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Dominion Energy®

February 26, 2018

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By

Ms. Marcellina Gurley
Maryland Department of the Environment
Air and Radiation Management Administration
1800 Washington Boulevard, Suite 720
Baltimore, MD 21230

Re: Dominion Energy Cove Point LNG, LP
Charles Station
Updated Air Dispersion Modeling - Air Quality Permit to Construct Application

Dear Ms. Gurley:

Please find attached for your review an update to the air dispersion modeling in support of the Air Quality Permit to Construct Application for the Dominion Energy Cove Point LNG, LP (DECP) Eastern Market Access (EMA) Project at the proposed Charles Compressor Station located in Bryans Road, Charles County, Maryland. This updated information to the Air Quality Permit to Construct Application is being provided to the Maryland Department of the Environment (MDE) to include a revised air dispersion modeling analysis based on final building designs and layout.

The updated report section of the Air Quality Permit to Construct Application submitted on November 2016 and Revised April 2017 is provided as Attachment A. The updated sections of the application based on the revised modeling analysis includes new Figure 2-2 (General Arrangement Plan); updated text in Section 4.2.3 (page 4-5); and Tables 4-6 and 4-7 on pages 4-1 and 4-11 respectively. Results of the revised modeling analysis (input and output files) are provided on the enclosed CD.

If you have any questions or comments regarding these responses, please feel free to contact T.R. Andrake at (804) 273-2882 or via email at Thomas.R.Andrake@dominionenergy.com.

Sincerely,

Amanda B. Tornabene
Director, Environmental Services (Air Program and Gas Infrastructure Group)

Attachment: Updated Report to the Air Quality Permit to Construct Application

Enclosures: Air Quality Modeling Input and Output Files on CD

Dominion Cove Point LNG, LP
Charles Compressor Station
Eastern Market Access Project
Air Permit to Construct Application

Prepared for:

Dominion Cove Point LNG, LP

Prepared by:

TRC Environmental Corporation
1200 Wall Street West, 5th Floor
Lyndhurst, New Jersey 07071

November 2016
Revision 1 - April 2017
Revision 2 - February 2018

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 Project Overview

Dominion Cove Point LNG, LP (Dominion) is seeking authorization from the Federal Energy Regulatory Commission (FERC or Commission) pursuant to Section 7(c) of the Natural Gas Act to construct, install, operate, and maintain the Eastern Mark Access Project (EMA Project). The purpose of the EMA Project is to permit Dominion to transport an incremental volume of approximately 290,000 dekatherms per day of natural gas. As part of the Eastern Market Access Project and in order to boost pressures on Dominion's transmission pipeline system, Dominion is proposing to construct and operate one Solar Mars 90 compressor turbine (13,220 hp (ISO)) and one Solar Taurus 70 compressor turbine (11,150 hp (ISO)) at a new compressor Station in the census designated place of Bryans Road, Charles County, and known as the Charles Compressor Station. The Charles Compressor Station (CS) will be a new natural gas transmission facility covered by Standard Industrial Classification (SIC) 4922. Ancillary project emission sources include one (1) 1,070 hp (750 kW) Caterpillar G3512 emergency generator, one (1) 5.25 MMBtu/hr natural gas fired utility boiler, one (1) 13,000 gallon ammonia storage tank, one (1) 2,500 gallon accumulator storage tank, and a 1,000 gallon hydrocarbon tank.

1.2 Application Summary

The Charles Compressor Station (Project or Charles Station) is a proposed minor stationary source (as defined under the Prevention of Significant Deterioration of Air Quality (PSD) and Title V rules) located in Charles County, Maryland. As demonstrated in Section 3 of this application, the proposed project is not subject to major source air permitting requirements.

The Project will be located in census designated place of Bryans Road, Charles County, which is part of the National Capital Intrastate Air Quality Control Region in Maryland and Virginia. Charles County is considered attainment or unclassifiable for all criteria pollutants with the exception of ozone, which is considered marginal nonattainment for the 2008 8-hour ozone standard.

The proposed project involves the installation of new emission units and will be considered a minor source with respect to New Source Review (NSR) permitting requirements at COMAR 26.11.17 and Title V major source permitting requirements at COMAR 26.11.03. This Permit to Construct (PTC) Application package per COMAR

26.11.02.11 is designed to address the air regulatory requirements of Maryland Department of the Environment (MDE). As such, Dominion is submitting an initial minor source State Facility air permit application for the new Charles Compressor Station. The new Solar Mars 90 and Taurus 70 combustion turbines will be subject to 40 CFR 60 Subpart KKKK, New Source Performance Standards for Stationary Gas Turbines as well as the applicable state regulations as outlined in Section 3 of this application. The new emergency generator will be subject to 40 CFR 60, Subpart JJJJ, New Source Performance Standards for Stationary Spark-Ignition Internal Combustion Engines and 40 CFR 63, Subpart ZZZZ, and National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. The project will not trigger permitting requirements for non-attainment areas per COMAR 26.11.17.

Appendix A of this PTC application contains the MDE application forms. Emission calculation spreadsheets providing supporting calculations for the application forms are included as Appendix B of this application.

2.0 PROJECT DESCRIPTION

2.1 Site Location and Surroundings

The proposed Charles Compressor Station, as shown in Figure 2-1, is located in a rural area in the census designated place of Bryans Road, Charles County. The site is currently undeveloped.

The approximate Universal Transverse Mercator (UTM) coordinates of the facility are: 319,700 meters east and 4,281,700 meters north in Zone 18 (North American Datum of 1983(NAD83)).

2.2 Facility Conceptual Design

As a part of the Eastern Market Access Project, Dominion is proposing to install the following equipment at the proposed Charles compressor station:

- One Solar Mars 90, 13,220 hp (ISO) natural gas fired turbine-driven compressor unit;
- One Solar Taurus 70, 11,150 hp (ISO) natural gas fired turbine-driven compressor unit;
- One Caterpillar G3512 (1,070 hp) natural gas fired emergency generator;
- One 5.25 MMBtu/hr utility boiler;
- One 2,500 gallon accumulator storage tank;
- One 13,000 aqueous ammonia storage tank; and
- One 1,000 gallon hydrocarbon storage tank.

In addition to the four significant emission sources consisting of the Solar Mars 90 and Taurus 70 combustion turbines, the Caterpillar emergency generator and the 5.25 MMBtu/hr utility boiler, several exempt emission units will be located at the Charles compressor station. These sources include the proposed natural gas liquids filter/separators and associated hydrocarbon storage tank (1,000 gallon), which are typical for natural gas compressor stations that may receive small amounts of condensate from upstream natural gas supply and where pipeline cleaning activities may result in residual condensate collection. In addition, the 2,500 gallon accumulator storage tank and 13,000 gallon aqueous ammonia tank are exempt sources.

Lastly, emissions include trivial station blowdowns consisting of two types of gas blowdown events that could occur at the Station: (1) a type of maintenance gas blowdown that could occur when a compressor is stopped and gas between the suction/discharge valves and compressors is vented to the atmosphere via a blowdown vent, and (2) an emergency shutdown (ESD) that would only occur at required U.S. Department of Transportation (DOT) test intervals or in an emergency situation.

The installation of the above equipment will include a number of piping components at the station which could result in additional fugitive emissions due to equipment leaks.

Dominion has provided fugitive emissions estimates for VOC and greenhouse gas (GHG) emissions. Estimates of fugitive emissions are required to be included for Title V applicability assessments, per COMAR 26.11.02. Typical sources of fugitive emissions from natural gas compressor stations include leaks from piping components (valves, flanges, connectors and open-ended lines) as well as potential gas release events.

2.2.1 Compressor Turbines

The proposed Solar Mars 90 and Taurus 70 natural gas-fired turbines to be installed at the Charles Compressor Station will be equipped with Solar's SoLoNOx dry low NOx combustor technology for NOx control as well as selective catalytic reduction (SCR) for NOx control and oxidation catalyst for CO and VOC control. Emissions for the Solar Turbines assume that the units will operate up to 8,760 hours per year and up to 100% rated output. The vendor provided emission rates for normal operating conditions are as follows (all emissions rates are in terms of parts per million dry volume (ppmvd) @ 15% O2):

- 15 ppmvd NOx (Solar Mars 90), 9 ppmvd NOx (Solar Taurus 70);
- 25 ppmvd CO;
- 25 ppmvd unburned hydrocarbons (UHC); and
- 2.5 ppmvd VOC.

The proposed SCR will further reduce NOx during normal operation to 3.75 ppm at 15% O2. The oxidation catalyst will provide 80% control for CO to achieve 5 ppmvd CO at 15% O2 and will also provide 50% control for VOC. Aqueous ammonia is drawn from a storage tank, vaporized, and injected into the flue gas stream ahead of the catalyst bed. Excess ammonia which is not reacted in the SCR and which is emitted from the stack is referred to as ammonia slip. Potential emissions of ammonia (NH3) are provided by the SCR vendor with a proposed maximum ammonia slip emission rate of 10 ppmvd @ 15% O2 during all operating scenarios. Vendor estimates for SCR and oxidation catalyst performance are provided in Appendix B.

Depending upon demand, the turbines may operate at loads ranging from 50% to 100% of full capacity. Because of the different emission rates and exhaust characteristics that occur at different loads and ambient temperatures, a matrix of operating modes is presented in this air permit application. Emission parameters for three turbine loads (50%, 75%, and 100%) and three ambient temperatures (0°F, 59°F, and 100°F) are accounted for in this air permit application to cover the range of steady-state turbine operations.

At very low load and cold temperature extremes, the turbine system must be controlled differently in order to assure stable operation. The required adjustments to the turbine controls at these conditions cause emissions of NOx, CO and VOC to increase (emission rates of other pollutants are unchanged). Low-load operation (non-normal SoLoNOx operation) of the turbines is expected to occur only during periods of startup and shutdown and for maintenance or unforeseen emergency events. Solar has provided emissions estimates during start-up and shutdown and low load operation (see Solar Product Information Letter (PIL) 170, included as part of the vendor attachments in Appendix B).

Similarly, Solar has provided emission estimates for low temperature operation (inlet combustion air temperature less than 0° F and greater than -20° F) in Solar PIL 167 (SoLoNOx Products: Emissions in Non-SoLoNOx Modes). Solar PIL 167 provides estimated pre-control emissions from the turbines at low temperature conditions.

- 120 ppmvd NOx (Mars 90), 42 ppmvd NOx (Taurus 70);
- 150 ppmvd CO;
- 50 ppmvd unburned hydrocarbons (UHC); and
- 5 ppmvd VOC.

Dominion reviewed historic meteorological data from the previous five years for the region to estimate the worst case number of hours per year under sub-zero (less than 0° F) conditions. The annual hours of operation during sub-zero conditions was assumed to be not more than 30 hours per year.

Turbine emission rates during start-up and shutdown events increase for NOx, CO and VOC as compared to operating above 50% load. The start-up process for the Solar Mars 90 and Taurus 70 turbines takes approximately 10 minutes from the initiation of start-up to normal operation (equal to or greater than 50% load). Shutdown takes approximately 10 minutes. Dominion has estimated there would be 100 start-up/shutdown events per year. Emissions per start- up and shutdown event for the turbine were estimated based on Table 3 from the Solar PIL 170 entitled "Emission

Estimates at Start-up, Shutdown, and Commissioning for SoLoNOx Combustion Products". Appendix B contains these per-event emission calculations for start- up and shutdown and the associated Solar PIL 170.

2.2.2 Ancillary Equipment

Dominion is proposing to install a new Caterpillar G3512 (1,070 hp) four stroke lean burn natural gas fired emergency generator. The emergency generator will operate for no more than 500 hours/year and will not operate to generate electricity for sale or load shaving, and therefore meets the definition of an emergency power generating stationary internal combustion engine. Maximum hourly and annual emission rates for the emergency generator are provided in Appendix B. Emissions of NOx, CO, and VOC are based on regulatory limits under New Source Performance Standard (NSPS) Subpart JJJJ. Emission rates for SO_2, particulates, and HAPs are based on US EPA AP-42 emission factors (Table 3.2-2). GHG emissions are based on 40 CFR Part 98 Tables A-1, C-1, and C-2. The emission rates are based on the emergency generator operating at peak load.

Dominion is proposing to install one new 5.25 MMBtu/hr (heat input) utility boiler. Appendix B provides information on the emission factors used to calculate emissions from the boiler.

2.3 Fuel

The Charles Station will utilize pipeline natural gas as the sole fuel for all proposed equipment. The natural gas is assumed to have a higher heating value (HHV) of approximately 1,020 Btu/standard cubic foot (SCF) and will contain no more than 2.0 grains of sulfur per 100 SCF of gas on an annual average basis.

2.4 Fugitive Emissions and Tanks

Fugitive emissions are defined as those emissions which do not pass through a stack, vent, or other functionally equivalent opening, and include natural gas leaks from valves, flanges, pumps, compressors, seals, connections, etc. Vented emissions are defined as those emissions which pass through a stack, vent, or equivalent opening. A compressor may be vented for startup, shutdown, maintenance, or for protection of gas seals from contamination. An individual compressor or the entire station may be blown down (i.e., vented) for testing, or in the event of an emergency.

Fugitive emissions at natural gas compressor stations include leaks from piping components (valves, flanges, connectors and open-ended lines) as well as potential gas release events. The vast majority of gas release events are associated with startup, shutdown, or maintenance activities. Dominion has provided fugitive emissions estimates for VOC and greenhouse gas (GHG) emissions in Appendix B. The calculations in Appendix B are based on a methodology described in Interstate Natural Gas Association of America guidelines and a recent analysis of a Dominion Pipeline natural gas sample, which is also included in Appendix B. The calculations for operational vented natural gas conservatively assume that the Charles Station will conduct two full-station blowdowns per year.

Proposed tanks at the Charles Station may have associated emissions, such as the flashing losses that occur when the pressure of a liquid is decreased or the temperature is increased. At Charles Station, flashing losses will occur at the 1,000 gallon hydrocarbon storage tank and include VOCs as provided in Appendix B. Lastly, Dominion is proposing to install a new 2,500 gallon accumulator tank. The 2,500 gallon accumulator storage tank is considered an exempt activity per COMAR 26.11.02.10. Emissions were calculated using the Tanks 4.09d estimation tool for storage tank working and standing losses as provided in Appendix B.

2.5 Proposed Project Emission Potential

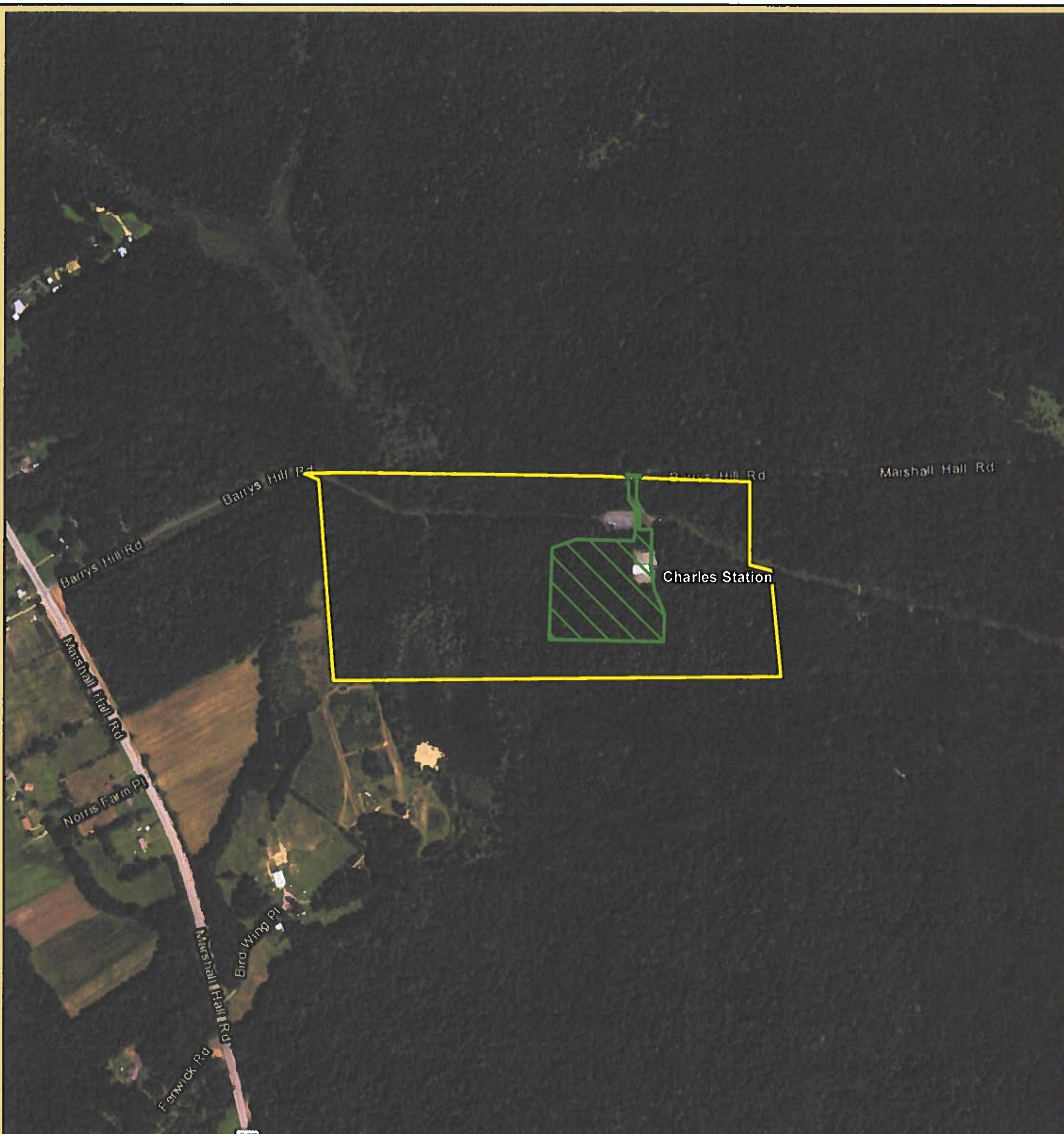
Table 2-1 presents project emission potentials from the new units to be installed as a part of the proposed Charles Compressor Station. For new units, project emission potential is equal to potentials to emit. Detailed emission calculations and supporting vendor data can be found in Appendix B of this permit application.

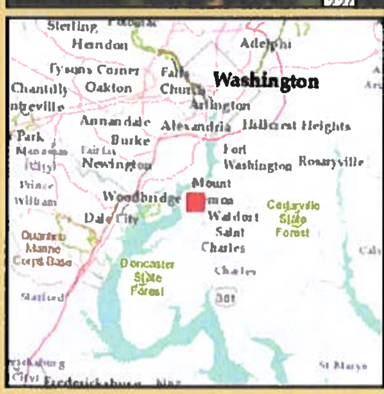
Table 2-1: Proposed Facility Emissions

Pollutant	Solar Mars 90 Turbine	Solar Taurus 70 Turbine	Caterpillar G3512 Emergency Generator	Utility Boiler	Hydrocarbon and Accumulator Tanks	Station Blowdowns	Station Fugitives	Proposed Project Total
NO_x	7.74	5.78	1.18	2.25	-	-	-	16.95
VOC	1.00	0.77	0.59	0.12	0.35	4.89	5.99	13.71
CO	18.22	14.30	2.36	1.89	-	-	-	36.78
SO_2	3.09	2.38	0.001	0.13	-	-	-	5.60
$PM_{10}/PM_{2.5}$	8.25	6.35	0.02	0.17	-	-	-	14.79
CO_2e (1)	64,342	49,570	226	2,693	-	10,836	13,268	140,935
HAPs	0.40	0.31	0.14	0.04	-	0.23	0.28	1.40
Maximum Individual HAP (2)	0.28	0.22	0.10	0.002	-	-	-	0.60

(1) Greenhouse gases calculated as CO_2e.

(2) The individual HAP with the highest total annual emission rate is formaldehyde.





Legend

- Site Boundary
- Operational LOD

N

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Feet

Dominion

Eastern Market Access Project

Figure 2-1

Site Location Map

Charles Station

Mount Vernon quadrangle

Charles County, Maryland

Created:
9/15/2016

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Figure 2-2: General Arrangement Plan

3.0 APPLICABLE REQUIREMENTS AND REQUIRED ANALYSES

This section contains an analysis of the applicability of federal and state air quality regulations to the proposed project. The specific regulations included in this applicability review are the Federal New Source Performance Standards (NSPS), Prevention of Significant Deterioration (PSD) and Non-Attainment New Source Review (NNSR) requirements, Maximum Achievable Control Technology (MACT) requirements for HAPs, and MDE Regulations and Policy.

3.1 Federal New Source Performance Standards

The 40 CFR 60 NSPS are technology-based standards that apply to new and modified stationary sources. The 40 CFR 60 NSPS requirements have been established for approximately 70 source categories. The proposed project is subject to the following four subparts: General Provisions (40 CFR Part 60, Subpart A), Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (40 CFR Part 60, Subpart JJJJ), Standards of Performance for Stationary Combustion Turbines (40 CFR Part 60, Subpart KKKK), and the Standards of Performance for Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources (40 CFR Part 60, Subpart OOOOa).

3.1.1 40 CFR Part 60, Subpart A – General Provisions

The new Mars 90 and Taurus 70 turbines are subject to the general provisions for NSPS units in 40 CFR Part 60 Subpart A. These include the requirements for notification, record keeping, and performance testing contained in 40 CFR Parts 60.7 and 60.8.

3.1.2 40 CFR Part 60 Subpart Kb - Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels)

Subpart Kb potentially applies to storage vessels with a capacity greater than 75 cubic meters (m^3) (19,813 gallons) that will store volatile organic liquids. Tanks with a capacity greater than 75 m^3 are not proposed to be constructed, reconstructed, or modified at Charles Station. Therefore, this subpart will not apply.

3.1.3 40 CFR Part 60, Subpart JJJJ – Spark Ignition Internal Combustion Engines

On January 18, 2008, the USEPA promulgated NSPS Subpart JJJJ for new stationary spark-ignited (SI) internal combustion engines (ICE). Under NSPS Subpart JJJJ, all new, modified, and reconstructed stationary SI engines, both emergency and non-emergency, are covered regardless of size and fuel type. Owners/operators have several options to demonstrate compliance with Subpart JJJJ. The rule allows compliance to be demonstrated by purchase of a certified engine or a non-certified engine and an initial performance test. The performance test for a non-certified engine must show compliance with applicable emission limits of:

- NOx – 2.0 g/bhp-hr or 160 ppmvd @ 15% O2;
- CO – 4.0 g/bhp-hr or 540 ppmvd @ 15% O2 ; and
- VOC (not including formaldehyde) – 1.0 g/bhp-hr or 86 ppmvd @ 15% O2.

If the spark-ignition engine is a non-certified engine, the owner/operator has the option of complying with the emissions standards in either set of units.

3.1.4 40 CFR Part 60, Subpart KKKK – Stationary Combustion Turbines

On July 6, 2006, the USEPA promulgated Subpart KKKK to establish emission standards and compliance schedules for the control of emissions from new stationary combustion turbines that commence construction, modification, or reconstruction after February 18, 2005. Note that stationary combustion turbines regulated under Subpart KKKK are exempt from Subpart GG requirements, which are applicable to units constructed, modified, or reconstructed prior to February 18, 2005.

Pursuant to 40 CFR 60.4305(a), the new Solar gas turbines are subject to requirements of 40 CFR 60 Subpart KKKK, because the heat input at peak load will be greater than or equal to 10 MMBtu/hr (HHV) and Dominion will have commenced the construction or modification of the turbines after February 18, 2005. Pursuant to 40 CFR 60.4320(a) and Table 1 to Subpart KKKK of Part 60 – Nitrogen Oxide Emission Limits for New Stationary Combustion Turbines, the new gas turbine, which will have HHV heat inputs of between 50 and 850 MMBtu/hr, will comply with a NOx emission standard of 25 ppm at 15 percent O_2 or 1.2 lb/MWh useful output as indicated by the vendor guarantee shown in Appendix B. Subpart KKKK also includes a NOx limit of 150 ppmvd at 15% O2 or 8.7 lb/MWh for turbine operation at temperatures less than 0°F and turbine operation at loads less than 75 % of peak load which the new turbine will meet as indicated by the vendor guarantee shown in Appendix B. The new turbines will not burn any fuel that has the potential to emit in excess of 0.060 lb/MMBtu SO_2 heat input, pursuant to 40 CFR 60.4330(a)(1) and (2), respectively.

3.1.5 40 CFR 60, Subparts OOOO and OOOOa – Crude Oil and Natural Gas Production, Transmission and Distribution

Subpart OOOO currently applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011. Subpart OOOO establishes emissions standards and compliance schedules for the control of VOCs and SO2 emissions for affected facilities producing, transmitting, or distributing natural gas. Compressors located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment are subject to this Subpart. Custody transfer is defined as the transfer of natural gas after processing and/or treatment in the producing operations. Charles Station is located after the point of custody transfer, and therefore centrifugal compressors driven by the proposed turbines are not currently subject to this regulation. Storage vessels located in the natural gas transmission and storage segment that have the potential for VOC emissions equal to or greater than 6 tpy are also subject to this Subpart. All storage vessels at Charles Station will emit less than this threshold, and thus will not be subject to this regulation. On August 18, 2015, EPA proposed amendments to 40 CFR 60, Subpart OOOO and proposed an entirely new Subpart OOOOa.

Based on the effective date of August 2, 2016 for the new Subpart, this project will be required to comply with the requirements of NSPS Subpart OOOOa. While storage tanks remain covered, Subpart OOOOa also includes provisions intended to reduce emissions from compressors and equipment leaks at compressor stations. For equipment leaks, Subpart OOOOa proposes requiring periodic surveys using optical gas imaging (OGI) technology and subsequent repair of any identified leaks. The project will comply with all applicable leak detection provisions of proposed Subpart OOOOa.

3.2 Nonattainment New Source Review

Because the project will be located in an area designated as non-attainment for the federal 8-hour ozone ambient air quality standard, the applicability of the Non-Attainment NSR requirements of 26 COMAR 11.17 must also be considered. In this case, the requirements of Non-Attainment NSR apply to new major stationary sources and major modifications that are major for emissions of ozone precursor pollutants (NOx and VOC).

Pursuant to COMAR 11.17.01.B(17)(a)(i), any stationary source of air pollution located in Charles County which emits or has the potential to emit 25 tons or more per year of VOC or NOx is a major stationary source. Pursuant to COMAR 11.17.02.A, a new major stationary source would be subject to the requirements of Non-Attainment NSR under COMAR 11.17.03 which includes the use of Lowest Achievable Emission Rate (LAER) and emission offset requirements. The proposed Project will not trigger nonattainment NSR because potential emissions are less than the applicable emissions thresholds as shown in Table 3-1. As the facility will be a minor source for all nonattainment pollutants, offsets and the application of the Lowest Achievable Emission Rate (LAER) are not necessary.

Table 3-1: PSD/NNSR Applicability Assessment

Pollutant	PSD/NNSR Major Source Threshold (tons/year)	Total Facility Emissions (tons/year)	Emissions Exceed PSD/NNSR Major Source Threshold
Carbon Monoxide (CO)	250	36.78	No
Sulfur Dioxide (SO2)	250	5.60	No
TSP	250	14.79	No
PM10	250	14.79	No
PM2.5	250	14.79	No
Nitrogen Oxides (NOx)	25	16.95	No
VOC	25	13.71	No
Greenhouse Gases (CO2e)	100,000	140,935	Yes
Total HAP	25	1.4	No
Individual HAP - Formaldehyde	10	0.6	No

3.3 Prevention of Significant Deterioration (PSD)

Preconstruction air permitting programs that regulate the construction of new stationary sources of air pollution and the modification of existing stationary sources are commonly referred to as NSR. NSR can be divided into major NSR and minor NSR. Major NSR is comprised of the Prevention of Significant Deterioration (PSD). Major NSR requirements are established on a federal level but may be implemented by state or local permitting authorities under either a delegation agreement with USEPA or as a SIP program approved by USEPA. MDE has adopted the federal PSD permitting program in COMAR 26.11.06.14. The Charles Compressor Station is not classified as one of the 28 named source categories listed in Section 169 of the Clean Air Act. Therefore, to be considered a "major stationary source" subject to PSD, the facility would need to have potential emissions of 250 tons per year or more of any regulated pollutant (except CO_2). The final PSD and Title V GHG Tailoring Rule was published in the Federal Register on June 3, 2010 (75 FR 31514) but was ultimately overturned on June 23, 2014 by the US Supreme Court. Under the formerly effective rule, GHGs could, as of July 1, 2011, become "subject to regulation" under the PSD program for construction projects that would result in potential GHG emissions of 100,000 tons per year (tpy) carbon dioxide equivalents (CO2e) or more. However, the June 23, 2014 Supreme Court Decision clarifies that construction projects cannot trigger major NSR for GHGs unless major NSR is otherwise triggered for criteria pollutants.

As shown in Table 3-1, the proposed Charles Compressor Station is a minor stationary source with respect to NSR as all pollutants with the exception of CO2e are below the PSD and NNSR major source thresholds.

3.4 Title V Operating Permit and State Preconstruction and Operating Permit Programs

The Title V permit program in 40 CFR Part 70 requires major sources of air pollutants to obtain federal operating permits. The major source thresholds under the Title V program, as defined in 40 CFR 70.2 and which are different from the federal NSR major source thresholds, are 100 tpy of any air pollutant, 10 tpy of any single hazardous air pollutant (HAP), or 25 tpy of total HAPs. More stringent Title V major source thresholds apply for VOC and NOx in ozone nonattainment areas, namely 50 tpy of VOC or NOx in areas defined as serious, 25 tpy in areas defined as severe, and 10 tpy in areas classified as extreme. For Title V applicability, the major source thresholds for NOx and VOC are 25 tpy in Charles County per COMAR 26.11.03.01.

Maryland's Title V Operating Permit Program is administered through a USEPA-approved program at COMAR 26.11.03. MDE also administers a state operating permit program through COMAR 26.11.02.13 for certain non-Title V facilities. The Charles Station will have two Solar turbines with heat inputs greater than 50 MMBtu/hr and as a such, is required to obtain a State Permit to Operate. Emission sources or activities listed under COMAR 26.11.02.10 are exempt from the registration and permitting provisions of COMAR 26.11.02.13 and COMAR 26.11.02.03.

As shown in Table 3-1, potential emissions of all regulated pollutants are below the Title V major source thresholds. As such, the facility is not subject to Title V permitting requirements for these pollutants and is required to obtain a State Permit to Operate per COMAR 26.11.02.13.

The MDE requires certain sources to obtain a preconstruction air quality permit known as a Permit to Construct per COMAR 26.11.09. The Charles Compressor Station includes two Solar combustion turbines, an emergency generator, and a small utility boiler that are subject to NSPS and NESHAPs requirements. Thus, this application for a permit to construct per COMAR 26.11.09 includes the relevant MDE application forms in Appendix A

3.5 National Emission Standards for Hazardous Air Pollutants

The USEPA has established National Emission Standards for Hazardous Air Pollutants (NESHAP) for specific pollutants and industries in 40 CFR Part 61. The Project does not include any of the specific sources for which NESHAP have been established in Part 61. Therefore, Part 61 NESHAP requirements will not apply to the Project. The USEPA has also established NESHAP requirements in 40 CFR Part 63 for various source categories. The Part 63 NESHAP apply to certain emission units at facilities that are major sources of HAP. The applicability to the Project of several NESHAP rules is discussed below.

3.5.1 40 CFR Part 63 Subpart HHH (National Emission Standards for Hazardous Air Pollutants from Natural Gas Transmission and Storage Facilities)

Subpart HHH applies to natural gas transmission and storage facilities that are major sources of HAPs and that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final end user (if there is no local distribution company). The Charles Station is an area source (i.e., not major source) of HAPs. Therefore, this subpart will not apply because it only applies to major sources.

3.5.2 40 CFR Part 63 Subpart YYYY (National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines)

Subpart YYYY applies to stationary combustion turbines at major sources of HAPs. Emissions and operating limitations under Subpart YYYY apply to new and reconstructed stationary combustion turbine. The Charles Station is an area source (i.e., not major source) of HAPs. Therefore, this subpart will not apply because it only applies to major sources.

3.5.3 40 CFR Part 63 Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines)

Subpart ZZZZ, applies to existing, new, and reconstructed stationary reciprocating internal combustion engines (ICE) depending on size, use, and whether the engine is located at a major or area source of HAP. The Project includes the installation of one new emergency stationary RICE with a site rating greater than 500 hp at the Charles Station. New stationary ICE located at area sources of HAP, such as the emergency engine proposed for the Project, must meet the requirements of Subpart ZZZZ by meeting the NSPS. As discussed above, the new emergency engine is subject to the NSPS at 40 CFR Part 60, Subpart JJJJ, therefore the requirements of Subpart ZZZZ will be met.

3.5.4 40 CFR Part 63 Subpart DDDDD (National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters)

Subpart DDDDD applies to certain new and existing boilers and process heaters at major HAP sources. The Charles Station is an area source (i.e., not major source) of HAPs. Therefore, this subpart will not apply because it only applies to major sources.

3.6 Maryland Regulations

Potentially applicable regulations from Title 26, Subtitle 11 of Code of Maryland Regulations (COMAR) are identified below:

- 26 COMAR 11.09.05 "Visible Emissions" requires that the facility may not cause or permit the discharge of emissions from any fuel burning equipment, other than water in an uncombined form, which is visible to human observers. This limit does not apply to emissions during load changing, soot blowing, startup, or adjustments or occasional cleaning of control equipment if: (a) The visible emissions are not greater than 40 percent opacity; and (b) The visible emissions do not occur for more than 6 consecutive minutes in any sixty minute period. Pursuant to 26 COMAR 11.09.05E, emissions from stationary internal combustion engine powered equipment shall not exceed 10 percent opacity while operating at idle and 40 percent opacity while operating during non-idle conditions.
- 26 COMAR 11.09.06 "Control of Particulate Matter" limits emissions of particulate matter for fuel burning equipment and requires dust-collector devices. The requirements in this chapter do not apply to natural gas-burning or distillate oil-burning equipment. Since natural gas is proposed to be the sole sources of fuel for the equipment being installed for this project, these requirements do not apply to the project.
- 26 COMAR 11.09.08 "Control of NOx Emissions for Major Stationary Sources" applies to installations that cause emissions of NOx located at a facility that has a potential to emit of NOx of 25 tons per year or more located in Charles county. The

proposed Charles Station is not a major stationary source for NOx emissions since the potential to emit of NOx is limited to less than 25 tons per year. Therefore, this rule does not apply.

- 26 COMAR 11.15.03 "Toxic Air Pollution: Applicability and Exemptions" exempts fuel burning equipment other than equipment burning refuse-derived fuel from conducting an analysis of Best Available Control Technology for Toxics (TBACT). As per COMAR 26.11.15.03B, the combustion turbines, emergency generator, and utility boiler are exempt from TBACT requirements. However, as discussed in Section 2.2.1, it is anticipated that some ammonia emissions will be generated from the SCR systems on the gas turbines due to ammonia slip (unreacted ammonia). As ammonia is a listed Toxic Air Pollutant (TAP) and not a product of combustion, ammonia emissions are subject to TAP requirements. TBACT must be used for ammonia emissions (COMAR 26.11.15.05) and it must be demonstrated that the ammonia emissions will not adversely impact public health beyond the property line (COMAR 26.11.15.06). Emissions of ammonia are a result of SCR controls on the turbines. There are no additional add-on control options for ammonia and as such TBACT will be good operating practices to minimize ammonia slip emissions, including not injecting ammonia until the SCR reaches appropriate operating temperature. An air quality impact analysis was conducted to demonstrate ammonia emissions will not adversely impact public health. Section 4 includes additional information on the air quality impact analysis conducted for ammonia emissions.

- 26 COMAR 11.36.03 "Distribution Generation" limits the operation of the emergency generator for testing and engine maintenance purposes between 12:01 am and 2:00 pm on any day on which the MDE forecasts that the air quality will be a code red, orange, or purple unless the engine fails a test and engine maintenance and then a re-test are necessary.

4.0 AIR QUALITY MODELING ANALYSIS

At the federal level, because the emission increases from the Charles Station equipment are less than applicable major source thresholds, Dominion will not trigger federal NSR requirements for any regulated air pollutant under either PSD or NNSR permitting programs. At the state level, the Project triggers air permitting through the MDE as a minor source of air emissions subject to State Permit to Construct and Operate permitting. If the agency considers that any project triggering minor NSR permitting could threaten attainment with the National Ambient Air Quality Standards (NAAQSs), MDE can require air dispersion modeling for the Project. A site wide modeling analysis for criteria pollutants has been performed to demonstrate that the Proposed Project will comply with the NAAQS. This section details the NAAQS modeling assessment for the proposed Charles Station.

4.1 Background Ambient Air Quality

Background ambient air quality data was obtained from various existing monitoring locations. Based on a review of the locations of Maryland and Virginia ambient air quality monitoring sites, the closest representative monitoring sites were used to represent the current background air quality in the site area.

Background data for CO, and NO2, was obtained from a monitoring station located in Arlington County, Virginia (USEPA AIRData # 51-013-0020). This monitor is located at the Aurora Hills Visitor Center in the City of Arlington, which has a higher population density and higher density of industrial facilities than the Charles Station area in Charles County. Further, this monitor is located in an area with a greater amount of mobile and point sources of air emissions as compared to the project area. Thus, this monitor is considered to conservatively represent the ambient air quality within the project area.

Background data for SO2 and PM2.5 was obtained from a monitoring station located in Fairfax County, Virginia (USEPA AIRData # 51059-0030). This monitor is located at Lee District Park in the census designated place of Groveton, VA that has a higher population density and higher density of industrial facilities than the area around the Charles Station. Further, this monitor is located in an area with a greater amount of mobile and point sources of air emissions as compared to the project area. Thus, this monitor is also considered to conservatively represent the ambient air quality within the project study area.

Background data for PM10 was obtained from a monitoring station located in Alexandria County, Virginia (USEPA AIRData # 51-510-0020). This monitor is located at Tucker Elementary School in Alexandria City that has a higher population density and higher density of industrial facilities than the area around the Charles Station. Further, this monitor is located in an area with a greater amount of mobile and point sources of air emissions as compared to the project area. Thus, this monitor is also considered to conservatively represent the ambient air quality within the project study area.

The monitoring data for the most recent three years (2013 – 2015) are presented and compared to the NAAQS in Table 4-1. The maximum measured concentrations for each of these pollutants during the last three years are all below applicable standards and are proposed to be used as representative background values for comparison of facility concentrations to the NAAQS.

Table 4-1: Maximum Measured Ambient Air Quality Concentrations

Pollutant	Averaging Period	Maximum Ambient Concentrations ($\mu g/m^3$)			NAAQS ($\mu g/m^3$)
		2013	2014	2015	
SO_2	1-Hour[a]	NA	28.8	24.1	196
	3-Hour	NA	**26.5**	18.9	1,300
NO_2	1-Hour[b]	81.0	93.8	91.9	188
	Annual	20.3	**21.1**	20.3	100
CO	1-Hour	1,380	1,840	**2,185**	40,000
	8-Hour	1,265	1,495	**2,070**	10,000
PM10	24-Hour	**28**	23	27	150
PM2.5[c]	24-Hour	21.0	18.0	19.7	35
	Annual	8.3	8.2	8.0	12

[a]1-hour 3-year average 99th percentile value for SO_2 is **26.5** $\mu g/m^3$.

[b]1-hour 3-year average 98th percentile value for NO_2 is **88.9** $\mu g/m^3$.

[c]24-hour 3-year average 98th percentile value for PM-2.5 is **19.6** $\mu g/m^3$; Annual 3-year average value for PM2.5 is **8.2** $\mu g/m^3$.

High second-high short term (1-, 3-, 8-, and 24-hour) and maximum annual average concentrations presented for all pollutants other than PM2.5 and 1-hour SO_2 and NO_2.

Bold values represent the proposed background values for use in any necessary NAAQS/NYAAQS analyses.

Monitored background concentrations obtained from the USEPA AirData website (https://www3.epa.gov/airdata/).

4.2 Modeling Methodology

An air quality modeling analysis was performed consistent with the procedures found in the following documents: Guideline on Air Quality Models (Revised) (USEPA, 2005), New Source Review Workshop Manual (USEPA, 1990), and Screening Procedures for Estimating the Air Quality Impact of Stationary Sources (USEPA, 1992)

4.2.1 Model Selection

The USEPA has compiled a set of preferred and alternative computer models for the calculation of pollutant impacts. The selection of a model depends on the characteristics of the source, as well as the nature of the surrounding study area. Of the four classes of models available, the Gaussian type model is the most widely used technique for estimating the impacts of nonreactive pollutants.

The AERMOD model was designed for assessing pollutant concentrations from a wide variety of sources (point, area, and volume). AERMOD is currently recommended by the USEPA for modeling studies in rural or urban areas, flat or complex terrain, and transport distances less than 50 kilometers, with one hour to annual averaging times.

The latest version of USEPA's AERMOD model (Version 15181) was used in the analysis. AERMOD was applied with the regulatory default options and 5-years (2011-2015) of hourly meteorological data consisting of surface data observed at the Reagan National Airport meteorological station (WBAN #13743) and upper air data collected from Sterling, Virginia upper air sounding station (WBAN #93734).

4.2.2 Urban/Rural Area Analysis

A land cover classification analysis was performed to determine whether the URBAN option in the AERMOD model should be used in quantifying ground-level concentrations. The methodology utilized to determine whether the project is located in an urban or rural area is described below.

The following classifications relate the colors on a United States Geological Survey (USGS) topographic quadrangle map to the land use type that they represent:

- Blue – water (rural);
- Green – wooded areas (rural);

- White – parks, unwooded, non-densely packed structures (rural);
- Purple – industrial; identified by large buildings, tanks, sewage disposal or filtration plants, rail yards, roadways, and, intersections (urban);
- Pink – densely packed structures (urban); and,
- Red – roadways and intersections (urban)

The USGS map covering the area within a 3-kilometer radius of the facility was reviewed and indicated that the vast majority of the surrounding area is denoted as blue, green, or white, which represent water, wooded areas, parks, and non-densely packed structures (all designated as rural land uses). Although a small percent of the surrounding area is designated as urban land use, the "AERMOD Implementation Guide" published on August 3, 2015 cautions users against applying the Land Use Procedure on a source-by-source basis and instead to consider the potential for urban heat island influences across the full modeling domain. This approach is consistent with the fact that the urban heat island is not a localized effect, but is more regional in character.

Because the urban heat island is more of a regional effect, the Urban Source option in AERMOD was not utilized since the area within 3 kilometers of the facility as well as the full modeling domain (20 kilometers by 20 kilometers) is predominantly rural.

4.2.3 Good Engineering Practice Stack Height

Section 123 of the Clean Air Act (CAA) required the USEPA to promulgate regulations to assure that the degree of emission limitation for the control of any air pollutant under an applicable State Implementation Plan (SIP) was not affected by (1) stack heights that exceed Good Engineering Practice (GEP) or (2) any other dispersion technique. The USEPA provides specific guidance for determining GEP stack height and for determining whether building downwash will occur in the Guidance for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations), (USEPA, 1985). GEP is defined as "...the height necessary to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, and wakes that may be created by the source itself, or nearby structures, or nearby terrain "obstacles"."

The GEP definition is based on the observed phenomenon of atmospheric flow in the immediate vicinity of a structure. It identifies the minimum stack height at which significant adverse aerodynamics (downwash) are avoided. The USEPA GEP stack height regulations (40 CFR 51.100) specify that the GEP stack height (H_{GEP}) be calculated in the following manner:

$$H_{GEP} = H_B + 1.5L$$

Where: H_B = the height of adjacent or nearby structures, and
L = the lesser dimension (height or projected width of the adjacent or nearby structures).

A detailed plot plan of the proposed facility is shown in Figure 2-2. A GEP stack height analysis has been conducted using the USEPA approved Building Profile Input Program with PRIME (BPIPPRM, version 04274). The maximum calculated GEP stack height for the new emission sources is 113.5 feet; the controlling structure is the proposed compressor building (peak height of 45.4 feet). As such, all of the exhaust stacks are subject to downwash and the downwash parameters from the BPIP program were included in the AERMOD analysis. Electronic input and output files for the BPIPPRM model have been provided on the DVD-ROM contained in Appendix C.

4.2.4 Meteorological Data

If at least one year of hourly on-site meteorological data is not available, the application of the AERMOD dispersion model requires five years of hourly meteorological data that are representative of the project site. In addition to being representative, the data must meet quality and completeness requirements per USEPA guidelines. The closest source of representative hourly surface meteorological data is Reagan National Airport located in Arlington, VA located approximately 12 miles to the north of the Charles Compressor Station.

The meteorological data at the Reagan National Airport is recorded by an Automated Surface Observing System (ASOS) that records 1-minute measurements of wind direction and wind speed along with hourly surface observations necessary. The USEPA AERMINUTE program was used by the MDE to process 1-minute ASOS wind data (2011 – 2015) from the Reagan National Airport surface station in order to generate hourly averaged wind speed and wind direction data to supplement the standard hourly ASOS observations. The hourly averaged wind speed and direction data generated by AERMINUTE was merged with the aforementioned hourly surface data.

The AERMOD assessment utilized five (5) years (2011–2015) of concurrent meteorological data collected from a meteorological tower at the Reagan National Airport and from radiosondes launched from Sterling, Virginia. Both the surface and upper air sounding data were processed by the MDE using AERMOD's meteorological processor, AERMET (version 15181). The output from AERMET was used as the meteorological database for the modeling analysis and consists of a surface data file and a vertical profile data file. These data, which were prepared and processed to AERMOD format by the MDE, was provided for use in the modeling analyses for the proposed facility.

4.3 Receptor Grid

4.3.1 Basic Grid

The AERMOD model requires receptor data consisting of location coordinates and ground-level elevations. The receptor generating program, AERMAP (Version 11103), was used to develop a complete receptor grid to a distance of 10 kilometers from the proposed facility. AERMAP uses digital elevation model (DEM) or the National Elevation Dataset (NED) data obtained from the USGS. The preferred elevation dataset based on NED data was used in AERMAP to process the receptor grid. This is currently the preferred data to be used with AERMAP as indicated in the USEPA AERMOD Implementation Guide published August 3, 2015. AERMAP was run to determine the representative elevation for each receptor using 1/3 arc second NED files that were obtained for an area covering at least 10 kilometers in all directions from the proposed facility. The NED data was obtained through the USGS Seamless Data Server (http://seamless.usgs.gov/index.php).

The following rectangular (i.e. Cartesian) receptors were used to assess the air quality impact of the proposed facility:

- Fine grid receptors (100 meter spacing) for a 20 km (east-west) x 20 km (north-south) grid centered on the proposed facility site.

4.3.2 Property Line Receptors

The facility has a fenced property line that precludes public access to the site. Ambient air is therefore defined as the area at and beyond the fence. The modeling receptor grid includes receptors spaced at 25-meter intervals along the entire fence line. Any Cartesian receptors located within the fence line were removed.

4.4 Selection of Sources for Modeling

The emission sources responsible for most of the potential emissions from the Charles Compressor Station are the two Solar combustion turbines. These units were included in and are the main focus of the modeling analyses. The modeling includes consideration of operation over a range of turbine loads, ambient temperatures, and operating scenarios.

Ancillary sources (emergency generator and utility boiler) were included in the modeling for appropriate pollutants and averaging periods. The emergency equipment may operate for up to 30 minutes in any day for readiness testing and maintenance purposes. Operation of the emergency equipment for longer periods of time in an emergency mode will not be expected to occur when the turbines are operating.

Although only limited operation is expected from the emergency equipment, initial modeling to assess short-term facility impacts assumed concurrent operation of the emergency equipment for readiness testing (i.e., up to 30 minutes per day) with the combustion turbine.

4.4.1 Emission Rates and Exhaust Parameters

The dispersion modeling analysis was conducted with emission rates and flue gas exhaust characteristics (flow rate and temperature) that are expected to represent the range of possible values for the proposed natural gas fired turbines. Because emission rates and flue gas characteristics for a given turbine load vary as a function of ambient temperature and fuel use, data were derived for a number of ambient temperature cases for natural gas fuel at 100%, 75% and 50% operating loads. The temperatures were:

- <0°F, 0°F, 59°F, and 100°F.

To be conservative and limit the number of cases to be modeled, the modeling analyses were conducted using the lowest stack exhaust temperature and exit velocity coupled with the maximum emission rate over all ambient temperature cases for each operating load (with the exception of 1-hour NO2 modeling which excluded the <0°F data as discussed below). Annual modeling was based on the 100% load, 59°F case. Tables 4-2 and 4-3 summarize the stack parameters and emission rates that were used in the modeling for the compressor turbines.

Note that the modeling for 1-hour NO2 excluded the emergency generator for which normal operations (maintenance purposes only) will be limited to no more than 30 minutes per day with an annual limit of 100 hours per year for testing and maintenance purposes. The 1-hour NO2 modeling also did not consider combustion turbine operations under sub-zero ambient temperature conditions as these conditions are extremely limited annually. The exclusion of the emergency generator and sub-zero operations for the combustion turbines for the 1-hour NO2 modeling is based on USEPA guidance provided in the March 1, 2011 memorandum, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard" for intermittent sources such as emergency generators. In the memo, US EPA states the following:

> *"Given the implications of the probabilistic form of the 1-hour NO2 NAAQS discussed above, we are concerned that assuming continuous operation of intermittent emissions would effectively impose an additional level of stringency beyond that level intended by the standard itself. As a result, we feel it would be inappropriate to implement the 1-hour NO2 standard in such a manner and recommend that compliance demonstrations for the 1-hour NO2 NAAQS be based on emission scenarios that can logically be assumed to be relatively continuous or which occur frequently enough to contribute significantly to the annual distribution of daily maximum 1-hour concentrations."*

The emergency generator and sub-zero operation of the combustion turbine are considered as intermittent emissions, and thus, were excluded from the 1-hour NO2 modeling assessment.

Table 4-2: Stack Parameters and Emission Rates – Proposed Solar Mars 90 Compressor Turbine

Parameter		Values			
Load		50%	75	100%	Annual(1)
Stack Height (m)		15.24	15.24	15.24	15.24
Stack Diameter (m)(1)		2.24	2.24	2.24	2.24
Exhaust Velocity (m/s)		15.84	17.23	19.44	21.56
Exhaust Temperature (K)		688.7	688.7	688.7	688.7
Pollutant Emissions (g/s)	NOx	0.158	0.186	0.214	0.223
	CO	0.806	0.932	1.084	-
	SO2	0.069	0.081	0.092	0.089
	PM10/PM2.5	0.183	0.216	0.245	0.237
	Ammonia	0.199	NA	0.227	NA
(1) Based on conservative annual average exhaust parameters for 59°F and annual potential to emit discussed in Section 2.					

Table 4-3: Stack Parameters and Emission Rates – Proposed Solar Taurus 70 Compressor Turbine

Parameter		Values			
Load		50%	75	100%	Annual(1)
Stack Height (m)		15.24	15.24	15.24	15.24
Stack Diameter (m)(1)		1.42	1.42	1.42	1.42
Exhaust Velocity (m/s)		28.84	31.44	34.39	37.90
Exhaust Temperature (K)		688.7	688.7	688.7	688.7
Pollutant Emissions (g/s)	NOx	0.121	0.147	0.163	0.166
	CO	0.605	0.731	0.832	-
	SO2	0.051	0.062	0.070	0.068
	PM10/PM2.5	0.137	0.166	0.188	0.183
	Ammonia	0.105	NA	0.129	NA

(1) Based on conservative annual average exhaust parameters for 59°F and annual potential to emit discussed in Section 2.

Tables 4-4 and 4-5 present the stack parameters and emission rates for the emergency generator and utility boiler. The emergency generator was included in the modeling analysis for appropriate pollutants and averaging periods when used for readiness testing (i.e., up to 30 minutes per day).

Table 4-4: Stack Parameters and Emission Rates – Proposed Emergency Generator

Parameter		Values				
Stack Height (m)		7.62				
Stack Diameter (m)		0.30				
Exhaust Velocity (m/s)		45.4				
Exhaust Temperature (K)		809.3				
Averaging Period		**1-hr**	**3-hr**	**8-hr**	**24-hr**	**Annual**
Pollutant Emissions (g/sec)	NOx	0.30	--	--	--	0.034
	CO	0.59	--	0.074	--	-
	SO2	2.87E-04	9.55E-05	--	1.19E-05	3.27E-05
	PM10/PM2.5	--	--	--	2.02E-04	5.55E-04

Notes:
Hourly emission rate divided by 2 to simulate limit of 30 minutes testing per day. For the 3-, 8- and 24-hour period the hourly emission rate is further divided by the number of hours in the period.

Table 4-5: Stack Parameters and Emission Rates – Proposed Utility Boiler

Parameter		Values
Stack Height (m)		7.62
Stack Diameter (m)		0.36
Exhaust Velocity (m/s)		8.74
Exhaust Temperature (K)		449.8
Pollutant Emissions (g/sec)	NOx	0.065
	CO	0.054
	SO2	0.004
	PM10/PM2.5	0.0049

4.5 Maximum Modeled Facility Concentrations

Table 4-6 presents the maximum modeled air quality concentrations of the proposed facility calculated by AERMOD. As shown in this table, the maximum modeled concentrations when combined with a representative background concentration, are less than the applicable NAAQS for all pollutants.

Table 4-6: Facility Maximum Modeled Concentrations Compared to NAAQS

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$)	Maximum Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)
CO	1-Hour	40,000	236	2,185	2,421
	8-Hour	10,000	55	2,070	2,125
SO_2	1-Hour	196	3.9	26.5	30.4
	3-Hour	1,300	3.7	26.5	30.2
PM-10	24-Hour	150	7.6	28.0	35.6
PM-2.5	24-Hour	35	5.5[a]	19.6	25.1
	Annual	12	0.7	8.2	8.9
NO_2	1-Hour	188	39.9[b]	88.9	128.8
	Annual	100	5.9[c]	21.1	27.0

[a]Conservatively based upon maximum 98% percentile daily maximum modeled concentrations.
[b]Assumed 80% of NO_x is NO_2 per USEPA guidance.
[c]Assumed 75% of NO_x is NO_2 per USEPA guidance.

APPENDIX C
ELECTRONIC AIR QUALITY MODELING FILES

Revised February 2018