MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Office of Air Quality Assessments

1111 East Main Street, Richmond, VA 23219
22nd Floor **804/698-4000**

To: Patrick Corbett, Air Toxics Coordinator - Office of Air Permit Programs

From: Michael Kiss, Manager - Office of Air Quality Assessments

Date: July 13, 2018

Subject: Air Quality Analysis – Buckingham County Compressor Station

I. Project Background

Atlantic Coast Pipeline, LLC (Atlantic) and Dominion Energy Transmission, Inc. (DETI) are proposing to construct and operate a natural gas-fired compressor station in a rural location in Buckingham County, Virginia for the proposed Atlantic Coast Pipeline (ACP). The proposed new facility, herein referred to as the Project, will consist of four combustion turbines, four line heaters, one auxiliary boiler, one emergency generator, and three storage tanks. All combustion sources will be fueled by natural gas. Four station vent stacks and one vent stack for each combustion turbine will also be installed to purge/blowdown natural gas to ensure safe operation of the compressor station.

The proposed facility meets the definition of minor source under 9 VAC 5 Chapter 80, Article 6 (Permits for New and Modified Stationary Sources) of the Commonwealth of Virginia Regulations for the Control and Abatement of Air Pollution. The DEQ required an air quality analysis in order to assess the potential impacts to ambient air quality. Modeling was conducted for nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter having an aerodynamic diameter equal to or less than 2.5 microns (PM-2.5), and particulate matter having an aerodynamic diameter equal to or less than 10 microns (PM-10).

Toxics modeling was also conducted for each pollutant that exceeded applicable exemption rates as defined in 9 VAC 5 Chapter 60, Article 5 (Emission Standards for Toxic Pollutants from New and Modified Sources) of the Commonwealth of Virginia Regulations for the Control

and Abatement of Air Pollution (9 VAC 5-60-300 et al). Specifically, hourly and annual formaldehyde emissions as well as hourly hexane emissions exceeded the exemption rates and were modeled.

II. Modeling Methodology

The air quality modeling analysis conforms to 40 CFR Part 51, Appendix W - Guideline on Air Quality Models and was performed in accordance with approved modeling methodology. The air quality model used for the analyses was AERMOD (Version 16216r). AERMOD is the preferred EPA-approved regulatory model for near-field applications.

Additional details on the modeling methodology are available in the applicant's July 2018 air quality modeling report and the April 2018 air quality modeling protocol.

III. Modeling Results

A. NAAQS Analysis

The NAAQS analysis was conducted to assess compliance with the NAAQS for NO_2 (1-hour and annual averaging periods), CO (1-hour and 8-hour averaging periods), PM-2.5 (24-hour and annual averaging periods), and PM-10 (24-hour averaging period). This analysis included emissions from the proposed Project, emissions from existing sources from Virginia, and representative ambient background concentrations of NO_2, CO, PM-2.5, and PM-10. The results of the analysis are presented in Table 1 and demonstrate modeled compliance with the applicable NAAQS.

Table 1
NAAQS Analysis Results

Pollutant (Averaging Period)	**Total Modeled Concentration ($\mu g/m^3$)**	**Ambient Background Concentration ($\mu g/m^3$)**	**Total Concentration ($\mu g/m^3$)**	**NAAQS ($\mu g/m^3$)**
NO_2 (1-hour)	42.0	75.2	117.2	188
NO_2 (Annual)	3.5	16.92	20.4	100
CO (1-hour)	303	1,374	1,677	40,000
CO (8-hour)	122	1,259.5	1,382	10,000
PM2.5 (24-hour)	6.6	15	21.6	35
PM2.5 (Annual)	1.5	7.2	8.7	12
PM10 (24-hour)	9.1	27	36.1	150

B. Toxics Analysis

The proposed source is subject to the state toxics regulations at 9 VAC 5-60-300 et al. An analysis was conducted in accordance with the regulations and the predicted concentrations for each toxic pollutant were below their respective SAAC. Table 2 summarizes the toxic pollutant modeling analysis results.

Table 2
Toxics Analysis Maximum Predicted Concentrations

Toxic Pollutant	Scenario	Modeled Concentration ($\mu g/m^3$)	SAAC ($\mu g/m^3$)
Formaldehyde (1-hour)	50% Load	38.9	62.5
Formaldehyde (1-hour)	75% Load	38.9	62.5
Formaldehyde (1-hour)	100% Load	38.9	62.5
Formaldehyde (1-hour)	Startup (blended with 50% load)	40.5	62.5
Formaldehyde (1-hour)	Shutdown (blended with 50% load)	40.2	62.5
Formaldehyde (annual)	50% Load	0.081	2.4
Formaldehyde (annual)	75% Load	0.079	2.4
Formaldehyde (annual)	100% Load	0.076	2.4
Hexane (1-hour)	Pigging (Launching)	6,277	8,800
Hexane (1-hour)	Pigging (Receiving)	6,897	8,800
Hexane (1-hour)	Purging from Startup Events	1,370	8,800
Hexane (1-hour)	Blowdown from Shutdown Events	4,518	8,800
Hexane (1-hour)	Normal Operations	20	8,800

C. Other Modeling Considerations

Ozone

DEQ conducted an assessment to estimate the impact on ozone from the proposed Project's NO_X and VOC emissions. This analysis was based on the EPA's *Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program* (December 2, 2016). DEQ estimates that approximately 0.1368 ppb (NO_X) and 0.00117 ppb (VOC) of ozone might be formed on a worst-case day. The monitored ozone design value for the area is 60 ppb. The addition of the Project's worst-case daily impact to the design value equals 60.14 ppb which is well below the 8-hour ozone NAAQS of 70 ppb. It is important to note that this approach is highly conservative because it adds a daily maximum 8-hour ozone concentration to a design value. The Project's actual modeled impact on the design value (4^{th} highest ozone concentration averaged over 3 years) is likely to be much less than the result obtained using this approach, based on DEQ's ozone modeling experience.