

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)**

GOVERNMENT OF THE DISTRICT OF COLUMBIA
Department of Energy and Environment

MEMORANDUM

TO: Sunil Kumar
Principal Environmental Engineer

FROM: Joseph Jakuta
Environmental Protection Specialist, Monitoring and Assessment Branch, AQD

DATE: November 20, 2019

SUBJECT: Base Year 2017 Ozone Season Day Nonpoint Source Inventory for the District of Columbia

The Department of Energy and Environment (DOEE) is transmitting the 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 file being transmitted contains three worksheets. The first worksheet contains data for each SCC that was outputted from the August 21, 2019 version of the Wagon Wheel tool. This run of the Wagon Wheel tool included District-specific 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. Both annual and ozone season totals are included.

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

GOVERNMENT OF THE DISTRICT OF COLUMBIA
Department of Energy and Environment

MEMORANDUM

TO: Sunil Kumar
Principal Environmental Engineer

FROM: Joseph Jakuta
Environmental Protection Specialist, Monitoring and Assessment Branch, AQD

DATE: December 6, 2019

SUBJECT: Base Year 2017 Ozone Season Day MAR Inventory for the District of Columbia

The Department of Energy and Environment (DOEE) is transmitting the 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, air, and rail.

Marine Emissions

The marine category is for emissions from ocean-going ships and barges used to transport petroleum liquids. Activities include petroleum vessel loading and ballasting (when materials are used to stabilize a ship in the water), which typically occur in urban coastal areas and inland waterways, and evaporative losses while in transit. The category does not include emissions from fuel consumed by vessels while in transit or in port.

Ocean-bearing marine vessels very rarely, if ever, travel near the District, and there are no marine ports, so this category is not applicable in the District.

Air 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. Oxides of Nitrogen (NO_x), Volatile Organic Compound (VOC), and Carbon Monoxide (CO) data are provided in tons.

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 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 rail yard located in the District. The second worksheet is a summary for each of the four companies with line-haul trains and the two rail yards. Oxides of Nitrogen (NO_x), Volatile Organic Compound (VOC), and Carbon Monoxide (CO) data are provided in tons.

Line-haul emissions and yard emissions at the CSX railyard were originally calculated as part of the interregional inventory development project. Documentation of those calculations can be found here: https://drive.google.com/open?id=1GiT-3X_tPRint_GGPg5b_AX8l3r7xPIR.

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

Ozone Season Day (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 are assumed to occur equally over weekdays and weekends and are 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

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 engines at Ivy City in the District of Columbia.

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 Manufacture 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 uncounted
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 Washington 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 VOC, NOX, and CO in tons per day.

A spread-sheet titled “Ivy City Switcher Engine Emissions.xlsx” provides details of emissions calculations.