Technical Memorandum

Northeast Ohio Areawide Coordinating Agency (NOACA)

2012 Annual PM2.5 NAAQS SIP Inventory

Mobile Source Emissions (Direct PM2.5 and NOx)

August 2016

By NOACA and ODOT

In Coordination with the Ohio Environmental Protection Agency

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1. Overview

This memorandum is intended to document the U.S. EPA MOVES based mobile source air quality analyses performed by the Ohio Department of Transportation (ODOT) and NOACA for the counties of Cuyahoga and Lorain in its area. These analyses were conducted in support of Ohio EPA's intent to submit an attainment demonstration State Implementation Plan (SIP) for the 2012 Annual PM2.5 National Ambient Air Quality Standard (NAAQS).

The designated nonattainment area in northeast Ohio for the 2012 Annual PM2.5 NAAQS includes the counties of Cuyahoga and Lorain.

The inventories include county based, annual totals of direct fine particulate matter (PM2.5) and Oxides of Nitrogen (NOx) for the years 2019, 2021 and 2022. Years 2019 and 2022 are the reasonable further progress (RFP) milestone years and year 2021 is the attainment year.

Latest Planning Assumptions

The mobile source emission inventory MOVES runs meet the latest planning assumption requirement by using the latest approved version of MOVES at the time attainment demonstration modeling began, which is MOVES2014 with default databases dated October 21, 2014. In addition, the input data for the MOVES runs is based on the latest available planning emission inputs and in some cases, actual measured data. The input data and model run specification were developed in accordance with the latest MOVES technical guidance at the time attainment demonstration modeling began, which is "MOVES2014 Technical Guidance: Using MOVES to Prepare Emission Inventories for State Implementation Plans and Transportation Conformity", EPA-420-B-15-007, January 2015.

As discussed in Section 2 of this report, the trip-based NOACA travel demand forecast modeling (TDFM) processes used to develop link vehicle miles of travel (VMT) of the model highway network. The NOACA model was developed based on the latest socioeconomic data, highway and transit networks and calibrated using recent traffic counts and other available data. Currently, the data are validated to 2005.

U.S. EPA's MOVES2014 is used for all mobile source emission analyses with MOVES input and output needs being established at various interagency consultation meetings and e-mails (See Appendix A). It was also established that annual emission estimates would be based on a single-season approach. The emissions estimates are expressed in tons per year.

Finally, the regional emissions analysis includes emissions for direct PM2.5 and NOx.

On Road Mobile Source Emissions Inventory Summary

Tables 1 to 3 present a summary of emissions by county as well as the entire nonattainment area for direct PM2.5 and NOx for calendar years 2019, 2021 and 2022. They also include annual VMT totals. The remainder of this document focuses on the assumptions behind the analyses.

Table 1 – Northeast Ohio On-Road Mobile Source Emissions for 2019

2019			
County	**Direct PM2.5 (tons/year)**	**NOx (tons/year)**	**Annual VMT**
Cuyahoga	373.91	7759.79	9,082,986,310
Lorain	93.88	2025.09	2,387,051,820
Total	**467.79**	**9784.88**	**11,470,038,130**

Table 2 – Northeast Ohio On-Road Mobile Source Emissions for 2021

2021			
County	**Direct PM2.5 (tons/year)**	**NOx (tons/year)**	**Annual VMT**
Cuyahoga	336.13	6736.26	9,584,419,660
Lorain	82.05	1706.52	2,467,293,420
Total	**418.18**	**8442.78**	**12,051,713,080**

Table 3 – Northeast Ohio On-Road Mobile Source Emissions for 2022

2022			
County	**Direct PM2.5 (tons/year)**	**NOx (tons/year)**	**Annual VMT**
Cuyahoga	311.64	5,809.41	9,601,858,630
Lorain	80.74	1,610.49	2,487,915,555
Total	**392.38**	**7,419.90**	**12,089,774,185**

2. Urban Travel Demand Models

NOACA maintains a PC-based regional travel demand forecasting model on the Citilabs CUBE platform for use in its urban transportation planning process. This model employs the traditional four step modeling process to project existing and future traffic volumes and travel patterns on the regional transportation networks. The four step process consists of trip generation, trip distribution, mode split, and route assignment. Output from the model is link-by-link directional volumes for four time periods: AM peak, Midday, PM peak, and Night and is added together to create 24-hour traffic volumes for the existing or future regional transportation networks. ODOT ran NOACA's model for this effort.

These models are uniquely suited to perform emission analyses. The modeling process identifies growth in vehicle miles of travel and changes in regional travel patterns resulting from the projects that are proposed in these areas' transportation plans and programs.

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Landuse and Socio-economic Data

The areas' socio-economic model variables reflect the current and expected future regional land uses as best known to staff.

Socio-economic variables were developed for all areas based on 2000 Census data and 2030 county-level Ohio Department of Development (ODOD) population projections. Minor adjustments to 2005 data have been made in an effort to have this data correspond to 2005 estimates released by the US Census Bureau.

Until new 2010 Census based projections are developed by ODOD, the current data represents the best available for this effort.

3. Emission Factor Generation

Using MOVES, emission factor files were generated for 2019, 2021 and 2022. Assumptions for these runs include a vehicle inspection/maintenance (I/M) program. Programs and corresponding MOVES parameters were developed in consultation with Ohio EPA.

Technical Details

Table 4 summarizes the settings used in the MOVES run specification file and the MOVES County-Data Manager. All inputs for the region's analyses are included in the CD provided to Ohio EPA as part of this document submittal. Further information about specific inputs that are not using default values is also discussed below.

Ohio's motor vehicle emissions inventories used for the base year and attainment modeling (using CAMx) where developed by Ramboll-Environ from quality-assured MOVES inputs used by U.S. EPA in developing the 2011 National Emission Inventory (NEI) version 2 (v2) inventory. The NEI inputs originated from Ohio EPA and were subsequently enhanced by U.S. EPA through improvement projects and research. Ramboll-Environ and Ohio EPA needed to retain the U.S. EPA methods to remain consistent with U.S. EPA and include the U.S. EPA improvements.

This quality assurance effort identified some problems in the MOVES inputs in NEIv2. For example, Ramboll-Environ reviewed vehicle population data used in the NEIv2 and discovered that the vehicle population data in Ohio differed markedly from that for other Midwestern states, and warranted further review from the State of Ohio. This is just one example of issues identified by Ramboll-Environ in U.S. EPA's NEIv2 on-road inventory.

Based on these findings, the Lake Michigan Air Directors Consortium (LADCO) worked with its member states and 3 adjacent states (IA, KY, and MO) to review and update key MOVES inputs, including vehicle population, VMT, speed, and vehicle inspection and maintenance characteristics. After extensive review, Ramboll-Environ completed the final MOVES (Version MOVES2014) and provided model-ready inputs to LADCO for 2011 and several projection years, including 2021.

However, these inventories were not used for the development of these mobile budgets. Rather, the NOACA and ODOT, in consultation with Ohio EPA and U.S. EPA Region 5, prepared motor

vehicle emissions inventories for 2019, 2021 and 2022 for the purpose of setting mobile emissions budgets. These inventories were developed using appropriate and up-to-date assumptions about VMT, socioeconomic variables, fuels used, weather inputs, other planning assumptions, and the latest approved motor vehicle emissions model (MOVES2014). NOACA, ODOT and Ohio EPA, in consultation with U.S. EPA Region 5, agreed upon variables and inputs that would be necessary to promote consistency between the Ramboll-Environ motor vehicle emissions estimates used in the attainment demonstration modeling and those estimates that would be used for mobile budget setting.

However, NOACA's inputs do not completely match the attainment modeling inputs. The attainment modeling inventory, just like the U.S. EPA NEI, estimates MOVES emissions based on emission factors generated by MOVES for representative counties, not every county. Cuyahoga county is a representative county, but Lorain county is not. U.S. EPA and attainment modeling Lorain county emissions are based on Cuyahoga county emission factors. NOACA ran MOVES for each county using specific data for each county to satisfy the requirement for using the latest planning assumptions for each county.

Note that representative counties are selected by U.S. EPA based on specific grouping criteria such as similar fuel data, vehicle inspection/maintenance programs, vehicle fleet age profile, elevation, and freeway ramp fractions. Cuyahoga county was deemed a representative county for Lorain county so the emission factors are similar.

Table 4 – MOVES Inputs

RunSpec Parameter Settings	
MOVES Version	MOVES2014 10/21/2014
Scale	County
MOVES Modeling Technique	Emission Factor Method Rates per Distance (grams/mile) Rates per Vehicle (grams/vehicle)
Time Span	Time Aggregation: Hour April All hours of day selected 16 speed bins Weekdays only
Geographic Bounds	Cuyahoga and Lorain counties
Vehicles/Equipment	All related source types, gasoline, diesel and electricity
Road Type	All road types including off-network
Pollutants and Processes	PM2.5 and NOx including prerequisite pollutants
General Output	Units = grams, joules and miles
Output Emissions	Time = hour, Location =county, on-road emission rates by road type and source use type
Advance Performance	None
County Data Manager Sources	
Source Type Population	Combination of local and default data

	Local Bureau of Motor Vehicle (BMV) data for passenger car (source type 21), passenger truck (31) and light commercial truck (32). U.S. EPA data for source types 11, 41, 42, 43, 51, 52, 53, 54, 61 and 62 Future year growth rate based on TDFM's household growth rates.
Vehicle Type VMT	2011 Highway Performance Monitoring System (HPMS) data multiplied by growth rates obtained from the TDFM.
I/M Program	I/M program information supplied by Ohio EPA
Fuel Formulation	Default, per the MOVES Technical Guidance.
Fuel Supply	Default, per the MOVES Technical Guidance.
Meteorology Data	Local data obtained from National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center for Cleveland Hopkins International Airport.
Ramp Fraction	Travel Demand Forecast Model
Road Type Distribution	ODOT's 2011 daily VMT (DVMT) by Functional Class
Age Distribution	Local BMV's data for passenger car (source type 21), passenger truck (31) and light commercial truck (32). U.S. EPA data for source types 11, 41, 42, 43, 51, 52, 53, 54, 61 and 62 The U.S. EPA Age Distribution Projection Tool was used to "grow" the 2011 base year data to years 2019, 2021 and 2022.
Average Speed Distribution	ODOT data for urban roads and default data for rural roads.
Zone Activity	Default with necessary modification as prescribed in MOVES user guide.

Temperature and Relative Humidity

Per Section IV.B.2.h. (Mobile Source Emission Models) of the Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements, if different approaches are taken for inventories that serve different purposes (for example, between inventories developed for air quality modeling, which may require greater temporal and spatial detail, and inventories used as the motor vehicle emissions budget), states should seek to understand and minimize any differences in results. For example, an approach may be used for the modeled attainment demonstration that uses gridded temperatures and other meteorological data, but this approach could be too burdensome for use in the base year inventory for the nonattainment area. If a state chooses to use MOVES to create emissions inventories for purposes of establishing motor vehicle emissions budgets for transportation conformity purposes, it must use the same MOVES approach in the base year inventory for the nonattainment area, and using a straightforward MOVES approach without gridded meteorology is more reasonable for that purpose.

Ohio EPA's attainment demonstration modeling, which is used for the attainment year mobile emissions budget, and the RFP mobile emissions budgets, follows the example cited above.

Temperatures used for the single season approach are representative of 12 months in 2011 based on NOAA data from the National Climate Data Center website. April was used as the representative month. Data for Cleveland Hopkins International Airport (CLE) was used. To get the correct format for MOVES, the data was entered into the U.S. EPA Meteorological Data Converter spreadsheet that was designed to convert Mobile6 data to MOVES. The average April hourly temperature and relative humidity distribution profile for Cuyahoga and Lorain counties can be seen in Table 5.

The temperature and meteorological data used in the attainment demonstration modeling is obtained from the weather research and forecasting model (WRF). The program predicts the future meteorological data for all of the grid cells and elevations. The resulting data file is significantly larger and more complex than the simple MOVES temperature and humidity monthly average data table. The program Met4Moves converts this file into a Sparse Matrix Operator Kernel Emissions (SMOKE) and MOVES readable file. NOACA cannot manipulate this complex meteorological data file into a MOVES input file.

The forecasting model WRF data is compared to actual National Weather Service (NWS) monitoring station data to check the accuracy of the model. Thus the data is consistent with actual data from the Cleveland Hopkins airport, which is the data used by NOACA. Therefore, NOACA used NWS data from the Cleveland Hopkins airport for conformity purposes. This best meets the consistency requirement in 40 CFR 93.122(a)(6) and Section IV.B.2.h. of the Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements.

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Table 5 – Temperature and Relative Humidity Data for April

Hour	Temperature	Relative Humidity
1	48.3	72.7
2	47.5	73.6
3	47.1	75.1
4	47.0	75.8
5	46.5	78.2
6	46.1	78.3
7	46.5	77.8
8	47.2	77.1
9	48.5	76.3
10	50.0	73.0
11	51.0	69.6
12	51.8	68.8
13	53.0	66.0
14	53.0	65.4
15	53.7	64.4
16	54.0	62.6
17	53.7	63.3
18	52.6	64.9
19	52.1	65.1
20	51.0	66.3
21	50.6	67.4
22	50.3	67.7
23	49.6	70.4
24	49.1	70.6

Ramp Fraction

Ramp fractions were derived using the base year travel demand model vehicle hours traveled (VHT) fractions. Ramp fractions can be seen in Table 6. Base year fractions were kept the same for future years.

Table 6 – Ramp Fractions

County	roadTypeID	roadDesc	rampFraction
Cuyahoga	2	Rural Restricted Access	0
	4	Urban Restricted Access	0.116
Lorain	2	Rural Restricted Access	0.107
	4	Urban Restricted Access	0.107

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Source Type Population

Source type population is based on a combination of local and MOVES default data. Local data was obtained from the Ohio Department of Public Safety (ODPS) BMV Motor Vehicle Registrations by county and vehicle type.

Ohio BMV's (OBMV's) vehicle registration data was used as the source type population for passenger car (source type 21), passenger truck (31) and light commercial truck (32). For the rest of source types 11, 41, 42, 43, 51, 52, 53, 54, 61 and 62, U.S. EPA data was used. Future year source type growth rate is based on travel demand model's annual household growth rate from year 2011 to year 2019, 2021 and 2022 for corresponding analysis years. Table 7 shows source type population for the analyzed counties in 2021.

Table 7 – Source Type Population for year 2021

sourceTypeID	sourceTypeName	Cuyahoga	Lorain
11	Motorcycle	22,991	5,275
21	Passenger Car	559,550	130,116
31	Passenger Truck	396,722	125,009
32	Light Commercial Truck	31,560	8,841
41	Intercity Bus	418	112
42	Transit Bus	272	73
43	School Bus	2,834	755
51	Refuse Truck	161	41
52	Single Unit Short-haul Truck	9,704	2,470
53	Single Unit Long-haul Truck	1,201	306
54	Motor Home	2,112	537
61	Combination Short-haul Truck	3,932	929
62	Combination Long-haul Truck	4,488	1,061

I/M Program

Vehicle I/M program information was supplied by Ohio EPA. The I/M program was applied to all analysis years. The I/M program MOVES inputs reflect:

1) Acceleration Simulation Mode (ASM) 2525 Final Cutpoints for model years up to 1995

2) Evaporative Gas Cap Check, for all model years.

3) Exhaust On-Board Diagnostics (OBD) Check, for model years 1996 & newer

Vehicles 4 years old and newer are exempt from the I/M program. Also, vehicles that are 25 years old and older are exempt from the I/M program. The compliance rate and failure rates are from Ohio EPA are used to calculate the compliance factors. These are applied to Cuyahoga and Lorain counties and for all model years. For the 2021 attainment year, no vehicles are subject to ASM 2525 Final Cutpoints because those vehicles are 25 years old and older.

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Vehicle Age Distribution

Vehicle age distribution information was derived using the same data used for the source type population. OBMV's vehicle registration data was used as the basis for the vehicle age distribution for passenger car (source type 21), passenger truck (31) and light commercial truck (32). For the rest of source types 11, 41, 42, 43, 51, 52, 53, 54, 61 and 62, U.S. EPA data was used. The U.S. EPA Age Distribution Projection Tool was used to "grow" the 2011 base year data to years 2019, 2021 and 2022. A different age distribution file is used for each county. Table 8 shows the vehicle age distribution for Cuyahoga County. The distributions for Lorain county and both counties for year 2019 and 2022 can be found in the electronic input submittal files.

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Table 8 – Vehicle Age Distribution for Cuyahoga County for year 2021

sourceTypeID	ageID	ageFraction
11	0	0.0702
11	1	0.0699
11	2	0.0679
11	3	0.0632
11	4	0.0599
11	5	0.0556
11	6	0.0506
11	7	0.0465
11	8	0.0414
11	9	0.0370
11	10	0.0296
11	11	0.0268
11	12	0.0277
11	13	0.0491
11	14	0.0437
11	15	0.0414
11	16	0.0363
11	17	0.0308
11	18	0.0263
11	19	0.0232
11	20	0.0197
11	21	0.0157
11	22	0.0119
11	23	0.0101
11	24	0.0097
11	25	0.0085
11	26	0.0064
11	27	0.0074
11	28	0.0060
11	29	0.0050
11	30	0.0025

sourceTypeID	ageID	ageFraction
21	0	0.0702
21	1	0.0690
21	2	0.0677
21	3	0.0666
21	4	0.0665
21	5	0.0648
21	6	0.0616
21	7	0.0587
21	8	0.0540
21	9	0.0502
21	10	0.0351
21	11	0.0401
21	12	0.0424
21	13	0.0348
21	14	0.0317
21	15	0.0268
21	16	0.0225
21	17	0.0188
21	18	0.0145
21	19	0.0125
21	20	0.0099
21	21	0.0074
21	22	0.0058
21	23	0.0041
21	24	0.0041
21	25	0.0030
21	26	0.0024
21	27	0.0018
21	28	0.0014
21	29	0.0010
21	30	0.0504

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Table 8 – Vehicle Age Distribution for Cuyahoga County for year 2021 - continued

sourceTypeID	ageID	ageFraction
31	0	0.0751
31	1	0.0743
31	2	0.0741
31	3	0.0745
31	4	0.0735
31	5	0.0716
31	6	0.0665
31	7	0.0605
31	8	0.0542
31	9	0.0488
31	10	0.0176
31	11	0.0364
31	12	0.0339
31	13	0.0333
31	14	0.0388
31	15	0.0301
31	16	0.0274
31	17	0.0228
31	18	0.0154
31	19	0.0138
31	20	0.0115
31	21	0.0095
31	22	0.0075
31	23	0.0060
31	24	0.0055
31	25	0.0047
31	26	0.0033
31	27	0.0021
31	28	0.0014
31	29	0.0011
31	30	0.0048

sourceTypeID	ageID	ageFraction
32	0	0.0750
32	1	0.0740
32	2	0.0736
32	3	0.0736
32	4	0.0723
32	5	0.0699
32	6	0.0645
32	7	0.0582
32	8	0.0518
32	9	0.0462
32	10	0.0377
32	11	0.0488
32	12	0.0436
32	13	0.0361
32	14	0.0364
32	15	0.0275
32	16	0.0214
32	17	0.0186
32	18	0.0131
32	19	0.0127
32	20	0.0098
32	21	0.0077
32	22	0.0055
32	23	0.0045
32	24	0.0039
32	25	0.0035
32	26	0.0023
32	27	0.0016
32	28	0.0011
32	29	0.0008
32	30	0.0042

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Table 8 – Vehicle Age Distribution for Cuyahoga County for year 2021 - continued

sourceTypeID	ageID	ageFraction
41	0	0.0570
41	1	0.0564
41	2	0.0555
41	3	0.0549
41	4	0.0527
41	5	0.0519
41	6	0.0495
41	7	0.0451
41	8	0.0398
41	9	0.0361
41	10	0.0327
41	11	0.0282
41	12	0.0231
41	13	0.0293
41	14	0.0375
41	15	0.0378
41	16	0.0383
41	17	0.0366
41	18	0.0331
41	19	0.0304
41	20	0.0284
41	21	0.0265
41	22	0.0253
41	23	0.0187
41	24	0.0149
41	25	0.0121
41	26	0.0154
41	27	0.0116
41	28	0.0095
41	29	0.0068
41	30	0.0047

sourceTypeID	ageID	ageFraction
42	0	0.0571
42	1	0.0566
42	2	0.0559
42	3	0.0554
42	4	0.0532
42	5	0.0524
42	6	0.0499
42	7	0.0454
42	8	0.0400
42	9	0.0364
42	10	0.0435
42	11	0.0260
42	12	0.0260
42	13	0.0358
42	14	0.0340
42	15	0.0241
42	16	0.0369
42	17	0.0297
42	18	0.0284
42	19	0.0282
42	20	0.0316
42	21	0.0209
42	22	0.0200
42	23	0.0229
42	24	0.0205
42	25	0.0185
42	26	0.0149
42	27	0.0127
42	28	0.0104
42	29	0.0089
42	30	0.0039

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Table 8 – Vehicle Age Distribution for Cuyahoga County for year 2021 - continued

sourceTypeID	ageID	ageFraction
43	0	0.0570
43	1	0.0566
43	2	0.0559
43	3	0.0552
43	4	0.0530
43	5	0.0522
43	6	0.0498
43	7	0.0454
43	8	0.0401
43	9	0.0363
43	10	0.0254
43	11	0.0271
43	12	0.0316
43	13	0.0340
43	14	0.0345
43	15	0.0397
43	16	0.0347
43	17	0.0336
43	18	0.0282
43	19	0.0290
43	20	0.0258
43	21	0.0275
43	22	0.0250
43	23	0.0192
43	24	0.0176
43	25	0.0149
43	26	0.0186
43	27	0.0088
43	28	0.0104
43	29	0.0082
43	30	0.0047

sourceTypeID	ageID	ageFraction
51	0	0.0637
51	1	0.0636
51	2	0.0629
51	3	0.0630
51	4	0.0613
51	5	0.0600
51	6	0.0563
51	7	0.0508
51	8	0.0445
51	9	0.0398
51	10	0.0211
51	11	0.0162
51	12	0.0209
51	13	0.0157
51	14	0.0534
51	15	0.0391
51	16	0.0358
51	17	0.0210
51	18	0.0199
51	19	0.0141
51	20	0.0167
51	21	0.0222
51	22	0.0310
51	23	0.0276
51	24	0.0130
51	25	0.0165
51	26	0.0206
51	27	0.0141
51	28	0.0063
51	29	0.0055
51	30	0.0035

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Table 8 – Vehicle Age Distribution for Cuyahoga County for year 2021 - continued

sourceTypeID	ageID	ageFraction
52	0	0.0638
52	1	0.0634
52	2	0.0630
52	3	0.0631
52	4	0.0615
52	5	0.0603
52	6	0.0569
52	7	0.0516
52	8	0.0453
52	9	0.0407
52	10	0.0227
52	11	0.0135
52	12	0.0141
52	13	0.0283
52	14	0.0361
52	15	0.0372
52	16	0.0313
52	17	0.0268
52	18	0.0224
52	19	0.0195
52	20	0.0204
52	21	0.0324
52	22	0.0268
52	23	0.0147
52	24	0.0197
52	25	0.0129
52	26	0.0171
52	27	0.0127
52	28	0.0087
52	29	0.0067
52	30	0.0066

sourceTypeID	ageID	ageFraction
53	0	0.0639
53	1	0.0643
53	2	0.0632
53	3	0.0643
53	4	0.0629
53	5	0.0614
53	6	0.0578
53	7	0.0522
53	8	0.0457
53	9	0.0409
53	10	0.0154
53	11	0.0094
53	12	0.0108
53	13	0.0184
53	14	0.0313
53	15	0.0272
53	16	0.0245
53	17	0.0177
53	18	0.0146
53	19	0.0119
53	20	0.0284
53	21	0.0681
53	22	0.0576
53	23	0.0094
53	24	0.0075
53	25	0.0083
53	26	0.0138
53	27	0.0111
53	28	0.0302
53	29	0.0052
53	30	0.0027

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Table 8 – Vehicle Age Distribution for Cuyahoga County for year 2021 - continued

sourceTypeID	ageID	ageFraction
54	0	0.0636
54	1	0.0632
54	2	0.0626
54	3	0.0627
54	4	0.0610
54	5	0.0598
54	6	0.0563
54	7	0.0511
54	8	0.0449
54	9	0.0404
54	10	0.0296
54	11	0.0254
54	12	0.0207
54	13	0.0259
54	14	0.0330
54	15	0.0330
54	16	0.0331
54	17	0.0314
54	18	0.0282
54	19	0.0256
54	20	0.0237
54	21	0.0219
54	22	0.0208
54	23	0.0118
54	24	0.0177
54	25	0.0107
54	26	0.0123
54	27	0.0114
54	28	0.0077
54	29	0.0066
54	30	0.0039

sourceTypeID	ageID	ageFraction
61	0	0.0519
61	1	0.0517
61	2	0.0512
61	3	0.0510
61	4	0.0489
61	5	0.0487
61	6	0.0469
61	7	0.0430
61	8	0.0379
61	9	0.0370
61	10	0.0181
61	11	0.0133
61	12	0.0170
61	13	0.0150
61	14	0.0480
61	15	0.0348
61	16	0.0334
61	17	0.0207
61	18	0.0181
61	19	0.0138
61	20	0.0263
61	21	0.0355
61	22	0.0313
61	23	0.0311
61	24	0.0249
61	25	0.0341
61	26	0.0379
61	27	0.0309
61	28	0.0222
61	29	0.0167
61	30	0.0089

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Table 8 – Vehicle Age Distribution for Cuyahoga County for year 2021 - continued

sourceTypeID	ageID	ageFraction
62	0	0.0509
62	1	0.0499
62	2	0.0482
62	3	0.0468
62	4	0.0440
62	5	0.0432
62	6	0.0411
62	7	0.0367
62	8	0.0320
62	9	0.0303
62	10	0.0323
62	11	0.0251
62	12	0.0327
62	13	0.0251
62	14	0.0856
62	15	0.0626
62	16	0.0583
62	17	0.0343
62	18	0.0329
62	19	0.0236
62	20	0.0265
62	21	0.0416
62	22	0.0303
62	23	0.0198
62	24	0.0110
62	25	0.0118
62	26	0.0103
62	27	0.0061
62	28	0.0041
62	29	0.0024
62	30	0.0004

DRAFT

Road Type Distribution

The road type distribution is based on the ODOT's 2011 DVMT by functional classification (FC). These inputs vary by county. Table 9 shows the road type distribution input for Cuyahoga and Lorain Counties.

Table 9 – Road Type Distribution

		roadTypeVMTFraction	
sourceTypeID	**roadTypeID**	**Cuyahoga**	**Lorain**
11	2	0.000	0.020
11	3	0.000	0.104
11	4	0.443	0.305
11	5	0.557	0.571
21	2	0.000	0.020
21	3	0.000	0.104
21	4	0.443	0.305
21	5	0.557	0.571
31	2	0.000	0.020
31	3	0.000	0.104
31	4	0.443	0.305
31	5	0.557	0.571
32	2	0.000	0.020
32	3	0.000	0.104
32	4	0.443	0.305
32	5	0.557	0.571
41	2	0.000	0.020
41	3	0.000	0.104
41	4	0.443	0.305
41	5	0.557	0.571
42	2	0.000	0.020
42	3	0.000	0.104
42	4	0.443	0.305
42	5	0.557	0.571
43	2	0.000	0.020
43	3	0.000	0.104
43	4	0.443	0.305
43	5	0.557	0.571
51	2	0.000	0.020
51	3	0.000	0.104
51	4	0.443	0.305
51	5	0.557	0.571
52	2	0.000	0.020

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sourceTypeID	roadTypeID	roadTypeVMTFraction	
		Cuyahoga	Lorain
52	3	0.000	0.104
52	4	0.443	0.305
52	5	0.557	0.571
53	2	0.000	0.020
53	3	0.000	0.104
53	4	0.443	0.305
53	5	0.557	0.571
54	2	0.000	0.020
54	3	0.000	0.104
54	4	0.443	0.305
54	5	0.557	0.571
61	2	0.000	0.020
61	3	0.000	0.104
61	4	0.443	0.305
61	5	0.557	0.571
62	2	0.000	0.020
62	3	0.000	0.104
62	4	0.443	0.305
62	5	0.557	0.571
11	1	0	0
21	1	0	0
31	1	0	0
32	1	0	0
41	1	0	0
42	1	0	0
43	1	0	0
51	1	0	0
52	1	0	0
53	1	0	0
54	1	0	0
61	1	0	0
62	1	0	0

Vehicle Type VMT and VMT Fractions

MOVES' VMT inputs are subdivided into four sections that include HPMSVtype year VMT, monthly VMT fractions, daily VMT fractions and hourly VMT fractions. The VMT for 2019, 2021 and 2022 is based on the 2011 average annual daily VMT (AADVMT) from ODOT. The data from ODOT provides VMT for each road type (rural, urban, limited access, etc) and each county.

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MOVES requires annual VMT speciated by vehicle type, not road type. Thus the data needs converted from average daily VMT to annual VMT and road type-based to vehicle type-based.

Per the MOVES Technical Guidance, the data was converted from road type-based to vehicle type-based using the default 1999 vehicle type VMT and 2011 VMT growth factors obtained from MOVES. For each vehicle type, the 1999 VMT is multiplied by the 2011 VMT growth factor to obtain estimated 2011 annual VMT for each HPMS vehicle type, which is used to develop HPMS vehicle type VMT fractions. These fractions were multiplied by the 2011 ODOT AADVMT for each county. This method yielded similar results to using ODOT-supplied weigh in motion (WIM) data.

This daily VMT was converted to annual VMT using the U.S. EPA AADVMT Calculator HPMS spreadsheet tool. The converter takes AADVMT and generates annual VMT for MOVES input.

After Ohio EPA submitted the 2011 NEI, U.S. EPA revised the VMT data based on improvements developed by the Coordinating Research Council (CRC) and Eastern Research Group (ERG) CRC project A-88. Improved data on the short/long-haul VMT fractions was applied to the Ohio EPA-supplied data. In order to retain these enhancements by U.S. EPA, this U.S. EPA-revised VMT data, in flat file (FF10) format used for SMOKE-MOVES, was used as the basis for subsequent revisions and growth into MOVES VMT data for years 2019, 2021 and 2022.

Ohio EPA revised this SMOKE-MOVES VMT data to incorporate revisions made to the ODOT 2011 AADVMT data. In addition, this 2011 data was “grown” to years 2019, 2021 and 2022 using TDFM-based growth rates. This SMOKE-MOVES data was then distilled into MOVES-format data. Table 10 shows the MOVES VMT data for Cuyahoga and Lorain counties. The 2019 and 2022 data can be found in the electronic input submittal files.

Table 10 – HPMSVtype VMT Data for year 2021

HPMSVtypeID	Cuyahoga VMT	Lorain VMT
10	37,892,650	9,281,826
25	9,679,970,725	2,372,435,179
40	38,932,983	9,347,123
50	336,354,194	80,752,709
60	622,270,241	149,396,108

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Output Emission Factors

Table 11 shows a record in a MOVES sample output (rate per distance) emission file for year 2021. For any given month, day of week, hour of the day, pollutant, and process; the rate per distance varies by road type, and speed bin. Rates per distance emissions are applied to link and intrazonal VMT.

Table 11 – Sample Emission File (Rate per Distance) for year 2021

Heading:	ScenarioID	RunID	yearID	monthID	dayID	hourID
Record:	Cuyahoga	1	2021	4	5	1
Heading:	linkID	pollutantID	processID	sourceTypeID	SCC	fuelTypeID
Record:	390350401	3	1	11		0
Heading:	modelYearID	roadTypeID	avgSpeedBinID	temperature	relHumidity	ratePerDistance
Record:	0	4	1	48.296	72.7	1.27671

Table 12 shows a record in a MOVES sample output (rate per vehicle) emission file for year 2021. The rate per vehicle varies for any combinations of month, day of week, hour of the day, pollutant, and process. Rates per vehicle emissions are applied to the vehicle source type population.

Table 12 – Sample Emission File (Rate per Vehicle) for year 2021

Heading:	ScenarioID	RunID	yearID	monthID	dayID	hourID
Record:	Cuyahoga	1	2021	4	5	1
Heading:	zoneID	pollutantID	processID	sourceTypeID	SCC	fuelTypeID
Record:	390350	3	2	11		0
Heading:	modelYearID	Temperature	relHumidity	ratePerDistance		
Record:	0	48.296	72.7	0.000706248		

All output files are available in the electronic submittal.

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4. Post Processing

Total emissions were computed with the aid of several custom programs by ODOT. The process uses data on daily and directional traffic distributions as well as more up to date volume/delay functions from the 2000 Highway Capacity Manual (HCM). This process, described below and illustrated in Figure 4, also uses rewritten code able to handle the newer model network formats and MOVES generated emission factors.

First step (movessource.exe) aggregates the emission factors. Rate per profile and rate per vehicle files are combined during this process. The resultant emission factor files contain emission factors broadly classified into total vehicles, cars and trucks by pollutant, by average speed, road type and hour of day.

The second step in the process involves running ODOT postcms.exe to calculate hourly link volumes based on the percentage of the daily volume (travel demand model output) determined by a link's facility and area type. Link speeds from the travel demand model are not used in the analysis. The speeds are estimated as a post-process to the model based on HCM methods using a link's volume-to-capacity ratio and link group code.

The third step (movesnet.exe) uses a combination of the MOVES emission factors and the hourly link volumes that are output of the postcms.exe program. The hourly volumes are multiplied by the MOVES emission factor for the corresponding hour of day, speed bin, and roadtype to calculate emissions for every network link for each hour. The final link on road vehicle emissions for the area is the sum of all individual link-hour emissions.

The fourth step, (movesveh.exe), calculates vehicle-based emissions for each source type for each hour of the day. The vehicle source type is based on a combination of local and default data. The final vehicle emissions for each county are the sum of all individual hourly emissions for all vehicle types.

Intrazonal trips do not get loaded onto the network, so the fifth step in the process requires a separate method to account for those trips that use local roads to travel within a zone. The movesintra.exe program uses intrazonal trips to estimate VMT using the area in square miles and intrazonal trips of each zone. The zone is assumed circular and the radius of the circle is used as the average trip length for these intrazonal trips. Intrazonal emissions are then calculated by combining MOVES generated emissions with estimated intrazonal VMT. The emission rates are the same as those used to calculated link based emissions.

The final step is to summarize link, vehicle, and intrazonal emissions for each county, pollutant, and analyzed year. Summary emissions for each pollutant, county, and scenario year in northeast Ohio were previously displayed in tables 1-3.

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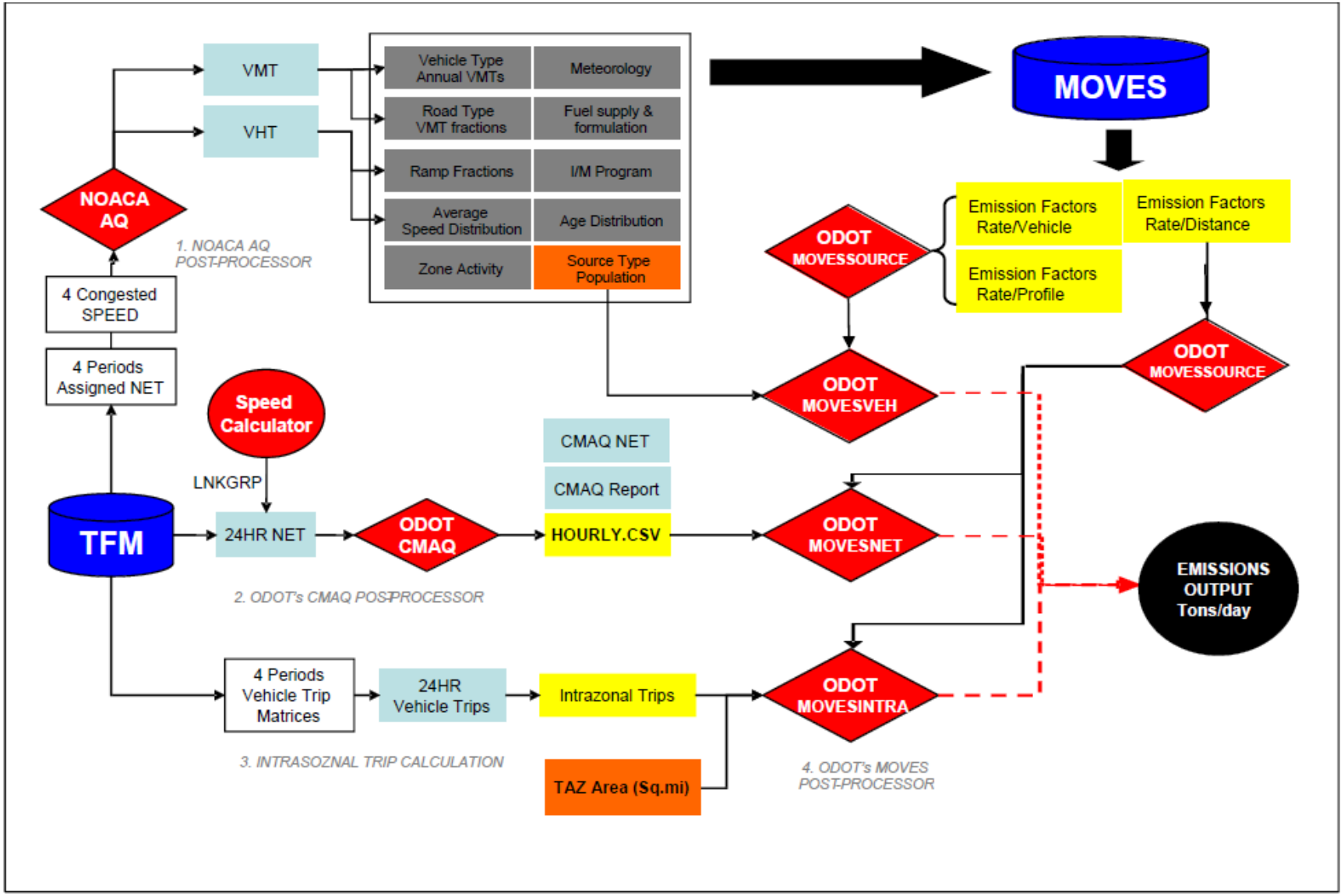

Figure 4 – Emission Calculation Process

5. Multiple MPO Coordination Issues

NOACA, ODOT, and Ohio EPA have a long history of working together in air quality issues. All parties have had an opportunity to review and approve this summary document.

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Appendix A

Interagency Consultation Documentation

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----Original Appointment-----
From: Maleski, Michael
Sent: Tuesday, July 26, 2016 12:58 PM
To: Van Vlerah, Jennifer; Brunello, Antonino; Tim Kovach; 'Joe MacDonald'; 'BDavis@mpo.noaca.org'; 'Persoon, Carolyn'; Maietta.Anthony@epa.gov; Leslie, Michael (leslie.michael@epa.gov); 'kapichak.rudolph@epa.gov'
Subject: Mobile emissions budget years for the PM2.5 standard in Cleveland
When: Thursday, July 28, 2016 10:00 AM-11:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: Call in number is (614) 387-7405

The purpose of this conference call is to clarify the mobile emissions budget years and requirements due to the changes from past requirements, as noted below.

A budget must be set for 2019 (we can interpolate the TDM from other years but can't interpolate budgets). This was confirmed with USEPA headquarters conformity program who also said there are very specific requirements under CAA Subpart 4 for conformity that do not exist under subpart 1. We used to implement under subpart 1 but because USEPA was sued by Sierra Club, this PM2.5 standard (and all future) require implementation under both Subpart 1 and 4. This is why this is new to us all.

Call in number is (614) 387-7405

DRAFT

From: Maietta, Anthony [mailto:maietta.anthony@epa.gov]
Sent: Wednesday, June 15, 2016 9:19 AM
To: Van Vlerah, Jennifer <Jennifer.VanVlerah@epa.ohio.gov>; Maleski, Michael <Michael.Maleski@epa.ohio.gov>; Leslie, Michael <leslie.michael@epa.gov>; Persoon, Carolyn <persoon.carolyn@epa.gov>
Cc: Woods, Laura <Laura.Woods@epa.ohio.gov>
Subject: RE: am I encapsulating the photochemical vs MOVES met data question?

Hey Jennifer,

I should have explained my original response in the context of: NOACA is running MOVES to model the MVEB's but it's OEPA that ultimately submits the MVEB approval request, so that's where the documentation comes in—documenting it for the submittal. And also remembering that the MVEB's that NOACA models need to be equal to or less than what LADCO modeled for attainment.

That said, hopefully these answer your questions:

1) The airport needs to be used as the met source for NOACA's budget modeling and future conformity determinations
2) NOACA would use 2011, the same year as the photochemical modeling. In its MVEB submittal to EPA, OEPA would need to document how the met data used by NOACA is consistent with LADCO's modeling for attainment.
3) OEPA needs to show in its budget submittal documentation of how the transportation activity inputs used by NOACA for modeling the MVEB's are consistent with the inputs used by LADCO to model attainment. This is just talking about modeling the MVEB's, for the future if newer traffic/population data are available, those data would be used to determine conformity

-Tony

Anthony Maietta

EPA Region 5

maietta.anthony@epa.gov

(312) 353-8777

From: Jennifer.VanVlerah@epa.ohio.gov [mailto:Jennifer.VanVlerah@epa.ohio.gov]
Sent: Wednesday, June 15, 2016 7:48 AM
To: Maietta, Anthony <maietta.anthony@epa.gov>; Michael.Maleski@epa.ohio.gov; Leslie, Michael <leslie.michael@epa.gov>; Persoon, Carolyn <persoon.carolyn@epa.gov>
Cc: Laura.Woods@epa.ohio.gov
Subject: RE: am I encapsulating the photochemical vs MOVES met data question?

Thanks Tony….we need to clarify a couple thoughts….

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EPA agrees that NOACA should use NWS data from the Cleveland Hopkins airport for conformity purposes. Ohio EPA is assuming you are saying to address meeting the "consistency" requirement of 40 CFR 93.122(a)(6), NOACA should use Cleveland Hopkins airport data for *EITHER* developing budgets as part of the upcoming PM2.5 attainment demonstration OR, if they so choose to base their budget off of the LADCO/ENVIRON mobile modeling, they would use the Cleveland Hopkins airport data for conformity determinations in the future based on that budget. Can you confirm?

OEPA will need to document the how the meteorology data used to develop the Motor Vehicle Emissions Budgets is consistent with the time period when PM violations occur. Ohio EPA does not understand this requirement. Perhaps you are expecting they would use a year that was one of the years this area was nonattaining which technically could be any year to date. Meaning, the standard we are submitting an attainment demonstration for is 12.0 ug/m3 and the design value for this area has been over that since we started PM2.5 monitoring. For our attainment demonstration we are using 2011 as our base year. One reason that year was selected was because it was meteorologically a representative year. Selection of that year was discussed with USEPA (Summerhays) previously as a part of all of our technical group calls and agreed upon. I would assume we would want NOACA to also use 2011 MET data to stay consistent with our base year selection.

The MVEB portion of the Attainment Demonstration will also need to address how the transportation activity and the mobile source fleet characteristics used as MOVES inputs for the photochemical modeling and MVEB are consistent. So you are saying if NOACA's modeling is used to set the budget then transportation activity (speed and VMT) and mobile source fleet characteristics (age, population) must be the same as that used by LADCO/ENVIRON? However, to clarify, if we use LADCO/ENVIRON mobile numbers to set the budget or if we use NOACA modeling, the activity and characteristics may change in the future when/if NOACA has to determine conformity with those budgets. Meaning they should be using the most up to date and current activities and characteristics when determining conformity down the road. Can you confirm?

Hopefully we are nearing the end zone on wrapping this up….thanks again for all your assistance!

Jen (and Mike)

Jennifer Van Vlerah

Manager, SIP, Inventory and Rulemaking

Ohio EPA Division of Air Pollution Control

614-644-3696

From: Maietta, Anthony [mailto:maietta.anthony@epa.gov]
Sent: Tuesday, June 14, 2016 2:33 PM
To: Maleski, Michael <Michael.Maleski@epa.ohio.gov>; Leslie, Michael <leslie.michael@epa.gov>;

DRAFT

Persoon, Carolyn <persoon.carolyn@epa.gov>
Cc: Van Vlerah, Jennifer <Jennifer.VanVlerah@epa.ohio.gov>; Woods, Laura <Laura.Woods@epa.ohio.gov>
Subject: RE: am I encapsulating the photochemical vs MOVES met data question?

Hey Mike,

EPA agrees that NOACA should use NWS data from the Cleveland Hopkins airport for conformity purposes. OEPA will need to document the how the meteorology data used to develop the Motor Vehicle Emissions Budgets is consistent with the time period when PM violations occur. The MVEB portion of the Attainment Demonstration will also need to address how the transportation activity and the mobile source fleet characteristics used as MOVES inputs for the photochemical modeling and MVEB are consistent.

-Tony

Anthony Maietta

EPA Region 5

maietta.anthony@epa.gov

(312) 353-8777

From: Michael.Maleski@epa.ohio.gov [mailto:Michael.Maleski@epa.ohio.gov]
Sent: Monday, June 13, 2016 2:56 PM
To: Maietta, Anthony <maietta.anthony@epa.gov>; Leslie, Michael <leslie.michael@epa.gov>; Persoon, Carolyn <persoon.carolyn@epa.gov>
Cc: Jennifer.VanVlerah@epa.ohio.gov; Laura.Woods@epa.ohio.gov
Subject: RE: am I encapsulating the photochemical vs MOVES met data question?

Hi Tony, Mike and Carolyn,

I am following up on the emails below after my discussion with Mark. I originally believed that MOVES met/temp data had to be used to generate the MOVES emissions for input into SMOKE then CAMx. This is not correct.

The temperature and met data used in the attainment demonstration modeling is obtained from the weather research and forecasting model (WRF). The program predicts the future met data for all of the grid cells and elevations. The resulting data file is significantly larger and more complex than the simple MOVES temperature and humidity monthly average data table. The program Met4Moves converts this file into a SMOKE and MOVES readable file but I do not believe manipulating this complex met file into a MOVES input file is the best method for the MPOs (NOACA) to use.

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The forecasting model WRF data is compared to actual National Weather Service monitoring station data to check the accuracy of the model. Thus the data is consistent with actual data from the Cleveland Hopkins airport, which is the data used by NOACA. Therefore, I feel it would be best for NOACA to continue to use NWS data from the Cleveland Hopkins airport for conformity purposes. I believe this best meets the consistency requirement in 40 CFR 93.122(a)(6). Do you agree?

Thanks,

Mike Maleski

Ohio EPA - Division of Air Pollution Control
Mailing Address: P.O. Box 1049, Columbus, OH 43216-1049
Street Address: 50 West Town Street, Suite 700 Columbus, OH 43215

Phone: 614-644-1961 Fax: 614-644-3681

From: Maietta, Anthony [mailto:maietta.anthony@epa.gov]
Sent: Friday, June 10, 2016 3:10 PM
To: Van Vlerah, Jennifer <Jennifer.VanVlerah@epa.ohio.gov>; Maleski, Michael <Michael.Maleski@epa.ohio.gov>
Subject: RE: am I encapsulating the photochemical vs MOVES met data question?

Oh good! Yeah, I never thought it would be this difficult to figure out temperatures ☺

Thanks so much for both your help and patience with this. The good thing is if/when this happens again I will know what to do

From: Jennifer.VanVlerah@epa.ohio.gov [mailto:Jennifer.VanVlerah@epa.ohio.gov]
Sent: Friday, June 10, 2016 1:44 PM
To: Maietta, Anthony <maietta.anthony@epa.gov>; Michael.Maleski@epa.ohio.gov
Subject: RE: am I encapsulating the photochemical vs MOVES met data question?

Mike is going to talk to Mark more. Either one of two things is what we think will lead to addressing consistency.

1. We believe that when Environ runs in emission factor mode they still have Temp/MET that they put in just like anyone else in emissions factor mode would. We want to ask Mark to retrieve the file that Environ used. Ultimately what environ delivered to Mark is the emission factors that he can then use in CAMx for the photochemical modeling. What Mark was discussing at length regarding MET data was the very complex MET data that is in CAMx that is used as a part of the photochemical modeling. It is totally different stuff and yes could never be consistent and no we don't want to try and figure out how to convert that to MOVES MET. We want the

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MET that Environ used to generate the results that were given to Mark. This would be easiest for NOACA because they could just use the same input file.

2. Absent being able to retrieve the same file…. just knowing that the basis of the meteorology used in MOVES is 2011 meteorology from Cleveland Hopkins Airport, once confirmed with Environ, we think if NOACA/ODOT used that in their modeling it would be consistent with what Environ did.

I'm afraid Mark might have been confusing the matter by bringing the entire CAMx MET data into the conversation.

Jen

Jennifer Van Vlerah

Manager, SIP, Inventory and Rulemaking

Ohio EPA Division of Air Pollution Control

614-644-3696

From: Maietta, Anthony [mailto:maietta.anthony@epa.gov]
Sent: Friday, June 10, 2016 1:56 PM
To: Van Vlerah, Jennifer <Jennifer.VanVlerah@epa.ohio.gov>; Maleski, Michael <Michael.Maleski@epa.ohio.gov>
Subject: am I encapsulating the photochemical vs MOVES met data question?

So this is the question, right?

-The LADCO model can't give us specific local temperatures for Cleveland, but it can say what date the temperature data came from. If Ohio/NOACA uses local temps from the date LADCO used, is that consistent?

I think the answer is yes, and I'll find out Monday. I just want to make sure I'm asking the right question because I don't really understand LADCO's model and having been brought into this after they'd already run it, I don't have the familiarity to have made a decision on the call.

DRAFT

From: Van Vlerah, Jennifer
Sent: Thursday, June 09, 2016 8:11 AM
To: Tim Kovach <TKovach@mpo.noaca.org>; Bill Davis <BDavis@mpo.noaca.org>
Cc: Moore, David <Dave.Moore1@dot.ohio.gov>; Joe MacDonald <JMacDonald@mpo.noaca.org>; Byram, Mark <Mark.Byram@dot.ohio.gov>; Ali Makarachi <AMakarachi@mpo.noaca.org>; Brunello, Antonino <Nino.Brunello@dot.ohio.gov>; Maleski, Michael <Michael.Maleski@epa.ohio.gov>; Woods, Laura <Laura.Woods@epa.ohio.gov>
Subject: RE: PM2.5 Attain Demo Budgets

I am booked until 1130 am. I don't think ODOTis available until 1230. This will be a fairly brief call to prepare you for what USEPA relayed to me and will relay on the call tomorrow so perhaps the one who can't attend can be updated. We won't be discussing any procedures etc. like will be discussed tomorrow. This is more of a policy oriented call and I think most importantly the information should be relayed to Bill and Dave.

Jennifer Van Vlerah

Manager, SIP, Inventory and Rulemaking

Ohio EPA Division of Air Pollution Control

614-644-3696

From: Tim Kovach [mailto:TKovach@mpo.noaca.org]
Sent: Wednesday, June 08, 2016 3:40 PM
To: Van Vlerah, Jennifer <Jennifer.VanVlerah@epa.ohio.gov>; Bill Davis <BDavis@mpo.noaca.org>
Cc: Moore, David <Dave.Moore1@dot.ohio.gov>; Joe MacDonald <JMacDonald@mpo.noaca.org>; Byram, Mark <Mark.Byram@dot.ohio.gov>; Ali Makarachi <AMakarachi@mpo.noaca.org>; Brunello, Antonino <Nino.Brunello@dot.ohio.gov>; Maleski, Michael <Michael.Maleski@epa.ohio.gov>; Woods, Laura <Laura.Woods@epa.ohio.gov>
Subject: RE: PM2.5 Attain Demo Budgets

Jennifer,

Could we push this up into the morning tomorrow? At least one of us would not be able to make it at 12:30.

Thanks,

Tim Kovach

Air Quality Planner

Northeast Ohio Areawide Coordinating Agency (NOACA)

DRAFT

Phone: (216) 241-2414 ext. 399 | Email: tkovach@mpo.noaca.org

From: Jennifer.VanVlerah@epa.ohio.gov [mailto:Jennifer.VanVlerah@epa.ohio.gov]
Sent: Wednesday, June 8, 2016 2:31 PM
To: Bill Davis <BDavis@mpo.noaca.org>
Cc: Dave.Moore1@dot.ohio.gov; Joe MacDonald <JMacDonald@mpo.noaca.org>; Tim Kovach <TKovach@mpo.noaca.org>; Mark.Byram@dot.ohio.gov; Ali Makarachi <AMakarachi@mpo.noaca.org>; Nino.Brunello@dot.ohio.gov; Michael.Maleski@epa.ohio.gov; Laura.Woods@epa.ohio.gov
Subject: Re: PM2.5 Attain Demo Budgets

Let's plan on 12:30 pm. I can conference two lines in on my office phone...1 for ODOT and 1 for NOACA. 614-644-3696.

Thanks everyone, Jen

Jennifer Van Vlerah

Manager, SIP, Rulemaking and Inventory Section

Ohio EPA Division of Air Pollution Control

614-644-3696

On Jun 8, 2016, at 9:28 AM, Bill Davis <BDavis@mpo.noaca.org> wrote:

Jennifer,

Thursday should be fine. Tim and Ali from NOACA will participate. I may or may not be able to join in as well depending on my always changing schedule. I am completely confident that Tim and Ali would be fine on their own in any event.

Bill

BILL DAVIS

NORTHEAST OHIO AREAWIDE COORDINATING AGENCY

ASSOCIATE DIRECTOR OF OPERATIONS MANAGEMENT

1299 SUPERIOR AVENUE

CLEVELAND, OH 44114

216-241-2414, EXT. 251

DRAFT

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EMAIL

<IMAGE001.GIF><IMAGE002.GIF>

From: Jennifer.VanVlerah@epa.ohio.gov [mailto:Jennifer.VanVlerah@epa.ohio.gov]
Sent: Tuesday, June 7, 2016 1:34 PM
To: Dave.Moore1@dot.ohio.gov; Bill Davis <BDavis@mpo.noaca.org>
Cc: Joe MacDonald <JMacDonald@mpo.noaca.org>; Tim Kovach <TKovach@mpo.noaca.org>; Mark.Byram@dot.ohio.gov; Ali Makarachi <AMakarachi@mpo.noaca.org>; Nino.Brunello@dot.ohio.gov; Michael.Maleski@epa.ohio.gov; Laura.Woods@epa.ohio.gov
Subject: FW: PM2.5 Attain Demo Budgets

Bill, I think we should have a quick call Thursday with you and whichever staff you'd like present and anyone from ODOT who wants to also participate. I had a call with USEPA today and they sent a follow up email below that has important information regarding budgets for attainment demonstrations.

Anytime between 8-10am and 12-230 pm would work for me. My preference is not to try and schedule something that works for everyone cc'd on this but if someone from NOACA and someone from ODOT can identify the time(s) that work the best for the majority that need to be present. It probably will only take about 30 minutes.

Jennifer Van Vlerah

Manager, SIP, Inventory and Rulemaking

Ohio EPA Division of Air Pollution Control

614-644-3696

From: Maietta, Anthony [mailto:maietta.anthony@epa.gov]
Sent: Tuesday, June 07, 2016 12:18 PM
To: Van Vlerah, Jennifer <Jennifer.VanVlerah@epa.ohio.gov>; Persoon, Carolyn <persoon.carolyn@epa.gov>
Cc: Leslie, Michael <leslie.michael@epa.gov>; Maleski, Michael <Michael.Maleski@epa.ohio.gov>
Subject: RE: PM2.5 Attain Demo Budgets

Jennifer,

DRAFT

The answer to whether they can put a safety margin in the attainment demo budget: No they can't, that's a function of the maintenance plan. If they wanted a 'safety margin' in their attainment budget, that would have to have been built into the attainment modeling by estimating growth at the higher end.

Also to follow up with our call this morning, here's the information we've put together on what consistencies need to be there between the photochemical modeling and the motor vehicle emissions budget model run:

The parameters that ***MUST*** remain the same between the SIP and conformity is the temperature/met profiles (See 93.122(a)(6)):
(6) The ambient temperatures used for the regional emissions analysis shall be consistent with those used to establish the emissions budget in the applicable implementation plan. All other factors, for example the fraction of travel in a hot stabilized engine mode, must be consistent with the applicable implementation plan, unless modified after interagency consultation according to §93.105(c)(1)(i) to incorporate additional or more geographically specific information or represent a logically estimated trend in such factors beyond the period considered in the applicable implementation plan.

The following are the parameters that ***should*** remain the same:

1. same calculation type (emission rates or inventory)
2. same pollutant processes
3. same time span/evaluation period

For future transportation conformity, the MPOs can use updated travel demand modeled updates, as long as the temp/met profile remains the same.

For MVEBs that are in the attainment plan, the budgets **MUST** be at the same emissions (tpy) or below the emissions used to model attainment of the standard.

From: Maietta, Anthony
Sent: Tuesday, June 07, 2016 10:59 AM
To: 'Jennifer.VanVlerah@epa.ohio.gov' <Jennifer.VanVlerah@epa.ohio.gov>; Persoon, Carolyn <persoon.carolyn@epa.gov>
Cc: Leslie, Michael <leslie.michael@epa.gov>
Subject: RE: PM2.5 Attain Demo Budgets

It was Mike Leslie, who I'm copying here

From: Jennifer.VanVlerah@epa.ohio.gov [mailto:Jennifer.VanVlerah@epa.ohio.gov]
Sent: Tuesday, June 07, 2016 10:58 AM

To: Persoon, Carolyn <persoon.carolyn@epa.gov>; Maietta, Anthony <maietta.anthony@epa.gov>
Subject: PM2.5 Attain Demo Budgets

I think I detected on the call a 2nd "male" voice but don't know who that was so sorry for not including ☺

Another Q came up here – can you do margins of safety on the budgets established as part of the attain demo. In redesignations we often add a 15% safety margin to the mobile modeled numbers for the budget years and that becomes the budget provided the safety margin is captured within the overall larger safety margin for all sectors in our maintenance showing. How would this work with an attainment demonstration?

Jennifer Van Vlerah

Manager, SIP, Inventory and Rulemaking

Ohio EPA Division of Air Pollution Control

614-644-3696

DRAFT

-----Original Message-----
From: Mark Janssen [mailto:janssen@ladco.org]
Sent: Friday, June 03, 2016 5:59 PM
To: Maietta, Anthony <maietta.anthony@epa.gov>; Van Vlerah, Jennifer <Jennifer.VanVlerah@epa.ohio.gov>; Bill Davis <BDavis@mpo.noaca.org>; Ali Makarachi <AMakarachi@mpo.noaca.org>; Byram, Mark <Mark.Byram@dot.ohio.gov>; Moore, David <Dave.Moore1@dot.ohio.gov>; Tim Kovach <TKovach@mpo.noaca.org>; Joe MacDonald <JMacDonald@mpo.noaca.org>; Kaleel, Rob <Rob.Kaleel@illinois.gov>; Persoon, Carolyn <persoon.carolyn@epa.gov>; Brunello, Antonino <Nino.Brunello@dot.ohio.gov>
Cc: Woods, Laura <Laura.Woods@epa.ohio.gov>; Maleski, Michael <Michael.Maleski@epa.ohio.gov>
Subject: Webinar, Mobile Budgets for 2012 PM2.5 Standard - Attainment Demonstration Work

Here is the registration link for the Webinar Next Friday the 10th at
12:00 Central/1:00 Eastern.

https://attendee.gotowebinar.com/register/4780477920997314561

Mark Janssen - LADCO

DRAFT

From: Woods, Laura
Sent: Tuesday, May 31, 2016 9:11 AM
To: Van Vlerah, Jennifer <Jennifer.VanVlerah@epa.ohio.gov>; 'Bill Davis' <BDavis@mpo.noaca.org>; 'Ali Makarachi' <AMakarachi@mpo.noaca.org>; Byram, Mark <Mark.Byram@dot.ohio.gov>; Moore, David <Dave.Moore1@dot.ohio.gov>; 'Tim Kovach' <TKovach@mpo.noaca.org>; 'Joe MacDonald' <JMacDonald@mpo.noaca.org>; Mark Janssen <janssen@ladco.org>; Carolyn Persoon <Persoon.Carolyn@epamail.epa.gov>; Maietta, Anthony <maietta.anthony@epa.gov>; Brunello, Antonino <Nino.Brunello@dot.ohio.gov>
Cc: Maleski, Michael <Michael.Maleski@epa.ohio.gov>
Subject: RE: Mobile Budgets for 2012 PM2.5 Standard - Attainment Demonstration Work

Here is the number to dial-in: (614)752-7418

Friday, June 3 at 11am

Thank you,

Laura Woods

From: Van Vlerah, Jennifer
Sent: Tuesday, May 31, 2016 8:38 AM
To: 'Bill Davis' <BDavis@mpo.noaca.org>; 'Ali Makarachi' <AMakarachi@mpo.noaca.org>; Byram, Mark <Mark.Byram@dot.ohio.gov>; Moore, David <Dave.Moore1@dot.ohio.gov>; 'Tim Kovach' <TKovach@mpo.noaca.org>; 'Joe MacDonald' <JMacDonald@mpo.noaca.org>; 'Kaleel, Rob' <Rob.Kaleel@Illinois.gov>; Mark Janssen (janssen@ladco.org) <janssen@ladco.org>; Carolyn Persoon <Persoon.Carolyn@epamail.epa.gov>; Maietta, Anthony (maietta.anthony@epa.gov) <maietta.anthony@epa.gov>; Nino Brunello (Nino.Brunello@dot.state.oh.us) <Nino.Brunello@dot.state.oh.us>
Cc: Woods, Laura <Laura.Woods@epa.ohio.gov>; Maleski, Michael <Michael.Maleski@epa.ohio.gov>
Subject: RE: Mobile Budgets for 2012 PM2.5 Standard - Attainment Demonstration Work

Looks like June 3rd at 11am EST will work best for most everyone. We will send around a call in number shortly.

Thanks, Jennifer

Jennifer Van Vlerah

Manager, SIP, Inventory and Rulemaking

Ohio EPA Division of Air Pollution Control

614-644-3696

DRAFT

From: Van Vlerah, Jennifer
Sent: Thursday, May 26, 2016 11:47 AM
To: 'Bill Davis' <BDavis@mpo.noaca.org>; Ali Makarachi <AMakarachi@mpo.noaca.org>; Byram, Mark <Mark.Byram@dot.ohio.gov>; Moore, David <Dave.Moore1@dot.ohio.gov>; Tim Kovach <TKovach@mpo.noaca.org>; Joe MacDonald <JMacDonald@mpo.noaca.org>; Kaleel, Rob <Rob.Kaleel@Illinois.gov>; Mark Janssen (janssen@ladco.org) <janssen@ladco.org>; Carolyn Persoon <Persoon.Carolyn@epamail.epa.gov>; Maietta, Anthony (maietta.anthony@epa.gov) <maietta.anthony@epa.gov>; Nino Brunello (Nino.Brunello@dot.state.oh.us) <Nino.Brunello@dot.state.oh.us>
Cc: Woods, Laura <Laura.Woods@epa.ohio.gov>; Maleski, Michael <Michael.Maleski@epa.ohio.gov>
Subject: Mobile Budgets for 2012 PM2.5 Standard - Attainment Demonstration Work

Hello all….

I had a discussion with NOACA and I think they would like to do their own MOVES modeling for the purpose of establishing mobile budgets as part of our upcoming attainment demonstration. We are on a pretty tight schedule so I'd like to get a call together with all of us to discuss how we should proceed to ensure we perform the modeling in a manner that is appropriate for approving the budgets and maintaining consistency with the modeling that was performed by Environ to generate mobile budgets that are used in attainment modeling. This is not my area of expertise by a long shot so I will be relying on many of you to help us know what we need to know ☺ Mark – if you think it would be best to invite Environ too please check with them on what works. Questions will likely come up as to what methods/inputs/etc. they used in their modeling.

I'm soliciting your availability for the following dates/times (EST):

May 31 – 11am, 1p, 2p

June 1 – 11am, 1p, 2p

June 2 – 11am, 1p, 2p

June 3 – 11am, 1p, 2p, 3p

June 6 - 11am, 1p, 2p, 3p

Thanks much, Jen

Jennifer Van Vlerah

Manager, SIP, Inventory and Rulemaking

Ohio EPA Division of Air Pollution Control

614-644-3696

DRAFT