Appendix B1a

Nonpoint and Marine/Air/Rail Inventory Development Overview

(District of Columbia)

Base Year 2017 Emissions Inventory

(Washington, DC-MD-VA 2015 Ozone NAAQS Nonattainment Area)

MEMORANDUM

TO: Sunil Kumar
Principal Environmental Engineer

FROM: Joseph Jakuta
Environmental Protection Specialist, Monitoring and Assessment Branch, Air Quality Division

DATE: May 27, 2020

SUBJECT: District of Columbia's 2017 Base Year Ozone Season Day Nonpoint Source Inventory – Technical Correction

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The Department of Energy and Environment (DOEE) is transmitting a technical correction to the 2017 base year inventory for nonpoint sources for use in compiling emissions inventories for DC-MD-VA nonattainment area to fulfill requirements under the 2015 Ozone NAAQS. The original documentation was transmitted on November 20, 2019.

The file being transmitted contains three worksheets. The first worksheet contains data for each SCC taken from the final 2017 National Emissions Inventory (NEI) published by United States Environmental Protection Agency on May 8, 2020. The NEI tool included District of Columbia (District) data for the ICI point source fuel usage subtraction (option A), publically owned treatment works flow rate, and solvent emissions subtraction. All of these District-specific datasets were submitted to EPA as part of the 2017 National Emissions Inventory process.

The second worksheet contains the seasonal adjustment factors (SAF) and other variables required to temporally allocate annual emissions to ozone season data. This data was provided to DOEE on November 18, 2019 by Maryland Department of Environment and was supplemented by DOEE. The following formula was used to calculate the ozone season day (OSD) emissions:

$$Emissions_{OSD} = (Emissions_{Annual} * (\frac{SAF}{PeakOSFactor}))/Period$$

The third worksheet is a summary for each of the nonpoint sector categories in the District's emissions inventory. Oxides of Nitrogen (NO_X), Volatile Organic Compound (VOC), and Carbon Monoxide (CO) data are provided in tons, and both annual and ozone season totals are included. Emissions that were corrected are italicized.

Please contact Mr. Joseph Jakuta at 202-535-2988 for any additional information about this document.

MEMORANDUM

TO: Sunil Kumar
Principal Environmental Engineer

FROM: Joseph Jakuta
Environmental Protection Specialist, Monitoring and Assessment Branch, Air Quality Division

DATE: June 1, 2020

SUBJECT: District of Columbia's 2017 Base Year Ozone Season Day MAR Inventory – Technical Corrections

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The Department of Energy and Environment (DOEE) is transmitting a technical correction for the 2017 base year inventory for use in compiling emissions inventories for DC-MD-VA nonattainment area to fulfill requirements under the 2015 Ozone NAAQS. Three sectors are discussed in this memorandum- marine, aviation, and rail. The original documentation was transmitted on December 10, 2019. The technical corrections are for the marine and rail sectors only.

Marine Emissions

The file being transmitted contains two worksheets. The first worksheet contains data for each SCC taken from the final 2017 National Emissions Inventory (NEI) published by the United States Environmental Protection Agency on May 8, 2020.

Ozone Season Day (OSD) emissions are calculated by dividing each annual total by 365. This is because, with a few exceptions, the sources of emissions are vessels associated with military operations and it is assumed that activity is consistent across days of the week and months of the year.

The second worksheet is a summary for commercial marine vessels in the District of Columbia's (District) emissions inventory. Emissions data for NO_X, VOCs, and CO are provided in tons, and both annual and ozone season totals are included. Emissions that were corrected are italicized.

Airport Emissions

The file being transmitted contains two work sheets. The first worksheet contains data for each point source classified as an airport by the United States Environmental Protection Agency (EPA) as part of the 2017 National Emissions Inventory (NEI) process. The second worksheet is a summary for each of the 12 facilities in the District's airport inventory. Emissions data for NO_X, VOCs, and CO are provided in tons.

OSD emissions are calculated by dividing each annual total by 365. This is because, with a few exceptions, the sources of emissions are helipads associated with police operations or hospitals and it is assumed that activity is consistent across days of the week and months of the year.

Emissions data was originally obtained from the NEI FTP server.

Rail Emissions

The file being transmitted contains two work sheets. The first worksheet contains data for each company that runs line haul trains that run in the District and for each railyard located in the District. The second worksheet is a summary for each of the four companies with line-haul trains and the two railyards. Emissions data for NO_X, VOCs, and CO are provided in tons. Emissions that were corrected are italicized.

Line-haul emissions and yard emissions at the CSX railyard were originally calculated as part of the interregional inventory development project. Documentation of this process is located here: http://views.cira.colostate.edu/wiki/wiki/9182

Railyard emissions at the Ivy City railyard were calculated by the Metropolitan Washington Council of Governments and are detailed in Attachment 1.

OSD emissions are calculated differently depending on the source. VRE annual emissions are assumed to occur equally over weekdays and are divided by 260. MARC annual emissions are assumed to occur based on the data in Table 1. The remainder of the annual emissions is assumed to occur equally over weekdays and weekends and is divided by 365.

Table 1: MARC train ozone season day adjustment factors

Line	**No. Daily Trains**	**Days/Week**	**Adjustment**
Brunswick	18	5	0.00072115
Camden Line	20	5	0.00080128
Penn Line	28	5	0.00112179
	18	6	0.00060096
	12	7	0.00034247
Total			**0.00358766**

Emissions data was originally obtained from the NEI FTP server.

Please contact Mr. Joseph Jakuta at 202-535-2988 for any additional information about this document.

Attachment 1

District of Columbia Switcher Engine Inventory Overview

MWCOG staff developed emissions inventory for switcher locomotive engines at Ivy City in the District of Columbia (District).

There are 11 switcher engines in the District, which were manufactured in different years. A number of these engines were recently replaced with newer engines. Two units are not used and are considered backups. A detailed description of the original years of manufacture and replacement for these engines is provided in Table 1 below.

Table 1

Tier	Unit #	Old Unit #	Mfg.	Model #	Original Manufature Year	Year Re-Built [a]	Mfg Re-Build	Model #	Remarks
0	533		Electro Motive Division of GM	MP1500	1975				
NA	541		Electro Motive Division of GM	SW1500	1973				Rarely Used
NA	569		Electro Motive Division of GM	SW1000	1973				Rarely Used
4	597	797	Electro Motive Division of GM	SW1000M	1956	2015	National	2GS12B-R (GenSet)	
4	599	799	Electro Motive Division of GM		1952	2014	National	2GS12B-R (GenSet)	
0	737		Electro Motive Division of GM	SW-1	2006				Overhauled, but still uncont
Unc	792		Electro Motive Division of GM	SW1000	1952	At NRE for Re-Build after 2017			
Unc	793	Not Renumbered	Electro Motive Division of GM	SW1000M	1952	2018	National	2GS12B-R (GenSet)	
Unc	794		Electro Motive Division of GM	SW1000M	1950				
Unc	796		Electro Motive Division of GM	SW1000M	1952				
Unc	798		Electro Motive Division of GM	SW1000M	1952	At NRE for Re-Build after 2017			

[a] Re-Built refers to Engine replacement. Engines already replaced and currently in process of being replaced at NRE are all Tier 4 compliant.

Emissions Development Methodology

Emissions factors corresponding to different Tier levels for switcher engines provided in Table 2 of the EPA document titled "Emission Factors for Locomotives, EPA-420-F-09-025, April 2009" were used in emissions calculations. Emissions factors for old engines still in operation were assigned appropriate Tier levels and corresponding emissions factors depending on the year in which they were manufactured. Emissions factors for new replacement engines were assigned appropriate Tier levels and corresponding emissions factors depending on the year in which they were replaced. One of the eleven units was moved from DC to Wilmington. Table 2 below shows engine Tier level assignment.

Table 2

Original/Rebuild Year of Manufacture	Tier Levels	# of Engines
1972 or earlier	Uncontrolled	5
1973-2001	Tier 0	2
2002-2004	Tier 1	0
2005-2010	Tier 2	0
2011-2014	Tier 3	0
2015 or later	Tier 4	2
		9

Emissions factor for each engine was multiplied with the fuel consumed by the engine to calculate total emissions of VOCs, NO_X, and CO in tons per day.

An Excel worksheet titled “Ivy City Switcher Engine Emissions.xlsx” provides details of emissions calculations.