INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live.

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Governor

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Mr. Bharat Mathur
Acting Regional Administrator
U.S. Environmental Protection Agency
Region V
77 West Jackson Boulevard
Chicago, IL 60604-3950

June 2, 2005

Re: Redesignation Petition and Maintenance Plan for Vanderburgh and Warrick Counties, Indiana; Final Submittal

Dear Mr. Mathur:

The Indiana Department of Environmental Management (IDEM) prepared a draft Redesignation Petition and Maintenance Plan for Vanderburgh and Warrick Counties, Indiana, and submitted them to the United States Environmental Protection Agency (US EPA) with a request for parallel processing on March 18, 2005. IDEM conducted a public hearing concerning the Redesignation Petition and Maintenance Plan on April 19, 2005 and the public comment period concluded on April 22, 2005.

Attached hereto is the final Redesignation Petition and Maintenance Plan for Vanderburgh and Warrick Counties, Indiana. This final version documents the public review process, including a detailed summary of and response to substantive comments. The document has not been altered substantively since it was submitted to the U.S. EPA for parallel processing.

The attached document consists of the following:

Redesignation Petition and Maintenance Plan

- A formal request that the Evansville 8-hour ozone nonattainment area be redesignated to a maintenance area. It contains and meets the requirements set forth in Section 107 of the Clean Air Act and in the Redesignation guidance issued September 4, 1992.
- A maintenance year of 2015 is established and 2010 is analyzed as an interim year.
- The appendices of the document contain historic trend data, projected emission inventory data and thorough documentation of the mobile emissions analysis.
- A transcript of the public hearing and record of all comments received.
- A summary of and response to substantive comments.

Motor Vehicle Emissions Budgets

- Contained in the Redesignation Petition is a new Motor Vehicle Emissions Budget for 2015. The Evansville Urban Transportation Study's travel demand model and MOBILE6 were used to determine emissions for the 8-hour ozone nonattainment area.
- A conservative safety margin was applied to the 2015 projected emissions.
- The Travel Demand Model was updated with the best available assumptions.
- Vehicle Registration data gathered from the Indiana Bureau of Motor Vehicles was used to replace the MOBILE6 default vehicle age distribution.

IDEM hereby requests that the U.S. EPA proceed with final review and approval of this submittal. If you have any questions or need additional information, please contact Laurence Brown, Air Programs Branch at (317)234-3097.

Sincerely,

Thomas W. Easterly

TWE/kaw/sad
Attachments

cc: Jay Bortzer, US EPA
Ed Doty, US EPA
John Mooney, US EPA
Anthony Maietta, USEPA
Dona Bergman, Evansville EPA
Joanne Alexandrovich, Vanderburgh County

REQUEST FOR REDESIGNATION AND MAINTENANCE PLAN FOR OZONE ATTAINMENT IN THE 8-HOUR OZONE BASIC NONATTAINMENT AREA

Vanderburgh and Warrick Counties, Indiana

Developed By:
The Indiana Department of Environmental Management

June 2, 2005

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REQUEST FOR REDESIGNATION AND
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IN THE 8-HOUR OZONE BASIC
NONATTAINMENT AREA

VANDERBURGH AND WARRICK COUNTIES, INDIANA

1.0 INTRODUCTION

This document is intended to support Indiana's request that Vanderburgh and Warrick Counties, in Southwestern Indiana, be redesignated from nonattainment to attainment of the 8-hour ozone standard. These counties have recorded three years of complete, quality-assured ambient air quality monitoring data for the years 2002 – 2004 demonstrating attainment with the 8-hour ozone standard.

Section 107 of the Clean Air Act (CAA) establishes specific requirements to be met in order for an area to be considered for redesignation including:

(a) A determination that the area has attained the 8-hour ozone standard.
(b) An approved State Implementation Plan (SIP) for the area under Section 110(k).
(c) A determination that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the SIP and other federal requirements.
(d) A fully approved maintenance plan under Section 175(A).
(e) A determination that all Section 110 and Part D requirements have been met.

This document addresses each of those requirements. It also provides additional information to support continued compliance with the 8-hour ozone standard.

1.1 Background

The Clean Air Act Amendments of 1990 (CAAA) required areas failing to meet the National Ambient Air Quality Standard (NAAQS) for ozone to develop SIPs to expeditiously attain and maintain the standard. In 1997 the United States Environmental Protection Agency (U.S. EPA) revised the air quality standard for ozone replacing the 1979 1-hour standard with an 8-hour ozone standard set at 0.08 parts per million (ppm). The standard was challenged legally and upheld by the U.S. Supreme Court in February of 2001. The U.S. EPA designated areas that attain or do not attain the 8-hour ozone standard on April 15, 2004.

Vanderburgh County was designated as Marginal nonattainment for the one-hour ozone standard pursuant to the 1990 CAAA. After several years of monitored data showing the air quality met the one-hour standard, Vanderburgh County was redesignated to attainment on December 9, 1997. At the time of the 1990 CAAA, there were no monitors in Warrick County that violated the one-hour standard. Since that time, a monitoring network has been developed that includes a total of six sites in Posey, Vanderburgh, and Warrick Counties. On April 15, 2004, U.S. EPA designated Vanderburgh and Warrick Counties Basic nonattainment and subject to the new 8-hour ozone requirements. This requires the development of a plan to reduce volatile organic compound (VOC) and oxides of nitrogen (NO_x) emissions and a demonstration that the area will meet the 8-hour ozone standard by June 2009.

1.2 Geographical Description

Vanderburgh and Warrick are adjacent counties, located in southwestern Indiana. The city of Evansville is located in Vanderburgh County, which is west of Warrick County. Posey County is to the west of Vanderburgh, Gibson and Pike are to the north. Spencer County is to the east of Warrick County. Both Vanderburgh and Warrick are bordered on the south by the Ohio River. This area is shown in Figure 3.1.

1.3 Status of Air Quality

Ozone monitoring data for the most recent three (3) years, 2002 through 2004, demonstrates that air quality has met the NAAQS for ozone in this Basic nonattainment area. This fact, accompanied by the decreases in emission levels discussed in Section 4.0, justifies a redesignation to attainment for the subject area based on Section 107(d)(3)(D) of the CAAA.

2.0 REQUIREMENTS FOR REDESIGNATION

2.1 General

Section 110 and Part D of the CAAA lists the requirements that must be met by nonattainment areas prior to consideration for redesignation to attainment. In addition, U.S. EPA has published detailed guidance in a document entitled, *Procedures for Processing Requests to Redesignate Areas to Attainment*, issued September 4, 1992, to Regional Air Directors. This document is hereafter referred to as the "Redesignation Guidance". This Request for Redesignation and Maintenance Plan is based on the Redesignation Guidance, supplemented with additional guidance received from staff of the Criteria Pollutant Section of U.S. EPA Region V.

The subsections below refer in greater detail to the requirements listed in Section 1.0 of this document. Each subsection describes how the requirement has been met. The pertinent sections of the CAAA are referenced where appropriate.

2.2 Ozone Monitoring

107(d)(3)(D)(i)

1) A demonstration that the NAAQS for ozone, as published in 40 CFR 50.4, has been attained. Ozone monitoring data must show that violations of the ambient standard are no longer occurring.

2) Ambient monitoring data quality assured in accordance with 40 CFR 58.10, recorded in the Aerometric Information and Retrieval System (AIRS) data base, and available for public view.

3) A showing that the three-year average of the fourth highest values, based on data from all monitoring sites in the area or its affected downwind environs, is below 85 parts per billion (ppb). This showing must rely on three (3) complete, consecutive calendar years of quality assured data.

4) A commitment that, once redesignated, the State will continue to operate an appropriate monitoring network to verify the maintenance of the attainment status.

2.3 Emission Inventory

107(d)(3)(D)(iii)

1) A comprehensive emission inventory of the precursors of ozone completed for the base year.

2) A projection of the emission inventory for a year at least 10 years following redesignation.

3) A demonstration that the projected level of emissions is sufficient to maintain the ozone standard.

4) A demonstration that improvement in air quality between the year violations occurred and attainment was achieved is based on permanent and enforceable emission reductions and not on temporary adverse economic conditions or unusually favorable meteorology.

5) Provisions for future annual updates of the inventory to enable tracking of the emission levels including an annual emission statement from major sources.

2.4 Modeling Demonstration

While no modeling is required for redesignating ozone nonattainment areas, IDEM has relied upon it extensively to determine necessary controls for this area.

2.5 Controls and Regulations

107(d)(3)(D)(ii) & 107(d)(3)(D)(v)

1) A U.S. EPA approved SIP control strategy that includes Reasonably Available Control Technology (RACT) requirements for existing stationary sources covered by Control Technology Guidelines (CTG) and non-CTG RACT for all major sources.

2) Evidence that control measures required in past ozone SIP revisions have been fully implemented.

3) Acceptable provisions to provide for new source review.

4) Assurances that existing controls will remain in effect after redesignation, unless the State demonstrates through photochemical modeling that the standard can be maintained without one or more controls.

5) If appropriate, a commitment to adopt a requirement that all transportation plans conform with, and are consistent with, the SIP.

2.6 Corrective Actions for Potential Future Violations of the Standard

1) A commitment to submit a revised plan eight years after redesignation.

2) A commitment to expeditiously enact and implement additional contingency control measures in response to exceeding specified predetermined levels (triggers) or in the event that future violations of the ambient standards occur.

3) A list of potential contingency measures that would be implemented in such an event.

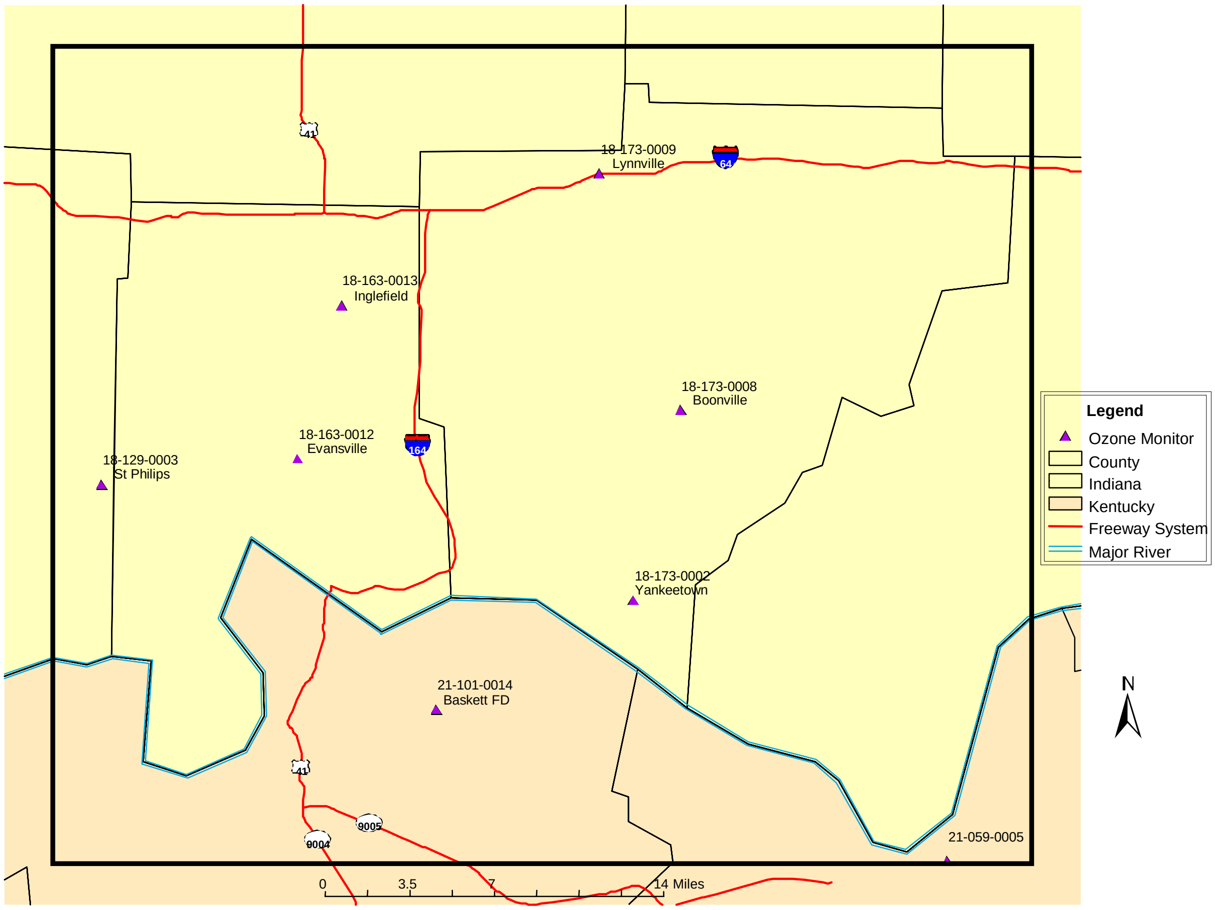
4) A list of VOC and NO_x sources potentially subject to future controls.

3.0 OZONE MONITORING

3.1 Ozone Monitoring Network

There have been five (5) monitors measuring ozone concentrations in this nonattainment area and a sixth in Posey County. All of the monitors are currently operated by the IDEM, Office of Air Quality (OAQ) and through a contract with the Evansville Environmental Protection Agency. A listing of the sites with the four highest readings from 2002 through 2004 is shown in Table 3.1 and was retrieved from the U.S. EPA's Air Quality System (AQS). The locations of the monitoring sites for this nonattainment area are shown in Figure 3.1.

Figure 3.1 Vanderburgh & Warrick Counties Basic Nonattainment Area



3.2 Ambient Ozone Monitoring Data

The following information is taken from U.S. EPA's "Guideline on Data Handling Conventions for the 8-Hour Ozone National Ambient Air Quality Standard (NAAQS)," EPA-454/R-98-017, December 1998.

Three complete years of ozone monitoring data are required to demonstrate attainment at a monitoring site. The 8-hour primary and secondary ozone ambient air quality standards are met at an ambient air quality monitoring site when the 3-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than or equal to 0.08 ppm (i.e. the site is said to be in attainment). Three significant digits must be carried in the computations. Because the third decimal digit, in ppm, is rounded, 0.084 ppm is the largest concentration that is less than, or equal to, 0.08 ppm. These data handling procedures are applied on an individual basis at each monitor in the area. An area is in compliance with the 8-hour ozone NAAQS if, and only if, every monitoring site in the area meets the NAAQS. An individual site's 3-year average of the annual fourth highest daily maximum 8-hour average ozone concentration is also called the site's *design value*. The air quality design value for the area is the highest design value among all monitor sites in the area.

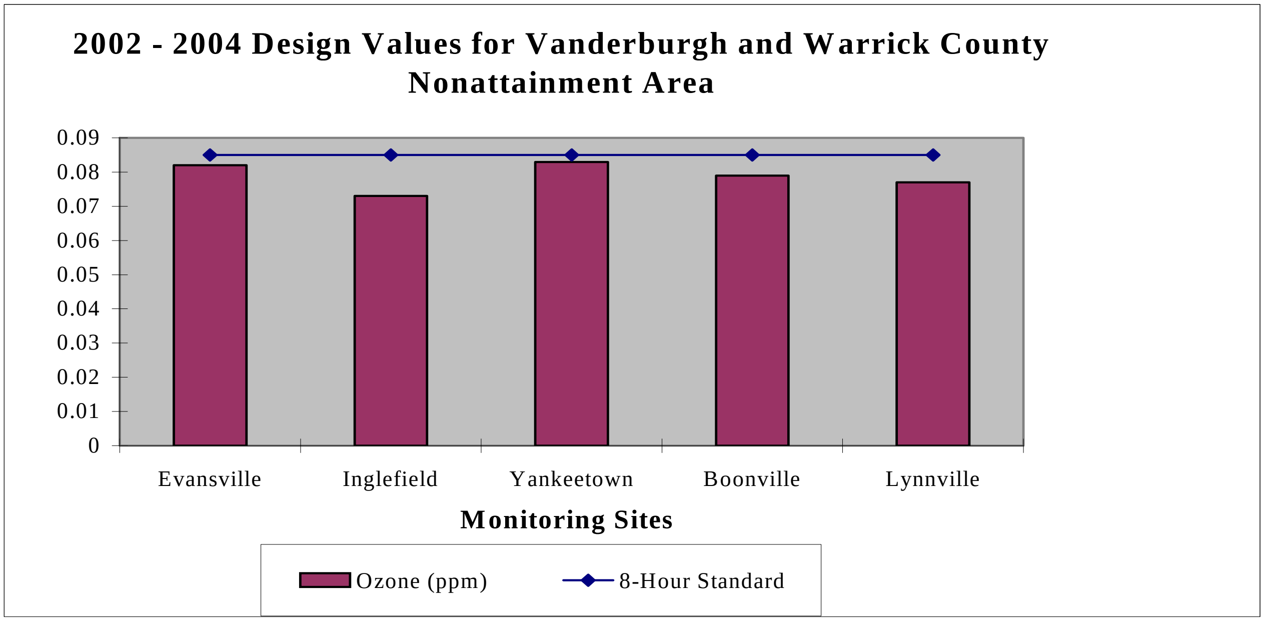
Table 3.1 shows the monitoring data for the three most recent years, 2002 - 2004, at the five nonattainment area sites.

Table 3.1 Monitoring Data for Vanderburgh and Warrick Counties 2002 - 2004

SITE ID	COUNTY	LOCATION	YEAR	1ST 8-HR	2ND 8-HR	3RD 8-HR	4TH 8-HR	2002-2004 Design Value
18-163-0012	VANDERBURGH	EVANSVILLE	2002	0.105	0.102	0.096	0.095	
18-163-0012	VANDERBURGH	EVANSVILLE	2003	0.089	0.086	0.082	0.081	
18-163-0012	VANDERBURGH	EVANSVILLE	2004	0.078	0.074	0.073	0.072	**0.082**
18-163-0013	VANDERBURGH	INGLEFIELD	2002	0.097	0.095	0.089	0.086	
18-163-0013	VANDERBURGH	INGLEFIELD	2003	0.085	0.081	0.075	0.075	
18-163-0013	VANDERBURGH	INGLEFIELD	2004	0.065	0.061	0.058	0.057	**0.073**
18-173-0002	WARRICK	YANKEETOWN	2002	0.113	0.097	0.094	0.094	
18-173-0002	WARRICK	YANKEETOWN	2003	0.101	0.090	0.082	0.082	
18-173-0002	WARRICK	YANKEETOWN	2004	0.075	0.074	0.074	0.074	**0.083**
18-173-0008	WARRICK	BOONVILLE	2002	0.107	0.093	0.092	0.091	
18-173-0008	WARRICK	BOONVILLE	2003	0.087	0.087	0.083	0.076	
18-173-0008	WARRICK	BOONVILLE	2004	0.084	0.076	0.073	0.072	**0.079**
18-173-0009	WARRICK	LYNNVILLE	2002	0.094	0.091	0.091	0.090	
18-173-0009	WARRICK	LYNNVILLE	2003	0.089	0.086	0.082	0.078	
18-173-0009	WARRICK	LYNNVILLE	2004	0.070	0.066	0.064	0.064	**0.077**

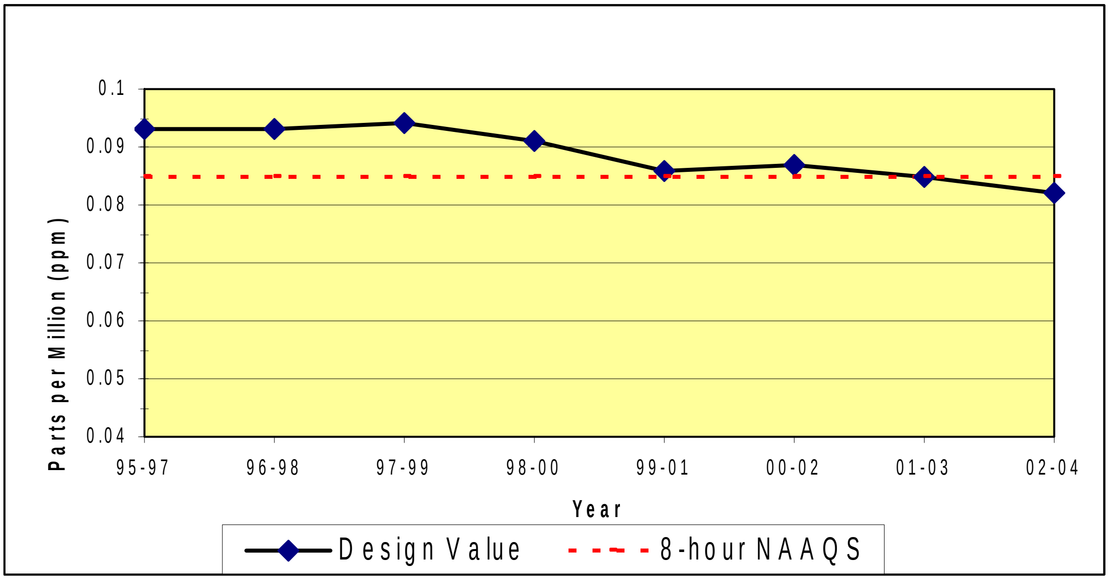
The graph below visually demonstrates the design values for this nonattainment area.

Graph 3.1 2002-2004 Design Values for Vanderburgh / Warrick Nonattainment Area.



The design values calculated for the Vanderburgh and Warrick Counties nonattainment area demonstrate that the NAAQS for ozone has been attained.

Graph 3.2 Trends in Southwestern Indiana 8-Hour Design Values, 1995 through 2004



The above graph shows the trend in design values for the region over the past several years. A comprehensive list of the site's design values over this time period is in Appendix A. The area's design value has trended downward, as emissions have declined due to such factors as the Acid Rain program and cleaner automobiles and fuels on both regional and local scales. U.S. EPA's rule to control nitrogen oxides from specific source categories referred to as the NO_x SIP Call (40 CFR Parts 51, 72, 75 and 96, published on October 17, 1998) has significantly reduced emissions from large electric generating units (EGUs), industrial boilers and cement kilns. Indiana's NO_x Rule was adopted on June 6, 2001 (326 IAC 10-3 and 10-4). An analysis of meteorological conditions and monitoring values is in Section 7.0 and supports the conclusion that attainment of the standard as of 2004 is not the result of unusually favorable meteorological conditions. It is expected that this downward trend will continue as the above programs continue and some further reductions, such as the U.S. EPA Clean Air Interstate Rule, are implemented.

3.3 Quality Assurance

IDEM has quality assured all data shown in Appendix A in accordance with 40 CFR 58.10 and the Indiana Quality Assurance Manual. IDEM has recorded the data in the Aerometric Information Retrieval System (AIRS) database and, thus, they are available to the public.

3.4 Continued Monitoring

Indiana commits to continue monitoring ozone levels at the sites indicated in Table 3.1 and Appendix A. IDEM will consult with U.S. EPA Region V staff prior to making any changes to the existing monitoring network should changes be necessary in the future.

Following consultation with and approval from U.S. EPA, IDEM relocated the Yankeetown monitor. The new monitor location, known as Dayville, is located approximately 1.25 miles

NNW of the Yankeetown monitor's former location. We believe that the data from both of these locations could be used for the three-year assessment to determine attainment status. The land use, topography and demographics are the same for both monitoring locations. IDEM will continue to quality assure the monitoring data to meet the requirements of 40 CFR 58. Connection to a central station and updates to the IDEM website (www.state.in.us/idem/) will provide real time availability of the data and knowledge of any exceedances. IDEM will enter all data into AIRS on a timely basis in accordance with federal guidelines.

4.0 EMISSION INVENTORY

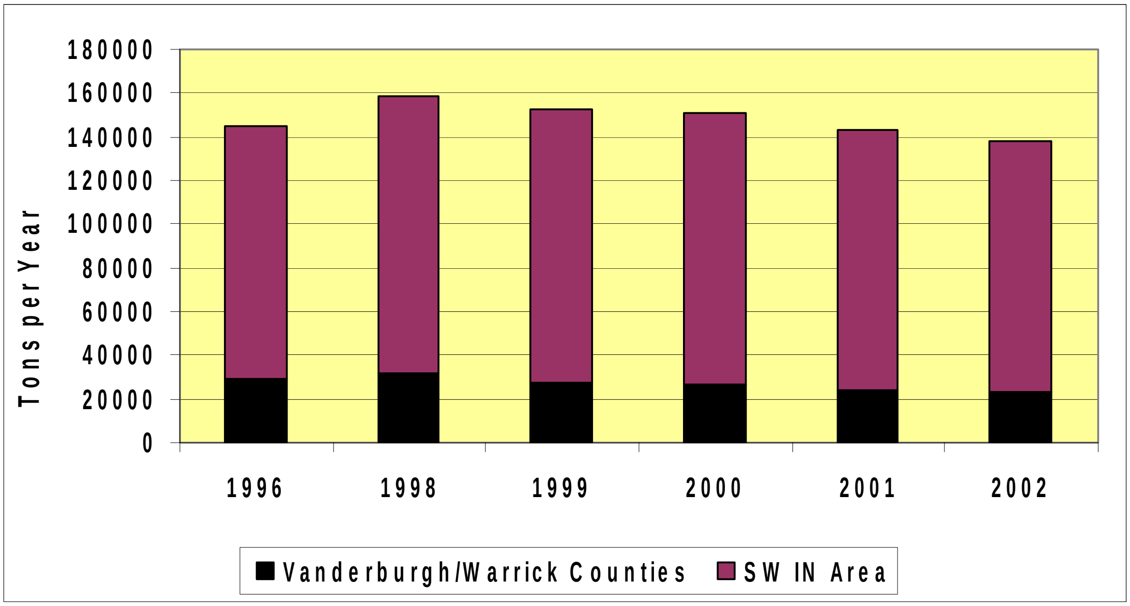
U.S. EPA's Redesignation Guidance requires the submittal of a comprehensive inventory of ozone precursor emissions (VOC and NO_x) representative of the year when the area achieves attainment of the ozone air quality standard. Indiana must also demonstrate that the improvement in air quality between the year that violations occurred and the year that attainment was achieved is based on permanent and enforceable emission reductions. Other emissions inventory-related requirements include a projection of the emission inventory to a year at least 10 years following redesignation, a demonstration that the projected level of emissions is sufficient to maintain the ozone standard, and a commitment to provide future updates of the inventory to enable tracking of emission levels during the 10-year maintenance period.

The following subsections address each of these requirements.

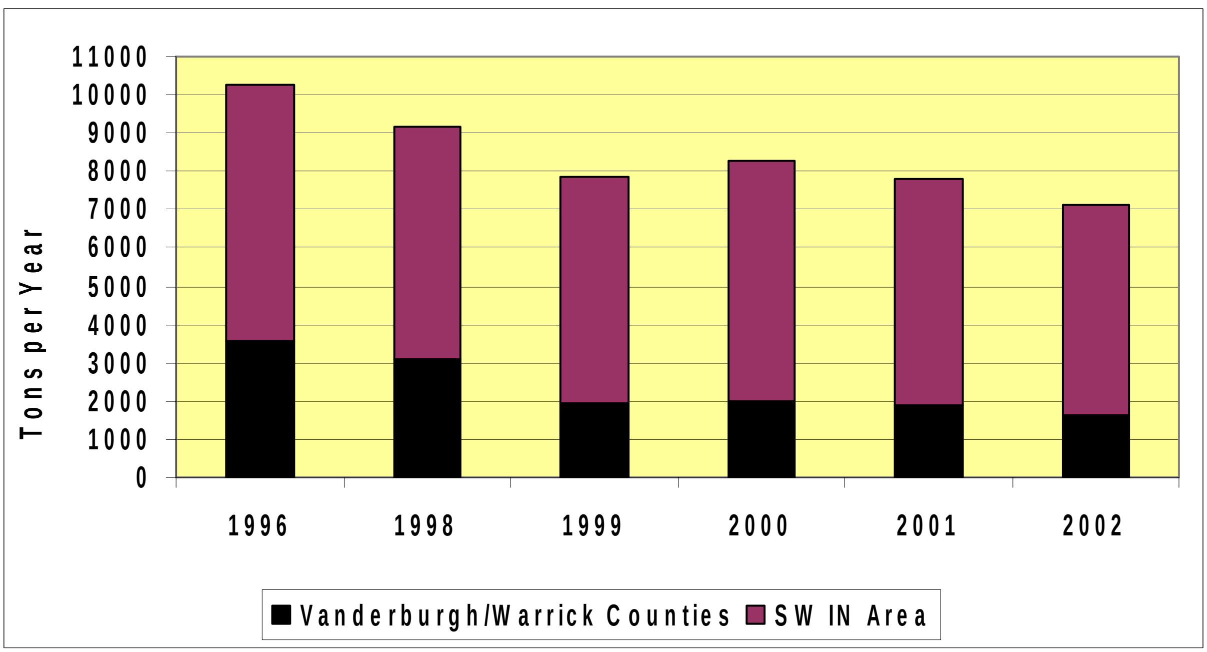
4.1 Emission Trends

Graphs 4.1 and 4.2 below show the trend in point source emissions of NO_x and VOC, respectively, that correspond to the years of monitored values used in this report. To better illustrate emissions that impact ozone formation at the monitoring sites, these graphs include the Evansville nonattainment area emissions and emissions from an additional five surrounding counties (Dubois, Gibson, Pike, Posey, Spencer) in the southwest corner of Indiana. The point source data are taken from Indiana's annual emissions reporting program. Data later than 2002 are not available for all sources.

Graph 4.1 Southwest Indiana NO_x Point Source Emissions 1996 - 2002



Graph 4.2 Southwest Indiana VOC Point Source Emissions 1996 - 2002



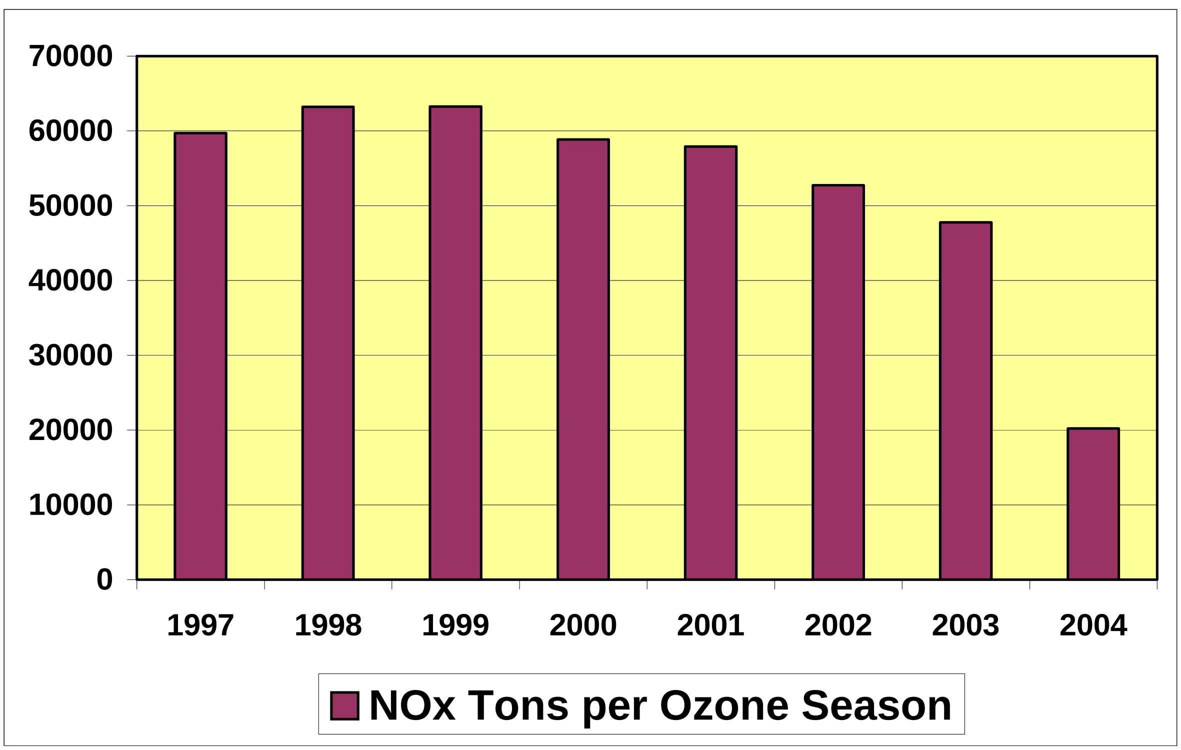
Graph 4.3 below shows the trend in regional NO_x emissions from Electric Generating Units (EGUs) for the seven southwestern Indiana counties. While ozone and its precursors are transported into this region from outside areas, this information does provide some indication of the impact from Indiana sources near the nonattainment area. The emissions are decreasing substantially in response to national programs affecting all EGUs, including the Acid Rain program and the NO_x SIP Call. Other sectors of the inventory also impact ozone formation, but

large regional sources such as EGUs have a substantial impact on the formation of ozone. This area has the highest concentration of EGUs in Indiana.

These data were taken from U.S. EPA's Clean Air Markets database (www.epa.gov/airmarkets). Data are available sooner for these units than other point sources in the inventory because of the NO_x SIP Call budget and trading requirements. Information from 2003 is significant because some EGUs started operation of their NO_x SIP Call controls in order to generate Early Reduction Credits for their future year NO_x budgets. The first season of the SIP Call budget period began May 31, 2004.

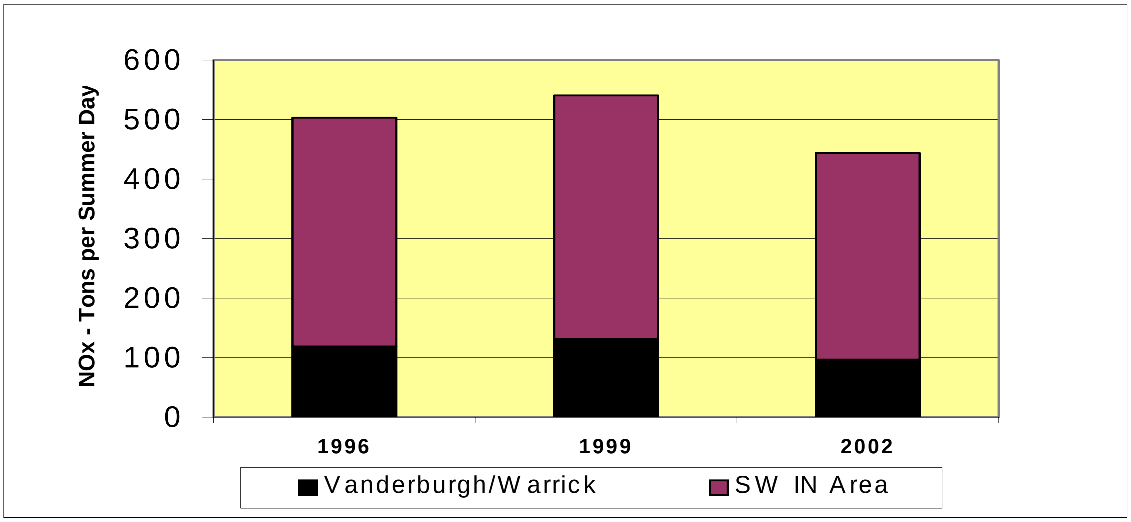
Summer season emissions from 2004 are not yet available. However, as part of the NO_x SIP Call, the states were required to adopt into their rules a budget for all large EGUs. Indiana's budget is adopted in 326 IAC 10-4. The budget represents a statewide cap on NO_x emissions. The 2004 column in the graph represents this budget. Although each unit is allocated emissions based upon historic heat input, utilities can meet this budget by over-controlling certain units or purchasing credits from the market to account for overages at other units. Therefore, although 2004 actual emissions could be higher or lower, the value is a good approximation. To summarize, NO_x emissions have substantially decreased over the years represented on these graphs. These emissions, capped by the state rule, will remain at least this low through the maintenance period covered by this request.

Graph 4.3 Emissions from Southwest Indiana Electric Generating Units

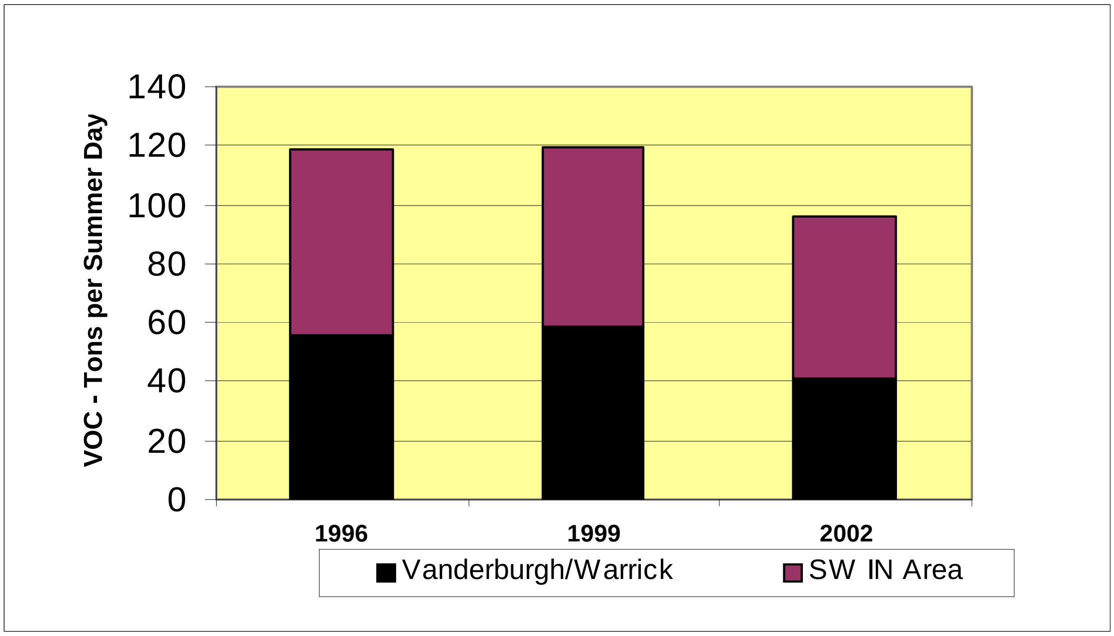


Periodic inventories, which include emissions from all sectors, mobile, area, non-road, and point sources, are prepared every three years. Graphs 4.4 and 4.5 show the trends for the total emission for all anthropogenic source categories in these years, which also roughly follow the years of monitored trends discussed in Section 3. Graphs and data tables of emissions from each source category and from the 7 county region are available in Appendix B.

Graph 4.4 NO_x Emissions Trends, 1996 - 2002, All Sources



Graph 4.5 VOC Emissions Trends, 1996 - 2002, All Sources



4.2 Base Year Inventory

IDEM prepared a comprehensive inventory for Vanderburgh and Warrick Counties, including area, mobile, nonroad, and point sources for precursors of ozone (volatile organic compounds and nitrogen oxides) for base year 2002.

- Area sources were taken from the Indiana 2002 periodic inventory submitted to U.S. EPA. These estimates were made from the U.S. Department of Commerce Bureau of Economic Analysis (BEA) growth factors, with some updated local information.
- Mobile source emissions were calculated using MOBILE6 produced emission factors. 1996 and 1999 data were taken from the National Emissions Inventory (NEI) maintained by EPA. 2002 data was calculated using the travel demand model and post-processor provided by the Evansville Urban Transportation Study (EUTS). See Section 5.0.
- Point source information was compiled from IDEM's 2002 annual emissions statement database and the 2002 U.S. EPA Air Markets acid rain database. www.epa.gov/airmarkets/acidrain
- Biogenic emissions are not included in these summaries.
- Nonroad emissions were generated by U.S. EPA and are part of the 2002 National Emissions Inventory (NEI). To address concerns about the accuracy of some of the categories in U.S. EPA's Nonroad emissions model, the Lake Michigan Air Directors' Consortium (LADCO), the Midwest Regional Planning Organization, contracted with two companies to review the base data and make recommendations. One of the contractors also estimated emissions for two nonroad categories not included in U.S. EPA's Nonroad model. Emissions were estimated for commercial marine vessels and railroads. Recreational motorboat population and spatial surrogates were significantly updated. The construction equipment category was reviewed and updated based upon surveys completed in the Midwest and the temporal allocation for agricultural sources was also updated. A new nonroad estimation model was provided by EPA for the 2002 analysis.

Appendix B contains data tables and graphs of all these emissions.

4.3 Emission Projections

In consultation with the U.S. EPA, IDEM selected the year 2015 as the maintenance year for this redesignation request. This document contains projected emissions inventories for 2010 and 2015.

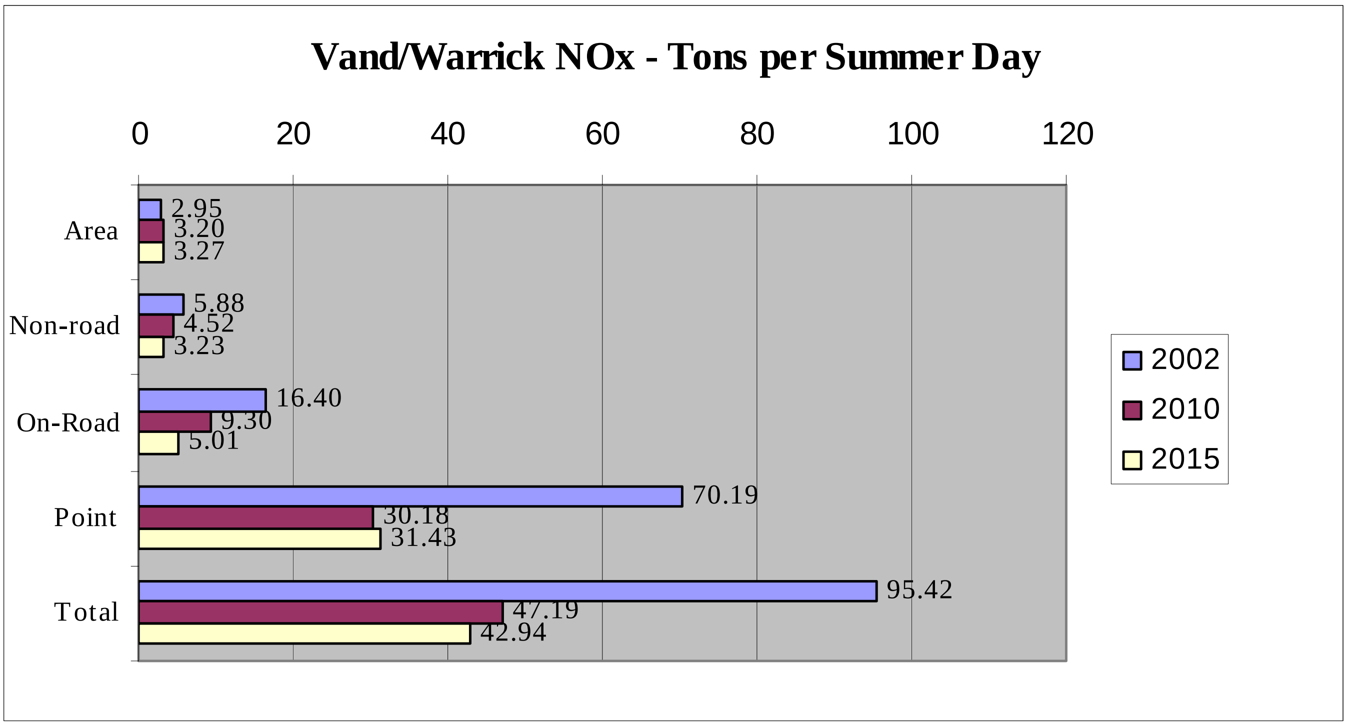
IDEM performed emission projections for Vanderburgh and Warrick using the following approaches:

- Mobile source emission projections are based on the U.S. EPA MOBILE6 model. The nonattainment area emissions were analyzed using the Evansville Urban Transportation Study's (EUTS) Travel Demand Model. This analysis is described in more detail in Section 5.0. All projections were made in accordance with "Procedures for Preparing Emissions Projections"; U.S. EPA-45/4-91-019.
- Emissions inventories are required to be projected to future dates to assess the influence growth and future controls will have. The Midwest Regional Planning Organization

(Midwest RPO) has developed growth and control files for Point, Area, and Non-road categories. These files were used to develop the future year emissions estimates used in this document. This was done so that the inventories used for redesignation are consistent with modeling performed in the future.

The detailed inventory information for 2010 and 2015 is also contained in Appendix B. Emission trends are an important gauge for continued compliance with the ozone standard. Therefore, IDEM performed an initial comparison of the inventories for the base year and maintenance years for Vanderburgh and Warrick, which are summarized below in Graphs 4.6 and 4.7. Mobile Source emission inventories are described in Section 5. In addition to the Midwest RPO's estimates, point source emissions were projected based upon the state-wide EGU NO_x budgets from the Indiana NO_x rule.

Graph 4.6 - 2002 Estimated and 2010 and 2015 Projected NO_x Emissions for Vanderburgh/Warrick



Graph 4.7 - 2002 Estimated and 2010 and 2015 Projected VOC Emissions for Vanderburgh/Warrick

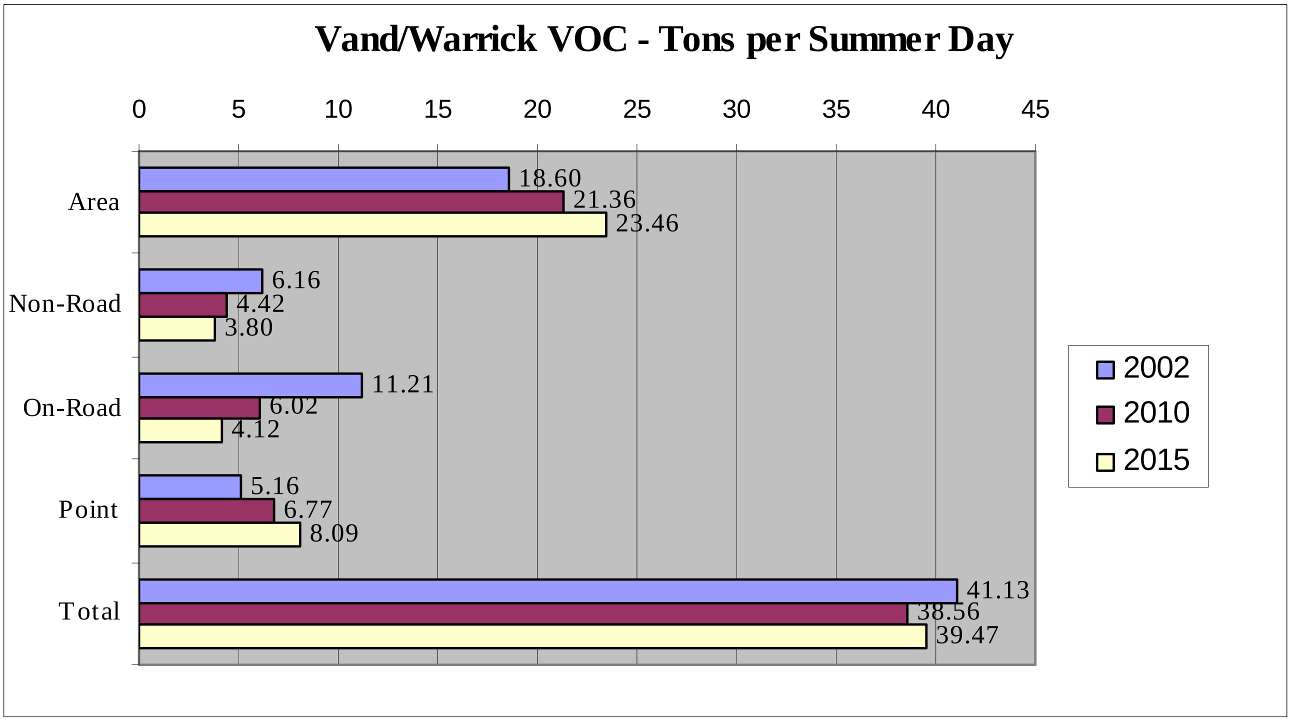


TABLE 4.1 Comparison of 2002 estimated and 2015 projected emission estimates in tons per summer day Vanderburgh and Warrick Counties, Indiana

	2002	**2015**	**Change**
VOC	41.13	39.47	-1.66 (-4.04%)
NOx	95.42	42.94	-52.48 (-55.0%)

VOC emissions in the non-attainment area are projected to decrease by 4.04%. Area source emissions, and to lesser extent point sources, shows an increase due to the expectation that population will grow considerably in this area. However, cleaner vehicles and fuels to be in place in 2010 and 2015 result in an overall drop in VOC emissions.

NO_x emissions show a large decrease at 55.0%. In 2002, point source (primarily EGU) emissions comprised over 65% of the inventory and so the implementation of the NO_x SIP Call accounts for much of this decrease. Further, due to its implementation across the eastern United States, NO_x and ozone levels entering this area will also be decreased. Also factored in are new U.S. EPA rules covering Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements[1], Highway Heavy-Duty Engine Rule[2] and Non-Road Diesel Engine Rule[3].

1 http://www.epa.gov/fedrgstr/EPA-AIR/2000/February/Day-10/a19a.htm
2 http://www.epa.gov/fedrgstr/EPA-AIR/1997/October/Day-21/a27494.htm
3 http://www.epa.gov/fedrgstr/EPA-AIR/1998/October/Day-23/a24836.htm

4.4 Demonstration of Maintenance

Ambient air quality data from all monitoring sites indicates that air quality met the NAAQS for ozone in 2004. U.S. EPA's Redesignation Guidance (page 9) states, "A state may generally demonstrate maintenance of the NAAQS by either showing that future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory, or by modeling to show that the future mix of sources and emissions rates will not cause a violation of the NAAQS." NO_x emissions will be substantially reduced, while VOC emissions will slightly decrease. Section 7.0 further discusses the implications of these emissions trends and provides an analysis to support these conclusions. Therefore, air quality should meet the NAAQS ozone standard through the projected year 2015.

In Indiana, major point sources in all counties are required to submit air emissions information once every three years or annually, if VOC potential-to-emit is greater than 100 tons or NO_x is greater than 250 tons, in accordance with the Emission Statement Rule, 326 IAC 2-6. IDEM prepares a new periodic inventory for all ozone precursor emission sectors every three (3) years. These ozone precursor inventories will be prepared for 2002, 2005, 2008, and 2011, as necessary, to comply with the inventory reporting requirements established in the CAAA. Emissions information will be compared to the 2002 base year and the 2015 projected maintenance year inventories to assess emission trends, as necessary, to assure continued compliance with the ozone standard.

4.5 Permanent and Enforceable Emissions Reductions

Permanent and enforceable reductions of volatile organic compounds and oxides of nitrogen have contributed to the attainment of the 8-hour ozone standard. Some of these reductions were due to the application of RACT rules; some were due to the application of tighter federal standards on new vehicles, and some due to closure of point source facilities. Table 4.2 shows significant reductions resulting from closed plants between 1996 and 2002. Also, Title IV of the Clean Air Act and the NO_x SIP Call required the reduction of oxides of nitrogen from utility sources. Section 6.0 identifies these reductions along with an explanation of their status. Any reopening of closed facilities at these sources will require review as a new source and the application of appropriate controls.

Table 4.2 Closed Sources Annual VOC Emissions for Vanderburgh County

County	Plant ID	Plant Name	NAICS	1996	1998	1999	2000	2001	2002
163	7	HAHN INC	339999	7	2	3	8	24	0
163	10	KOCH LABEL CO., L. L. C.	323119	1152	940	0	0	0	0
163	12	GEO KOCH SONS INC #2	333414	2	4	0	0	0	0
163	47	HERITAGE PETROLEUM, LLC.	454312	6	6	6	5	3	0
163	78	ROBUR CORPORATION	333415	6	3	7	19	10	0
		Total		**1173**	**955**	**16**	**32**	**37**	**0**

4.6 Provisions for Future Updates

As required by Section 175A(b) of the CAAA, Indiana commits to submit to the Administrator, eight (8) years after redesignation, an additional revision of this SIP. The revision will contain Indiana's plan for maintaining the national primary ozone air quality standard for ten (10) years beyond the first 10-year period after redesignation.

5.0 TRANSPORTATION CONFORMITY BUDGETS

5.1 On-Road Emission Estimations

The Evansville Urban Transportation Study (EUTS) is the Metropolitan Planning Organization (MPO) for the Evansville area. This organization has a travel demand model that was updated and improved in 2003 by the consultant Bernardin-Lochmueller & Associates. The model incorporates the road network of a 5-county area, which includes the counties of Vanderburgh, Warrick, Posey, Gibson and Henderson (in Kentucky). Incorporated into the travel demand model is a post-processor created by the same consultant that uses the EPA-required emissions estimation model MOBILE6.2 to calculate total emissions.

5.2 Overview

Broadly described, MOBILE6 is used to determine "emission factors", which are the average emissions per mile (grams/mile) for different facility types (Freeway, Arterial, Local, Ramp) at different speeds for each pollutant, thus creating a "look-up table" that is organized by speed and facility type. There is one look-up table for NO_x and one for VOCs. The travel demand model predicts the traffic volumes on all the roads in the 5-county area. Each segment of road is described as a separate "link" for which the model predicts a separate speed and volume. The post-processor matches the link attributes with an emission factor in the table and multiplies it by the VMT (Vehicle Miles Traveled: volume x length of link) to determine the emissions from that link. These emissions are then summed to determine the area's total on-road emissions. Each year that is analyzed will have different emission factors, volumes, speeds and likely some additional links. Appendix C contains documentation provided by EUTS from a previous conformity determination that used virtually the same method. This documentation further details the emissions analysis method. IDEM has footnoted the statements that no longer apply or need further clarification. Appendix D contains samples of the MOBILE6 input files and the actual post-processing software used for this analysis.

5.2 Analysis Years

Travel demand models contain hundreds of Travel Analysis Zones (TAZs) that have zone-specific information regarding population, employment, destinations and expected growth, among other things. These data are commonly referred to as the "socioeconomic data". The travel demand model also contains the road network, thus, the information is time specific. EUTS has modeled the years 2000, 2006, 2015, 2025 and 2030. This Redesignation Petition requires emission estimates for 2002, 2010 and 2015, thus, 2002 and 2010 did not have an exact match with the travel demand model. To predict these years, an interpolation / extrapolation method was devised.

5.3 Interpolation for 2002, 2010

To estimate 2002 emissions, the VMT was interpolated from 2000 and 2006 model VMT data. The 5-county model has nearly 4000 links. An average growth rate was determined for 18 sub-categories daytimes, vehicle and facility types. The model categorizes VMT by two types of vehicles (trucks and cars), 3 periods in the day (AM peak, PM peak and Off Peak) and 3 facility types (Freeway, Arterial and Local) for a total of 18 combinations. Each has a VMT sub-total associated with it. An annual growth factor was determined for each of these 18 categories by linearly interpolating the 5-county VMT between 2000 and 2006. These growth factors were applied to all the links. The adjusted VMT values were then sent through the post-processor using the 2000 network to calculate the total emissions from the 2-county nonattainment area.

For 2010, the VMT was extrapolated using the same annual growth rates used for 2002, not the growth rates from the 2006 to 2015 model data (See growth factor table in Appendix C). The VMT growth rates from 2006 to 2015 were less than those from 2000 to 2006. Note that the purpose of calculating emissions for 2010 is to verify that during the period between the base year and the maintenance year, overall emissions do not exceed the base year. Thus, it is prudent to use the higher growth rates to predict 2010 VMT and not underestimate 2010 on-road emissions. This method has caused the predicted 2010 VMT calculation to be higher than the 2015 modeled VMT.

Overall, these methods followed the general practice of using a linear VMT growth to interpolate VMT. However, using a slightly smaller network than would actually exist in that year may report slightly lower speeds than if a model network of that year had been available. The emissions effect is unknown, but would likely be negligible.

5.4 Local Road VMT

Not all local roads are represented in the network due to their lack of effect on the modeled road network. The post-processor multiplies the existing VMT on modeled local roads by a factor of 2.2225 to get a total local-road VMT. This was the adjustment factor determined for Vanderburgh through comparisons with HPMS. For this analysis, this factor was also applied to Warrick.

5.5 Emission Estimations

Table 5.1 contains the results of the emissions analysis for the appropriate years.

Table 5.1 - Emission Estimations for On-Road Mobile Sources

	2002	2010	2015
VMT (miles/day)	6225764	6520671	6463504
VOC (tons/day)	11.21	6.02	4.12
NOx (tons/day)	16.40	9.30	5.01

5.7 Motor Vehicle Emission Budget

Table 5.2 contains the motor vehicle emissions budget for the Evansville ozone nonattainment area (Vanderburgh and Warrick counties) for the year 2015.

Table 5.2 – Mobile Vehicle Emission Budgets

2015	tons/day
VOC	4.20
NOx	5.40

This budget includes the emission estimates calculated for 2015, and margin of safety. The emission estimates are derived from the EUTS travel demand model and MOBILE6.2 as described above under the current EUTS 2030 Long Range Plan. The safety margins include 0.08 tons/day for VOC and 0.39 tons/day for NOx. These correspond to approximately a 2% and 8% increase from the 2015 on-road emissions, respectively. Margins of safety are used to accommodate the wide array of assumptions that are factored into the calculation process. Since assumptions change over time, it is necessary to have a margin of safety that will accommodate the impact of refined assumptions in the process. This budget results in the 2015 emissions, for both VOC and NO_x, still being below the base year emissions shown in Graphs 4.6 and 4.7.

All methodologies, latest planning assumptions and the safety margins were determined through the interagency consultation process described in the Transportation Conformity Memorandum of Understanding (MOU) for the Evansville Area.

6.0 CONTROL MEASURES AND REGULATIONS

This section provides specific information on the control measures implemented in Vanderburgh and Warrick Counties, including CAAA requirements and additional state or local measures implemented beyond CAAA requirements.

6.1 Reasonably Available Control Technology (RACT)

As required by Section 172 of the CAAA, Indiana in the mid-1990s promulgated rules requiring RACT for emissions of VOCs. There were no specific rules required by the CAA, such as RACT for existing sources, for these two counties beyond statewide rules. Statewide RACT rules have applied to all new sources locating in Indiana since that time. The Indiana rules are located at 326 IAC 8. The following is a listing of applicable rules:

326 IAC 8-2	Surface Coating Emission Limitations
326 IAC 8-3	Organic Solvent Degreasing Operations
326 IAC 8-4	Petroleum Sources
326 IAC 8-5	Miscellaneous Operation
326 IAC 8-6	Organic Solvent Emission Limitations
326 IAC 8-10	Auto Body Refinishing

6.2 Implementation of Past SIP Revisions

This nonattainment area was not required to develop an Attainment Demonstration SIP for the 1-hour NAAQS. Similarly, since the area was only recently designated non-attainment for ozone and the area has now attained the standard; no Attainment Demonstration SIP has been required to bring the area into attainment for the 8-hour NAAQS. Therefore, this requirement does not apply. Emissions of VOCs are regulated by applicable statewide provisions of 326 IAC 8.

6.3 Nitrogen Oxides (NO_x) Rule

The U.S. EPA NO_x SIP Call required 22 states to adopt rules that would result in significant emission reductions from large EGUs, industrial boilers, and cement kilns in the eastern United States. Indiana passed this rule in 2001. Beginning in 2004, this rule will account for a reduction of approximately 31% of all NO_x emissions state-wide over previous uncontrolled years.

The other states have also adopted these rules. The result is that significant reductions will occur upwind and within the nonattainment area because of the number of large electric utilities located in Kentucky, Indiana, Illinois, and Tennessee. U.S. EPA and IDEM have performed modeling that indicates this area will attain the 8-hour ozone standard with the implementation of the NO_x SIP Call. Controls for EGUs formally commenced May 31, 2004. From Graph 4.3, "NO_x Emissions from Southwest Indiana Electric Generating Units," it can be seen that emissions covered by this program started trending down in 2003 and then much larger reductions were required in 2004. Table 6.1, compiled from data taken from the U.S. EPA Clean Air Markets web site, quantifies the gradual NO_x reductions that have occurred in Indiana as a result of Title IV of the Clean Air Act Amendments and the beginning of the NO_x SIP Call Rule. This cap will stay in place into the foreseeable future, unless replaced by a newer program such as the Clean Air Interstate Rule.

Further, U.S. EPA has recently published Phase II of the NO_x SIP Call, which establishes a budget for large (greater than 1 ton per day emissions) stationary internal combustion engines. This rule will decrease emissions statewide from natural gas compressor stations by 4263 tons during the ozone season. OAQ is on track to finalize this rule in mid-2005. Implementation of this rule is expected in 2007.

Table 6.1 - Trends in EGU Ozone Season NO_x Emissions State-wide in Indiana

Year	**NO_x Emissions, tons / ozone season**	**NO_x Emission rate, lbs/MMBtu**
1997	152,834	0.557
1998	159,931	0.540
1999	149,827	0.502
2000	133,881	0.476
2001	136,121	0.481
2002	114,082	0.409
2003	99,967	0.342
Cap 2004-2009	43,654	0.150

6.4 Measures Beyond Clean Air Act Requirements

Reductions in ozone precursor emissions have occurred, or are anticipated to occur, as a result of federal control programs. These additional control measures include:

Tier 2 Emission Standards for Vehicles and Gasoline Sulfur Standards

In February 2000, U.S. EPA finalized a federal rule to significantly reduce emissions from cars and light trucks, including sport utility vehicles (SUVs). Under this proposal, automakers will be required to sell cleaner cars, and refineries will be required to make cleaner, lower sulfur gasoline. This rule will apply nationwide. The federal rules will phase in between 2004 and 2009. U.S. EPA has estimated that NO_x emission reductions will be approximately 77% for passenger cars, 86% for smaller SUVs, light trucks, and minivans, and 65-95% reductions for larger SUVs, vans, and heavier trucks. VOC emission reductions will be approximately 12% for passenger cars, 18% for smaller SUVs, light trucks, and minivans, and 15% for larger SUVs, vans, and heavier trucks.

Heavy-Duty Diesel Engines

In July 2000, U.S. EPA issued a final rule for Highway Heavy Duty Engines, a program which includes low-sulfur diesel fuel standards, which will be phased in from 2004 through 2007. This rule applies to heavy-duty gasoline and diesel trucks and buses. This rule will result in a 40% reduction in NO_x from diesel trucks and buses, a large sector of the mobile sources NO_x inventory.

Clean Air Nonroad Diesel Rule

In May 2004, U.S. EPA issued the Clean Air Nonroad Diesel Rule. This rule applies to diesel engines used in industries such as construction, agriculture, and mining. It also contains a cleaner fuel standard, similar to the highway diesel program. The new standards will cut emissions from nonroad diesel engines by over 90 percent. Nonroad diesel equipment, as described in this rule, currently accounts for 47 percent of diesel particulate matter (PM) and 25 percent of nitrogen oxides (NO_x) from mobile sources nationwide. Sulfur levels will be reduced in nonroad diesel fuel by 99 percent from current levels (from approximately 3,000 parts per million [ppm] now to 15 ppm in 2010). New engine standards take effect, based on engine horsepower, starting in 2008.

Together, these rules will substantially reduce local and regional sources of ozone precursors. The modeling analyses discussed in Section 7 include these rules and show the ozone concentrations expected to result from the implementation of these rules.

6.5 Controls to Remain in Effect

Indiana commits to maintain the control measures listed above after redesignation. Indiana hereby commits that any changes to its rules or emission limits applicable to VOC and/or NO_x sources, as required for maintenance of the ozone standard in Vanderburgh and Warrick Counties, will be submitted to U.S. EPA for approval as a SIP revision.

Indiana, through the Evansville Environmental Protection Agency and IDEM's Office of Air Quality and Office of Enforcement, has the legal authority and necessary resources to actively enforce any violations of its rules or permit provisions. After redesignation, it intends to continue enforcing all rules that relate to the emission of ozone precursors in Vanderburgh and Warrick Counties.

6.6 New Source Review Provisions

Indiana has a longstanding and fully implemented New Source Review (NSR) program. This program is addressed in rule 326 IAC 2. The rule includes provisions for the Prevention of Significant Deterioration (PSD) permitting program in 326 IAC 2-2. Indiana's PSD program has been approved by U.S. EPA as part of its SIP. (Final program approval – May 20, 2004, 69 FR 290710)

Any facility that is not listed in the 2002 emission inventory, or for the closing of which credit was taken in demonstrating attainment, will not be allowed to construct, reopen, modify, or reconstruct without meeting any applicable permit rule requirement. The review process will be identical to that used for new sources. Once the area is redesignated, OAQ will implement NSR through the PSD program which requires an air quality analysis to ensure that the new source will not threaten to exceed the NAAQS.

6.7 Local Air Quality Mitigation

The Evansville Environmental Protection Agency (Evansville EPA) has worked with the community to identify and implement a number of locally enforceable control measures via ordinance. These ordinances address the following subjects:

County	City	Subject
Chapter 8.12	Section 3.30.214	Burning Regulations.
Chapter 19.08	Section 3.30.248	Gasoline Dispensing Regulations.
Chapter 19.12	Section 3.30.249	Automobile Refinishing.
Chapter 19.16	Section 3.30.250	Pollution Prevention and Education Program.

The City ordinances also address the creation and function of the Evansville EPA, which enforces the local environmental ordinances and performs a variety of state authorized duties via contract with IDEM. Additionally, the Evansville EPA in coordination and cooperation with the Vanderburgh County Health Department, implements a voluntary ozone episodic reduction program as part of its air quality education and outreach program. Although these local air quality mitigation efforts are not deemed permanent and enforceable under state or federal authority, they are a valuable asset to the community and will continue to further supplement air quality improvements in the region.

7.0 MODELING

7.1 Summary of Modeling Results for National Emission Control Strategies in Final Rulemakings

Although U.S. EPA's redesignation guidance does not require modeling for ozone nonattainment areas seeking redesignation, extensive modeling has been performed covering the Southwest Indiana region to determine the effect of national emission control strategies on ozone levels. These modeling analyses determined that Warrick and Vanderburgh Counties are significantly impacted by ozone and ozone precursor transport, and regional NO_x reductions are an effective way to attain the 8-hour standard in this area.

U.S. EPA Modeling Analysis for HDE Final Rulemaking

U.S. EPA conducted modeling for Tier II vehicles and low-sulfur fuels. This analysis was performed in 2000 to support final rulemaking for the Heavy Duty Engine (HDE) and Vehicle Standards and Highway Diesel Fuel and its expected impact on ozone levels. "Technical Support Document for the Heavy Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements: Air Quality Modeling Analyses" (EPA420-R-00-028) was referenced for support of this ozone redesignation for the two counties. Base year emissions from 1996 were modeled for three ozone episodes: June 12-24, 1995; July 5-15, 1995; and August 7-21, 1995. Results of this modeling show that ozone impacts from these fuel emission control measures, as well as the NO_x SIP call, would be substantial in Warrick and Vanderburgh Counties. Relative Reduction Factors (RRF) calculated for each county were 0.8424 for Warrick

County and 0.8800 for Vanderburgh County. These RRFs were applied to the three-year (2001-2003) design values of 85 ppb in Warrick County and 83 ppb in Vanderburgh County. The resulting future year design values were calculated at 71 ppb and 73 ppb, respectively, as shown below in Table 7.1. The modeled future year design values will attain the 8-hour ozone NAAQS.

Table 7.1 - Modeling Results from U.S. EPA HDE Rulemaking for Warrick/Vanderburgh

Monitor ID	Monitor Name	County	Design Value	Modeled Relative Reduction Factor (RRFs)	Future Design Value
			2001-2003	2007 Base	2007
181730002	Yankeetown	Warrick	85	0.8336	70.9
181730008	Boonville	Warrick	81	0.8315	67.4
181730009	Lynnville	Warrick	81	0.8424	68.2
181630012	Evansville	Vanderburgh	83	0.8800	73
181630013	Inglefield	Vanderburgh	77	0.8633	66.5

LADCO Modeling Analysis for 8-Hour Ozone Standard Assessment

The Lake Michigan Air Directors Consortium (LADCO) performed modeling to evaluate the effect of the NO_x SIP Call and Tier II / Low Sulfur rule for future-year 2007 ozone in the Lake Michigan area. This modeling was originally designed to assess the 1-hour ozone standard. Further analysis was conducted and documented in LADCO's White Paper "8-Hour Ozone Assessment," dated May 2, 2001. Base year design values used were the average of the design values for the three 3-year periods (1994-1996, 1995-1997, and 1996-1998). Base year emissions were taken from 1996 and four ozone episodes were evaluated: June 22-28, 1991; July 14-21, 1991; June 13-25, 1995; and July 7-18, 1995. Results are shown in Table 7.2 below.

Table 7.2 LADCO Modeling Results for 8-Hour Ozone Assessment

Monitor ID	Monitor Name	County	Base Year Average Design Value (ppb)	Future Design Value
			'94-'96, '95-'97, '96-'98	2010
181730002	Yankeetown	Warrick	85	75.2
181730008	Boonville	Warrick	81	71.8
181730009	Lynnville	Warrick	81	71.8
181630012	Evansville	Vanderburgh	83	74.5
181630013	Inglefield	Vanderburgh	77	69.1

The resulting future year design values were calculated at 75 ppb for Warrick County and 74 ppb for Vanderburgh County. The modeled future year design values will attain the 8-hour ozone NAAQS of 85 ppb.

7.2 Summary of Modeling Results to Support Proposed Rulemakings

U.S. EPA Modeling for Clean Air Interstate Rule (CAIR), 2004

On March 10, 2005, the U.S. EPA promulgated the Clean Air Interstate Rule (CAIR). NO_x emissions will be cut from 4.5 million tons in 2003 to a cap of 1.5 million tons by 2009 and 1.3 million tons in 2015 in 28 eastern states and the District of Columbia.

U.S. EPA performed modeling to support the associated emission reductions. The modeling was based on 1999 – 2003 design values. Future year modeling was conducted, including for Posey, Vanderburgh, and Warrick Counties, and the future year design values for 2010 and 2015 were evaluated for attainment of the 8-hour ozone NAAQS, as shown below in Table 7.3. Results of the CAIR modeling show that all three will continue to attain the 8-hour ozone NAAQS in 2010. With further reductions projected in CAIR for 2015, all design values continue to decrease.

Table 7.3 Modeling Results from U.S. EPA for the Clean Air Interstate Rule

County	MSA/CMSA	Design Value (ppb)	Future Design Value	Future Design Value
		2000-2002	2010 w/o CAIR	2010 with CAIR
Posey	Evansville	85.7	74.4	73.9
Vanderburgh	Evansville	83.3	72.4	72
Warrick	Evansville	84.5	73.4	73.1

LADCO modeling for Clean Air Interstate Rule (CAIR)

LADCO conducted modeling to determine the impact of the proposed CAIR in the Midwest. The modeling was based on 2001-2003 design values. Future year modeling for 2010 was conducted and the future year design values were determined, as shown below in Table 7.4. Results of the CAIR modeling show Warrick and Vanderburgh Counties will attain the 8-hour ozone NAAQS.

Table 7.4 Modeling Results from LADCO for the Clean Air Interstate Rule

Monitor ID	Monitor Name	County	Design Value (ppb)	Modeled Relative Reduction Factor (RRFs)	Future Design Value
			2001-2003	2010 Base	2010
181730002	Yankeetown	Warrick	85	0.885	75.2
181730008	Boonville	Warrick	81	0.886	71.8
181730009	Lynnville	Warrick	81	0.886	71.8
181630012	Evansville	Vanderburgh	83	0.898	74.5
181630013	Inglefield	Vanderburgh	77	0.898	69.1

7.3 Summary of Existing Modeling Results

U.S. EPA and LADCO modeling for future year design values have consistently shown that existing national emission control measures will bring Warrick and Vanderburgh Counties into attainment of the 8-hour ozone NAAQS. Proposed rulemakings to be implemented in the next several years will provide even greater assurance that air quality will continue to meet the standard into the future. Modeling support for the NO_x SIP Call, Heavy Duty Engine and Highway Diesel Fuel and Tier II/Low Sulfur Fuel has shown that future year design values for Warrick and Vanderburgh Counties will attain the ozone standard with modeled future year design values well below 85 ppb. U.S. EPA has modeled base case future years with existing emission controls only and shown that Warrick and Vanderburgh Counties will attain the 8-hour ozone NAAQS without proposed additional national emission control strategies. Future national emission control strategies will ensure that each county's attainment will be maintained with an increasing margin of safety over time.

7.4 Temperature Analysis for Warrick and Vanderburgh County

Meteorological conditions are one of the most important factors that influence ozone development and transport. A temperature analysis has been conducted to determine how the temperatures during the ozone conducive months of May, June, July, August and September compare to normal temperatures for the Southwest Indiana area for the years 1971 through 2000. Complete climatological data is not available for Warrick and Vanderburgh counties. Therefore, the Evansville National Weather Service Office Climate Data data as well as other weather stations in southwest Indiana including Bloomfield, Boonville, Dubois, Freelandville, Huntingburg, Mount Vernon, Shoals, St. Meinrad and Washington were used to fill in any missing data. The data from the additional weather stations was used to calculate the average number of 90 degree days from 1995-1999. Available normal maximum temperatures by summer months from 1971-2004 for the Evansville, Southwest Indiana area are as follows:

May – 77.0^{o} F
June – 85.6^{o} F
July – 89.1^{o} F
August – 87.6^{o} F
September – 81.3^{o} F
May - September – 84.1^{o} F

Evansville's monthly maximum temperatures for the previous 9 years (1996 – 2004) during the summer months are compared to normal summer month temperatures in Table 7.5. Overall, the temperatures during the 2002 summer months of May, June, July, August, and September were 1% to 2% higher while temperatures during the 1996, 1997, 2000, 2001, 2003 and 2004 summer months were 1% to 5% lower than the normal temperatures. Table 7.5 shows the average temperatures in Southwest Indiana for each of the past nine years and the percent difference from normal for each year.

Table 7.5 Analysis of Maximum Temperatures for Southwest Indiana

(Percent Change from Maximum Temperature (^{o}F) Normals (1971 – 2004))

	Normal	1996		1997		1998		1999	
	Max	Max	%	Max	%	Max	%	Max	%
May	77.0	76.9	0	70.3	-9	77.5	+1	76.3	-1
June	85.6	83.5	-2	78.5	-8	82.3	-4	82.7	-3
July	89.1	84.7	-5	87.4	-2	84.4	-5	88.5	-1
August	87.6	86	-2	82.4	-6	85.2	-3	83	-5
September	81.3	77.4	-5	79.7	-2	84.1	+3	83.3	+2
AVERAGE	84.1	81.7	-3	79.7	-5	82.7	-2	82.8	-2

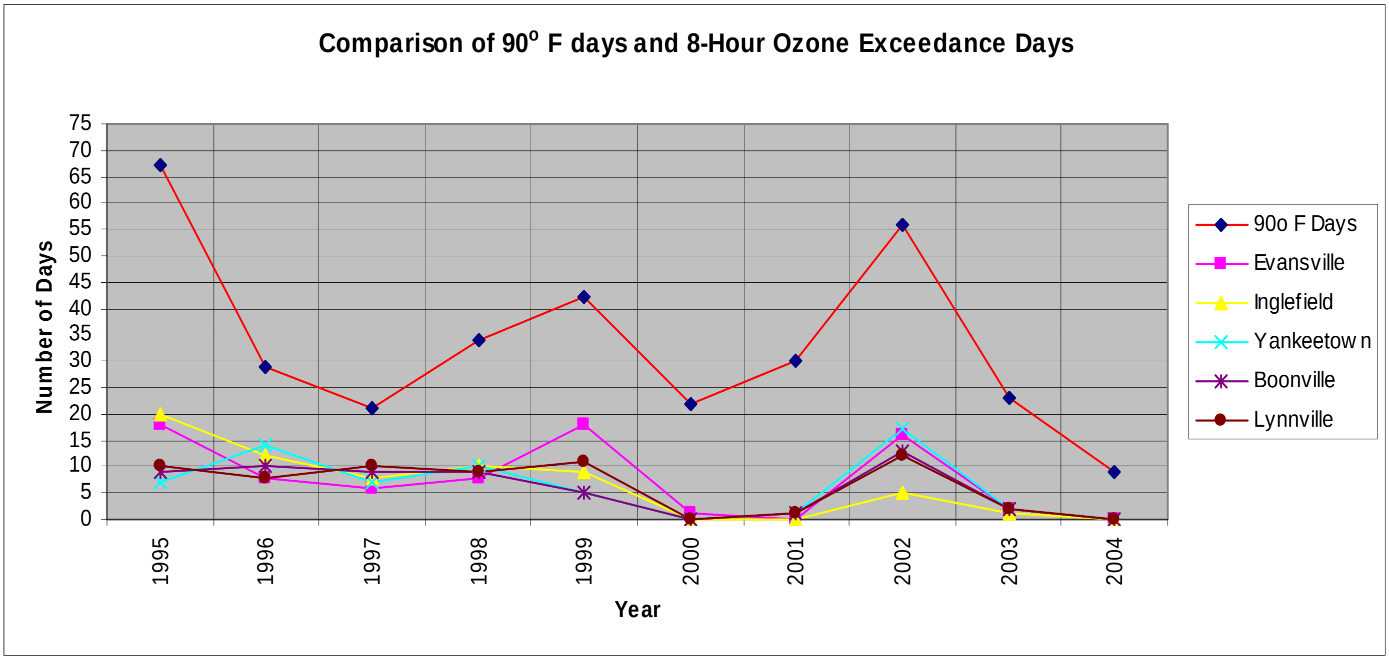
	2000		2001		2002		2003		2004	
	Max	%	Max	%	Max	%	Max	%	Max	%
May	77.8	+1	79.2	+3	74.4	-3	73.6	-4	79.8	+4
June	83.9	-2	82.5	-2	86.6	+1	80.0	-7	83.7	-2
July	84.7	-5	87.5	-2	90.5	+2	87.1	-2	84.3	-5
August	86.0	-2	86.2	-2	89.8	+3	87.6	0	82.9	-5
September	78.2	-4	79.0	-3	85.7	+5	80.4	-1	82.3	-1
AVERAGE	82.1	-2	83.0	-1	85.4	+2	81.7	-3	82.6	-2

The number of days with temperatures of 90° F and higher was taken from National Weather Service data from the Evansville Regional Airport compared to the normal number of days from 1995 through 2004. Table 7.6 shows a comparison of 8-hour ozone exceedances and temperatures while Graph 7.1 shows the correlation graphically.

Table 7.6 - Comparison of Days with 90° F and 8-Hour Ozone Exceedance Days

Number of Days with Temperatures of 90° F and higher											
		Normal	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
# of 90° F days		**41.9**	**67**	**29**	**21**	**34**	**42**	**22**	**30**	**56**	**23**	**9**
Number of 8-Hour Exceedance Days at Vanderburgh and Warrick County ozone monitors												
Monitor	County		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Evansville	Vander.		**18**	**8**	**6**	**8**	**18**	**1**	**0**	**16**	**2**	**0**
Inglefield	Vander.		**20**	**12**	**8**	**10**	**9**	**0**	**0**	**5**	**1**	**0**
Yankeetown	Warrick		**7**	**14**	**7**	**10**	**5**	**0**	**1**	**17**	**2**	**0**
Boonville	Warrick		**9**	**10**	**9**	**9**	**5**	**0**	**1**	**13**	**2**	**0**
Lynnville	Warrick		**10**	**8**	**10**	**9**	**11**	**0**	**1**	**12**	**2**	**0**

Graph 7.1 - Comparison of Days with 90° F and 8-Hour Ozone Exceedance Days



As can be seen, a greater number of ozone exceedance days per year correlate with a greater number of 90° F days per year.

7.5 Summary of Meteorological Conditions

The analysis of the departure from normal of the maximum temperatures during the summer months shows variation as illustrated in Table 7.6. The analysis shows that 20 or more days with temperatures of 90° F and higher occurred in all years but 2004. The number of 8-hour ozone exceedance days for those years shows a greater correlation to the number of higher temperature days. However, the years with a lesser number of 90° F days still yielded 8-hour ozone exceedance days. For example, 1997 temperatures were on average 5% cooler than normal. However, there were still a significant number of 8-hour ozone exceedances for that year. In comparison, 2003 was also a cooler year, but due to lower emissions than in 1997, there were fewer ozone exceedances. Lower ozone values correspond to lowered local and regional ozone precursor emissions. This is why U.S. EPA developed the 8-hour standard as a 4th high ozone value averaged over 3 years to account for variations in temperature. Despite such variations, ozone values in Vanderburgh and Warrick counties have steadily decreased since 1995.

8.0 CORRECTIVE ACTIONS

8.1 Commitment to Revise Plan

As noted in Section 4.5 above, Indiana hereby commits to revise its Maintenance Plan eight years after redesignation, as required by Section 175(A) of the CAAA.

8.2 Commitment for Contingency Measures

Indiana hereby commits to adopt and implement expeditiously necessary corrective actions in the following circumstances:

Warning Level Response

A Warning Level Response shall be prompted whenever an annual (1-year) fourth high monitored value of 88 ppb occurs in a single ozone season within the maintenance area. A Warning Level Response will consist of a study to determine whether the ozone value indicates a trend toward higher ozone values or whether emissions appear to be increasing. The study will evaluate whether the trend, if any, is likely to continue and, if so, the control measures necessary to reverse the trend taking into consideration ease and timing for implementation, as well as economic and social considerations. The study, including the applicable recommended next steps, shall be completed within 12 months from the close of the most recent ozone season (September 30).

Should it be determined through the Warning Level study that action is necessary to reverse the noted trend, the procedures for control selection and implementation outlined under “Action Level Response” shall be followed.

Action Level Response

An Action Level Response shall be prompted whenever a two-year average fourth high monitored value of 85 ppb occurs within the maintenance area. In the event that the Action Level is triggered and is not due to an exceptional event, malfunction, or noncompliance with a permit condition or rule requirement, IDEM will determine additional control measures needed to assure future attainment of NAAQS for ozone. In this case, measures that can be implemented in a short time will be selected in order to be in place within 18 months from the close of the ozone season that prompted the Action Level.

Control Measure Selection and Implementation

Adoption of any additional control measures is subject to the necessary administrative and legal process. This process will include publication of notices, an opportunity for public hearing, and other measures required by Indiana law for rulemaking by state environmental boards.

If a new measure/control is already promulgated and scheduled to be implemented at the federal or state level, and that measure/control is determined to be sufficient to address the upward trend in air quality, additional local measures may be unnecessary. IDEM will submit to EPA an analysis to demonstrate the proposed measures are adequate to return the area to attainment.

8.3 Contingency Measures

Contingency measures to be considered will be selected from a comprehensive list of measures deemed appropriate and effective at the time the selection is made. Listed below are example measures that may be considered. The selection of measures will be based upon cost-effectiveness, emission reduction potential, economic and social considerations or other factors that IDEM deems appropriate. IDEM will solicit input from all interested and affected persons in the maintenance area prior to selecting appropriate contingency measures. All of the listed contingency measures are potentially effective or proven methods of obtaining significant reductions of ozone precursor emissions. Because it is not possible at this time to determine what control measure will be appropriate at an unspecified time in the future, the list of contingency measures outlined below is not comprehensive.

1) Lower-reid vapor pressure gasoline program.

2) Broader geographic applicability of existing measures.

3) Tighten RACT on existing sources covered by US EPA Control Technique Guidelines issued in response to the 1990 CAAA.

4) Apply RACT to smaller existing sources.

5) A modern vehicle inspection/maintenance program.

6) One or more transportation control measures sufficient to achieve at least 0.5% reduction in actual area wide VOC emissions. Transportation measures will be selected from the following, based upon the factors listed above after consultation with affected local governments:

   a) Trip reduction programs, including, but not limited to, employer-based transportation management plans, area wide rideshare programs, work schedule changes, and telecommuting.

   b) Transit improvements.

   c) Traffic flow improvements.

   d) Other new or innovative transportation measures not yet in widespread use that affects state and local governments deemed appropriate.

7) Alternative fuel and diesel retrofit programs for fleet vehicle operations.

8) Controls on consumer products consistent with those adopted elsewhere in the United States.

9) Require VOC or NO_x emission offsets for new and modified major sources.

10) Require VOC or NO_x emission offsets for new and modified minor sources.

11) Increase the ratio of emission offsets required for new sources.

12) Require VOC or NO_x controls on new minor sources (less than 100 tons).

No contingency measure shall be implemented without providing the opportunity for full public participation during which the relative costs and benefits of individual measures, at the time they are under consideration, can be fully evaluated.

9.0 PUBLIC PARTICIPATION

Indiana published notification for a public hearing and solicitation for public comment concerning the draft Redesignation Petition and Maintenance Plan in several publications, including the primary Evansville newspaper on or before March 18, 2005. A public hearing was conducted on April 19, 2005 and a number of comments were received. The public comment period closed on April 22, 2005. Appendix E includes a copy of the public notice, certifications of publication, the transcript from the public hearing, copies of all written comments received, and a summary of all comments received that includes IDEM's responses, as applicable.

10.0 CONCLUSIONS

The Vanderburgh and Warrick Counties basic nonattainment area has attained the NAAQS standard and complied with the applicable provisions of the 1990 Amendments to the Clean Air Act regarding redesignation of basic ozone nonattainment areas. Documentation to that effect is contained herein. IDEM has prepared a State Implementation and Maintenance Plan that meets the requirements of Section 110(a)(1) of the 1990 Clean Air Act.

Indiana has performed an analysis that shows the air quality improvements are due to permanent and enforceable measures. In addition, significant regional NO_x reductions will ensure continued compliance (maintenance) with the standard and that all CAAA requirements necessary for redesignation have been met.

Based on this presentation, the Vanderburgh and Warrick counties ozone basic nonattainment area meets the requirements for redesignation under the CAA and U.S. EPA guidance. Furthermore, because this area is subject to significant transport of pollutants, significant regional NO_x reductions will ensure continued compliance (maintenance) with the standards with an increasing margin of safety.

The State of Indiana hereby requests that the Vanderburgh and Warrick Counties ozone basic nonattainment area be redesignated to attainment simultaneously with U.S. EPA approval of the Indiana State Implementation and Maintenance Plan provisions contained herein.

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Appendix A

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

Nov. 10, 2004

EXCEPTIONAL DATA TYPES

EDT	DESCRIPTION
0	NO EVENTS
1	EVENTS EXCLUDED
2	EVENTS INCLUDED
3	EXCEPTIONAL EVENTSEXCLUDED
4	NATURAL EVENTS EXCLUDED
5	EVENTS WITH CONCURRENCE EXCLUDED
6	EXCEPTIONAL EVENTSWITH CONCURRENCE EXCLUDED
7	NATURAL EVENTS WITH CONCURRENCE EXCLUDED

Note: The * indicates that the mean does not satisfy summary criteria.

Ozone (44201) INDIANA PPM -7
8-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	%OBS	VALID DAYS MEAS	NUM DAYS REQ	1ST MAX 8-HR	2ND MAX 8-HR	3RD MAX 8-HR	4TH MAX 8-HR	DAY MAX>/= 0.085	CERT	EDT
18-163-0012	1	520	EVANSVILLE	VANDERBURGH	425 WEST MILL ROAD	2002	47	89	163	183	0.105	0.102	0.096	0.095	16	Y	0
18-163-0012	1	520	EVANSVILLE	VANDERBURGH	425 WEST MILL ROAD	2003	47	100	183	183	0.089	0.086	0.082	0.081	2		0
18-163-0012	1	520	EVANSVILLE	VANDERBURGH	425 WEST MILL ROAD	2004	47	97	177	183	0.078	0.074	0.073	0.072	0		0
18-163-0013	1	520	EVANSVILLE	VANDERBURGH	14940 OLD STATE ROAD	2002	47	100	183	183	0.097	0.095	0.089	0.086	5	Y	0
18-163-0013	1	520	EVANSVILLE	VANDERBURGH	14940 OLD STATE ROAD	2003	47	100	183	183	0.085	0.081	0.075	0.075	1		0
18-163-0013	1	520	EVANSVILLE	VANDERBURGH	14940 OLD STATE ROAD	2004	47	97	178	183	0.065	0.061	0.058	0.058	0		0
18-173-0002	2	520	NOT IN A CITY	WARRICK	200 YARDS S. OF S65	2002	47	99	182	183	0.113	0.097	0.094	0.094	17	Y	0
18-173-0002	2	520	NOT IN A CITY	WARRICK	200 YARDS S. OF S65	2003	47	100	183	183	0.101	0.09	0.082	0.082	2		0
18-173-0002	2	520	NOT IN A CITY	WARRICK	200 YARDS S. OF S65	2004	47	98	179	183	0.075	0.074	0.074	0.074	0		0
18-173-0008	1	520	BOONVILLE	WARRICK	BOONVILLE HIGH SCHOOL	2002	47	96	175	183	0.107	0.093	0.092	0.091	13	Y	0
18-173-0008	1	520	BOONVILLE	WARRICK	BOONVILLE HIGH SCHOOL	2003	47	100	183	183	0.087	0.087	0.083	0.076	2		0
18-173-0008	1	520	BOONVILLE	WARRICK	BOONVILLE HIGH SCHOOL	2004	47	96	175	183	0.084	0.076	0.075	0.073	0		0
18-173-0009	1	520	NOT IN A CITY	WARRICK	TECUMSEH HIGH SCHOOL	2002	47	100	183	183	0.094	0.091	0.091	0.09	12	Y	0
18-173-0009	1	520	NOT IN A CITY	WARRICK	TECUMSEH HIGH SCHOOL	2003	47	100	183	183	0.089	0.086	0.082	0.078	2		0
18-173-0009	1	520	NOT IN A CITY	WARRICK	TECUMSEH HIGH SCHOOL	2004	47	93	170	183	0.07	0.066	0.066	0.066	0		0

METHODS USED IN THIS REPORT

METHOD PARAMETER	CODE	COLLECTION METHOD	ANALYSIS METHOD
44201	47	INSTRUMENTAL	ULTRA VIOLET

REPORTING ORGANIZATIONS USED IN THIS REPORT

REPORTING ORGANIZATION

CODE	AGENCY DESCRIPTION
520	Indiana Depart Of Environ Management/Office Of Air Management
523	Indianapolis Division Of Air Pollution Control

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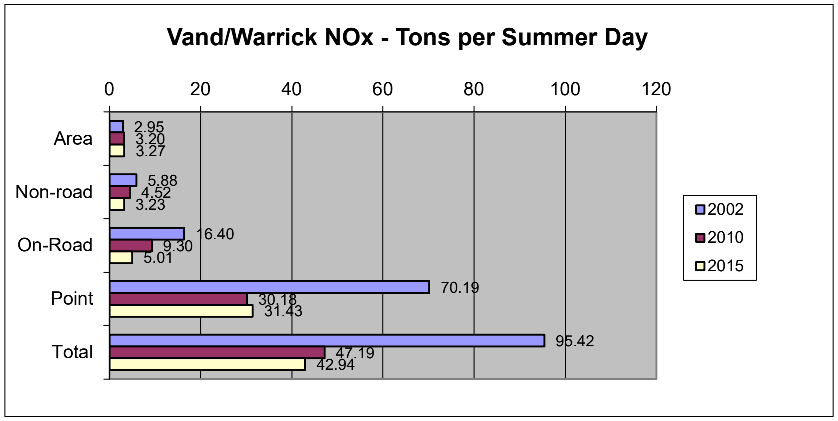
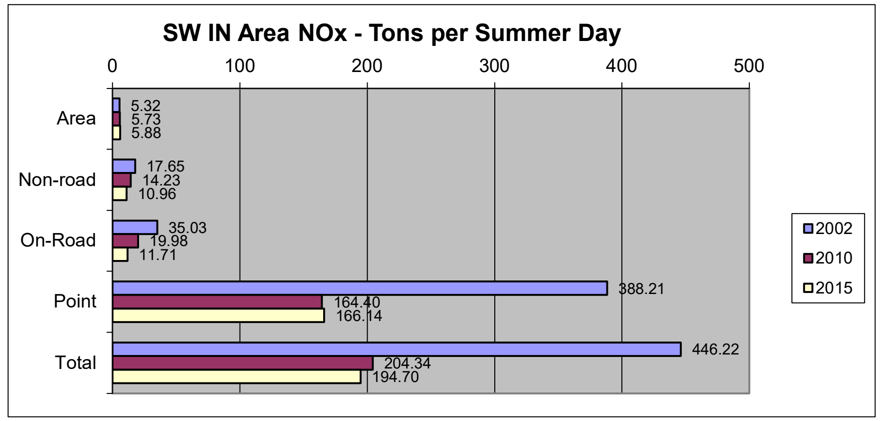
Appendix B

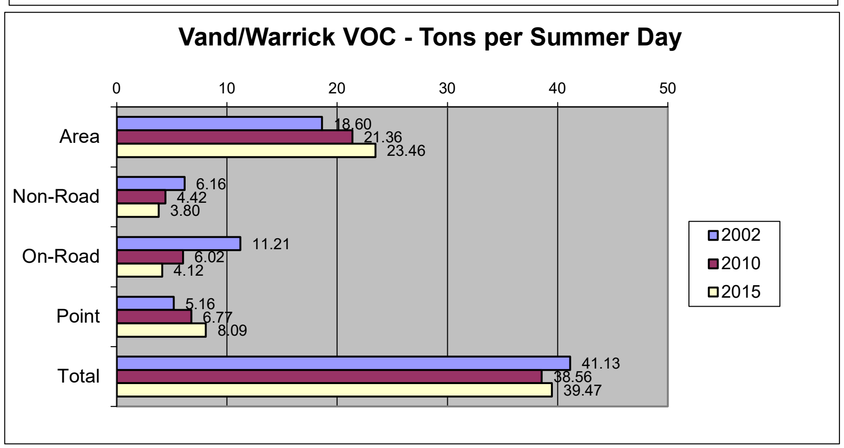
Appendix B

	Vanderburgh/Warrick			SW IN out-counties			SW IN Total		
	2002	2010	2015	2002	2010	2015	2002	2010	2015
NOx									
Area	2.95	3.20	3.27	2.37	2.53	2.61	5.32	5.73	5.88
Non-road	5.88	4.52	3.23	11.76	9.72	7.73	17.65	14.23	10.96
On-Road	16.40	9.30	5.01	18.63	10.68	6.70	35.03	19.98	11.71
Point	70.19	30.18	31.43	318.03	134.22	134.71	388.21	164.40	166.14
Total	95.42	47.19	42.94	350.79	157.15	151.76	446.22	204.34	194.70
VOC									
Area	18.60	21.36	23.46	*					
Non-Road	6.16	4.42	3.80						
On-Road	11.21	6.02	4.12						
Point	5.16	6.77	8.09						
Total	41.13	38.56	39.47						

*VOC emissions for the out-counties for future years were not considered since their influence is not regional.





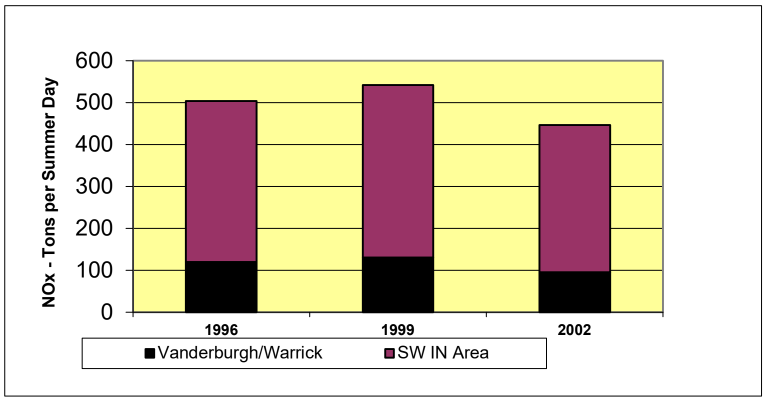


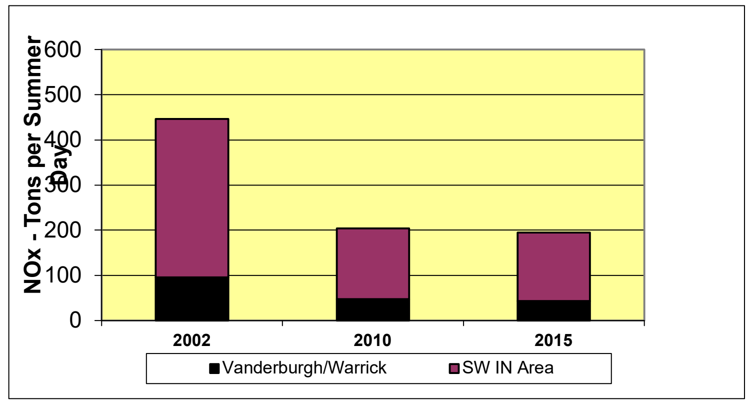
Appendix B

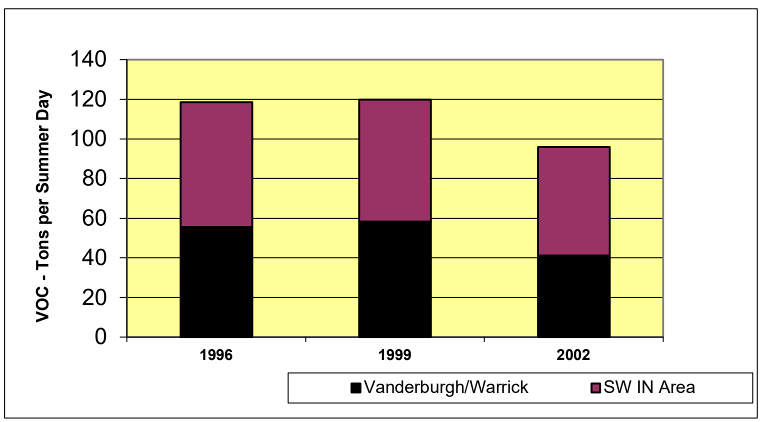
All Sources

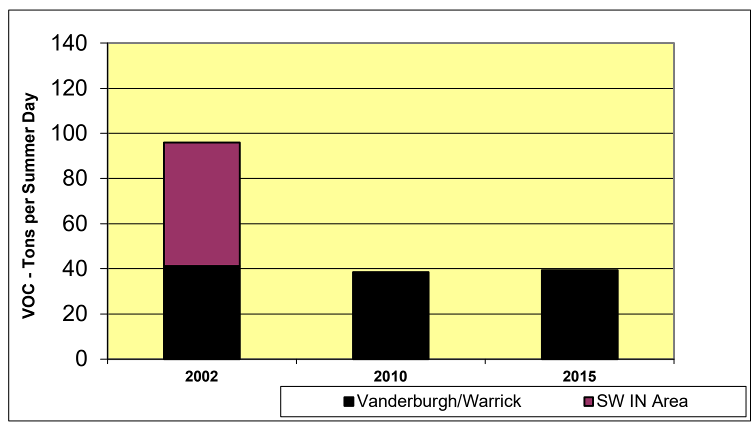
NOx	1996	1999	2002	2010	2015
Dubois	19.21	17.02	8.32	6.29	5.17
Gibson	143.52	163.00	140.12	48.66	47.17
Pike	81.73	66.08	64.65	32.17	31.75
Posey	36.84	48.77	38.43	22.46	21.50
Spencer	102.75	116.44	99.27	47.56	46.17
Vanderburgh	27.55	38.28	*	*	*
Warrick	92.17	92.12	*	*	*
SW IN Area	**384.06**	**411.31**	**350.79**	**157.15**	**151.76**
Vanderburgh/Warrick	**119.72**	**130.40**	**95.42**	**47.19**	**42.94**
VOC					
Dubois	24.84	23.23	18.83		
Gibson	11.49	11.57	13.29		
Pike	4.36	4.22	4.66		
Posey	14.87	13.80	10.57		
Spencer	7.38	8.68	7.39		
Vanderburgh	43.16	43.16	*	*	*
Warrick	12.38	15.13	*	*	*
SW IN Area	**62.94**	**61.49**	**54.74**		
Vanderburgh/Warrick	**55.54**	**58.28**	**41.13**	**38.56**	**39.47**

* Vanderburgh and Warrick On-Road emissions were not calculated separately for 2002, 2010 and 2015. They were calculated together using the travel demand model. The emissions are given in the Vanderburgh/Warrick row.





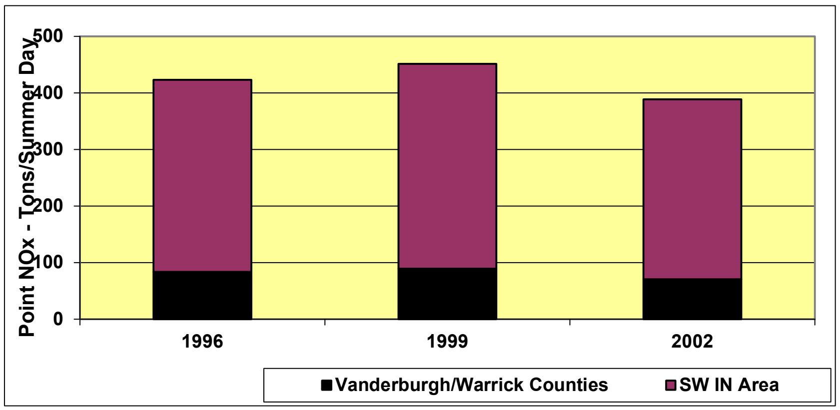


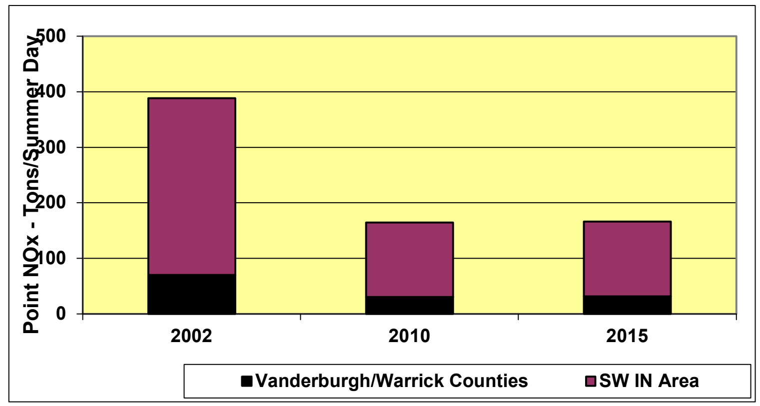


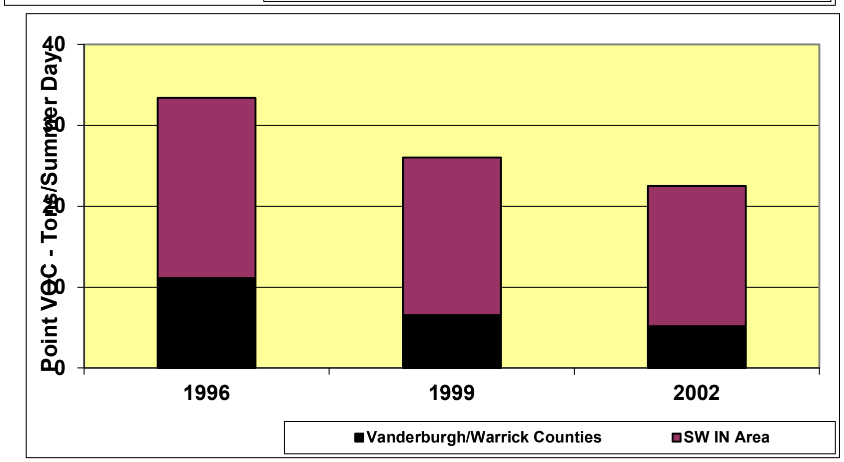
Appendix B

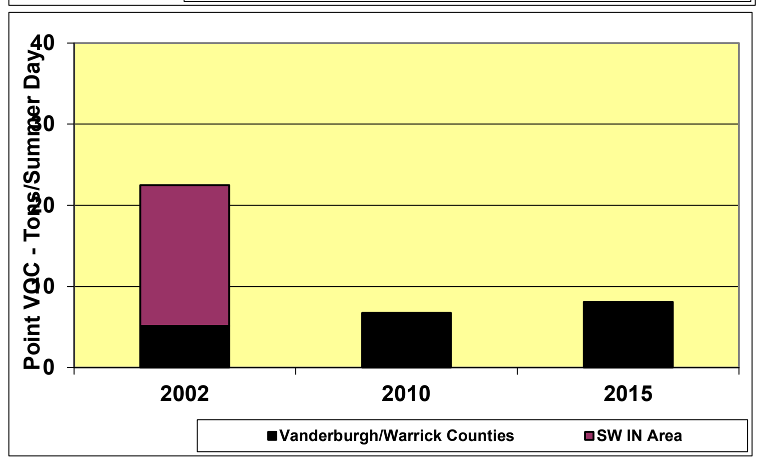
Point

NOx	1996	1999	2002	2010	2015
Dubois	8.38	7.04	1.07	1.16	1.24
Gibson	133.79	153.12	132.50	43.50	43.51
Pike	77.08	62.95	61.97	30.25	30.25
Posey	27.67	34.95	29.67	16.21	16.56
Spencer	92.43	104.57	92.81	43.09	43.15
Vanderburgh	1.13	9.80	5.85	0.88	0.90
Warrick	82.52	79.08	64.34	29.30	30.53
SW IN Area	**339.35**	**362.63**	**318.03**	**134.22**	**134.71**
van/war	**83.65**	**88.88**	**70.19**	**30.18**	**31.43**
VOC					
Dubois	12.18	11.19	8.03		
Gibson	1.89	1.64	3.91		
Pike	0.65	0.56	0.58		
Posey	7.19	5.13	3.75		
Spencer	0.38	0.96	1.06		
Vanderburgh	8.66	4.45	3.26	4.36	5.19
Warrick	2.45	2.09	1.90	2.41	2.90
SW IN Area	**22.29**	**19.48**	**17.33**		
van/war	**11.11**	**6.54**	**5.16**	**6.77**	**8.09**





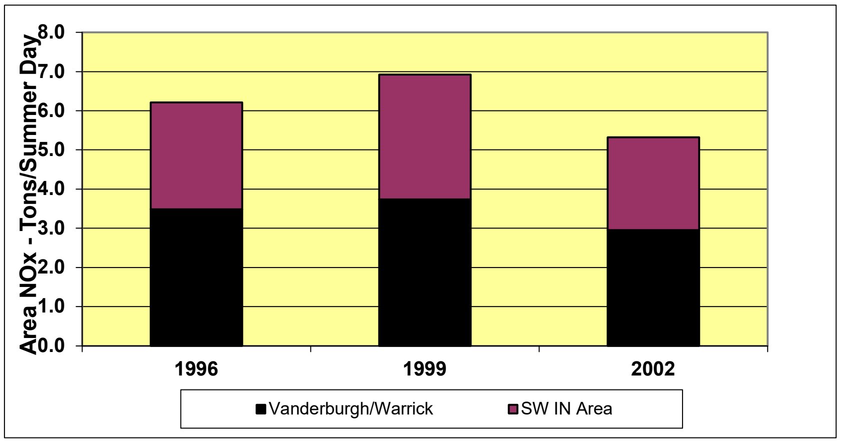


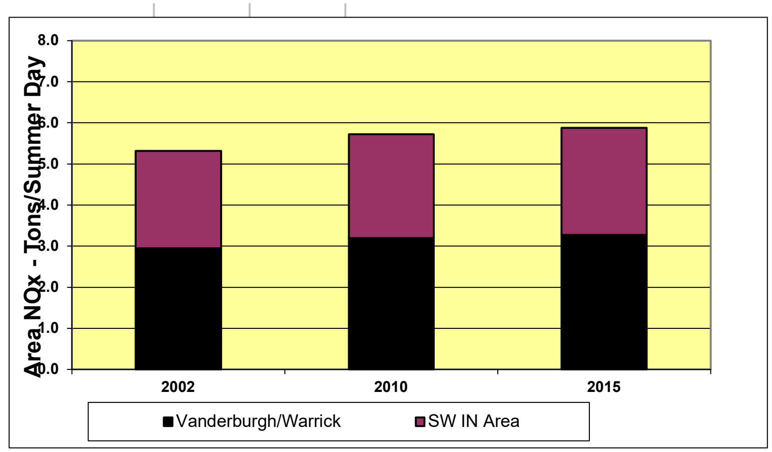


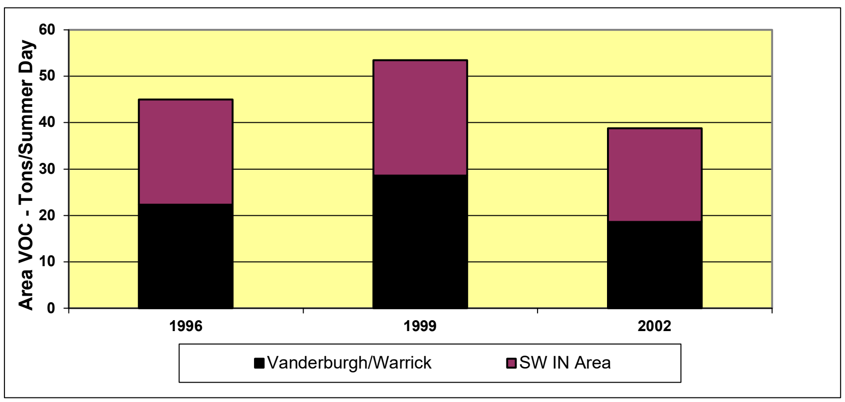
Appendix B

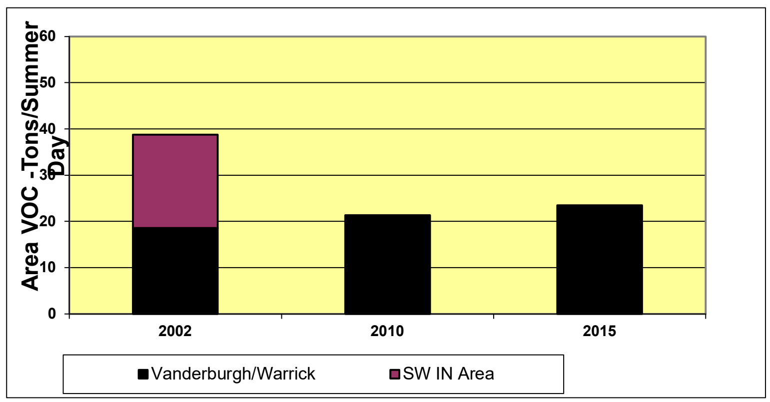
Area

NOx	1996	1999	2002	2010	2015
Dubois	1.48	1.87	1.20	1.28	1.32
Gibson	0.42	0.40	0.51	0.54	0.56
Pike	0.11	0.10	0.09	0.09	0.09
Posey	0.40	0.47	0.31	0.34	0.35
Spencer	0.31	0.35	0.26	0.28	0.29
Vanderburgh	2.97	3.14	2.51	2.72	2.78
Warrick	0.52	0.59	0.44	0.48	0.49
SW IN Area	**2.72**	**3.19**	**2.37**	**2.53**	**2.61**
Vanderburgh/Warrick	**3.49**	**3.74**	**2.95**	**3.20**	**3.27**
VOC					
Dubois	7.65	8.14	6.52		
Gibson	5.43	5.72	4.89		
Pike	2.10	2.17	2.08		
Posey	4.01	4.41	3.35		
Spencer	3.50	4.36	3.31		
Vanderburgh	17.06	21.75	13.73	15.74	17.33
Warrick	5.25	6.87	4.87	5.62	6.13
SW IN Area	**22.69**	**24.80**	**20.16**		
Vanderburgh/Warrick	**22.30**	**28.62**	**18.60**	**21.36**	**23.46**





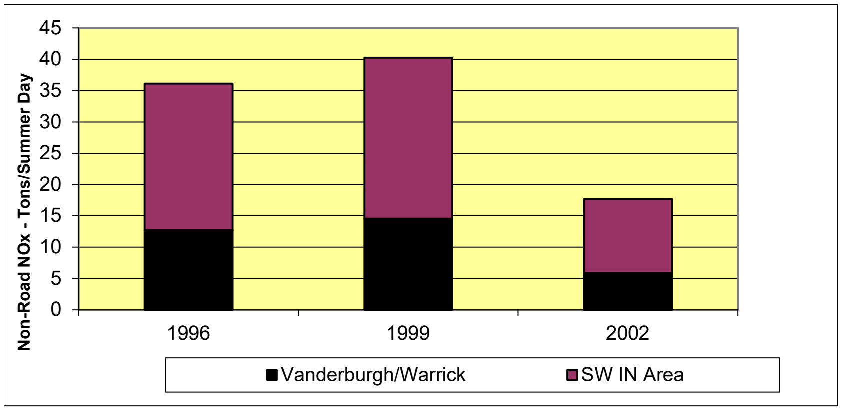


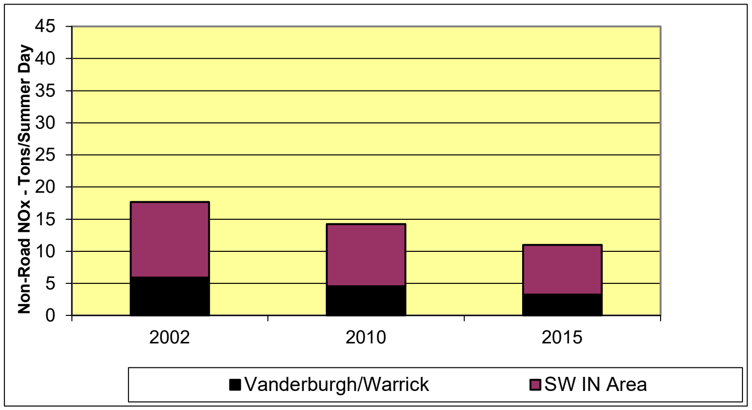


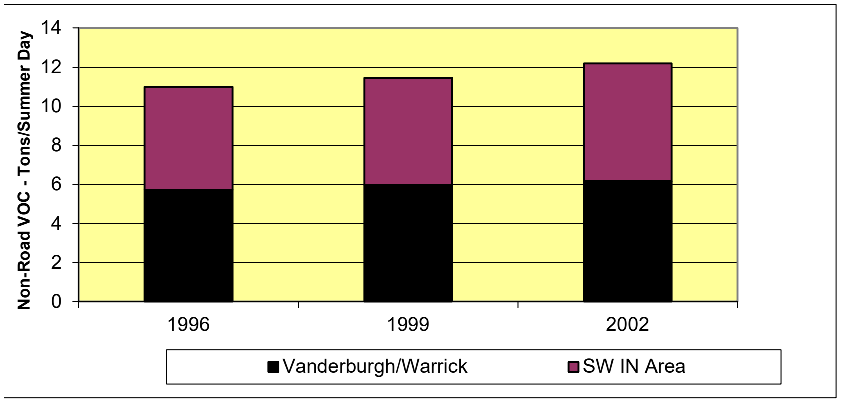
Appendix B

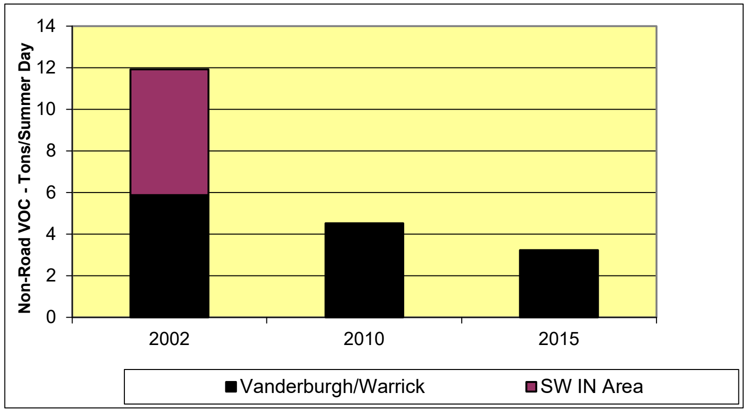
Non-Road

NOx	1996	1999	2002	2010	2015
Dubois	5.19	3.56	2.01	1.43	1.02
Gibson	4.47	5.3	2.28	1.93	1.46
Pike	2.82	1.23	0.94	0.79	0.71
Posey	4.49	8.18	4.13	3.56	3.18
Spencer	6.44	7.45	2.41	2.00	1.36
Vanderburgh	9.75	10.16	4.63	3.48	2.41
Warrick	2.95	4.38	1.26	1.04	0.82
SW IN Area	**23.42**	**25.72**	**11.76**	**9.72**	**7.73**
Vanderburgh/Warrick	**12.71**	**14.54**	**5.88**	**4.52**	**3.23**
VOC					
Dubois	1.46	0.92	1.22		
Gibson	1.13	1.61	1.77		
Pike	0.38	0.44	0.71		
Posey	0.89	1.38	1.35		
Spencer	1.42	1.15	0.99		
Vanderburgh	4.76	4.74	4.55	3.01	2.70
Warrick	0.95	1.22	1.60	1.40	1.10
SW IN Area	**5.28**	**5.50**	**6.04**		
Vanderburgh/Warrick	**5.71**	**5.96**	**6.16**	**4.42**	**3.80**





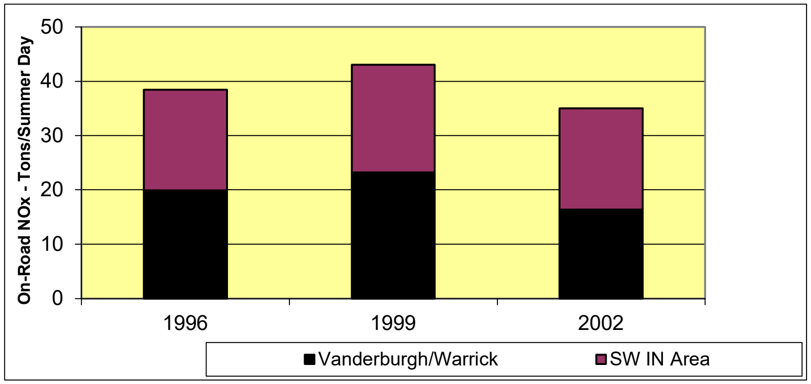


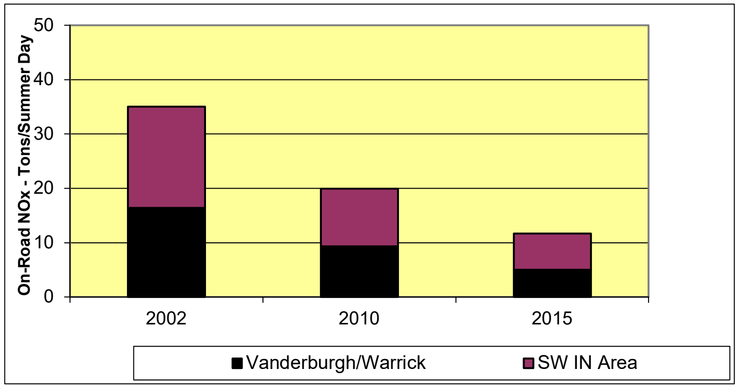


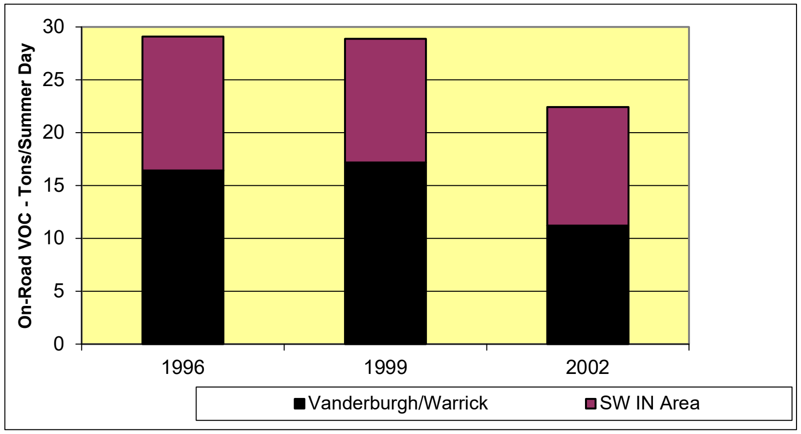
On-Road

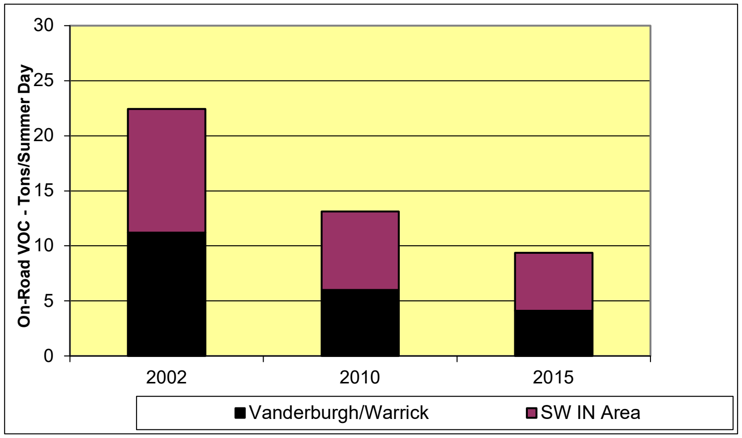
NOx	1996	1999	2002	2010	2015
Dubois	4.16	4.55	4.03	2.43	1.59
Gibson	4.84	4.18	4.84	2.69	1.65
Pike	1.71	1.81	1.66	1.04	0.69
Posey	4.28	5.16	4.31	2.34	1.41
Spencer	3.58	4.07	3.79	2.19	1.37
Vanderburgh	13.70	15.18	*	*	*
Warrick	6.18	8.07	*	*	*
SW IN Area	**18.56**	**19.77**	**18.63**	**10.68**	**6.70**
Vanderburgh/Warrick	**19.88**	**23.24**	**16.40**	**9.30**	**5.01**
VOC					
Dubois	3.55	2.98	3.06	1.94	1.46
Gibson	3.05	2.60	2.72	1.69	1.23
Pike	1.23	1.05	1.30	0.88	0.65
Posey	2.78	2.88	2.12	1.28	0.93
Spencer	2.08	2.21	2.02	1.32	1.00
Vanderburgh	12.68	12.21	*	*	*
Warrick	3.74	4.95	*	*	*
SW IN Area	**12.68**	**11.71**	**11.22**	**7.10**	**5.27**
Vanderburgh/Warrick	**16.42**	**17.16**	**11.21**	**6.02**	**4.12**

* Vanderburgh and Warrick On-Road emissions were not calculated separately for 2002, 2010 and 2015. They were calculated together using the travel demand model. The emissions are given in the Vanderburgh/Warrick row.









On-Road Emissions Summary for 5 Surrounding Counties - 2002, 2010, 2015

	VOC (Tons per Day)			NOX (Tons per Day)		
County	2002	2010	2015	2002	2010	2015
Dubois	3.06	1.94	1.46	4.03	2.43	1.59
Gibson	2.72	1.69	1.23	4.84	2.69	1.65
Pike	1.30	0.88	0.65	1.66	1.04	0.69
Posey	2.12	1.28	0.93	4.31	2.34	1.41
Spencer	2.02	1.32	1.00	3.79	2.19	1.37

VMT Summaries - 2002, 2010, 2015

2002

	HPMS	Adjusted Vehicle Miles Traveled				
Rural / Urban	Functional Class	Dubois	Gibson	Pike	Posey	Spencer
Rural	Interstate (1)	42490.11858	79051.3834	0	220355.7312	122529.6443
	OPA (2)	114,941	538,355	111,011	194,515	243,635
	Minor Arterial (6)	76,627	172,902	44,208	39,296	144,413
	Major Collector (7)	526,207	215,455	310,752	276,569	415,372
	Minor Collector (8)	94,261	141,910	42,469	91,154	54,900
	Local (9)	102,548	154,340	88,046	108,763	124,301
Urban	Interstate (11)	0	0	0	0	0
	Fwy/Exy (12)	0	0	0	0	0
	OPA (14)	220,888	66,481	0	67,553	0
	Minor Arterial (16)	261,634	45,035	0	124,383	0
	Collector (17)	18,229	4,289	0	36,457	0
	Local (19)	146,901	56,830	0	40,746	0

2010

	HPMS	Adjusted Vehicle Miles Traveled				
Rural / Urban	Functional Class	Dubois	Gibson	Pike	Posey	Spencer
Rural	Interstate (1)	55605.46173	108324.3502	0	264540.6636	151269.6131
	OPA (2)	125,842	615,036	136,363	206,352	243,909
	Minor Arterial (6)	98,585	177,255	52,097	27,739	148,610
	Major Collector (7)	672,568	259,104	397,901	301,266	611,215
	Minor Collector (8)	117,276	172,213	51,252	115,399	65,120
	Local (9)	132,349	190,846	115,342	138,024	151,245
Urban	Interstate (11)	0	0	0	0	0
	Fwy/Exy (12)	0	0	0	0	0
	OPA (14)	270,271	83,124	0	95,042	0
	Minor Arterial (16)	304,895	58,903	0	147,031	0
	Collector (17)	22,121	4,055	0	41,949	0
	Local (19)	178,705	67,527	0	47,869	0

2015

	HPMS	Adjusted Vehicle Miles Traveled				
Rural / Urban	Functional Class	Dubois	Gibson	Pike	Posey	Spencer
Rural	Interstate (1)	62432.62666	125092.8255	0	300712.6602	168457.3003
	OPA (2)	133,583	645,669	152,320	213,169	249,952
	Minor Arterial (6)	112,398	177,463	56,235	20,327	156,380
	Major Collector (7)	756,345	292,848	438,644	310,275	722,740
	Minor Collector (8)	130,459	190,011	56,588	129,116	70,990
	Local (9)	149,739	211,249	130,943	154,535	166,249
Urban	Interstate (11)	0	0	0	0	0
	Fwy/Exy (12)	0	0	0	0	0
	OPA (14)	304,778	89,395	0	103,036	0
	Minor Arterial (16)	336,869	66,767	0	162,953	0
	Collector (17)	24,493	4,348	0	46,075	0
	Local (19)	211,328	75,065	0	52,905	0

GROWTH FACTOR TABLE

M6FT		Growth Factors annual	2002 GF	2010 GF
1	AM Truck Volume	1.7%	3.4%	6.8%
	AM Auto Volume	0.9%	1.7%	3.4%
	PM Truck Volume	1.6%	3.3%	6.6%
	PM Auto Volume	1.2%	2.5%	4.9%
	OP Truck Volume	1.6%	3.3%	6.5%
	OP Auto Volume	1.2%	2.5%	4.9%
2	AM Truck Volume	0.9%	1.8%	3.7%
	AM Auto Volume	0.4%	0.7%	1.5%
	PM Truck Volume	0.9%	1.8%	3.6%
	PM Auto Volume	0.4%	0.8%	1.7%
	OP Truck Volume	0.9%	1.8%	3.6%
	OP Auto Volume	0.6%	1.1%	2.3%
3	AM Truck Volume	0.8%	1.5%	3.1%
	AM Auto Volume	0.4%	0.9%	1.8%
	PM Truck Volume	0.7%	1.4%	2.8%
	PM Auto Volume	0.2%	0.4%	0.7%
	OP Truck Volume	0.7%	1.5%	3.0%
	OP Auto Volume	0.3%	0.6%	1.3%
4		8% of Freeway Trips		

EUTS travel demand model / MOBILE6.2 emission results

	Vanderburgh and Warrick Counties 2002	2010	2015
VMT (miles/day)	6225764	6520671	6463504
VOC (tons/day)	11.21	6.02	4.12
NOx (tons/day)	16.4	9.3	5.01

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EVANSVILLE REGIONAL TRAVEL MODEL DEVELOPMENT

Technical Memorandum: *Automated Air Quality Conformity Analysis*

Prepared for the

EVANSVILLE URBAN TRANSPORTATION STUDY

Room 316, Civic Center Complex
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Introduction

The Clean Air Act (CAAA) and the Transportation Equity Act for the 21st Century (TEA-21) require evaluation of transportation plans for areas that are designated as “non-attainment” or “maintenance” areas for the National Ambient Air Quality Standards (NAAQS) to ensure consistency with air quality planning efforts. Certain activities require that a conformity determination be made, namely the development of new or amended long-range transportation plans or short-range transportation improvement programs (TIP) for Urbanized Areas.

To assist in required air quality conformity analyses, the Evansville Urban Transportation Study (EUTS) contracted with Bernardin-Lochmueller & Associates (BLA) to develop a micro-computer program to interface with and post-process the output of the new Evansville Regional Travel Model, also developed by BLA for EUTS.

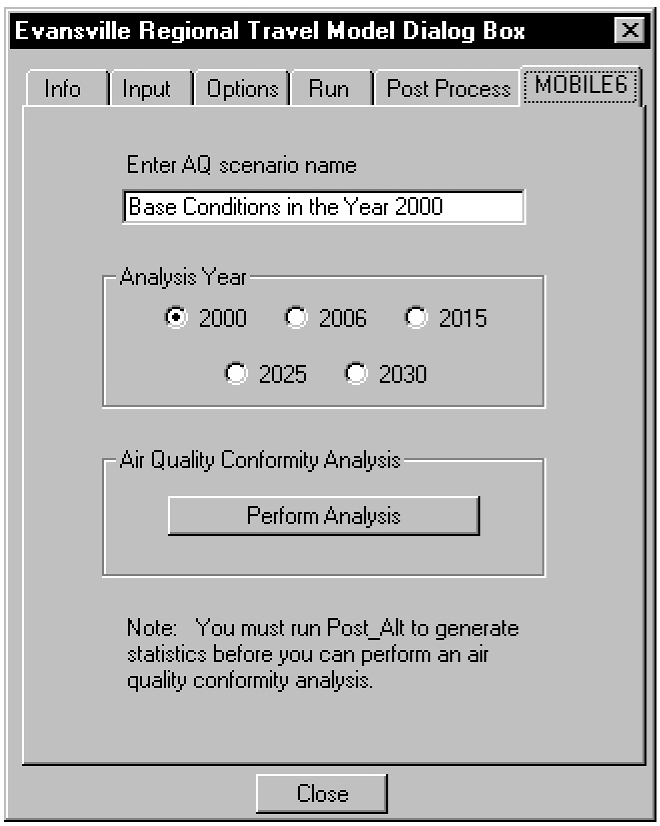

Figure 1: Air Quality Post-Processor User Interface

The air quality post-processor program was written in the GIS/DK programming language and incorporated into the travel model’s user interface in the TransCAD software environment. This enables the user to run the air quality program after making a travel model run by the simple push of a button. The user needs only to specify the year of the analysis, and the program incorporates the parameters specific to the analysis area in that year. The user interface is displayed in Figure 1. The current program is designed only to determine conformity for Vanderburgh County, since it is currently the only non-attainment area in the Evansville region. If due to new standards (e.g., the 8-hr ozone standard, etc.) or for other reasons future conformity analyses require the examination of other counties within the model area, the program could be modified in a fairly simple, straightforward manner to report emissions and conformity for other counties or the model area as a whole.

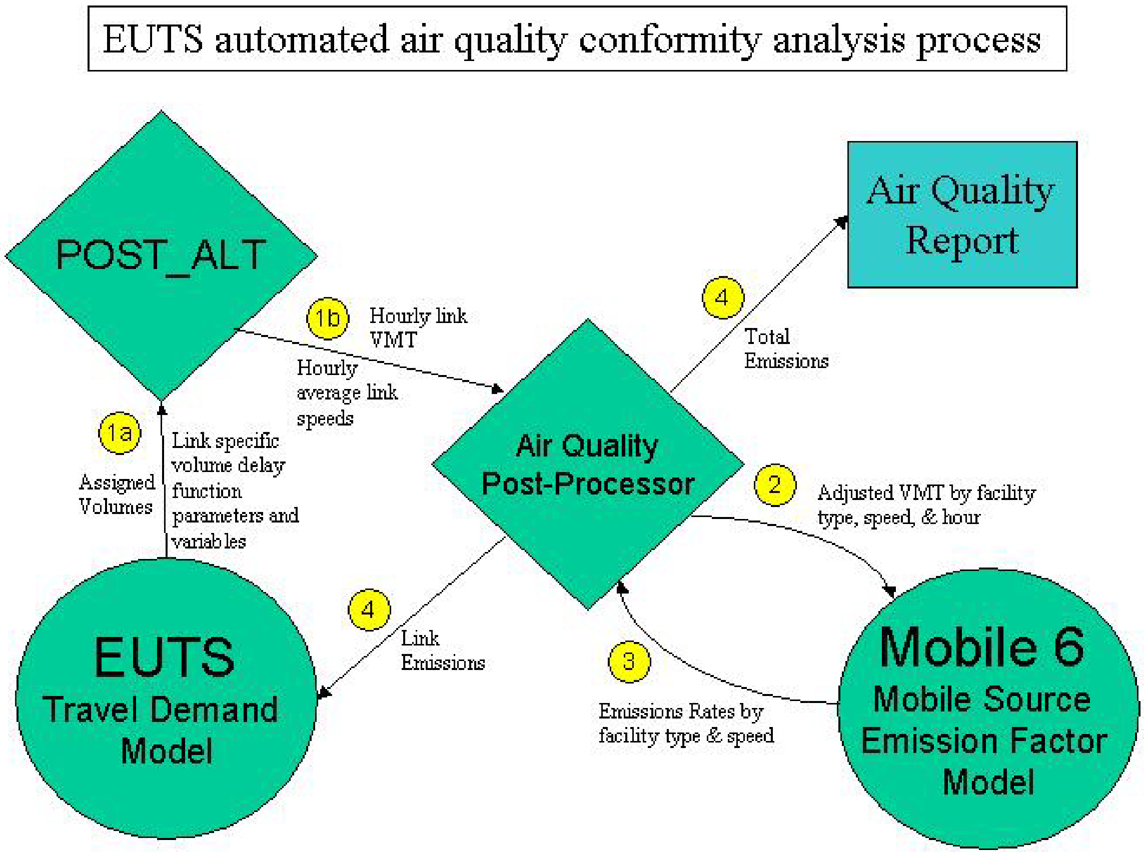

Figure 2: EUTS Automated Air Quality Conformity Analysis Process

The process of air quality conformity analysis automated by the post-processor is displayed in Figure 2. The process can be understood as being made up of four steps. The first step is the estimation of hourly link speeds and volumes. This step is accomplished by the POST_ALT post-processor for the travel model that also produces other traffic statistics. In the second step, the air quality post-processor (proper) adjusts and aggregates the link VMT from POST_ALT by facility type, speed, and hour of the day and passes this data along with the other standard inputs to the Mobile 6 model. The third step would be the series of thirty Mobile 6 runs to produce emissions rates by facility type and speed bin. The fourth and final step then consists of application of the rates from the Mobile 6 runs to the VMT to calculate the emissions and the reporting of these emissions on the network links and in summary in the report file.

Estimation of Hourly Speeds and Volumes

The average congested speeds for links in the model's roadway network used by the air quality post-processor are computed first by a post-processor for the travel model, POST_ALT. POST_ALT, developed by BLA, passes to the air quality post-processor the hourly VMT and average speeds on each link in the model's roadway network. The air quality post-processor then tabulates the VMT on each facility type, in each speed bin, for each hour of the day. Harmonic means are used in disaggregating each link's hourly VMT into the upper and lower bins around its hourly average speed, as described in section 5.3.4 of the Mobile 6 User's Guide.

The hourly average speed for each link is calculated by using the traditional Bureau of Public Roads (BPR) volume delay function. Link specific parameters are used to adjust the link's free-flow speed on the basis of its hourly volume to capacity ratio to account for congestion related delay. The alpha and beta parameters for the BPR equation which are used in both the travel model's assignment procedure as well as the post-processing are coded on the network links. Two sets of parameters were used in the EUTS model. Rural principal arterials and interstates were coded with an alpha of 0.83 and beta of 2.10. All other links were coded with an alpha of 0.84 and a beta of 5.50. These parameters are taken from *Delay-Volume Relations for Travel Forecasting, Based on the 1985 Highway Capacity Manual* by Alan Horowitz, published by the FHWA in 1991 and cited by the Travel Model Improvement Program's (TMIP) 1997 report on *Travel Model Speed Estimation and Post Processing Methods for Air Quality Analysis.* The link free-flow speeds were assigned on the basis of posted speed, functional class, number of lanes, and presence/absence of median; and on some facilities these free-flow speeds may have been subsequently adjusted in the calibration process. The speed table used in assigning speeds was developed on the basis of an extensive speed study conducted at over 60 stations in southwest Indiana for the study of I-69. The capacities used in the estimation of average speeds are absolute (LOS E) capacities from the Highway Capacity Manual. The last input to the volume delay function, the volume, is estimated by apportioning the model's assigned daily volumes using an hourly distribution and peak-period directional factor that are specified by the user. The examples given in this documentation all reflect the use of the a 60/40 directional split in the peak periods and an hourly distribution obtained by averaging the trip distributions reported in the 2000 Evansville Household Travel Survey and the 1995 Indiana Statewide Household Travel Survey.

A formal calibration/validation of speeds was not part of the BLA's services contracted to EUTS, nor was there average speed data available for the area necessary for such a process. Therefore, the validation of the average speeds was limited to reasonableness checks. However, POST_ALT has recently been calibrated for another urban model, using local peak period speed studies, and obtained a 36.1% RMSE with AM period speeds and a 31.5% RMSE with PM period speeds. This calibration was accomplished by dampening the hourly distribution from a household travel survey to account for a more disperse commercial traffic distribution and disproportionate underreporting of off-peak period trips. Averaging the distributions from the Evansville and Indiana statewide household travel surveys produced a fairly similar distribution due to the less peaked character of the statewide distribution. Another hourly distribution of traffic for the Evansville region was produced by dampening the distribution from the 2000 Evansville Household Travel Survey similarly as was done to achieve the calibration in the other model. It could be appropriate to use either of these distributions (the average or the dampened distribution), but statistical agreement of the calculated speeds with observed speeds is not expected to be as good here because no observed speed data was available for calibration purposes.

Preprocessing for Mobile 6

The preprocessor for the thirty Mobile 6 runs produces a control file to implement the Mobile 6 runs and creates fifty-one external data files. The creation of the control file is very straightforward since most of the assumptions for the Mobile 6 runs can be hard-coded because they depend only on the air quality analysis area and do not vary from analysis to analysis. (These assumptions are recorded in the next section dealing with the Mobile 6 runs.) A representative Mobile 6 input control file created in the preprocessor is reproduced in Appendix A.

The external data files created in the preprocessor are distributions of VMT in the analysis area by facility type, speed bin, and hour of the day. Examples of these external data files produced in the preprocessor can be found in Appendix B. The preprocessor essentially cross tabulates the hourly link VMT's for each combination of facility type, speed bin, and hour of the day and then converts these sums into distributions. The Mobile 6 facility type is coded directly on the model's roadway network links in the field M6FT. Freeways are coded as 1, arterials (including collectors) by 2, locals by 3, and any ramps by 4 in the M6FT field. However, before the VMT can be tabulated, it must be adjusted to ensure relative agreement with HPMS and account for the underrepresentation of local streets in the model.

Year 2000 VMT	Model		Model Adjusted		HPMS	
	VMT	Share	VMT	Share	VMT	Share
Freeways	508,579	12.3%	508,579	11.6%	432,400	9.9%
Arterials	3,365,478	81.5%	3,365,478	76.6%	3,443,000	78.4%
Locals	213,065	5.2%	473,538	10.8%	476,000	10.8%
Ramps	44,224	1.1%	44,224	1.0%	37,600	0.9%
Total	4,131,347	100.0%	4,391,819	100.0%	4,389,000	100.0%

Table 1: HPMS vs. Model VMT Table

For each facility type, as well as for Vanderburgh County as a whole, the daily VMT reported by the travel model for the year 2000 was compared with the daily VMT estimates from the Federal Highway Administration's (FHWA) Highway Performance Monitoring System (HPMS). Because the travel model's roadway network does not contain ramps, the Mobile 6 national default was used to break out the model's total freeway VMT into mainline and ramp VMT. Because the model network also includes only a fraction of the local streets, it was expected that the VMT for local facilities would have to be factored up to yield an accurate estimate of VMT. The comparison revealed that if the VMT reported by the model for local roads was factored up to agree with the HPMS estimate, the total VMT and shares for each facility type were in good agreement between the model and the HPMS estimates. The base year VMT by facility type for Vanderburgh County are displayed in Table 1. The same factor was applied to the local facilities' VMT for future years as was used in the base year of 2000.

Automated Mobile 6 Runs

The air quality post-processor makes thirty Mobile 6 runs for each travel model run in order to produce a table of emissions rates by facility type and speed bin. An example of an emissions rate table produced by the post-processor is displayed in Table 2. Mobile 6 model documentation (User's Guide section *2.8.8.2.d*) makes clear that it is not inappropriate to use Mobile 6 to model emissions rates for roadway links separately. Section 4.5.3 of the TMIP's report entitled Travel Model Speed Estimation and Post Processing Methods for Air Quality Analysis also encourages the estimation of link based emissions and emissions rates.

Facility Type		Average Speed (in miles per hour)													
		2.5	5	10	15	20	25	30	35	40	45	50	55	60	65+
Freeway	VOC	12.96	5.46	3.10	2.43	2.11	1.96	1.85	1.76	1.71	1.66	1.58	1.61	1.63	1.59
	CO	58.29	34.50	21.84	18.17	17.10	16.52	16.16	16.19	16.82	17.49	17.12	19.74	22.25	22.81
	NOX	4.37	3.96	3.20	2.79	2.70	2.64	2.62	2.61	2.65	2.72	2.83	3.00	3.23	3.53
Arterial	VOC	12.96	5.11	3.04	2.44	2.11	2.04	1.95	1.84	1.77	1.72	1.68	1.65	1.62	1.59
	CO	56.29	33.14	22.12	18.78	17.13	17.68	17.67	17.71	18.37	19.14	19.99	20.97	21.82	22.65
	NOX	4.04	3.52	3.00	2.66	2.47	2.40	2.34	2.31	2.34	2.41	2.52	2.67	2.89	3.19
Local	VOC				2.86										
	CO				17.84										
	NOX				2.33										
Ramp	VOC								2.07						
	CO								27.90						
	NOX								2.30						

Table 2: Emissions Rate Table

Each of the thirty Mobile 6 runs assumes the same fuel volatility, VMT fractions for the various vehicle types, meteorological data, and vehicle fleet age mix. The fuel volatility is assumed to be a Reid vapor pressure of 9.0 psi. The VMT fractions for the various vehicle types were borrowed from the previous air quality analysis done in 2000 in which data was obtained from the Indiana Bureau of Motor Vehicles (BMV). The meteorological data, including average daily low and high temperatures (68 and 89 degrees Fahrenheit), sunrise and sunset hours (7AM and 9PM), and cloud cover (27%), was taken from the *Comparative Climatic Data Publication* by the National Climatic Data Center (NCDC) specifically for Evansville, Indiana, in the month of July. The national vehicle fleet age mix was used for heavy truck categories, but for passenger cars and light trucks the age distribution of household vehicles from the 2000 Evansville Household Travel Survey was used.

The thirty Mobile 6 runs differ in the VMT for which they estimate emissions rates. Each run calls a different set of the external data files created in the preprocessor. Fourteen runs are made for freeways at various speeds, fourteen runs are made for arterials at various speeds, and one run each is made for local facilities and ramps. An example of the resulting Mobile 6 outputs are included in Appendix C.

Postprocessing of Mobile 6 Runs

The product of the Mobile 6 runs is a set of emissions rates. However, in order to determine conformity, these rates must be applied to the VMT to calculate the actual emissions. The post-processing of the Mobile 6 runs consists of this application of the Mobile 6 emissions rates and the generation of the report file.

Emissions are calculated differently for freeways and arterials than for local facilities and ramps. For freeways and arterials, emissions are computed for each link in the travel model's roadway network. Average link speeds by hour of the day (from POST_ALT) are used to distribute the hourly VMT on the link between the Mobile 6 speed bins using harmonic means as prescribed by Mobile 6 documentation. The emissions rates by facility type and speed bin are then applied to determine the emissions resulting from traffic on the link in each hour. The hourly emissions on each link are summed to produce the total emissions for the link and the emissions from each link are summed to produce total emissions for freeways and for arterials. The total daily emissions for each link are written to the link in the TransCAD network file in the fields: VOC, CO1, and NOX.

Since all local facilities and ramps are not included in the model's roadway network, their emissions cannot be calculated on a link-by-link basis. Moreover, Mobile 6 assumes specific speeds for these facility types based on national averages such that there would be little advantage to a link specific calculation in their case anyway. Therefore, emissions are computed for all local roads and all ramps with one calculation for each category in which the total VMT for the facility type (computed in the preprocessor) is multiplied by the emissions rates for the facility type.

```
Air Quality Conformity Analysis Report for Vanderburgh County
from MOBILE6 and the Evansville Regional Travel Model
Wed Oct 01 17:48:27 2003


Year: 2000
Scenario: Base Conditions in the Year 2000
          4391345 VMT in Vanderburgh County

             VOC               CO                NOX
Scenario:    9.01 tons/day    95.22 tons/day   12.44 tons/day
Budget:     16.29 tons/day   106.96 tons/day   12.52 tons/day
```

Figure 3: Air Quality Post-Processor Report

The total emissions for freeways and arterials are then added to the totals for local facilities and ramps to produce the grand total emissions for the analysis area. The program generates a report file in ASCII text format that reports the daily vehicle miles of travel (VMT) and daily emissions of volatile organic compounds (VOC), carbon monoxide (CO) and nitrogen oxides (NOX) for Vanderburgh County. The State Implementation Plan (SIP) budgets for the emissions of VOC, CO, and NOX are also included in the report to facilitate the determination of conformity. An example report can be seen above in Figure 3.

Appendix A: Mobile 6 Control Input File

The air quality post-processor produces a Mobile 6 control file which is used to specify the inputs for the thirty Mobile 6 model runs (or, scenarios, more precisely). This control file, named Mobile6.in, is created in and called from the TransCAD program's root directory. An example of a control file created and used by the air quality post-processor is presented below.

MOBILE6.in

```
MOBILE6 INPUT FILE :
*created by M6in macro written 6/13/03, vlb2

POLLUTANTS        : HC CO NOx
REPORT FILE       : C:\EUTS\Model_v3\post\M6REPORT.txt
SPREADSHEET       : M6REPORT

RUN DATA
MIN/MAX TEMP      : 68. 89.
FUEL RVP          : 9.0

REG DIST          : C:\EUTS\Model_v3\post\VREGDATA.D
VMT FRACTIONS     :
0.617  0.044  0.148  0.059  0.027  0.032  0.003  0.002
0.002  0.007  0.008  0.009  0.033  0.002  0.001  0.006

SCENARIO RECORD    : Scenario Title : Vanderburg Co., 2000 Freeways 0mph to 2.5mph
CALENDAR YEAR      : 2000
EVALUATION MONTH   : 7
CLOUD COVER        : 0.27
SUNRISE/SUNSET     : 7 9
VMT BY FACILITY    : C:\EUTS\Model_v3\post\Fvmt1.d
VMT BY HOUR        : C:\EUTS\Model_v3\post\Hvmt1_1.d
SPEED VMT          : C:\EUTS\Model_v3\post\Svmt1.d

SCENARIO RECORD    : Scenario Title : Vanderburg Co., 2000 Freeways 2.5mph to 7.5mph
CALENDAR YEAR      : 2000
EVALUATION MONTH   : 7
CLOUD COVER        : 0.27
SUNRISE/SUNSET     : 7 9
VMT BY FACILITY    : C:\EUTS\Model_v3\post\Fvmt1.d
VMT BY HOUR        : C:\EUTS\Model_v3\post\Hvmt1_2.d
SPEED VMT          : C:\EUTS\Model_v3\post\Svmt2.d

SCENARIO RECORD    : Scenario Title : Vanderburg Co., 2000 Freeways 7.5mph to 12.5mph
CALENDAR YEAR      : 2000
EVALUATION MONTH   : 7
CLOUD COVER        : 0.27
SUNRISE/SUNSET     : 7 9
VMT BY FACILITY    : C:\EUTS\Model_v3\post\Fvmt1.d
VMT BY HOUR        : C:\EUTS\Model_v3\post\Hvmt1_3.d
SPEED VMT          : C:\EUTS\Model_v3\post\Svmt3.d

SCENARIO RECORD    : Scenario Title : Vanderburg Co., 2000 Freeways 12.5mph to 17.5mph
CALENDAR YEAR      : 2000
EVALUATION MONTH   : 7
CLOUD COVER        : 0.27
SUNRISE/SUNSET     : 7 9
VMT BY FACILITY    : C:\EUTS\Model_v3\post\Fvmt1.d
VMT BY HOUR        : C:\EUTS\Model_v3\post\Hvmt1_4.d
SPEED VMT          : C:\EUTS\Model_v3\post\Svmt4.d

SCENARIO RECORD    : Scenario Title : Vanderburg Co., 2000 Freeways 17.5mph to 22.5mph
CALENDAR YEAR      : 2000
EVALUATION MONTH   : 7
CLOUD COVER        : 0.27
SUNRISE/SUNSET     : 7 9
VMT BY FACILITY    : C:\EUTS\Model_v3\post\Fvmt1.d
VMT BY HOUR        : C:\EUTS\Model_v3\post\Hvmt1_5.d
SPEED VMT          : C:\EUTS\Model_v3\post\Svmt5.d
```

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Freeways 22.5mph to 27.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt1.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt1_6.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt6.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Freeways 27.5mph to 32.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt1.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt1_7.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt7.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Freeways 32.5mph to 37.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt1.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt1_8.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt8.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Freeways 37.5mph to 42.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt1.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt1_9.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt9.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Freeways 42.5mph to 47.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt1.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt1_10.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt10.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Freeways 47.5mph to 52.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt1.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt1_11.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt11.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Freeways 52.5mph to 57.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt1.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt1_12.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt12.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Freeways 57.5mph to 62.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt1.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt1_13.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt13.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Freeways 62.5mph to 500mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt1.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt1_14.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt14.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Arterials 0mph to 2.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt2.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt2_1.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt1.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Arterials 2.5mph to 7.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt2.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt2_2.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt2.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Arterials 7.5mph to 12.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt2.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt2_3.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt3.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Arterials 12.5mph to 17.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt2.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt2_4.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt4.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Arterials 17.5mph to 22.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt2.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt2_5.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt5.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Arterials 22.5mph to 27.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt2.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt2_6.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt6.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Arterials 27.5mph to 32.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt2.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt2_7.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt7.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Arterials 32.5mph to 37.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt2.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt2_8.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt8.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Arterials 37.5mph to 42.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt2.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt2_9.d

SPEED VMT : C:\EUTS\Model_v3\post\Svmt9.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Arterials 42.5mph to 47.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt2.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt2_10.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt10.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Arterials 47.5mph to 52.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt2.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt2_11.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt11.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Arterials 52.5mph to 57.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt2.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt2_12.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt12.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Arterials 57.5mph to 62.5mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt2.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt2_13.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt13.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Arterials 62.5mph to 500mph
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt2.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt2_14.d
SPEED VMT : C:\EUTS\Model_v3\post\Svmt14.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Locals
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt3.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt1.d

SCENARIO RECORD : Scenario Title : Vanderburg Co., 2000 Ramps
CALENDAR YEAR : 2000
EVALUATION MONTH : 7
CLOUD COVER : 0.27
SUNRISE/SUNSET : 7 9
VMT BY FACILITY : C:\EUTS\Model_v3\post\Fvmt4.d
VMT BY HOUR : C:\EUTS\Model_v3\post\Hvmt1.d

END OF RUN

Appendix B: Example Mobile 6 External Data Input Files

The air quality post-processor calls a number of external data files in its Mobile 6 model runs. In particular, it calls four types of files, the VREGDATA file, FVMT, SVMT, and HVMT files.

The VREGDATA.d file displayed below contains the distribution of vehicles by vehicle age for light duty vehicles. The distribution was taken from the 2000 Evansville Household Travel Survey and shows that there are slightly more newer vehicles in the Evansville area than assumed in the national defaults for Mobile 6. Due to a lack of local data the national defaults were used for heavy duty vehicles.

VREGDATA.d

```
REG DIST
*
* LDV
 1 0.0746 0.0888 0.0782 0.0772 0.0600 0.0677 0.0749 0.0610 0.0477 0.0500
   0.0500 0.0494 0.0366 0.0333 0.0283 0.0216 0.0167 0.0144 0.0056 0.0061
   0.0061 0.0094 0.0089 0.0106 0.0229
* LDT1
 2 0.0746 0.0888 0.0782 0.0772 0.0600 0.0677 0.0749 0.0610 0.0477 0.0500
   0.0500 0.0494 0.0366 0.0333 0.0283 0.0216 0.0167 0.0144 0.0056 0.0061
   0.0061 0.0094 0.0089 0.0106 0.0229
* LDT2
 3 0.0746 0.0888 0.0782 0.0772 0.0600 0.0677 0.0749 0.0610 0.0477 0.0500
   0.0500 0.0494 0.0366 0.0333 0.0283 0.0216 0.0167 0.0144 0.0056 0.0061
   0.0061 0.0094 0.0089 0.0106 0.0229
* LDT3
 4 0.0746 0.0888 0.0782 0.0772 0.0600 0.0677 0.0749 0.0610 0.0477 0.0500
   0.0500 0.0494 0.0366 0.0333 0.0283 0.0216 0.0167 0.0144 0.0056 0.0061
   0.0061 0.0094 0.0089 0.0106 0.0229
* LDT4
 5 0.0746 0.0888 0.0782 0.0772 0.0600 0.0677 0.0749 0.0610 0.0477 0.0500
   0.0500 0.0494 0.0366 0.0333 0.0283 0.0216 0.0167 0.0144 0.0056 0.0061
   0.0061 0.0094 0.0089 0.0106 0.0229
```

The post-processor creates input files FVMT1.d through FVMT4.d and SVMT1.d through SVMT14.d but as these files only contain 1's and 0's to flag the appropriate facility type and speed bin and as they are of considerable length, they are not all reproduced here. Instead, one example of an SVMT file is given.

SVMT5.d

```
SPEED VMT
1 1  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 2  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 3  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 4  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 5  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 6  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 7  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 8  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 9  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 10 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 11 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
```

```
1 12 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 13 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 14 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 15 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 16 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 17 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 18 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 19 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 20 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 21 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 22 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 23 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
1 24 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 1  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 2  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 3  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 4  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 5  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 6  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 7  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 8  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 9  0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 10 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 11 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 12 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 13 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 14 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 15 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 16 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 17 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 18 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 19 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 20 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 21 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 22 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 23 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2 24 0.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
```

The post-processor also produces 29 HVMT files: HVMT1.d, HVMT1_1.d through HVMT1_14.d, and HVMT2_1.d through HVMT2_14.d. These files contain the hourly distribution of total daily VMT for each facility type and speed bin. HVMT1.d (shown below) is the overall average hourly distribution for the model used by the POST_ALT post-processor. HVMT1_1.d contains the average hourly distribution of VMT on freeways with speeds in speed bin 1 for that hour. HVMT2_14.d contains the average hourly distribution of VMT on arterials with speeds in speed bin 14 in that hour.

HVMT1.d

```
VMT BY HOUR
*  Fraction of all vehicle miles traveled by hour of the day.
*  First hour is 6 a.m.
*
   0.0586  0.1042  0.0744  0.0504  0.0499  0.0629
   0.0626  0.0549  0.0613  0.0834  0.0831  0.0807
   0.0496  0.0320  0.0202  0.0171  0.0164  0.0090
   0.0043  0.0025  0.0018  0.0018  0.0038  0.0151
```

Two additional examples of the hourly distribution of VMT on arterials with speeds in the third and eighth bins for that hour are presented below. These examples were based on using the average of the hourly distributions from the Evansville and Indiana household travel surveys which is contained in the file: EVIN24DTD.dbf. HVMT2_3.d shows that essentially all VMT on arterials in the third speed bin (7.5-12.5 mph) occurs as a result of congestion in the morning peak hour. HVMT2_8.d shows that the VMT on arterials in the eighth speed bin (32.5-37.5 mph) is more evenly distributed throughout the day with peaks from 6-9 AM and 3-6 PM.

HVMT2_3.d

```
VMT BY HOUR
*  Fraction of all vehicle miles traveled by hour of the day.
*  First hour is 6 a.m.
*
    0.00001  0.99977  0.00001  0.00001  0.00001  0.00001
    0.00001  0.00001  0.00001  0.00001  0.00001  0.00001
    0.00001  0.00001  0.00001  0.00001  0.00001  0.00001
    0.00001  0.00001  0.00001  0.00001  0.00001  0.00001
```

HVMT2_8.d

```
VMT BY HOUR
*  Fraction of all vehicle miles traveled by hour of the day.
*  First hour is 6 a.m.
*
    0.05342  0.09456  0.07875  0.04634  0.04585  0.05761
    0.05735  0.05045  0.05619  0.09978  0.10017  0.09967
    0.04556  0.02943  0.01865  0.01579  0.01508  0.00832
    0.00394  0.00233  0.00169  0.00168  0.00350  0.01389
```

Ramps and Local facilities both use the HVMT1.d distribution reflecting the hourly distribution of all VMT in the model.

Appendix C: Mobile 6 Report Output File

An example of a Mobile6 report file created from the thirty model runs is presented below. The emissions rate table used by the post-processor and displayed in Figure 4 is created from the rates reported in the file reproduced below.

M6REPORT.TXT

```
***************************************************************************
* MOBILE6.2.01 (31-Oct-2002)                                              *
* Input file: MOBILE6.IN (file 1, run 1).                                 *
***************************************************************************

* Reading Registration Distributions from the following external
* data file: C:\EUTS\MODEL_V3\POST\VREGDATA.D
  M615 Comment:
             User supplied VMT mix.

* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Freeways 0mph to 2.5mph
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT1.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1_1.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT1.D
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2000
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  68.0 (F)
            Maximum Temperature:  89.0 (F)
              Absolute Humidity:   75. grains/lb
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.7 psi
            Fuel Sulfur Content:  300. ppm

            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  No
               Reformulated Gas:  No

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
  -------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :     13.569    13.170    14.340    13.529    21.282     1.965     1.968     2.448      8.71    12.964
     Composite CO  :     55.74     61.40     70.64     64.23    142.40     5.202     4.430    18.348    105.40    58.287
     Composite NOX :      2.311     2.492     2.745     2.570     3.852     2.910     2.604    30.607      1.07     4.372
  -------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Freeways 2.5mph to 7.5mph
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT1.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1_2.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT2.D
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2000
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  68.0 (F)
            Maximum Temperature:  89.0 (F)
```

Absolute Humidity: 75. grains/lb
Nominal Fuel RVP: 9.0 psi
Weathered RVP: 8.7 psi
Fuel Sulfur Content: 300. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.6157	0.1918	0.0848		0.0301	0.0013	0.0013	0.0689	0.0060	1.0000
Composite Emission Factors (g/mi):										
Composite VOC :	5.421	5.669	6.195	5.830	10.511	1.772	1.767	2.151	5.89	5.455
Composite CO :	31.27	36.06	41.06	37.59	113.78	4.416	3.733	14.978	62.13	34.495
Composite NOX :	2.025	2.194	2.419	2.263	3.952	2.624	2.346	28.362	1.00	3.958

* #
* Scenario Title : Vanderburg Co., 2000 Freeways 7.5mph to 12.5mph
* File 1, Run 1, Scenario 3.
* #
M617 Comment:
User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
M618 Comment:
User supplied alternate AC input: Sunrise at 7 AM, Sunset at 9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT1.D

Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1_3.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT3.D
M 48 Warning:
there are no sales for vehicle class HDGV8b

Calendar Year: 2000
Month: July
Altitude: Low
Minimum Temperature: 68.0 (F)
Maximum Temperature: 89.0 (F)
Absolute Humidity: 75. grains/lb
Nominal Fuel RVP: 9.0 psi
Weathered RVP: 8.7 psi
Fuel Sulfur Content: 300. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.6157	0.1918	0.0848		0.0301	0.0013	0.0013	0.0689	0.0060	1.0000
Composite Emission Factors (g/mi):										
Composite VOC :	3.013	3.211	3.491	3.296	6.391	1.471	1.454	1.689	3.75	3.102
Composite CO :	19.37	23.42	26.29	24.30	75.70	3.331	2.772	10.328	31.57	21.835
Composite NOX :	1.449	1.574	1.747	1.627	4.152	2.193	1.957	24.965	0.94	3.198

* #
* Scenario Title : Vanderburg Co., 2000 Freeways 12.5mph to 17.5mph
* File 1, Run 1, Scenario 4.
* #
M617 Comment:
User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
M618 Comment:
User supplied alternate AC input: Sunrise at 7 AM, Sunset at 9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT1.D

Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1_4.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT4.D
M 48 Warning:
there are no sales for vehicle class HDGV8b

Calendar Year: 2000
Month: July
Altitude: Low
Minimum Temperature: 68.0 (F)
Maximum Temperature: 89.0 (F)
Absolute Humidity: 75. grains/lb
Nominal Fuel RVP: 9.0 psi
Weathered RVP: 8.7 psi
Fuel Sulfur Content: 300. ppm

```
             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  No
                Reformulated Gas:  No

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
               GVWR:              <6000     >6000     (All)
                         ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
  ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      2.377     2.484     2.707     2.553     4.734     1.254     1.228     1.355      3.02     2.427
     Composite CO  :     16.44     20.21     22.63     20.95     53.21      2.660     2.178     7.453     21.67    18.169
     Composite NOX :      1.176     1.277     1.425     1.322     4.353     1.897     1.691    22.642      0.96     2.791
  ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Freeways 17.5mph to 22.5mph
* File 1, Run 1, Scenario 5.
* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
              User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
              User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT1.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1_5.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT5.D
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2000
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  68.0 (F)
             Maximum Temperature:  89.0 (F)
               Absolute Humidity:   75. grains/lb
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.7 psi
             Fuel Sulfur Content:  300. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  No
                Reformulated Gas:  No

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
               GVWR:              <6000     >6000     (All)
                         ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
  ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      2.088     2.162     2.359     2.222     3.721     1.096     1.063     1.112      2.68     2.108
     Composite CO  :     15.89     19.63     21.95     20.34     39.52      2.234     1.801     5.628     17.11    17.095
     Composite NOX :      1.185     1.294     1.441     1.339     4.553     1.700     1.513    21.088      1.01     2.700
  ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Freeways 22.5mph to 27.5mph
* File 1, Run 1, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
              User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
              User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT1.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1_6.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT6.D
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2000
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  68.0 (F)
             Maximum Temperature:  89.0 (F)
               Absolute Humidity:   75. grains/lb
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.7 psi
             Fuel Sulfur Content:  300. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  No
                Reformulated Gas:  No
```

```
      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :     1.954     2.035     2.215     2.090     3.119     0.979     0.941     0.932      2.47     1.957
    Composite CO  :     15.64     19.38     21.65     20.08     31.01     1.959     1.557     4.449     14.32    16.515
    Composite NOX :     1.188     1.304     1.450     1.349     4.753     1.575     1.401    20.111      1.07     2.644
 ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Freeways 27.5mph to 32.5mph
* File 1, Run 1, Scenario 7.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT1.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1_7.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT7.D
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2000
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  68.0 (F)
            Maximum Temperature:  89.0 (F)
              Absolute Humidity:   75. grains/lb
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.7 psi
            Fuel Sulfur Content:  300. ppm

            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  No
               Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :     1.861     1.948     2.117     1.999     2.720     0.893     0.851     0.799      2.32     1.852
    Composite CO  :     15.50     19.26     21.49     19.94     25.71     1.779     1.398     3.680     12.30    16.163
    Composite NOX :     1.189     1.310     1.456     1.355     4.954     1.510     1.342    19.599      1.13     2.617
 ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Freeways 32.5mph to 37.5mph
* File 1, Run 1, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT1.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1_8.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT8.D
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2000
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  68.0 (F)
            Maximum Temperature:  89.0 (F)
              Absolute Humidity:   75. grains/lb
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.7 psi
            Fuel Sulfur Content:  300. ppm

            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  No
               Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
 ---------------------------------------------------------------------------------------------------------------------
```

```
 Composite Emission Factors (g/mi):
     Composite VOC :      1.777     1.862     2.017     1.909     2.448    0.829     0.784     0.700      2.20     1.759
     Composite CO  :     15.67     19.49     21.70     20.17     22.52     1.664     1.296     3.185     10.80    16.194
     Composite NOX :      1.184     1.309     1.454     1.353     5.154    1.497     1.331    19.496      1.18     2.612
  ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Freeways 37.5mph to 42.5mph
* File 1, Run 1, Scenario 9.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
               User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
               User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT1.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1_9.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT9.D
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2000
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  68.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.7 psi
              Fuel Sulfur Content:  300. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
  ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      1.730     1.818     1.967     1.864     2.260    0.781     0.735     0.627      2.11     1.707
     Composite CO  :     16.42     20.35     22.57     21.03     20.84     1.594     1.234     2.886      9.76    16.818
     Composite NOX :      1.196     1.325     1.469     1.369     5.354    1.535     1.364    19.791      1.21     2.651
  ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Freeways 42.5mph to 47.5mph
* File 1, Run 1, Scenario 10.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
               User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
               User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT1.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1_10.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT10.D
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2000
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  68.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.7 psi
              Fuel Sulfur Content:  300. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
  ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      1.689     1.779     1.921     1.823     2.127    0.747     0.699     0.575      2.06     1.662
     Composite CO  :     17.18     21.20     23.44     21.89     20.37     1.559     1.203     2.736      9.10    17.492
     Composite NOX :      1.213     1.348     1.492     1.392     5.555    1.627     1.447    20.515      1.23     2.724
  ---------------------------------------------------------------------------------------------------------------------
```

```
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Freeways 47.5mph to 52.5mph
* File 1, Run 1, Scenario 11.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
               User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
               User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT1.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1_11.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT11.D
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2000
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  68.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.7 psi
              Fuel Sulfur Content:  300. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
  ----------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      1.609     1.699     1.831     1.739     1.969     0.723     0.674     0.538      2.04     1.582
     Composite CO  :     16.59     21.20     23.50     21.91     20.13     1.554     1.199     2.715      8.43    17.124
     Composite NOX :      1.217     1.370     1.516     1.415     5.821     1.784     1.589    21.750      1.36     2.827
  ----------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Freeways 52.5mph to 57.5mph
* File 1, Run 1, Scenario 12.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
               User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
               User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT1.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1_12.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT12.D
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2000
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  68.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.7 psi
              Fuel Sulfur Content:  300. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
  ----------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      1.641     1.726     1.855     1.765     1.992     0.708     0.659     0.515      2.05     1.608
     Composite CO  :     19.53     23.68     25.99     24.39     23.93     1.579     1.220     2.820      9.11    19.743
     Composite NOX :      1.264     1.413     1.557     1.457     5.949     2.024     1.806    23.643      1.45     3.003
  ----------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Freeways 57.5mph to 62.5mph
* File 1, Run 1, Scenario 13.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
```

```
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT1.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1_13.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT13.D
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2000
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  68.0 (F)
            Maximum Temperature:  89.0 (F)
              Absolute Humidity:   75. grains/lb
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.7 psi
            Fuel Sulfur Content:  300. ppm

            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  No
               Reformulated Gas:  No
```

Vehicle Type: GVWR:	LDGV	LDGT12 <6000	LDGT34 >6000	LDGT (All)	HDGV	LDDV	LDDT	HDDV	MC	All Veh
VMT Distribution:	0.6157	0.1918	0.0848		0.0301	0.0013	0.0013	0.0689	0.0060	1.0000
Composite Emission Factors (g/mi):										
Composite VOC :	1.660	1.740	1.865	1.778	2.015	0.701	0.651	0.504	2.36	1.625
Composite CO :	22.22	25.94	28.25	26.65	29.07	1.636	1.271	3.064	17.14	22.250
Composite NOX :	1.299	1.446	1.588	1.490	6.083	2.379	2.125	26.432	1.53	3.231

```
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Freeways 62.5mph to 500mph
* File 1, Run 1, Scenario 14.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT1.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1_14.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT14.D
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2000
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  68.0 (F)
            Maximum Temperature:  89.0 (F)
              Absolute Humidity:   75. grains/lb
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.7 psi
            Fuel Sulfur Content:  300. ppm

            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  No
               Reformulated Gas:  No
```

Vehicle Type: GVWR:	LDGV	LDGT12 <6000	LDGT34 >6000	LDGT (All)	HDGV	LDDV	LDDT	HDDV	MC	All Veh
VMT Distribution:	0.6157	0.1918	0.0848		0.0301	0.0013	0.0013	0.0689	0.0060	1.0000
Composite Emission Factors (g/mi):										
Composite VOC :	1.625	1.698	1.817	1.735	1.994	0.701	0.651	0.504	2.65	1.593
Composite CO :	22.53	26.42	28.74	27.13	34.64	1.734	1.358	3.485	24.10	22.809
Composite NOX :	1.309	1.463	1.605	1.506	6.293	2.897	2.592	30.503	1.67	3.531

```
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Arterials 0mph to 2.5mph
* File 1, Run 1, Scenario 15.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.
```

```
* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT2.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT2_1.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT1.D
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2000
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  68.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.7 psi
              Fuel Sulfur Content:  300. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

       Vehicle Type:     LDGV    LDGT12    LDGT34     LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
               GVWR:              <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:   0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
  ------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :     13.569    13.170    14.341    13.529    21.282    1.965     1.968     2.448      8.71    12.964
     Composite CO  :     55.74     61.40     70.64     64.23    142.40     5.202     4.430    18.348    105.40    58.287
     Composite NOX :      2.311     2.492     2.745     2.570     3.852    2.910     2.604    25.709      1.07     4.035
  ------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Arterials 2.5mph to 7.5mph
* File 1, Run 1, Scenario 16.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT2.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT2_2.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT2.D
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2000
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  68.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.7 psi
              Fuel Sulfur Content:  300. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

       Vehicle Type:     LDGV    LDGT12    LDGT34     LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
               GVWR:              <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:   0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
  ------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      5.018     5.396     5.908     5.553     9.963    1.772     1.767     2.151      5.84     5.114
     Composite CO  :     29.36     36.08     41.00     37.59    108.83     4.416     3.733    14.978     57.79    33.140
     Composite NOX :      1.885     2.152     2.378     2.221     3.997    2.624     2.346    23.464      1.03     3.524
  ------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Arterials 7.5mph to 12.5mph
* File 1, Run 1, Scenario 17.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT2.D

  Reading User Supplied ROADWAY VMT Factors
```

```
* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT2_3.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT3.D
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2000
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  68.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.7 psi
              Fuel Sulfur Content:  300. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
  ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :     2.927     3.220     3.497     3.305     6.154     1.471     1.454     1.689      3.72     3.044
     Composite CO  :     19.43     24.65     27.68     25.58     72.41     3.331     2.772    10.328     29.49    22.115
     Composite NOX :     1.572     1.784     1.976     1.843     4.200     2.193     1.957    20.067      0.97     2.998
  ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Arterials 12.5mph to 17.5mph
* File 1, Run 1, Scenario 18.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT2.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT2_4.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT4.D
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2000
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  68.0 (F)
              Maximum Temperature:  89.0 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   8.7 psi
              Fuel Sulfur Content:  300. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
  ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :     2.375     2.559     2.779     2.626     4.576     1.254     1.228     1.355      3.00     2.441
     Composite CO  :     16.91     21.57     24.21     22.38     51.05     2.660     2.178     7.453     20.39    18.781
     Composite NOX :     1.379     1.554     1.724     1.606     4.401     1.897     1.691    17.744      0.98     2.659
  ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Arterials 17.5mph to 22.5mph
* File 1, Run 1, Scenario 19.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT2.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT2_5.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT5.D
```

```
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2000
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  68.0 (F)
            Maximum Temperature:  89.0 (F)
              Absolute Humidity:   75. grains/lb
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.7 psi
            Fuel Sulfur Content:  300. ppm

            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  No
               Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
 --------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      2.079     2.188     2.380     2.247     3.629     1.096     1.063     1.112      2.67     2.107
     Composite CO  :     15.78     20.11     22.56     20.86     38.29     2.234     1.801     5.628     16.35    17.133
     Composite NOX :      1.287     1.441     1.600     1.490     4.597     1.700     1.513    16.190      1.03     2.469
 --------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Arterials 22.5mph to 27.5mph
* File 1, Run 1, Scenario 20.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT2.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT2_6.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT6.D
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2000
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  68.0 (F)
            Maximum Temperature:  89.0 (F)
              Absolute Humidity:   75. grains/lb
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   8.7 psi
            Fuel Sulfur Content:  300. ppm

            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  No
               Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
 --------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      2.050     2.114     2.295     2.170     3.237     0.979     0.941     0.932      2.49     2.042
     Composite CO  :     16.93     20.43     22.78     21.15     33.18     1.959     1.557     4.449     15.32    17.677
     Composite NOX :      1.292     1.405     1.556     1.451     4.729     1.575     1.401    15.213      1.06     2.398
 --------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Arterials 27.5mph to 32.5mph
* File 1, Run 1, Scenario 21.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT2.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT2_7.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT7.D
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:  2000
                          Month:  July
```

```
                 Altitude:  Low
      Minimum Temperature:  68.0 (F)
      Maximum Temperature:  89.0 (F)
        Absolute Humidity:   75. grains/lb
         Nominal Fuel RVP:   9.0 psi
            Weathered RVP:   8.7 psi
      Fuel Sulfur Content:  300. ppm

      Exhaust I/M Program:  No
         Evap I/M Program:  No
              ATP Program:  No
         Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
 ------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
    Composite VOC :     1.964     2.030     2.202     2.082     2.865     0.893     0.851     0.799      2.34     1.943
    Composite CO  :     17.23     20.51     22.78     21.21     28.13     1.779     1.398     3.680     13.48    17.665
    Composite NOX :     1.259     1.361     1.506     1.405     4.901     1.510     1.342    14.701      1.10     2.335
 ------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Arterials 32.5mph to 37.5mph
* File 1, Run 1, Scenario 22.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT2.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT2_8.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT8.D
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

            Calendar Year:  2000
                    Month:  July
                 Altitude:  Low
      Minimum Temperature:  68.0 (F)
      Maximum Temperature:  89.0 (F)
        Absolute Humidity:   75. grains/lb
         Nominal Fuel RVP:   9.0 psi
            Weathered RVP:   8.7 psi
      Fuel Sulfur Content:  300. ppm

      Exhaust I/M Program:  No
         Evap I/M Program:  No
              ATP Program:  No
         Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
 ------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
    Composite VOC :     1.861     1.933     2.092     1.982     2.570     0.829     0.784     0.700      2.21     1.835
    Composite CO  :     17.44     20.79     23.01     21.47     24.54     1.664     1.296     3.185     11.75    17.708
    Composite NOX :     1.229     1.337     1.482     1.382     5.097     1.497     1.331    14.598      1.14     2.308
 ------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Arterials 37.5mph to 42.5mph
* File 1, Run 1, Scenario 23.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT2.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT2_9.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT9.D
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

            Calendar Year:  2000
                    Month:  July
                 Altitude:  Low
      Minimum Temperature:  68.0 (F)
      Maximum Temperature:  89.0 (F)
        Absolute Humidity:   75. grains/lb
         Nominal Fuel RVP:   9.0 psi
```

```
                 Weathered RVP:   8.7 psi
           Fuel Sulfur Content:  300. ppm

           Exhaust I/M Program:  No
              Evap I/M Program:  No
                   ATP Program:  No
             Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                        ------   ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
 ------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      1.802     1.882     2.034     1.928     2.360     0.781     0.735     0.627      2.12     1.772
     Composite CO  :     18.24     21.70     23.94     22.39     22.59     1.594     1.234     2.886     10.52    18.370
     Composite NOX :      1.234     1.351     1.494     1.395     5.299     1.535     1.364    14.893      1.17     2.342
 ------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Arterials 42.5mph to 47.5mph
* File 1, Run 1, Scenario 24.
* # # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT2.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT2_10.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT10.D
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                 Calendar Year:  2000
                         Month:  July
                      Altitude:  Low
           Minimum Temperature:  68.0 (F)
           Maximum Temperature:  89.0 (F)
             Absolute Humidity:   75. grains/lb
              Nominal Fuel RVP:   9.0 psi
                 Weathered RVP:   8.7 psi
           Fuel Sulfur Content:  300. ppm

           Exhaust I/M Program:  No
              Evap I/M Program:  No
                   ATP Program:  No
             Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                        ------   ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
 ------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      1.752     1.839     1.985     1.884     2.213     0.747     0.699     0.575      2.07     1.721
     Composite CO  :     19.10     22.66     24.92     23.35     22.05     1.559     1.203     2.736      9.77    19.137
     Composite NOX :      1.247     1.372     1.515     1.416     5.499     1.627     1.447    15.617      1.19     2.412
 ------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Arterials 47.5mph to 52.5mph
* File 1, Run 1, Scenario 25.
* # # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
             User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
             User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT2.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT2_11.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT11.D
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

                 Calendar Year:  2000
                         Month:  July
                      Altitude:  Low
           Minimum Temperature:  68.0 (F)
           Maximum Temperature:  89.0 (F)
             Absolute Humidity:   75. grains/lb
              Nominal Fuel RVP:   9.0 psi
                 Weathered RVP:   8.7 psi
           Fuel Sulfur Content:  300. ppm

           Exhaust I/M Program:  No
              Evap I/M Program:  No
```

ATP Program: No
Reformulated Gas: No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.6157	0.1918	0.0848		0.0301	0.0013	0.0013	0.0689	0.0060	1.0000
Composite Emission Factors (g/mi):										
Composite VOC :	1.711	1.800	1.938	1.842	2.109	0.723	0.674	0.538	2.06	1.678
Composite CO :	20.02	23.65	25.92	24.34	22.77	1.554	1.199	2.715	9.47	19.992
Composite NOX :	1.262	1.394	1.537	1.438	5.696	1.784	1.589	16.853	1.26	2.519

* #
* Scenario Title : Vanderburg Co., 2000 Arterials 52.5mph to 57.5mph
* File 1, Run 1, Scenario 26.
* #
M617 Comment:
User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
M618 Comment:
User supplied alternate AC input: Sunrise at 7 AM, Sunset at 9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT2.D

Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT2_12.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT12.D
M 48 Warning:
there are no sales for vehicle class HDGV8b

Calendar Year: 2000
Month: July
Altitude: Low
Minimum Temperature: 68.0 (F)
Maximum Temperature: 89.0 (F)
Absolute Humidity: 75. grains/lb
Nominal Fuel RVP: 9.0 psi
Weathered RVP: 8.7 psi
Fuel Sulfur Content: 300. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.6157	0.1918	0.0848		0.0301	0.0013	0.0013	0.0689	0.0060	1.0000
Composite Emission Factors (g/mi):										
Composite VOC :	1.680	1.765	1.896	1.805	2.043	0.708	0.659	0.515	2.06	1.645
Composite CO :	21.02	24.68	26.96	25.38	24.88	1.579	1.220	2.820	9.49	20.967
Composite NOX :	1.278	1.417	1.559	1.460	5.889	2.024	1.806	18.745	1.40	2.673

* #
* Scenario Title : Vanderburg Co., 2000 Arterials 57.5mph to 62.5mph
* File 1, Run 1, Scenario 27.
* #
M617 Comment:
User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
M618 Comment:
User supplied alternate AC input: Sunrise at 7 AM, Sunset at 9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT2.D

Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT2_13.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT13.D
M 48 Warning:
there are no sales for vehicle class HDGV8b

Calendar Year: 2000
Month: July
Altitude: Low
Minimum Temperature: 68.0 (F)
Maximum Temperature: 89.0 (F)
Absolute Humidity: 75. grains/lb
Nominal Fuel RVP: 9.0 psi
Weathered RVP: 8.7 psi
Fuel Sulfur Content: 300. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						

```
                     ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:  0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :    1.649     1.728     1.853     1.767     2.001     0.701     0.651     0.504      2.36     1.615
     Composite CO  :    21.74     25.53     27.83     26.24     28.53     1.636     1.271     3.064     16.82    21.820
     Composite NOX :    1.293     1.440     1.582     1.483     6.093     2.379     2.125    21.535      1.54     2.889
 ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Arterials 62.5mph to 500mph
* File 1, Run 1, Scenario 28.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
              User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
              User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT2.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT2_14.D

* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: C:\EUTS\MODEL_V3\POST\SVMT14.D
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2000
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  68.0 (F)
             Maximum Temperature:  89.0 (F)
               Absolute Humidity:   75. grains/lb
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.7 psi
             Fuel Sulfur Content:  300. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  No
               Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                     ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:  0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :    1.622     1.695     1.814     1.731     1.990     0.701     0.651     0.504      2.65     1.590
     Composite CO  :    22.36     26.26     28.57     26.97     34.41     1.734     1.358     3.485     23.95    22.653
     Composite NOX :    1.307     1.460     1.602     1.503     6.295     2.897     2.592    25.605      1.67     3.191
 ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Locals
* File 1, Run 1, Scenario 29.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
              User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
              User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT3.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1.D
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2000
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  68.0 (F)
             Maximum Temperature:  89.0 (F)
               Absolute Humidity:   75. grains/lb
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.7 psi
             Fuel Sulfur Content:  300. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  No
               Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                     ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:  0.6157    0.1918    0.0848              0.0301    0.0013    0.0013    0.0689    0.0060    1.0000
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :    2.838     2.892     3.132     2.966     5.633     1.337     1.314     1.482      3.28     2.863
     Composite CO  :    15.36     19.56     22.14     20.35     66.33     2.904     2.394     8.500     27.28    17.841
     Composite NOX :    1.241     1.292     1.439     1.337     4.225     2.008     1.790    15.315      0.92     2.327
 ---------------------------------------------------------------------------------------------------------------------
```

```
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Scenario Title : Vanderburg Co., 2000 Ramps
* File 1, Run 1, Scenario 30.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M617 Comment:
              User supplied alternate AC input: Cloud Cover Fraction set to 0.27.
  M618 Comment:
              User supplied alternate AC input: Sunrise at  7 AM, Sunset at  9 PM.

* Reading Hourly Roadway VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\FVMT4.D

  Reading User Supplied ROADWAY VMT Factors

* Reading Hourly VMT distribution from the following external
* data file: C:\EUTS\MODEL_V3\POST\HVMT1.D
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

                   Calendar Year:  2000
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  68.0 (F)
             Maximum Temperature:  89.0 (F)
               Absolute Humidity:   75. grains/lb
                Nominal Fuel RVP:   9.0 psi
                   Weathered RVP:   8.7 psi
             Fuel Sulfur Content:  300. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  No
                Reformulated Gas:  No
```

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.6157	0.1918	0.0848		0.0301	0.0013	0.0013	0.0689	0.0060	1.0000
Composite Emission Factors (g/mi):										
Composite VOC :	2.124	2.209	2.362	2.256	2.579	0.833	0.789	0.707	2.21	2.074
Composite CO :	29.59	30.55	32.84	31.25	24.58	1.671	1.302	3.217	11.70	27.898
Composite NOX :	1.471	1.659	1.812	1.706	5.085	1.496	1.330	11.070	1.14	2.304

Appendix D: Associated GIS/DK Macros Code

The GIS/DK resource code for the EUTS model's POST_ALT and air quality post-processor macros are reproduced here from version 3.5 of the model.

```
Macro "getnames" (in_value)
   nnpath = in_value[1]

//Reads in the fields on the link layer from the netnames.dbf file

          nnfile = nnpath + "\\Netnames.dbf"
          netnames = OpenTable("netnames","DBASE",{nnfile,})

          SetView (netnames)
          rec = GetFirstRecord(netnames + "|",null)
          while rec <> null do

                    Var = netnames.VAR
                    Name = netnames.NAME

                    If Var = "ID" then ID = Name
                    If Var = "LENGTH" then LENGTH = Name
                    If Var = "FC" then FC = Name
                    If Var = "LANES" then LANES = Name
                    If Var = "AMAUTO" then AMAUTO = Name
                    If Var = "PMAUTO" then PMAUTO = Name
                    If Var = "OPAUTO" then OPAUTO = Name
                    If Var = "AMTRK" then AMTRK = Name
                    If Var = "PMTRK" then PMTRK = Name
                    If Var = "OPTRK" then OPTRK = Name
                    If Var = "PKCAP" then PKCAP = Name
                    If Var = "BPRA" then BPRA = Name
                    If Var = "BPRB" then BPRB = Name
                    If Var = "FFTMIN" then FFTMIN = Name
                    If Var = "MDT" then MDT = Name
                    If Var = "MDAT" then MDAT = Name
                    If Var = "MDTT" then MDTT = Name
                    If Var = "ADJFFT" then ADJFFT = Name
                    If Var = "MIDAUTO" then MIDAUTO = Name
                    If Var = "MIDTRK" then MIDTRK = Name
                    If Var = "AREA" then AREA = Name

                    If Var = "US41ID" then US41ID = Name
                    If Var = "TBID" then BridgeID = Name
                    If Var = "COR" then COR = Name
                    If Var = "M6FT" then M6FT = Name
                    If Var = "CO" then CO = Name
                    If Var = "RTENM" then RTENM = Name
                    If Var = "FTFC" then FTFC = Name
                    If Var = "ABPKCAP" then ABPKCAP = Name
                    If Var = "BAPKCAP" then BAPKCAP = Name

          rec = GetNextRecord(netnames + "|",null,null)
          end

          CloseView(netnames)

          thefields = {ID, LENGTH, FC, LANES, AMAUTO, PMAUTO, MIDAUTO, OPAUTO,
                    AMTRK, PMTRK, MIDTRK, OPTRK,
                    PKCAP, BPRA, BPRB, FFTMIN, MDT, MDAT, MDTT, ADJFFT, AREA,
                    US41ID, BridgeID, COR, M6FT, CO, RTENM, FTFC, ABPKCAP, BAPKCAP}

          Return(thefields)

endMacro

//  ==================================================================================

Macro "postalt" (in_value)
   thepath = in_value[1]
   linevw = in_value[2]
   dsplit = in_value[3]
   todass = in_value[4]

/*
Created by Vincent Bernardin, Jr.
of Bernardin, Lochmueller and Assoc.
for the Muncie, IN model
using the hourly distribution from the EUTS HH travel survey
04/25/03

refined and updated by the author for Lexinton, KY
incorporating the half-hourly distribution from the Knoxville, TN
HH travel survey, allowing for user-defined distributions from
external data files, and adding statistics for area type
05/08/03

refined and updated by the same for Evansville, IN to include
hourly speeds and volumes for the Mobile6 macro 4M6 and adding
statistics for calibration corridors
06/10/03

refined and updated again by the author for the US 31 Plymouth-
South Bend EIS to calculate and report accident statistics, report
statistics on the US 31 corridor, to exclude links outside
```

```
Marshall, St. Joseph, and Elkhart counties, to report statistics
by county, and to reflect new LOS v/c breakpoints from HCM 2000
07/01/03

converted back for to include the new accident statistics, county
breakout, and LOS breakpoints in the EUTS version
07/02/03
*/

//Get network link layer

//        linevw = GetLayer()
//        ShowMessage("The current layer is " + linevw)
          netfilename = GetLayerDB(linevw)

//Get path to modeling directory

//        thepath = ChooseDirectory("Choose the Modeling Directory", )

//Ns is the number of statistics (records) in the report file
          Ns = 43

//Choose output file name

          links = GetRecordCount(linevw, )

          opt = {,{"Initial Directory", thepath + "\\post\\"},
                    {"Suggested Name", "post_rep"} ,}
          outfilename = ChooseFileName({{"dBASE", "*.dbf"}}, "Choose Report File", opt)

          linkfile = "Post_Alt Link File"
          linkpath = SplitPath(outfilename)
          linkfilename = thepath  + "\\post\\" + linkpath[3] + "_links.dbf"
          mfilename = thepath  + "\\post\\" + linkpath[3] + "_24M6.dbf"
          SaveArray({linkfilename, mfilename}, thepath + "\\post\\post.gar")

//Read in the Network Field Names from the auxillary file
          thefields = RunMacro("getnames", {thepath + "\\post\\"})

//Get daily distribution from auxillary file

          errorno = 0
          getfiles:
          dtdfile = ChooseFile({{"Daily Trip Distribution File", "*DTD.dbf"}},
                                        "Choose the daily trip distribution file",
                                        {,{"Initial Directory", thepath + "\\post\\"},})

          dtdvw = OpenTable("dtdview", "DBASE", {dtdfile, })
          dtdrecs = GetRecordCount(dtdvw, )
          dim DAILY100[dtdrecs]
          i = 0
          rec =  GetFirstRecord(dtdvw + "|", )
          while rec <> null do
          i = i + 1
          DAILY100[i] = dtdvw.DTD
          rec = GetNextRecord(dtdvw + "|", , )
          end
          CloseView(dtdvw)

//Get TOD periods from auxillary file

//        todfile = ChooseFile({{"Time of Day Periods File", "*TOD.dbf"}},
//                                      "Choose the time of day periods file",
//                                      {,{"Initial Directory", thepath + "\\post\\"},})

          todfile = thepath + "\\post\\Eville24TOD.dbf"

          todvw = OpenTable("todview", "DBASE", {todfile, })
          todrecs = GetRecordCount(todvw, )
          dim PERIODS[todrecs]
          i = 0
          rec =  GetFirstRecord(todvw + "|", )
          while rec <> null do
          i = i + 1
          PERIODS[i] = todvw.PERIOD
          rec = GetNextRecord(todvw + "|", , )
          end
          CloseView(todvw)

//Check for inconsistencies

          if dtdrecs <> todrecs then do
                    ShowMessage("Error: The distribution and periods are inconsitent!")
                    errorno = errorno + 1
                    if errorno < 4 then goto getfiles
                    if errorno = 4 then goto quit
          end
          dp = dtdrecs

   EnableProgressBar("Post_Alt", 1)
   CreateProgressBar("loading...", "False")

//Initialize some variables

          RM =0
          RLM = 0
          Tot_Delay = 0
          MAXMAXVC = 0
          TOTVC = 0

          TOTVHT = 0
```

```
          TOTVMT = 0
          TOTVHT_Auto = 0
          TOTVHT_Trk = 0
          TOTVMT_Auto = 0
          TOTVMT_Trk = 0
          TOTFX = 0
          TOTIX = 0
          TOTPX = 0
          TOTTX = 0

          ESPI_VMT = 0
          ESPI_VHT = 0
          ESPI_VMT_CAR = 0
          ESPI_VHT_CAR = 0
          ESPI_VMT_TRK = 0
          ESPI_VHT_TRK = 0

//Remember: if you change CLEVELS you may need to change the ESPI calculations
//report variables may also need to be adjusted
          CLEVELS = {0.50, 0.70, 0.84, 0.99}
          Ls = CLEVELS.length
          dim VMTVC[Ls]
          dim VHTVC[Ls]
          dim AMTVC[Ls]
          dim AHTVC[Ls]
          dim TMTVC[Ls]
          dim THTVC[Ls]
          dim CLANEMI[Ls]
          For j = 1 to Ls do
                    VMTVC[j] = 0
                    VHTVC[j] = 0
                    AMTVC[j] = 0
                    AHTVC[j] = 0
                    TMTVC[j] = 0
                    THTVC[j] = 0
                    CLANEMI[j] = 0
          end
          FCLASS = {1, 2, 6, 7, 8, 9, 11, 12, 14, 16, 17, 19}
          dim CVC[Ns]
          dim RDMILES[Ns]
          dim VMTC[Ns]
          dim VHTC[Ns]
          dim VMTAUTO[Ns]
          dim VHTAUTO[Ns]
          dim VMTTRK[Ns]
          dim VHTTRK[Ns]
          dim SPDC[Ns]
          dim SUMFX[Ns]
          dim SUMIX[Ns]
          dim SUMPX[Ns]
          dim SUMTX[Ns]
          for i = 1 to FCLASS.length do
                    CVC[i] = 0
                    RDMILES[i] = 0
                    VMTC[i] = 0
                    VHTC[i] = 0
                    VMTAUTO[i] = 0
                    VHTAUTO[i] = 0
                    VMTTRK[i] = 0
                    VHTTRK[i] = 0
                    SUMFX[i] = 0
                    SUMIX[i] = 0
                    SUMPX[i] = 0
                    SUMTX[i] = 0
          end
          AREA = {"CBD", "URB", "SUB", "RUR"}
          COS = {"26", "KY", "65", "82", "87"}
          CORRS = {1, 2, 3, 4, 5, 6, 7}
          lc = 16 + AREA.length
          for i = 17 to lc do
                    CVC[i] = 0
                    RDMILES[i] = 0
                    VMTC[i] = 0
                    VHTC[i] = 0
                    VMTAUTO[i] = 0
                    VHTAUTO[i] = 0
                    VMTTRK[i] = 0
                    VHTTRK[i] = 0
                    SUMFX[i] = 0
                    SUMIX[i] = 0
                    SUMPX[i] = 0
                    SUMTX[i] = 0
          end
          lc2 = lc + 2 + COS.length
          fc2 = lc + 3
          for i = fc2 to lc2 do
                    CVC[i] = 0
                    RDMILES[i] = 0
                    VMTC[i] = 0
                    VHTC[i] = 0
                    VMTAUTO[i] = 0
                    VHTAUTO[i] = 0
                    VMTTRK[i] = 0
                    VHTTRK[i] = 0
                    SUMFX[i] = 0
                    SUMIX[i] = 0
                    SUMPX[i] = 0
                    SUMTX[i] = 0
          end
          lc3 = lc2 + 2 + CORRS.length
          fc3 = lc2 + 3
```

```
        for i = fc3 to lc3 do
                CVC[i] = 0
                RDMILES[i] = 0
                VMTC[i] = 0
                VHTC[i] = 0
                VMTAUTO[i] = 0
                VHTAUTO[i] = 0
                VMTTRK[i] = 0
                VHTTRK[i] = 0
                SUMFX[i] = 0
                SUMIX[i] = 0
                SUMPX[i] = 0
                SUMTX[i] = 0
        end

        VHT_US41 = 0
        VHTTRK_US41 = 0
        VHTAUTO_US41 = 0
        VMT_US41 = 0
        VMTTRK_US41 = 0
        VMTAUTO_US41 = 0

//The following accident rates by functional class are based on
//Indiana's statistics for 1997-1999

        FXR = {0.73, 1.96, x, x, x, x, 2.06, 1.38, 1.97, 3.65,
                x, 0.33, 3.12, x, 0.61, x, 0.93, 1.56, x, 0.68}
        IXR = {17.53, 43.15, x, x, x, x, 53.48, 81.13, 89.67, 87.96,
                x, 14.50, 45.27, x, 99.50, x, 110.51, 113.24, x, 111.89}
        PXR = {68.08, 137.45, x, x, x, x, 155.98, 232.66, 254.57, 249.45,
                x, 55.38, 132.28, x, 304.39, x, 365.16, 376.64, x, 372.67}
        TXR = {86.34, 186.57, x, x, x, x, 211.52, 315.18, 346.21, 341.07,
                x, 70.21, 180.67, x, 404.50, x, 476.59, 491.43, x, 485.24}

//Daily distribution of traffic and period directional factor

        np = 1 + R2I(ArrayMax(PERIODS))
        dim persum[np]
        for i = 1 to np do
                persum[i] = 0
        end
        for i = 1 to np do
                for j = 1 to dp do
                        if PERIODS[j] = i - 1 then do
                                persum[i] = persum[i] + DAILY100[j]
                        end
                end
        end
        dim DDIST[dp]
        for i = 1 to dp do
                tp = 1 + PERIODS[i]
                if todass = 0 then DDIST[i] = DAILY100[i]
                if todass = 1 then DDIST[i] = DAILY100[i] / persum[tp]
        end
        dim PDIR[dp]
        for i = 1 to dp do
                PDIR[i] = 0.5
                if PERIODS[i] > 0 then PDIR[i] = dsplit/100
        end

//Initialize daily period volume arrays

        dim PCEVOL[dp]
        dim ADTVOL[dp]
        dim CARVOL[dp]
        dim TRKVOL[dp]

//Create the output files

        lfile = CreateTable(linkfile, linkfilename, "dBASE", {{"LID", "Integer", 16, null, "No"},
                                                            {"FHWA_FC", "Integer", 8, null, "No"},
                                                            {"MAXVC1", "Real", 8, 3, "No"},
                                                            {"AVGSP", "Real", 8, 2, "No"},
                                                            {"AVGTT1", "Real", 6, 3, "No"},
                                                            {"WORSTLOS", "String", 1, null, "No"},
                                                            {"HRS_DELAY","Real", 16, 3, "No"},
                                                            {"VHT", "Real", 10, 3, "No"},
                                                            {"VMT", "Real", 12, 3, "No"},
                                                            {"BPRA","Real",12,3,"No"},
                                                            {"BPRB","Real",12,3,"No"},
                                                            {"FFTIME","Real",12,3,"No"},
                                                            {"BAD","Integer",16,null,"No"},
                                                            {"AMAVGTT","Real",12,3,"No"},
                                                            {"PMAVGTT","Real",12,3,"No"},
                                                            {"OPAVGTT","Real",12,3,"No"},
                                                            {"FX", "Real", 12,3,"No"},
                                                            {"IX", "Real", 12,3,"No"},
                                                            {"PX", "Real", 12,3,"No"},
                                                            {"TX", "Real", 12,3,"No"}})
        dim carvolfield[24]
        dim trkvolfield[24]
        dim avgspdfield[24]
        dim mfields[73]
        mfields[1] = {"LID", "Integer", 16, null, "No"}
        for i = 1 to 24 do
                if i > 9 then do
                        carvolfield[i] = "CARVOL_" + i2s(i)
                        trkvolfield[i] = "TRKVOL_" + i2s(i)
                        avgspdfield[i] = "AVGSPD_" + i2s(i)
                end
                else do
```

```
                        carvolfield[i] = "CARVOL_0" + i2s(i)
                        trkvolfield[i] = "TRKVOL_0" + i2s(i)
                        avgspdfield[i] = "AVGSPD_0" + i2s(i)
                end
                a = i + 1
                b = i + 25
                c = i + 49
                mfields[a] = {carvolfield[i], "Real",12,3,"No"}
                mfields[b] = {trkvolfield[i], "Real",12,3,"No"}
                mfields[c] = {avgspdfield[i], "Real",12,3,"No"}
        end

        mfile = CreateTable("Mobile6 Summary", mfilename, "dBASE", mfields)

        postrep = CreateTable("Post_Alt Report", outfilename, "dBASE",
                                                        {{"SystemStat", "String", 30, null, "No"},
                                                                {"Stat", "String", 20, null, "No"},
                                                                {"Class", "String", 45, null, "No"},
                                                                {"FHWA_FC", "Integer", 10, null, "No"},
                                                                {"RoadMiles", "Real", 8, 2, "No"},
                                                                {"VMT", "Integer", 10, null, "No"},
                                                                {"Auto_VMT", "Integer", 10, null, "No"},
                                                                {"Truck_VMT", "Integer", 10, null, "No"},
                                                                {"VHT", "Integer", 10, null, "No"},
                                                                {"Auto_VHT", "Integer", 10, null, "No"},
                                                                {"Truck_VHT", "Integer", 10, null, "No"},
                                                                {"AvgSpeed", "Real", 12, 2, "No"},
                                                                {"VC", "Real", 12, 2, "No"},
                                                                {"Fatal_Xs", "Integer", 10, null, "No"},
                                                                {"Injury_Xs", "Integer", 10, null, "No"},
                                                                {"PDO_Xs", "Integer", 10, null, "No"},
                                                                {"Total_Xs", "Integer", 10, null, "No"}})

//Loop through the assigned network

        SetView(linevw)
        recno = 0
        rec = GetFirstRecord(linevw + "|", null)
        while rec <> null do

                recno = recno + 1
                prog = Round ((recno/links)*98, 0)
           UpdateProgressBar("Computing Statistics", prog)
        SetStatus(1, "Record " + i2s(recno) + " of " + i2s(links), )

//Read in values for the record from the fields on the link layer

//      thefields = {ID, LENGTH, FC, LANES, AMAUTO, PMAUTO, MIDAUTO, OPAUTO,
//                      AMTRK, PMTRK, MIDTRK, OPTRK,
//                      PKCAP, BPRA, BPRB, FFTMIN, MDT, MDAT, MDTT, ADJFFT, AREA,
//                      US41ID, BridgeID, COR}


                ID = linevw.(thefields[1])
                LENGTH = linevw.(thefields[2])
                FC = linevw.(thefields[3])
                LANES = linevw.(thefields[4])
                AMAUTO = linevw.(thefields[5])
                PMAUTO = linevw.(thefields[6])
                OPAUTO = linevw.(thefields[8])
                AMTRK = linevw.(thefields[9])
                PMTRK = linevw.(thefields[10])
                OPTRK = linevw.(thefields[12])
                PKCAP = linevw.(thefields[13])
                BPRA = linevw.(thefields[14])
                BPRB = linevw.(thefields[15])
                FFTMIN = linevw.(thefields[16])
                MDT = linevw.(thefields[17])
                MDAT = linevw.(thefields[18])
                MDTT = linevw.(thefields[19])
                AT = linevw.(thefields[21])
                US41ID = linevw.(thefields[22])
                BridgeID = linevw.(thefields[23])
                COR = linevw.(thefields[24])
//              CO = linevw.(thefields[26])
                RTENM = linevw.(thefields[27])
                CO = Left(RTENM, 2)
                FTFC = linevw.(thefields[28])
                ABPKCAP = linevw.(thefields[29])
                BAPKCAP = linevw.(thefields[30])

                if ABPKCAP = null then ABPKCAP = 0
                if BAPKCAP = null then BAPKCAP = 0
                PKCAP = 2 * Max(ABPKCAP, BAPKCAP) / 3

        fhwa_fc = FTFC
        totln = 2 * linevw.LN1DIR
        if ABPKCAP = null | ABPKCAP = 0 | BAPKCAP = null | BAPKCAP = 0 then totln = linevw.LN1DIR
        ln = linevw.LN
        if (ln = 5 or ln = 7 or ln = 9) then divided = true
        ln_one_dir = linevw.LN1DIR

// load HCM ideal capacities
    if fhwa_fc  = 12 then idealcap = 2000  // freeways and expressways
    if (fhwa_fc  = 1 or fhwa_fc = 11) then do
        if ln_one_dir <= 2 then idealcap = 2200  // interstates
        if ln_one_dir > 2 then idealcap = 2300
    end
    if ((fhwa_fc  = 2 or fhwa_fc = 6) and totln > 2 and divided) then do
        idealcap = 1600  //  arterials/multilane divided
    end
```

```
    if ((fhwa_fc  = 14 or fhwa_fc = 16) and totln > 2 and divided) then do
        idealcap = 1200  //  arterials/multilane divided
    end
    if ((fhwa_fc  = 2 or fhwa_fc = 6) and totln > 2 and not divided) then do
        idealcap = 1400  //  arterials/multilane undivided
    end
    if ((fhwa_fc  = 14 or fhwa_fc = 16) and totln > 2 and not divided) then do
        idealcap = 1200  //  arterials/multilane undivided
    end
    if ((fhwa_fc  = 7 or fhwa_fc = 8 or fhwa_fc = 9) and totln > 2 and divided) then do
        idealcap = 1400  // collectors and local/multilane divided
    end
    if ((fhwa_fc  = 17 or fhwa_fc = 19) and totln > 2 and divided) then do
        idealcap = 1200  // collectors and local/multilane divided
    end
    if ((fhwa_fc  = 7 or fhwa_fc = 8 or fhwa_fc = 9) and totln > 2 and not divided) then do
        idealcap = 1400  // collectors and multilane undivided
    end
    if ((fhwa_fc  = 17 or fhwa_fc = 19) and totln > 2 and not divided) then do
        idealcap = 1200  // collectors and multilane undivided
    end
    if ((fhwa_fc  = 2 or fhwa_fc = 6) and totln = 2) then do
        idealcap = 1400  // 2 lane arterials
    end
    if ((fhwa_fc  = 14 or fhwa_fc = 16) and totln = 2) then do
        idealcap = 1200  // 2 lane arterials
    end
    if ((fhwa_fc  = 7 or fhwa_fc = 8 or fhwa_fc = 9 or fhwa_fc = 17 or fhwa_fc = 19) and totln = 2) then do
        idealcap = 1200  // 2 lane collectors and local
    end
    if ((fhwa_fc  = 7 or fhwa_fc = 8 or fhwa_fc = 9 or fhwa_fc = 17 or fhwa_fc = 19) and totln = 1) then do
        idealcap = 1200  // 2 lane collectors and local
    end

          PKCAP = idealcap * LANES

                    If np > 3 then do
                              MDAUTO = linevw.(thefields[7])
                              MDTRK = linevw.(thefields[11])
                    end
                    else do
                              MDAUTO = 0
                              MDTRK = 0
                    end

// Exclude centroid connectors
                    if FC = 99 then goto Skip

//Avoid adding nulls problem

                    IF AMAUTO = null then AMAUTO = 0
                    IF PMAUTO = null then PMAUTO = 0
                    IF MDAUTO = null then MDAUTO = 0
                    IF OPAUTO = null then OPAUTO = 0
                    IF AMTRK = null then AMTRK = 0
                    IF PMTRK = null then PMTRK = 0
                    IF MDTRK = null then MDTRK = 0
                    IF OPTRK = null then OPTRK = 0

//Reset daily period volume arrays to zero for each period

          for i = 1 to dp do
                    PCEVOL[i] = 0
                    ADTVOL[i] = 0
                    CARVOL[i] = 0
                    TRKVOL[i] = 0
          end

//Before beginning daily loop
          if todass = 1 then do
                    PCEAM = (AMTRK*1.5) + AMAUTO
                    PCEPM = (PMTRK*1.5) + PMAUTO
                    PCEMD = (MDTRK*1.5) + MDAUTO
                    PCEOP = (OPTRK*1.5) + OPAUTO
                    PCES = {PCEOP, PCEAM, PCEPM, PCEMD}

                    ADTAM = AMTRK + AMAUTO
                    ADTPM = PMTRK + PMAUTO
                    ADTMD = MDTRK + MDAUTO
                    ADTOP = OPTRK + OPAUTO
                    ADTS = {ADTOP, ADTAM, ADTPM, ADTMD}

                    CARS = {OPAUTO, AMAUTO, PMAUTO, MDAUTO}
                    TRKS = {OPTRK, AMTRK, PMTRK, MDTRK}
          end
                    dim PCE[dp]
                    dim ADT[dp]
                    dim CAR[dp]
                    dim TRK[dp]

          if todass = 1 then do
                    for i = 1 to dp do
                              tp = 1 + PERIODS[i]
                              PCE[i] = PCES[tp]
                              ADT[i] = ADTS[tp]
                              CAR[i] = CARS[tp]
                              TRK[i] = TRKS[tp]
                    end
          end

          if todass = 0 then do
```

```
                    for i = 1 to dp do
                              PCE[i] = (MDTT*1.5) + MDAT
                              ADT[i] = MDT
                              CAR[i] = MDAT
                              TRK[i] = MDTT
                    end
          end

                    DPCAP = PKCAP * 0.5 * (24/dp)

                    alpha = 0.15
                    beta = 4.0
                    if BPRA <> null then alpha = BPRA
                    if BPRB <> null then beta = BPRB

                    delay = 0
                    AMTIME = 0
                    PMTIME = 0
                    MDTIME = 0
                    OPTIME = 0
                    AMADTVOL = 0
                    PMADTVOL = 0
                    MDADTVOL = 0
                    OPADTVOL = 0
                    AMSP = 0
                    PMSP = 0
                    MDSP = 0
                    OPSP = 0
                    AMMAXVC = 0
                    PMMAXVC = 0
                    MDMAXVC = 0
                    OPMAXVC = 0
                    FX = 0
                    IX = 0
                    PX = 0
                    TX = 0

//Initialize arrays

                    dim VC[dp]
                    dim time[dp]
                    dim losttime[dp]
                    dim sp[dp]
                    dim VHTHR[dp]
                    dim VMTHR[dp]
                    dim AHTHR[dp]
                    dim AMTHR[dp]
                    dim THTHR[dp]
                    dim TMTHR[dp]

//Begin daily loop to calculate hourly volumes, v/c ratios, and
//congested travel times and speeds.

                    for i = 1 to dp do

//                            Compute hourly volumes

                              PCEVOL[i] = PCE[i] * DDIST[i]
                              ADTVOL[i] = ADT[i] * DDIST[i]
                              CARVOL[i] = CAR[i] * DDIST[i]
                              TRKVOL[i] = TRK[i] * DDIST[i]

//                            Compute hourly v/c ratio

                              VC[i] = PCEVOL[i] * PDIR[i] / DPCAP

//                            Compute hourly travel times and delays

                              time[i] = FFTMIN * (1 + (alpha * pow(VC[i], beta)))

                              losttime[i] = time[i] - FFTMIN

                              delay = delay + losttime[i] * ADTVOL[i]

//                            Begin calculation of average travel times and speeds for the periods

                              sp[i] = (LENGTH / time[i]) * 60
                              if sp[i] < 0.01 then sp[i] = 0.01

                              if PERIODS[i] = 1 then do
                                        AMTIME = AMTIME + (time[i] * ADTVOL[i])
                                        AMADTVOL = AMADTVOL + ADTVOL[i]
                                        AMSP = AMSP + (sp[i] * ADTVOL[i])
                                        AMMAXVC = Max(AMMAXVC, VC[i])
                              end

                              if PERIODS[i] = 2 then do
                                        PMTIME = PMTIME + (time[i] * ADTVOL[i])
                                        PMADTVOL = PMADTVOL + ADTVOL[i]
                                        PMSP = PMSP + (sp[i] * ADTVOL[i])
                                        PMMAXVC = Max(PMMAXVC, VC[i])
                              end

                              if PERIODS[i] = 3 then do
                                        MDTIME = MDTIME + (time[i] * ADTVOL[i])
                                        MDADTVOL = MDADTVOL + ADTVOL[i]
                                        MDSP = MDSP + (sp[i] * ADTVOL[i])
                                        MDMAXVC = Max(MDMAXVC, VC[i])
                              end

                              if PERIODS[i] = 0 then do
```

```
                                        OPTIME = OPTIME + (time[i] * ADTVOL[i])
                                        OPADTVOL = OPADTVOL + ADTVOL[i]
                                        OPSP = OPSP + (sp[i] * ADTVOL[i])
                                        OPMAXVC = Max(OPMAXVC, VC[i])
                              end

//                            Compute hourly VMT & VHT

                              VHTHR[i] = (ADTVOL[i] * time[i]) / 60
                              VMTHR[i] = ADTVOL[i] * LENGTH
                              AHTHR[i] = (CARVOL[i] * time[i]) / 60
                              AMTHR[i] = CARVOL[i] * LENGTH
                              THTHR[i] = (TRKVOL[i] * time[i]) / 60
                              TMTHR[i] = TRKVOL[i] * LENGTH

//                            Compute congested VMT & VHT

                              For j = 1 to Ls do

                                        If VC[i] > CLEVELS[j] then do
                                                  VMTVC[j] = VMTVC[j] + VMTHR[i]
                                                  VHTVC[j] = VHTVC[j] + VHTHR[i]
                                                  AMTVC[j] = AMTVC[j] + AMTHR[i]
                                                  AHTVC[j] = AHTVC[j] + AHTHR[i]
                                                  TMTVC[j] = TMTVC[j] + TMTHR[i]
                                                  THTVC[j] = THTVC[j] + THTHR[i]
                                        end
                              end
                    end
//        end daily loop

//After daily loop
//Calculate total system delay

                    If delay <> null then Tot_Delay = Tot_Delay + (delay/60)

//Complete calculation of average travel times and speeds for the periods and the day
//Remember you must avoid division by zero

                    If AMADTVOL < 1 then AMADTVOL = 1
                    If PMADTVOL < 1 then PMADTVOL = 1
                    If MDADTVOL < 1 then MDADTVOL = 1
                    If OPADTVOL < 1 then OPADTVOL = 1

                    AMAVGTT = AMTIME / AMADTVOL
                    AMAVGSP = AMSP / AMADTVOL
                    PMAVGTT = PMTIME / PMADTVOL
                    PMAVGSP = PMSP / PMADTVOL
                    MDAVGTT = MDTIME / MDADTVOL
                    MDAVGSP = MDSP / MDADTVOL
                    OPAVGTT = OPTIME / OPADTVOL
                    OPAVGSP = OPSP / OPADTVOL
                    AVGTT = (AMTIME + PMTIME + MDTIME + OPTIME) /
                              (AMADTVOL + PMADTVOL + MDADTVOL + OPADTVOL)

                    BAD = 0
                    If AVGTT < FFTMIN then do
                              BAD = 1
                              AVGTT = FFTMIN
                    end

                    AVGSP = (LENGTH / AVGTT)* 60

// What is maximum v/c ratio and the worst LOS experienced on the link?

                    MAXVC = Max(OPMAXVC, Max(MDMAXVC, Max(AMMAXVC, PMMAXVC)))
                    MAXMAXVC = Max(MAXMAXVC, MAXVC)

                    If FC = null then FC = FTFC
                    if FC = 1 or FC = 11 then do
                              LOS = "A"
                              IF MAXVC > .29 THEN LOS = "B"
                              IF MAXVC > .47 THEN LOS = "C"
                              IF MAXVC > .69 THEN LOS = "D"
                              IF MAXVC > .88 THEN LOS = "E"
                              IF MAXVC > 1.00 THEN LOS = "F"
                    end
                    if FC = 12 then do
                              LOS = "A"
                              IF MAXVC > .33 THEN LOS = "B"
                              IF MAXVC > .55 THEN LOS = "C"
                              IF MAXVC > .75 THEN LOS = "D"
                              IF MAXVC > .88 THEN LOS = "E"
                              IF MAXVC > 1.00 THEN LOS = "F"
                    end
                    if FC = 2 or FC = 6 or FC = 14 or FC = 16 then do
                              LOS = "A"
                              IF MAXVC > .30 THEN LOS = "B"
                              IF MAXVC > .50 THEN LOS = "C"
                              IF MAXVC > .70 THEN LOS = "D"
                              IF MAXVC > .84 THEN LOS = "E"
                              IF MAXVC > 1.00 THEN LOS = "F"
                    end
                    if FC = 7 or FC = 8 or FC = 9 or FC = 17 or FC = 19 then do
                              LOS = "A"
                              IF MAXVC > .31 THEN LOS = "B"
                              IF MAXVC > .52 THEN LOS = "C"
                              IF MAXVC > .72 THEN LOS = "D"
                              IF MAXVC > .83 THEN LOS = "E"
                              IF MAXVC > 1.00 THEN LOS = "F"
                    end
```

```
//Calculate total road miles, total road lane miles, and congested road lane miles

                    RM =  RM + LENGTH
                    RLM = RLM + (LENGTH * LANES)

                    For j = 1 to Ls do
                              If MAXVC > CLEVELS[j] then do
                                        CLANEMI[j] = CLANEMI[j] + (LENGTH * LANES)
                              end
                    end

// Calculate VHT and VMT by mode

                    VHT = (MDT * AVGTT)/60
                    VHT_Trk = (MDTT * AVGTT)/60
                    VHT_Auto = (MDAT * AVGTT)/60

                    VMT = MDT * LENGTH
                    VMT_Trk = MDTT * LENGTH
                    VMT_Auto = MDAT * LENGTH

                    IF VHT <> null then TOTVHT = TOTVHT + VHT
                    IF VHT_Trk <> null then TOTVHT_Trk = TOTVHT_Trk + VHT_Trk
                    IF VHT_Auto <> null then TOTVHT_Auto = TOTVHT_Auto + VHT_Auto

                    IF VMT <> null then TOTVMT = TOTVMT + VMT
                    IF VMT_Trk <> null then TOTVMT_Trk = TOTVMT_Trk + VMT_Trk
                    IF VMT_Auto <> null then TOTVMT_Auto = TOTVMT_Auto + VMT_Auto

// Calculate Accidents by type

                    If FC = null then FC = FTFC
                    FX = 330*VMT*FXR[FC]/100000000
                    IX = 330*VMT*IXR[FC]/100000000
                    PX = 330*VMT*PXR[FC]/100000000
                    TX = 330*VMT*TXR[FC]/100000000

                    If FX <> null then TOTFX = TOTFX + FX
                    If IX <> null then TOTIX = TOTIX + IX
                    If PX <> null then TOTPX = TOTPX + PX
                    If TX <> null then TOTTX = TOTTX + TX

//Begin Functional Class Loop
// Remember i is not equal to the functional class number

                    for i = 1 to FCLASS.length do

                              If FC = FCLASS[i] then do
                                        WFCVC = MAXVC * VMT
                                        CVC[i] = CVC[i] + WFCVC
                                        TOTVC = TOTVC + WFCVC
                                        RDMILES[i] = RDMILES[i] + LENGTH
                                        VMTC[i] = VMTC[i] + VMT
                                        VHTC[i] = VHTC[i] + VHT
                                        VMTAUTO[i] = VMTAUTO[i] + VMT_Auto
                                        VHTAUTO[i] = VHTAUTO[i] + VHT_Auto
                                        VMTTRK[i] = VMTTRK[i] + VMT_Trk
                                        VHTTRK[i] = VHTTRK[i] + VHT_Trk
                                        SUMFX[i] = SUMFX[i] + FX
                                        SUMIX[i] = SUMIX[i] + IX
                                        SUMPX[i] = SUMPX[i] + PX
                                        SUMTX[i] = SUMTX[i] + TX
                              end
                    end
//        end Functional Class Loop

//Begin Area Type Loop

                    for i = 1 to AREA.length do

                              j = i + 16
                              If AT = AREA[i] then do
                                        WACVC = MAXVC * VMT
                                        CVC[j] = CVC[j] + WACVC
                                        RDMILES[j] = RDMILES[j] + LENGTH
                                        VMTC[j] = VMTC[j] + VMT
                                        VHTC[j] = VHTC[j] + VHT
                                        VMTAUTO[j] = VMTAUTO[j] + VMT_Auto
                                        VHTAUTO[j] = VHTAUTO[j] + VHT_Auto
                                        VMTTRK[j] = VMTTRK[j] + VMT_Trk
                                        VHTTRK[j] = VHTTRK[j] + VHT_Trk
                                        SUMFX[j] = SUMFX[j] + FX
                                        SUMIX[j] = SUMIX[j] + IX
                                        SUMPX[j] = SUMPX[j] + PX
                                        SUMTX[j] = SUMTX[j] + TX
                              end
                    end
//        end Area Type Loop

//Begin County Loop

                    for i = 1 to COS.length do

                              j = i + fc2 - 1
                              If CO = COS[i] then do
                                        WCOCVC = MAXVC * VMT
                                        CVC[j] = CVC[j] + WCOCVC
                                        RDMILES[j] = RDMILES[j] + LENGTH
                                        VMTC[j] = VMTC[j] + VMT
                                        VHTC[j] = VHTC[j] + VHT
```

```
                                        VMTAUTO[j] = VMTAUTO[j] + VMT_Auto
                                        VHTAUTO[j] = VHTAUTO[j] + VHT_Auto
                                        VMTTRK[j] = VMTTRK[j] + VMT_Trk
                                        VHTTRK[j] = VHTTRK[j] + VHT_Trk
                                        SUMFX[j] = SUMFX[j] + FX
                                        SUMIX[j] = SUMIX[j] + IX
                                        SUMPX[j] = SUMPX[j] + PX
                                        SUMTX[j] = SUMTX[j] + TX
                              end
                    end
//        end County Loop

//Begin Corridor Loop

                    for i = 1 to CORRS.length do

                              j = i + fc3 - 1
                              If COR = CORRS[i] then do
                                        WCCVC = MAXVC * VMT
                                        CVC[j] = CVC[j] + WCCVC
                                        RDMILES[j] = RDMILES[j] + LENGTH
                                        VMTC[j] = VMTC[j] + VMT
                                        VHTC[j] = VHTC[j] + VHT
                                        VMTAUTO[j] = VMTAUTO[j] + VMT_Auto
                                        VHTAUTO[j] = VHTAUTO[j] + VHT_Auto
                                        VMTTRK[j] = VMTTRK[j] + VMT_Trk
                                        VHTTRK[j] = VHTTRK[j] + VHT_Trk
                                        SUMFX[j] = SUMFX[j] + FX
                                        SUMIX[j] = SUMIX[j] + IX
                                        SUMPX[j] = SUMPX[j] + PX
                                        SUMTX[j] = SUMTX[j] + TX
                              end
                    end
//        end Corridor Loop

//VMT and VHT Along US-41 (I-64 to Pennyrile at KY 425)

        if US41ID = 1 then do
                              VHT_US41 = VHT_US41 + VHT
                              VHTTRK_US41 = VHTTRK_US41 + VHT_Trk
                              VHTAUTO_US41 = VHTAUTO_US41 + VHT_Auto
                              VMT_US41 = VMT_US41 + VMT
                              VMTTRK_US41 = VMTTRK_US41 + VMT_Trk
                              VMTAUTO_US41 = VMTAUTO_US41 + VMT_Auto
          end

//VPD (VEHICLES PER DAY ON US41/OHIO-RIVER BRIDGE)AADT on the Bridge

          if BridgeID = 1 then do
                    VPDAUTO_Bridge = Round(MDAT,0)
                    VPDTRK_Bridge = Round(MDTT,0)
                    VPDTOT_Bridge = Round(MDT,0)
          end

//Write link information into the output link file

                    AddRecord(linkfile,           {{"LID",ID},
                                                   {"FHWA_FC",FC},
                                                   {"MAXVC1",MAXVC},
                                                   {"AVGSP",AVGSP},
                                                   {"AVGTT1",AVGTT},
                                                   {"WORSTLOS",LOS},
                                                   {"HRS_DELAY",delay},
                                                   {"VHT",VHT},
                                                   {"VMT",VMT},
                                                   {"BPRA",alpha},
                                                   {"BPRB",beta},
                                                   {"FFTIME",FFTMIN},
                                                   {"BAD",BAD},
                                                   {"AMAVGTT",AMAVGTT},
                                                   {"PMAVGTT",PMAVGTT},
                                                   {"OPAVGTT",OPAVGTT},
                                                   {"FX", FX},
                                                   {"IX", IX},
                                                   {"PX", PX},
                                                   {"TX", TX}})

//Write link information into the output Mobile6 file

                    dim marec[73]
                    marec[1] = {"LID",ID}
                    for i = 1 to 24 do
                              a = i + 1
                              b = i + 25
                              c = i + 49
                              marec[a] = {carvolfield[i],CARVOL[i]}
                              marec[b] = {trkvolfield[i],TRKVOL[i]}
                              marec[c] = {avgspdfield[i],sp[i]}
                    end

                    AddRecord(mfile, marec)

                    Skip:
                    rec = GetNextRecord(linevw + "|", null, null)
          end
//end loop through assigned network

          UpdateProgressBar("Writing Report", 99)

//Calculation of the ESPI Indices
```

```
        If MAXMAXVC > 0.70 then do
                ESPI_VMT = (10*TOTVMT)/(VMTVC[2] + VMTVC[4])
                ESPI_VHT = (10*TOTVHT)/(VHTVC[2] + VHTVC[4])
                ESPI_VMT_CAR = (10*TOTVMT_Auto)/(AMTVC[2] + AMTVC[4])
                ESPI_VHT_CAR = (10*TOTVHT_Auto)/(AHTVC[2] + AHTVC[4])
                ESPI_VMT_TRK = (10*TOTVMT_Trk)/(TMTVC[2] + TMTVC[4])
                ESPI_VHT_TRK = (10*TOTVHT_Trk)/(THTVC[2] + THTVC[4])
        end

//Normalize the Functional Class, Area Type, Corridor, and System v/c Ratios
//And Calculate Avg Speeds by Functional Class, Area Type, and Corridor

        for i = 1 to FCLASS.length do
                if VMTC[i] <> 0 then CVC[i] = Round(CVC[i]/VMTC[i], 2)
                if VHTC[i] <> 0 then SPDC[i] = Round(VMTC[i] / VHTC[i], 2)
                if VHTC[i] = 0 then SPDC[i] = 0.00
        end
        for i = 1 to AREA.length do
                j = i + 16
                if VMTC[j] <> 0 then CVC[j] = Round(CVC[j]/VMTC[j], 2)
                if VHTC[j] <> 0 then SPDC[j] = Round(VMTC[j] / VHTC[j], 2)
                if VHTC[j] = 0 then SPDC[j] = 0.00
        end
        for i = 1 to COS.length do
                j = i + fc2 - 1
                if VMTC[j] <> 0 then CVC[j] = Round(CVC[j]/VMTC[j], 2)
                if VHTC[j] <> 0 then SPDC[j] = Round(VMTC[j] / VHTC[j], 2)
                if VHTC[j] = 0 then SPDC[j] = 0.00
        end
        for i = 1 to CORRS.length do
                j = i + fc3 - 1
                if VMTC[j] <> 0 then CVC[j] = Round(CVC[j]/VMTC[j], 2)
                if VHTC[j] <> 0 then SPDC[j] = Round(VMTC[j] / VHTC[j], 2)
                if VHTC[j] = 0 then SPDC[j] = 0.00
        end
        TOTVC = TOTVC / TOTVMT

//Write Summary File

        dim systat[Ns]
        systat[1] = "Total VMT"
        systat[2] = "VMT with v/c > 0.50"
        systat[3] = "VMT with v/c > 0.70"
        systat[4] = "VMT with v/c > 0.84"
        systat[5] = "VMT with v/c > 0.99"
        systat[6] = "Total VHT"
        systat[7] = "VHT with v/c > 0.50"
        systat[8] = "VHT with v/c > 0.70"
        systat[9] = "VHT with v/c > 0.84"
        systat[10] = "VHT with v/c > 0.99"

        systat[12] = "Total Road Miles"
        systat[13] = "Total Lane Miles"
        systat[14] = "Lane Miles with v/c > 0.50"
        systat[15] = "Lane Miles with v/c > 0.70"
        systat[16] = "Lane Miles with v/c > 0.84"
        systat[17] = "Lane Miles with v/c > 0.99"

        systat[19] = "Total VMT on US 41"
        systat[20] = "Auto VMT on US 41"
        systat[21] = "Truck VMT on US 41"
        systat[22] = "Total VHT on US 41"
        systat[23] = "Auto VHT on US 41"
        systat[24] = "Truck VHT on US 41"
        systat[25] = "Total VPD on Twin Bridges"
        systat[26] = "Auto VPD on Twin Bridges"
        systat[27] = "Truck VPD on Twin Bridges"

        systat[29] = "ESPI by VMT"
        systat[30] = "ESPI by VHT"
        systat[31] = "ESPI by Auto VMT"
        systat[32] = "ESPI by Auto VHT"
        systat[33] = "ESPI by Truck VMT"
        systat[34] = "ESPI by Truck VHT"

        systat[36] = "Total Systemwide Delay"

        dim cstat[Ns]
        cstat[1] = i2s(Round(TOTVMT, 0))
        cstat[2] = i2s(Round(VMTVC[1], 0))
        cstat[3] = i2s(Round(VMTVC[2], 0))
        cstat[4] = i2s(Round(VMTVC[3], 0))
        cstat[5] = i2s(Round(VMTVC[4], 0))
        cstat[6] = i2s(Round(TOTVHT, 0))
        cstat[7] = i2s(Round(VHTVC[1], 0))
        cstat[8] = i2s(Round(VHTVC[2], 0))
        cstat[9] = i2s(Round(VHTVC[3], 0))
        cstat[10] = i2s(Round(VHTVC[4], 0))

        cstat[12] = i2s(Round(RM, 0))
        cstat[13] = i2s(Round(RLM, 0))
        cstat[14] = i2s(Round(CLANEMI[1], 0))
        cstat[15] = i2s(Round(CLANEMI[2], 0))
        cstat[16] = i2s(Round(CLANEMI[3], 0))
        cstat[17] = i2s(Round(CLANEMI[4], 0))

        cstat[19] = i2s(Round(VMT_US41, 0))
        cstat[20] = i2s(Round(VMTAUTO_US41, 0))
        cstat[21] = i2s(Round(VMTTRK_US41, 0))
        cstat[22] = i2s(Round(VHT_US41, 0))
        cstat[23] = i2s(Round(VHTAUTO_US41, 0))
```

```
        cstat[24] = i2s(Round(VHTTRK_US41, 0))
        cstat[25] = i2s(Round(VPDTOT_Bridge, 0))
        cstat[26] = i2s(Round(VPDAUTO_Bridge, 0))
        cstat[27] = i2s(Round(VPDTRK_Bridge, 0))

        cstat[29] = r2s(Round(ESPI_VMT, 2))
        cstat[30] = r2s(Round(ESPI_VHT, 2))
        cstat[31] = r2s(Round(ESPI_VMT_CAR, 2))
        cstat[32] = r2s(Round(ESPI_VHT_CAR, 2))
        cstat[33] = r2s(Round(ESPI_VMT_TRK, 2))
        cstat[34] = r2s(Round(ESPI_VHT_TRK, 2))

        cstat[36] = i2s(Round(Tot_Delay, 0))


        dim class[Ns]
        class[1] = "Rural Interstates"
        class[2] = "Other Rural Principal Arterials"
        class[3] = "Rural Minor Arterials"
        class[4] = "Rural Major Collectors"
        class[5] = "Rural Minor Collectors"
        class[6] = "Rural Local Roads"
        class[7] = "Urban Interstates"
        class[8] = "Other Urban Freeways & Expwys"
        class[9] = "Other Urban Principal Arterials"
        class[10] = "Urban Minor Arterials"
        class[11] = "Urban Collectors"
        class[12] = "Urban Local Roads"
        class[14] = "-----Totals-----"
        class[17] = "Area Type --- CBD"
        class[18] = "Area Type --- URB"
        class[19] = "Area Type --- SUB"
        class[20] = "Area Type --- RUR"
        class[23] = "County --- Gibson"
        class[24] = "County --- Henderson"
        class[25] = "County --- Posey"
        class[26] = "County --- Vanderburgh"
        class[27] = "County --- Warrick"
        class[30] = "Corridor --- Lloyd Expwy (in Vand. Co)"
        class[31] = "Corridor --- US 41 (IN only)"
        class[32] = "Corridor --- US 41 Bridge"
        class[33] = "Corridor --- I-164"
        class[34] = "Corridor --- I-64"
        class[35] = "Corridor --- SR-57"
        class[36] = "Corridor --- Pennyrile Pkwy"

        datetime = GetDateAndTime()
        class[40] = "Network Layer: " + linevw
        class[41] = "Network File: " + netfilename
        class[42] = "Report File: " + outfilename
        class[43] = datetime

        FFC = {1,2,6,7,8,9,11,12,14,16,17,19,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,}

        RDMILES[14] = Round(RM, 0)
        VMTC[14] = Round(TOTVMT, 0)
        VMTAUTO[14] = Round(TOTVMT_Auto, 0)
        VMTTRK[14] = Round(TOTVMT_Trk, 0)
        VHTC[14] = Round(TOTVHT, 0)
        VHTAUTO[14] = Round(TOTVHT_Auto, 0)
        VHTTRK[14] = Round(TOTVHT_Trk, 0)
        SPDC[14] = Round(TOTVMT/TOTVHT, 2)
        CVC[14] = Round(TOTVC, 2)
        SUMFX[14] = TOTFX
        SUMIX[14] = TOTIX
        SUMPX[14] = TOTPX
        SUMTX[14] = TOTTX

        for i = 1 to Ns do

                AddRecord(postrep,     {{"SystemStat", systat[i]},
                                        {"Stat", cstat[i]},
                                        {"Class", class[i]},
                                        {"FHWA_FC", FFC[i]},
                                        {"RoadMiles", Round(RDMILES[i],2)},
                                        {"VMT", Round(VMTC[i],0)},
                                        {"Auto_VMT", Round(VMTAUTO[i],0)},
                                        {"Truck_VMT", Round(VMTTRK[i],0)},
                                        {"VHT", Round(VHTC[i],0)},
                                        {"Auto_VHT", Round(VHTAUTO[i],0)},
                                        {"Truck_VHT", Round(VHTTRK[i],0)},
                                        {"AvgSpeed", Round(SPDC[i],2)},
                                        {"VC", Round(CVC[i],2)},
                                        {"Fatal_Xs", Round(SUMFX[i],0)},
                                        {"Injury_Xs", Round(SUMIX[i],0)},
                                        {"PDO_Xs", Round(SUMPX[i],0)},
                                        {"Total_Xs", Round(SUMTX[i],0)}})
        end

        CloseView(linkfile)
        CloseView(mfile)
        CloseView(postrep)

   DestroyProgressBar()
   SetStatus(1, "@System0", )
quit:
endMacro


macro "addavgtt" (in_value)
  thepath = in_value[1]
```

```
  linevw = in_value[2]

          postgar = LoadArray(thepath + "\\post\\post.gar")
          linkfilename = postgar[1]

          totrec = GetRecordCount(linevw,)

   thefields1 = {"AVGTT", "AVGSPD", "AVGTTAM", "AVGTTPM", "AVGTTOFF"}

   RunMacro("addfields", {thefields1, linevw})

   EnableProgressBar("Post_Alt", 1)
   CreateProgressBar("loading...", "False")
   recno = 0

   paview = OpenTable("postlinks", "dBASE", {linkfilename, })
   joinvw = JoinViews("Network+Post_Alt", linevw + ".ID", paview + ".LID", )
   jnrec = GetFirstRecord(joinvw + "|", null)
   while jnrec <> null do

          recno = recno + 1
          prog = Round ((recno/totrec)*99, 0)
   UpdateProgressBar("Updating Network...", prog)

          joinvw.AVGTT = joinvw.AVGTT1
          joinvw.AVGSPD = joinvw.AVGSP
          joinvw.AVGTTAM = joinvw.AMAVGTT
          joinvw.AVGTTPM = joinvw.PMAVGTT
          joinvw.AVGTTOFF = joinvw.OPAVGTT
     jnrec = GetNextRecord(joinvw + "|", null, null)
   end

   CloseView(joinvw)
   CloseView(paview)

   DestroyProgressBar()

endmacro

macro "addlos" (in_value)
  thepath = in_value[1]
  linevw = in_value[2]

          postgar = LoadArray(thepath + "\\post\\post.gar")
          linkfilename = postgar[1]

          totrec = GetRecordCount(linevw,)

   fldnames2 = {"MAXVC", "LOS"}
          fldtype = {{"Real", 10, 2}, {"String", 3, null}}

   struct = GetTableStructure(linevw)
   viewflds = GetFields(linevw, numeric)

   for i = 1 to struct.length do
      struct[i] = struct[i] + {struct[i][1]}
   end

   for i = 1 to fldnames2.length do
      pos = ArrayPosition(viewflds[1], {fldnames2[i]}, )
      if pos = 0 then do
         newstr = newstr +
                    {{fldnames2[i], fldtype[i][1], fldtype[i][2], fldtype[i][3], "false", null, null, null, null}}
         modtab = 1
      end
   end

   if modtab = 1 then do
      newstr = struct + newstr
      ModifyTable(in_value[2], newstr)
   end

   EnableProgressBar("Post_Alt", 1)
   CreateProgressBar("loading...", "False")
   recno = 0

   paview = OpenTable("postlinks", "dBASE", {linkfilename, })
   joinvw = JoinViews("Network+Post_Alt", linevw + ".ID", paview + ".LID", )
   jnrec = GetFirstRecord(joinvw + "|", null)
   while jnrec <> null do

          recno = recno + 1
          prog = Round ((recno/totrec)*99, 0)
   UpdateProgressBar("Updating Network...", prog)

          joinvw.MAXVC = joinvw.MAXVC1
          joinvw.LOS = joinvw.WORSTLOS
     jnrec = GetNextRecord(joinvw + "|", null, null)
   end

   CloseView(joinvw)
   CloseView(paview)

   DestroyProgressBar()

endmacro


Macro "4M6" (in_value)
          thepath = in_value[1]
          linevw = in_value[2]
```

```
          year = in_value[3]

/*
A Program written by Vincent L. Bernardin, Jr. of Bernardin, Lochmueller, and Assoc. to post-process the EUTS regional model to
calculate the VMT by facility type, by hour, and by speed bin for input into the Mobile6 air quality model using the *24M6.dbf
file created by Post_Alt.
6/11/03
Revised 6/23/03
*/

          postgar = LoadArray(thepath + "\\post\\post.gar")
          mfile = postgar[2]
          reterr = 0

//Set the analysis year
          yn = 0
          if year = 1 then yn = 1
          if year = 2 then yn = 2
          if year = 3 then yn = 3
          if year > 3 then yn = 4
          if yn = 0 then do
                    ShowMessage("Error: Invalid Analysis Year!")
                    reterr = reterr + 1
                    goto quit2
          end

//Get Line Layer and record count

//        linevw = GetLayer()
//        ShowMessage("The current layer is " + linevw)
          totrec = GetRecordCount(linevw,)

//Choose output directory
//        thepath = ChooseDirectory("Choose a directory for the results",)

//Read in the Network Field Names from the auxillary file
          thefields = RunMacro("getnames", {thepath + "\\post\\"})

//Choose and open the input file from Post_Alt

//        mfile = ChooseFile({{"24M6 File", "*_24M6.dbf"}},
//                                      "Choose the input file",
//                                      {,{"Initial Directory", thepath},})

          mvw = OpenTable("24M6view", "DBASE", {mfile, })


   EnableProgressBar("4M6", 1)
   CreateProgressBar("loading...", "False")


//Define Mobile6 speed bins

          M6spdbin = {2.5, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65}

//Initialize Arrays
          dim CLASSES[4]
          dim C_VMT[24]
          dim T_VMT[24]
          dim FVMT1[2]
          dim HVMT1[3]
          dim SVMT1[2]
          dim FVMT3[28]
          dim HVMT2[3]
          dim NAR24[24]
          dim NAR5[5]
          dim NAR15[15]
          dim NAR28[28]
          dim CARVOL[24]
          dim TRKVOL[24]
          dim AVGSPD[24]
          dim HBVMT[2]

//Zero out arrays to be summed
          for m = 1 to 2 do
                    FVMT1[m] = CopyArray(NAR24)
                    for h = 1 to 24 do
                              FVMT1[m][h] = CopyArray(NAR5)
                              for f = 1 to 5 do
                                        FVMT1[m][h][f] = 0
                              end
                    end
          end
          for m = 1 to 28 do
                    FVMT3[m] = CopyArray(NAR24)
                    for h = 1 to 24 do
                              FVMT3[m][h] = CopyArray(NAR5)
                    end
          end
          for q = 1 to 3 do
                    HVMT2[q] = CopyArray(NAR24)
                    HVMT1[q] = CopyArray(NAR24)
                    for i = 1 to 24 do
                              HVMT1[q][i] = 0
                              HVMT2[q][i] = 0
                    end
          end
          for f = 1 to 2 do
                    SVMT1[f] = CopyArray(NAR24)
                    for h = 1 to 24 do
                              SVMT1[f][h] = CopyArray(NAR15)
```

```
                    for s = 1 to 15 do
                            SVMT1[f][h][s] = 0
                    end
            end
    end
    for f = 1 to 2 do
            HBVMT[f] = CopyArray(NAR15)
            for s = 1 to 14 do
                    HBVMT[f][s] = CopyArray(NAR24)
            end
    end

//Define the default mode to class breakout

    MODE = {1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 1,
            1, 2, 2, 2, 2, 2, 2, 2, 2, 1, 2, 2, 2, 1}

    CLASSES[1] = {0.680, 0.048, 0.162, 0.064, 0.030, 0.253, 0.010, 0.010,
                    0.020, 0.040, 0.030, 0.000, 0.000, 0.006, 0.002, 0.071,
                    0.020, 0.010, 0.001, 0.030, 0.051, 0.091, 0.333, 0.007,
                    0.010, 0.010, 0.010, 0.001}

    CLASSES[2] = {0.667, 0.050, 0.170, 0.066, 0.030, 0.252, 0.009, 0.019,
                    0.019, 0.047, 0.028, 0.001, 0.000, 0.006, 0.002, 0.065,
                    0.019, 0.009, 0.001, 0.028, 0.056, 0.093, 0.327, 0.007,
                    0.009, 0.009, 0.009, 0.002}

    CLASSES[3] = {0.654, 0.053, 0.178, 0.068, 0.032, 0.250, 0.017, 0.017,
                    0.017, 0.043, 0.034, 0.000, 0.000, 0.005, 0.003, 0.069,
                    0.017, 0.009, 0.000, 0.026, 0.052, 0.095, 0.327, 0.006,
                    0.009, 0.009, 0.009, 0.001}

    CLASSES[4] = {0.649, 0.054, 0.183, 0.068, 0.032, 0.254, 0.017, 0.017,
                    0.017, 0.042, 0.034, 0.000, 0.000, 0.005, 0.003, 0.068,
                    0.017, 0.008, 0.001, 0.025, 0.051, 0.093, 0.332, 0.005,
                    0.008, 0.008, 0.008, 0.001}

//Create the 24M6field arrays
    dim carvolfield[24]
    dim trkvolfield[24]
    dim avgspdfield[24]
    for i = 1 to 24 do
            if i > 9 then do
                    carvolfield[i] = "CARVOL_" + i2s(i)
                    trkvolfield[i] = "TRKVOL_" + i2s(i)
                    avgspdfield[i] = "AVGSPD_" + i2s(i)
            end
            else do
                    carvolfield[i] = "CARVOL_0" + i2s(i)
                    trkvolfield[i] = "TRKVOL_0" + i2s(i)
                    avgspdfield[i] = "AVGSPD_0" + i2s(i)
            end
    end

//Create, Open, and begin Looping the Joined View

    dview = JoinViews("Network+24M6", linevw + ".ID", mvw + ".LID", )

    SetView(dview)
    recno = 0
    rec = GetFirstRecord(dview + "|", null)
    while rec <> null do

            recno = recno + 1
            prog = Round ((recno/totrec)*99, 0)
            UpdateProgressBar("Computing Statistics", prog)
            SetStatus(1, "Record " + i2s(recno) + " of " + i2s(totrec), )

//Read in 24M6 data arrays

            for i = 1 to 24 do
                    CARVOL[i] = dview.(carvolfield[i])
                    TRKVOL[i] = dview.(trkvolfield[i])
                    AVGSPD[i] = dview.(avgspdfield[i])
            end
//          if recno = 1 then do
//                  ShowArray(CARVOL)
//                  ShowArray(TRKVOL)
//                  ShowArray(AVGSPD)
//          end

//Read in variables from the network

            LENGTH = dview.(thefields[2])
            FC = dview.(thefields[3])
            M6FT = dview.(thefields[25])
            CO = s2i(dview.(thefields[26]))
//          if recno = 1 then do
//                  ShowMessage("LENGTH = " + r2s(LENGTH))
//                  ShowMessage("FC = " + i2s(FC))
//                  ShowMessage("M6FT = " + i2s(M6FT))
//                  ShowMessage("CO = " + i2s(CO))
//          end

//Skip Centroid Connectors
            if FC = 99 then goto Skip

//Do only Vandeburgh Co.
            if CO <> 82 then goto Skip

//Calculate hourly VMT by mode
```

```
			for i = 1 to 24 do
				C_VMT[i] = LENGTH * CARVOL[i]
				T_VMT[i] = LENGTH * TRKVOL[i]
			end
			VMT = {C_VMT, T_VMT}

//Calculate hourly VMT by mode by M6 facility type

			for m = 1 to 2 do
				for h = 1 to 24 do
					for f = 1 to 4 do
						if M6FT = f then do
							FVMT1[m][h][f] = FVMT1[m][h][f] + VMT[m][h]
							FVMT1[m][h][5] = FVMT1[m][h][5] + VMT[m][h]
						end
					end
				end
			end

//Tabulate Total VMT by hour

			for i = 1 to 24 do
				HVMT1[1][i] = HVMT1[1][i] + C_VMT[i] + T_VMT[i]
				if M6FT = 1 then do
					HVMT1[2][i] = HVMT1[2][i] + C_VMT[i] + T_VMT[i]
				end
				if M6FT = 2 then do
					HVMT1[3][i] = HVMT1[3][i] + C_VMT[i] + T_VMT[i]
				end
			end

//Calculate VMT by M6 Speed Bin by hour, by facility type

			for f = 1 to 2 do
				if M6FT = f then do
				for h = 1 to 24 do
					z = AVGSPD[h]
					if M6FT = 1 then z = (0.92*AVGSPD[h])-0.00213
					s = 0
					u = 0
					while u = 0 do
						s = s + 1
						if z < M6spdbin[s] then u = s
					end
					l = u - 1
					if l = 0 then l = 1
					su = M6spdbin[u]
					sl = M6spdbin[l]
					if sl <> su then x = ((1/z) - (1/su))/((1/sl) - (1/su))
					if sl = su then x = 1
					SVMT1[f][h][l] = SVMT1[f][h][l] + (x*(C_VMT[h] + T_VMT[h]))
					SVMT1[f][h][u] = SVMT1[f][h][u] + ((1-x)*(C_VMT[h] + T_VMT[h]))
					SVMT1[f][h][15] = SVMT1[f][h][15] + C_VMT[h] + T_VMT[h]
				end
				end
			end

			Skip:
			rec = GetNextRecord(dview + "|", null, null)
		end
//end loop through joined network

//		ShowArray(FVMT1)
//		ShowArray(HVMT1)
//		ShowArray(SVMT1)

		UpdateProgressBar("Writing Data to Files", 99)

//Manipulating FVMT to convert from model network shares to real network shares

		FVMT2 = CopyArray(FVMT1)
		for m = 1 to 2 do
			for h = 1 to 24 do
				FVMT2[m][h][1] = 0.92 * FVMT1[m][h][1]
				FVMT2[m][h][3] = 2.2225 * FVMT1[m][h][3]
				FVMT2[m][h][4] = 0.08 * FVMT1[m][h][1]
			end
		end

//Breaking FVMT out into 28 vehicle classes

		y = yn
		for c = 1 to 28 do
			m = MODE[c]
			for h = 1 to 24 do
				for f = 1 to 5 do
					FVMT3[c][h][f] = FVMT2[m][h][f] * CLASSES[y][c]
				end
			end
		end
//		ShowArray(FVMT3)

//Converting FVMT from sums to normalized percents

		FVMT4 = CopyArray(FVMT3)
		for c = 1 to 28 do
			for h = 1 to 24 do
				total = FVMT4[c][h][5]
				counter = 0
				while total < 0.9995 | total > 1.0004 do
```

```
                                        if total = 0 then do
                                                  FVMT4[c][h] = {0.342, 0.498, 0.130, 0.030, 1.000}
                                                  total = 1.000
                                        end
                                        FVMT4[c][h][5] = 0
                                        for f = 1 to 4 do
                                                  FVMT4[c][h][f] = Round(FVMT4[c][h][f]/total, 3)
                                                  FVMT4[c][h][5] = FVMT4[c][h][5] + FVMT4[c][h][f]
                                        end
                                        ltotal = total
                                        total = FVMT4[c][h][5]
                                        if total = ltotal | counter = 98 then do
                                                  FVMT4[c][h][5] = 0
                                                  maxval = ArrayMax(FVMT4[c][h])
                                                  p = ArrayPosition(FVMT4[c][h], {maxval},)
                                                  FVMT4[c][h][p] = FVMT4[c][h][p] + 1 - total
                                                  total = 0
                                                  for i = 1 to 4 do
                                                            total = total + FVMT4[c][h][i]
                                                  end
                                        end
                                        counter = counter + 1
                                        if counter = 100 then do
                                                  errmsg = "Error: Normalization failed at FVMT[" +
                                                            i2s(c) + "][" + i2s(h) + "]!"
                                                  ShowMessage(errmsg)
                                                  ShowArray(FVMT4[c][h])
                                                  reterr = reterr + 1
                                                  goto quit
                                        end
                              end
                    end
          end
          FVMT = CopyArray(FVMT4)
          for c = 1 to 28 do
                    for i = 1 to 6 do
                              j = i + 18
                              FVMT[c][j] = FVMT4[c][i]
                    end
                    for i = 7 to 24 do
                              j = i - 6
                              FVMT[c][j] = FVMT4[c][i]
                    end
          end
//        ShowMessage("FVMT Finished!")
//        ShowArray(FVMT)

//Manipulating HVMT to reflect M6 numbering of the hours

          TOTVMT = {0, 0, 0}
          for q = 1 to 3 do
                    for i = 1 to 6 do
                              j = i + 18
                              HVMT2[q][j] = HVMT1[q][i]
                              TOTVMT[q] = TOTVMT[q] + HVMT1[q][i]
                    end
                    for i = 7 to 24 do
                              j = i - 6
                              HVMT2[q][j] = HVMT1[q][i]
                              TOTVMT[q] = TOTVMT[q] + HVMT1[q][i]
                    end
          end
//        ShowArray(HVMT2)

//Calculating totals by speed bin by facitly type and reformating to create HBVMT

          dim STOTALS[2]
          STOTALS[1] = {0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0}
          STOTALS[2] = {0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0}
          for f = 1 to 2 do
                    for s = 1 to 14 do
                              for h = 1 to 24 do
                                        STOTALS[f][s] = STOTALS[f][s] + SVMT1[f][h][s]
                                        HBVMT[f][s][h] = SVMT1[f][h][s]
                              end
                    end
          end

//Converting HVMT from sums to normalized percents

          HVMT = CopyArray(HVMT2)
          for q = 1 to 3 do
          total = TOTVMT[q]
          counter = 0
          while total < 0.99995 | total > 1.00004 do
                    TOTVMT[q] = 0
                    for i = 1 to 24 do
                              HVMT[q][i] = Round(HVMT[q][i]/total, 4)
                              TOTVMT[q] = TOTVMT[q] + HVMT[q][i]
                    end
                    ltotal = total
                    total = TOTVMT[q]
                    if total = ltotal | counter = 98 then do
                              maxval = ArrayMax(HVMT[q])
                              p = ArrayPosition(HVMT[q], {maxval},)
                              HVMT[q][p] = HVMT[q][p] + 1 - total
                              total = 0
                              for i = 1 to 24 do
                                        total = total + HVMT[q][i]
                              end
                    end
```

```
                    counter = counter + 1
                    if counter = 100 then do
                              errmsg = "Error: Normalization failed on HVMT!"
                              ShowMessage(errmsg)
                              ShowArray(HVMT)
                              reterr = reterr + 1
                              goto quit
                    end
          end
          end
//        ShowMessage("HVMT Finished!")
//        ShowArray(HVMT)

//Converting SVMT from sums to normalized percents

          SVMT3 = CopyArray(SVMT1)
          for i = 1 to 2 do
                    for j = 1 to 24 do
                              total = SVMT3[i][j][15]
                              counter = 0
                              while total < 0.99995 | total > 1.00004 do
                                        SVMT3[i][j][15] = 0
                                        for k = 1 to 14 do
                                                  SVMT3[i][j][k] = Round(SVMT3[i][j][k]/total, 4)
                                                  SVMT3[i][j][15] = SVMT3[i][j][15] + SVMT3[i][j][k]
                                        end
                                        ltotal = total
                                        total = SVMT3[i][j][15]
                                        if total = ltotal | counter = 97 then do
                                                  SVMT3[i][j][15] = 0
                                                  maxval = ArrayMax(SVMT3[i][j])
                                                  p = ArrayPosition(SVMT3[i][j], {maxval},)
                                                  SVMT3[i][j][p] = SVMT3[i][j][p] + 1 - total
                                                  total = 0
                                                  for k = 1 to 14 do
                                                            total = total + SVMT3[i][j][k]
                                                  end
                                        end
                                        counter = counter + 1
                                        if counter = 100 then do
                                                  errmsg = "Error: Normalization failed at SVMT[" +
                                                            i2s(i) + "][" + i2s(j) + "]!"
                                                  ShowMessage(errmsg)
                                                  ShowArray(SVMT[i][j])
                                                  reterr = reterr + 1
                                                  goto quit
                                        end
                              end
                    end
          end
          SVMT = CopyArray(SVMT3)
          for f = 1 to 2 do
                    for i = 1 to 6 do
                              j = i + 18
                              SVMT[f][j] = SVMT3[f][i]
                    end
                    for i = 7 to 24 do
                              j = i - 6
                              SVMT[f][j] = SVMT3[f][i]
                    end
          end
//        ShowMessage("SVMT Finished!")
//        ShowArray(SVMT)

//Creating HFTSVMT by normalizing SVMT1 by hour rather than by speed bin

          HFTSVMT1 = CopyArray(HBVMT)
          for f = 1 to 2 do
                    for s = 1 to 14 do
                              total = STOTALS[f][s]
                              counter = 0
                              while total < 0.999995 | total > 1.000004 do
                                        if total = 0 then do
                                                  HFTSVMT1[f][s] = HVMT[1]
                                                  total = 1.0000
                                                  goto nexts
                                        end
                                        STOTALS[f][s] = 0
                                        for i = 1 to 24 do
                                                  HFTSVMT1[f][s][i] = Round(HFTSVMT1[f][s][i]/total, 5)
                                                  if HFTSVMT1[f][s][i] = 0 then HFTSVMT1[f][s][i] = 0.00001
                                                  STOTALS[f][s] = STOTALS[f][s] + HFTSVMT1[f][s][i]
                                        end
                                        total = Round(total, 5)
                                        ltotal = total
                                        total = STOTALS[f][s]
                                        if total = ltotal | counter = 95 then do
                                                  maxval = ArrayMax(HFTSVMT1[f][s])
                                                  p = ArrayPosition(HFTSVMT1[f][s], {maxval},)
                                                  HFTSVMT1[f][s][p] = HFTSVMT1[f][s][p] + 1 - total
                                                  total = 0
                                                  for i = 1 to 24 do
                                                            total = total + HFTSVMT1[f][s][i]
                                                  end
                                        end
                                        counter = counter + 1
                                        if counter = 100 then do
                                                  errmsg1 = "Error: Normalization failed on HBVMT at s = "
                                                  errmsg2 = i2s(s) + "! "
                                                  ShowMessage(errmsg1 + errmsg2)
                                                  ShowArray(HBVMT)
```

```
                                        ShowArray(HFTSVMT1)
                                        ShowArray(STOTALS)
                                        reterr = reterr + 1
                                        goto quit
                              end
                    nexts:
                    end
          end
end
HFTSVMT = CopyArray(HFTSVMT1)
for f = 1 to 2 do
for s = 1 to 14 do
          for i = 1 to 6 do
                    j = i + 18
                    HFTSVMT[f][s][j] = HFTSVMT1[f][s][i]
          end
          for i = 7 to 24 do
                    j = i - 6
                    HFTSVMT[f][s][j] = HFTSVMT1[f][s][i]
          end
end
end
```

```
//Write FVMT M6 input file

          ffile = OpenFile(thepath + "\\post\\FVMT.d", "w")
          WriteLine(ffile, "VMT BY FACILITY")
          WriteLine(ffile, "* VMT fractions are listed for 28 vehicle classes.")
          for i = 1 to 28 do
                    fsthr = "   "
                    if i < 10 then fsthr = fsthr + " "
                    fsthr = fsthr + i2s(i)
                    for k = 1 to 4 do
                              plusnext = r2s(FVMT[i][1][k])
                              while Len(plusnext)<5 do
                                        plusnext = plusnext + "0"
                              end
                              fsthr = fsthr + "  " + plusnext
                    end
                    WriteLine(ffile, fsthr)
                    for j = 2 to 24 do
                              hrvmt = "       "
                              for k = 1 to 4 do
                                        plusnext = r2s(FVMT[i][j][k])
                                        while Len(plusnext)<5 do
                                                  plusnext = plusnext + "0"
                                        end
                                        hrvmt = hrvmt + plusnext + "  "
                              end
                              WriteLine(ffile, hrvmt)
                    end
          end
          CloseFile(ffile)

//Write FVMT M6 input file for each facility type


          for f = 1 to 4 do
          ffile = OpenFile(thepath + "\\post\\FVMT" + i2s(f) + ".d", "w")
          WriteLine(ffile, "VMT BY FACILITY")
          WriteLine(ffile, "* VMT fractions are listed for 28 vehicle classes.")
          for i = 1 to 28 do
                    fsthr = "   "
                    if i < 10 then fsthr = fsthr + " "
                    fsthr = fsthr + i2s(i)
                    for k = 1 to 4 do
                              plusnext = "0.000"
                              if k = f then plusnext = "1.000"
                              fsthr = fsthr + "  " + plusnext
                    end
                    WriteLine(ffile, fsthr)
                    for j = 2 to 24 do
                              hrvmt = "       "
                              for k = 1 to 4 do
                                        plusnext = "0.000"
                                        if k = f then plusnext = "1.000"
                                        hrvmt = hrvmt + plusnext + "  "
                              end
                              WriteLine(ffile, hrvmt)
                    end
          end
          CloseFile(ffile)
          end

//Write HVMT M6 input file

          for q = 1 to 3 do
          hfile = OpenFile(thepath + "\\post\\HVMT" + i2s(q) + ".d", "w")
          WriteLine(hfile, "VMT BY HOUR")
          WriteLine(hfile, "*  Fraction of all vehicle miles traveled by hour of the day.")
          WriteLine(hfile, "*  First hour is 6 a.m.")
          WriteLine(hfile, "* ")
          for i = 1 to 4 do
                    line = "     "
                    for j = 1 to 6 do
                              h = (i-1)*6 + j
                              plusnext = r2s(HVMT[q][h])
                              while Len(plusnext)<6 do
                                        plusnext = plusnext + "0"
                              end
                              line = line + plusnext + "  "
```

```
          end
          WriteLine(hfile, line)
     end
     CloseFile(hfile)
     end

//Write HVMT M6 input file for each speed bin and facility type

     for f = 1 to 2 do
     for s = 1 to 14 do
     hfile = OpenFile(thepath + "\\post\\HVMT" + i2s(f) + "_" + i2s(s) + ".d", "w")
     WriteLine(hfile, "VMT BY HOUR")
     WriteLine(hfile, "*  Fraction of all vehicle miles traveled by hour of the day.")
     WriteLine(hfile, "*  First hour is 6 a.m.")
     WriteLine(hfile, "* ")
     for i = 1 to 4 do
          line = "     "
          for j = 1 to 6 do
               h = (i-1)*6 + j
               plusnext = r2s(HFTSVMT[f][s][h])
               if plusnext = "1" then plusnext = "1.0000"
               while Len(plusnext)<6 do
                    plusnext = plusnext + "0"
               end
               line = line + plusnext + "  "
          end
          WriteLine(hfile, line)
     end
     CloseFile(hfile)
     end
     end

//Write SVMT M6 input file for each speed bin

     for s = 1 to 14 do
     sfile = OpenFile(thepath + "\\post\\SVMT" + i2s(s) + ".d", "w")
     WriteLine(sfile, "SPEED VMT")
     for i = 1 to 2 do
          for j = 1 to 24 do
               line = i2s(i) + " " + i2s(j) + " "
               if j < 10 then line = line + " "
               for k = 1 to 14 do
                    plusnext = "0.0000"
                    if k = s then plusnext = "1.0000"
                    line = line + plusnext + " "
               end
               WriteLine(sfile, line)
          end
     end
     CloseFile(sfile)
     end

//Write SVMT M6 input file

     sfile = OpenFile(thepath + "\\post\\SVMT.d", "w")
     WriteLine(sfile, "SPEED VMT")
     for i = 1 to 2 do
          for j = 1 to 24 do
               line = i2s(i) + " " + i2s(j) + " "
               if j < 10 then line = line + " "
               for k = 1 to 14 do
                    plusnext = r2s(SVMT[i][j][k])
                    while Len(plusnext)<6 do
                         plusnext = plusnext + "0"
                    end
                    line = line + plusnext + " "
               end
               WriteLine(sfile, line)
          end
     end
     CloseFile(sfile)

//Close the macro
quit:
     CloseView(dview)
     CloseView(mvw)

   DestroyProgressBar()
   SetStatus(1, "@System0", )
quit2:
   Return(reterr)
endMacro

Macro "M6in" (in_value)
     thepath = in_value[1]
     anyr = in_value[2]

/*
A Program written by Vincent L. Bernardin, Jr. of Bernardin, Lochmueller, and Assoc. to generate Mobile6 control (*.in) files for
Vanderburgh Co.
6/13/03
Revised 6/23/03
*/

     gp = GetProgram()
     TCpath = SplitPath(gp[1])
     infile = OpenFile(TCpath[1] + TCpath[2] + "\\Mobile6.in", "w")
     WriteLine(infile, "MOBILE6 INPUT FILE :")
     WriteLine(infile, "*created by M6in macro written 6/13/03, vlb2")
     WriteLine(infile, "")
     WriteLine(infile, "POLLUTANTS         : HC CO NOx")
```

```
          WriteLine(infile, "REPORT FILE        : " + thepath + "\\post\\M6REPORT.txt")
          WriteLine(infile, "SPREADSHEET        : M6REPORT")
          WriteLine(infile, "")
          WriteLine(infile, "RUN DATA")
          WriteLine(infile, "MIN/MAX TEMP       : 68. 89.")
          WriteLine(infile, "FUEL RVP           : 9.0")
          WriteLine(infile, "")
          WriteLine(infile, "REG DIST           : " + thepath + "\\post\\VREGDATA.D")
          WriteLine(infile, "VMT FRACTIONS      :")
          if anyr = 1 then yrvmtf1 = "0.617  0.044  0.148  0.059  0.027  0.032  0.003  0.002"
          if anyr = 1 then yrvmtf2 = "0.002  0.007  0.008  0.009  0.033  0.002  0.001  0.006"
          if anyr = 2 then yrvmtf1 = "0.600  0.046  0.154  0.060  0.027  0.034  0.003  0.003"
          if anyr = 2 then yrvmtf2 = "0.002  0.008  0.009  0.010  0.035  0.002  0.001  0.006"
          if anyr = 3 then yrvmtf1 = "0.583  0.048  0.159  0.061  0.028  0.037  0.004  0.003"
          if anyr = 3 then yrvmtf2 = "0.002  0.008  0.010  0.011  0.038  0.002  0.001  0.005"
          if anyr > 3 then yrvmtf1 = "0.577  0.049  0.163  0.061  0.028  0.038  0.004  0.003"
          if anyr > 3 then yrvmtf2 = "0.002  0.008  0.010  0.011  0.039  0.002  0.001  0.004"
          WriteLine(infile, yrvmtf1)
          WriteLine(infile, yrvmtf2)
          WriteLine(infile, "")
          YEARS = {2000, 2006, 2015, 2025, 2030}
          year = YEARS[anyr]
          for f = 1 to 2 do
          for s = 1 to 14 do
          if f = 1 then ftype = "Freeways"
          if f = 2 then ftype = "Arterials"
          M6spdbins = {0, 2.5, 7.5, 12.5, 17.5, 22.5, 27.5, 32.5,
                      37.5, 42.5, 47.5, 52.5, 57.5, 62.5, 500}
          lows = r2s(M6spdbins[s])
          highs = r2s(M6spdbins[s+1])
          scnname = i2s(year) + " " + ftype + " " + lows + "mph to " + highs + "mph"
          WriteLine(infile, "SCENARIO RECORD    : Scenario Title : Vanderburg Co., " + scnname)
          WriteLine(infile, "CALENDAR YEAR      : " + i2s(year))
          WriteLine(infile, "EVALUATION MONTH   : 7")
          WriteLine(infile, "CLOUD COVER        : 0.27")
          WriteLine(infile, "SUNRISE/SUNSET     : 7 9")
          WriteLine(infile, "VMT BY FACILITY    : " + thepath + "\\post\\Fvmt" + i2s(f) + ".d")
          WriteLine(infile, "VMT BY HOUR        : " + thepath + "\\post\\Hvmt" + i2s(f) + "_" + i2s(s) + ".d")
          WriteLine(infile, "SPEED VMT          : " + thepath + "\\post\\Svmt" + i2s(s) + ".d")
          WriteLine(infile, "")
          end
          end
          for f = 3 to 4 do
          if f = 3 then ftype = "Locals"
          if f = 4 then ftype = "Ramps"
          scnname = i2s(year) + " " + ftype
          WriteLine(infile, "SCENARIO RECORD    : Scenario Title : Vanderburg Co., " + scnname)
          WriteLine(infile, "CALENDAR YEAR      : " + i2s(year))
          WriteLine(infile, "EVALUATION MONTH   : 7")
          WriteLine(infile, "CLOUD COVER        : 0.27")
          WriteLine(infile, "SUNRISE/SUNSET     : 7 9")
          WriteLine(infile, "VMT BY FACILITY    : " + thepath + "\\post\\Fvmt" + i2s(f) + ".d")
          WriteLine(infile, "VMT BY HOUR        : " + thepath + "\\post\\Hvmt1.d")
          WriteLine(infile, "")
          end
          WriteLine(infile, "END OF RUN")
          CloseFile(infile)

endMacro

Macro "RunM6" (in_value)
          thepath = in_value[1]

          ShowMessage("When Mobile6 prompts you for an input file, simply press ENTER.")

          SetEnvironmentVariable("PATH", thepath + "\\post")

          status = RunProgram("Mobile62.exe", )

endMacro

Macro "Apply" (in_value)
          thepath = in_value[1]
          linevw = in_value[2]
          anyr = in_value[3]
          aqscn = in_value[4]

          repfilename = thepath + "\\post\\M6report.txt"
          dbfname = thepath + "\\post\\M6rates.dbf"

          repfile = OpenFile(repfilename, "r")

          REPARR = ReadArray(repfile)

          dim VOC[30]
          dim CO[30]
          dim NOX[30]
          c = 0
          for i = 1 to REPARR.length do
                    comp = Word(REPARR[i], 1)
                    if comp = "Composite" then do
                              emtype = Word(REPARR[i], 2)
                              if emtype = "VOC" then do
                                        c = c + 1
                                        rate = Word(REPARR[i], 21) + "." + Word(REPARR[i], 22)
                                        VOC[c] = Round(Value(rate), 3)
                              end
                              if emtype = "CO" then do
                                        rate = Word(REPARR[i], 21) + "." + Word(REPARR[i], 22)
                                        CO[c] = Round(Value(rate), 3)
                              end
```

```
                    if emtype = "NOX" then do
                            rate = Word(REPARR[i], 21) + "." + Word(REPARR[i], 22)
                            NOX[c] = Round(Value(rate), 3)
                    end
            end
    end

    dim nullrec[16]
    dim rec[15]
    rec[1] = {"Freeways", "VOC", VOC[1], VOC[2], VOC[3], VOC[4], VOC[5], VOC[6], VOC[7],
                            VOC[8], VOC[9], VOC[10], VOC[11], VOC[12], VOC[13], VOC[14]}
    rec[2] = {"Freeways", "CO", CO[1], CO[2], CO[3], CO[4], CO[5], CO[6], CO[7],
                            CO[8], CO[9], CO[10], CO[11], CO[12], CO[13], CO[14]}
    rec[3] = {"Freeways", "NOX", NOX[1], NOX[2], NOX[3], NOX[4], NOX[5], NOX[6], NOX[7],
                            NOX[8], NOX[9], NOX[10], NOX[11], NOX[12], NOX[13], NOX[14]}
    rec[4] = nullrec
    rec[5] = {"Arterials", "VOC", VOC[15], VOC[16], VOC[17], VOC[18], VOC[19], VOC[20],
            VOC[21], VOC[22], VOC[23], VOC[24], VOC[25], VOC[26], VOC[27], VOC[28]}
    rec[6] = {"Arterials", "CO", CO[15], CO[16], CO[17], CO[18], CO[19], CO[20], CO[21],
                            CO[22], CO[23], CO[24], CO[25], CO[26], CO[27], CO[28]}
    rec[7] = {"Arterials", "NOX", NOX[15], NOX[16], NOX[17], NOX[18], NOX[19], NOX[20],
            NOX[21], NOX[22], NOX[23], NOX[24], NOX[25], NOX[26], NOX[27], NOX[28]}
    rec[8] = nullrec
    rec[9] = {"Locals", "VOC", , , , VOC[29], , , , , , , , , , }
    rec[10] = {"Locals", "CO", , , , CO[29], , , , , , , , , , }
    rec[11] = {"Locals", "NOX", , , , NOX[29], , , , , , , , , , }
    rec[12] = nullrec
    rec[13] = {"Ramps", "VOC", , , , , , , , VOC[30], , , , , , }
    rec[14] = {"Ramps", "CO", , , , , , , , CO[30], , , , , , }
    rec[15] = {"Ramps", "NOX", , , , , , , , NOX[30], , , , , , }

    dbffile = CreateTable("dbffile", dbfname, "dBASE", {{"M6FT", "String", 12, null, "No"},
                                                        {"TYPE", "String", 8, null, "No"},
                                                        {"BIN1", "Real", 8, 3, "No"},
                                                        {"BIN2", "Real", 8, 3, "No"},
                                                        {"BIN3", "Real", 8, 3, "No"},
                                                        {"BIN4", "Real", 8, 3, "No"},
                                                        {"BIN5", "Real", 8, 3, "No"},
                                                        {"BIN6", "Real", 8, 3, "No"},
                                                        {"BIN7", "Real", 8, 3, "No"},
                                                        {"BIN8", "Real", 8, 3, "No"},
                                                        {"BIN9", "Real", 8, 3, "No"},
                                                        {"BIN10", "Real", 8, 3, "No"},
                                                        {"BIN11", "Real", 8, 3, "No"},
                                                        {"BIN12", "Real", 8, 3, "No"},
                                                        {"BIN13", "Real", 8, 3, "No"},
                                                        {"BIN14", "Real", 8, 3, "No"}})

    SetView(dbffile)
    for i = 1 to 15 do
            AddRecord(dbffile,  {{"M6FT", rec[i][1]},
                                {"TYPE", rec[i][2]},
                                {"BIN1", rec[i][3]},
                                {"BIN2", rec[i][4]},
                                {"BIN3", rec[i][5]},
                                {"BIN4", rec[i][6]},
                                {"BIN5", rec[i][7]},
                                {"BIN6", rec[i][8]},
                                {"BIN7", rec[i][9]},
                                {"BIN8", rec[i][10]},
                                {"BIN9", rec[i][11]},
                                {"BIN10", rec[i][12]},
                                {"BIN11", rec[i][13]},
                                {"BIN12", rec[i][14]},
                                {"BIN13", rec[i][15]},
                                {"BIN14", rec[i][16]}})
    end
    CloseView(dbffile)

//Apply the rates


    RunMacro("add_fields", {linevw, {"VOC", "CO1", "NOX"}, {"r", "r", "r"}})
    thefields = RunMacro("getnames", {thepath + "\\post\\"})


    postgar = LoadArray(thepath + "\\post\\post.gar")
    mfile = postgar[2]


    mvw = OpenTable("24M6view", "DBASE", {mfile, })

    RunMacro("add_fields", {mvw, {"VOC1", "VOC6", "VOC10", "VOC18", "CO_1", "CO6", "CO10", "CO18",
                                "NOX1", "NOX6", "NOX10", "NOX18"}, {"r", "r", "r", "r", "r",
                                "r", "r", "r", "r", "r", "r", "r"}})


   EnableProgressBar("M6 App", 1)
   CreateProgressBar("loading...", "False")

//Define Mobile6 speed bins

    M6spdbin = {2.5, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65}

//Initialize Arrays and Variables

    dim VMT[24]
    dim hrVOC[24]
    dim hrCO[24]
    dim hrNOX[24]
    VMT1 = 0
```

```
		VMT2 = 0
		VMT3 = 0
		VOC1 = 0
		CO1 = 0
		NOX1 = 0
		VOC2 = 0
		CO2 = 0
		NOX2 = 0
		dim CARVOL[24]
		dim TRKVOL[24]
		dim AVGSPD[24]
		dim C_VMT[24]
		dim T_VMT[24]

//Create the 24M6field arrays
		dim carvolfield[24]
		dim trkvolfield[24]
		dim avgspdfield[24]
		for i = 1 to 24 do
			if i > 9 then do
				carvolfield[i] = "CARVOL_" + i2s(i)
				trkvolfield[i] = "TRKVOL_" + i2s(i)
				avgspdfield[i] = "AVGSPD_" + i2s(i)
			end
			else do
				carvolfield[i] = "CARVOL_0" + i2s(i)
				trkvolfield[i] = "TRKVOL_0" + i2s(i)
				avgspdfield[i] = "AVGSPD_0" + i2s(i)
			end
		end

//Create, Open, and begin Looping the Joined View

		totrec = GetRecordCount(linevw, )
		dview = JoinViews("Network+24M6", linevw + ".ID", mvw + ".LID", )

		SetView(dview)
		recno = 0
		rec = GetFirstRecord(dview + "|", null)
		while rec <> null do

			recno = recno + 1
			prog = Round ((recno/totrec)*99, 0)
			UpdateProgressBar("Computing Emissions", prog)
			SetStatus(1, "Record " + i2s(recno) + " of " + i2s(totrec), )

//Read in 24M6 data arrays

			for i = 1 to 24 do
				CARVOL[i] = dview.(carvolfield[i])
				TRKVOL[i] = dview.(trkvolfield[i])
				AVGSPD[i] = dview.(avgspdfield[i])
			end

//Read in variables from the network

			LENGTH = dview.(thefields[2])
			FC = dview.(thefields[3])
			DTV = dview.(thefields[17])
			M6FT = dview.(thefields[25])
			COunty = s2i(dview.(thefields[26]))

//Skip Centroid Connectors
			if FC = 99 then goto Skip

//Do only Vandeburgh Co.
			if COunty <> 82 then goto Skip

//Calculate hourly VMT by mode

			for i = 1 to 24 do
				C_VMT[i] = LENGTH * CARVOL[i]
				T_VMT[i] = LENGTH * TRKVOL[i]
				VMT[i] = C_VMT[i] + T_VMT[i]
			end

//Sum Local VMT

			if M6FT = 3 | M6FT = 4 then do
				for i = 1 to 24 do
					VMT3 = VMT3 + VMT[i]
				end
				goto Skip
			end

//Initialize Variables

			VOC24hr = 0
			CO24hr = 0
			NOX24hr = 0
			VMT24hr = 0

//Apply Rates to Freeways

			if M6FT = 1 then do
				for i = 1 to 24 do
					z = (0.92*AVGSPD[i])-0.00213
					s = 0
					u = 0
					while u = 0 do
						s = s + 1
```

```
                                        if z < M6spdbin[s] then u = s
                              end
                              l = u - 1
                              if l = 0 then l = 1
                              su = M6spdbin[u]
                              sl = M6spdbin[l]
                              if sl <> su then x = ((1/z) - (1/su))/((1/sl) - (1/su))
                              if sl = su then x = 1
                              hrVOC[i] = x*VOC[l]*VMT[i] + (1-x)*VOC[u]*VMT[i]
                              hrCO[i] = x*CO[l]*VMT[i] + (1-x)*CO[u]*VMT[i]
                              hrNOX[i] = x*NOX[l]*VMT[i] + (1-x)*NOX[u]*VMT[i]
                              VOC24hr = VOC24hr + hrVOC[i]
                              CO24hr = CO24hr + hrCO[i]
                              NOX24hr = NOX24hr + hrNOX[i]
                              VMT24hr = VMT24hr + VMT[i]
                    end
                              dview.VOC = VOC24hr
                              dview.CO1 = CO24hr
                              dview.NOX = NOX24hr
                              VOC1 = VOC1 + (0.92 * VOC24hr)
                              CO1 = CO1 + (0.92 * CO24hr)
                              NOX1 = NOX1 + (0.92 * NOX24hr)
                              VMT1 = VMT1 + VMT24hr
          end


//Apply Rates to Arterials/Collectors

          if M6FT = 2 then do
                    for i = 1 to 24 do
                              z = AVGSPD[i]
                              s = 0
                              u = 0
                              while u = 0 do
                                        s = s + 1
                                        if z < M6spdbin[s] then u = s
                              end
                              l = u - 1
                              if l = 0 then l = 1
                              su = M6spdbin[u]
                              sl = M6spdbin[l]
                              if sl <> su then x = ((1/z) - (1/su))/((1/sl) - (1/su))
                              if sl = su then x = 1
                              l = l + 14
                              u = u + 14
                              hrVOC[i] = x*VOC[l]*VMT[i] + (1-x)*VOC[u]*VMT[i]
                              hrCO[i] = x*CO[l]*VMT[i] + (1-x)*CO[u]*VMT[i]
                              hrNOX[i] = x*NOX[l]*VMT[i] + (1-x)*NOX[u]*VMT[i]
                              VOC24hr = VOC24hr + hrVOC[i]
                              CO24hr = CO24hr + hrCO[i]
                              NOX24hr = NOX24hr + hrNOX[i]
                              VMT24hr = VMT24hr + VMT[i]
                    end
                              dview.VOC = VOC24hr
                              dview.CO1 = CO24hr
                              dview.NOX = NOX24hr
                              VOC2 = VOC2 + VOC24hr
                              CO2 = CO2 + CO24hr
                              NOX2 = NOX2 + NOX24hr
                              VMT2 = VMT2 + VMT24hr
          end


          Skip:
          rec = GetNextRecord(dview + "|", null, null)
     end
//end loop through joined network

     UpdateProgressBar("Writing Report File", 99)


//Apply Rate to Local VMT factored to HPMS

          VMT3 = 2.2225 * VMT3
          VOC3 = VOC[29] * VMT3
          CO3 =  CO[29] * VMT3
          NOX3 = NOX[29] * VMT3

//Apply Rate for Ramps

          VMT4 = 0.08 * VMT1
          VMT1 = 0.92 * VMT1
          VOC4 = VOC[30] * VMT4
          CO4 =  CO[30] * VMT4
          NOX4 = NOX[30] * VMT4

          VandVMT = VMT1 + VMT2 + VMT3 + VMT4

//Combine functional types to get totals and convert from kg to tons

          VOCkg = (VOC1 + VOC2 + VOC3 + VOC4)/1000
          COkg = (CO1 + CO2 + CO3 + CO4)/1000
          NOXkg = (NOX1 + NOX2 + NOX3 + NOX4)/1000

          VOCton = VOCkg / 907.813
          COton = COkg / 907.813
          NOXton = NOXkg / 907.813

//Temporarily use Notes to report rather than file

//        ShowMessage("VOC = " + r2s(VOCton) + " tons")
```

```
//                  ShowMessage("CO = " + r2s(COton) + " tons")
//                  ShowMessage("NOX = " + r2s(NOXton) + " tons")

//Write Report File

          opt = {,{"Initial Directory", thepath + "\\post\\"},
                    {"Suggested Name", "AQreport"} ,}
          outfilename = ChooseFileName({{"text", "*.txt"}}, "Choose Report File", opt)

          YEARS = {2000, 2006, 2015, 2025, 2030}
          year = YEARS[anyr]

          budget = "Budget:     10.91 tons/day    77.94 tons/day   11.56 tons/day"
          if anyr = 1 then budget = "Budget:     16.29 tons/day   106.96 tons/day   12.52 tons/day"

          ofile = OpenFile(outfilename, "w")
          WriteLine(ofile, "Air Quality Conformity Analysis Report for Vanderburgh County")
          WriteLine(ofile, "from MOBILE6 and the Evansville Regional Travel Model")
          datetime = GetDateAndTime()
          WriteLine(ofile, datetime)
          WriteLine(ofile, " ")
          WriteLine(ofile, " ")
          WriteLine(ofile, "Year: " + i2s(year))
          WriteLine(ofile, "Scenario: " + aqscn)
          WriteLine(ofile, "          " + r2s(Round(VandVMT, 0)) + " VMT in Vanderburgh County")
          WriteLine(ofile, " ")
          WriteLine(ofile, "             VOC               CO               NOX")
//This line is simply for visual      xx.xx tons/day   xxx.xx tons/day   xx.xx tons/day
          VOCip = Round(VOCton, 0)
          COip = Round(COton, 0)
          NOXip = Round(NOXton, 0)
          VOCdp = r2s(Round(VOCton - VOCip, 2))
          COdp = r2s(Round(COton - COip, 2))
          NOXdp = r2s(Round(NOXton - NOXip, 2))
          VOCip = r2s(VOCip)
          COip = r2s(COip)
          NOXip = r2s(NOXip)
          if Len(VOCip) < 2 then VOCip = " " + VOCip
          while Len(COip) < 3 do
                    COip = " " + COip
          end
          if Len(NOXip) < 2 then NOXip = " " + NOXip
          while Len(VOCdp) < 4 do
                    if Len(VOCdp) = 1 then VOCdp = VOCdp + "."
                    VOCdp = VOCdp + "0"
          end
          while Len(COdp) < 4 do
                    if Len(COdp) = 1 then COdp = COdp + "."
                    COdp = COdp + "0"
          end
          while Len(NOXdp) < 4 do
                    if Len(NOXdp) = 1 then NOXdp = NOXdp + "."
                    NOXdp = NOXdp + "0"
          end
          VOCdp = Right(VOCdp, 3)
          COdp = Right(COdp, 3)
          NOXdp = Right(NOXdp, 3)
          VOCstr = VOCip + VOCdp + " tons/day   "
          COstr = COip + COdp + " tons/day   "
          NOXstr = NOXip + NOXdp + " tons/day"
          WriteLine(ofile, "Scenario:   " + VOCstr + COstr + NOXstr)
          WriteLine(ofile, budget)
          CloseFile(ofile)


//Close the macro
quit:
          CloseView(dview)
          CloseView(mvw)

   DestroyProgressBar()
   SetStatus(1, "@System0", )
quit2:
endMacro



Macro "add_fields" (in_value)
   dview = in_value[1]
   fldnames = in_value[2]
   typeflags = in_value[3]

/*
A utility macro written by Vince Bernardin, Jr. 5/15/03
updated 6/18/03
*/

          fd = fldnames.length
          dim fldtypes[fd]
          for i = 1 to fldnames.length do
                    if typeflags[i] = "r" then fldtypes[i] = {"Real", 10, 4}
                    if typeflags[i] = "i" then fldtypes[i] = {"Integer", 10, 3}
                    if typeflags[i] = "c" then fldtypes[i] = {"String", 16, null}
          end

          SetView(dview)

   struct = GetTableStructure(dview)

          dim snames[1]
   for i = 1 to struct.length do
```

```
      struct[i] = struct[i] + {struct[i][1]}
          snames = snames + {struct[i][1]}
   end

          modtab = 0
   for i = 1 to fldnames.length do
      pos = ArrayPosition(snames, {fldnames[i]}, )
      if pos = 0 then do
         newstr = newstr + {{fldnames[i], fldtypes[i][1], fldtypes[i][2], fldtypes[i][3],
                                                 "false", null, null, null, null}}
         modtab = 1
      end
   end

   if modtab = 1 then do
      newstr = struct + newstr
      ModifyTable(dview, newstr)
   end

endMacro
```

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Summary of and Response to Comments Received

Legend

- Comment
- *IDEM's Response*

John Blair, Valley Watch

- Asthma rates in Evansville are five times those compared to Fort Wayne.
  - *Although ozone is a known asthma trigger, there are a number of other triggers for asthma as well. The Evansville Area clearly meets the federal health-based standard for ozone. The City of Fort Wayne is still in violation of the federal health-based standard for ozone and has been subject to ozone concentrations greater than those experienced in the Evansville Area for several years. Therefore, the asthma statistics referenced cannot be influenced solely by ozone concentrations.*
- Request that the public comment period be extended thirty days in order to provide time for evaluation of meteorological data.
  - *IDEM and the Ozone Officer for VanderburghCounty have conducted detailed analysis of meteorological data available for the years 1995 through 2004. These analyses have not found that the Evansville Area has benefited from unusually mild meteorology. More importantly, the analysis indicates a better correlation between reductions in ozone concentrations and permanent and enforceable precursor emission reductions. The 2005 critical value for the Evansville Area is .099 parts per million (PPM). A critical value represents the level that the fourth highest ozone value for the 2005 season would have to reach in order for a violation of the standard to occur. The .099 critical value for 2005 is a level that has never been registered at the controlling monitor (Yankeetown) since ozone has been measured under the 8-hour standard. It is unlikely that an extension of the comment period will yield new information to support a link between meteorology and attainment of the ozone standard. Additionally, should the comment period be extended, IDEM has been informed that there would be adverse consequences for planned transportation projects due to the June 15, 2005 deadline for a transportation conformity finding to be in place. The U. S. EPA, not IDEM, will make the decision whether to redesignate the Evansville Area to attainment under the 8-hour ozone standard. Once a final submittal is made, the U.S. EPA will solicit additional comments from interested parties. This will provide adequate time for data collection, analysis, and the compilation of additional comment prior to federal action being taken. Therefore, IDEM does not believe that an extension of the public comment period is necessary.*
- Request that IDEM not finalize the petition until ozone levels associated with the 2005 season can be evaluated.
  - *Once again, the 2005 critical value of .099 ppm is a value that has never been registered at the controlling monitor since ozone has been measured under the 8-hour standard. Therefore, it is extremely*

unlikely that the Evansville Area will violate the standard this year, or in the near future. Nevertheless, if unforeseeable backsliding were to occur in the future, the maintenance plan provides for prompt and sufficient action to protect local air quality and ensure that corrective actions are implemented to maintain ozone levels that are within the standard.

- US EPA set the standard at 80 parts per billion, not 85.
  - *The U.S. EPA established the 8-hour standard for ozone at .08 parts per million, as opposed to 80 or 85 parts per billion. Within the Guidelines On Data Handling Conventions For The 8-Hour Ozone NAAQS, published by the U.S. EPA in December of 1998, the U.S. EPA established parts per million (ppm) and three significant figures as the basis for computation of 8-hour ozone concentrations. In accordance with this guidance, three significant digits are used to determine an area's design value and for conducting attainment tests. Specifically, because the third decimal digit is rounded, 0.084 ppm is the largest concentration that is less than or equal to the standard of 0.08 ppm. Therefore, an ozone concentration equal to or greater than .085 ppm is considered to be above or in violation of the standard. The U.S. EPA established this methodology and uses this methodology along with all of the states to report and interpret ozone monitoring data. Furthermore, the U.S. EPA used this method for evaluating and designating areas under the standard in 2004.*
- Guidance issued by EPA states that an area cannot be redesignated as a result of unusual meteorology.
  - *IDEM and the Ozone Officer for VanderburghCounty have conducted detailed analysis of meteorological data available for the years 1995 through 2004. These analyses have not found that the Evansville area has benefited from unusually mild meteorology. More importantly, the research does indicate that reductions in ozone concentrations better correlate with permanent and enforceable precursor emission reductions.*
- EPA is looking at lowering the standard further. The area should not be redesignated to be designated nonattainment at a later date.
  - *The Area's eligibility for redesignation is solely based on the applicable standards of today. It is not known whether there will be a more stringent standard for ozone in the future, or at what level a new standard may be set. Therefore, it is not known whether the Evansville Area will or will not comply with an unidentified standard at some point in the future. Nevertheless, the implementation of the Clean Air Interstate Rule and continued phase-in of gasoline and diesel engine and fuel standards will further improve air quality into the future.*
- Due to NO_x scavenging, it is unclear whether the NO_x SIP call will benefit the area.
  - *The U.S. EPA and IDEM, through the Lake Michigan Air Directors Consortium, have conducted detailed photochemical modeling in association with the* NO_x *SIP Call and the Clean Air Interstate Rule. Current modeling depicts significant reductions of ozone in SW Indiana as a result of regional* NO_x *reductions. The U.S. EPA's most recent modeling in association with the Clean Air Interstate Rule shows an eleven parts per billion reduction of ozone from the 1999-2003 design value, resulting in an anticipated ozone concentration for the year 2010 of .070 parts per million. These reductions include* NO_x

reductions from the Clean Air Interstate Rule, as well as NO_x *and volatile organic reductions from gasoline and diesel engine and fuel standards. Disbenefits associated with* NO_x *emission reductions only occur in major metropolitan areas (e.g., Chicago) that are more sensitive/responsive to reductions of volatile organic compounds. Local data has not demonstrated, nor have photochemical models predicted, the Evansville Area to be unresponsive to reductions of* NO_x*. Therefore, no disbenefits are likely to occur. In fact, since controls associated with the* NO_x *SIP call were in place at the beginning of the 2004 ozone season, if disbenefits were likely, notable adverse trends in ozone values should have occurred. However, opposite and favorable trends in ozone concentrations have occurred.*

- No federally enforceable action has been taken to improve air quality.
  - *All actions that have been taken to improve air quality in the Evansville Area and other parts of Indiana are in fact federally enforceable. As noted in the redesignation petition, the* NO_x *SIP Call and Tier II engine and low sulfur gasoline standards account for the majority of the emission reductions that have occurred in recent years. These measures are indeed permanent and federally enforceable actions. In additional to these critical measures, a number of Nationally Enforceable Standards for Hazardous Air Pollutants (NESHAPs) have been incorporated into state law, and new federal engine and fuel standards have been established for onroad and off-road diesel-fueled vehicles and equipment. These measures are also federally enforceable and will be phased in over the next several years, with implementation already underway.*
- Kentucky has issued a permit for a new power plant that will worsen area air quality.
  - *IDEM has not been informed that such a permit has been issued. However, with the* NO_x *SIP Call and Clean Air Interstate Rules being in place and setting enforceable caps for* NO_x *emissions, regional air quality is not expected decline.*
- If the new state administration supports more power plants in SW Indiana, air quality will worsen.
  - *IDEM is not aware of any plans for major development in SW Indiana, including the construction of new electric generating units. However, if an entity applies for the required permit in the future, the facility's potential to emit must fit within the existing budget for* NO_x*. Also, IDEM will conduct the necessary evaluation to ensure that the area's air quality will not be jeopardized and continued compliance with the National Ambient Air Quality Standards is assured. Furthermore, the Clean Air Interstate Rule will establish more stringent permanent emission caps for* NO_x *and sulfur dioxide, which will result in additional regional emission reductions and prevent emission increases from the power generating industry.*
- Redesignation will allow for more pollution and take away protection from the Clean Air Act.
  - *The maintenance plan has been drafted to comply with Clean Air Act requirements and ensure that there is a mechanism in place to keep precursor emissions at levels equal to or less than they were at the time the area complied with the standard. Nonetheless, if unforeseeable backsliding were to occur in the future, the maintenance plan provides for prompt and sufficient action to protect local air*

quality and ensure that corrective actions are implemented to maintain ozone levels that are within the standard.

Jim Daniels, Izaac Walton League

- The standard is 80, not 85, so I agree with Mr. Blair's arguments.
  - *Within the Guidelines On Data Handling Conventions For The 8-Hour Ozone NAAQS, published by the U.S. EPA in December of 1998, the U.S. EPA established parts per million (ppm) and three significant figures as the basis for computation of 8-hour ozone concentrations. In accordance with this guidance, three significant digits are used to determine an area's design value and for conducting attainment tests. Specifically, because the third decimal digit is rounded, 0.084 ppm is the largest concentration that is less than or equal to the standard of 0.08 ppm. Therefore, an ozone concentration equal to or greater than .085 parts per million is considered to be above or in violation of the standard. The U.S. EPA established this methodology and uses this methodology along with all of the states to report and interpret ozone monitoring data. Furthermore, the U.S. EPA used this method for evaluating and designating areas under the standard in 2004. There were a number of areas in the country that were designated attainment under the standard that maintained a design value greater than that of the Evansville area today.*
- The area benefited from an unusually mild summer, not from emission reductions.
  - *IDEM and the Ozone Officer for VanderburghCounty have conducted detailed analysis of meteorological data available for the years 1995 through 2004. These analyses have not found that the Evansville area has benefited from unusually mild meteorology. More importantly, the research does indicate that reductions in ozone concentrations better correlate with permanent and enforceable precursor emission reductions.*
- The goal of regulators should be zero levels of ozone.
  - *IDEM is supportive of air quality standards that are protective of human health. The health effects research does not indicate that achieving zero ppm of ozone has any health benefit. In addition, some of the precursor emissions that form ozone come from natural sources such as plants, trees and wild fires, so zero is an unachievable goal.*
- I request an extension of the comment period to review the materials further and make sure that the area has not simply benefited from good weather.
  - *IDEM and the Ozone Officer for VanderburghCounty have conducted detailed analysis of meteorological data available for the years 1995 through 2004. These research efforts have failed to conclude that the Evansville Area has benefited from unusually mild meteorology. More importantly, the research does indicate that reductions in ozone concentrations better correlate with permanent and enforceable precursor emission reductions. The 2005 critical value for the Evansville Area is .099 parts per million (PPM). A critical value represents the level that the fourth highest ozone value for the 2005 season would have to reach in order for a violation of the standard to occur. The .099 critical value for 2005 is a level that has never been registered at the controlling monitor (Yankeetown) since ozone has*

been measured under the 8-hour standard. Based on the availability of meteorological, monitoring, and emissions data, and the results of research efforts to date, there does not appear to be a justifiable need to extend the comment period. Additionally, should the comment period be extended, IDEM has been informed that there would be adverse consequences for planned transportation projects due to the June 15, 2005 deadline for a transportation conformity finding to be in place. IDEM will not finalize the documents for final submittal for at least thirty days from the public hearing, and U.S. EPA will solicit public comment prior to taking action on the submittal. This will provide adequate additional time to collect and review additional information, and provide additional comment to the U.S. EPA prior to action being taken. Therefore, IDEM does not believe that an extension of the public comment period is necessary.

Joanne Alexandrovich, Vanderburgh County Health Department

- The petition meets Clean Air Act requirements and is consistent with US EPA guidance.
- Air quality has been improving within the region for years.
- In the early 1990's, ozone decreased because emissions dropped as the result of new motor vehicle engine standards.
- In the late 1990's ozone levels were further reduced by NO_x reductions required by the Acid Rain Program.
- Most recently, ozone levels are down further due to phase II of the Acid Rain Program and the NO_x SIP Call.
- New violations of the standard are not expected because of Tier 2 Engine and Fuel Standards, heavy-duty and off-road diesel rules, and the Clean Air Interstate Rule.
- Formation of ozone within the region is limited by NO_x, thus NO_x must be reduced to reduce ozone. The documented reductions of NO_x within the region substantiate the reductions of ozone and the regions clean air.
- In the nonattainment area from 1999 to 2002, VOC emissions are down by 1700 tons and NO_x emissions are down by 1900 tons per year (according to the National Emissions Inventory).
- There are seventeen coal-fired power plants within sixty-two miles of Vanderburgh County. Between 1999 and 2002, these plants reduced NO_x emissions by almost 83,000 tons per year. From 2002 to 2004, these plants reduced NO_x emissions by an additional 65,000 tons per year. These reductions have improved air quality.
- The City of Evansville and County of Vanderburgh enforce local air pollution control ordinances and implement an "Ozone Alert" voluntary episodic reduction program. Due to local enforcement, we are assured that business and industry minimize emissions.
- I request that information concerning the local ordinances and voluntary programs be included in Section 6.4 of the petition.
  - *The local air quality ordinances and voluntary programs are very important and should be referenced in the maintenance plan. However, since these do not represent permanent and enforceable controls under federal or state authority, IDEM wants to make sure that the inclusion of these measures does not create confusion.*

Therefore, a new section titled 6.7 "Local Air Quality Mitigation" has been added to the document.

- The petition adequately demonstrates that permanent and enforceable emission reductions have been achieved and will be maintained.
- It is my contention that ozone values have not been influenced by favorable meteorology.
- I concur with IDEM's conclusion that lower ozone values correspond to lowered local and regional ozone precursor emissions.
- Based on research of 1995 through 2005 data, the meteorology associated with 2004 ozone season appears to be fairly average.
- Based on a detailed analysis of historic weather conditions, recent ozone levels reflect emission reductions rather than favorable meteorology.
- Several typographical errors are noted.
    - *So noted, and appropriate corrections have been made.*
- IDEM is urged to submit the petition and maintenance plan to US EPA quickly, and no later than July 1, 2005.

Dona Bergman, City of Evansville EPA

- A nonattainment designation adversely affects the area economically and environmentally.
- A nonattainment designation applied inconsistently geographically actually causes further harm to air quality from a regional perspective because growth does not respect nonattainment/county lines, urban sprawl is encouraged and farm land is lost.
- The NO_x SIP Call and the associated control equipment has reduced emissions by 52% from 1999 NO_x levels.
- By the fall of 2004, air quality in the Evansville Area met the ozone standard because of new NO_x controls.
- The research done by state and local officials demonstrates that the area has attained the standard based on permanent and enforceable emission reductions.
- The area should benefit further by new NESHAP regulations, the Clean Air Interstate Rule, and new engine and fuel standards.
- The Evansville EPA was established to improve and protect air quality, and will continue to do so.

Don Faulkner, Cinergy

- Significant reductions of NO_x have been achieved as a result of the NO_x SIP Call.
- These NO_x reductions have reduced ozone in SW Indiana.
- The Clean Air Interstate rule will further improve air quality in SW Indiana.
- The Gibson station has implemented a number of changes that have benefited regional air quality and Cinergy has made significant financial commitments to achieve this.
- Cinergy has and will continue to do its share to improve Indiana air quality.