

**ATLANTIC COAST PIPELINE, LLC  
ATLANTIC COAST PIPELINE**

**and**

**DOMINION TRANSMISSION, INC.  
SUPPLY HEADER PROJECT**

**Supplemental Filing  
January 19, 2017**

**APPENDIX E**

**Updated Resource Report 9 Tables**

Facility ID	Location	Emission Unit	Unit Size	Units
M&R Station 1 (Brunswick)	Brunswick County, VA	Heater 1	14.7	MMBtu/hr
		Heater 2	14.7	MMBtu/hr
		Heater 3	14.7	MMBtu/hr
M&R Station 2 (Greensville)	Greensville County, VA	Heater 1	15.9	MMBtu/hr
		Heater 2	15.9	MMBtu/hr
		Heater 3	15.9	MMBtu/hr
M&R Station 3 (Long Run)	Randolph County, WV	Heater 1	9.8	MMBtu/hr
		Heater 2	9.8	MMBtu/hr
		Heater 3	9.8	MMBtu/hr
		Heater 4	9.8	MMBtu/hr
		Cummins Generator	55 [105]	kW [hp]
		Cummins Generator (back-up)	55 [105]	kW [hp]
M&R Station 4 (Elizabeth River)	City of Chesapeake, VA	Cummins Emergency Generator	36 [70]	kW [hp]
M&R Station 5 (Fayetteville)	Johnston County, NC	Cummins Emergency Generator	36 [70]	kW [hp]
M&R Station 6 (Pembroke)	Robeson County, NC	Cummins Emergency Generator	36 [70]	kW [hp]
M&R Station 7 (Smithfield)	Johnston County, NC	Cummins Emergency Generator	36 [70]	kW [hp]

*Note: This table is updated from the previous version submitted September 2015 due to the following design changes at the M&R Stations:*

- *Decreases in size of Heaters at Greensville and Brunswick*
- *Addition of Heater 4 at M&R Station 3*
- *Decrease in size of Heaters 1-3 at M&R Station 3*
- *Replacement of two microturbines with two emergency generators at M&R Station 3*
- *Addition of one emergency generator to each of M&R Stations 4-7*

Source	NO <sub>x</sub>	CO	VOC	SO <sub>2</sub>	PM	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>
(total tons during construction activities)								
ACP Compressor Stations	91.4	58.2	14.1	0.113	9.34	9.34	9.06	19,591
SHP Compressor Stations	73.3	48.7	11.5	0.091	7.71	7.71	7.48	15,748
M&R Stations	28.6	15.6	4.03	0.040	2.57	2.57	2.49	6,970
Pipeline Spread	4,266	4,257	868	5.08	633	627	613	928,262

*Note: This table is consistent with the previous version submitted November 2016 with the exception of some minor increases in pipeline spread emissions of NO<sub>x</sub>, CO, VOC, SO<sub>2</sub>, and CO<sub>2</sub> based on minor construction equipment assumption updates.*

TABLE 9.1.4-2			
Estimated Emissions from Particulate Matter From Material Transfers and Road Traffic			
Source	PM	PM <sub>10</sub>	PM <sub>2.5</sub>
	(total tons during construction activities)		
ACP Compressor Stations	583	198	34.9
SHP Compressor Stations	247	86.6	14.7
M&R Stations	424	138	25.2
Pipeline Spread	16,943	6,994	1,109

*Note: This table is consistent with the previous version submitted November 2016 with the exception of some minor increases in pipeline spread PM/PM<sub>10</sub>/PM<sub>2.5</sub> emissions based on minor construction equipment assumption updates.*

TABLE 9.1.4-3								
Estimated Tailpipe Emissions From Vehicles Used By Commuting Construction Workers								
Source	NO <sub>x</sub>	CO	VOC	SO <sub>2</sub>	PM	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>
	(total tons during construction activities)							
ACP Compressor Stations	3.91	55.0	2.97	0.054	0.231	0.231	0.131	6,602
SHP Compressor Stations	1.62	23.3	1.19	0.022	0.097	0.097	0.055	2,504
M&R Stations	3.38	33.1	2.12	0.035	0.213	0.213	0.156	5,918
Pipeline Spread	44.8	620	45.4	0.735	2.41	2.41	1.20	122,885

*Note: This table is consistent with the previous version submitted November 2016, provided here for reference.*

TABLE 9.1.4-5

**Potential Emissions by M&R Station for the Atlantic Coast Pipeline**

M&R Station	NO <sub>x</sub>	CO	VOC	SO <sub>2</sub>	PM/PM <sub>10</sub> / PM <sub>2.5</sub>	CO <sub>2e</sub>
			(tons per year)			
Brunswick M&R Station (Brunswick County, Virginia)	2.12	7.15	1.31	0.221	1.35	23,084
Greensville M&R Station (Greensville County, Virginia)	2.30	7.73	1.41	0.24	1.46	24,946
Long Run M&R Station (Randolph County, West Virginia)	17.5	16.3	1.95	0.10	2.27	20,978
Elizabeth River M&R Station (City of Chesapeake, Virginia)	0.039	0.304	0.159	1.4E-05	0.001	168
Fayetteville M&R Station (Johnston County, North Carolina)	0.039	0.304	0.147	1.4E-05	0.001	157
Pembroke M&R Station (Robeson County, North Carolina)	0.039	0.304	0.227	1.4E-05	0.001	248
Smithfield M&R Station (Johnston County, North Carolina)	0.039	0.304	0.238	1.4E-05	0.001	259

Notes:  
Emission factors used in all calculations were supplied by the manufacturer or retrieved from EPA's AP-42 Sections 1.4 and 3.2.  
Assume all particulate matter (PM) is less than 1.0 microns.  
Equivalent carbon dioxide (CO<sub>2e</sub>) emissions were calculated based upon Table A-1 of 40 Code of Federal Regulations Part 98 Subpart A.

*Note: This table is updated from the previous version submitted April 2016 due to the following design changes at the M&R Stations:*

- *Updates to Brunswick and Greensville M&R Station emissions to reflect consistency with air permit (updated sizing of line heaters) and update VOC and CO<sub>2e</sub> to reflect fugitive emissions*
- *Increase in Long Run M&R Station emissions of all listed pollutants*
- *Addition of Elizabeth River, Fayetteville, Johnston, and Smithfield M&R Station emissions*
- *Removal of Remaining M&R station emissions (replaced by the previous change)*

TABLE 9.1.4-7		
Engineering Measures to Minimize Methane Fugitive Emissions for the Atlantic Coast Pipeline and Supply Header Projects		
Equipment/Process	Type of Measure	Control Measures Description
Blowdowns	Engineering/Design	Install a large volume, lower pressure header; send unit blowdown gas to the header, in order to recover the blowdown gas as fuel, where sufficient fuel burning sources are installed to utilize the recovered blowdown gas.
Blowdowns	Engineering/Design	Locate isolation valves as close to compressor buildings to minimize venting of gas at compressor station during operation and maintenance.
Blowdowns	Engineering/Design	Install fittings for capped emergency shutdown system testing instead of full station blowdown.
Blowdowns	Work Practice	Pumping down the pressure of lines to as low a pressure as possible using in-line compression prior to blowdown for maintenance.
Blowdowns	Work Practice	Close main and unit valves prior to blowdown
Centrifugal Compressors	Engineering/Design	Installation and operation of lean premix combustion turbine compressors
Centrifugal Compressors	Engineering/Design	Dry Seals on compressors <sup>a</sup>
Fugitive Components	Engineering/Design	Install low leak fugitive components, where practicable
Fugitive Components	Work Practice	Implementation of enhanced leak detection/monitoring program <sup>a</sup>
Turbines	Engineering/Design	Automated air/fuel ratio control system
Turbines	Engineering/Design	Electric motor starters instead of gas start systems
<sup>a</sup> These will comply with requirements of applicable EPA proposed New Source Performance Standards (NSPS); 40CFR Part 60 Subpart OOOOa.		

*Note: This table is updated from the previous version submitted September 2015; the pneumatic controller engineering measure was removed as some intermittent bleed natural gas pneumatic valves are necessary.*

TABLE 9.1.4-8		
Potential Emissions of Fugitive Leaks from Valve Sites, Pigging, and Pneumatic Valves for the Atlantic Coast Pipeline and the Supply Header Project		
Project	VOC (tons per year)	CO <sub>2</sub> e
Atlantic Coast Pipeline	1.57	1,400
Supply Header Project	0.289	257
Notes: Equivalent carbon dioxide (CO <sub>2</sub> e) emissions were calculated based upon Table A-1 of 40 Code of Federal Regulations Part 98 Subpart A.		

*Note: This is a new table to capture VOC and CO<sub>2</sub>e emissions along the ACP and SHP pipelines from valve sites, pigging, and pneumatic valves. This table captures emissions not previously included in the RR9 consistent with a data request response to FERC provided July 2016 that was directly focused on methane emissions.*

TABLE 9.1.5-5

**ACP and SHP Construction Emissions for Nonattainment and Maintenance Areas for Calendar Year 2018**

County/City	Air Quality Designation	NO <sub>x</sub>	VOC	SO <sub>2</sub>	PM <sub>2.5</sub>
(tons per year)					
<u>Southwest Pennsylvania Intrastate Air Quality Control Air Region</u>					
Greene (PA)	NT, Mod – PM2.5 24-hr (2006)	9.72	1.71	0.015	3.61
Westmoreland (PA)	NT, Mar – Ozone 8-hr (2008)	13.7	2.31	0.021	4.04
	NT, Mod – PM2.5 24-hr (2006)				
Air Region Total		23.5	4.01	0.036	7.65
	<i>PA General Conformity de minimis</i>	<i>100</i>	<i>50</i>	<i>100</i>	<i>100</i>
<u>Steubenville-Weirton-Wheeling Interstate Air Quality Control Region</u>					
Marshall (WV)	NT – SO2 24-hr (2010)	N/A	N/A	0	N/A
Air Region Total		N/A	N/A	0	N/A
	<i>WV General Conformity de minimis</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
Key					
Mar = Marginal					
Mod = Moderate					
NT = Nonattainment Area					
N/A = Not Applicable					

*Note: This table is consistent with the previous version submitted November 2016, provided here for reference.*

TABLE 9.1.5-6

## ACP and SHP Construction Emissions for Nonattainment and Maintenance Areas for Calendar Year 2019

County/City	Air Quality Designation	NO <sub>x</sub>	VOC	SO <sub>2</sub>	PM <sub>2.5</sub>
(tons per year)					
<u>Southwest Pennsylvania Intrastate Air Quality Control Air Region</u>					
Greene (PA)	NT, Mod – PM2.5 24-hr (2006)	7.95	1.40	0.012	2.96
Westmoreland (PA)	NT, Mar – Ozone 8-hr (2008)	75.4	12.8	0.135	25.0
	NT, Mod – PM2.5 24-hr (2006)				
Air Region Total		83.3	14.2	0.147	28.0
	<i>PA General Conformity de minimis</i>	<i>100</i>	<i>50</i>	<i>100</i>	<i>100</i>
<u>Steubenville-Weirton-Wheeling Interstate Air Quality Control Region</u>					
Marshall (WV)	NT – SO2 24-hr (2010)	N/A	N/A	0.010	N/A
Air Region Total		N/A	N/A	0.010	N/A
	<i>WV General Conformity de minimis</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
Key					
Mar = Marginal					
Mod = Moderate					
NT = Nonattainment Area					
N/A = Not Applicable					

Note: This table is consistent with the previous version submitted November 2016, provided here for reference.