



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We Protect Hoosiers and Our Environment.

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December 13, 2012

Ms. Susan Hedman
Regional Administrator
U.S. Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3950

Dear Ms. Hedman:

Re: Request to Parallel Process the Draft
MOBILE6.2 to MOVES MVEB
Replacement Update to the Maintenance
Plan for the Annual Fine Particles Standard
for Lake and Porter Counties, Indiana

The Indiana Department of Environmental Management (IDEM) submits the enclosed MOBILE6.2 to Motor Vehicle Emissions Simulator (MOVES) Motor Vehicle Emissions Budget (MVEB) replacement update to the maintenance plan for the annual fine particles standard for Lake and Porter counties, Indiana. The United States Environmental Protection Agency (U.S. EPA) approved the *Request for Redesignation and Maintenance Plan Under the Annual National Ambient Air Quality Standard for Fine Particles for the Indiana Portion of the Chicago-Gary-Lake County, IL-IN Nonattainment Area* submitted by IDEM on May 26, 2011, with an effective date of February 6, 2012. IDEM requests that U.S. EPA parallel process this draft MVEB replacement submittal for approval into Indiana's State Implementation Plan.

IDEM is providing an opportunity for a public hearing on the MVEB replacement update to the maintenance plan for the annual fine particles standard for Lake and Porter counties, Indiana, if a public hearing request is received by January 14, 2012. A hearing has been scheduled for January 23, 2013. If a request for a public hearing is not received by January 14, 2012, the hearing will be cancelled. IDEM is providing a 36 day comment period on this update, with the public comment period ending on January 25, 2013. The final submittal of the MVEB update for the maintenance plan for the annual fine particles standard for Lake and Porter counties, Indiana will document the public review process, including a detailed summary of and response to substantive comments.

Ms. Hedman
Page 2

This MOBILE6.2 to MOVES MVEB replacement update incorporates onroad emission estimates and revised MVEBs using U.S. EPA's recently adopted MOVES model. The onroad emission estimates were calculated using the MOVES-based emission factors and data extracted from the Lake and Porter counties, Indiana, area's travel-demand model.

MVEBs are being revised in anticipation of the mandatory use of the MOVES model in future transportation conformity determinations. Preliminary use of the new model indicates that emission estimates can be considerably different than similar calculations using MOBILE6.2, which was used to create the MVEBs in the original annual fine particles maintenance plan.

Onroad safety margins, established through the interagency consultation process, are included for nitrogen oxides (NO_x) and fine particulate matter (PM_{2.5}). These onroad safety margins are allocated to onroad emission estimates in order to account for the wide array of assumptions that are factored into the calculation process. With the addition of onroad safety margins applied to mobile sources, the Lake and Porter counties, Indiana, annual fine particles maintenance area will continue to remain well below the overall safety margins for all sources. MVEBs are also constrained to ensure that total NO_x and PM_{2.5} emissions (i.e., all source categories) do not exceed attainment year emissions to ensure continued maintenance of the annual fine particles standard.

This submittal consists of one (1) hard copy of the required documentation. An electronic version of the submittal in PDF format that is identical to the hard copy has been sent to Pamela Blakley, Chief of U.S. EPA Region 5's Control Strategies Section.

IDEM respectfully requests that U.S. EPA proceed with preliminary review of the MOBILE6.2 to MOVES MVEB replacement update and revised transportation conformity budgets and approval into Indiana's State Implementation Plan for the Lake and Porter counties, Indiana, maintenance area under the annual fine particles standard. If you have any questions or need additional information, please contact Scott Deloney, Chief, Air Programs Branch, at (317) 233-5694.

Sincerely,



Keith Baugues
Assistant Commissioner
Office of Air Quality

KB/sad/sms

Enclosures:

Onroad Emissions MOBILE6.2 to MOVES Replacement Submittal for Lake and Porter Counties, Indiana, Maintenance Plan Under the Annual National Ambient Air Quality Standard for Fine Particles.

Electronic MOVES-based modeling input and output data files.

Ms. Hedman

Page 3

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DRAFT

Onroad Emissions MOBILE6.2 to
MOVES Replacement Submittal

For the Lake and Porter Counties,
Indiana, Maintenance Plan Under
the Annual National Ambient Air
Quality Standard for Fine Particles

December 2012

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Introduction

On May 26, 2011, the Indiana Department of Environmental Management (IDEM) submitted a *Request for Redesignation and Maintenance Plan Under the Annual National Ambient Air Quality Standard for Fine Particles* for the Indiana portion of the Chicago-Gary-Lake County, IL-IN nonattainment area. The United States Environmental Protection Agency (U.S. EPA) subsequently approved the Indiana redesignation of Lake and Porter counties, Indiana, to attainment for the annual standard for fine particles with an effective date of February 6, 2012 (76 FR 76302). Onroad emissions for the May 26, 2011, submittal were calculated using MOBILE6.2. U.S. EPA has encouraged mobile source stakeholders to transition to the new Motor Vehicle Emissions Simulator (MOVES) model as expeditiously as possible. Therefore, IDEM is providing this MOBILE6.2 to MOVES replacement update to the previously submitted redesignation and maintenance plan for the Lake and Porter counties, Indiana, annual fine particles standard maintenance area that incorporates MOVES-based onroad emissions.

Emission Inventory

The tables titled, 2008-Lake and Porter Counties, IN Totals (Tons per Year), 2015-Lake and Porter Counties, IN Totals (Tons per Year), 2020-Lake and Porter Counties, IN Totals (Tons per Year), and 2025-Lake and Porter Counties, IN Totals (Tons per Year), were included in Appendix E of the original Redesignation Petition and Maintenance Plan. The consolidated table titled, 2008, 2015, 2020, and 2025 Lake and Porter Counties, Indiana, Area - All Anthropogenic Sources in Tons Per Year (to be considered a replacement of the existing separate 2008, 2015, 2020, and 2025 tables included in Appendix E as detailed above) has been revised to incorporate updated onroad emission estimates for nitrogen oxides (NO_x) and fine particulate matter (PM_{2.5}) for the years 2008, 2015, 2020, and 2025 and results in a different overall safety margin for the area. It should be noted that although sulfur dioxide (SO₂) emissions are included in the Appendix E tables, consistent with the federal implementation rule for fine particles, Indiana does not consider mobile source SO₂ to be a significant contributor to fine particles for this maintenance area, as mobile source SO₂ constitutes less than 1.2% of the area's total anthropogenic emissions. As such, SO₂ emissions are not included in the table titled, 2008, 2015, 2020, and 2025 Lake and Porter Counties, Indiana, Area - All Anthropogenic Sources in Tons Per Year.

2008-Lake and Porter Counties, IN Totals (Tons per Year)					
	AREA	NONROAD	ONROAD	POINT	GRAND TOTAL
NO _x	2,264.46	6,667.71	10,703.81	39,945.76	59,581.74
SO ₂	703.25	476.33	103.08	54,916.02	56,198.68
Direct PM _{2.5}	23.60	363.91	187.10	6,676.32	7,250.93

2015-Lake and Porter Counties, IN Totals (Tons per Year)					
	AREA	NONROAD	ONROAD	POINT	GRAND TOTAL
NO _x	2,226.21	4,962.17	5,723.67	28,883.26	41,795.31
SO ₂	682.86	267.22	66.23	42,394.24	43,410.55
Direct PM _{2.5}	22.70	248.01	136.61	6,650.33	7,057.65

2020-Lake and Porter Counties, IN Totals (Tons per Year)					
	AREA	NONROAD	ONROAD	POINT	GRAND TOTAL
NO _x	2,187.09	4,057.84	3,004.68	27,832.65	37,082.26
SO ₂	664.67	215.27	72.76	38,493.19	39,445.89
Direct PM _{2.5}	21.97	185.11	114.32	6,566.86	6,888.26

2025-Lake and Porter Counties, IN Totals (Tons per Year)					
	AREA	NONROAD	ONROAD	POINT	GRAND TOTAL
NO _x	2,148.80	3,349.95	2,534.95	26,980.09	35,013.79
SO ₂	647.07	175.39	76.51	35,888.27	36,787.24
Direct PM _{2.5}	21.29	140.67	115.39	6,484.75	6,762.10

2008, 2015, 2020, and 2025 Lake and Porter Counties, Indiana, Area - All Anthropogenic Sources in Tons Per Year (MOVES-based Onroad Emissions)

Sector	2008 NO_x	2015 NO_x	2020 NO_x	2025 NO_x
Area	2,264.46	2,226.21	2,187.09	2,148.80
Nonroad	6,667.71	4,962.17	4,057.84	3,349.95
Onroad	15,175.43	9,118.33	5,782.93	4,758.55
Point	39,945.76	28,883.26	27,832.65	26,980.09
Total	64,053.36	45,189.97	42,528.83	37,237.39
Sector	2008 PM_{2.5}	2015 PM_{2.5}	2020 PM_{2.5}	2025 PM_{2.5}
Area	23.60	22.70	21.97	21.29
Nonroad	363.91	248.01	185.11	140.67
Onroad	1,988.84	325.48	198.51	164.12
Point	6,676.32	6,650.33	6,566.86	6,484.75
Total	9,052.67	7,246.52	7,074.03	6,810.83

Onroad emission estimates in the table titled, 2008, 2015, 2020, and 2025 Lake and Porter Counties, Indiana, Area - All Anthropogenic Sources in Tons Per Year were calculated using U.S. EPA's MOVES model-produced emission factors and data extracted from the area's travel-demand model. The MOVES model implements a significantly different approach to emissions estimation than the previous model (MOBILE6.2). Preliminary use of the MOVES model indicates that emission estimates can be considerably different than similar calculations using MOBILE6.2, which was used to create the original MVEBs for the Lake and Porter counties, Indiana, annual fine particles standard maintenance area. A general summary of the MOVES methodology used in this area can be found in Appendix A. In addition, MOVES input and output files are being provided electronically with this submittal. Growth and control strategy assumptions for non-mobile sources (i.e. area, nonroad, and point) from the original submittal for the years 2008, 2015, 2020, and 2025 were developed before the economic challenges of the last several years. Because of this, the factors included in the original submittal may project more growth than will actually occur in the future. As a result, the growth and control strategy

assumptions for the non-mobile sources for the years 2008, 2015, 2020, and 2025 continue to be valid and do not affect the overall conclusions of the plan.

Onroad safety margins have been included for onroad emission estimates to accommodate the wide array of assumptions that are factored into the calculation process. Since assumptions change over time, it is necessary to have an onroad safety margin that will accommodate the impact of refined assumptions in the process. The plan continues to meet all applicable Clean Air Act (CAA) requirements as the revised emission inventories clearly illustrate that total NO_x and PM_{2.5} emissions in the Lake and Porter counties, Indiana, annual fine particles standard maintenance area will continue to decline leading to local reductions between 2008 (base year) and 2015 (maintenance plan interim budget year), as well as 2008 (base year) and 2025 (maintenance plan horizon budget year).

Transportation Conformity Budgets

Table 5.1 was included on Page 34 of the original Redesignation Petition and Maintenance Plan for the Lake and Porter counties, Indiana, annual fine particles standard maintenance area. Table 5.1 – A (to be considered a replacement of Table 5.1) has been revised to incorporate U.S. EPA’s MOVES model-produced emission factors and data extracted from the region’s travel-demand model. Through the interagency consultation process, it was determined that including Chicago Area emissions in this replacement submittal was not necessary due to U.S. EPA’s designation of attainment separately for Lake and Porter counties, Indiana effective February 6, 2012.

**Table 5.1
Emission Estimates for On-Road Mobile Sources
(MOBILE6.2-based Onroad Emissions)**

Chicago Area	2005	2008	2015	2016	2020	2025
Direct PM _{2.5} (tons/year)	2,443.50	1,816.00	1,231.00	1,137.00	1,043.00	1,064.00
NO _x (tons/year)	133,623.50	99,627.00	49,746.00	39,424.00	29,102.00	23,687.00
Lake and Porter Counties, IN subtotal						
Direct PM _{2.5} (tons/year)	229.39	187.09	136.61	132.15	114.32	115.39
NO _x (tons/year)	14,095.55	10,703.81	5,723.67	5,179.87	3,004.68	2,534.95
Lake and Porter Counties, IN subtotal%						
Direct PM _{2.5} (tons/year)	9.39%	10.30%	11.10%	11.62%	10.96%	10.84%
NO _x (tons/year)	10.55%	10.74%	11.51%	13.14%	10.32%	10.70%

Table 5.1 - A
Emission Estimates for On-Road Mobile Sources
(MOVES-based Onroad Emissions)

Lake and Porter Counties, Indiana	2008	2015	2020	2025
NO _x (tons/year)	15,175.43	9,118.33	5,782.93	4,758.55
PM _{2.5} (tons/year)	1,988.84	325.48	198.51	164.12

Table 5.2 was included on Page 35 of the original Redesignation Petition and Maintenance Plan for the Lake and Porter counties, Indiana, annual fine particles standard maintenance area. Table 5.2 – A (to be considered a replacement of Table 5.2) has been revised to incorporate MVEBs calculated using U.S. EPA’s MOVES model-produced emission factors and data extracted from the region’s travel-demand model as detailed in Table 5.1 - A. Through the interagency consultation process, it was determined that substituting the previous interim budget year of 2015 with a revised interim budget year of 2015 was both reasonable and appropriate for transportation conformity demonstrations moving forward.

Table 5.2
Motor Vehicle Emission Budgets for Lake and Porter Counties
(MOBILE6.2-based Onroad Emissions)

	2016	2025
PM_{2.5} (tons/year)	145.37	132.70
NO_x (tons/year)	5,697.86	2,915.19

Table 5.2 - A
Motor Vehicle Emission Budgets for Lake and Porter Counties
(MOVES-based Onroad Emissions)

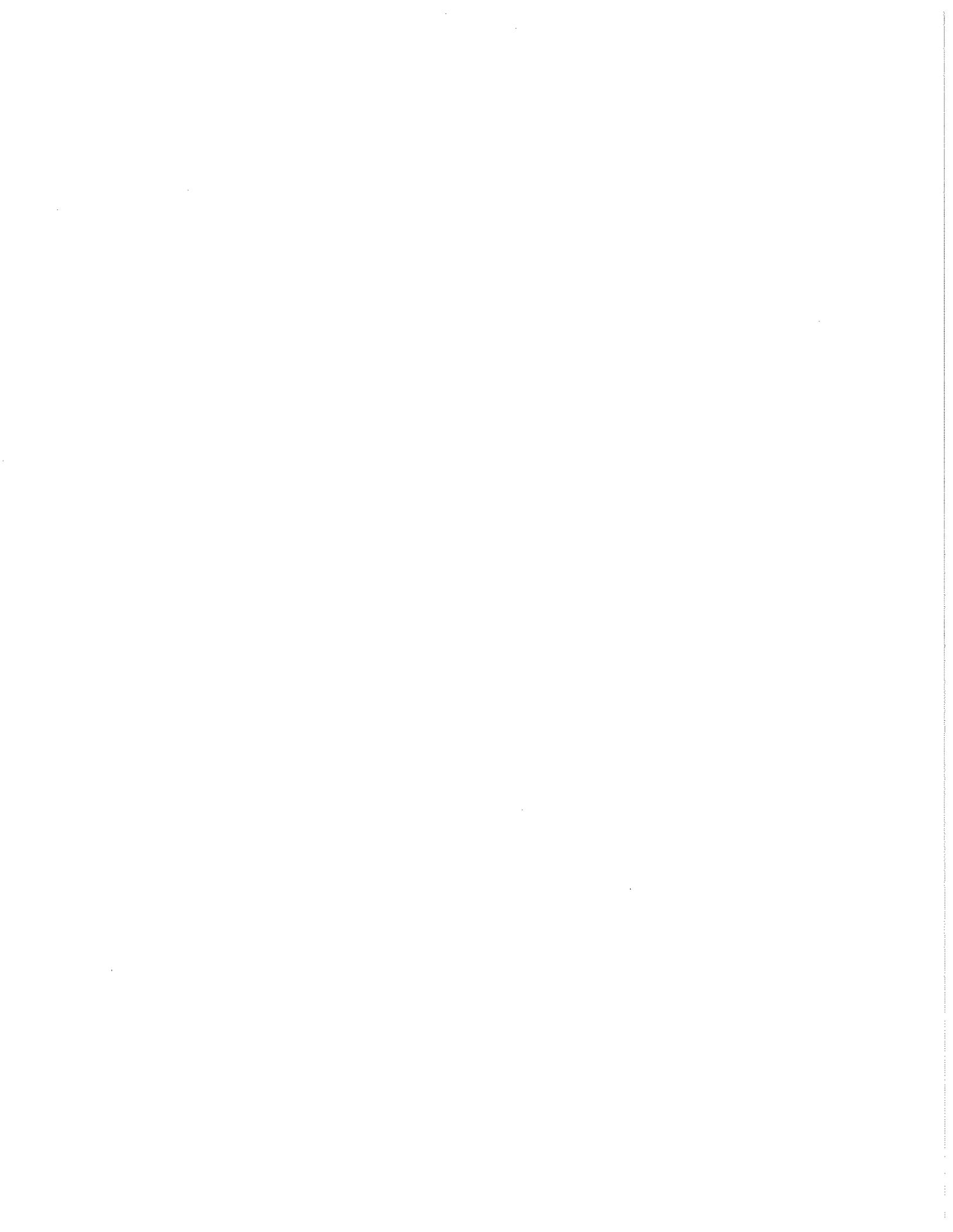
	2015	2025
NO_x (tons/year)	10,486.08	5,472.34
PM_{2.5} (tons/year)	374.30	188.73

Through the interagency consultation process, it was determined that a revised maintenance plan interim budget year of 2015 and a horizon budget year of 2025, would be appropriate. The interagency consultation group approved onroad margins of safety of fifteen percent (15%) for both NO_x and PM_{2.5} onroad emission estimates for the years 2015 and 2025. A summary of this interagency consultation discussion can be found in Appendix B. These revised emission inventories clearly illustrate that onroad NO_x and PM_{2.5} emissions in the Lake and Porter counties, Indiana, annual fine particles standard maintenance area will continue to decline leading to local reductions between 2008 (base year) and 2015 (revised maintenance plan interim budget year), as well as 2008 (base year) and 2025 (maintenance plan horizon budget year).

Furthermore, when compared to the overall safety margin as defined in the Code of Federal Regulations (CFR) at 40 CFR 93.101, it is evident the onroad safety margin allocation is reasonable and appropriate. More specifically, even with the allocation of an onroad safety margin to mobile sources, emissions will continue to remain well below the overall safety margin for all sources as detailed in the table titled, 2008, 2015, 2020, and 2025 Lake and Porter Counties, Indiana, Area - All Anthropogenic Sources in Tons Per Year. MVEBs are constrained to ensure that the total emissions (i.e., all source categories) do not exceed the 2008 attainment year emissions of either NO_x or PM_{2.5}, thereby ensuring continued maintenance of the annual fine particles standard.

Conclusion

This MOBILE6.2 to MOVES replacement update to the previously submitted *Request for Redesignation and Maintenance Plan Under the Annual National Ambient Air Quality Standard for Fine Particles* for the Indiana portion of the Chicago-Gary-Lake County, IL-IN nonattainment area incorporates onroad emission estimates and a revised MVEB using U.S. EPA's recently adopted MOVES model. MVEBs have been revised in anticipation of the mandatory use of the MOVES model in future transportation conformity determinations. The onroad emission estimates were calculated using the MOVES-based emission factors and data extracted from the area's travel-demand model. Onroad safety margins for NO_x and PM_{2.5}, established through the interagency consultation process, are included in order to account for the wide array of assumptions that are factored into the calculation process. MVEBs are also constrained to ensure that total NO_x and PM_{2.5} emissions (i.e., all source categories) do not exceed attainment year (2008) emissions to ensure continued maintenance of the annual fine particles standard. With the addition of MOVES-based onroad safety margins applied to mobile sources, the Lake and Porter counties, Indiana, annual fine particles standard maintenance area will continue to remain well below the overall safety margins for all sources into the future. As such, the annual fine particles maintenance plan for Lake and Porter counties, Indiana, continues to meet all applicable CAA requirements.



Appendix A

Lake and Porter Counties, Indiana, Maintenance Area MOVES Methodology

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Lake and Porter Counties
MOVES2010a Input Data and
Parameters

INDOT Planning Contract

Final Report
October 2, 2012



CDM
Smith

Table of Contents

Overview	1
Vehicle Age Distribution	1
Vehicle Population.....	2
Meteorological Data.....	4
Default VMT Distributions	4
Default Hourly Distributions	5
Default Daily and Monthly Distributions	6
Ramp Fractions	6

LIST OF TABLES

Table 1: MOVES2010a Source Type Codes	1
Table 2: MOVES2010a Road Type Codes	1
Table 3: Distribution of MOBILE 6.2 Light Duty Trucks into MOVES Source Types.....	3
Table 4: Inventory of Permanent Count Stations	5

LIST OF APPENDICES

Appendix A – MOVES2010a Input Settings and Assumptions
Appendix B – Vehicle Age Distributions for Lake and Porter Counties
Appendix C – Vehicle Populations for Lake and Porter Counties
Appendix D – Meteorological Data for Lake and Porter Counties
Appendix E – Default Statewide Factors
Appendix F – Statewide Default Hourly Distribution Factors
Appendix G – Statewide Default Daily Distribution Factors
Appendix H – Statewide Default Monthly Distribution Factors
Appendix I – Ramp Fractions

Overview:

This report is being written to document the input parameters for a set of MOVES2010a runs for the Lake and Porter Counties 8-hour Ozone Maintenance Area and the Lake and Porter Counties PM 2.5 non-attainment area. This report contains a discussion on the intended input settings used in MOVES2010a and the development of the input datasets. These MOVES2010a runs are intended to develop a default set of emission rates that can be used for conformity determination and is part of a statewide effort being conducted by the Indiana Department of Transportation (INDOT).

Throughout this report references are made to MOVES 2010a codes for two types of data. The values for the source type codes are shown in Table 1. The values for the road type codes are shown in Table 2. MOVES2010a input settings and assumptions for this effort are shown in Appendix A.

Table 1: MOVES2010a Source Type Codes

sourcetypeid	Description
11	Motorcycles
21	Passenger Car
31	Passenger Truck
32	Light Commercial Truck
41	Intercity Bus
42	Transit Bus
43	School Bus
51	Refuse Truck
52	Single Unit Short-haul Truck
53	Single Unit Long-haul Truck
54	Motor Home
61	Combination Short-haul Truck
62	Combination Long-haul Truck

Table 2: MOVES2010a Road Type Codes

roadtypeid	Description
1	Off Network
2	Rural Restricted Access
3	Rural Unrestricted Access
4	Urban Restricted Access
5	Urban Unrestricted Access

Vehicle Age Distribution:

The vehicle age distributions for MOVES source types 21, 31, and 32 (cars, passenger trucks, and light commercial vehicles respectively) were developed through an analysis of Indiana's 2009 vehicle registration data. The analysis was performed by Eastern Research Group (ERG) under contract to the Lake Michigan Air Directors Consortium (LADCO). ERG was provided with vehicle identification numbers (VIN) for vehicles in Indiana.

There were approximately 6.37 million VINs in the statewide data set. Out of these, approximately 1.3 million returned errors. Of these, approximately 200,000 errors were deemed non-critical. This means that the model year and vehicle type assigned to the records were most likely correct despite there being an error in the VIN decoding. These records were included in ERG's analysis. The remaining errors were considered critical enough to call into question the accuracy of the model year and vehicle types. These critical errors were excluded from ERG's analysis.

In all, approximately 5.2 million VINs from around the state were used in the analysis. Each VIN was associated to a specific county. ERG then developed age distributions for each county in the state along with seven combination areas comprised of two or more counties each. Additional information on the methodology used to develop the vehicle age distributions can be found in a May 28, 2010 report written by ERG for LADCO titled MOBILE6 and MOVES Registration Distribution Calculations for Indiana Registration Data. Each set of age distributions was provided in both MOBILE6 and MOVES formats. The MOVES formatted data will be used for these MOVES2010a runs.

Due to limitations in ERG's VIN decoder, it was not possible to develop vehicle age distributions for any source types other than 21, 31, and 32 from the vehicle registration data. For all other source types, MOVES2010a default vehicle age distributions specific to each source types were used. This includes motorcycles and all heavy vehicles. Vehicle age distributions for all source types were kept constant for all future years. The vehicle age distributions for Lake and Porter Counties as a combined area are shown in Appendix B of this report.

Vehicle Population:

The vehicle populations for source types 21, 31, and 32 were developed directly from the vehicle registration data. All valid records that were identified from the vehicle registration data set were used to determine the number of vehicles for each of these three source types. The VIN decoded data provided to INDOT contained vehicle types according to MOBILE6.2 vehicle categories. There is a direct correlation between MOVES source type 21 (cars) and the MOBILE6.2 vehicle type LDV. All valid LDV records (those records not excluded from the vehicle age distribution analysis due to errors as was described in the section on Vehicle Age Distribution in this report) were counted in the vehicle population.

There is not a direct correlation between MOVES source types 31 (passenger trucks) and 32 (light commercial vehicles) and the MOBILE6.2 light truck vehicle types (LDT1, LDT2, LDT3, and LDT4). All valid records from the vehicle registration data set for MOBILE6.2 light duty trucks were counted in the vehicle populations. The light duty trucks were distributed between MOVES source types 31 and 32 as per the Environmental Protection Agency's (EPA) guidance documented in Table A.1 of the appendix of the Technical Guidance on the Use of MOVES2010 for Emission Inventory Preparation in State Implementation Plans and Transportation Conformity. The guidance provides two sets of factors for distributing MOBILE6.2 light trucks between MOVES source types 31 and 32. These are based on fuel type and are shown in Table 3.

Table 3: Distribution of MOBILE6.2 Light Duty Trucks into MOVES Source Types

Fuel	Source Types	
	31	32
Gas	78%	22%
Diesel	42%	58%

As per ERG's assumption documented in MOBILE6 and MOVES Registration Distribution Calculations for Indiana Registration Data, all light duty trucks that did not have a fuel type identified were counted as diesel trucks. This was to prevent an underestimation of diesel trucks and their related emissions.

Since only valid records from the vehicle registration data were used to calculate vehicle populations for source types 21, 31, and 32, it is reasonable to assume that some of the erroneous records that were discarded from the analysis actually belonged to these source types. The nature of these errors is not that the vehicle does not exist. Rather, it is that the vehicle could not be properly identified with any sense of certainty. It was therefore necessary to adjust the vehicle populations calculated from vehicle registration data to compensate for these discarded records. Based on an analysis of the error rate reported by ERG, vehicle populations for source types 21, 31, and 32 were increased by 5.8 percent.

Vehicle populations were not able to be developed directly from the vehicle registration data for some source types. This was due to the limitations in the VIN decoder used by ERG to process the vehicle registration data. Vehicle populations for all other source types (motorcycles and heavy vehicles) were derived by applying the Mileage Accumulation Rate (MAR) method documented in EPA's Technical Guidance on the Use of MOVES2010 for Emission Inventory Preparation in State Implementation Plans and Transportation Conformity, Section 3.3 Source Type Population.

The default MARs were extracted from MOVES by running MOVES for a single pollutant and a single year for all vehicles, fuels, months, days, and hours. The activity output was set to report both distance and population. A ratio of population to vehicle-miles-traveled (VMT) was calculated from these outputs. The ratios were calculated for each source type.

The Northwestern Indiana Regional Planning Commission (NIRPC), which is the metropolitan planning organization (MPO) for Lake and Porter Counties, provided VMT by MOVES road types extracted from their travel demand model's base year. Since the default MARs in MOVES vary by year (but not by location), the MOVES run that was executed to extract the MARs was run for a year consistent with the travel demand model's base year. This resulted in MARs that could be applied directly to the validated VMTs reported by the travel demand model. The travel demand model VMTs were converted into annual VMT and distributed by vehicle types using statewide default VMT distribution factors documented in this report in the section on Default VMT Distributions. The MARs were then applied to the annual vehicle type VMTs. The result was an estimated vehicle population for each source type for the travel demand model's base year. Since the vehicle populations for source types 21, 31, and 32 were developed directly from the vehicle registration data, the population estimates derived for those

source types using the MAR method were discarded and the observed data were used instead.

Future year vehicle populations were developed base on socioeconomic growth rates for the maintenance area. The MPO provided base year and horizon year population and employment data for the area. Annual growth rates were calculated for population growth and employment growth individually. Population growth rates were then used to grow the light vehicle populations (source types 11, 21, 31, and 32). Employment growth rates were used to grow the heavy vehicle populations (source types 41, 42, 43, 51, 52, 53, 54, 61, and 62). Vehicle populations were calculated for every year from 2008 to 2040. These vehicle populations for Lake and Porter Counties as a combined area are shown in Appendix C.

Meteorological Data:

The default set of hourly temperatures and hourly relative humidity was developed using EPA's data converters for changing MOBILE6.2 minimum / maximum temperatures and absolute humidity to the MOVES equivalent formats. The values for the MOBILE6.2 inputs were taken from the Air Quality Conformity Determination Between the 2040 Regional Transportation Plan, the Fiscal Year 2012 to 2015 Transportation Improvement Program, and the Indiana State Implementation Plan for Air Quality, Appendix E, developed by NIRPC in June, 2011.

Meteorological data reflect average annual conditions for the PM 2.5 runs. The MOBILE6.2 meteorological input data for each of the twelve months of the years were averaged together to create average annual temperatures and humidity. These were then passed through the data converters. The data reflect summer conditions for ozone using MOBILE6.2 inputs for July. The MOVES formatted meteorological data for Lake and Porter Counties as a combined area are presented in Appendix D of this report.

Default VMT Distributions:

As part of this effort, INDOT developed a default set of VMT distribution factors by Highway Performance Monitoring System (HPMS) vehicle type and by MOVES road type. These distribution factors were developed by analyzing four consecutive years of continuous traffic count data ending in 2010 for twenty permanent traffic count stations throughout Indiana. The stations were selected to provide a spread of locations corresponding to each of the four MOVES road types. Furthermore, these stations were selected from among sites that were concentrated in nonattainment and maintenance areas. In some cases, data from the requested site were either partially or completely unavailable. An inventory of the sites used to develop the distributions is shown in Table 4.

The vehicle counts reported at each station were provided by vehicle class. These were aggregated into the six basic HPMS vehicle types: motorcycle, passenger car, light truck, bus, single-unit heavy truck, and combination heavy truck. The distribution of VMT by vehicle type was calculated for each road type by taking each vehicle type's percentage of total traffic. These default statewide factors are shown in Appendix E.

Table 4: Inventory of Permanent Count Stations

SiteID	City	County	Location	Road Type	Data Quality
3000	MUNCIE	DELAWARE	SR 332 RM 0.5	3	Closed since 9/26/2006. No data.
3200	CARMEL	HAMILTON	US 31 RM 125.7	5	Good
3300	INDY WEST	MARION	I 465 MM 10.0	4	Closed since 9/1/10
4000	GARY	LAKE	I 80 / I 94 MM 6.0	4	Only 2010 data passed QC
4500	LAPORTE	LAPORTE	SR 2 RM 65.2	3	Good
5600	SELLERSBURG	CLARK	I 65 MM 8.0	4	Bad sensors. Not usable.
6100	EVANSVILLE	GIBSON	I 64 MM 27.9	2	Good
0105	TERRE HAUTE	VIGO	US 41 RM 104.2	3	Good-closed 11/13/08-5/13/09
0201	MIDDLEBURY	ELKHART	SR 120 RM 13.9	3	Good- closed 8/3/10-12/6/10
0210	FORT WAYNE	ALLEN	I-69 0.53 mi N of SR 3	4	Good
0303	MUNCIE	DELAWARE	US 35 RM 44.5	5	Good
0327	DALEVILLE	DELAWARE	I 69 MM 31.4	2	Good-built in 12/10/2007
0403	SOUTH BEND	ST. JOSEPH	US 20 RM 77.1	4	Good
0501	INDY SOUTH	MARION	SR 37 RM 143.5	5	Good-closed 5/22/09-6/1/09
0502	MARTINSVILLE	MORGAN	SR 67 RM 80.6	3	Good
0507	SEYMOUR	JACKSON	I 65 MM 47.0	2	Good
0602	HAZLETON	GIBSON	SR 56 RM 0.6	3	Good
0603	DUBOIS	DUBOIS	SR 56 RM 53.3	3	Good- closed 10/16/08-3/20/09
0608	EVANSVILLE	VANDEBURGH	SR 66 RM 23.5	5	Good
1315	I 70	MARION	I 70 MM 83.5	4	Closed 5/17/06-3/24/08

Default Hourly Distributions:

The same set of twenty permanent traffic count locations discussed in the section on Default VMT Distributions was analyzed to develop a set of hourly distribution factors. These factors were calculated by road type, by HPMS vehicle type. Hourly factors were only calculated for the average weekday. The hourly distribution pattern for each traffic count location was reviewed. Any data that appeared to reflect either an error in the data or an outlier of behavior were removed to prevent bias in the data. The following data were excluded from the analysis:

- Bus data from count stations 0105 and 0603 were excluded due to abnormal midnight peaks in the data;
- An abnormal relationship between passenger cars and light duty trucks at count station 4500 prompted the exclusion of all data from this location due to questions of reliability;
- Peak spreading behavior observed at count station 4000 from traffic related to Chicago was considered to be too unique to be included in a default statewide data set; and,
- Combination truck traffic from station 3200 was excluded due to too much overnight traffic when compared to other vehicles and other stations.

Furthermore, traffic patterns reported by those count stations corresponding to road type 3 (3000, 4500, 0105, 0201, 0502, 0602, and 0603) had a tendency to over represent long distance travel. This was most likely the result of statewide permanent count stations focusing primarily on higher order facilities. Rural collectors and local streets are less likely to reflect long distance travel. The hourly distributions for road type 3 (rural unrestricted access) were adjusted to better account for traffic behavior on lower order facilities in rural areas. A sample of traffic count data from Morgan County, IN was used to introduce more local traffic behavior in the road type 3 hourly distributions. An analysis of the Morgan County data showed a pattern more consistent with AM and PM peaking characteristics reflecting local commuting traffic on collectors and local streets for passenger cars and light duty trucks. The Morgan County data for passenger cars and light duty trucks on collectors and local streets were weighted and added to the road type 3 data set. This analysis assumed that rural collectors and local streets accounted for 20 percent of all VMT for road type 3.

The statewide default hourly distribution factors are presented in Appendix F.

Default Daily and Monthly Distributions:

Default daily and monthly distribution factors were calculated from INDOT's official count adjustment factors which are more commonly used to develop AADT from raw traffic counts. These factors are based on the set of daily traffic counts collected from all permanent count stations throughout the state. The daily distribution factors determine what percentage of VMT is occurring on weekdays and what percentage is occurring on weekends. The monthly distribution factors determine what percentage of annual VMT is occurring in each month of the year. The statewide default daily distribution factors are shown in Appendix G. The statewide default monthly distribution factors are shown in Appendix H.

Ramp Fractions:

The ramp fractions represent the percentage of vehicle-hours-traveled (VHT) for road types 2 (rural restricted access) and 4 (urban restricted access) occurring on the ramps associated with those road types. These fractions were calculated based on the percentage of VHT occurring on ramps reported by the base year travel demand model. These ramp fractions are reported in Appendix I.

Appendix A

Number of Runs:

Input Item	Ozone	PM 2.5
Years	2006, 2010, 2015, 2020, 2025, 2030, 2035, 2040	2008, 2010, 2015, 2020, 2025, 2030, 2035, 2040
Pollutants/ Processes	Volatile Organic Compound (VOC), NO _x , and supporting	PM 2.5 with all subspecies; NO _x
Meteorology	Summer	Average Annual
# of MOVES runs	8	8

General Parameters:

MOVES Screen	Input Item	Ozone	PM 2.5
Description	Description	User Choice	
Scale	Domain/Scale	County	
	Calculation Type	Emission Rate	
Time Spans	Time Aggregation Level	Hour	Hour
	Year	2004, 2010, 2015, 2020, 2025, 2030, 2035, 2040	2008, 2010, 2015, 2020, 2025, 2030, 2035, 2040
	Months	July	April
	Days	Weekday	Weekday
	Hours	Select All	Select All
Geographic Bounds	Geographic Bounds	Lake County*	Lake County*
Vehicles	Vehicles	All Gas and Diesel Combinations	
Road Type	Road Type	Select All	
Pollutants/ Processes	Pollutants/ Processes	VOC, NOx, and supporting	PM 2.5 with all subspecies; NOx
General Output	Database Name	LakePorter Ozone	LakePorter PM
	Units	Select "Grams" and "Miles" and "Million BTU"	
	Activity	Distance, Population	
Output Emissions Detail	On Road	Select "Source Use Type" and "Road Type"	

*Represents both Lake and Porter Counties.

County Data Manager

County Data Manager Input	Excel Sheet Tab Name	Ozone		PM 2.5	
Source (Vehicle) Type Population	sourceTypeYear	Local Registration for Source Types 21, 31, and 32; Estimated population using default MOVES mileage accumulation rates and local VMT for all other source types. Future year vehicle populations based on population growth rates for source types 11, 21, 31, and 32. Employment growth used for all other source types.			
Vehicle Type VMT (by 13 MOVES Vehicle Types)	HPMSVTypeYear	Statewide default vehicle distributions across road types developed by INDOT using an analysis of permanent count station data from a statewide data set.			
	MonthVMTFraction	Statewide default monthly fractions developed by INDOT using an analysis of permanent count station data from a statewide data set.			
	DayVMTFraction	Statewide default daily fractions developed by INDOT using an analysis of permanent count station data from a statewide data set.			
	HourVMTFraction	Statewide default hourly fractions developed by INDOT using an analysis of permanent count station data from a statewide data set.			
Average Speed Distribution (% of VHT in each 5 mph speed bin)	avgSpeed Distribution	National defaults.			
Road Type Distribution (VMT by 5 MOVES Road Types)	roadType Distribution	Calculated from local VMT data. Use travel demand model base year distributions for all years.			
Age Distribution (Vehicle Population by Age of Vehicle)	sourceTypeAge Distribution	Local age distributions developed from vehicle registration data for source types 21, 31, and 32. Default MOVES age distributions for all other source types.			
Ramp Fraction	RoadType	Based on local travel demand model.			
Meteorology Data	ZoneMonthHour	MOBILE6 Summer Met Data Converted to MOVES format	MOBILE6 12 month Met Data Converted to MOVES format and averaged to annual meteorology		
Fuel (% of Market Share by Fuel Type)	FuelFormulation	MOVES Defaults			
	FuelSupply	Lake County MOVES Defaults for Summer (check if varies among counties)	Lake County MOVES Defaults for annual (check if varies among counties)		
I/M Program	IMCoverage	Consistent with current local I/M Program			

Appendix B

Vehicle Age Distributions for Lake and Porter Counties:

ageid	Source Types												
	11	21	31	32	41	42	43	51	52	53	54	61	62
0	0.2109690540	0.0267370941	0.0145061143	0.0355122377	0.0643023355	0.0545743076	0.0622220643	0.0494240790	0.0588526168	0.0787544027	0.0615095870	0.0535634660	0.0670845256
1	0.1921154969	0.0530181832	0.0500664299	0.0734065149	0.0626728412	0.0531913309	0.0606452875	0.0481716155	0.0573612230	0.0767586735	0.0599508636	0.0535634660	0.0670845256
2	0.1573471585	0.0665539321	0.0582074781	0.0786470016	0.0624853859	0.0530322328	0.0604638952	0.0480275345	0.0571896519	0.0765290827	0.0597715492	0.0541045093	0.0677621447
3	0.1359771581	0.0610324714	0.0519847618	0.0656648868	0.0624229593	0.0529792497	0.0604034894	0.0479795509	0.0571325186	0.0764526251	0.0597118340	0.0575579884	0.0720873878
4	0.1058454735	0.0659801258	0.0780550961	0.0793616134	0.0617369906	0.0523970560	0.0597397140	0.0474523026	0.0565046834	0.0756124785	0.0590556596	0.0564182312	0.0706599203
5	0.0750909142	0.0645627102	0.0733914482	0.0732874129	0.0559170498	0.0474575929	0.0541080614	0.0429789769	0.0511779950	0.0684845018	0.0534884926	0.0489290859	0.0612802835
6	0.0476805323	0.0608386692	0.0747132670	0.0647716220	0.0468365056	0.0397508123	0.0453212873	0.0359994879	0.0428670388	0.0573630896	0.0448023279	0.0366034411	0.0458432683
7	0.0331026886	0.0649389143	0.0806648410	0.0721559442	0.0425786431	0.0361370941	0.0412011709	0.0327268079	0.0389700355	0.0521482660	0.0407293873	0.0340742206	0.0426755959
8	0.0197278356	0.0649997150	0.0643827445	0.0597693392	0.0468268516	0.0397426124	0.0453119367	0.0359920640	0.0428582007	0.0573512681	0.0447930981	0.0358093100	0.0448486759
9	0.0118473747	0.0677129448	0.0689108213	0.0689004903	0.0534377006	0.0453533365	0.0517089150	0.0410733035	0.0489087688	0.0654479137	0.0511168252	0.0526288382	0.0659139597
10	0.0053251777	0.0607512683	0.0648030151	0.0588165234	0.0532712252	0.0452120443	0.0515478328	0.0409453420	0.0487564067	0.0652440247	0.0509575859	0.0624520143	0.0782168041
11	0.0025378610	0.0524367768	0.0558146471	0.0510748953	0.0407951886	0.0536203440	0.0411075833	0.0313560350	0.0391491717	0.0523881239	0.0302729398	0.0478258601	0.0598985955
12	0.0013011470	0.0529801828	0.0501138798	0.0424003017	0.0331924560	0.0489936472	0.0382933197	0.0255124310	0.0294483131	0.0394065607	0.0466101866	0.0389128550	0.0487354179
13	0.0006124019	0.0425262678	0.0386377810	0.0326140898	0.0277347637	0.0458089741	0.0333751020	0.0545980574	0.0316399801	0.0194774783	0.0291673253	0.0325145854	0.0462990441
14	0.0002476898	0.0448138930	0.0390038231	0.0330507970	0.0364294706	0.0377746681	0.0430863640	0.0632656498	0.0364439725	0.0194691525	0.0347804437	0.0427077419	0.0462072388
15	0.0001527705	0.0327297800	0.0357704509	0.0282867181	0.0283511969	0.0332950401	0.0210164622	0.0395649332	0.0357887614	0.0311848083	0.0335202065	0.0332372597	0.0300444032
16	0.0000668536	0.0270600977	0.0244095876	0.0196716756	0.0235884296	0.0279132162	0.0253671498	0.0341566540	0.0259987277	0.0230196849	0.0233151075	0.0276536739	0.0230524492
17	0.0000299603	0.0197450172	0.0182482037	0.0135180737	0.0175637044	0.0244970846	0.0206833827	0.0146346390	0.0197956396	0.0052258132	0.0206748599	0.0205906442	0.0138452217
18	0.0000127409	0.0157207729	0.0129944958	0.0106794767	0.0201192241	0.0250480695	0.0266888558	0.0401958334	0.0193740288	0.0037212159	0.0155464816	0.0235865809	0.0100066460
19	0.0000055369	0.0109327203	0.0097340094	0.0083371380	0.0225790392	0.0366610768	0.0301447753	0.0342277190	0.0227335396	0.0175775477	0.0203628520	0.0264703224	0.0098603738
20	0.0000022027	0.0097167069	0.0096594452	0.0078607301	0.0226407923	0.0281971934	0.0173882093	0.0270081845	0.0289956333	0.0183874566	0.0265944575	0.0265427135	0.0095755112
21	0.0000010015	0.0060838669	0.0075445351	0.0053595887	0.0212965445	0.0224413685	0.0209032932	0.0367430589	0.0255089927	0.0121624816	0.0238465850	0.0249667984	0.0083402541
22	0.0000005320	0.0047196519	0.0043586128	0.0031760526	0.0221366577	0.0207614938	0.0211741003	0.0294241579	0.0211707159	0.0029207200	0.0232916866	0.0259516972	0.0021970287
23	0.0000002372	0.0034656381	0.0032604864	0.0028187467	0.0187753208	0.0176845935	0.0186862600	0.0367365508	0.0255742899	0.0006595597	0.0173635700	0.0220110680	0.0022815392
24	0.0000001072	0.0034048375	0.0028063230	0.0021239852	0.0165801584	0.0153441343	0.0162223474	0.0195371739	0.0181341022	0.0013228019	0.0186391363	0.0194375881	0.0028947085
25	0.0000000515	0.0020672227	0.0018979963	0.0014292237	0.0130464803	0.0119613578	0.0125269842	0.0202862884	0.0101534224	0.0013255722	0.0189070434	0.0152949162	0.0014963357
26	0.0000000201	0.0015238168	0.0010100052	0.0009131151	0.0052066606	0.0114707358	0.0046276161	0.0058785937	0.0158244798	0.0000000000	0.0123859355	0.0061039775	0.0003051544
27	0.0000000084	0.0007410082	0.0008269841	0.0008535641	0.0044375500	0.0062552616	0.0034269422	0.0066192300	0.0082431519	0.0005853113	0.0073123264	0.0052023202	0.0002365920
28	0.0000000046	0.0008208090	0.0006507416	0.0006550608	0.0038534093	0.0027153367	0.0040227141	0.0058648852	0.0078447522	0.0004224309	0.0040199156	0.0045175071	0.0007539156
29	0.0000000027	0.0007486082	0.0002846994	0.0002382039	0.0050202650	0.0073813428	0.0039557847	0.0014702211	0.0082910352	0.0000000000	0.0005297244	0.0058854602	0.0002483418
30	0.0000000060	0.0106363170	0.0052872753	0.0046449769	0.0041641999	0.0025473919	0.0046291194	0.0021486392	0.0093642209	0.0005969550	0.0069720059	0.0048818593	0.0002641374

Source: Quality assured vehicle registration data for the combined Lake County and Porter County area for source types 21, 32, and 32, MOVES2010a default distributions for all other source types.

Appendix C

Lake and Porter Counties Vehicle Populations:

Vehicle Populations	Source Types												
	11	21	31	32	41	42	43	51	52	53	54	61	62
<i>Annual Populations</i>													
2008	12,164	276,531	159,214	48,746	293	157	2,005	58	3,634	434	831	6,485	7,399
2009	12,247	278,418	160,301	49,078	296	159	2,021	58	3,664	437	838	6,539	7,461
2010	12,330	280,318	161,395	49,413	298	160	2,038	59	3,694	441	845	6,593	7,523
2011	12,414	282,231	162,496	49,751	301	161	2,055	59	3,725	445	852	6,648	7,586
2012	12,499	284,156	163,605	50,090	303	163	2,072	60	3,756	448	859	6,703	7,649
2013	12,584	286,095	164,721	50,432	306	164	2,089	60	3,788	452	867	6,759	7,713
2014	12,670	288,048	165,845	50,776	308	166	2,107	61	3,819	456	874	6,816	7,777
2015	12,757	290,013	166,977	51,122	311	167	2,124	61	3,851	460	881	6,872	7,842
2016	12,844	291,992	168,116	51,471	314	168	2,142	62	3,883	463	888	6,930	7,907
2017	12,931	293,984	169,263	51,822	316	170	2,160	62	3,915	467	896	6,987	7,973
2018	13,020	295,990	170,418	52,176	319	171	2,178	63	3,948	471	903	7,046	8,039
2019	13,108	298,010	171,581	52,532	322	173	2,196	63	3,981	475	911	7,104	8,106
2020	13,198	300,044	172,752	52,891	324	174	2,214	64	4,014	479	918	7,163	8,174
2021	13,288	302,091	173,931	53,251	327	175	2,233	64	4,048	483	926	7,223	8,242
2022	13,379	304,152	175,117	53,615	330	177	2,251	65	4,081	487	934	7,283	8,311
2023	13,470	306,228	176,312	53,981	332	178	2,270	66	4,115	491	942	7,344	8,380
2024	13,562	308,317	177,516	54,349	335	180	2,289	66	4,150	495	949	7,405	8,450
2025	13,654	310,421	178,727	54,720	338	181	2,308	67	4,184	499	957	7,467	8,520
2026	13,746	312,539	179,946	55,093	341	183	2,327	67	4,219	504	965	7,529	8,591
2027	13,841	314,672	181,174	55,469	344	184	2,347	68	4,254	508	973	7,592	8,663
2028	13,936	316,819	182,410	55,848	346	186	2,366	68	4,290	512	982	7,655	8,735
2029	14,031	318,981	183,655	56,229	349	187	2,386	69	4,325	516	990	7,719	8,808
2030	14,127	321,158	184,908	56,612	352	189	2,406	69	4,361	521	998	7,783	8,881
2031	14,223	323,349	186,170	56,999	355	191	2,426	70	4,398	525	1,006	7,848	8,955
2032	14,320	325,556	187,440	57,388	358	192	2,446	71	4,434	529	1,015	7,913	9,030
2033	14,418	327,777	188,719	57,779	361	194	2,467	71	4,471	534	1,023	7,979	9,105
2034	14,516	330,014	190,007	58,174	364	195	2,487	72	4,509	538	1,032	8,046	9,181
2035	14,615	332,265	191,304	58,571	367	197	2,508	72	4,546	543	1,040	8,113	9,257
2036	14,715	334,533	192,609	58,970	370	199	2,529	73	4,584	547	1,049	8,181	9,334
2037	14,815	336,815	193,923	59,373	373	200	2,550	74	4,622	552	1,058	8,249	9,412
2038	14,916	339,114	195,247	59,778	376	202	2,571	74	4,661	556	1,066	8,317	9,490
2039	15,018	341,428	196,579	60,186	380	204	2,593	75	4,700	561	1,075	8,387	9,570
2040	15,121	343,757	197,920	60,596	383	205	2,614	75	4,739	566	1,084	8,457	9,649

Source: Quality assured vehicle registration data for the combined Lake County and Porter County area for source types 21, 32, and 32. MOVES2010a default mileage accumulation rates for all other source types. Population growth factors are taken from local socioeconomic data forecasts.

Appendix D

Lake and Porter Counties Meteorological Data:

Ozone					PM 2.5				
monthID	zoneID	HourID	temperature	relHumidity	monthID	zoneID	HourID	temperature	relHumidity
7	180890	1	67.0	88.0	4	180890	1	43.7	100.0
7	180890	2	65.8	91.8	4	180890	2	42.5	100.0
7	180890	3	64.9	94.9	4	180890	3	41.6	100.0
7	180890	4	64.2	97.2	4	180890	4	41.0	100.0
7	180890	5	63.6	99.0	4	180890	5	40.5	100.0
7	180890	6	63.0	100.0	4	180890	6	39.9	100.0
7	180890	7	62.5	100.0	4	180890	7	39.4	100.0
7	180890	8	62.9	100.0	4	180890	8	39.8	100.0
7	180890	9	65.5	92.6	4	180890	9	42.3	100.0
7	180890	10	69.7	80.2	4	180890	10	46.2	97.2
7	180890	11	74.0	69.4	4	180890	11	50.3	83.5
7	180890	12	77.7	61.4	4	180890	12	53.8	73.5
7	180890	13	80.9	55.3	4	180890	13	56.8	65.8
7	180890	14	82.6	52.2	4	180890	14	58.5	62.0
7	180890	15	83.2	51.2	4	180890	15	59.0	60.7
7	180890	16	83.4	50.9	4	180890	16	59.2	60.3
7	180890	17	83.0	51.6	4	180890	17	58.8	61.2
7	180890	18	81.7	53.7	4	180890	18	57.6	63.8
7	180890	19	79.7	57.5	4	180890	19	55.7	68.6
7	180890	20	77.0	62.9	4	180890	20	53.1	75.3
7	180890	21	74.3	68.8	4	180890	21	50.5	82.7
7	180890	22	71.9	74.5	4	180890	22	48.3	89.9
7	180890	23	70.3	78.8	4	180890	23	46.7	95.4
7	180890	24	68.6	83.4	4	180890	24	45.2	100.0

Source: Mobile 6.2 reported meteorological data from *Air Quality Conformity Determination Between the 2040 Regional Transportation Plan, the Fiscal Year 2012 to 2015 Transportation Improvement Program, and the Indiana State Implementation Plan for Air Quality*, Appendix E, developed by NIRPC in June, 2011 converted using EPA data converter.

Appendix E

Indiana Default VMT Distributions by Vehicle Type and Road Type:

Road Type	Motorcycle	Passenger Car	Light Duty Truck	Bus	Single Unit Truck	Combination Truck
2	0.007033832	0.506408086	0.163786651	0.004174166	0.007773053	0.310824213
3	0.001733929	0.659751199	0.225767175	0.000793168	0.010963315	0.100991214
4	0.004429643	0.424581084	0.299243052	0.005271096	0.008735204	0.257739921
5	0.002785022	0.702754695	0.245240087	0.001402085	0.009764356	0.038053756

Source: Statewide averages developed from Indiana Department of Transportation traffic count data for all road types except for Road Type 4. Distributions for Road Type 4 taken specifically from I-80 in Gary (count station 4000) as per ICG consensus to represent higher than average truck traffic in Gary.

Appendix F

Indiana Default Hourly Distribution Factors for Road Type 2 – Rural Restricted Access:

Hour	Source Types													
	11	21	31	32	41	42	43	51	52	53	54	61	62	
1	0.0125903247	0.0101219844	0.0084967341	0.0084967341	0.0254913340	0.0254913340	0.0254913340	0.0126607789	0.0126607789	0.0126607789	0.0126607789	0.0197906895	0.0197906895	
2	0.0104070951	0.0069241973	0.0066421955	0.0086421955	0.0269500431	0.0269500431	0.0269500431	0.0114617645	0.0114617645	0.0114617645	0.0114617645	0.0212124099	0.0212124099	
3	0.0098043179	0.0056567534	0.0061275627	0.0061275627	0.0231103443	0.0231103443	0.0231103443	0.0107741941	0.0107741941	0.0107741941	0.0107741941	0.0201622890	0.0201622890	
4	0.0140329469	0.0069658232	0.0084286563	0.0084286563	0.0234460042	0.0234460042	0.0234460042	0.0128724692	0.0128724692	0.0128724692	0.0128724692	0.0213065902	0.0213065902	
5	0.0165212405	0.0100941552	0.0134026652	0.0134026652	0.0244090660	0.0244090660	0.0244090660	0.0174195788	0.0174195788	0.0174195788	0.0174195788	0.0250478552	0.0250478552	
6	0.0312047458	0.0241732202	0.0316551315	0.0316551315	0.0322923692	0.0322923692	0.0322923692	0.0261005783	0.0261005783	0.0261005783	0.0261005783	0.0304976568	0.0304976568	
7	0.0399082603	0.0390974746	0.0481531313	0.0481531313	0.0302344914	0.0302344914	0.0302344914	0.0420450985	0.0420450985	0.0420450985	0.0420450985	0.0339947725	0.0339947725	
8	0.0482864956	0.0528758381	0.0535145983	0.0535145983	0.0386071681	0.0386071681	0.0386071681	0.0556119122	0.0556119122	0.0556119122	0.0556119122	0.0383435322	0.0383435322	
9	0.0472316355	0.0493101459	0.0541442978	0.0541442978	0.0454144773	0.0454144773	0.0454144773	0.0647383083	0.0647383083	0.0647383083	0.0647383083	0.0447350945	0.0447350945	
10	0.0521292001	0.0488627065	0.0570682751	0.0570682751	0.0533197396	0.0533197396	0.0533197396	0.0711110358	0.0711110358	0.0711110358	0.0711110358	0.0517738130	0.0517738130	
11	0.0559204481	0.0513700269	0.0575854739	0.0575854739	0.0576707709	0.0576707709	0.0576707709	0.0730230234	0.0730230234	0.0730230234	0.0730230234	0.0557712484	0.0557712484	
12	0.0572822100	0.0533048469	0.0582753930	0.0582753930	0.0549541212	0.0549541212	0.0549541212	0.0731872952	0.0731872952	0.0731872952	0.0731872952	0.0571435296	0.0571435296	
13	0.0592008057	0.0551586141	0.0599414146	0.0599414146	0.0541541840	0.0541541840	0.0541541840	0.0739324454	0.0739324454	0.0739324454	0.0739324454	0.0567014536	0.0567014536	
14	0.0615145144	0.0595500442	0.0635019874	0.0635019874	0.0570747392	0.0570747392	0.0570747392	0.0746488056	0.0746488056	0.0746488056	0.0746488056	0.0567500887	0.0567500887	
15	0.0647783324	0.0662712693	0.0683897966	0.0683897966	0.0551925339	0.0551925339	0.0551925339	0.0704234655	0.0704234655	0.0704234655	0.0704234655	0.0578234055	0.0578234055	
16	0.0713500739	0.0764876319	0.0772110428	0.0772110428	0.0551956709	0.0551956709	0.0551956709	0.0628601912	0.0628601912	0.0628601912	0.0628601912	0.0577540296	0.0577540296	
17	0.0754978425	0.0847160034	0.0792545794	0.0792545794	0.0557979766	0.0557979766	0.0557979766	0.0534712990	0.0534712990	0.0534712990	0.0534712990	0.0562910814	0.0562910814	
18	0.0693763461	0.0821220539	0.0693254052	0.0693254052	0.0501011685	0.0501011685	0.0501011685	0.0436895095	0.0436895095	0.0436895095	0.0436895095	0.0527021980	0.0527021980	
19	0.0542187052	0.0620082513	0.0521045300	0.0521045300	0.0459665909	0.0459665909	0.0459665909	0.0363413126	0.0363413126	0.0363413126	0.0363413126	0.0502215100	0.0502215100	
20	0.0432143461	0.0459015588	0.0390794599	0.0390794599	0.0462959768	0.0462959768	0.0462959768	0.0312048570	0.0312048570	0.0312048570	0.0312048570	0.0467116534	0.0467116534	
21	0.0358137860	0.0372595462	0.0311015284	0.0311015284	0.0418602463	0.0418602463	0.0418602463	0.0261242877	0.0261242877	0.0261242877	0.0261242877	0.0421311043	0.0421311043	
22	0.0294294934	0.0312744978	0.0249803003	0.0249803003	0.0366496745	0.0366496745	0.0366496745	0.0215822587	0.0215822587	0.0215822587	0.0215822587	0.0381387483	0.0381387483	
23	0.0223450238	0.0235734666	0.0182964081	0.0182964081	0.0347517842	0.0347517842	0.0347517842	0.0189759266	0.0189759266	0.0189759266	0.0189759266	0.0342326572	0.0342326572	
24	0.0179418099	0.0169198902	0.0133194323	0.0133194323	0.0310595247	0.0310595247	0.0310595247	0.0157396039	0.0157396039	0.0157396039	0.0157396039	0.0307625891	0.0307625891	

Source: Statewide averages developed from Indiana Department of Transportation traffic count data.

Indiana Default Hourly Distribution Factors for Road Type 3 – Rural Unrestricted Access:

Hour	Source Types													
	11	21	31	32	41	42	43	51	52	53	54	61	62	
1	0.0040299464	0.0073183989	0.0054636028	0.0054636028	0.0036998387	0.0036998387	0.0036998387	0.0043986387	0.0043986387	0.0043986387	0.0043986387	0.0043986387	0.0164160879	0.0164160879
2	0.0040299464	0.0041131835	0.0034619242	0.0034619242	0.0045536477	0.0045536477	0.0045536477	0.0041872686	0.0041872686	0.0041872686	0.0041872686	0.0041872686	0.0167510731	0.0167510731
3	0.0041817017	0.0032797517	0.0030691885	0.0030691885	0.0046485153	0.0046485153	0.0046485153	0.0073497934	0.0073497934	0.0073497934	0.0073497934	0.0073497934	0.0165479051	0.0165479051
4	0.0053114356	0.0057247729	0.0048082254	0.0048082254	0.0039844417	0.0039844417	0.0039844417	0.0084039684	0.0084039684	0.0084039684	0.0084039684	0.0084039684	0.0195836328	0.0195836328
5	0.0140963815	0.0151258840	0.0143177758	0.0143177758	0.0082534864	0.0082534864	0.0082534864	0.0153176438	0.0153176438	0.0153176438	0.0153176438	0.0153176438	0.0258467673	0.0258467673
6	0.0292719118	0.0316782840	0.0354335195	0.0354335195	0.0293141068	0.0293141068	0.0293141068	0.0299744215	0.0299744215	0.0299744215	0.0299744215	0.0299744215	0.0344245647	0.0344245647
7	0.0397598894	0.0468485516	0.0516314034	0.0516314034	0.0496157860	0.0496157860	0.0496157860	0.0557776279	0.0557776279	0.0557776279	0.0557776279	0.0557776279	0.0440469233	0.0440469233
8	0.0448183995	0.0633910409	0.0636260878	0.0636260878	0.0768428043	0.0768428043	0.0768428043	0.0778885464	0.0778885464	0.0778885464	0.0778885464	0.0778885464	0.0512793380	0.0512793380
9	0.0370114322	0.0460357746	0.0558633273	0.0558633273	0.1049236315	0.1049236315	0.1049236315	0.0853025536	0.0853025536	0.0853025536	0.0853025536	0.0853025536	0.0568238265	0.0568238265
10	0.0416989849	0.0427840868	0.0547852386	0.0547852386	0.1065363817	0.1065363817	0.1065363817	0.0879727734	0.0879727734	0.0879727734	0.0879727734	0.0879727734	0.0599756501	0.0599756501
11	0.0509391967	0.0444183487	0.0568454275	0.0568454275	0.1186794422	0.1186794422	0.1186794422	0.0886336394	0.0886336394	0.0886336394	0.0886336394	0.0886336394	0.0633505956	0.0633505956
12	0.0563855259	0.0512966366	0.0618918527	0.0618918527	0.1154539418	0.1154539418	0.1154539418	0.0859045570	0.0859045570	0.0859045570	0.0859045570	0.0859045570	0.0635864154	0.0635864154
13	0.0638721209	0.0537246907	0.0610818211	0.0610818211	0.0999905132	0.0999905132	0.0999905132	0.0858537212	0.0858537212	0.0858537212	0.0858537212	0.0858537212	0.0644099711	0.0644099711
14	0.0708697265	0.0545001954	0.0632013074	0.0632013074	0.0864244379	0.0864244379	0.0864244379	0.0852196109	0.0852196109	0.0852196109	0.0852196109	0.0852196109	0.0637040231	0.0637040231
15	0.0774626513	0.0656899700	0.0681384267	0.0681384267	0.0592922873	0.0592922873	0.0592922873	0.0774551039	0.0774551039	0.0774551039	0.0774551039	0.0774551039	0.0609657913	0.0609657913
16	0.0849155229	0.0775959037	0.0765115831	0.0765115831	0.0295038421	0.0295038421	0.0295038421	0.0663381066	0.0663381066	0.0663381066	0.0663381066	0.0663381066	0.0570058311	0.0570058311
17	0.0916096179	0.0871890696	0.0796014405	0.0796014405	0.0317806680	0.0317806680	0.0317806680	0.0433522764	0.0433522764	0.0433522764	0.0433522764	0.0433522764	0.0517440242	0.0517440242
18	0.0855899909	0.0856725476	0.0737419189	0.0737419189	0.0184043260	0.0184043260	0.0184043260	0.0290727541	0.0290727541	0.0290727541	0.0290727541	0.0290727541	0.0467760851	0.0467760851
19	0.0685259502	0.0656330958	0.0545272751	0.0545272751	0.0120481928	0.0120481928	0.0120481928	0.0187744815	0.0187744815	0.0187744815	0.0187744815	0.0187744815	0.0413186686	0.0413186686
20	0.0503658989	0.0457301992	0.0390975413	0.0390975413	0.0118584575	0.0118584575	0.0118584575	0.0129711680	0.0129711680	0.0129711680	0.0129711680	0.0129711680	0.0364127078	0.0364127078
21	0.0353421239	0.0400621944	0.0294058171	0.0294058171	0.0096765013	0.0096765013	0.0096765013	0.0106166656	0.0106166656	0.0106166656	0.0106166656	0.0106166656	0.0318882915	0.0318882915
22	0.0217853168	0.0289018238	0.0218457686	0.0218457686	0.0061663979	0.0061663979	0.0061663979	0.0079972816	0.0079972816	0.0079972816	0.0079972816	0.0079972816	0.0290264055	0.0290264055
23	0.0119380838	0.0205028665	0.0136731866	0.0136731866	0.0048382506	0.0048382506	0.0048382506	0.0061564888	0.0061564888	0.0061564888	0.0061564888	0.0061564888	0.0255574344	0.0255574344
24	0.0061882440	0.0127827290	0.0079763402	0.0079763402	0.0035101034	0.0035101034	0.0035101034	0.0050809093	0.0050809093	0.0050809093	0.0050809093	0.0050809093	0.0225579868	0.0225579868

Source: Statewide averages developed from Indiana Department of Transportation traffic count data.

Indiana Default Hourly Distribution Factors for Road Type 4 --Urban Restricted Access:

Hour	Source Types													
	11	21	31	32	41	42	43	51	52	53	54	61	62	
1	0.0114838630	0.0104500369	0.0090397680	0.0090397680	0.0186488577	0.0186488577	0.0186488577	0.0090968023	0.0090968023	0.0090968023	0.0090968023	0.0194173119	0.0194173119	
2	0.0071800855	0.0062500477	0.0056304309	0.0056304309	0.0163411464	0.0163411464	0.0163411464	0.0080102618	0.0080102618	0.0080102618	0.0080102618	0.0198708197	0.0198708197	
3	0.0063691205	0.0049689741	0.0046493622	0.0046493622	0.0157775876	0.0157775876	0.0157775876	0.0078361983	0.0078361983	0.0078361983	0.0078361983	0.0186489893	0.0186489893	
4	0.0073777516	0.0058427101	0.0058801326	0.0058801326	0.0161766037	0.0161766037	0.0161766037	0.0086827231	0.0086827231	0.0086827231	0.0086827231	0.0198231326	0.0198231326	
5	0.0108139353	0.0098545059	0.0108999000	0.0108999000	0.0221330492	0.0221330492	0.0221330492	0.0117453229	0.0117453229	0.0117453229	0.0117453229	0.0232515449	0.0232515449	
6	0.0235457656	0.0231603609	0.0263517526	0.0263517526	0.0299755654	0.0299755654	0.0299755654	0.0204013312	0.0204013312	0.0204013312	0.0204013312	0.0294638153	0.0294638153	
7	0.0461747881	0.0495085217	0.0542414566	0.0542414566	0.0393812372	0.0393812372	0.0393812372	0.0435263184	0.0435263184	0.0435263184	0.0435263184	0.0375553768	0.0375553768	
8	0.0567226756	0.0788353145	0.0674512195	0.0674512195	0.0503870867	0.0503870867	0.0503870867	0.0659533819	0.0659533819	0.0659533819	0.0659533819	0.0446175773	0.0446175773	
9	0.0493171440	0.0638279223	0.0614111771	0.0614111771	0.0589556475	0.0589556475	0.0589556475	0.0756333178	0.0756333178	0.0756333178	0.0756333178	0.0515843704	0.0515843704	
10	0.0406144957	0.0466481655	0.0536303211	0.0536303211	0.0581555587	0.0581555587	0.0581555587	0.0790728466	0.0790728466	0.0790728466	0.0790728466	0.0553194565	0.0553194565	
11	0.0415130748	0.0428102606	0.0512594850	0.0512594850	0.0616027281	0.0616027281	0.0616027281	0.0824723032	0.0824723032	0.0824723032	0.0824723032	0.0583081277	0.0583081277	
12	0.0465166969	0.0452333632	0.0529793024	0.0529793024	0.0644246353	0.0644246353	0.0644246353	0.0820640679	0.0820640679	0.0820640679	0.0820640679	0.0589378233	0.0589378233	
13	0.0517959830	0.0478467216	0.0547982766	0.0547982766	0.0637644078	0.0637644078	0.0637644078	0.0808088903	0.0808088903	0.0808088903	0.0808088903	0.0575925555	0.0575925555	
14	0.0566713893	0.0502151226	0.0576880799	0.0576880799	0.0625591325	0.0625591325	0.0625591325	0.0811795580	0.0811795580	0.0811795580	0.0811795580	0.0571667797	0.0571667797	
15	0.0671882913	0.0580384620	0.0656779676	0.0656779676	0.0619482678	0.0619482678	0.0619482678	0.0795090490	0.0795090490	0.0795090490	0.0795090490	0.0573429674	0.0573429674	
16	0.0810035452	0.0715596945	0.0786905659	0.0786905659	0.0609466141	0.0609466141	0.0609466141	0.0727723312	0.0727723312	0.0727723312	0.0727723312	0.0567213465	0.0567213465	
17	0.0863864724	0.0838541123	0.0821371575	0.0821371575	0.0577256909	0.0577256909	0.0577256909	0.0563364761	0.0563364761	0.0563364761	0.0563364761	0.0551911545	0.0551911545	
18	0.0843264717	0.0874512168	0.0756929494	0.0756929494	0.0510164625	0.0510164625	0.0510164625	0.0371719560	0.0371719560	0.0371719560	0.0371719560	0.0531125437	0.0531125437	
19	0.0645951265	0.0604364374	0.0543673700	0.0543673700	0.0450990958	0.0450990958	0.0450990958	0.0249336618	0.0249336618	0.0249336618	0.0249336618	0.0487199307	0.0487199307	
20	0.0469536991	0.0424749554	0.0373951308	0.0373951308	0.0384927066	0.0384927066	0.0384927066	0.0188134711	0.0188134711	0.0188134711	0.0188134711	0.0432101938	0.0432101938	
21	0.0373781148	0.0353280630	0.0293181427	0.0293181427	0.0322318571	0.0322318571	0.0322318571	0.0162446774	0.0162446774	0.0162446774	0.0162446774	0.0390319248	0.0390319248	
22	0.0316564842	0.0313403787	0.0249971308	0.0249971308	0.0282046747	0.0282046747	0.0282046747	0.0142456600	0.0142456600	0.0142456600	0.0142456600	0.0355118446	0.0355118446	
23	0.0245992722	0.0251562568	0.0203505544	0.0203505544	0.0242700475	0.0242700475	0.0242700475	0.0124474209	0.0124474209	0.0124474209	0.0124474209	0.0317711657	0.0317711657	
24	0.0198157539	0.0189063955	0.0154623663	0.0154623663	0.0217813392	0.0217813392	0.0217813392	0.0110419727	0.0110419727	0.0110419727	0.0110419727	0.0278292477	0.0278292477	

Source: Statewide averages developed from Indiana Department of Transportation traffic count data.

Indiana Default Hourly Distribution Factors for Road Type 5 –Urban Unrestricted Access:

Hour	Source Types													
	11	21	31	32	41	42	43	51	52	53	54	61	62	
1	0.0092279794	0.0085268711	0.0060669694	0.0060669694	0.0126828270	0.0126828270	0.0126828270	0.0037158531	0.0037158531	0.0037158531	0.0037158531	0.0106396358	0.0106396358	
2	0.0055316691	0.0048527626	0.0037675180	0.0037675180	0.0099485186	0.0099485186	0.0099485186	0.0038117041	0.0038117041	0.0038117041	0.0038117041	0.0124309233	0.0124309233	
3	0.0047273286	0.0037895145	0.0033129405	0.0033129405	0.0069482800	0.0069482800	0.0069482800	0.0044165887	0.0044165887	0.0044165887	0.0044165887	0.0121505035	0.0121505035	
4	0.0047017359	0.0044201159	0.0042394230	0.0042394230	0.0113599945	0.0113599945	0.0113599945	0.0056282193	0.0056282193	0.0056282193	0.0056282193	0.0144699998	0.0144699998	
5	0.0081859928	0.0079416389	0.0087215410	0.0087215410	0.0153898606	0.0153898606	0.0153898606	0.0086545038	0.0086545038	0.0086545038	0.0086545038	0.0210508569	0.0210508569	
6	0.0225361588	0.0203863353	0.0238668712	0.0238668712	0.0256929528	0.0256929528	0.0256929528	0.0191822890	0.0191822890	0.0191822890	0.0191822890	0.0299165403	0.0299165403	
7	0.0435184779	0.0478282898	0.0541952158	0.0541952158	0.0448331117	0.0448331117	0.0448331117	0.0418068371	0.0418068371	0.0418068371	0.0418068371	0.0436775030	0.0436775030	
8	0.0602121997	0.0721456866	0.0675347974	0.0675347974	0.0691895946	0.0691895946	0.0691895946	0.0731482386	0.0731482386	0.0731482386	0.0731482386	0.0588646976	0.0588646976	
9	0.0556311148	0.0567013867	0.0643660182	0.0643660182	0.0747059425	0.0747059425	0.0747059425	0.0880926125	0.0880926125	0.0880926125	0.0880926125	0.0640862836	0.0640862836	
10	0.0485821670	0.0466493163	0.0603283916	0.0603283916	0.0803995772	0.0803995772	0.0803995772	0.0921313810	0.0921313810	0.0921313810	0.0921313810	0.0680944168	0.0680944168	
11	0.0495965610	0.0468148434	0.0590657789	0.0590657789	0.0774061573	0.0774061573	0.0774061573	0.0943973720	0.0943973720	0.0943973720	0.0943973720	0.0703404942	0.0703404942	
12	0.0573056055	0.0516032787	0.0615645883	0.0615645883	0.0753332651	0.0753332651	0.0753332651	0.0911430924	0.0911430924	0.0911430924	0.0911430924	0.0698309800	0.0698309800	
13	0.0607752380	0.0555323143	0.0626732860	0.0626732860	0.0739763390	0.0739763390	0.0739763390	0.0895629476	0.0895629476	0.0895629476	0.0895629476	0.0685413889	0.0685413889	
14	0.0609214817	0.0562211160	0.0629887267	0.0629887267	0.0779993863	0.0779993863	0.0779993863	0.0912650000	0.0912650000	0.0912650000	0.0912650000	0.0671175363	0.0671175363	
15	0.0649907135	0.0607579027	0.0667909366	0.0667909366	0.0761037810	0.0761037810	0.0761037810	0.0905726397	0.0905726397	0.0905726397	0.0905726397	0.0651260461	0.0651260461	
16	0.0724418316	0.0715477952	0.0751790074	0.0751790074	0.0728035185	0.0728035185	0.0728035185	0.0775387708	0.0775387708	0.0775387708	0.0775387708	0.0605241028	0.0605241028	
17	0.0773519648	0.0803647101	0.0757034489	0.0757034489	0.0526405510	0.0526405510	0.0526405510	0.0464337395	0.0464337395	0.0464337395	0.0464337395	0.0557885235	0.0557885235	
18	0.0770777578	0.0832250581	0.0684911688	0.0684911688	0.0347686748	0.0347686748	0.0347686748	0.0260342365	0.0260342365	0.0260342365	0.0260342365	0.0506461891	0.0506461891	
19	0.0635977420	0.0637849687	0.0526386278	0.0526386278	0.0285090860	0.0285090860	0.0285090860	0.0173341336	0.0173341336	0.0173341336	0.0173341336	0.0402747366	0.0402747366	
20	0.0483079600	0.0462284324	0.0372839274	0.0372839274	0.0220585728	0.0220585728	0.0220585728	0.0112536468	0.0112536468	0.0112536468	0.0112536468	0.0310667712	0.0310667712	
21	0.0383158572	0.0386568197	0.0292289942	0.0292289942	0.0174082029	0.0174082029	0.0174082029	0.0076615624	0.0076615624	0.0076615624	0.0076615624	0.0268533367	0.0268533367	
22	0.0305027859	0.0325107827	0.0236169348	0.0236169348	0.0137124544	0.0137124544	0.0137124544	0.0062358957	0.0062358957	0.0062358957	0.0062358957	0.0231915644	0.0231915644	
23	0.0214502991	0.0236017051	0.0170601049	0.0170601049	0.0139442910	0.0139442910	0.0139442910	0.0053276381	0.0053276381	0.0053276381	0.0053276381	0.0193751364	0.0193751364	
24	0.0145073780	0.0159083752	0.0113147831	0.0113147831	0.0121850602	0.0121850602	0.0121850602	0.0046510979	0.0046510979	0.0046510979	0.0046510979	0.0159618330	0.0159618330	

Source: Statewide averages developed from Indiana Department of Transportation traffic count data.

Appendix G

Indiana Default Daily Distribution Factors:

monthID	dayID	
	2	5
1	0.2325411725	0.7674588275
2	0.2380547378	0.7619452622
3	0.2393402049	0.7606597951
4	0.2396052454	0.7603947546
5	0.2484757701	0.7515242299
6	0.2489743665	0.7510256335
7	0.2481153021	0.7518846979
8	0.2527028648	0.7472971352
9	0.2496078420	0.7503921580
10	0.2462808693	0.7537191307
11	0.2439742406	0.7560257594
12	0.2258784720	0.7741215280

Source: Statewide averages developed from Indiana Department of Transportation traffic count data.

Appendix H

Indiana Default Monthly Distribution Factors:

monthID	monthVMTFraction
1	0.0733424010
2	0.0693661929
3	0.0827036024
4	0.0831789580
5	0.0891346903
6	0.0888150873
7	0.0907968617
8	0.0918542094
9	0.0854175366
10	0.0875162272
11	0.0812354405
12	0.0766387926

Source: Statewide averages developed from Indiana Department of Transportation traffic count data.

Appendix I

Lake and Porter Counties Ramp Fractions:

Road Type	Ramp Fraction
2	0.79%
4	6.66%

Source: Analysis of VHT from the CMAP travel demand model.

Appendix B

Lake and Porter Counties, Indiana, Maintenance Area Interagency Consultation Group Meeting Minutes/Summary

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Interagency Consultation Group (ICG) Conference Call Minutes

For the MOBILE6.2 to MOVES MVEB Replacement Update Related to the Maintenance Plan for the Annual Fine Particles Standard for Lake and Porter Counties, Indiana

ICG Conference Call Date and Time

- September 25, 2012 at 10am Eastern

ICG Attendees

- Shawn Seals (IDEM), Linda McClure (IDEM), Patricia Morris (EPA), Steve Smith (INDOT), Greg Katter (INDOT), Larry Heil (FHWA), and Bill Brown (NIRPC)

ICG Discussion Topics and Conclusions

1. For the Ozone MVEB Replacement submittal, various mobile source margins of safety were discussed.
 - A. After discussion, the consensus of the ICG was that as long as the a 15% mobile source margin of safety for VOC and NO_x emissions does not result in an exceedance of the all sources margins of safety, it was reasonable and appropriate for inclusion in MVEB replacement submittal.
2. For the PM_{2.5} MVEB Replacement submittal, various mobile source margins of safety were discussed.
 - A. After discussion, the consensus of the ICG was that as long as the a 15% mobile source margin of safety for NO_x and PM_{2.5} emissions does not result in an exceedance of the all sources margins of safety, it was reasonable and appropriate for inclusion in MVEB replacement submittal.

