Pollutant	1-Hour Operating Scenario	SAAC ($\mu g/m^3$)	Maximum Model Concentration Project ($\mu g/m^3$)	Percentage of SAAC-Project (%)	Model Concentration Project and Existing Facility ($\mu g/m^3$)	Percentage of SAAC – Project and Existing Facility (%)
Acrolein	Natural Gas	17.25	0.0206	0.12%	2.21	12.81%
	Fuel Oil	17.25	0.02057	0.12%	2.21	12.81%
Formaldehyde	Natural Gas	62.50	0.6226	1.00%	17.34	27.74%
	Fuel Oil	62.50	0.21701	0.35%	17.34	27.74%
Arsenic	Natural Gas	10	0.0002	0.00%	0.0033	0.03%
	Fuel Oil	10	0.0080	0.08%	0.0081	0.08%
Beryllium	Natural Gas	0.1	0.00001	0.01%	0.0001	0.10%
	Fuel Oil	0.1	0.00023	0.23%	0.0002	0.20%
Cadmium	Natural Gas	2.5	0.0013	0.05%	0.0027	0.11%
	Fuel Oil	2.5	0.00349	0.14%	0.0036	0.14%
Chromium	Natural Gas	2.5	0.0016	0.07%	0.0038	0.15%
	Fuel Oil	2.5	0.0080	0.32%	0.0082	0.33%
Lead	Natural Gas	7.5	0.0209	0.28%	0.0209	0.28%
	Fuel Oil*	7.5	0.02089	0.28%	0.0209	0.28%
Manganese	Natural Gas	250	0.0004	0.00%	0.2298	0.09%
	Fuel Oil	250	0.57486	0.23%	0.5840	0.23%
Mercury	Natural Gas	2.5	0.0003	0.01%	0.0006	0.02%
	Fuel Oil	2.5	0.00087	0.03%	0.0009	0.04%
Nickel	Natural Gas	5	0.0024	0.05%	0.0103	0.21%
	Fuel Oil	5	0.00334	0.07%	0.0103	0.21%
Selenium	Natural Gas	10	0.00003	0.00%	0.0073	0.07%
	Fuel Oil	10	0.01818	0.18%	0.0185	0.18%

* Results are based on updated lead fuel oil emission factor of $5.13e^{-06}$ lb/MMBtu based on the maximum measured concentration for No. 2 fuel oil from the California Air Toxics Emission Factor database and supported by site specific fuel oil analyses.

Source: ECT, 2025

[4] The maximum modeled facility-wide acrolein and formaldehyde concentrations result from an existing, 50-hp propane-fired emergency engine that supports the microwave communications tower. This engines is located on CPS property outside of the fenceline.

Table 4-7. Air Toxic Annual Model Results

Pollutant	Annual Operating Scenario	SAAC (µg/m³)	Maximum Model Concentration Project (µg/m³)	Percentage of SAAC-Project (%)	Model Concentration Project and Existing Facility (µg/m³)	Percentage of SAAC – Project and Existing Facility (%)
Acrolein	Natural Gas Only	0.46	0.00009	0.02%	0.04	8.70%
	Dual Fuel	0.46	0.00008	0.02%	0.04	8.70%
Formaldehyde	Natural Gas Only	2.40	0.00076	0.03%	0.32	13.33%
	Dual Fuel	2.40	0.00070	0.03%	0.32	13.33%
Arsenic	Natural Gas Only	0.4	0.00001	0.00%	0.00003	0.01%
	Dual Fuel	0.4	0.00001	0.00%	0.00003	0.01%
Beryllium	Natural Gas Only	0.004	0.00000	0.00%	0.00000	0.00%
	Dual Fuel	0.004	0.00000	0.00%	0.00000	0.00%
Cadmium	Natural Gas Only	0.1	0.00007	0.07%	0.00007	0.07%
	Dual Fuel	0.1	0.00003	0.03%	0.00008	0.08%
Chromium	Natural Gas Only	0.1	0.00004	0.04%	0.00010	0.10%
	Dual Fuel	0.1	0.00004	0.04%	0.00010	0.10%
Lead	Natural Gas Only	0.3	0.00002	0.01%	0.00004	0.01%
	Dual Fuel*	0.3	0.00002	0.01%	0.00004	0.01%
Manganese	Natural Gas Only	10	0.00001	0.00%	0.00189	0.02%
	Dual Fuel	10	0.00031	0.00%	0.00206	0.02%
Mercury	Natural Gas Only	0.1	0.00001	0.01%	0.00002	0.02%
	Dual Fuel	0.1	0.00001	0.01%	0.00002	0.02%
Nickel	Natural Gas Only	0.2	0.00006	0.03%	0.00014	0.07%
	Dual Fuel	0.2	0.00006	0.03%	0.00014	0.07%
Selenium	Natural Gas Only	0.4	0.00000	0.00%	0.00006	0.02%
	Dual Fuel	0.4	0.00001	0.00%	0.00007	0.02%

* Results are based on updated lead fuel oil emission factor of $5.13e^{-06}$ lb/MMBtu based on the maximum measured concentration for No. 2 fuel oil from the California Air Toxics Emission Factor database and supported by site specific fuel oil analyses.

Source: ECT, 2025

5.0 Air Quality Impact Analyses Conclusion

The results of the Article 6 air quality modeling analyses demonstrate that the Project does not cause or contribute to any exceedance of the NAAQS for NO_2, SO_2, and PM_{10} and does not exceed any of the VA SAACs.

Electronic modeling files were provided to VDEQ over a secure file transfer as part of this report. The following summarizes the contents of the electronic files:

- AERMOD input and output files for Article 6 and toxics analyses
- Meteorological data used in the analyses
- BPIP input and output

6.0 References/Bibliography

U.S. Environmental Protection Agency (EPA). 1985. Guidelines for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations [Revised]). EPA-450/4-80-023R. Research Triangle Park, North Carolina.

———. 2024a. Guideline on Air Quality Models (Revised). Codified in 40 CFR 51, Appendix W. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. November.

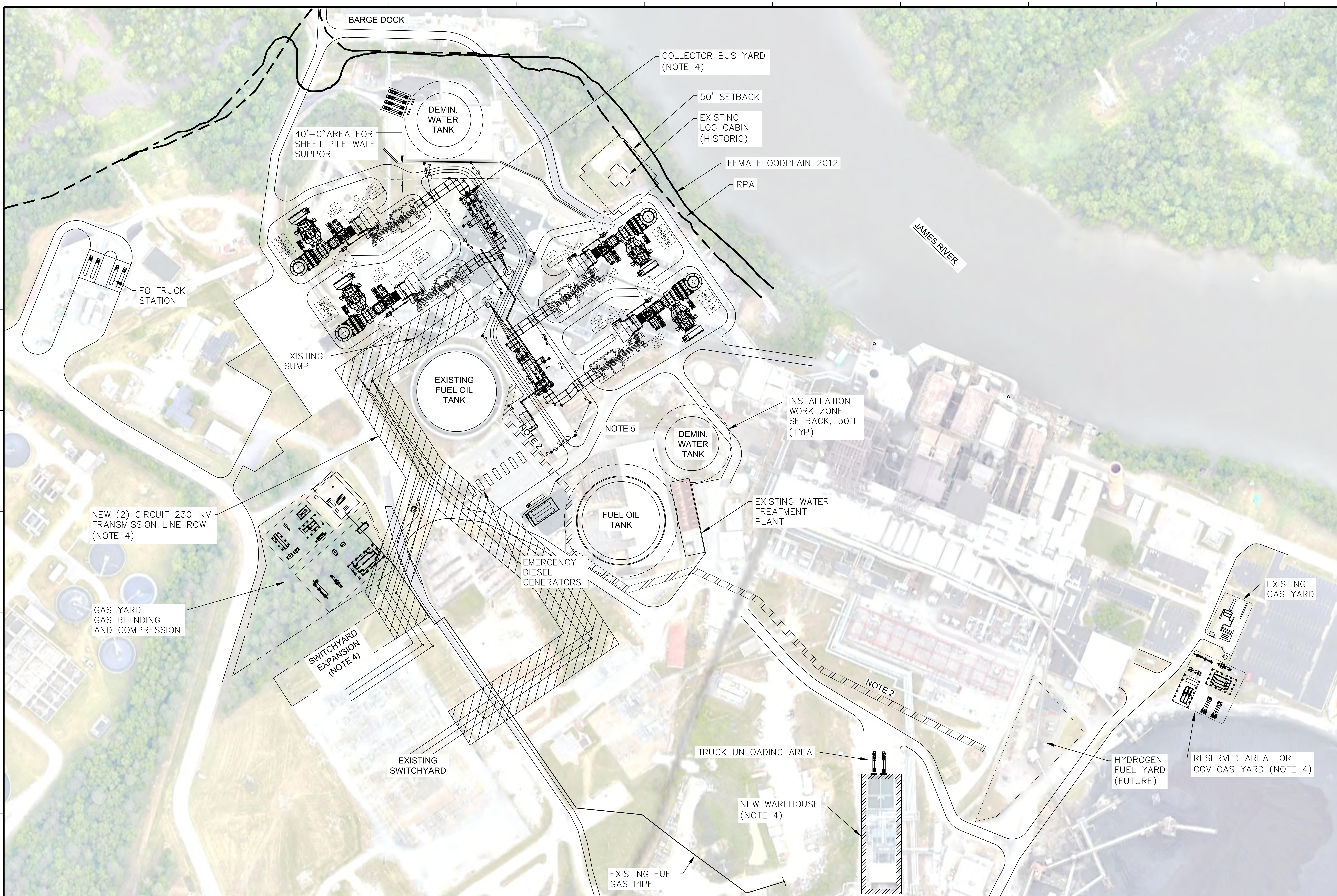
———. 2024b. User's Guide for the AMS/EPA Regulatory Model (AERMOD). EPA-454/B-24-007 (November 2024). Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.

———. 2024c. User's Guide for the AERMOD Meteorological Preprocessor (AERMET). (EPA-454/B-24-004, November 2024). Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.

———. 2024d. User's Guide for the AERMOD Terrain Preprocessor (AERMAP). (EPA-454/B-24-008, November 2024). Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.

Virginia Department of Environmental Quality (VDEQ) Division of Air Program Coordination Article 6 – Minor Source Review Permit Program Manual.

Appendix A Site Plan



NOTES:

1. CERC POWER ISLAND EQUIPMENT BASED ON GE DRAWING SET – IPS1646562-7F05-H35
2. OPTION PRICING UTILITY RACK – PIPE AND CABLE TRAY RACK CONNECTING THE CERC POWER ISLAND TO THE UNIT 7 & 8 TRUCK ENTRANCE. SEE PIPE RACK SECTION DETAIL FOR RACK LOADING AND ROAD CROSSING DETAILS.
3. FOR CLARITY – NOT ALL EXISTING STRUCTURES IN CLOSE PROXIMITY TO THE PROJECT ARE IDENTIFIED.
4. INFORMATION ONLY – NOT IN EPC SCOPE
5. EXISTING UNIT 7 & 8 FUEL OIL FORWARDING PUMPS TO REMAIN. SUCTION PIPING CAN REMAIN UNDISTURBED BUT THE DISCHARGE PIPING SHALL BE RELOCATED TO ACCOMMODATE THE NEW DEMINERALIZED WATER TANK. NEW PIPING CAN BE INSTALLED ON THE NEW PIPE RACK OR OTHER.

LEGEND:

———	EXISTING STRUCTURE TO REMAIN (NOTE 3)
– – – –	SETBACK FOR WORK ZONE OR EQUIPMENT REQUIRED SETBACKS

PRELIMINARY NOT FOR CONSTRUCTION
11/05/2024

0 120' 240'
SCALE: 1"=120'

Dominion Energy

REV.	DESCRIPTION	DRAWN	CHKD	APPRVD	DATE
F	ISSUED FOR REVIEW	PMD	AC		11/05/2024
E	ISSUED FOR BID	PMD	AC		07/19/2024
D	ISSUED FOR REVIEW	PMD	AC		06/27/2024
C	ISSUED FOR REVIEW	PMD	AC		06/18/2024
B	ISSUED FOR REVIEW	PMD	AC		03/27/2024
A	ISSUED FOR REVIEW	PMD	AC		03/13/2024

DRAWING REVISIONS

Stantec
Stantec Consulting Services Inc.
50 Derby Street, Suite 260
Hingham, MA 02902
Tel. 617.786.7960
Fax. 617.786.7962
www.stantec.com

FILE NAME: 2057318100-M-001-f.dwg

COA #

SEAL

DRAWN: P. DEFAZIO	CHECKED: A. CELLA	IND. REVIEW
DESIGNED: P. DEFAZIO	CHECKED: A. CELLA	APPROVED: A. CELLA
PROJECT NO: 2057318100		SCALE: 1"=120'

CLIENT/PROJECT:
DOMINION ENERGY
CHESTERFIELD ENERGY RELIABILTY CENTER (CERC)
CHESTERFIELD, VIRGINIA

TITLE:
OVERALL SITE PLAN
1000 MW SIMPLE CYCLE PLANT

SHT 1 OF 1 | DWG NO: 2057318100-M-001 | REV: F

Appendix B Model Support Data

GE - Natural Gas

	Exit Temperature	Exit Velocity	NO2 1-hour		SO2 1-hour		SO2 3-hour
			Turbine 1				
	F	fps					
Startup							
Start[1,2]	850.000	67.52	52.00		4.00		1.33
Normal Operation[3]	850.000	117.32	11.65		4.10		6.83

1. Exhaust velocity for the MECL load from performance data provided by vendor and/or Dominion
2. Exit temperature for the MECL load from performance data provided by vendor and/or Dominion
3. Exit velocity and temperature for the 100% load from performance data provided by vendor and/or Dominion

	Exit Temperature	Exit Velocity	PM10 24-hour
			Turbine 1
	F	fps	
Startup			
Start[1,2]	850.000	67.52	0.17
Normal Operation[3]	850.000	67.52	14.10

1. Exhaust velocity for the MECL load from performance data provided by vendor and/or Dominion
2. Exit temperature for the MECL load from performance data provided by vendor and/or Dominion
3. Exit velocity and temperature for the MECL load from performance data provided by vendor and/or Dominion

NOx-Startup/Shutdown Modeling Calculations

	Startup **Turbine 1**
Total emission per event	52
Maximum 1-hour rolling average rate during startup (lb/hr)	52.00
Time (min)	30
Maximum NOx during normal operation - 100% (lb/hr)	23.30

Scenarios

NOx - 1 hour

	Turbine 1 **Startup**
NOx 1-hour (min)	60
Startup/Shutdown (min)	30.0
emissions (lbs/hr)	**52.00**
Remaining Time (min)	30.0
emissions (lbs/hr)	**11.65**
Start Maximum	52.00
Normal Operation 100% with Evap Cooler Total	23.30

Separate SU and normal operation Stacks

	Turbine 1
Start	
Startup	52.00
Remaining time in Normal Operation	11.65

PM10-Startup/Shutdown Modeling Calculations

	Startup
	Turbine 1
Total emission per event	4
Maximum 1-hour rolling average rate during startup (lb/hr)	4.00
Time (min)	30
Maximum PM10 during normal operation - MECL (lb/hr)	14.40

	Turbine 1 Startup
PM10- 24hour (min)	1440
Startup/Shutdown (min)	30
Startup/Shutdown (hrs)	0.50
emissions	**4.00**

Remaining Time for Normal Operation for Turbine 1 in sequence (min)	1410
hours	23.50
emissions (lb/event)	**338.40**

Scenarios

PM10 24-hr

	Turbine 1
PM10 24-hour (min)	1440
Startup/Shutdown (min)	30.0
emisisons (lb/event)	4.0

Remaining Time for Normal Operation for Turbine 1 after startup (min)	1410.0
emissions (lb/24-hr)	**338.40**

Separate SU and normal operation Stacks

	Turbine 1
Startup	
Startup	0.17
Remaining time in Normal Operation	14.10

SO2-Startup/Shutdown Modeling Calculations

	Startup **Turbine 1**
Total emission per event	4.00
Maximum 1-hour rolling average rate during startup (lb/hr)	4.00
Time (min)	30
Maximum NOx during normal operation - 100% w/ Evap cooler (lb/hr)	8.20

SO2 1-hr

	Turbine 1 **Startup**
SO2 1-hour (min)	60
Startup/Shutdown (min)	30
emissions (lbs/hr)	**4.00**
Remaining Time (min)	30.00
emissions (lbs/hr)	**4.10**

SO2 3-hr

	Turbine 1
SO2 3-hour (min)	180
Startup/Shutdown (min)	30.0
emisisons (lb/event)	4.00
Remaining Time for Normal Operation for Turbine 1 after hot start (min)	150.0
emissions (lb/3-hr)	**20.50**

Scenarios

SO2 - 1 hour

Separate SU and normal operation Stacks

	Turbine 1
Start	
Startup	4.00
Remaining time in Normal Operation	4.10

SO2 3-hour

Separate SU and normal operation Stacks

	Turbine 1
Start	
Startup	1.33
Remaining time in Normal Operation	6.83

GE - Fuel Oil

	Exit Temperature	Exit Velocity	NO2 1-hour		SO2 1-hour		SO2 3-hour
	F	fps					
Startup							
Start[1,2]	850.00	94.81	143.00		2.00		0.67
Normal Operation[3]	850.00	127.01	23.95		2.25		3.75

1. Exhaust velocity for the 50% load from performance data provided by vendor and/or Dominion
2. Exit temperature for the 50% load from performance data provided by vendor and/or Dominion
3. Exit velocity and temperature for the 100% load from performance data provided by vendor and/or Dominion

	Exit Temperature	Exit Velocity	PM10 24-hour
	F	fps	
Startup			
Start[1,2]	850.00	94.81	0.88
Normal Operation[3]	850.00	94.81	43.67

1. Exhaust velocity for the 50% load from performance data provided by vendor and/or Dominion
2. Exit temperature for the 50% load from performance data provided by vendor and/or Dominion
3. Exit velocity and temperature for the MECL load from performance data provided by vendor and/or Dominion

NOx-Startup/Shutdown Modeling Calculations

	Startup **Turbine 1**
Total emission per event	143
Maximum 1-hour rolling average rate during startup (lb/hr)	143.00
Time (min)	30
Maximum NOx during normal operation - Base Load (lb/hr)	47.90

Scenarios

NOx - 1 hour

	Turbine 1 **Startup**
NOx 1-hour (min)	60
Startup/Shutdown (min)	30.0
emissions (lbs/hr)	**143.00**
Remaining Time (min)	30.0
emissions (lbs/hr)	**23.95**
Start Maximum	143.00
Normal Operation 100% with Evap Cooler	47.90
Total	

Separate SU and normal operation Stacks

	Turbine 1
Start	
Startup	143.00
Remaining time in Normal Operation	23.95

PM10-Startup/Shutdown Modeling Calculations

	Startup
	Turbine 1
Total emission per event	21
Maximum 1-hour rolling average rate during startup (lb/hr)	21.00
Time (min)	30
PM10 from worst case scenario for Load analysis (MECL)	44.60

	Turbine 1 Startup
PM10- 24hour (min)	1440
Startup/Shutdown (min)	30
Startup/Shutdown (hrs)	0.50
emissions	**21.00**

Remaining Time for Normal Operation for Turbine 1 in sequence (min)	1410
hours	23.50
emissions (lb/event)	**1048.10**

Scenarios

PM10 24-hr

	Turbine 1
PM10 24-hour (min)	1440
Startup/Shutdown (min)	30.0
emisisons (lb/event)	21.0

Remaining Time for Normal Operation for Turbine 1 after startup (min)	1410.0
emissions (lb/24-hr)	**1048.10**

Separate SU and normal operation Stacks

	Turbine 1
Startup	
Startup	0.88
Remaining time in Normal Operation	43.67

SO2-Startup/Shutdown Modeling Calculations

	Startup **Turbine 1**
Total emission per event	2.00
Maximum 1-hour rolling average rate during startup (lb/hr)	2.00
Time (min)	30
Maximum NOx during normal operation - 100% w/ Evap cooler (lb/hr)	4.50

SO2 1-hr

	Turbine 1 **Startup**
SO2 1-hour (min)	60
Startup/Shutdown (min)	30
emissions (lbs/hr)	**2.00**
Remaining Time (min)	30.00
emissions (lbs/hr)	**2.25**

SO2 3-hr

	Turbine 1
SO2 3-hour (min)	180
Startup/Shutdown (min)	30.0
emisisons (lb/event)	2.00
Remaining Time for Normal Operation for Turbine 1 after hot start (min)	150.0
emissions (lb/3-hr)	**11.25**

Scenarios

SO2 - 1 hour

Separate SU and normal operation Stacks

	Turbine 1
Start	
Startup	2.00
Remaining time in Normal Operation	2.25

SO2 3-hour

Separate SU and normal operation Stacks

	Turbine 1
Start	
Startup	0.67
Remaining time in Normal Operation	3.75

Truck trips per year calculations

1) Ash hauling UAP to FFCP

Truck trips per hour:	39
Working hours per day:	10
Working days per week:	7
Working weeks per year:	52
Truck trips per year:	141,960

2) Ash hauling - UAP to Beneficial Use (BU)

Truck trips per hour:	18
Working hours per day:	10
Working days per week:	7
Working weeks per year:	52
Truck trips per year:	65,520

3) Water trucks

Working days per week:	7
Working weeks per year:	52
VMT @10% of Haul Road Traffic, Low ADT:	2,424
VMT @10% of Haul Road Traffic, Medium ADT:	0

Truck trips per day calculations

1) Ash hauling UAP to FFCP

Truck trips per hour:	39
Working hours per day:	10
Truck trips per day:	390

2) Ash hauling - UAP to Beneficial Use (BU)

Truck trips per hour:	18
Working hours per day:	10
Truck trips per day:	180

2. Haul Roads Data

a. UAP Load Truck through FFCP Dropoff (Loaded Truck)

Segment	Segment	Length (miles)	Characterization	Silt Loading		Vehicle Speed (mph)	Suppression Method	Dust Control (%)	truck trips /year	lb PM-30 / VMT	lb PM-10 / VMT	lb PM-2.5 / VMT	controlled emission tons PM-30 / year	controlled emission tons PM-10 / year	controlled emission tons PM-2.5 / year	truck trips /day	controlled emission tons PM-30 / day	controlled emission tons PM-10 / day	controlled emission tons PM-2.5 / day
Ash Pickup and Exit through UAP	1	0.45	unpaved (packed)	8.4	%	25 mph or less	watering & speed limit	97.2%	141,960	7.533	2.147	0.215	6.73	1.92	0.19	390	1.85E-02	5.27E-03	5.27E-04
UAP Entrance Road	2	0.15	paved (med ADT)	0.2	g/m2	35	remove road deposits	90.0%	141,960	0.086	0.017	0.0042	0.091	0.018	0.0045	390	2.51E-04	5.02E-05	1.23E-05
From UAP Entrance Road to UAP/LAP Wheel Wash Station	3	0.20	paved (med ADT)	0.2	g/m2	35	remove road deposits	90.0%	141,960	0.086	0.017	0.0042	0.12	0.024	0.0060	390	3.35E-04	6.69E-05	1.64E-05
From Wheel Wash on Henricus to Coxendale at BU Entrance Road	4	0.77	paved (med ADT)	0.2	g/m2	35	wheel washing & remove deposits	98.0%	141,960	0.086	0.017	0.0042	0.094	0.019	0.0046	390	2.58E-04	5.15E-05	1.26E-05
Coxendale from BU Entrance Road to Dominion Entrance at Old Stage	5	0.51	paved (med ADT)	0.2	g/m2	35	wheel washing & remove deposits	98.0%	141,960	0.086	0.017	0.0042	0.063	0.013	0.0031	390	1.72E-04	3.45E-05	8.46E-06
Dominion Entrance to FFCP Entry	6	0.89	paved (med ADT)	0.2	g/m2	35	wheel washing & remove deposits	98.0%	141,960	0.086	0.017	0.0042	0.11	0.022	0.0053	390	2.97E-04	5.95E-05	1.46E-05
FFCP Entrance to Phase 4 Entry	7	0.43	unpaved (gravel)	4.8	%	25 mph or less	watering & speed limit	97.2%	141,960	5.091	1.298	0.130	4.35	1.11	0.11	390	1.20E-02	3.05E-03	3.05E-04
Ash Dropoff in Phase 4	8	0.15	unpaved (packed)	8.4	%	25 mph or less	watering & speed limit	97.2%	141,960	7.533	2.147	0.215	2.18	0.62	0.06	390	5.98E-03	1.71E-03	1.71E-04

b. Ash hauling UAP to FFCP (Unloaded Truck)

Segment	Segment	Length (miles)	Characterization	Silt Loading		Vehicle Speed (mph)	Suppression Method	Dust Control (%)											
From FFCP Dropoff to FFCP Perimeter Road at Phase 4	9	0.12	unpaved (packed)	8.4	%	25 mph or less	watering & speed limit	97.2%	141,960	6.049	1.724	0.172	1.47	0.42	0.042	390	4.04E-03	1.15E-03	1.15E-04
Phase 4 Exit Point to Wheel Wash	10	0.45	unpaved (gravel)	8.4	%	25 mph or less	watering & speed limit	97.2%	141,960	6.049	1.724	0.172	5.39	1.54	0.15	390	1.48E-02	4.22E-03	4.22E-04
Truck Wash to FFCP Entrance	11	0.08	paved (med ADT)	0.2	g/m2	35	wheel washing & remove deposits	98.0%	141,960	0.052	0.010	0.0026	0.0060	0.0012	0.00029	390	1.64E-05	3.29E-06	8.06E-07
FFCP Entrance to Dominion Entrance	6	0.89	paved (med ADT)	0.2	g/m2	35	wheel washing & remove deposits	98.0%	141,960	0.052	0.010	0.0026	0.066	0.013	0.0032	390	1.81E-04	3.62E-05	8.88E-06
Coxendale From Dominion Entrance to BU Entrance Road	5	0.51	paved (med ADT)	0.2	g/m2	35	wheel washing & remove deposits	98.0%	141,960	0.052	0.010	0.0026	0.038	0.008	0.0019	390	1.05E-04	2.10E-05	5.15E-06
From BU Entrance Road to Wheel Wash on Henricus	4	0.77	paved (med ADT)	0.2	g/m2	35	wheel washing & remove deposits	98.0%	141,960	0.052	0.010	0.0026	0.057	0.011	0.0028	390	1.57E-04	3.13E-05	7.69E-06
From UAP Entrance Road to UAP/LAP Wheel Wash Station	3	0.20	paved (med ADT)	0.2	g/m2	35	wheel washing & remove deposits	98.0%	141,960	0.052	0.010	0.0026	0.015	0.0030	0.0007	390	4.07E-05	8.14E-06	2.00E-06
UAP Entrance Road	2	0.15	paved (med ADT)	0.2	g/m2	35	wheel washing & remove deposits	98.0%	141,960	0.052	0.010	0.0026	0.011	0.0022	0.0005	390	3.05E-05	6.11E-06	1.50E-06
From UAP Entrance to Ash Pickup	1	0.45	unpaved (packed)	8.4	%	25 mph or less	watering & speed limit	97.2%	141,960	6.049	1.724	0.172	5.40	1.54	0.15	390	1.48E-02	4.23E-03	4.23E-04

c. UAP to BU Building to Dominion Entrance (BU Loaded Truck)

Segment	Segment	Length (miles)	Characterization	Silt Loading		Vehicle Speed (mph)	Suppression Method	Dust Control (%)											
Ash Pickup and Exit through UAP	1	0.45	unpaved (packed)	8.4	%	25 mph or less	watering & speed limit	97.2%	65,520	7.533	2.147	0.215	3.11	0.89	0.089	180	8.54E-03	2.43E-03	2.43E-04
UAP Entrance Road	2	0.15	paved (med ADT)	0.2	g/m2	25 mph or less	remove road deposits	90.0%	65,520	0.086	0.017	0.004	0.042	0.008	0.0021	180	1.16E-04	2.32E-05	5.69E-06
From UAP Entrance Road to UAP/LAP Wheel Wash Station	3	0.20	paved (med ADT)	0.2	g/m2	25 mph or less	remove road deposits	90.0%	65,520	0.086	0.017	0.004	0.056	0.011	0.0028	180	1.54E-04	3.09E-05	7.58E-06
From Wheel Wash to Coxendate at Intersection of LAP Entrance Road	4	0.77	paved (med ADT)	0.2	g/m2	35	wheel washing & remove deposits	98.0%	65,520	0.086	0.017	0.004	0.043	0.009	0.0021	180	1.19E-04	2.38E-05	5.84E-06
Coxendale from Intersection of LAP Entrance to BU Building	12	0.21	paved (low ADT)	0.6	g/m2	35	wheel washing & remove deposits	98.0%	65,520	0.142	0.028	0.007	0.020	0.004	0.0010	180	5.36E-05	1.07E-05	2.63E-06
CCR Dropoff in BU Bldg	13	0.03	unpaved (packed)	8.4	%	25 mph or less	speed limit	44.0%	65,520	7.533	2.147	0.215	4.15	1.18	0.12	180	1.14E-02	3.25E-03	3.25E-04
CCR Dropoff to BU Truck Wash	14	0.03	unpaved (packed)	8.4	%	25 mph or less	speed limit	44.0%	65,520	7.533	2.147	0.215	4.15	1.18	0.12	180	1.14E-02	3.25E-03	3.25E-04
From BU Building to Coxendale	15	0.16	paved (low ADT)	0.6	g/m2	35	wheel washing & remove deposits	98.0%	65,520	0.142	0.028	0.007	0.015	0.0030	0.0007	180	4.09E-05	8.17E-06	2.01E-06
Coxendale to Dominion Entrance	5	0.51	paved (med ADT)	0.2	g/m2	35	wheel washing & remove deposits	98.0%	65,520	0.086	0.017	0.004	0.029	0.0058	0.0014	180	7.95E-05	1.59E-05	3.90E-06

d. Beneficial Reuse to UAP (BU Unloaded Truck)

Segment	Segment	Length (miles)	Characterization	Silt Loading		Vehicle Speed (mph)	Suppression Method	Dust Control (%)											
Coxendale to Dominion Entrance	5	0.51	paved (med ADT)	0.2	g/m2	35	wheel washing & remove deposits	98.0%	65,520	0.052	0.010	0.0026	0.02	0.00	0.00	180	4.84E-05	9.68E-06	2.38E-06
From BU Entrance Road to Wheel Wash on Henricus	4	0.77	paved (med ADT)	0.2	g/m2	35	wheel washing & remove deposits	98.0%	65,520	0.052	0.010	0.0026	0.03	0.01	0.00	180	7.23E-05	1.45E-05	3.55E-06
From UAP/LAP Wheel Wash Station to UAP Entrance Road	3	0.20	paved (med ADT)	0.2	g/m2	25 mph or less	wheel washing & remove deposits	98.0%	65,520	0.052	0.010	0.0026	0.01	0.00	0.00	180	1.88E-05	3.76E-06	9.23E-07
UAP Entrance Road	2	0.15	paved (med ADT)	0.2	g/m2	25 mph or less	wheel washing & remove deposits	98.0%	65,520	0.052	0.010	0.0026	0.01	0.00	0.00	180	1.41E-05	2.82E-06	6.92E-07
LAP Haul Road Entrance to CCR Pickup	1	0.45	unpaved (packed)	8.4	%	25 mph or less	watering & speed limit	97.2%	65,520	6.049	1.724	0.172	2.50	0.71	0.07	180	6.86E-03	1.96E-03	1.96E-04

e. Watering Truck Traffic - assumed to be equal to 10 percent of the ash haul traffic provided above.

f. Dust control methods

Paved roads - combination of road sweeping and trackout minimization from unpaved areas (wheel washing)
Unpaved roads - combination of limiting vehicle speed and road watering

g. Data sources and assumptions for traffic data

Segment lengths: Roadway lengths established by measurements using Google Earth.
Paved road silt loadings: AP-42, Table 13.2.1-2. Only the haul traffic within the BU area is less than 500 VMT/day with a silt loading of 0.6 g/m2.
Coxendale and Henricus paved roads are public roads with ADT of 1,200 ADT baseline (2018 VA DOT database). Ash hauling alone is somewhat higher than 500 ADT. Silt loading = 0.2 g/m2 for all other roads with ADT of 500 - 5,000.
Upaved road silt loading: unpaved packed roads, AP-42, Table 13.2.2-1 (western surface mining, 8.4%). Gravel roads used silt loading information provided by manufacturer (4.8%). Gravel road from FFCP exit is 8.4% due to ash/soil buildup.
Vehicle speeds: Coxendale posted speed limit is 35 mph. Henricus is posted at 25 mph. All other plant roads assumed limited to 25 mph.

3. Vehicle Data

Vehicle Type	Loaded Weight (tons)	Unloaded Weight (tons)	Data Source
Ash hauling truck	31.5	19.35	Chesterfield Basis of Design, 90 lb/ft3 density, 10 ft3 capacity
Fill hauling truck	40	23.8	Chesterfield Basis of Design, 120 lb/ft3 density, 10 ft3 capacity
Water truck (4000 gal capacity)	7.4	24.1	Representative truck rental (Herc Rentals) data
Watering truck use	N/A	N/A	Assumed watering truck mileage is 10% of haul truck traffic

4. Landfill and Ash Pond Equipment (number per area)

Equipment Type	Landfill	LAP [1]	UAP	Basis of Estimate
CAT 330L Excavator	1	N/A	2	AECOM Equipment Estimation
Other Excavators	1	N/A	2	AECOM Equipment Estimation
Compactors/Graders	1	N/A	2	AECOM Equipment Estimation
CAT D6 Bulldozer	1	N/A	8	AECOM Equipment Estimation
Miscellaneous	1	N/A	1	AECOM Equipment Estimation
CAT 963 Loader	1	N/A	2	FFCP Phase 1 Application, assumed 2 needed in LAP to maintain projected haul traffic

Note 1: LAP trafffic not considered because no non-construction activities occurring within 20206 - 2027 worst-case emissions projection.

5. Material Handling and Operating Schedule

Equipment Type	BU Loadout Operation
980M Wheel Loader	2
CAT 745 Truck	2

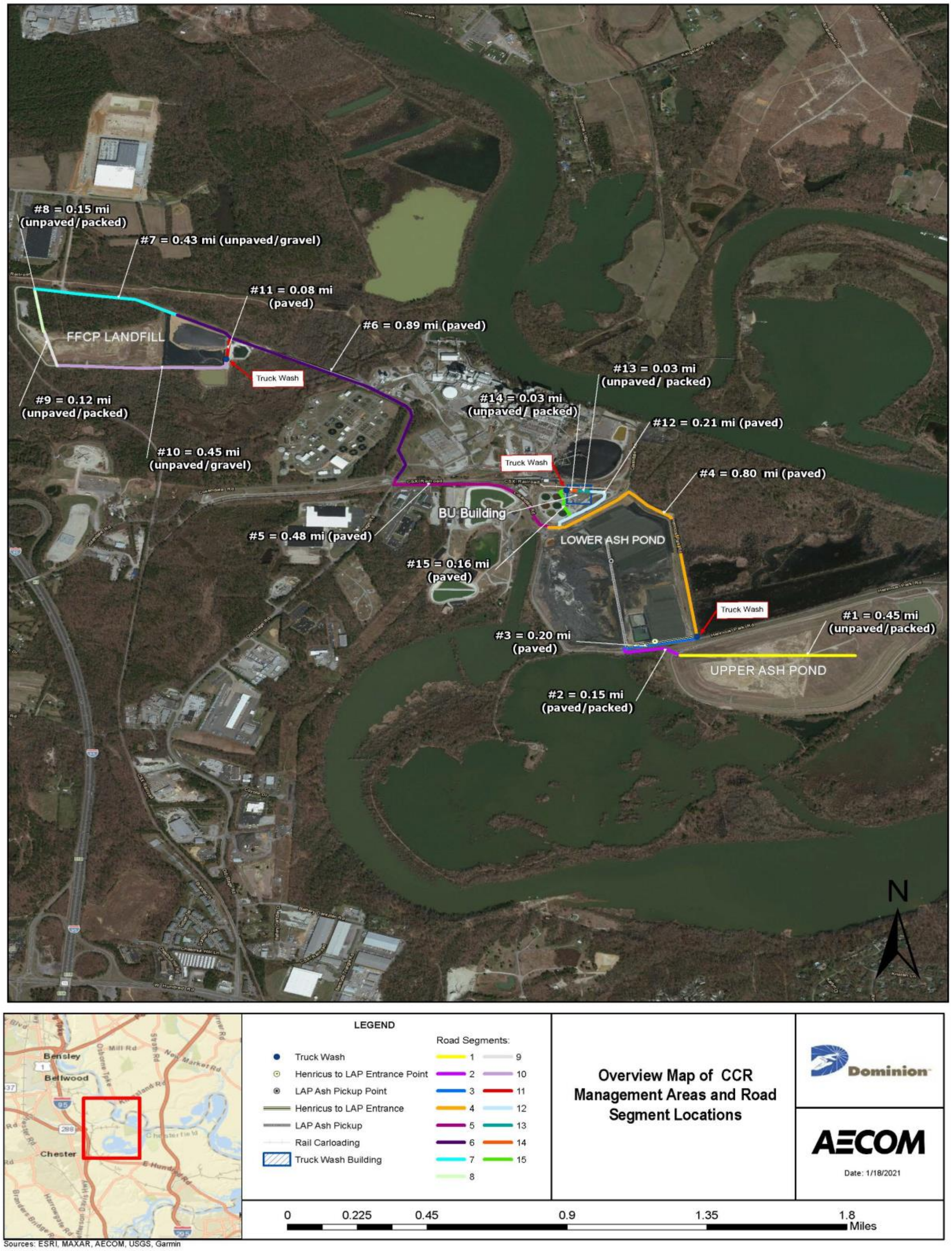
Calculation Inputs	Value		Data Source
Site wind speed	6.2	miles per hour	Weatherspark.com - Average Weather in Chesterfield, VA
Ash density	90	lb/ft^3	Common engineering assumption
	1.22	ton/CY	Converted value
Ash moisture content	20	%	Beneficial Reuse of Coal Ash from Dominion Energy Coal Ash Sites Feasibility Assessment, https://www.southernenvironment.org/uploads/words_docs/Coal_Ash_Recycling_Feasiblity_Assessment.pdf
Hauling capacity, ash trucks	10	CY/truck	Basis of Design Document, AECOM
Loading rate, UAP to FCCP	39	trucks/hr	*Calculated Value*
Annual rate, UAP to FFCP	###########	CY/yr	*Calculated using inputs*
Annual ash to BU	655,200	CY/yr	Charah Design Data, emission calculation spreadsheet 10/20/20
Total CCR Transported	###########	CY/yr	Summation of FFCP and BU rows above
Trucks/hr based to BU on annual rate and design schedule	18	trucks/hr	*Calculated using inputs (rounded value used)*
Daily work schedule	10	hrs/day	Basis of Design Document, AECOM
Weekly work schedule	7	days/week	Basis of Design Document, AECOM
Annual work schedule	52	weeks/yr	Worst-case assumption; design basis is 22 days/month
Working vehicle speed, heavy equipment in UAP and FFCP	2.0	miles per hour	Engineering estimate

Short-term Emission Rates

											Modeled emission Rate		
		PM30 tons/day	PM10 tons/day	PM2.5 tons/day		PM30 lb/hr	PM10 lb/hr	PM2.5 lb/hr		Number of Modeled Volume sources	PM30 lb/hr	PM10 lb/hr	PM2.5 lb/hr
Segment	Segment												
Ash Pickup and Exit through UAP	1	4.87E-02	1.39E-02	1.39E-03		4.06E+00	1.16E+00	1.16E-01		74	5.49E-02	1.56E-02	1.56E-03
UAP Entrance Road	2	4.12E-04	8.23E-05	2.02E-05		3.43E-02	6.86E-03	1.68E-03		25	1.37E-03	2.74E-04	6.73E-05
From UAP Entrance Road to UAP/LAP Wheel Wash Station	3	5.49E-04	1.10E-04	2.69E-05		4.57E-02	9.15E-03	2.24E-03		35	1.31E-03	2.61E-04	6.41E-05
From Wheel Wash on Henricus to Coxendale at BU Entrance Road	4	6.06E-04	1.21E-04	2.97E-05		5.05E-02	1.01E-02	2.48E-03		143	3.53E-04	7.06E-05	1.73E-05
Coxendale from BU Entrance Road to Dominion Entrance at Old Stage	5	2.77E-04	5.54E-05	1.36E-05		2.31E-02	4.62E-03	1.13E-03		85	2.72E-04	5.43E-05	1.33E-05
Dominion Entrance to FFCP Entry	6	4.78E-04	9.56E-05	2.35E-05		3.98E-02	7.97E-03	1.96E-03		176	2.26E-04	4.53E-05	1.11E-05
FFCP Entrance to Phase 4 Entry	7	1.20E-02	3.05E-03	3.05E-04		9.96E-01	2.54E-01	2.54E-02		72	1.38E-02	3.53E-03	3.53E-04
Ash Dropoff in Phase 4	8	5.98E-03	1.71E-03	1.71E-04		4.99E-01	1.42E-01	1.42E-02		26	1.92E-02	5.47E-03	5.47E-04
From FFCP Dropoff to FFCP Perimeter Road at Phase 4	9	4.04E-03	1.15E-03	1.15E-04		3.37E-01	9.60E-02	9.60E-03		27	1.25E-02	3.56E-03	3.56E-04
Phase 4 Exit Point to Wheel Wash	10	1.48E-02	4.22E-03	4.22E-04		1.23E+00	3.51E-01	3.51E-02		82	1.50E-02	4.29E-03	4.29E-04
Truck Wash to FFCP Entrance	11	1.64E-05	3.29E-06	8.06E-07		1.37E-03	2.74E-04	6.72E-05		20	6.85E-05	1.37E-05	3.36E-06
Coxendale from Intersection of LAP Entrance to BU Building	12	5.36E-05	1.07E-05	2.63E-06		4.47E-03	8.94E-04	2.19E-04		37	1.21E-04	2.42E-05	5.93E-06
CCR Dropoff in BU Bldg	13	1.14E-02	3.25E-03	3.25E-04		9.49E-01	2.71E-01	2.71E-02		6	1.58E-01	4.51E-02	4.51E-03
CCR Dropoff to BU Truck Wash	14	1.14E-02	3.25E-03	3.25E-04		9.49E-01	2.71E-01	2.71E-02		6	1.58E-01	4.51E-02	4.51E-03
From BU Building to Coxendale	15	4.09E-05	8.17E-06	2.01E-06		3.41E-03	6.81E-04	1.67E-04		24	1.42E-04	2.84E-05	6.97E-06

Annual Emission Rates

							Modeled emission Rate		
		PM30 tons/year	PM10 tons/year	PM2.5 tons/year		Number of Modeled Volume sources	PM30 lb/hr	PM10 lb/hr	PM2.5 lb/hr
Segment	Segment								
Ash Pickup and Exit through UAP	1	17.73	5.05	0.51		74	2.40E-01	6.83E-02	6.83E-03
UAP Entrance Road	2	0.15	0.03	0.01		25	5.99E-03	1.20E-03	2.94E-04
From UAP Entrance Road to UAP/LAP Wheel Wash Station	3	0.20	0.04	0.01		35	5.71E-03	1.14E-03	2.80E-04
From Wheel Wash on Henricus to Coxendale at BU Entrance Road	4	0.22	0.04	0.01		143	1.54E-03	3.08E-04	7.57E-05
Coxendale from BU Entrance Road to Dominion Entrance at Old Stage	5	0.10	0.02	0.00		85	1.19E-03	2.37E-04	5.83E-05
Dominion Entrance to FFCP Entry	6	0.17	0.03	0.01		176	9.89E-04	1.98E-04	4.85E-05
FFCP Entrance to Phase 4 Entry	7	4.35	1.11	0.11		72	6.04E-02	1.54E-02	1.54E-03
Ash Dropoff in Phase 4	8	2.18	0.62	0.06		26	8.38E-02	2.39E-02	2.39E-03
From FFCP Dropoff to FFCP Perimeter Road at Phase 4	9	1.47	0.42	0.04		27	5.45E-02	1.55E-02	1.55E-03
Phase 4 Exit Point to Wheel Wash	10	5.39	1.54	0.15		82	6.57E-02	1.87E-02	1.87E-03
Truck Wash to FFCP Entrance	11	0.006	0.0012	0.0003		20	2.99E-04	5.98E-05	1.47E-05
Coxendale from Intersection of LAP Entrance to BU Building	12	0.020	0.0039	0.0010		37	5.28E-04	1.06E-04	2.59E-05
CCR Dropoff in BU Bldg	13	4.15	1.18	0.12		6	6.91E-01	1.97E-01	1.97E-02
CCR Dropoff to BU Truck Wash	14	4.15	1.18	0.12		6	6.91E-01	1.97E-01	1.97E-02
From BU Building to Coxendale	15	0.01	0.0030	0.0007		24	6.20E-04	1.24E-04	3.04E-05



Overview Map of CCR Management Areas and Road Segment Locations

Dominion

AECOM

Date: 1/18/2021

Calculation of Uncontrolled Paved Road Total PM Emission Factors
Dominion Chesterfield CCR Project

Paved Road Surface

E = k (sL)^0.91*(W)^1.02
AP-42, 13.2.1.3, equation 1 (1/11)

Particle size multiplier (k)
AP-42, Table 13.2-1.1

Particle Size Range	lb/VMT
PM-2.5	0.00054
PM-10	0.0022
PM-15	0.0027
PM-30	0.0110

1) Ash hauling UAP to FFCP

	0.91 and 1.02 are exponents
E =	emission factor (lb/VMT)
k =	particle size multiplier
sL =	surface silt loading (g/m2)
W =	average weight (tons) of the vehicles traveling the road

Road type	Silt Loading (g/m2)	
paved (low ADT)	0.6	<500 ADT
paved (med ADT)	0.2	500 - 5000 ADT

Paved Road (low ADT) - Loaded Truck (Ash)

k =	0.011
sL =	0.6
W =	31.5
E (lb/VMT) =	0.233

Paved Road (med ADT) - Loaded Truck (Ash)

k =	0.011
sL =	0.2
W =	31.5
E (lb/VMT) =	0.086

Paved Road (low ADT) - Unloaded Truck (Ash)

k =	0.011
sL =	0.6
W =	19.35
E (lb/VMT) =	0.142

Paved Road (med ADT) - Unloaded Truck (Ash)

k =	0.011
sL =	0.2
W =	19.35
E (lb/VMT) =	0.052

Paved Road (low ADT) - Water Truck

k =	0.011	
sL =	0.6	
W =	15.74	(Average)
E (lb/VMT) =	0.115	

Paved Road (med ADT) - Water Truck

k =	0.011	
sL =	0.2	
W =	15.74	(Average)
E (lb/VMT) =	0.042	

Date of last update: 1/29/2001

Calculation of Uncontrolled Paved Road PM-10 Emission Factors
Dominion Chesterfield CCR Project

Paved Road Surface

E = k (sL)^0.91*(W)^1.02

AP-42, 13.2.1.3, equation 1 (1/11)

Particle size multiplier (k)

AP-42, Table 13.2-1.1

Particle Size Range	lb/VMT
PM-2.5	0.00054
PM-10	0.0022
PM-15	0.0027
PM-30	0.0110

1) Ash hauling UAP to FFCP

	0.91 and 1.02 are exponents
E =	emission factor (lb/VMT)
k =	particle size multiplier
sL =	surface silt loading (g/m2)
W =	average weight (tons) of the vehicles traveling the road

Road type	Silt Loading (g/m2)	
paved (low ADT)	0.6	<500 ADT
paved (med ADT)	0.2	500 - 5000 ADT

Paved Road (low ADT) - Loaded Truck (Ash)

k =	0.0022
sL =	0.6
W =	31.5
E (lb/VMT) =	0.047

Paved Road (med ADT) - Loaded Truck (Ash)

k =	0.0022
sL =	0.2
W =	31.5
E (lb/VMT) =	0.017

Paved Road (low ADT) - Unloaded Truck (Ash)

k =	0.0022
sL =	0.6
W =	19.35
E (lb/VMT) =	0.028

Paved Road (med ADT) - Unloaded Truck (Ash)

k =	0.0022
sL =	0.2
W =	19.35
E (lb/VMT) =	0.010

Paved Road (low ADT) - Water Truck

k =	0.0022	
sL =	0.6	
W =	15.74	(Average)
E (lb/VMT) =	0.023	

Paved Road (med ADT) - Water Truck

k =	0.0022	
sL =	0.2	
W =	15.74	(Average)
E (lb/VMT) =	0.008	

Date of last update: 1/29/2001

Calculation of Uncontrolled Unpaved Packed Road Total PM Emission Factors
Dominion Chesterfield CCR Project

Unpaved Road - Packed Surface

E = k (s/12)^a)(W/3)^b)
AP-42, 13.2.2.1, equation 1a (11/06)

Particle size multiplier (k)
AP-42, Table 13.2.2-2 (Industrial Roads)

Particle Size Range	k (lb/VMT)	a	b
PM-2.5	0.15	0.90	0.45
PM-10	1.50	0.90	0.45
PM-30	4.90	0.70	0.45

	a and b are exponents
E =	emission factor (lb/VMT)
k =	particle size multiplier
s =	surface silt loading (%)
W =	mean weight (tons) of vehicles on road

Emissions adjustment due to natural mitigation
Eadj = E ((365-P)/365)
AP-42, 13.2.2.1, equation 2 (1/11)

where:

E =	emission factor for equation 1a or 1b	
P =	days in year with at least 0.01 in of rain	
P =	115	days

Overall Emissions Equation
E = k (s/12)^a)(W/3)^b)* (365-P)/365)

Road type	Silt Loading (%)
unpaved (packed)	8.4

Unpaved Road - Loaded Truck (Ash)

k =	4.90
a =	0.70
b =	0.45
W =	31.5
E (lb/VMT) =	7.533

Unpaved Road - Unloaded Truck (Ash)

k =	4.90
a =	0.70
b =	0.45
W =	19.35
E (lb/VMT) =	6.049

Unpaved Road - Water Truck

k =	4.90	
a =	0.70	
b =	0.45	
W =	15.74	(Average)
E (lb/VMT) =	5.513	

Date of last update: 1/29/2001

Calculation of Uncontrolled Paved Road PM-2.5 Emission Factors
Dominion Chesterfield CCR Project

Paved Road Surface

E = k (sL)^0.91*(W)^1.02
AP-42, 13.2.1.3, equation 1 (1/11)

Particle size multiplier (k)
AP-42, Table 13.2-1.1

Particle Size Range	lb/VMT
PM-2.5	0.00054
PM-10	0.0022
PM-15	0.0027
PM-30	0.0110

	0.91 and 1.02 are exponents
E =	emission factor (lb/VMT)
k =	particle size multiplier
sL =	surface silt loading (g/m2)
W =	average weight (tons) of the vehicles traveling the road

Road type	Silt Loading (g/m2)	
paved (low ADT)	0.6	<500 ADT
paved (med ADT)	0.2	500 - 5000 ADT

Paved Road (low ADT) - Loaded Truck (Ash)		Paved Road (med ADT) - Loaded Truck (Ash)	
k =	0.00054	k =	0.00054
sL =	0.6	sL =	0.2
W =	31.5	W =	31.5
E (lb/VMT) =	0.0114	E (lb/VMT) =	0.0042

Paved Road (low ADT) - Unloaded Truck (Ash)		Paved Road (med ADT) - Unloaded Truck (Ash)	
k =	0.00054	k =	0.00054
sL =	0.6	sL =	0.2
W =	19.35	W =	19.35
E (lb/VMT) =	0.0070	E (lb/VMT) =	0.0026

Paved Road (low ADT) - Water Truck			Paved Road (med ADT) - Water Truck		
k =	0.001		k =	0.001	
sL =	0.6		sL =	0.2	
W =	15.74	(Average)	W =	15.74	(Average)
E (lb/VMT) =	0.0056		E (lb/VMT) =	0.0021	

Date of last update: 1/29/2001

Calculation of Uncontrolled Unpaved Packed Road PM-10 Emission Factors
Dominion Chesterfield CCR Project

Unpaved Road - Packed Surface

E = k (s/12)^a)(W/3)^b)
AP-42, 13.2.2.1, equation 1a (11/06)

Particle size multiplier (k)
AP-42, Table 13.2.2-2 (Industrial Roads)

Particle Size Range	k (lb/VMT)	a	b
PM-2.5	0.15	0.90	0.45
PM-10	1.50	0.90	0.45
PM-30	4.90	0.70	0.45

	a and b are exponents
E =	emission factor (lb/VMT)
k =	particle size multiplier
s =	surface silt loading (%)
W =	mean weight (tons) of vehicles on road

Emissions adjustment due to natural mitigation
Eadj = E ((365-P)/365)
AP-42, 13.2.2.1, equation 2 (1/11)

where:

E =	emission factor for equation 1a or 1b
P =	days in year with at least 0.01 in of rain
P =	115 days

Overall Emissions Equation
E = k (s/12)^a)(W/3)^b)* (365-P)/365)

Road type	Silt Loading (%)
unpaved (packed)	8.4

Unpaved Road - Loaded Truck (Ash)

k =	1.50
a =	0.90
b =	0.45
W =	31.5
E (lb/VMT) =	2.147

Unpaved Road - Unloaded Truck (Ash)

k =	1.50
a =	0.90
b =	0.45
W =	19.35
E (lb/VMT) =	1.724

Unpaved Road - Water Truck

k =	1.50
a =	0.90
b =	0.45
W =	15.74 (Average)
E (lb/VMT) =	1.571

Date of last update: 1/29/2001

Calculation of Uncontrolled Unpaved Packed Road $PM_{2.5}$ Emission Factors
Dominion Chesterfield CCR Project

Unpaved Road - Packed Surface
E = k (s/12)^a)(W/3)^b)
AP-42, 13.2.2.1, equation 1a (11/06)

Particle size multiplier (k)
AP-42, Table 13.2.2-2 (Industrial Roads)

Particle Size Range	k (lb/VMT)	a	b
PM-2.5	0.15	0.90	0.45
PM-10	1.50	0.90	0.45
PM-30	4.90	0.70	0.45

	a and b are exponents
E =	emission factor (lb/VMT)
k =	particle size multiplier
s =	surface silt loading (%)
W =	mean weight (tons) of vehicles on road

Emissions adjustment due to natural mitigation
Eadj = E ((365-P)/365)
AP-42, 13.2.2.1, equation 2 (1/11)

where:

E =	emission factor for equation 1a or 1b	
P =	days in year with at least 0.01 in of rain	
P =	115	days

Overall Emissions Equation
E = k (s/12)^a)(W/3)^b)* (365-P)/365)

Road type	Silt Loading (%)
unpaved (packed)	8.4

Unpaved Road - Loaded Truck (Ash)

k =	0.15
a =	0.90
b =	0.45
W =	31.5
E (lb/VMT) =	0.215

Unpaved Road - Unloaded Truck (Ash)

k =	0.15
a =	0.90
b =	0.45
W =	19.35
E (lb/VMT) =	0.172

Unpaved Road - Water Truck

k =	0.15	
a =	0.90	
b =	0.45	
W =	15.74	(Average)
E (lb/VMT) =	0.157	

Date of last update: 1/29/2001

Calculation of Uncontrolled Unpaved Gravel Road Total PM Emission Factors
Dominion Chesterfield CCR Project

Unpaved Road - Gravel Surface

E = k (s/12)^a)(W/3)^b)
AP-42, 13.2.2.1, equation 1a (11/06)

Particle size multiplier (k)
AP-42, Table 13.2.2-2 (Industrial Roads)

Particle Size Range	k (lb/VMT)	a	b
PM-2.5	0.15	0.90	0.45
PM-10	1.50	0.90	0.45
PM-30	4.90	0.70	0.45

	a and b are exponents
E =	emission factor (lb/VMT)
k =	particle size multiplier
s =	surface silt loading (%)
W =	mean weight (tons) of vehicles on road

Emissions adjustment due to natural mitigation
Eadj = E ((365-P)/365)
AP-42, 13.2.2.1, equation 2 (1/11)

where:

E =	emission factor for equation 1a or 1b	
P =	days in year with at least 0.01 in of rain	
P =	115	days

Overall Emissions Equation
E = k (s/12)^a)(W/3)^b)* (365-P)/365)

Road type	Silt Loading (%)	
unpaved (gravel)	4.8	
unpaved (gravel)	8.4	From FFCP Phase 4 to Wheel Wash

Unpaved Road - Loaded Truck (Ash), gravel, 4.8% silt

k =	4.90
a =	0.70
b =	0.45
W =	31.5
E (lb/VMT) =	5.091

Unpaved Road - Unloaded Truck (Ash), 4.8% silt content

k =	4.90
a =	0.70
b =	0.45
W =	19.35
E (lb/VMT) =	4.089

Unpaved Road - Unloaded Truck (Ash), 8.4% silt content

k =	4.9
a =	0.7
b =	0.45
W =	19.35
E (lb/VMT) =	6.049

Unpaved Road - Water Truck

k =	4.90	
a =	0.70	
b =	0.45	
W =	15.74	(Average)
E (lb/VMT) =	3.726	

Date of last update: 1/29/2001

Calculation of Uncontrolled Unpaved Gravel Road PM-10 Emission Factors
Dominion Chesterfield CCR Project

Unpaved Road - Gravel Surface

E = k (s/12)^a)(W/3)^b)
AP-42, 13.2.2.1, equation 1a (11/06)

Particle size multiplier (k)
AP-42, Table 13.2.2-2 (Industrial Roads)

Particle Size Range	k (lb/VMT)	a	b
PM-2.5	0.15	0.90	0.45
PM-10	1.50	0.90	0.45
PM-30	4.90	0.70	0.45

	a and b are exponents
E =	emission factor (lb/VMT)
k =	particle size multiplier
s =	surface silt loading (%)
W =	mean weight (tons) of vehicles on road

Emissions adjustment due to natural mitigation
Eadj = E ((365-P)/365)
AP-42, 13.2.2.1, equation 2 (1/11)

where:

E =	emission factor for equation 1a or 1b	
P =	days in year with at least 0.01 in of rain	
P =	115	days

Overall Emissions Equation
E = k (s/12)^a)(W/3)^b)* (365-P)/365)

Road type	Silt Loading (%)	
unpaved (gravel)	4.8	
unpaved (gravel)	8.4	From FFCP Phase 4 to Wheel Wash

Unpaved Road - Loaded Truck (Ash)

k =	1.50
a =	0.90
b =	0.45
W =	31.5
E (lb/VMT) =	1.298

Unpaved Road - Unloaded Truck (Ash), 4.8% silt content

k =	1.50
a =	0.90
b =	0.45
W =	19.35
E (lb/VMT) =	1.042

Unpaved Road - Unloaded Truck (Ash), 8.4% silt content

k =	1.5
a =	0.9
b =	0.45
W =	19.35
E (lb/VMT) =	1.724

Unpaved Road - Water Truck

k =	1.50	
a =	0.90	
b =	0.45	
W =	15.74	(Average)
E (lb/VMT) =	0.950	

Date of last update: 1/29/2001

Calculation of Uncontrolled Unpaved Gravel Road $PM_{2.5}$ Emission Factors
Dominion Chesterfield CCR Project

Unpaved Road - Gravel Surface

E = k (s/12)^a)(W/3)^b)
AP-42, 13.2.2.1, equation 1a (11/06)

Particle size multiplier (k)
AP-42, Table 13.2.2-2 (Industrial Roads)

Particle Size Range	k (lb/VMT)	a	b
PM-2.5	0.15	0.90	0.45
PM-10	1.50	0.90	0.45
PM-30	4.90	0.70	0.45

	a and b are exponents
E =	emission factor (lb/VMT)
k =	particle size multiplier
s =	surface silt loading (%)
W =	mean weight (tons) of vehicles on road

Emissions adjustment due to natural mitigation
Eadj = E ((365-P)/365)
AP-42, 13.2.2.1, equation 2 (1/11)

where:

E =	emission factor for equation 1a or 1b	
P =	days in year with at least 0.01 in of rain	
P =	115	days

Overall Emissions Equation
E = k (s/12)^a)(W/3)^b)* (365-P)/365)

Road type	Silt Loading (%)	
unpaved (gravel)	4.8	
unpaved (gravel)	8.4	From FFCP Phase 4 to Wheel Wash

Unpaved Road - Loaded Truck (Ash)

k =	0.15
a =	0.90
b =	0.45
W =	31.5
E (lb/VMT) =	0.130

Unpaved Road - Unloaded Truck (Ash), 4.8% silt content

k =	0.15
a =	0.90
b =	0.45
W =	19.35
E (lb/VMT) =	0.104

Unpaved Road - Unloaded Truck (Ash), 48.4% silt content

k =	0.15
a =	0.9
b =	0.45
W =	19.35
E (lb/VMT) =	0.172

Unpaved Road - Water Truck

k =	0.15	
a =	0.90	
b =	0.45	
W =	15.74	(Average)
E (lb/VMT) =	0.095	

Date of last update: 1/29/2001

Calculation of Emission Factors for Landfill and Upper Ash Pond Equipment Operations

Dominion Chesterfield CCR Project

Calculation Inputs

Average equipment speed		
Front End Loader	2.0	mph
Scraper	2.0	mph
	10	hrs/day
	7	days/wk
	52.0	weeks/yr

Emission Factors for Grading Operations
AP-42, 11.9 Table 11.9-1 (10/98)

E = 0.040 (S)^2.5	PM
E = 0.6(0.051)(S)^2.0	PM-10
E = 0.031(0.40)(S)^2.5	PM-2.5

where:

	2.5, 2.0 and 2.5 are exponents
S =	mean vehicle speed (mph)
E =	emission factor (lb/VMT)

Emission factors:

Front End Loader:

	PM	PM-10	$PM_{2.5}$
S =	2.0	2.0	2.0
E (lb/VMT) =	0.23	0.12	0.07

Scraper:

	PM	PM-10	$PM_{2.5}$
S =	2.0	2.0	2.0
E (lb/VMT) =	0.23	0.12	0.07

PM, PM-10 and $PM_{2.5}$ Emissions from Landfill Operations
Dominion Chesterfield CCR Project

Equipment utilization rate:		2.0	mph
	x	10	hrs/day
	x	7	days/wk
	x	52	wks/yr
	=	**7,280**	**VMT/yr**

PM Emissions

Equipment	Number of Units	VMT/yr	Speed (mph)	Emission Factor (lbs/VMT)	Uncontrolled Emissions (lbs/hr)	Uncontrolled Emissions (tons/yr)	Control Equipment	Control Efficiency	Controlled Emissions (lb/hr)	Controlled Emissions (tons/yr)
CAT 330L Excavator	1	7,280	2.0	0.23	0.45	0.82	Wetting	95%	0.02	0.041
Other Excavators	1	7,280	2.0	0.23	0.45	0.82	Wetting	95%	0.02	0.041
CAT 12 G Motor Grader	1	7,280	2.0	0.23	0.45	0.82	Wetting	95%	0.02	0.041
CAT D611 Bulldozer	1	7,280	2.0	0.23	0.45	0.82	Wetting	95%	0.02	0.041
CASE 580 Rubber Tire Back Hoe	1	7,280	2.0	0.23	0.45	0.82	Wetting	95%	0.02	0.041
CAT 963 Loader	1	7,280	2.0	0.23	0.45	0.82	Wetting	95%	0.02	0.041
Totals	6	43,680			**2.72**	**4.94**			**0.14**	**0.25**

PM-10 Emissions

Equipment	Number of Units	VMT/yr	Speed (mph)	Emission Factor (lbs/VMT)	Uncontrolled Emissions (lbs/hr)	Uncontrolled Emissions (tons/yr)	Control Equipment	Control Efficiency	Controlled Emissions (lb/hr)	Controlled Emissions (tons/yr)
CAT 330L Excavator	1	7,280	2.0	0.12	0.24	0.45	Wetting	95%	0.012	0.022
Other Excavators	1	7,280	2.0	0.12	0.24	0.45	Wetting	95%	0.012	0.022
CAT 12 G Motor Grader	1	7,280	2.0	0.12	0.24	0.45	Wetting	95%	0.012	0.022
CAT D611 Bulldozer	1	7,280	2.0	0.12	0.24	0.45	Wetting	95%	0.012	0.022
CASE 580 Rubber Tire Back Hoe	1	7,280	2.0	0.12	0.24	0.45	Wetting	95%	0.012	0.022
CAT 963 Loader	1	7,280	2.0	0.12	0.24	0.45	Wetting	95%	0.012	0.022
Totals	6	43,680			**1.47**	**2.67**			**0.07**	**0.13**

$PM_{2.5}$ Emissions

Equipment	Number of Units	VMT/yr	Speed (mph)	Emission Factor (lbs/VMT)	Uncontrolled Emissions (lbs/hr)	Uncontrolled Emissions (tons/yr)	Control Equipment	Control Efficiency	Controlled Emissions (lb/hr)	Controlled Emissions (tons/yr)
CAT 330L Excavator	1	7,280	2.0	0.07	0.14	0.26	Wetting	95%	0.007	0.013
Other Excavators	1	7,280	2.0	0.07	0.14	0.26	Wetting	95%	0.007	0.013
CAT 12 G Motor Grader	1	7,280	2.0	0.07	0.14	0.26	Wetting	95%	0.007	0.013
CAT D611 Bulldozer	1	7,280	2.0	0.07	0.14	0.26	Wetting	95%	0.007	0.013
CASE 580 Rubber Tire Back Hoe	1	7,280	2.0	0.07	0.14	0.26	Wetting	95%	0.007	0.013
CAT 963 Loader	1	7,280	2.0	0.07	0.14	0.26	Wetting	95%	0.007	0.013
Totals	6	43,680			**0.84**	**1.53**			**0.042**	**0.08**

PM, PM-10 and $PM_{2.5}$ Emissions from Upper Ash Pond Operations

Dominion Chesterfield CCR Project

Equipment utilization rate:		2.0	mph
	x	10	hrs/day
	x	7	days/wk
	x	52	wks/yr
	=	**7,280**	**VMT/yr**

PM Emissions

Equipment	Number of Units	VMT/yr	Speed (mph)	Emission Factor (lbs/VMT)	Uncontrolled Emissions (lbs/hr)	Uncontrolled Emissions (tons/yr)	Control Equipment	Control Efficiency	Controlled Emissions (lb/hr)	Controlled Emissions (tons/yr)
CAT 330L Excavator	2	14,560	2.0	0.23	0.45	1.65	Wetting	95%	0.02	0.082
Other Excavators	2	14,560	2.0	0.23	0.45	1.65	Wetting	95%	0.02	0.082
Compactors/Graders	2	14,560	2.0	0.23	0.45	1.65	Wetting	95%	0.02	0.082
CAT D6 Bulldozer	8	58,240	2.0	0.23	0.45	6.59	Wetting	95%	0.02	0.329
Miscellaneous	1	7,280	2.0	0.23	0.45	0.82	Wetting	95%	0.02	0.041
CAT 963 Loader	2	14,560	2.0	0.23	0.45	1.65	Wetting	95%	0.02	0.082
Totals	17	123,760			**2.72**	**14.00**			**0.14**	**0.70**

PM-10 Emissions

Equipment	Number of Units	VMT/yr	Speed (mph)	Emission Factor (lbs/VMT)	Uncontrolled Emissions (lbs/hr)	Uncontrolled Emissions (tons/yr)	Control Equipment	Control Efficiency	Controlled Emissions (lb/hr)	Controlled Emissions (tons/yr)
CAT 330L Excavator	2	14,560	2.0	0.12	0.24	0.89	Wetting	95%	0.01	0.045
Other Excavators	2	14,560	2.0	0.12	0.24	0.89	Wetting	95%	0.01	0.045
Compactors/Graders	2	14,560	2.0	0.12	0.24	0.89	Wetting	95%	0.01	0.045
CAT D6 Bulldozer	8	58,240	2.0	0.12	0.24	3.56	Wetting	95%	0.01	0.178
Miscellaneous	1	7,280	2.0	0.12	0.24	0.45	Wetting	95%	0.01	0.022
CAT 963 Loader	2	14,560	2.0	0.12	0.24	0.89	Wetting	95%	0.01	0.045
Totals	17	123,760			**1.47**	**7.57**			**0.07**	**0.38**

$PM_{2.5}$ Emissions

Equipment	Number of Units	VMT/yr	Speed (mph)	Emission Factor (lbs/VMT)	Uncontrolled Emissions (lbs/hr)	Uncontrolled Emissions (tons/yr)	Control Equipment	Control Efficiency	Controlled Emissions (lb/hr)	Controlled Emissions (tons/yr)
CAT 330L Excavator	2	14,560	2.0	0.07	0.14	0.51	Wetting	95%	0.01	0.026
Other Excavators	2	14,560	2.0	0.07	0.14	0.51	Wetting	95%	0.01	0.026
Compactors/Graders	2	14,560	2.0	0.07	0.14	0.51	Wetting	95%	0.01	0.026
CAT D6 Bulldozer	8	58,240	2.0	0.07	0.14	2.04	Wetting	95%	0.01	0.102
Miscellaneous	1	7,280	2.0	0.07	0.14	0.26	Wetting	95%	0.01	0.013
CAT 963 Loader	2	14,560	2.0	0.07	0.14	0.51	Wetting	95%	0.01	0.026
Totals	17	123,760			**0.84**	**4.34**			**0.042**	**0.22**

Appendix C Background Concentration Monitor Support Data

C1. Introduction

In order to complete the Article 6 modeling analyses, background concentrations for NO_2, SO_2, and PM_{10} are needed. The following monitors were reviewed for this data.

C2. Background NO_2 Monitor

The Charles City County Shirley Plantation NO_2 monitor was selected as a conservatively representative and appropriate background monitor to represent NO_2 background concentrations for the Project. It is the closest monitor to the Project at approximately 8 miles east-southeast along the James River. The monitor is located directly downwind from Hopewell and as a result captures the heavy industrial impact of that area.

To characterize 1-hour background NO_2 values, data for the most recent three-year average (2022-2024) of the 98th percentile 1-hour monitor values by season and hour-of-day was obtained from VDEQ. The use of variable background 1-hour NO_2 monitor data conforms with US EPA guidance. The US EPA guidance suggests that the season and hour-of-day combination be based on the 3rd highest values to represent the 98th percentile. The resultant matrix of ninety-six (96) season and hour-of-day 1-hour NO_2 monitor values were used in AERMOD for the 1-hour NO_2 modeling analyses. The season and hour-of-day NO_2 monitor values are summarized in Table C-1. Table C-4 provides the NO_2 annual background concentration.

Table C-1. 1-Hour NO_2 Variable Season and Hour of Day Background Monitor Values

3-yr Sea/Hr	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
Winter	30.08	35.97	35.78	32.46	34.03	36.10	34.72	37.35	35.47	34.09	28.70	24.94
Spring	32.52	35.97	29.52	23.88	17.92	26.07	22.18	27.01	23.50	21.62	18.74	12.22
Summer	37.73	29.27	35.66	36.10	32.15	27.32	23.50	25.63	20.93	16.17	12.78	14.29
Fall	20.93	20.24	21.06	17.80	20.12	19.43	20.24	21.37	25.63	26.38	24.94	16.48
3-yr Sea/Hr	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
Winter	23.94	20.87	19.93	18.05	22.81	22.81	25.32	27.76	26.13	30.52	26.01	26.70
Spring	12.22	10.78	11.84	10.59	10.78	12.72	18.30	22.75	21.87	20.37	23.94	27.39
Summer	11.09	9.65	9.71	10.03	12.53	16.92	15.98	21.68	33.46	29.95	32.59	30.46
Fall	19.36	13.47	12.47	9.71	11.53	15.79	19.55	26.01	20.30	20.12	19.36	23.63

Source: VDEQ, 2025
ECT, 2025

C3. Background SO_2 Monitor

The Charles City County Shirley Plantation SO_2 monitor was selected as a conservatively representative and appropriate background monitor to represent SO_2 background concentrations for the Project. It is the closest monitor to the Project at approximately 8 miles east-southeast along the James River. The monitor is located directly downwind from Hopewell and as a result captures the heavy industrial impact of that area. Table C-4 provides the SO_2 background concentration.

C4. Background PM_{10} Monitor

The Hopewell Carter Woodson Middle School PM_{10} monitor was selected as a conservatively representative and appropriate background monitor to represent PM_{10} background concentrations for the Project. It is the closest monitor to the Project approximately 8 miles south-southeast in the city of Hopewell and is located near the industrial area of the city. Table C-4 provides the PM_{10} background concentration.

C5. Additional Considerations

These monitor selections are supported by consideration of the population density and the countywide emissions as follows.

C5.1 Population Density

The Project is to be located in eastern Chesterfield County, approximately 6 km northeast of the nearest census designated place (CDP) called Chester, Virginia. The population of Chester was compared to the population of the location of the monitor station or the nearest city where the proposed monitor stations are located. Table C-2 presents a comparison of population data for Chester and the City of Hopewell, Virginia. As shown on Table C-2, the population size of Hopewell is similar to Chester.

Air emissions associated with population density (e.g., automobile traffic) and corresponding ambient air concentrations monitored by the stations will be similar to or greater than emissions associated with population density expected to exist near the Project. Therefore, each proposed monitoring station offers a conservative estimate for emissions associated with population density.

Table C-2. Population Comparison Analysis

Location	Pollutant	Nearby City	County	City Population Estimate for Year 2020
Project Site		Chester	Chesterfield	23,414
Shirley Plantation	NO_2, SO_2	Hopewell	Independent City	23,033
Carter Woodson Middle School	PM_{10}	Hopewell	Independent City	23,033

Source: https://www.census.gov/quickfacts/
Source: ECT, 2025.

C5.2 Countywide and Stationary Source Emission

Air emissions rate data for each of the counties or city of interest were obtained from EPA's National Emissions Inventory (NEI) Database through EPA's Air Emissions Inventories (https://www.epa.gov/air-emissions-inventories). The emission sources in the NEI are consolidated into four data categories: point source, nonpoint, on road mobile, and nonroad mobile emissions for 2020. Table C-3 summarizes total air emissions for each county for the pollutants of concern (NO_2, SO_2, and PM_{10}). An emissions density value (ton per square mile [T/mi^2]) was calculated to assist in the comparison. For the Shirly Plantation monitor site, the emissions from the City of Hopewell were used to calculate the emissions density value as the monitoring site is located directly north of Hopewell and was sited to capture emissions, including those associated with industry, from that area.

Table C-3. Comparison of Emissions

Location	Pollutant	County	County Area	NO_2		SO_2		PM_{10}*	
			(mi^2)	tpy	T/mi^2	tpy	T/mi^2	tpy	T/mi^2
Project	—	Chesterfield	424	4,853	11.45	788	1.86	4,587	10.82
Shirley Plantation	NO_2, SO_2	Hopewell	11	3,766	342.36	274	24.91	759	69.00
Carter Woodson Middle School	PM_{10}	Hopewell	11	3,766	342.36	274	24.91	759	69.00

Note: mi^2 = square mile.
T/mi^2 = ton per square mile.
*Filterable and condensable
Source: ECT, 2025

C6. Summary

For the Article 6 analyses, background data from the monitoring site in Charles City County (Shirley Plantation - ID 51-036-0002) for NO_2 and SO_2 and in Hopewell (Carter Woodson Middle School ID 51-670-0010) for PM_{10} were selected.

Table C-4 provides a summary of the background values for each monitor.

Table C-4. Representative Monitors Concentration Values

Pollutant	Monitor Name	Monitor ID	Background Monitor Concentration* (μg/m³)			
			1-Hour	3-Hour	24-hour	Annual
NO_2	Shirley Plantation	51-036-0002	(See Table C-1)	--	--	7.5
SO_2	Shirley Plantation	51-036-0002	7.9	8.9	--	0.8
PM_{10}	Carter Woodson Middle School	51-670-0010	--	--	24	--

* Background concentration for all pollutants and averaging periods are for 2022-2024.
Source: ECT, 2025.