STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

June 13, 2006

Mr. Bharat Mathur, Acting Regional Administrator
U.S. Environmental Protection Agency
Region 5
77 West Jackson Boulevard (R-19J)
Chicago, Illinois 60604-3950

Dear Mr. Mathur:

The Michigan Department of Environmental Quality (MDEQ) submits this request in support of a redesignation to attainment of the 8-hour ozone National Ambient Air Quality Standard for five counties in Michigan comprising four ozone nonattainment areas, and a proposed revision to the Michigan State Implementation Plan.

The attached final version of the redesignation request and maintenance plan for the counties of Lapeer, Genesee, Muskegon, Berrien, and Cass documents the public notice and comment process.

The MDEQ requests that the U.S. Environmental Protection Agency (EPA) proceed with final review and approval of this submittal. If you have any questions or need additional information, please contact Mr. G. Vinson Hellwig, Chief, Air Quality Division, at 517-373-7069, or you may contact me.

Sincerely,

Steven E. Chester
Director
517-373-7917

Attachment
cc/att: Mr. John Mooney, EPA Region 5
Ms. Dana Debel, Governor's Office
Ms. JoAnn Merrick, Senior Executive Assistant to Director, MDEQ
Mr. G. Vinson Hellwig, MDEQ
Ms. Mary Maupin, MDEQ

Proposed Revision to Michigan's State Implementation Plan for Achieving the Ozone National Ambient Air Quality Standard

Request to Redesignate to Attainment Status

Five Counties Comprising Four Ozone Nonattainment Areas in Michigan

and

Proposed Maintenance Plan for Five Counties Comprising
Four Ozone Nonattainment Areas

Counties of Lapeer, Genesee, Muskegon, Berrien, and Cass

Michigan Department of Environmental Quality
Air Quality Division

June 2006

Redesignation and Maintenance Plan Proposal
June 2006

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1. Introduction

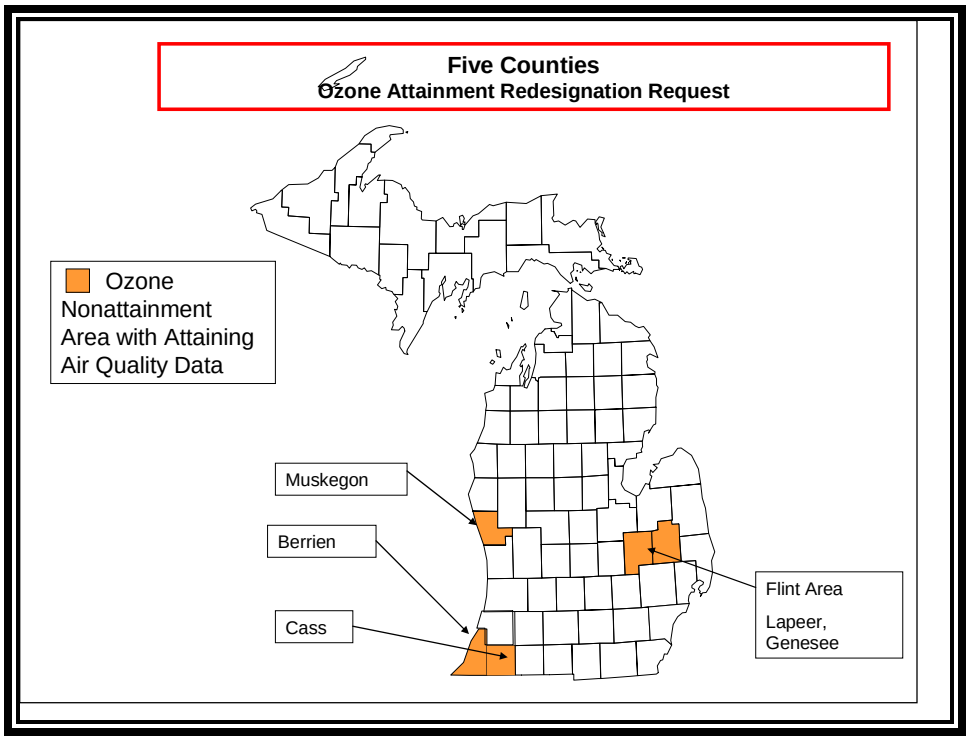
The State of Michigan, through the Michigan Department of Environmental Quality (MDEQ), is asking the U.S. Environmental Protection Agency (EPA) to make a determination that four ozone nonattainment areas are in attainment with ozone National Ambient Air Quality Standards (NAAQS), to change the legal status of these areas from nonattainment to attainment, and to approve the maintenance plans as part of the Michigan Ozone State Implementation Plan (SIP). The counties in the four nonattainment areas are Lapeer, Genesee, Muskegon, Berrien, and Cass.

The EPA established a revised NAAQS for ozone that is more restrictive than the preexisting 1-hour ozone standard. The EPA designated areas in Michigan as attainment or nonattainment of the new 8-hour ozone standard in April 2004. The designations were based on design values derived from air quality monitoring data for the years 2001-2003. Design values over 0.085 parts per million (ppm) are considered too high to be protective of health. The EPA designated 25 counties in Michigan as nonattainment.

Air quality monitoring data collected in the 2002-2004 period showed improved ozone design values in 11 of the original 25 nonattainment counties. Redesignation to attainment for the counties of Ingham, Eaton, Clinton, Kent, Ottawa, Kalamazoo, Calhoun, Van Buren, Benzie, Mason, and Huron has been requested by the MDEQ. Additionally, data for the years 2003-2005 demonstrates that the counties of Lapeer, Genesee, Muskegon, Berrien, and Cass are now meeting the 8-hour ozone NAAQS. The five counties comprise four nonattainment areas: Flint, Muskegon, Berrien, and Cass, as shown in Figure 1.1. The Flint and Berrien areas are subject to Subpart 1 nonattainment planning and control provisions of the federal Clean Air Act (CAA). The Muskegon and Cass nonattainment areas are subject to Subpart 2 nonattainment planning and control provisions of the CAA. This document is intended to support Michigan's request that the five counties be redesignated from nonattainment to attainment of the 8-hour NAAQS.

Figure 1.1

Map of Michigan Counties for Ozone Attainment Redesignation



Also included in this package is the MDEQ's proposed revision of the Michigan SIP for the inclusion of the 8-hour ozone maintenance plans for the counties to be redesignated, including transportation conformity budgets.

The MDEQ prepared this redesignation documentation with the technical assistance of the Michigan Department of Transportation (MDOT) and the Lake Michigan Air Directors Consortium (LADCO).

2. Redesignation Package Components

Section 107 of the CAA establishes requirements to be met in order for an area to be qualified for redesignation to attainment including:

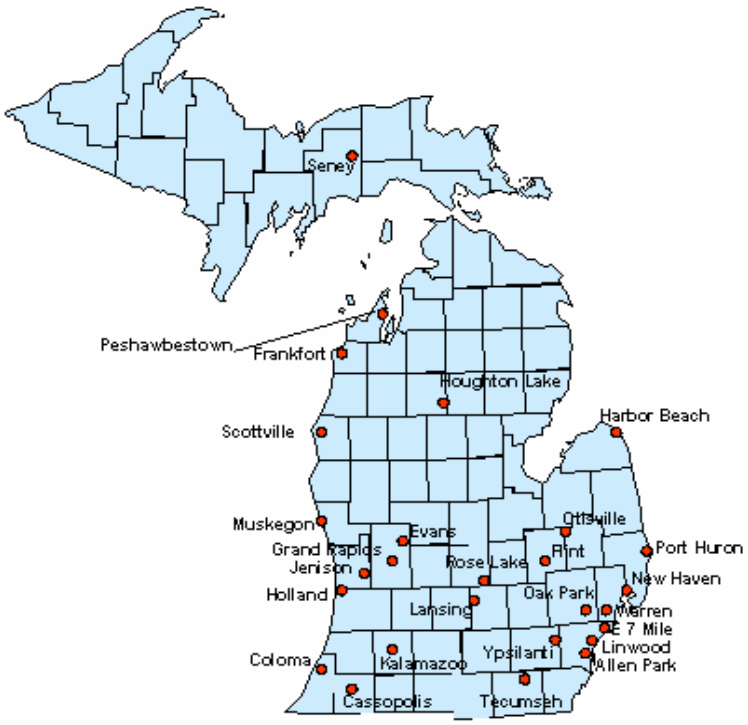
- A determination that the area has attained the 8-hour ozone standard;
- An approved SIP for the area under Section 110 of the CAA;
- A determination that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the SIP and other federal requirements;
- A fully approved maintenance plan under Section 175A; and
- A determination that all Section 110 and Part D requirements have been met.

This document summarizes compliance with each required component for approval of an attainment redesignation.

3. Demonstration of Attainment of the Standard

The MDEQ maintains a comprehensive network of ozone air quality monitors throughout Michigan with the primary objective being to determine compliance with the ozone NAAQS. The MDEQ was assisted in the operation of monitors in the counties to be redesignated by the City of Grand Rapids, Environmental Protection Services Department. The MDEQ submits network reviews to the EPA Region 5 annually to ensure that its air monitoring operations comply with all applicable federal requirements. The locations of ozone monitors in Michigan are shown in Figure 3.1.

Figure 3.1 Locations of Ozone Monitors



Data from air quality monitors show whether or not violations of the ozone NAAQS are occurring. The design value is the three-year average of the fourth highest values, based on data from each of the monitoring sites in an attainment or nonattainment area. For the period 2003-2005, the design value is less than 0.085 ppm in each of the four ozone nonattainment areas included in this request. Design values for 2005 confirming attainment of the NAAQS are show in Table 3.1.

Table 3.1
Monitor Data Design Values 2003-2005 for 8-Hour Ozone NAAQS
(ppm= parts per million)

Ozone Area	County	Monitors	4th High 2003 (ppm)	4th High 2004 (ppm)	4th High 2005 (ppm)	Design Value 2005 (ppm)
Flint	Genesee	Flint 26-0490021	0.087	0.075	0.079	0.08
	Lapeer	Otisville 26-0492001	0.091	0.077	0.080	0.08
Muskegon	Muskegon	Muskegon 26-1210039	0.094	0.070	0.090	0.08
Berrien	Berrien	Coloma 26-0210014	0.089	0.073	0.090	0.08
Cass	Cass	Cassopolis 26-0270003	0.089	0.077	0.086	0.08

Table 3.2 shows historic 8-hour ozone design values at each site in the counties to be redesignated. Due to ozone transport from upwind areas, the monitors located closest to Lake Michigan (Muskegon and Coloma) typically have higher ozone levels than monitors located further inland. The monitor in Cassopolis, which was sited to be the downwind monitor for South Bend, Indiana, is also greatly affected by ozone transported into the county.

Table 3.2
Historic 8-Hour Ozone Design Values
*4th highest 8-hour average and 3-year average truncated, ** Final site average rounded

				4th Highest*	Design Value Site *	Rounded to 2 Decimals Site**
NAA Area	**Site**	**AirsID**	**Year**	**8HrMax, ppm**	**Avg, ppm**	**Avg, ppm**
Berrien	Coloma	260210014	1992	0.064	8-3-92 sampling began	
	Coloma	260210014	1993	0.079		
	Coloma	260210014	1994	0.086		
	Coloma	260210014	1995	0.098	**0.087**	**0.09**
	Coloma	260210014	1996	0.098	**0.094**	**0.09**
	Coloma	260210014	1997	0.099	**0.098**	**0.10**
	Coloma	260210014	1998	0.093	**0.096**	**0.10**
	Coloma	260210014	1999	0.096	**0.096**	**0.10**
	Coloma	260210014	2000	0.077	**0.089**	**0.09**
	Coloma	260210014	2001	0.088	**0.087**	**0.09**
	Coloma	260210014	2002	0.098	**0.088**	**0.09**
	Coloma	260210014	2003	0.089	**0.092**	**0.09**
	Coloma	260210014	2004	0.073	**0.087**	**0.09**
	Coloma	260210014	2005	0.090	0.084	0.08
Cass	Cassopolis	260270003	1991		5-16-91 sampling began	
	Cassopolis	260270003	1992	0.093		
	Cassopolis	260270003	1993	0.080		
	Cassopolis	260270003	1994	0.090	**0.087**	**0.09**
	Cassopolis	260270003	1995	0.099	**0.089**	**0.09**
	Cassopolis	260270003	1996	0.095	**0.094**	**0.09**
	Cassopolis	260270003	1997	0.090	**0.094**	**0.09**
	Cassopolis	260270003	1998	0.091	**0.092**	**0.09**
	Cassopolis	260270003	1999	0.095	**0.092**	**0.09**
	Cassopolis	260270003	2000	0.079	**0.088**	**0.09**
	Cassopolis	260270003	2001	0.088	**0.087**	**0.09**
	Cassopolis	260270003	2002	0.103	**0.090**	**0.09**
	Cassopolis	260270003	2003	0.089	**0.093**	**0.09**
	Cassopolis	260270003	2004	0.077	**0.090**	**0.09**
	Cassopolis	260270003	2005	0.086	0.084	0.08
Flint	Flint	260490021	1992	0.069	6-16-92 sampling began	
	Flint	260490021	1993	0.069		
	Flint	260490021	1994	0.077	0.071	0.07
	Flint	260490021	1995	0.082	0.076	0.08
	Flint	260490021	1996	0.089	0.082	0.08
	Flint	260490021	1997	0.076	0.082	0.08
	Flint	260490021	1998	0.089	0.084	0.08
	Flint	260490021	1999	0.089	0.084	0.08

				4th Highest*	Design Value Site *	Rounded to 2 Decimals Site**
NAA Area	**Site**	**AirsID**	**Year**	**8HrMax, ppm**	**Avg, ppm**	**Avg, ppm**
	Flint	260490021	2000	0.072	0.083	0.08
	Flint	260490021	2001	0.091	0.084	0.08
	Flint	260490021	2002	0.088	0.084	0.08
	Flint	260490021	2003	0.087	**0.089**	**0.09**
	Flint	260490021	2004	0.075	0.083	0.08
	Flint	260490021	2005	0.079	0.080	0.08
Flint	Otisville	260492001	1992	0.071	5-13-80 sampling began	
	Otisville	260492001	1993	0.071		
	Otisville	260492001	1994	0.073	0.071	0.07
	Otisville	260492001	1995	0.079	0.074	0.07
	Otisville	260492001	1996	0.084	0.078	0.08
	Otisville	260492001	1997	0.079	0.080	0.08
	Otisville	260492001	1998	0.089	0.084	0.08
	Otisville	260492001	1999	0.095	**0.087**	**0.09**
	Otisville	260492001	2000	0.074	**0.086**	**0.09**
	Otisville	260492001	2001	0.091	**0.087**	**0.09**
	Otisville	260492001	2002	0.089	**0.085**	**0.09**
	Otisville	260492001	2003	0.091	**0.090**	**0.09**
	Otisville	260492001	2004	0.077	**0.086**	**0.09**
	Otisville	260492001	2005	0.080	0.083	0.08
Muskegon	Muskegon	261210039	1992	0.086	5-1-91 sampling began	
	Muskegon	261210039	1993	0.083		
	Muskegon	261210039	1994	0.090	**0.086**	**0.09**
	Muskegon	261210039	1995	0.117	**0.096**	**0.10**
	Muskegon	261210039	1996	0.097	**0.101**	**0.10**
	Muskegon	261210039	1997	0.084	**0.099**	**0.10**
	Muskegon	261210039	1998	0.092	**0.091**	**0.09**
	Muskegon	261210039	1999	0.103	**0.093**	**0.09**
	Muskegon	261210039	2000	0.078	**0.091**	**0.09**
	Muskegon	261210039	2001	0.095	**0.092**	**0.09**
	Muskegon	261210039	2002	0.096	**0.090**	**0.09**
	Muskegon	261210039	2003	0.094	**0.095**	**0.10**
	Muskegon	261210039	2004	0.070	**0.087**	**0.09**
	Muskegon	261210039	2005	0.090	0.084	0.08

The completeness criteria for ambient monitoring data are specified in *Title 40 of the Code of Federal Regulations (CFR), Part 50, National Primary and Secondary Ambient Air Quality Standards, Appendix I*; and quality assurance criteria are specified in *40 CFR,*

Section 58.10, Quality Assurance. A minimum completeness of 75 percent annually and 90 percent over each three-year period is required. Ambient monitoring data is recorded in the EPA Air Quality System (AQS) database, and is available for public view. The monitors representing Muskegon, Berrien, Genesee, and Lapeer Counties meet the federal completeness criteria. Completeness data is summarized in Table 3.3.

Table 3.3
Completeness of 8-Hour Ozone Data for Selected Sites in Michigan

					Must be >=75%	Must be > =90%	**4th Highest* 8HrMax, ppm**	**Design Value Site * Avg, ppm**	**Rounded to 2 Decimals Site** Avg, ppm**
Site	**AirsID**	**Year**	Number of Measurements Collected	Number of Measurements Required	Annual % Complete	3-year % Complete			
Coloma	260210014	2002	183	183	100		0.098	**0.098**	**0.09**
Coloma	260210014	2003	183	183	100		0.089	**0.094**	**0.09**
Coloma	260210014	2004	180	183	98	99	0.073	**0.087**	**0.09**
Coloma	260210014	2005	180	183	98	99	0.090	0.084	0.08
Cassopolis	260270003	2002	161	183	88		0.103	**0.103**	**0.09**
Cassopolis	260270003	2003	98	183	54		0.089	**0.096**	**0.09**
Cassopolis	260270003	2004	169	183	92	78	0.077	**0.090**	**0.09**
Cassopolis	260270003	2005	183	183	100	82	0.086	0.084	0.08
Flint	260490021	2002	171	183	93		0.088	0.088	0.08
Flint	260490021	2003	183	183	100		0.087	**0.088**	**0.09**
Flint	260490021	2004	183	183	100	98	0.075	0.083	0.08
Flint	260490021	2005	137	183	75	92	0.079	0.080	0.08
Otisville	260492001	2002	183	183	100		0.089	**0.089**	**0.09**
Otisville	260492001	2003	167	183	91		0.091	**0.090**	**0.09**
Otisville	260492001	2004	183	183	100	97	0.077	**0.086**	**0.09**
Otisville	260492001	2005	160	183	87	93	0.080	0.083	0.08
Muskegon	261210039	2002	182	183	99		0.096	**0.096**	**0.09**
Muskegon	261210039	2003	183	183	100		0.094	**0.095**	**0.10**
Muskegon	261210039	2004	182	183	99	100	0.070	**0.087**	**0.09**
Muskegon	261210039	2005	176	183	96	99	0.090	0.084	0.08

The MDEQ assumed responsibility for the operation of the Cass County monitor on April 1, 2005. Prior to this time, the Indiana Department of Environmental Management operated the monitor. During the summer of 2003, multiple disruptions to the power supply at

this site resulted in incomplete data collection. The Cassopolis monitor was not operational in the 2003 ozone season, on April 5-9, April 22, and July 3 - September 10. Instruction on reconciling design values in instances where incomplete capture of data has occurred is provided in *CFR 50, Appendix I, Section 2.3 (b).*

> "When computing whether the minimum data completeness requirements have been met, meteorological or ambient data may be sufficient to demonstrate that meteorological conditions on missing days were not conducive to concentrations above the level of the standard. Missing days assumed less than the level of the standard are counted for the purpose of meeting the data completeness requirement, subject to the approval of the appropriate Regional Administrator."

The MDEQ determined the possible range of ozone concentrations that would have occurred at the Cassopolis monitor through an examination of ozone measurements at surrounding monitors in South Bend, Indiana; Coloma, Michigan; and Kalamazoo, Michigan. Tables 3.4 and 3.6 provide the comparison data used in the analysis, and maximum temperatures on the days when the Cassopolis monitor was not operational are provided in Table 3.5.

As shown in Table 3.5, there were many days in 2003 when the maximum temperatures were above 85° Fahrenheit in southwest Michigan. Hot days, which are more conducive to ozone formation, occurred on 11 days when the Cassopolis monitor was not operational. Ozone levels over 0.085 ppm were only observed on two of the 11 days at any of the comparison monitoring sites. These days were July 4 and August 26. The MDEQ analyzed the nearby ambient monitoring data on these days, and concluded that the Cassopolis monitor

design value would have remained the same, 0.084 ppm, if ozone measurements had been collected every day of the ozone season.

The 8-hour design value for each site is based on the 4th highest 8-hour average of the summer. The upwind site for Cassopolis is in South Bend, IN. The 1st, 2nd, 3rd, and 4th highest ozone values measured at South Bend all occurred during the month of June. There was complete data collection at Cassopolis during the month of June in 2003. This would indicate that the 4th highest value for Cassopolis would have likely occurred in June when the monitor was operational and that the 3-year average of 4th highest ozone values for 2003-2005 at Cassopolis meets the 8-hour ozone NAAQS.

The 1st, 2nd, and 3rd highest values at the other comparison monitoring sites in Kalamazoo, and Coloma all occurred in June. The 4th highest value at Kalamazoo occurred on August 26, 2003, and the 4th highest value at Coloma occurred on July 4, 2003. These were the only two ozone measurements above the 0.085 threshold at the surrounding monitors during the relevant time periods when the Cassopolis monitor was not operating.

On July 4, 2003, the Coloma monitor recorded an ozone concentration of 0.089 ppm, which was the 4th highest value at this site for the year. On this day, the highest 8-hour ozone average measured at South Bend was 0.063 ppm, and was 0.075 ppm in Kalamazoo. The Coloma monitor located near the Lake Michigan shoreline receives overwhelming transport from the Chicago, Illinois and Gary, Indiana areas when the prevailing wind direction is southwest, as it was on July 4th. The high ozone measurement of 0.089 ppm at the Coloma monitor would be of more concern if the ozone concentrations at the South Bend and Kalamazoo monitors were also high on this day, but they were not. The MDEQ concludes that it would have been very unlikely for ozone levels to have been higher than 0.085 ppm on July 4, 2003 at the Cassopolis site.

On August 26, 2003, the Kalamazoo monitor measured an 8-hour ozone average of 0.085 ppm, which was the 4th highest value at this site for 2003. On this day, a high 8-hour average of 0.054 ppm was measured at the South Bend monitor, and 0.082 ppm was measured at the Coloma monitor. It is likely that the Cassopolis monitor would have recorded a value between 0.082 and 0.087 ppm on August 26, 2003. This range of values indicates the likely ozone levels were lower than the 4th highest ozone value for the season, 0.089 ppm, measured at Cassopolis.

The MDEQ concludes that the incomplete data collection at the Cassopolis site did not affect the ozone design value for the 2003 season or attainment of the ozone 8-hour standard for the 2003-2005 period. Given this demonstration, the MDEQ concludes that the data for 2003, though it does not meet the 75 percent collection criteria, should not prevent the EPA from redesignating this Michigan county to attainment.

Table 3.4 - Ozone Data Comparison for 2003, in ppm
Cassopolis, South Bend, Coloma, and Kalamazoo

Cassopolis Missing Data Comparison					Cassopolis Missing Data Comparison			
April and July 2003					August and September 2003			
Date	**South Bend**	**Coloma**	**Kalamazoo**		**Date**	**South Bend**	**Coloma**	**Kalamazoo**
5-Apr	0.044	0.044	0.04		1-Aug	0.059	0.08	0.05
6-Apr	0.041	0.042	0.042		2-Aug	0.051	0.061	0.059
7-Apr	0.036	0.037	0.038		3-Aug	0.053	0.053	0.051
8-Apr	0.044	0.046	0.046		4-Aug	0.049	0.057	0.056
9-Apr	0.048	0.052	0.054		5-Aug	0.051	0.049	0.054
22-Apr	0.05	0.048	0.042		6-Aug	0.046	0.051	0.053
3-Jul	0.076	0.083	0.079		7-Aug	0.04	0.037	0.04
4-Jul	0.063	**0.089**	0.075		8-Aug	0.008	0.04	0.033
5-Jul	0.064	0.07	0.066		9-Aug		0.035	0.036
6-Jul	0.061	0.069	0.069		10-Aug		0.038	0.036
7-Jul	0.043	0.05	0.053		11-Aug		0.039	0.035
8-Jul	0.038	0.041	0.037		12-Aug	0.039	0.038	0.039
9-Jul	0.05	0.043	0.045		13-Aug	0.052	0.056	0.052
10-Jul	0.046	0.053	0.049		14-Aug	0.061	0.075	0.073
11-Jul	0.042	0.039	0.035		15-Aug	0.059	0.067	0.06

Cassopolis Missing Data Comparison					Cassopolis Missing Data Comparison			
April and July 2003					August and September 2003			
Date	**South Bend**	**Coloma**	**Kalamazoo**		**Date**	**South Bend**	**Coloma**	**Kalamazoo**
12-Jul	0.038	0.045	0.036		16-Aug	0.07	0.069	0.063
13-Jul	0.051	0.065	0.048		17-Aug	0.037	0.038	0.036
14-Jul	0.059	0.063	0.063		18-Aug	0.046	0.052	0.047
15-Jul	0.064	0.07	0.059		19-Aug	0.061	0.065	
16-Jul	0.037	0.038	0.039		20-Aug	0.071	0.073	
17-Jul	0.068	0.077	0.075		21-Aug	0.069	0.08	
18-Jul	0.043	0.044	0.045		22-Aug	0.049	0.042	
19-Jul	0.056	0.05	0.049		23-Aug	0.038	0.047	0.035
20-Jul	0.057	0.065	0.062		24-Aug	0.053	0.057	0.051
21-Jul	0.056	0.055	0.052		25-Aug	0.084	0.076	0.068
22-Jul	0.027	0.029	0.032		26-Aug	0.054	0.082	**0.085**
23-Jul	0.034	0.033	0.034		27-Aug	0.065	0.066	0.068
24-Jul	0.039	0.032	0.046		28-Aug	0.066	0.071	0.064
25-Jul	0.056	0.058	0.055		29-Aug	0.041	0.048	0.043
26-Jul	0.061	0.064	0.061		30-Aug	0.034	0.041	0.034
27-Jul	0.045	0.046	0.054		31-Aug	0.028	0.031	0.032
28-Jul	0.036	0.044	0.048		1-Sep	0.028	0.03	0.031
29-Jul	0.052	0.054	0.063		2-Sep	0.032	0.056	0.053
30-Jul	0.065	0.07	0.07		3-Sep	0.041	0.055	0.052
31-Jul	0.07	0.074	0.078		4-Sep	0.026	0.031	0.026
					5-Sep	0.036	0.038	0.041
					6-Sep	0.059	0.061	0.063
					7-Sep	0.055	0.062	0.066
					8-Sep	0.054	0.052	0.072
					9-Sep	0.045	0.053	0.051
					10-Sep	0.058	0.058	0.055

Table 3.5

Maximum Daily Temperatures at Locations Surrounding Cassopolis Monitor On Missing Data Days in 2003

			DAILY MAXIMUM				
YY	**MM**	**DD**	**South Bend**	**Kalamazoo**	**Sturgis**	**Benton Harbor**	**85°+**
2003	Apr	5	41.1	35.0	38.9	38.9	
2003	Apr	6	41.1	42.0	38.9	43.1	
2003	Apr	7	33.0	31.0	31.9	31.9	
2003	Apr	8	34.1	33.0	34.1	34.1	
2003	Apr	9	49.0	47.9	46.0	40.0	

			DAILY MAXIMUM				
YY	**MM**	**DD**	**South Bend**	**Kalamazoo**	**Sturgis**	**Benton Harbor**	**85°+**
2003	Apr	22	47.0	50.1	47.9	41.1	
2003	Jul	3	91.0	91.0	91.0	89.0	**HOT**
2003	Jul	4	91.0	90.1	90.1	90.1	**HOT**
2003	Jul	5	83.0	81.1	83.9	80.0	
2003	Jul	6	87.0	85.0	82.0	86.1	**HOT**
2003	Jul	7	83.9	83.0	82.0	83.0	
2003	Jul	8	80.0	78.0	82.0	74.9	
2003	Jul	9	80.0	78.0	79.1	78.0	
2003	Jul	10	76.0	79.1	74.9	80.0	
2003	Jul	11	74.0	70.1	70.1	72.1	
2003	Jul	12	74.0	77.1	74.9	72.1	
2003	Jul	13	81.1	81.1	81.1	79.1	
2003	Jul	14	83.0	83.0	82.0	83.0	
2003	Jul	15	83.0	81.1	81.1	81.1	
2003	Jul	16	78.0	80.0	79.1	74.9	
2003	Jul	17	83.0	83.9	82.0	85.0	
2003	Jul	18	77.1	78.0	79.1	74.9	
2003	Jul	19	81.1	81.1	79.1	76.0	
2003	Jul	20	83.0	82.0	82.0	82.0	
2003	Jul	21	78.0	79.1	79.1	76.0	
2003	Jul	22	72.1	76.0	73.0	71.0	
2003	Jul	23	74.0	77.1	74.9	70.1	
2003	Jul	24	77.1	80.0	79.1	73.0	
2003	Jul	25	81.1	83.0	79.1	81.1	
2003	Jul	26	81.1	82.0	79.1	82.0	
2003	Jul	27	80.0	87.0	79.1	78.0	
2003	Jul	28	73.0	77.1	74.9	71.0	
2003	Jul	29	78.0	80.0	79.1	74.0	
2003	Jul	30	80.0	83.0	79.1	79.1	
2003	Jul	31	82.0	85.0	82.0	83.0	
2003	Aug	1	85.0	81.1	83.9	85.0	
2003	Aug	2	82.0	83.0	81.1	81.1	
2003	Aug	3	79.1	82.0	79.1	78.0	
2003	Aug	4	76.0	77.1	77.1	74.0	
2003	Aug	5	77.1	79.1	77.1	74.0	
2003	Aug	6	80.0	82.0	79.1	77.1	
2003	Aug	7	79.1	82.0	79.1	76.0	
2003	Aug	8	80.0	80.0	79.1	74.9	
2003	Aug	9	78.0	79.1	74.9	74.9	
2003	Aug	10	78.0	78.0	74.9	77.1	
2003	Aug	11	77.1	79.1	79.1	73.0	
2003	Aug	12	79.1	78.0	79.1	74.9	
2003	Aug	13	83.0	83.9	81.1	80.0	
2003	Aug	14	88.1	87.0	83.9	88.1	**HOT**
2003	Aug	15	86.1	86.1	83.9	83.9	**HOT**
2003	Aug	16	87.0	89.0	88.1	85.0	**HOT**

			DAILY MAXIMUM				
YY	**MM**	**DD**	**South Bend**	**Kalamazoo**	**Sturgis**	**Benton Harbor**	**85°+**
2003	Aug	17	83.0	82.0	81.1	82.0	
2003	Aug	18	82.0	83.0	79.1	81.1	
2003	Aug	19	83.0	83.0	81.1	83.9	
2003	Aug	20	87.0	86.1	83.9	89.0	**HOT**
2003	Aug	21	96.0	95.1	91.0	97.1	**HOT**
2003	Aug	22	81.1	80.0	79.1	78.0	
2003	Aug	23	82.0	79.1	77.1	77.1	
2003	Aug	24	85.0	82.0	79.1	83.9	
2003	Aug	25	92.9	88.1	88.1	92.0	**HOT**
2003	Aug	26	88.1	90.1	82.0	86.1	**HOT**
2003	Aug	27	87.0	83.9	83.9	81.1	
2003	Aug	28	90.1	86.1	83.9	91.0	**HOT**
2003	Aug	29	78.0	78.0	77.1	81.1	
2003	Aug	30	74.9	73.0	72.1	72.1	
2003	Aug	31	68.1	74.0	65.9	71.0	
2003	Sep	1	62.0	61.1	63.1	62.0	
2003	Sep	2	71.0	76.0	72.1	77.1	
2003	Sep	3	76.0	78.0	74.9	77.1	
2003	Sep	4	68.1	67.0	68.1	68.1	
2003	Sep	5	71.0	71.0	70.1	67.0	
2003	Sep	6	77.1	77.1	74.9	76.0	
2003	Sep	7	81.1	82.0	79.1	82.0	
2003	Sep	8	81.1	83.0	81.1	79.1	
2003	Sep	9	80.0	80.0	79.1	82.0	
2003	Sep	10	80.0	80.0	79.1	81.1	

Table 3.6

High 8-hour Ozone Averages in 2003
At Comparison Sites for Cassopolis

(ozone values in ppm)

Monitor	1st High	Day	2nd High	Day	3rd High	Day	4th High	Day
South Bend, IN	0.093	6/25	0.091	6/18	0.088	6/22	0.087	6/24
Kalamazoo, MI	0.092	6/25	0.088	6/24	0.088	6/18	0.085	8/26
Coloma, MI	0.103	6/25	0.094	6/23	0.090	6/24	0.089	7/4
Cassopolis	0.101	6/25	0.091	6/18	0.090	6/22	0.089	6/23

4. State Implementation Plan Approval and Compliance with CAA Section 110 and Part D Requirements

Section 110 of the CAA delineates general SIP requirements and Part D contains requirements applicable to the nonattainment areas. Michigan meets all applicable requirements for ozone redesignation under these provisions of the CAA for the four nonattainment areas.

Under the 1-hour ozone NAAQS, Muskegon County was classified as a moderate nonattainment area. The county was redesignated to attainment in 2000 (65 Federal Register (FR) 52651). Genesee County was a Section 185A area. Section 185A areas were previously called "Transitional." The pre-existing designation of nonattainment was retained by operation of law in 1991 when ozone designations were made in accordance with the 1990 amendments to the CAA, even though there was not a measured violation of the 1-hour ozone NAAQS based on 1987-1989 monitoring data. Genesee County was redesignated to attainment in 2001 (65 FR 67629). The EPA made determinations that all ozone SIP requirements had been met in approving the attainment redesignation for these counties. New nonattainment area requirements under the 8-hour NAAQS are not yet due.

Michigan's SIP contains all emission control programs related to ozone under Section 110(k) of the CAA required for attainment redesignation. Programs for emissions limitations, permitting, emissions inventories and statements, emissions fees, enforcement authorities, ambient monitoring, Reasonably Available Control Technology (RACT), and conformity requirements, general and transportation, have been implemented in Michigan and are included in the SIP.

Subpart 110(a) (2) (D) requires that SIPs contain certain measures to prevent sources in a state from significantly contributing to air quality problems in another state. Michigan has met the requirements of the federal Nitrogen Oxides (NOx) SIP Call, Phase 1 to reduce NOx

emissions contributing to downwind states. Michigan's rules to implement the NOx SIP Call have been approved as part of the SIP (70 FR 23029, May 4, 2005).

Redesignation approval is not contingent on state adoption of certain Part D requirements found in Section 172(c) (1) – (9) that have not come due prior to the date of this submission, including RACT, Reasonably Available Control Measures (RACM), and contingency measures. Conformity and New Source Review requirements are not linked to redesignation. This eliminates the need for the EPA approval of the program elements prior to redesignation. However, Michigan has submitted conformity SIPs to the EPA and has adopted many volatile organic compound (VOC) RACT rules statewide. Michigan also administers a New Source Review permitting program.

New Source Review

New Source Review permitting for major new and modified sources of ozone precursors in attainment areas is required under Michigan's Prevention of Significant Deterioration (PSD) permit program. PSD program responsibility was delegated to Michigan on September 10, 1979, and amended on November 7, 1983 and September 26, 1988. Permits to install cannot be issued unless the applicant can demonstrate, among other things, that increased emissions from the new or modified source will not result in a violation of the NAAQS. Included in the Michigan SIP are Rule 702, which requires the installation of Best Available Control Technology (BACT) regardless of size or location of all new and modified sources of VOC in the state, and Rule 207, which requires denial of any permit to install if operation of the equipment will interfere with attainment or maintenance of the NAAQS.

Conformity

Section 176(c) of the CAA requires states to establish criteria and procedures to ensure that federally supported or funded projects conform to the air quality planning goals in the SIP. The requirement to determine conformity applies to transportation plans, programs and projects developed, funded, or approved under Title 23 of the United States Code and the Federal Transit Act (transportation conformity), as well as to all other federally supported or funded projects (general conformity). In Michigan, air quality transportation conformity is enforced through the process provided under Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. On June 15, 2005, the MDEQ submitted a revision of the Michigan SIP to the EPA based on an amendment to the federal Transportation Conformity Rule, issued July 1, 2004, to include criteria and procedures for the 8-hour ozone NAAQS. Michigan's general conformity procedures submitted pursuant to 40 CFR, Part 51, Subpart W, were approved in FR 61-66607.

RACT Measures

The MDEQ has adopted statewide RACT regulations for major sources (100 tons/year) of VOC emissions for the following industrial point source categories:

- Gasoline Loadings Terminals
- Gasoline Bulk Plants
- Fixed Roof Petroleum Tanks
- Miscellaneous Refinery Sources (Vacuum Producing Systems, Wastewater Separators, and Process Unit Turnarounds)
- Cutback Asphalt
- Solvent Metal Cleaning
- Can Coating
- Metal Coil Coating
- Fabric Coating
- Paper Coating
- Automobile and Light-Duty Truck Coating
- Metal Furniture Coating
- Magnet Wire Coating
- Coating of Large Appliances

- Leaks from Petroleum Refineries
- Miscellaneous Metal Parts
- Flatwood Paneling
- Synthesized Pharmaceutical Products
- External Floating Roof Petroleum Tanks
- Graphic Arts
- Perchloroethylene Dry Cleaning
- Gasoline Tank Trucks and Vapor Collection System Leaks
- Large Petroleum Dry Cleaners
- Stage 1 Vapor Recovery in Urbanized Areas

The MDEQ adopted additional RACT regulations applicable to the former moderate nonattainment areas, including Muskegon County, under the 1-hour ozone NAAQS for the following source categories:

- SOCMI and Polymer Manufacturing Equipment Leaks
- Equipment Leaks from Natural Gas/Gasoline Processing Plants
- Resin Manufacturing
- Plastic Parts Coating

5. Demonstration of Improvement in Air Quality

Improvement in air quality must be reasonably attributed to emissions reductions of the ozone precursor pollutants NOx and VOC that are permanent and enforceable. An examination of NOx and VOC emissions from a period of nonattainment (2002) to attainment (2005) indicates a continuous decrease in overall emissions. The source of the emissions data is the EPA final 2002 National Emissions Inventory (NEI) that was processed by LADCO to yield summer day county totals (2002 base K inventory) and a projected 2005 inventory. An actual 2005 calculated inventory is not scheduled to be submitted to EPA until May 2007. Therefore, an estimate of 2005 emissions was made for some categories by interpolating between the LADCO 2002 base K inventory and the LADCO 2009 base K inventory. This was done for non-electric generating unit (EGU) point and area sources. For EGU emissions, 2004 actual emissions appeared to be a better representation of 2005 than interpolating from 2009. Both nonroad and onroad emissions were calculated specifically for 2005 using the latest version of the Mobile and NMIM models. Specific details regarding this data are included in Appendix A. Table 5.1 identifies emission reductions by source category for the subject counties. Both VOC and NOx emissions decreased from 2002 to 2005 for all counties.

Table 5.1
Emission Reduction Demonstration Inventories
2002 and 2005
All units are in tons per day

Flint Area – Genesee and Lapeer Counties

Genesee

		NOx			
	Point Total	Area Total	Onroad	Nonroad	Total
2002	2.66	1.76	40.80	8.72	53.94
2005	2.61	1.80	29.98	8.07	42.46

		VOC			
	Point Total	Area Total	Onroad	Nonroad	Total
2002	4.93	22.06	26.68	13.74	67.41
2005	4.38	21.63	17.71	11.79	55.51

Lapeer

		NOx			
	Point Total	Area Total	Onroad	Nonroad	Total
2002	0.32	0.37	9.82	2.97	13.48
2005	0.30	0.38	6.10	2.79	9.57

		VOC			
	Point Total	Area Total	Onroad	Nonroad	Total
2002	1.14	4.60	4.84	6.81	17.39
2005	0.95	4.60	3.39	6.72	15.66

Berrien Area

Berrien

		NOx			
	Point Total	Area Total	Onroad	Nonroad	Total
2002	3.70	0.79	20.45	4.80	29.74
2005	3.47	0.81	14.49	4.54	23.31

		VOC			
	Point Total	Area Total	Onroad	Nonroad	Total
2002	1.91	9.05	11.11	11.67	33.74
2005	1.93	8.99	7.45	10.98	29.35

Cass Area

Cass

		NOx			
	Point Total	Area Total	Onroad	Nonroad	Total
2002	0.20	0.20	4.52	2.06	6.98
2005	0.20	0.20	2.97	1.92	5.29

		VOC			
	Point Total	Area Total	Onroad	Nonroad	Total
2002	0.31	2.22	2.45	5.07	10.05
2005	0.34	2.22	1.66	5.06	9.28

Muskegon Area

Muskegon

		NOx			
	Point Total	Area Total	Onroad	Nonroad	Total
2002	14.35	0.81	11.93	6.48	33.57
2005	13.83	0.83	8.91	6.27	29.84

		VOC			
	Point Total	Area Total	Onroad	Nonroad	Total
2002	1.77	8.20	7.67	10.41	28.05
2005	1.73	8.15	5.08	10.26	25.22

Reductions in emissions between 2002 and 2005 can be attributed to state, regional, and federal emissions control programs. The Federal Motor Vehicle Control Program has produced significant emission reductions from onroad and nonroad motor vehicles throughout the country. The National Low Emission Vehicle (NLEV) program was phased in for passenger cars during 1999-2001. NLEV vehicles are 70 percent cleaner than "Tier 1" (the previous level of emission control) vehicles with reductions in VOCs, NOx, and toxics. Phase-in of federal "Tier 2" standards began in 2004. Light-duty passenger vehicles standards, including sport utility vehicles, minivans, and pickup trucks, gasoline sulfur content regulations, nonroad diesel engine standards, and heavy-duty diesel vehicles standards all contributed to a reduction in emissions of NOx and hydrocarbons in the five counties, as well as in upwind areas contributing to the ozone levels in these counties.

The federal Acid Rain Program and federal NOx SIP Call requirements resulted in significant reductions in NOx emissions from stationary sources in Michigan. EGU located in Michigan and subject to the federal Acid Rain Program emitted 62,728.5 tons of NOx in 2002, and 32,493.9 tons of NOx in 2004. The federal NOx SIP Call resulted in the adoption of state rules to further limit NOx emissions in Michigan and in some upwind states. The May 31, 2004 compliance date for the NOx SIP Call assures that many regional NOx emissions reductions occurred during the applicable time period. Upwind ozone nonattainment areas in the Lake Michigan region, including Chicago, Illinois; Gary, Indiana; and Milwaukee, Wisconsin, have continued to reduce emissions of NOx and VOCs in keeping with Rate of Progress obligations under the CAA for the 1-hour ozone NAAQS. Upwind reductions in emissions of VOCs and NOx have resulted in lower concentrations of transported ozone arriving onshore in West Michigan counties. Reductions that have occurred due to these programs are permanent and enforceable.

6. Maintaining Ozone Attainment into the Future

A maintenance plan must demonstrate continued attainment for at least ten years after approval of redesignation. Section 175A of the CAA sets forth the elements of a maintenance plan for areas seeking redesignation from nonattainment to attainment. Eight years after the redesignation, a revised maintenance plan demonstrating that attainment will continue to be maintained for the next ten years must be submitted to the EPA. To address the possibility of future NAAQS violations, the maintenance plan must contain contingency measures to assure prompt correction of any future ozone NAAQS violation.

Future attainment is demonstrated through emission inventory projections. This demonstration includes an actual attainment year inventory for 2005, a projected interim year inventory for 2009, and a projected maintenance inventory for 2018. The future year inventories of VOC and NOx emissions are shown to remain below attainment year 2005 emission levels to assure that local contribution to ozone formation will not exceed current levels. The inventory emissions totals are provided in Table 6.1.

Table 6.1
Maintenance Plan Emission Inventories
2005 - 2009 - 2018
All units are in tons per day

Flint Area – Genesee and Lapeer Counties

Genesee

				NOx			
	Point non-EGU	Point EGU	Point Total	Area Total	Onroad	Nonroad	Total
2005	2.47	0.14	2.61	1.80	29.98	8.07	42.46
2009	2.46	0.00	2.46	1.86	26.57	6.80	37.69
2018	2.50	0.01	2.51	1.92	9.40	4.27	18.10
Safety Margin							24.36

				VOC			
	Point non-EGU	Point EGU	Point Total	Area Total	Onroad	Nonroad	Total
2005	4.32	0.06	4.38	21.63	17.71	11.79	55.51
2009	3.66	0.00	3.66	21.06	15.34	9.63	49.69
2018	4.10	0.00	4.10	21.19	8.07	8.20	41.56
Safety Margin							13.95

Lapeer

				NOx			
	Point non-EGU	Point EGU	Point Total	Area Total	Onroad	Nonroad	Total
2005	0.30	0.00	0.30	0.38	6.10	2.79	9.57
2009	0.28	0.00	0.28	0.39	6.32	2.40	9.39
2018	0.31	0.00	0.31	0.41	2.03	1.66	4.41
Safety Margin							5.16

				VOC			
	Point non-EGU	Point EGU	Point Total	Area Total	Onroad	Nonroad	Total
2005	0.95	0.00	0.95	4.60	3.39	6.72	15.66
2009	0.69	0.00	0.69	4.59	2.84	6.20	14.32
2018	0.73	0.00	0.73	4.82	1.69	4.68	11.92
Safety Margin							3.74

Berrien

Berrien

				NOx			
	Point non-EGU	Point EGU	Point Total	Area Total	Onroad	Nonroad	Total
2005	3.47	0.00	3.47	0.81	14.49	4.54	23.31
2009	3.17	0.00	3.17	0.83	13.27	4.01	21.28
2018	3.22	0.00	3.22	0.86	4.57	2.86	11.51
Safety Margin							11.80

				VOC			
	Point non-EGU	Point EGU	Point Total	Area Total	Onroad	Nonroad	Total
2005	1.93	0.00	1.93	8.99	7.45	10.98	29.35
2009	1.95	0.00	1.95	8.92	6.54	9.86	27.27
2018	2.40	0.00	2.40	9.38	3.44	7.77	**22.99**
Safety Margin							**6.36**

Cass Area

Cass

				NOx			
	Point non-EGU	Point EGU	Point Total	Area Total	Onroad	Nonroad	Total
2005	0.20	0.00	0.20	0.20	2.97	1.92	5.29
2009	0.20	0.00	0.20	0.21	3.03	1.67	5.11
2018	0.23	0.00	0.23	0.22	0.94	1.17	2.56
Safety Margin							2.73

				VOC			
	Point non-EGU	Point EGU	Point Total	Area Total	Onroad	Nonroad	Total
2005	0.34	0.00	0.34	2.22	1.66	5.06	9.28
2009	0.39	0.00	0.39	2.22	1.47	4.70	8.78
2018	0.49	0.00	0.49	2.31	0.74	3.50	7.04
Safety Margin							2.24

Muskegon Area

Muskegon

				NOx			
	Point non-EGU	Point EGU	Point Total	Area Total	Onroad	Nonroad	Total
2005	4.75	9.08	13.83	0.83	8.91	6.27	29.84
2009	4.75	6.23	10.98	0.85	8.19	5.84	25.86
2018	5.14	7.17	12.31	0.88	2.74	4.73	20.66
Safety Margin							9.18

				VOC			
	Point non-EGU	Point EGU	Point Total	Area Total	Onroad	Nonroad	Total
2005	1.63	0.10	1.73	8.15	5.08	10.26	25.22
2009	1.59	0.10	1.69	8.09	4.66	9.52	23.96
2018	2.02	0.12	2.14	8.36	2.27	7.56	20.33
Safety Margin							4.89

A comprehensive baseline emissions inventory was prepared by the MDEQ and includes area, mobile, and point sources of VOC and NOx for the year 2002, as required by the EPA Consolidated Emissions Reporting Rule (40 CFR, Part 51). The 2002 inventory was further processed by LADCO to produce summer day totals by county. Since a 2005 inventory of actual emissions is still not available, an estimate of 2005 emissions was made for some categories by interpolating between the 2002 LADCO base K inventory and the LADCO 2009 base K inventory. This was done for non-EGU point and area sources. For EGU emissions, 2004 actual emissions appeared to be a better representation of 2005 than interpolating from 2009. Both nonroad and onroad emissions were calculated specifically for 2005 using the latest version of the Mobile and NMIM models. Full documentation of methodologies and models used to derive emission inventories is contained in Appendix A.

The 2009 projected interim year inventory was prepared by LADCO as part of the regional planning effort for ozone, PM 2.5, and regional haze. The 2018 projected maintenance inventory was also prepared by LADCO, with the exception of the onroad mobile inventories

that were projected by MDOT. Although significant emission reductions are projected to occur throughout the maintenance period, it must be stressed that many of the counties in West Michigan are so overwhelmingly impacted by transported ozone that continued attainment is significantly dependent on the decrease in emissions in the Lake Michigan upwind areas.

Maintenance Commitments

Michigan will develop and submit to the EPA no later than eight years after approval of this redesignation request a new maintenance plan covering the next ten-year period.

The MDEQ will continue to track ozone levels through the operation of an EPA-approved monitoring network as necessary to demonstrate ongoing compliance with the NAAQS. Data will be entered into the AQS on a timely basis in accordance with federal regulations. The MDEQ will continue to produce periodic emission inventories as required by the federal Consolidated Emissions Reporting Rule (40 CFR, Part 51), to track levels of emissions in the future. The control measures for VOC and NOx emissions that were contained in the SIP before redesignation of these areas to attainment shall be retained, as required by Section 175A of the CAA.

Michigan will expeditiously enact legal authorities needed for additional contingency control measures, and/or studies of conditions resulting in unexpected ozone increases in response to identified triggering events.

Action Level Response

An Action Level Response will be prompted when a two-year average fourth high monitored value of 0.085 ppm occurs within a maintenance area. If this response is triggered, a review of circumstances leading to the high monitored values will be conducted. The MDEQ will explore whether a special event, malfunction, or noncompliance with permit conditions resulted

in high ozone levels in order to immediately address needed corrective measures. The MDEQ will also review meteorological conditions during high ozone episodes. This review will be conducted within six months following the close of the ozone season. If the MDEQ determines that contingency measure implementation is necessary to prevent a future violation, the MDEQ will select and implement a measure that can be implemented promptly.

Contingency Measure Response

If a violation of the ozone NAAQS occurs, Michigan will select one or more control measures from the following list of potential contingency measure options for implementation. The timing for implementation of a contingency measure is dependent on the process needed for legal adoption and source compliance, which varies for each measure. Some potential measures/controls have already been promulgated and are scheduled to be implemented at the federal or state levels. Other measures will need state administrative rulemaking or legislative approval. The MDEQ will seek to expedite the process of securing enabling authority and implementing the selected measures as needed to reduce ozone levels measured at air quality monitors in the maintenance areas, with a goal of having measures in place as expeditiously as practicable and within 18 months. Opportunity for public participation in the contingency measure response will be provided.

List of Potential Contingency Measures

Michigan will select one or more measures for implementation in the event that a Contingency Level Response has been triggered.

1. Lower Reid Vapor Pressure gasoline program.
2. Reduced VOC content in Architectural, Industrial, and Maintenance (AIM) coatings rule.
3. Auto body refinisher self-certification audit program.

4. Reduced VOC degreasing rule.
5. Transit improvements.
6. Diesel retrofit program.
7. Reduced VOC content in commercial and consumer products.
8. Clean Air Interstate Rule reductions.
9. Tier II reductions including low sulfur fuel, and vehicle standards.
10. Reduced idling program.

7. Transportation Conformity Budgets

Transportation conformity is required by Section 176(c) of the CAA. The EPA's conformity rule requires that transportation plans, programs, and projects conform to SIPs and establishes the criteria and procedures for determining whether or not they do. Conformity to a SIP means that transportation activities will not produce new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS.

Estimates of onroad motor vehicle emissions are projected for the maintenance period, which must be at least ten years, to assess emission trends and to ensure continued compliance with the ozone NAAQS. Onroad emissions include those from cars, buses, and trucks driven on public roadways. These estimates are considered a ceiling or "budget" for emissions and are used to determine whether transportation plans and projects conform to the SIP. Estimated onroad mobile emissions of VOC and NOx must not exceed the emission budgets contained in the maintenance plan. The emissions estimates for this sector reflect appropriate and up-to-date assumptions about vehicle miles traveled, socioeconomic variables, fuels used, weather inputs, and other planning assumptions.

A safety margin is the difference between the level of emissions in a year used to determine attainment of the NAAQS (from all sources) and the projected level of emissions (from all sources) in the maintenance plan. In this maintenance plan, the safety margin is the difference in total emissions between the years 2002 and 2018. The maintenance plan is designed to provide for future growth while still maintaining the ozone NAAQS. The conformity budgets for each maintenance area are being allocated 90 percent of the safety margin for VOC and NOx emissions. Transportation emission budgets for conformity are provided in Table 7.1.

Table 7.1
Transportation Conformity Budgets
In Tons per Day

Maintenance Area	VOC	NOx
Flint Area Genesee and Lapeer Counties	**25.68**	**37.99**
Berrien Area	**9.16**	**15.19**
Cass Area	**2.76**	**3.40**
Muskegon Area	**6.67**	**11.00**

8. Public Hearing and Comments

In accordance with Section 110(a)(2) of the CAA, public participation in the SIP process was provided for as follows:

Notice of availability of the ozone redesignation documents and notice of the public hearing and comment period has been published in the *Flint Journal,* the *Muskegon Chronicle,* and the *St. Joseph-Benton Harbor Herald Palladium.* Notice was also posted on the MDEQ web pages at http://www.Michigan.gov/deqair.

The public hearing on this redesignation request and maintenance plan SIP revision was held on May 30, 2006, at Constitution Hall, 525 West Allegan, Lansing, Michigan.

A summary of comments received and the MDEQ responses is included in Appendix B.

APPENDIX A

OZONE REDESIGNATION EMISSIONS INVENTORY SUPPORT DOCUMENTATION

FOR

LAPEER, GENESEE, MUSKEGON, BERRIEN, AND CASS COUNTIES, MICHIGAN

Michigan Department of Environmental Quality
Air Quality Division

April 2006

Attainment and Maintenance Plan Inventories

Emissions inventory documentation support for the Maintenance Plan emissions inventory provided in the 2006 Ozone Maintenance Plan for the Flint, Muskegon, Berrien and Cass nonattainment areas is provided below. Except where indicated (e.g., 2018 mobile estimates prepared by MDOT), the summer day emissions described here represent the Midwest Planning Organization's typical summer weekday. The meteorological conditions on July 12, 2002, which occurred during a significant ozone episode, were chosen to represent the typical summer day. Conditions on this day will not only be used for this demonstration, but will be used for comparisons during the development of 8-hour ozone attainment demonstrations throughout the Midwest region. The future year projections take into account existing control measures and measures that are known to be on the way (e.g., federal Clean Air Interstate Rule measures). These inventories are taken from the Lake Michigan Air Directors Consortium (LADCO) base K inventories, as posted in January 2006.

I. EGU Point Sources

The table below summarizes typical ozone season weekday Electric Generating Unit (EGU) point source emissions in the redesignation counties for the years 2002, 2009, and 2018.

DAILY TOTAL VOC (TONS)

COUNTY	2002	2005	2009	2018
Berrien	0.00	0.00	0.00	0.00
Cass	0.00	0.00	0.00	0.00
Genesee	0.11	0.09	0.00	0.00
Lapeer	0.00	0.00	0.00	0.00
Muskegon	0.11	0.10	0.10	0.12

DAILY TOTAL NOx (TONS)

COUNTY	2002	2005	2009	2018
Berrien	0.00	0.00	0.00	0.00
Cass	0.00	0.00	0.00	0.00
Genesee	0.19	0.14	0.00	0.01
Lapeer	0.00	0.00	0.00	0.00
Muskegon	9.60	9.08	6.23	7.17

2002 EGU Point Source Methodologies

The 2002 EGU point source data has as its origin the dataset generated by the EPA for the 2002 NEI database. The document "DOCUMENTATION FOR THE 2002 ELECTRIC GENERATING UNIT (EGU) NATIONAL EMISSIONS INVENTORY (NEI)," prepared by: Eastern Research Group, Inc., 1600 Perimeter Park Drive, Morrisville, NC 27560 and E. H. Pechan & Associates, Inc., 5528-B Hempstead Way, Springfield, VA 22151 for: Emission Factor and Inventory Group (D205-01), Emissions, Monitoring and Analysis Division, U.S. Environmental Protection Agency (EPA), Research Triangle Park, NC 27711, September 2004, describes the methodology used to estimate the emissions for the 2002 NEI EGU Point Sources. Further validation and quality assurance of the EPA 2002 NEI EGU sources was completed using a cross-reference list between the EPA 2002 NEI EGU emission units and ORIS ID Boilers created by E. H. Pechan & Associates for LADCO.

2005 EGU Point Source Methodologies

The 2005 EGU data based on CEM reporting is not yet available from the EPA. The MDEQ considered interpolating between the 2002 inventory and the 2009 projected emissions estimated by the Integrated Planning Model (IPM) model. However, many of the emissions reductions that are expected to occur between 2002 and 2009 will occur after 2005. Therefore, the MDEQ used EGU emissions data submitted for 2004 to the Michigan Air Emissions Reporting System (MAERS) to represent 2005. This resulted in higher estimates than those obtained through interpolation.

Growing EGU Point Source Years 2009 and 2018:

The 2009 and 2018 data is extracted from emissions modeling performed by LADCO. The source scenario is the base K modeling run posted in January 2006. The following is a Regional Planning Organization (RPO) IPM document, which details the methodologies used to project the EGU emissions to 2009 and 2018 in the IPM model:

Inter-RPO IPM Global Parameter Decisions (May 11, 2005):

> The following summarizes the decisions made by VISTAS, MRPO, CENRAP, and MANE-VU for global assumptions to be used in EGU forecasting with IPM. These decisions and changes are made to IPM version 2.1.9 assumptions, which can be referenced via EPA's IPM Web site at:
>
> http://www.epa.gov/airmarkets/epa-ipm/
>
> A. Market Assumptions
>
> 1. National Electricity and Peak Demand
> Decision: Use unadjusted EIA AEO 2005 national electricity and peak demand values.
> 2. Regional Electricity and Demand Breakout
> Decision: Use the existing IPM region breakdown as conducted in earlier modeling.
> 3. Natural Gas Supply Curve and Price Forecast
> Decision: Take existing supply curves and scale application to EIA AEO 2005 price point. In this approach, the EPA 2.1.9 gas supply

curves will be scaled in such a manner that IPM will solve for AEO 2005 gas prices when the power sector gas demand in IPM is consistent with AEO 2005 power sector gas demand projections. In instances where the power sector gas demand in IPM is lower than that of AEO 2005 projections, IPM will project gas prices that are lower than that in AEO 2005 and vice versa.

4. Oil Price Forecast
   Decision: Use EIA AEO 2005 values.
5. Coal Supply and Price Forecast
   Decision: Take existing supply curves and scale application to EIA AEO 2005 price points, coal supply regions, and coal grades. In this approach, the coal supply curves used in EPA 2.1.9 are scaled in such a manner that the average mine mouth coal prices that the IPM is solving in aggregated coal supply regions are comparable to AEO 2005. Due to the fact that the coal grades and supply regions between AEO 2005 and the EPA 2.1.9 are not directly comparable, this is an approximate approach and has to be performed in an iterative fashion. This approach does not involve updating the coal transportation matrix with EIA assumptions due to significant differences between the EPA 2.1.9 and EIA AEO 2005 coal supply and coal demand regions.

B. Technical Assumptions

1. Firmly Planned Capacity Assumptions
   Decision: Use revisions and new data as provided by RPOs and stakeholders.
   Decision: Allow NC Clean Smokestacks 2009 data as provided to define “must run” units.
2. Pollution Control Retrofit Cost and Performance [SO2, NOx, and Hg]
   Decision: Retain pollution control retrofit cost and performance values.
3. New Conventional Capacity cost and performance assumptions
   Decision: Use EIA AEO 2005 cost and performance assumptions for new conventional capacity.
   Decision: Retain existing 2.1.9 framework cost and performance for new renewable capacity.
   Decision: Exclude constraint on new capacity type builds (i.e., no new coal).
4. SO2 Title IV Allowance Bank
   Decision: Use existing SO2 allowance bank value (4.99 million tons) for 2007.
5. Nuclear Re-licensing and Uprate
   Decision: Use existing IPM configuration with updated EIA AEO 2005 (~$27/kW) incurrence cost for continued operation.

C. Strategy Assumptions

1. Clear Air Mercury Rule (CAMR)
   Decision: Include CAMR in future rounds of IPM modeling.
2. Renewable Portfolio Standards
   Decision: Model RPS based on the most recent RGGI documentation using a single RPS region for MA, RI, NY, NJ, MD and CT. The RPS requirements within these states can be met by renewable generation from New England, New York and PJM. EPA 2.1.9 methodology and hardwired EIA AEO 2004 projected renewable builds for the remainder of the country.

D. Other Assumptions

1. Run Years
   Decision: Revise runs years to 2008 [2007-08], 2009 [2009], 2012 [2010-13], 2015 [2014-17], 2018 [2018], 2020 [2019-22], and 2026 [2023-2030].
2. Canadian Sources
   Decision: Utilize existing v.2.1.9 configuration (no Canadian site specific sources).

II. Non-EGU Point Sources

The table below summarizes typical ozone season weekday non-EGU point source emissions for the redesignation counties for the years 2002, 2009, and 2018.

DAILY TOTAL VOC (TONS)

COUNTY	2002	2005	2009	2018
Berrien	1.91	1.93	1.95	2.40
Cass	0.31	0.34	0.39	0.49
Genesee	4.82	4.32	3.66	4.10
Lapeer	1.14	0.95	0.69	0.73
Muskegon	1.66	1.63	1.59	2.02

DAILY TOTAL NOx (TONS)

COUNTY	2002	2005	2009	2018
Berrien	3.70	3.47	3.17	3.22
Cass	0.20	0.20	0.20	0.23
Genesee	2.47	2.47	2.46	2.50
Lapeer	0.32	0.30	0.28	0.31
Muskegon	4.75	4.75	4.75	5.14

2002 Non-EGU Point Source Methodologies

The 2002 point source data has as its original source the 2002 Michigan point source emission inventory. The data used was extracted from the dataset generated for the EPA 2002 NEI database. This section of the document describes the compilation and processing of point source emission data submitted to the to comply with the Consolidated Emission Reporting Rule for the EPA NEI 2002 emission inventory.

The data originates with the entry of data by the reporting facilities into MAERS. Full discussion of the MAERS system is beyond the scope of this document, but it is worth noting that annually data is entered into electronic format at the reporting facilities, reviewed and compiled by the MDEQ, and exported to the fixed-width text version of the National Inventory Format (NIF), with a couple of added fields for internal use.

The data was loaded into a PostgreSQL database closely resembling the MS Access version of the NIF, and the following processing steps and checks were performed:

Both emissions estimated by default calculations in MAERS and any emissions reported by facility operators are maintained in MAERS. For evaluation and quality assurance purposes, both types of records are included in the exports. To avoid double-counting, where a specific process/pollutant has emission records calculated by the facility operator, as well as estimated by MAERS default calculations, the latter are excluded.

Portable facilities (primarily asphalt plants) report total throughput and emissions for the facility in MAERS. External to MAERS, the facilities report process-level operating percentages for each county in which the portable facility was located during the year. Corresponding record sets are generated for each county of operation, throughput and emissions are apportioned based on the operating percentages reported by county and SCC, and geo-coordinates for the center of the counties of operation are assigned.

As particulate emission quality assurance efforts have focused on PM10-PRI and PM25-RI, PM-PRI records are excluded.

As over 99.8 percent of total criteria emissions are accounted for by emissions reported by operator, the exported criteria emissions estimated via default calculations are excluded.

In the site table, where strFacilityCategory is null, it is set to “01.”

Mandatory geo-coordinate fields were added to the NIF specifications released in December 2003, well after it would have been possible to collect this information from the reporting facilities. The following values were deemed most often representative and the exported data are updated accordingly:
"strHorizontalCollectionMethodCode" is set to '027'
"strHorizontalAccuracyMeasure" is set to '2000'
"strHorizontalReferenceDatumCode" is set to '001'
"strReferencePointCode" is set to '106'

MAERS tracks emissions of interest to the Great Lakes Commission, but are not valid pollutant codes according to the most recent NIF code tables. Emission records for the following pollutant codes are excluded:

7440508
8052413
DICDD,TOT
DICDF,TOT
HYDFLUORO
PERFLUORO
TRICDD,TOTRICDF,TO
CH4
CO2
N20
117840
7783064

Emission records for ammonia are exported with the CAS number 7 664417, rather than the pollutant code NH3. These pollutant codes are updated to NH3.

All criteria and HAP emissions are reported at the process level, and the export routines reflect that in the strEmissionDataLevel field of the emission table. This field is set to null for criteria pollutant emission records per EPA guidance.

All emissions are exported as pounds of annual emissions. The EPA guidance suggests that criteria pollutant emission be reported in tons. The field strEmissionUnitNumerator is changed to TON and the filed dblEmissionNumericValue is divided by 2000 for criteria pollutant emission records.

Null values in the quarterly throughput fields of process records are set to zero.

Where quarterly throughput fields of process records sum to zero, throughput percentages are set to 25 percent for each quarter.

MAERS recognizes a control device code of '909' for a "Roll Media Fiberglass Tack Filter (Tacky 1 side)," which is not recognized in the NIF code tables. In the one instance where this control device code is exported, the "strPrimaryDeviceTypeCode" field of the control equipment table is updated to a value of 058.

Because of the exclusion of emission records as described above, the referential integrity of the exported data has been compromised. At this point, it is reestablished by deleting records stepwise, in the following order.

1. CE records without corresponding EM records
2. PE records without corresponding EM records
3. EP records without corresponding EM records
4. ER records without corresponding EP records
5. EU records without corresponding EP records
6. SI records without corresponding EU records

Summer period records, average summer weekday emission (emission type 27) records, and average summer weekend day emission (emission type 28) records are generated from annual data and merged into the period and emission tables. The throughput for the summer period records is annual throughput multiplied by the summer throughput percentage from the corresponding emitting process record. For summer

weekday and weekend day emissions, summer throughput percentage and annual average days per week information from the corresponding emitting process record is applied. Annual emissions are multiplied by the summer throughput percentage, divided by 92 days in the summer period, and multiplied by seven days per week to get average summer week emissions. Average summer weekday and weekend day records are then created for three different situations. Where average annual days per week is five or less; weekday emissions are one-fifth of weekly emissions, and weekend day emissions are zero. Where average annual days per week is six; weekday emissions are one-sixth of weekly emissions, and weekend day emissions are one-twelfth of weekly emissions. Where average annual days per week is seven, both weekday emissions and weekend day emissions are one-seventh of weekly emissions.

The data are then checked again for referential integrity and mandatory fields and then loaded into the MS Access shell version of the NIF via append queries that connect to the PostgreSQL data tables via ODBC. The Basic Content and Format Checker is run and its output is reviewed.

There are three basic differences between the MAERS and NEI datasets. The MAERS emissions are annual averages, and the NEI data represents both annual average and also have been temporally allocated to best reflect an average ozone season day. The data provided for NEI included emissions from EGU facilities and were replaced by EPA with emissions reported by the EGU facilities to EPA's Acid Rain Division, so EGU emissions from MAERS have been temporally allocated according to the same methodology used for the NEI sources, and added into the above total for 2002.

The 2002 point source records were incorporated into the LADCO base K inventory. The emissions presented here are identical to those posted by LADCO in January 2006.

2005 Non-EGU Point Source Methodologies

The 2005 inventory is not due to EPA until June 2007 and has not been completed yet. Therefore, an estimate of 2005 non-EGU point source emissions was made by interpolating between the 2002 and 2009 inventories. Growth and control rates are expected to be uniform during this time period for this source category. Therefore, this approach should be relatively accurate.

Growing Stationary Non-EGU Point, Stationary Area, Locomotive, Shipping, and Aircraft Categories to the Years 2009 and 2018:

The 2009 and 2018 figures are based on work and a follow-up report (E.H. Pechan & Associates, Inc., Development of Growth and Control Factors for Lake Michigan Air Directors Consortium, Final Report, December 14, 2004) done by E.H. Pechan & Associates, Inc. (Pechan). This work supports LADCO's efforts to forecast anthropogenic emissions for the purpose of assessing progress for air quality goals, including goals related to regional haze and attainment of the ozone National Ambient Air Quality Standards (NAAQS). The Pechan growth factors were used to estimate the LADCO base K future year emissions posted by LADCO in January 2006. The future year emissions represent both emission controls that already exist and those that are known to be on the way (e.g., CAIR control measures).

To assess progress for attaining air quality goals, LADCO requires emission activity growth and control data to forecast emissions from a 2002 base year inventory to several future years of interest. These future years were identified by LADCO as 2007, 2008, 2009, 2012, and 2018 (e.g., 2018 is the first milestone for regional haze reasonable progress demonstrations). Pechan prepared emission control factors to support forecasting for each of these years. Because the incremental level of effort required to develop emission activity growth factors for each year over the 2003-2018 period was nominal, Pechan prepared non-EGU point and area and nonroad source growth factors for each year over this entire period.

The report describes Pechan efforts to develop emission growth and control data to support future year air quality modeling by LADCO. The report is organized into a background chapter and:

Chapter II, which describes the development of the emission activity growth data;
Chapter III, which discusses how the emission control data were compiled;
Chapter IV, which describes the preparation of the growth and control factor files;
Chapter V, which identifies projection issues for future consideration; and
Chapter VI, which presents the references consulted in preparing this report.

The Pechan Growth and Control Factor report is too lengthy to be included in this document, but it can be provided upon request or downloaded at:
http://www.ladco.org/reports/rpo/MWRPOprojects/Strategies/Growth&ControlDraftReport Oct26-04.pdf

III. Stationary Area Sources

The table below summarizes typical ozone season weekday stationary area source emissions for the ozone redesignation counties for the years 2002, 2009, and 2018.

DAILY TOTAL VOC (TONS)

COUNTY	2002	2005	2009	2018
Berrien	9.05	8.99	8.92	9.38
Cass	2.22	2.22	2.22	2.31
Genesee	22.06	21.63	21.06	21.19
Lapeer	4.60	4.60	4.59	4.82
Muskegon	8.20	8.15	8.09	8.36

DAILY TOTAL NOX (TONS)

COUNTY	2002	2005	2009	2018
Berrien	0.79	0.81	0.83	0.86
Cass	0.20	0.20	0.21	0.22
Genesee	1.76	1.80	1.86	1.92
Lapeer	0.37	0.38	0.39	0.41
Muskegon	0.81	0.83	0.85	0.88

A. 2002 Area Source Methodologies

The following methodologies were used to compile the emissions for the various stationary area source categories for the 2002 Emissions Inventory base year.

Oil and Natural Gas Production

The oil and gas production area source category represents those VOC emissions that result from the exploration, drilling, and the field processing of crude oil and natural gas. Fugitive VOC emissions occur from control valves, relief valves, spills, pipe fittings, pump seals and compressor seals in the production and field processing of crude oil and natural gas. Individual county crude oil and natural gas production data was obtained from the MDEQ, Geological and Land Management Division. VOC emission factors were derived from the EPA publication entitled: Revision of Evaporative Hydrocarbon Emission Factors (EPA – 450/3-76-039). The emission factors are 107 pounds of emitted VOCs per thousand barrels of produced crude oil and 175 pounds of emitted VOCs per million cubic feet of produced natural gas. For crude oil production, emission controls reflecting National Emission Standards for Hazardous Air Pollutants (NESHAP) application of a 45 percent reduction in VOCs were considered. This control level was based on the EPA determination of an overall 45 percent reduction in VOCs from oil and natural gas production facilities. This control reduction was obtained from a May 14, 1999, EPA fact sheet that was published with the Final Air Toxics Rules for Oil and Natural Gas Production Facilities and Natural Gas Transmission and Storage Facilities. Rule effectiveness of 80 percent was applied, and point source deductions were performed to estimate the area source contribution. For natural gas, emission controls from Michigan air pollution control rule R336.1629 of 72 percent and the federal emission control reduction in VOCs of 19 percent associated with NESHAP application to natural gas transmission and storage were applied. The 19 percent emission reduction was obtained from the May 14, 1999, EPA fact sheet that was published with the Final Air Toxics Rules for Oil and Natural Gas Production Facilities and Natural Gas Transmission and Storage Facilities. The federal NESHAP rule became effective June 17, 1999. Area source emissions were then reported using SCC codes of 2310010000 for crude petroleum oil production and 2310020000 for natural gas production.

Vessel Loading/Ballasting

Evaporative VOCs occur from Great Lakes ships when being loaded with gasoline and petrochemicals. Vapors are also displaced when cargo tanks are loaded with water for ballasting. To estimate VOC emissions from vessel loading and ballasting activities, a list of marine terminals at Michigan-based ports handling petroleum products was obtained from the Michigan Department of Transportation (MDOT). Because of the need to acquire information on gasoline and petrochemical handling at each Michigan port and the time frames during which vessel loading/ballasting occurred, a survey form was sent to the marine terminals. This state survey approach went beyond the EPA's prescribed inventory procedures in Volume III, Chapter 12 of the Emission Inventory Improvement Program January 2001 guidance for Marine Vessel Loading, Ballasting and Transit. The survey form requested information on days of operation, seasonal fuel transfer information on gasoline, distillate fuel oil, jet naphtha, jet kerosene, kerosene, residual fuel oil, and crude petroleum loading into ship and barge cargo tanks as well as ballast operations. The survey data was then summed to derive individual county totals.

The results of this survey revealed that there were only two fuel types (contaminated gasoline, and residual fuel oil) where loading had occurred. VOC emission factors (0.00009 lbs/1000 gallons of residual fuel oil and 3.4 lbs/1000 gallons of gasoline) were then applied to their respective fuel volumes to obtain the estimated emission losses. Although, the EPA, on September 19, 1995, issued Federal Standards for Marine Tank Vessel Loading Operations and National Emission Standards for Hazardous Air Pollutants for Marine Vessel Loading Operations, the respective facilities transferring fuel were exempt from control requirements. Consequently, emissions estimates were based on the respective emission factors without the application of control measures. Individual county VOC emission estimates from loading and ballasting operations were reported using the following SCC codes:

Vessel Loading/Ballasting Operations	Reported SCC Code
Vessel loading, distillate fuel oil	2505020090
Vessel loading, gasoline	2505020120
Vessel loading, residual fuel oil	2505020060
Vessel loading, crude oil	2505020030
Vessel loading, naphtha	2505020150
Vessel loading, jet kerosene	2505020180
Vessel loading, kerosene	2505020180
Vessel ballasting, gasoline	2505020900
Vessel ballasting, crude oil	2505020900

Service Station Loading (Stage I)

Gasoline vapor loss occurs at service stations when gasoline is unloaded from delivery tank trucks into underground storage tanks. The extent of vapor loss is dependent upon the method of filling (splash, submerge, or vapor balanced). In computing VOC emissions from service station loading, year 2002 gasoline throughput estimates were obtained from Energy Information Administration's Petroleum Marketing Monthly data. The monthly data was summed to derive an estimated statewide gasoline total. County gasoline total estimates were determined by apportioning the statewide gasoline by the percent of state gasoline sales occurring within each county. County gasoline sales data was obtained from the U.S. Department of Commerce, Bureau of Census, Michigan 1997 Economic Census, Retail Trade, Geographic Area Series. State gasoline throughput consumption was apportioned on a county basis using the following mathematical equation:

$$Ct = St \times Cs/Ss$$

Where:

Ct = Estimated county gasoline consumption for year 2002
St = Statewide gasoline consumption for year 2002
Cs = County gasoline service station retail sales data
Ss = State gasoline service station retail sales data

VOC emission estimates were developed based upon the EPA's prescribed inventory procedures in Volume III, Chapter 11 of the Emission Inventory Improvement Program January 2001 Guidance for Gasoline Marketing (Stage I and Stage II) and subsequent September 2002 Draft Summary of the Analysis of the Emissions Reported in the 1999 NEI for Stage I and Stage II Operations at Gasoline Service Stations. Year 2002 and summer weekday emission factors were developed based on actual temperature, and Reid vapor pressure (RVP) fuel volatility information for various regions of the state to reflect the applicable RVP control measures. Monthly temperature data was obtained for the year 2002 from the NOAA, National Climatic Center Local Climatological Data that was utilized in determining year and summer day temperatures for the Michigan Upper Peninsula and Michigan Lower Peninsula regions. RVP data for marketed gasoline in 2002 was obtained from the Michigan Department of Agriculture, Motor Fuels Quality, Laboratory Division. VOC mission factors were developed for splash fill, submerge fill, and vapor balanced gasoline dispensing facilities on a county basis, which reflected the actual temperature and RVP of marketed gasoline products.

Stage I loading emission factors were determined using the methodology specified in September 2002 Draft Summary of the Analysis of the Emissions Reported in the 1999 NEI for Stage I and Stage II Operations at Gasoline Service Stations. The following equation is presented:

$$L = 12.46 \times SPM/T$$

Where: L = Loading loss (uncontrolled), pounds per 1000 gal of liquid loaded

S = A saturation factor where S= 0.6 for submerged loading with no vapor balance, S = 1.00 for submerge loading with vapor balance, and S = 1.45 = splash loading no vapor balance

P = True vapor pressure of liquid loaded, pounds per square inch absolute (psia)

M = Molecular weight of vapors, pounds per pound-mole

T = Temperature of bulk liquid in degrees F + 460

The quantity of county gasoline throughput that is splash filled, submerge filled, and vapor balanced was estimated on the basis of past gasoline surveys, and the applicability of state regulations which require the installation of submerge fill or vapor balanced systems. These percentages were obtained from the year 1999 emissions inventory. The same county fractional percentages of splash filled, submerge filled, and vapor balanced were used in the year 2002 inventory for consistency with respect to prior emission inventories.

The respective emission estimates were reported using the following SCC codes:

Michigan Gasoline Marketing Stage I Emission SCC Codes

Stage I Type	SCC
Submerge filled loading	2501060051
Splash filled loading	2501060052
Vapor balanced loading	2501060053

The EPA, on December 19, 2003, issued final requirements for Stage I gasoline distribution in Standards of Performance for Bulk Gasoline Terminals and National Emission Standards for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations. These NESHAP requirements will be applied in point source inventories for bulk terminals.

Calculation of Stage I Emission Factors

Vapor Balance

Region	Year 2002 Annual Emission Factor lbs/1000 gal	Ozone Season 4/1/02-9/30/02 Emission Factor lbs/1000 gal	Summer Weekday 6/1/02-8/31 Emission Factor lbs/1000 gal	Year 2002 Annual Temperature F	Year 2002 Ozone Season 4/1/02-9/30/02 Temperature F	Year 2002 Summer Weekday 6/1/02-9/30/02 Temperature F	Annual RVP	Ozone Season RVP 4/1/02-9/30/02	Summer Weekday RVP 6/1/02-8/31/02	Year 2002 Annual True Vapor Pressure P	Year 2002 Ozone Season 4/1/02-9/30/02 True Vapor Pressure P	Year 2002 Summer Weekday 6/1/02-9/30/02 True Vapor Pressure P	Saturation Factor S	Year 2002 Annual RVP Molecular Weight	Ozone Season 4/1/02-9/30/02 RVP Molecular Weight	Summer Weekday 6/1/02-9/30/02 RVP Molecular Weight
Upper Peninsula	0.70	0.85	0.93	50.6	66.7	76.3	10.7	9.4	8.8	4.4	5.4	6	1	65.06	66.4	66.8
Lower Peninsula	0.79	0.96	1.01	57.5	73.2	81.3	10.7	9.4	8.8	5.02	6.2	6.6	1	65.06	66.4	66.8
SE Michigan	0.78	0.85	0.87	57.5	73.2	81.3	10.4	8.5	7.5	4.95	5.4	5.6	1	65.47	67	67.7

Submerge Fill

Region	Year 2002 Annual Emission Factor lbs/1000 gal	Ozone Season 4/1/02-9/30/02 Emission Factor lbs/1000 gal	Summer Weekday 6/1/02-8/31 Emission Factor lbs/1000 gal	Year 2002 Annual Temperature F	Year 2002 Ozone Season 4/1/02-9/30/02 Temperature F	Year 2002 Summer Weekday 6/1/02-9/30/02 Temperature F	Annual RVP	Ozone Season RVP 4/1/02-9/30/02	Summer Weekday RVP 6/1/02-8/31/02	Year 2002 Annual True Vapor Pressure P	Year 2002 Ozone Season 4/1/02-9/30/02 True Vapor Pressure P	Year 2002 Summer Weekday 6/1/02-9/30/02 True Vapor Pressure P	Saturation Factor S	Year 2002 Annual RVP Molecular Weight	Ozone Season 4/1/02-9/30/02 RVP Molecular Weight	Summer Weekday 6/1/02-9/30/02 RVP Molecular Weight
Upper Peninsula	4.19	5.09	5.59	50.6	66.7	76.3	10.7	9.4	8.8	4.4	5.4	6	0.6	65.06	66.4	66.8
Lower Peninsula	4.72	5.77	6.09	57.5	73.2	81.3	10.7	9.4	8.8	5.02	6.2	6.6	0.6	65.06	66.4	66.8
SE Michigan	4.68	5.07	5.24	57.5	73.2	81.3	10.4	8.5	7.5	4.95	5.4	5.6	0.6	65.47	67	67.7

Splash Fill

Region	Year 2002 Annual Emission Factor lbs/1000 gal	Ozone Season 4/1/02-9/30/02 Emission Factor lbs/1000 gal	Summer Weekday 6/1/02-8/31 Emission Factor lbs/1000 gal	Year 2002 Annual Temperature F	Year 2002 Ozone Season 4/1/02-9/30/02 Temperature F	Year 2002 Summer Weekday 6/1/02-9/30/02 Temperature F	Annual RVP	Ozone Season RVP 4/1/02-9/30/02	Summer Weekday RVP 6/1/02-8/31/02	Year 2002 Annual True Vapor Pressure P	Year 2002 Ozone Season 4/1/02-9/30/02 True Vapor Pressure P	Year 2002 Summer Weekday 6/1/02-9/30/02 True Vapor Pressure P	Saturation Factor S	Year 2002 Annual RVP Molecular Weight	Ozone Season 4/1/02-9/30/02 RVP Molecular Weight	Summer Weekday 6/1/02-9/30/02 RVP Molecular Weight
Upper Peninsula	10.13	12.30	13.50	50.6	66.7	76.3	10.7	9.4	8.8	4.4	5.4	6	1.45	65.06	66.4	66.8
Lower Peninsula	11.40	13.95	14.72	57.5	73.2	81.3	10.7	9.4	8.8	5.02	6.2	6.6	1.45	65.06	66.4	66.8
SE Michigan	11.31	12.26	12.65	57.5	73.2	81.3	10.4	8.5	7.5	4.95	5.4	5.6	1.45	65.47	67	67.7

Service Station Unloading/Vehicle Fueling (Stage II)

Motor vehicle fueling at service stations results in evaporative loss of gasoline. VOC emissions are produced during displacement of vaporized hydrocarbons and spillage of gasoline during refueling. EPA guidance, Volume III, Chapter 11 of the Emission Inventory Improvement Program January 2001 Guidance for Gasoline Marketing (Stage I and Stage II) recommends the MOBILE model be used to generate refueling (Stage II) emission factors for highway emission inventories. Additional procedures were presented in September 2002 Draft Summary of the Analysis of the Emissions Reported in the 1999 NEI for Stage I and Stage II Operations at Gasoline Service Stations. The MOBILE6 model was used to derive the Stage II emission factor by obtaining monthly emission factors in grams/VOC mile, as well as fuel economy, as miles per gallon and vehicle miles traveled mix for the different gasoline vehicle types (e.g., LDTV, LDGT, and HDGV). For each vehicle type, the monthly emission factor was multiplied by the fuel economy to obtain an emission factor in unit grams of VOC/gallon.

grams VOC/gallon = Grams/mile x miles/gallon

The Stage II grams/gallon refueling emission factor rates were prepared by the Southeast Michigan Council of Government (SEMCOG) using MOBILE6.2 reflecting state-specific RVP and temperature data. The VMT mix for each vehicle types was used to calculate a single weighted monthly emission factor. Summer and average annual emission factors were developed for Southeast Michigan, the rest of the Lower Peninsula, and the Upper Peninsula. SEMCOG's Stage II grams/gallon emission factors are presented below.

SEMCOG Year 2002 Refueling Emission Rates for State of Michigan

Average Type and Geographical Area	**Grams/Gal.**
Summer (Average of monthly refueling emission rates for June, July & August, 2002)	
Southeast Michigan (Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw and Wayne counties)	2.398
Rest of Lower Peninsula (All counties in Lower Peninsula except the seven Southeast Michigan counties)	2.867
Upper Peninsula (All counties in the Upper Peninsula)	2.697
Average Annual (Average of monthly refueling emission rates)	
Southeast Michigan (Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw and Wayne counties)	2.649
Rest of Lower Peninsula (All counties in Lower Peninsula except the seven Southeast Michigan counties)	2.765
Upper Peninsula (All counties in the Upper Peninsula)	2.542

All rates calculated using MOBILE6.2 model

The respective SEMCOG grams VOC/gallon were converted to lbs/1000 gallons.

Lbs VOC/1000 gallons = Grams VOC/gallon x 1 lb/453 grams x 1000 gallons

Year 2002 gasoline throughput estimates were obtained from Energy Information Administration's Petroleum Marketing Monthly data. The monthly data was summed to derive an estimated statewide gasoline total. County gasoline total estimates were determined by apportioning the statewide gasoline by the percent of state gasoline sales occurring within each county. County gasoline sales data was obtained from the U.S. Department of Commerce, Bureau of Census, Michigan 1997 Economic Census, Retail Trade, Geographic Area Series. Total county emissions estimates are based on the county gasoline volume by the corresponding refueling emission factor. Emission rates are reported using the SCC code 2501060100.

Service Station Tank Breathing

Pressure changes occur within underground storage tanks as a result of temperature differences that exist between gasoline vapor and the liquid phases. The exchange of vapor within the storage tank to the atmosphere is commonly described as tank breathing. Underground gasoline storage tank breathing losses were estimated by applying a 1.0 pound per thousand gallon throughput emission factor using procedures presented in the EPA publications Volume III, Chapter 11 of the Emission Inventory Improvement Program January 2001 Guidance for Gasoline Marketing (Stage I and Stage II) and September 2002 Draft Summary of the Analysis of the Emissions Reported in the 1999 NEI for Stage I and Stage II Operations at Gasoline Service Stations. Year 2002 county gasoline consumption estimates were obtained by apportionment of the statewide gasoline consumption based on the county percentage of state gasoline retail sales. Statewide gasoline consumption data was obtained from Energy Information Administration's Petroleum Marketing Monthly and county retail gasoline sales information was identified in the U.S. Department of Commerce, Bureau of Census, Michigan 1997 Economic Census, Retail Trade, Geographic Area Series. Emission estimates were reported using the SCC of 2501060200.

Gasoline Tank Truck Transit

Breathing losses from gasoline tank trucks occurs as a result of pressure changes within the containment vessel. The pressure change in the containment vessel is caused by temperature differences between the vapor and liquid phases as well as agitation during transport. Gasoline tank trucks leak VOC vapors and liquids from gaskets, seals, and seams during transport.

Because some gasoline is delivered to bulk plants rather than delivered directly to service stations from terminals, the amount of gasoline transferred in any area may exceed the total gasoline consumption due to additional trips involved. Therefore, gasoline tank truck transit evaporation emissions were based on the total volume of gasoline transferred rather than county consumption level. The total gasoline transferred in a given county was obtained by taking the sum of both the service station volume delivery and the bulk plant gasoline transfer. The bulk plant gasoline transfer volume in a county was obtained from point source data. VOC emissions estimates were developed using the gasoline tank truck transit emission factors identified by EPA procedures presented in Volume III, Chapter 11 of the Emission Inventory Improvement Program January 2001 Guidance for Gasoline Marketing (Stage I and Stage II). In this document, VOC loss from gas-filled tank truck emission factor was 0.005 lbs/1000 gallons and empty vapor-filled tank trucks were 0.055 lbs/1000 gallons. A single emission factor of 0.06 lbs/1000 gallons was derived by taking the sum of the two respective factors, and applying this emission factor to the total transported gasoline volume. Further emission adjustments were made to the respective emission totals to reflect those delivery vessels in those counties subject to Michigan Air Pollution Control Rule R 336.1627. A control efficiency of 76 percent was considered before subsequent application of an 80 percent rule effectiveness

and 100 percent rule penetration factors for delivery vessels in those counties subject to R336.1627. Emission estimates were reported using the SCC of 2505030120.

Aviation Fuel Stage I Loading

Gasoline vapor loss occurs at airports when gasoline is unloaded from delivery tank trucks into underground storage tanks. Because of the need to temporally adjust aircraft refueling emissions for all respective fuel types within all Michigan counties, the MDEQ determined that local aviation fuel sales information could only be acquired by contacting each fuel distributor serving each airport. Because the aircraft fleet varies at each airport, the amount of fuel type consumed will likewise be dependent on the types of aircraft being serviced and not just based upon landings and takeoffs (LTOs) alone.

A list of those Michigan commercial and private airports where fuels are dispensed was obtained from the MDOT publication 2003 Michigan Airport Directory. A survey form was mailed to each airport operations manager. Total fuels sales information by fuel type(s) and season were obtained from airport staff or assigned fixed base operators. The information was summed for each county to provide an estimate of the total volumes of jet kerosene, jet naphtha, and aviation gasoline handled at each airport facility. Stage I loading VOC emission factors for jet kerosene and jet naphtha were determined using the following equation:

$$L = 12.46 \times SPM/T$$

Where:
- L = Loading loss (uncontrolled), pounds per 1000 gal of liquid loaded
- S = A saturation factor where 1.45 = splash loading
- P = True vapor pressure of liquid loaded, pounds per square inch absolute (psia)
- M = Molecular weight of vapors, pounds per pound-mole
- T = Temperature of bulk liquid in degrees F + 460

For Stage I aviation gasoline VOC emissions, an emission factor was obtained from the EPA publication, Documentation for the 2002 Nonpoint Source National Emission Inventory for Criteria and Hazardous Air Pollutants (January 2004 Version). The resultant emission factors were applied to the total county fuel throughput after considering point source fuel throughput deductions. Because the EPA does not have itemized SCC codes by fuel type, VOC emissions were added together and reported using an SCC of 2501080050.

Aircraft Refueling (Stage II)

Aircraft refueling at airports results in the evaporative loss of aviation gasoline, jet kerosene, and jet naphtha. VOC emissions occur when vapor-laden air in a partially empty fuel tank is displaced to the atmosphere during refueling. The quantity of the vapor being displaced is dependent upon the fuel temperature, fuel vapor pressure, aircraft fuel tank temperature, and the fuel dispensing rate.

Because of the need to temporally adjust aircraft refueling emissions for each respective fuel type within each county, the MDEQ determined that local aviation fuel sales information could only be acquired by contacting each fuel distributor serving each airport. Because the fleet of the aircraft varies at each airport, the amount of fuel type consumed will be dependent on the types of aircraft being serviced and not just based upon landings and takeoffs (LTOs) alone.

A list of those Michigan commercial and private airports where fuels are dispensed was obtained from the MDOT publication, 2003 Michigan Airport Directory. A survey form was mailed to each airport operations manager. Total fuels sales information by fuel type(s) and season were obtained from airport staff or assigned fixed base operators. The information was summed for each county to provide the total dispensed volumes of jet kerosene, jet naphtha, and aviation gasoline. VOC aviation refueling loss emission factors from the EPA publication, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42), were applied to the respective county total fuel volumes.

Aviation Fuel Type	Emission Factor as lbs of VOCs/1000 gallons fuel
Jet kerosene	0.08
Jet naphtha	5.58
Aviation gasoline	12.20

There is no provision currently to allow for the reporting of emissions by individual fuel type. Emissions were summed for all fuel types and reported using the SCC code 2275900000.

Traffic Marking Coatings

Traffic marking coatings are paints that are used to mark pavement, including dividing lines for traffic lanes, parking space markings, crosswalks, and arrows to direct traffic flow. VOC emissions result from the evaporation of organic solvents during the application and curing of the marking paint.

VOC emissions were estimated for each county using the methodology identified in the EPA publication, Volume III, Chapter 14 of the Emission Inventory Improvement Program May 1997 Final Guidance for Traffic Markings. The preferred method was to conduct surveys to determine the volume of water and solvent-based coating consumption, coating formulation (in terms of pounds of VOC content per applied gallon), and months of year 2002 when the coatings were applied. Survey forms were mailed to all Michigan county road commissions, major municipality road maintenance departments, and to the MDOT. Where county road commissions failed to submit the information, emission estimates were based upon results of those counties that had responded to the survey. An average coating application rate (total gallons of coating applied per road miles in county) was first determined from survey respondents. Road length miles were obtained for the counties that failed to respond to the survey. Total coating gallon consumption was estimated for counties that failed to respond by applying the road length miles to the average coating application rate. Similarly, an average VOC content (as lbs/gallon) was obtained by dividing the total mass of VOC emissions by the total coating volume of survey respondents. The result was applied to the estimated coating volumes for survey non-respondent counties. This average density was reflective of the proportions of solvent- and water-based coatings by survey respondents. Seasonal coating application was also based upon county survey results of the months during which the coatings were applied. It should be recognized that year 2002 was a recession year in which county and local governments had limited budgets. It is likely that projected emissions would be greater during better economic times. Traffic marking paint emissions were reported using an SCC of 2401008000

Cutback Asphalts

Cutback asphalt is a bituminous road coating material that is prepared by blending an asphalt cement tar with a petroleum distillate (such as naphtha, kerosene, or other fuel oils). Cutback asphalt is used as a pavement sealant, tack coat, pothole filler, and a bonding agent between layers of paving material. Evaporative loss of the solvent from bitumen cement occurs as the cutback asphalt cures on the road surface. The rate at which VOC emissions occur is dependent both upon the temperature of the applied road surface and the type of solvent used in the formulation of the cutback asphalt material. Gasoline or naphtha is used as a diluent in the production of "rapid cure" cutback asphalts. Kerosene and other low volatility fuel oils are also used as diluents in the production of "medium cure" and "slow cure" cutback asphalts.

VOC emissions were estimated for each county using the methodology identified in the EPA publication, Volume III, Chapter 17 of the Emission Inventory Improvement Program January 2001 Final Guidance for Asphalt Paving. In this document, the preferred method was to conduct surveys to determine locally-specific information on cutback asphalt use on roads.

To estimate VOC emissions from the application of cutback asphalt materials (rapid cure, medium cure, and slow cure), a survey was mailed to all Michigan county road commissions, major municipality road maintenance departments, and to the MDOT. The survey requested the following information:

- The quantities of rapid cure, medium cure, and slow cure cutback asphalt materials applied during year 2002;
- The type of petroleum distillate and volume used as a diluent in the formulation of each cutback paving material; and
- The months during which cutback asphalt materials were applied.

The EPA determined that evaporation occurs about four months with 75 percent by weight of diluent evaporating in the first day for rapid cure materials. It takes about one week for 50 percent by weight of diluent to evaporate from medium cure cutback asphalt materials. Conservative estimates were made by assuming that 100 percent of the diluent evaporates within the season during which it is applied.

VOC emission estimates were based on the amount of the petroleum based diluent that comprises the cutback asphalt material and then applying their respective solvent density. Emission estimates were reported using an SCC of 2461021000.

Emulsified Asphalts

Emulsified asphalts are a type of liquefied road surfacing material that is used in the same application as cutback asphalts. Instead of blending the asphalt material with a petroleum distillate like their cutback asphalt counterparts, emulsified asphalts use a blend of water with an emulsifier (soap). Emulsified asphalts either rely on water evaporation to cure (anionic-high float emulsions) or ionic bonding of the emulsion and the aggregate surface (cationic emulsions).

In the EPA publication, Volume III, Chapter 17 of the Emission Inventory Improvement Program January 2001 Final Guidance for Asphalt Paving, the preferred method is to conduct a survey of emulsified asphalt application on Michigan roads. Survey forms were mailed to all Michigan county road commissions, major municipality road maintenance departments, and to the MDOT. This form requested information on the quantities of asphalt materials (in pounds and barrels)

applied to Michigan roadways and the months during which they were applied. Road length miles were also obtained for all Michigan counties. In those situations where a county road commission failed to submit such information, emission estimates were based upon results of those counties that had responded to the survey. An average application rate (total barrels of emulsified asphalts applied per road miles in county) was first determined from survey respondents. Total barrel consumption estimates were estimated for counties that failed to respond by applying the road length miles to the average emulsified asphalt application rate. VOC emissions were obtained by applying an EPA factor of 9.2 lbs VOC/barrel of applied asphalt. It was further assumed that all emissions occur during the season that the asphalt materials were applied, and reported using an SCC of 2461022000.

Breweries

Breweries, microbreweries, brewpubs, and contract brewers emit VOCs including ethanol, ethyl acetate, myrcene and other higher alcohols from various brewing processes. For the smaller brewers, VOCs are lost by the fermentation, in brew kettles, hot wort, mash and lauter tuns, and through spent grain. Microbreweries and brewpubs typically produce beer for patron on-site consumption, although some may have limited keg distribution. These smaller microbreweries and brewpubs typically combine some processes, and canning/bottling operations typically do not exist as the beer is consumed on-site or stored in kegs.

Various trade organization lists were obtained to identify brewers in Michigan and their beer production. There are some regional breweries, though the vast majority are brewpubs and microbreweries. These facilities have very small to insignificant VOC emissions. Emission estimates were based on a combined emission factor rate from Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42) of 3.0465 lbs of VOC per 1000 barrels. The small emission factor and low beer production rates did not justify a need for a survey of these establishments. Emissions for each establishment were estimated on the basis of trade reported production and the application of the emission factors. An SCC of 2302070001 was used in reporting brewery emissions.

Distilleries

Distilleries include ethanol production facilities that are used in the production of gasohol motor fuels, grain alcohol for industrial purposes, and distilled spirits for personal consumption. These products are produced from the fermentation of aged mashed grains with distillation for the capture of desired alcohol based products. The fermentation products use yeast to convert grain sugars into ethanol, ethyl acetate, isoamyl alcohol, isobutyl alcohol and carbon dioxide. Grains used in the process may include corn, rye, barley, and wheat. A more detailed description of distilleries and their emissions can be found in EPA publication, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42).

In identifying distilleries in Michigan, contact was made with the Michigan Biomass Energy Program of the Michigan Department of Consumer and Energy Services. During year 2002, there was only one ethanol production facility in Caro, Michigan. This facility was already being reported as a point source. The area source contribution from distilleries using SCC 2302070010 had zero emissions for all Michigan counties.

Wineries

Wineries produce alcohol beverages from the fermentation of fruit juices. The major processes in vinification include fruit harvesting, crushing, pressing, fermentation, clarification, aging, finishing, and bottling. During this fermentation process of both red and white wines, primarily ethanol and smaller quantities of methyl alcohol, n-propyl alcohol, butyl alcohol, isoamyl alcohol, and acetaldehydes are produced along with carbon dioxide. This process involves the reaction of a yeast with glucose and fructose sugars to produce ethanol and carbon dioxide. The EPA emission factors are reflective of VOCs evolved during fermentation in vinification.

County estimates of wine production were based upon wine volume information of Michigan Department of Treasury tax receipt information supplied to the Michigan Grape and Wine Industry Council. A VOC emission factor was obtained from Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42) of 4.6263 lbs VOC/ 1000 gallons. This emission factor is a sum of ethyl alcohol, methyl alcohol, n-propyl alcohol, n-butyl alcohol, sec-butyl alcohol, isobutyl alcohol, isoamyl alcohol and acetaldehyde for red wine from AP-42. Emission estimates were reported using an SCC of 230207005.

Stationary Source Fossil Fuel Combustion

The combustion of natural gas, propane-LPG, distillate fuel oil, kerosene, and residual fuel oil in small boilers, furnaces, heaters, and stoves are also a source of VOCs, nitrogen oxides, particulates, sulfur dioxide, and ammonia emissions. Because these sources are so numerous to be identified in point source inventories, this area source category attempts to provide a collective estimate of emissions from these smaller energy consumption sources by subtracting all fuel used by point sources from total fuel consumption. Procedures for the estimation of these smaller sources are presented in the EPA's documents, entitled:

Volume II, Chapter 2 of the Emission Inventory Improvement Program January 2001 Preferred and Alternate Methods for Estimating Air Emissions from Boilers.

Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract- Fuel Oil and Kerosene Combustion

Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract-Natural Gas and LPG Combustion

Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract-Coal Combustion

Documentation for the Draft 1999 National Emissions Inventory (Version 3.0) for Criteria Air Pollutants and Ammonia

Hanke, B.H, manuscript prepared for the EPA entitled: A National Methodology and Emission Inventory for Residential Fuel Combustion

This documentation involves determination of total fuel consumption over an area with fuel deductions made for point source fuel consumption, and the application of emissions factors to estimate fuel emissions.

Total fuel consumption information is based on data supplied from U.S. Department of Energy, Energy Information Administration documents. This unaccounted fuel consumption was then apportioned to individual counties using U.S. Census Bureau information for the individual end use sector fuel types based upon LADCO states methodology. Area source fuel emissions were reported for the following residential, commercial/institutional, and industrial end use sectors. Utility boilers are accounted for as point sources, so area source emissions are not reported for this end use sector.

Residential Boilers & Furnaces

County emission estimates for the residential end use sector were based upon the consumption of natural gas, propane-LPG, distillate fuel oil, kerosene, and coal in U.S. Department of Energy, Energy Information Administration data. Because the Energy Information Administration merely provides statewide fuel consumption totals, county fuel consumption estimates were obtained by apportioning the fuel consumption based upon the number of year 2000 occupied household census counts using the given fuel. Emission estimates were calculated using the following mathematical equation:

$$Cf = Ch/Sh \times Sf$$

Where:

Cf = Estimated county residential sector consumption of a given fuel type for year 2002
Ch = Number of year 2000 census occupied households in a given county that utilize a given fuel type
Sh = Total number of year 2000 census occupied households statewide that utilize a given fuel type
Sf = Total statewide residential sector consumption of a given fuel type

Michigan Residential Fuel Consumption Information Sources

Residential Fuel Type	U.S. Dept of Energy, Energy Information Administration Data Sources
Natural gas	Natural Gas Monthly
Propane LPG	Petroleum Marketing Annual, 2002
Distillate fuel oil	Fuel Oil and Kerosene Sales 2002 Report
Kerosene	Fuel Oil and Kerosene Sales 2002 Report
Coal	State Energy Data Report 2000 (most recent)

Upon obtaining county residential fuel consumption estimates for the various fuel types in all Michigan counties Cf, emission estimates were obtained by applying an emission factor specific to that fuel type. These emission factors came from various EPA publications.

Michigan Residential Fuel Emission Factors

Residential Fuel Type	Units	CO	NH_3	NOx	PM10-PRI	PM25-PRI	SO_2	VOC
Natural gas	Lbs/million cubic feet	40	0.49	94	7.6	7.6	0.6	5.5
Propane LPG	Lbs/1000 gal	3.2		13	0.68	0.68	0.1	0.5
Distillate fuel oil	Lbs/1000 gal	5.0	0.8	18	2.38	2.13	42.60	0.7
Kerosene	Lbs/1000 gal	4.8	0.8	17.4	2.38	2.13	41.1	0.7
Coal	Lbs/ton	275	0.000565	3.0	20.7	5.4	58.5	10

Sources of emission factors:

EPA Documentation for the Draft 1999 National Emissions Inventory (Version 3.0) for Criteria Air Pollutants and Ammonia

Hanke, B.H, manuscript prepared for the EPA, entitled: A National Methodology and Emission Inventory for Residential Fuel Combustion

EPA. Final Report on Development and Selection of Ammonia Emission Factors

The resulting emission estimates were reported by individual fuel type using the following SCC codes.

Michigan Residential Combustion Emission SCC Codes

Residential Fuel Type	SCC
Natural gas	2104006000
Propane LPG	2199007000
Distillate fuel oil	2104004000
Kerosene	2104011000
Coal	2104001000

Commercial/Institutional Boilers and Furnaces

Estimation of fuel combustion by the commercial/institutional sector was performed using an adaptation of a methodology presented in the following EPA publications:

Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract- Fuel Oil and Kerosene Combustion

Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract- Natural Gas and LPG Combustion

Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract-Coal Combustion

County emission estimates for the commercial/institutional end use sector were based upon the consumption of natural gas, residual fuel oil, distillate fuel oil, kerosene, and coal. This energy consumption information was obtained from U.S. Department of Energy, Energy Information Administration data. Fuels were subtracted for point sources, and the net area fuel contribution was apportioned or allocated using procedures instructed by LADCO. This procedure involved statewide commercial/institutional fuel apportionment to a county level using the commercial/ institutional employment data as obtained from a U.S. Department of Commerce, Bureau of Census publication entitled: County Business Patterns, Michigan: 2000 (CBP/00-24 issued May, 2002). County fuel estimates of individual fuel types were estimated using the following equation:

$$Cf = Ce/Se \times Sf$$

Cf = Estimated county commercial/institutional sector consumption of a given fuel type
Ce= Total county employment in the commercial/institutional sector
Se= Statewide employment in commercial/institutional sector
Sf = Statewide commercial/institutional sector consumption of a given fuel type

Because the Energy Information data includes diesel fuel totals within the distillate fuel oil total, these motor vehicle fuels were deducted to provide only an estimate of #1, #2, and #4 fuel oils.

Michigan Commercial/Institutional Fuel Consumption Information Sources

Fuel Type	U.S. Dept of Energy, Energy Information Administration Data Sources
Natural gas	Natural Gas Monthly
Residual fuel oil	Fuel Oil and Kerosene Sales 2002 Report
Distillate fuel oil	Fuel Oil and Kerosene Sales 2002 Report
Kerosene	Fuel Oil and Kerosene Sales 2002 Report
Coal	State Energy Data Report 2000 (most recent)

Upon obtaining county commercial/institutional fuel consumption estimates for the various fuel types in all Michigan counties Cf, emission estimates were calculated by applying an emission factor that is specific to that fuel type. These emission factors were obtained from various EPA publications.

Michigan Commercial/Institutional Fuel Emission Factors

Commercial/Institutional Fuel Type	Units	CO	NH_3	NOx	PM10-PRI	PM25-PRI	SO_2	VOC
Natural gas	Lbs/million cubic feet	84	0.49	100	7.16	7.6	0.6	5.5
Residual fuel oil	Lbs/1000 gal	5	0.80	55	9.07	3.37	194.05	1.13
Distillate fuel oil	Lbs/1000 gal	5	0.80	20	1.08	0.83	53.96	0.34
Kerosene	Lbs/1000 gal	5	0.80	18	2.38	2.13	41.1	0.713
Coal	Lbs/ton	6	0.000565	7.5	6.0	2.2	38	0.05

Sources of Emission Factors:

LADCO state uniform adopted emission factors for commercial/institutional natural gas combustion

EPA. FIRES database

EPA, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42)

EPA. Final Report on Development and Selection of Ammonia Emission Factors

The resulting emission estimates were reported by individual fuel type using the following SCC codes.

Michigan Commercial/Institutional Combustion Emission SCC Codes

Fuel Type	SCC
Natural gas	2103006000
Residual fuel oil	2103005000
Distillate fuel oil	2103004000
Kerosene	2103011005
Coal	2103002000

Industrial Boilers and Furnaces

Estimation of fuel combustion emissions of industrial boilers and furnaces was performed in similar manner as the commercial/institutional sector. Statewide industrial fuel consumption information was obtained from the U.S. Department of Energy, Energy Information Administration publications. Point source deductions were made for each fuel type to obtain the area contribution, which was then apportioned to the county level using LADCO prescribed procedures.

County fuel consumption estimates of natural gas, residual fuel oil, distillate fuel oil, kerosene, and coal were based upon the following mathematical equation:

$$Cf = Ce/Se \times Sf$$

Cf = Estimated county industrial sector consumption of a given fuel type
Ce= Total county employment in the industrial sector
Se= Statewide employment in industrial sector
Sf = Statewide industrial sector consumption of a given fuel type

Michigan Industrial Fuel Consumption Information Sources

Industrial Fuel Type	U.S. Dept of Energy, Energy Information Administration Data Sources
Natural gas	Natural Gas Monthly
Residual fuel oil	Fuel Oil and Kerosene Sales 2002 Report
Distillate fuel oil	Fuel Oil and Kerosene Sales 2002 Report (#1, #2, and #4 fuel oils– excludes diesel oil)
Kerosene	Fuel Oil and Kerosene Sales 2002 Report
Coal	State Energy Data Report 2000 (most recent)

County employment data was obtained from the U.S. Department of Commerce, Bureau of Census publication entitled: County Business Patterns, Michigan: 2000 (CBP/00-24 issued May 2002). Upon obtaining county industrial fuel consumption estimates for the various fuel types in all Michigan counties Cf, emission estimates were obtained by applying an emission factor that is specific to that fuel type. These emission factors were generally based on the LADCO adopted emissions factors.

Michigan Industrial Fuel Emission Factors

Industrial Fuel Type	Units	CO	NH_3	NOx	PM10-PRI	PM25-PRI	SO_2	VOC
Natural gas	Lbs/million cubic feet	84	3.2	100	7.6	7.6	0.6	5.5
Residual fuel oil	Lbs/1000 gal	5.0	0.8	55	7.17	4.67	157	0.28
Distillate fuel oil	Lbs/1000 gal	5.0	0.8	20	1.0	0.25	142	0.2
Kerosene	Lbs/1000 gal	5.0	0.8	18	2.38	2.13	41.1	0.713
Coal	Lbs/ton	6	0.00057	7.5	6.0	2.2	38	0.05

Sources of Emission Factors:

LADCO state uniform adopted emission factors for industrial natural gas, residual fuel oil, distillate fuel oil, and coal combustion

EPA. FIRES database

EPA. Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42)

EPA. Final Report on Development and Selection of Ammonia Emission Factors

Emission estimates were reported using the following SCC codes:

Michigan Industrial Combustion Emission SCC Codes

Industrial Fuel Type	SCC
Natural gas	2102006000
Residual fuel oil	2102005000
Distillate fuel oil	2102004000
Kerosene	2102011000
Coal	2102002000

Remedial Action, Site Clean Up and Leaking Storage Tanks

Evaporative VOC emissions occur during remediation and clean up at those sites of environmental contamination. Such remediation activities may include air stripping or sparging of a VOC from contaminated groundwater or incineration of a spoil material removed from a contaminated site. In some instances carbon adsorption may be required to reduce VOC emitted during air stripping or spraying operations.

Estimation of VOC loss from remedial action activities was determined by summing the allowable emissions from permits to those parties that were engaged in such activities as provided by the MDEQ, Air Quality Division, Permit Section. Although site remediation activities are subject to NESHAP, these requirements did not apply at the time of the year 2002 emissions inventory. Emissions were reported using an SCC of 2660000000

Municipal Waste Landfills

A municipal solid waste landfill is defined as any facility that is regulated under Subtitle D of the Resource Conservation and Recovery Act (RCRA), which receives primarily household and/or commercial wastes.

VOCs are produced from municipal solid waste by the volatilization of the waste material itself, the microbiological (anaerobic) putrefaction of organic waste materials that result in the formation of organic acids and alcohols which are vaporized, and the chemical reaction of one or more waste materials or chemical decomposition intermediate. The rate at which VOCs are emitted from a landfill is dependent upon the structural design of cells, the waste composition (physical/chemical properties), the moisture content of the waste, the amount of waste disposed, temperature, age of the landfill, the chemical reactivity of the waste, and the microbiological toxicity of the waste.

Estimation of VOC emissions from municipal landfills were based on the revised technical procedures presented in the EPA publication entitled: Volume III, Chapter 15 of the Emission Inventory Improvement Program January 2001 Revised Final Guidance for Landfills. In this publication, the preferred method for the estimation of area source emissions is to use the LandGem model or the equations from the Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42) section on landfills. LandGem is a computer-based model that uses the same equations as that of AP-42. The emissions calculation for the estimation of landfill gas requires site specific information including: landfill design capacity, accumulated waste totals from operation of the landfill, and existing control requirements from landfill gas collection systems. Landfills may be subject to either new source performance standards (40 Code of Federal Regulations part 60 Subpart WWW) or emission guidelines (40 Code of Federal Regulations, part 60, Subpart Cc). Landfills are also subject to National Emission Standards for Hazardous Air Pollutants (NESHAPs),

which did not apply at the time of the year 2002 emissions inventory since these standards became effective on January 16, 2003. In Michigan, most municipal solid waste landfills are inventoried as point sources of which landfill operators estimate their yearly emissions using an MDEQ Emission Calculation Fact Sheet for Municipal Solid Waste Landfills. General fugitive emissions are reported using SCC codes 50400201 and 30502504. For landfills with gas recovery, landfill gas may be flared (50100410, 50200601, 50300601, 50100410, 50200601, and 50300601), used in boilers/heaters (10200701), or used in reciprocating/turbine engines (20100802 and 20100801). For those landfills that were not being reported in the point source inventory, area emission estimates were reported on the basis on LandGem model simulations using the SCC of 2620030000. These simulations reflected total waste receipts under the prior year 1999 inventory with addition made for waste receipts for years 2000-2002 as obtained from annual reports by the Michigan Department of Environmental Quality, Waste and Hazardous Materials Division Report of Solid Waste Landfilled in Michigan.

Architectural Surface Coating

Architectural surface coating operations consist of the application of a thin layer of paint, primer, varnish or lacquer to the exterior or interior surfaces of architectural structures. From these coatings, or the solvents used as thinners and cleaning agents, VOCs are emitted.

To estimate these emissions, alternative method one was chosen from the EPA guidance document Emission Inventory Improvement Program (EIIP), Volume III, Area Sources Preferred and Alternative Methods, Chapter 3: Architectural Surface Coating. Data was readily available for the use of per capita emission factors.

The MDEQ determined per capita usage factors by dividing the national total architectural surface quantities for solvent and water-based coatings (U.S. Census Bureau MA325F, Paint and Allied Products) by the U.S. population for 2002 (U.S. Census Bureau, http://www.census.gov).
http://www.census.gov/industry/1/ma325f02.pdf

Solvent-Based Paint

Solvent-based paints produced and shipped in the U.S. in 2002 were totaled (total includes architectural lacquers and architectural coatings). The resulting number was divided by the 2002 U.S. population to produce a per capita solvent-based paint usage factor of 0.4428 gallons per person.

The resulting solvent paint use, in gallons per county, was multiplied by a VOC emission factor of 3.87 lb/gal, from Table 5-2 of the Emission Inventory Improvement Program (EIIP) guidance, Volume III, Area Sources Preferred and Alternative Methods, Chapter 3: Architectural Surface Coating to produce total VOC emissions from solvent-based paint.

Water-Based Paint

Water-based paints produced and shipped in the U.S. in 2002 were totaled. The resulting number was divided by the 2002 U.S. population to produce a per capita water-based paint usage factor of 2.044 gallons per person.

The resulting water-based paint use in gallons per county was multiplied by a VOC emission factor of 0.74 lb/gal, from Table 5-2 from the EIIP guidance, Volume III, Area Sources Preferred and Alternative Methods, Chapter 3: Architectural Surface Coating. This produced total VOC emissions from water-based paint.

No point source deductions were performed for solvent-based or water-based paint, as none were needed for the category of architectural surface coating.

A seasonal adjustment factor of 1.3 was made for this category for the ozone season, per Table 5.8.1 of the EPA document, Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I: General Guidance for Stationary Sources. Ozone season daily emissions were calculated per the example on page 5-23 of this document. Ozone season throughput was also calculated. Seven activity days per week were selected, per Table 5.8.1. Annually, 365 days of operation were assumed.

Auto Body Refinishing

Auto body refinishing is the repairing of damaged automobiles, trucks, and other vehicles, and involves the application of paint coatings on top of that provided by the original equipment manufacturer assembly plants. Emissions of VOCs are released from this activity. The majority of the sources engaged in auto body refinishing are area sources, but there are several such sources in Michigan's point source inventory. The point source emissions have been deducted from the total emissions estimated for this category to produce area source emissions.

Per the EIIP guidance Volume III, Area Sources Preferred and Alternative Methods, Chapter 13: Auto Body Refinishing (Jan. 2000 external draft), a per capita factor can be created by using population data from the U.S. Bureau of the Census to allocate a national emissions estimate for body shops. This estimate for VOC may be obtained from Section 4.1 of the auto body refinishing chapter. The national VOC emissions estimate is based on 1998 and 1999 data. Once allocated by population, an emission factor of 0.5 lbs/yr was obtained for the per capita method. The per capita method utilizes county population data to allocate the national emissions estimate.

A seasonal adjustment factor of 1.0 was made for this category for the ozone season. The category of auto refinishing was considered to be uniform throughout the year, per Table 5.8.1 of the EPA document, Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I: General Guidance for Stationary Sources. Ozone season daily emissions were calculated per the example on page 5-23 of this document. Ozone season throughput was also calculated. Five activity days per week were selected, per Table 5.8.1. Annually, 260 days of operation were assumed.

Consumer and Commercial Solvent Use

Overview

The methodology for this category came from the source, EIIP, Volume 3, Chapter 5, Consumer and Commercial Solvent Use. The consumer and commercial solvent source category includes a wide array of products such as personal care products, household cleaning products and household pesticides. However, all VOC emitting products used by businesses, institutions and numerous industrial manufacturing operations are also included. A detailed list of products included in this category can be found on page 5.2-3 of the 1996 EIIP document. The majority

of VOCs introduced into the atmosphere from this category are a result of evaporation of the solvent contained in the product or from the propellant released during product use.

SCCs

The following SCCs were utilized by MDEQ, per recommendations of LADCO:

2460100000	Personal care products
2460200000	Household Products
2460400000	Automotive aftermarket
2460600000	Adhesives and sealants
2460800000	FIFRA-regulated product s
2460500000	Coatings and related products
2460900000	Miscellaneous products

These SCCs cover both consumer and commercial solvent use, whereas the EIIP guidance recommended SCCs that represented only consumer use and not commercial use.

Methodology

Per the EIIP (1996), the MDEQ utilized the recommended methodology, which was the use of per capita based emission factors.

VOC

1-Use of national average per capita emission factors adjusted for federal, state or local emission limits (preferred method),

Data Elements for using Preferred Method (Population-Based)

Population in the inventory area
Per capita emission factors, and
State and local regulations.

Example:

To estimate VOC emissions from personal care products:

Emissions = (Population) (Per Capita Emission Factor)(1-(%reduction/100))

Given a population of 1 million persons for a particular area, the VOC emissions from personal care products would be:
(1,000,000 persons) (2.32 lbs VOC/person/year)(1-.1211) = 2,039,048 lb VOC/year
= 1,019.5 tons VOC/year

Emission factors: Personal care	Household	Automotive aftermarket	Adhesives/sealants	FIFRA-regulated	Coatings	Miscellaneous
(lb VOC/ person)	(lb VOC/ person)	(lb VOC/ person)	(lb VOC/ person)	(lb VOC/ person)	(lb VOC/ person)	(lb VOC/ person)
2.32	0.79	1.36	0.57	1.78	0.95	0.07

Obtained from Table 5.4-1, EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 5, Consumer and Commercial Solvent Use

Following federal rule reduction for first four categories:

12.11% reduction	10.94% reduction	8.97% reduction	8.3% reduction
Personal care (lb VOC/ person)	Household (lb VOC/ person)	Automotive aftermarket (lb VOC/ person)	Adhesives/sealants (lb VOC/person)
2.04	0.70	1.24	0.52

A seasonal adjustment factor of 1.0 was made for this category for the ozone season. Annually, 365 days of operation were assumed.

Dry Cleaning

SIC 7215 (coin-operated dry cleaning establishments) was not considered for this inventory. The MDEQ's dry cleaning program indicated that virtually all coin-operated dry cleaning machines in Michigan have been discontinued due to the large cost of keeping them supplied with perchloroethylene. SIC 7216 (dry cleaning establishments, excluding coin-operated facilities) was considered instead. Under the NAICS system, SIC 7216 is known as NAICS 812320.

To calculate 2002 VOC emissions, the MDEQ utilized alternative method two, a per-employee emission factor. The 2001 county employment data was obtained from the U.S. Census Bureau's document, 2001 Michigan County Business Patterns. Data for 2002 was not available, and was not expected until the spring of 2004. Employment data was obtained for NAICS 812320 (SIC 7216), for each county where it was available. Where available, employment data for the broader category of NAICS 8123 (SIC 72), personal and laundry services, was also obtained. The total population of each county for 2001 (to correspond to the 2001 County Business Pattern data) was obtained from the State of Michigan Library.

The next step was to determine a ratio between the number of employees under NAICS 812320 (SIC 7216), and the number of employees under NAICS 8123 (SIC 72). For counties with employment numbers for both SIC 7216 and SIC 72, this ratio was determined to be one employee under SIC 7216, per each 2.17 employees under SIC 72. These SIC 72 employment numbers were multiplied by the 1 to 2.17 employment ratio for each county to create an estimate of the 4-digit SIC code employment for each county (except where the actual 4-digit SIC employment number for SIC 7216 was already provided in the 2001 Michigan County Business Patterns).

Michigan's 2002 point source emission inventory was queried, to determine if any counties had point source employment for SIC 7216 (NAICS 812320). Berrien, Ingham and Jackson (NAICS 8123) Counties did have point sources under SIC 7216, and the number of employees at each source was obtained from the emission inventory. Each source's employment number was subtracted from the appropriate county's employment number.

Once estimates of employment for SIC 7216 were available for each county, an emission factor for VOC was obtained from Table 4.5-1 of EIIP Vol. III, Chapter 4 (1800 lbs/yr/employee).

From EIIP

Subcategory	Reactive VOC (lb/year/employee)	Total Organics (lb/year/employee)
All solvents (total)	1,800	2,300
Halogenated Solvents		
PERC, TCA and CFC 113		980
Coin Operated		52
Commercial/Industrial		1,200
Mineral Spirits and Other Unspecified Solvents	1,800	1,800

A seasonal adjustment factor of 1.0 was made for this category for the ozone season, per Table 5.8.1 of the EPA document, Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I: General Guidance for Stationary Sources. Ozone season daily emissions were calculated per the example on pages 5-23 of this document. Ozone season throughput was also calculated. Five activity days per week were selected, per Table 5.8.1. Annually, 260 days of operation were assumed.

Graphic Arts, 2002

The graphic arts industry uses several different technologies, such as rotogravure, flexographic and letter press printing, to apply inks or coatings to different substrates. The inks and coatings are sources of VOC emissions.

The EIIP area source guidance document, dated November 18, 1996, was followed. This was the most updated guidance available.

The EIIP preferred method was not utilized, as it required a survey of facilities. Alternative Method 1 was not feasible for Michigan, as (during calculation of the 1999 inventory) point sources used more ink than the state proportion of national ink production was calculated to be.

Per Alternative Method 2, the population of the inventory region was obtained from state data for 2002, and multiplied by the per capita emission factor provided in the EIIP guidance. This produced total uncontrolled emissions from all graphic arts facilities with less than 100 tons per year of VOC emissions, for the entire state. This method used a 1991 EPA emission factor of 0.00065 tons VOC per capita.

Total uncontrolled VOC emissions from area source graphic arts facilities (those with less than 100 tons per year of VOC emissions) were then estimated for each county. This was done by obtaining uncontrolled VOC emissions from point sources with less than 100 tons per year of VOC, from the 2002 EI. SICs 2711, 2721, 2752 and 2754 were the SIC codes queried. This

number was then subtracted from total uncontrolled emissions from graphic arts facilities, on a county by county basis. The remaining number is the area source VOC emissions per year. If a negative number resulted, as for Clinton County, the value was set to zero for that county.

The seasonal adjustment factor = 1.0, uniform. Activity days of 5 days per week were assumed, per EPA document, Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I: General Guidance for Stationary Sources.

Solvent Cleaning 2002

In this category, the use of solvents is broken into two broad classifications. The classifications are solvent cleaning (which is composed of cold cleaning and vapor/in-line cleaning), and solvent cleanup (predominantly wipe cleaning of external surfaces).

EIIP Alternative Method Solvent Cleaning Equipment (both Cold Cleaners and Vapor/In-line Cleaners):

Emission factors:

EIIP Table 6.5-2 provides per capita and per employee emission factors, as reproduced below. Michigan population estimates per county for 2002 were obtained from Ken Darga, State Demographer of the Library of Michigan. The population data was multiplied by the appropriate per capita emission factors. Area source emissions will then be determined by subtracting point source emissions from total emissions. When the result is a negative number, area source emissions will be set to zero.

Recommended Method for Solvent Cleaning Equipment:

One method is to use the per capita emission factor from Table 6.5-2 for calculating solvent cleaning equipment emissions. The document, Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone: Volume I: General Guidance for Stationary Sources (EPA, 1991), states “Using per capita factors assumes that emissions in a given area can be reasonably associated with population. This assumption is valid over broad areas for certain activities such as dry cleaning, architectural surface coating, small degreasing operations and solvent evaporation from household and commercial products.”

Cold cleaning and vapor/in-line cleaning can be calculated together by the use of the total solvent cleaning emission factor. After total solvent cleaning emissions are calculated with the per capita emission factor, point source emissions must be accounted for. One method for accounting for point source emissions is to subtract point source emissions from the total solvent cleaning emissions to generate area source emission estimates for each county.

The MDEQ opted to use the per capita factors available in Table 6.5-2 for the 2002 emissions inventory. In times of economic fluctuation, the population numbers are likely to be steadier than the employment numbers. Also, Ron Ryan of the EPA indicated that for the subcategory of solvent cleaning (which consists of both cold cleaning and vapor/in-line cleaning), the per capita factor and the per employee factor were both estimated using the same national solvent use totals as a starting point. Per a suggestion from Ron Ryan, the general SCC of 2415000000 was utilized for reporting as one lump sum, because the individual categories were just fractions of this whole number.

Table 6.5-2: Per Capita and Per Employee Solvent Cleaning Emission Factors (EPA, 1991)

Subcategory	SIC Codes	Per Capita Factor (lb/yr/person)		Per Employee Factor (lb/yr/person)	
		VOCs	Organics	VOCs	Organics
Solvent cleaning (total)	25, 33-39, 417 423, 551, 552, 554-556, 753	4.3	7.2	87	144
Cold Cleaning					
Automobile Repair	417, 423, 551, 552, 554-556, 753	2.5	2.5	270	270
Manufacturing	25, 33-39	1.1	1.1	24	24
Vapor and In-Line Cleaning					
Electronics and Electrical	36	0.21	1.1	29	150
Other	25, 33-39, 417, 423, 551, 552, 554-556, 753	0.49	25	9.8	49

2002 point source VOC data was obtained from the MAERS. These values were deducted from the total emissions estimated by using the per capita emission factor and 2002 Michigan county population data.

Solvent Cleanup:

Per employee and per capita emission factors can be developed from information collected for the EPA's Alternative Control Techniques Document – Industrial Cleaning Solvents.

Recommended Method for Solvent Cleanup:

Unless states have good data for specific facilities, the preferred way to estimate emissions from solvent cleanup activities is per capita or per employee emission factors from EIIP.

The MDEQ utilized the nationwide emission estimates from VOC solvent usage presented in Table 6.5-4 to create per capita emission factors. The national population data was obtained from the U.S. Census Bureau. The categories of industries considered in Table 6.5-4, and the SIC codes matched to them, are presented below.

Furniture:	SIC 25
Magnetic Tape:	included under SIC 36, Electrical Equipment
Packaging:	SIC 265
Photographic supplies:	SIC 3861
Automotive - manufacturing:	SIC 3711
Automotive - trucks and buses:	SIC 3713
Automotive - parts/accessories:	SIC 3714
Automotive - stamping:	SIC 3465
Electrical equipment:	SIC 36 (entire 2 digit SIC number considered for expediency)

SIC	National population in 1999	National solvent cleanup VOC emissions by SIC, tons/yr*	Solvent cleanup emissions per capita, tons/yr	**Solvent cleanup VOC emissions per capita, lbs/yr**
25	272,691,000	47000	0.00017236	**0.344712513**
265	272,691,000	7000	0.00002567	**0.051340162**
3465	272,691,000	330	0.00000121	**0.002420322**
36	272,691,000	2400	0.00000880	**0.017602341**
3711	272,691,000	34000	0.00012468	**0.249366499**
3713	272,691,000	16000	0.00005867	**0.117348941**
3714	272,691,000	2200	0.00000807	**0.016135479**
3861	272,691,000	480	0.00000176	**0.003520468**

* Table 6.5-4, EIIP Area Source Guidance Chapter 6 – Solvent Cleaning

A seasonal adjustment factor of 1.0 was made for this category for the ozone season, per Table 5.8.1 of the EPA document, Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I: General Guidance for Stationary Sources. Ozone season daily emissions were calculated per the example on page 5-23 of this document. Ozone season throughput was also calculated. Six activity days per week were selected, per Table 5.8.1. Annually, 312 days of operation were assumed.

Industrial Surface Coating

Surface coating is the process by which paints, inks, varnishes, adhesives, or other decorative or functional coatings are applied to a substrate (e.g., paper, metal, plastic) for decoration and/or protection. After the coating has been applied, it is cured or dried either by conventional curing or radiation curing process. The surface coating products include either a water-based or solvent-based liquid carrier that generally evaporates in the curing process.

Source Identification

Protocol Section 3.2.1-SIC codes

SIC code 2426-Hardwood Dimension & Flooring

SIC code 2429-Special Product Sawmills, NEC

SIC code 243%-Millwork, Veneer, Plywood & Structural Members

SIC code 244%-Wood Containers

SIC code 245%-Wood Buildings and Mobile Homes

SIC code 25%%-Furniture and Fixtures

SIC code 26%%-Paper and Allied Products

SIC code 341%-Metal Cans and Shipping Containers

SIC code 3479-Metal Coating and Allied Services, NEC

SIC code 35%%-Industrial and Commercial Machinery & Computer Equipment

SIC code 3612-Transformers

SIC code 3357-Nonferrous Wire Drawing/Insulating

SIC code 37%%-Transportation Equipment

Protocol Section 3.2.2-SCC/AMS codes

SCC 2401015000-Factory Finished Wood

SCC 2401020000-Wood Furniture

SCC 2401030000-Paper Coating

SCC 2401040000-Metal Cans

SCC 2401045000-Metal Coils

SCC 2401055000-Machinery and Equipment

SCC 2401060000-Appliances

SCC 2401065000-Electronic and other Electrical

SCC 2401070000-New Motor Vehicles

SCC 2401075000-Other Transportation

SCC 2401080000-Marine Coatings

SCC 2401090000-Miscellaneous Manufacturing

SCC 2401100000-Industrial Maintenance

SCC 2401200000-Other Special Purpose

Chapter 8 of the EIIP Area Source technical documents presents the preferred and alternate methods for VOC emission estimation. The preferred method consists of the development of a SIC-specific, area-specific per employee factor using point source emissions inventory and employment information. This method is used for VOCs. Alternative Method 1 uses the national default per employee emission factors. Alternative Method 2 uses per capita emission factors and population estimates. The MDEQ chose to use the per capita VOC factors available in Table 8.5-2 for the 2002 emissions inventory. In times of economic fluctuation, the population numbers are likely to be steadier than the employment numbers.

Michigan population estimates per county for 2002 were obtained from Ken Darga, State Demographer of the Library of Michigan. The population data was multiplied by the appropriate per capita emission factors. Area source emissions will then be determined by subtracting point source emissions from total emissions. Point source emissions by county were obtained for the relevant SIC (NAICS) codes from the 2002 EI, and the appropriate deductions were made to

determine area source emissions per county. When the result was a negative number, area source emissions were set to zero.

A seasonal adjustment factor of 1.0 was made for this category for the ozone season, per Table 5.8.1 of the EPA document, Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I: General Guidance for Stationary Sources. Ozone season daily emissions were calculated per the example on page 5-23 of this document. Ozone season throughput was also calculated. Five activity days per week were selected, per Table 5.8.1. Annually, 260 days of operation were assumed.

Residential Wood Burning

The following method was available to estimate the number of wood burning households per county.

Housing units with wood heat by county was determined by using the U.S. Census Bureau's DP-4, Profile of Selected Housing Characteristics: 2000, Data Set: Census 2000 Summary File 3 (SF 3) for Michigan. This file provided a total value of households using wood heating. However, no breakdown was given by county.

The MDEQ decided to use the 2000 number of total wood burning households in Michigan, and to use the 1990 county proportions of the 1990 total to apportion the 2000 value to the county level for number of wood burning households per county.

Then, based on county value for number of wood burning households, the value for State Wood Use in Cords was apportioned to each county. The State Wood Use in Cords data came from the U.S. MAP States Page, *Table* 8, Residential Energy Consumption Estimates, Selected Years 1960-2000, Michigan, from the U.S. Department of Energy, Energy Information Administration, (http://www.eia.doe.gov/emeu/states/sep_use/res/use_res_mi.html). Data for 2002 was not yet available.

Once county wood use in cords was produced, the next step was to determine the wood weight in tons for each county. Utilizing the methodology prescribed in the Emission Inventory Improvement Program, Volume III: Chapter 2, Residential Wood Combustion, wood weight was determined by the following formula:

Wood weight = 'X' cords * 79 cu. ft. * 0.631 specific gravity * 62.4 lb./ cu ft. water

0.631 was selected as the specific gravity based on North Central Oak-Hickory Hardwoods, with a weight of 39.4 lb./ft., through the following formula:

Specific gravity = 39.4 lb./ft. divided by 62.4 lb./cu. ft. water = 0.631

The MDEQ did not have data available on the number of catalytic and non-catalytic woodstoves in Michigan, but did utilize 1993 survey data, which showed the proportions of fireplaces to woodstoves by county in Michigan. This was used to apportion wood weight per county between wood stoves and fireplaces. SCCs and emission factors were selected for fireplaces – cordwood (2104008001), woodstoves – general (2104008010) and non-catalytic woodstoves – conventional (2104008051). The SCC of 2104008051 was used because it contained a completely separate set of emission factors than 2104008010, and therefore was viewed as complimentary rather than duplicative.

VOC, PM10, CO and NOx emission factors were obtained from the Emission Inventory Improvement Program, Volume III: Chapter 2, Residential Wood Combustion, Table 2.4-1, for Residential Fireplaces, and for Residential Woodstoves – Conventional (reported under 2104008001 and 2104008051, respectively). VOC, PM10, PM2.5, CO, SOx and NOx emission factors were obtained for 2104008010 from the EPA's EFIG, per the latest update to the GLC methodology for toxics. The emissions estimated for 2104008051 for VOC, PM10, CO and NOx were believed to be duplicative of the emissions for 2104008010 and were therefore omitted from the NIF 3.0 files which were prepared for this area source category. There were no other criteria pollutants associated with 2104008051.

It was assumed that 60 percent of wood burning in woodstoves or fireplaces occurred during the winter months, with 20 percent in the spring and 20 percent in the fall. It was assumed that there was no fireplace or wood burning stove activity during the summer months, therefore summer weekday emissions were not calculated.

Structure Fires

The EIIP guidance from EIIP Volume III, Chapter 18: Structure Fires, was followed. The preferred method for estimating emissions was used due to the availability of county level structure fire data for 2002. The data, which was from the Michigan State Police Fire Marshal Division, did not provide any detail on the extent of each structure fire, or indicate if the structure was residential or commercial.

The default fuel loading factor provided in the EIIP guidance (1.15 tons of fuel per structure fire) was used. Emission factors for VOC, CO, and NOx were obtained from Table 18.4-1.

A seasonal adjustment factor of 1.0 was made for this category for the ozone season. Annually, 365 days of operation were assumed.

Year 2009 and 2018 Stationary Area Source Emission Inventory Projections:

See under Point Sources section **Growing Stationary Non-EGU Point, Stationary Area, Locomotive, Shipping, and Aircraft Categories for the Years 2009 and 2018** for reference and methodology for projecting the Stationary Area Source inventory.

2005 Stationary Area Source Emission Inventory

The 2005 inventory is not due to the EPA until June of 2007 and has not been completed yet. Therefore, an estimate of 2005 non-EGU point source emissions was made by interpolating between the 2002 and 2009 inventories. Since growth and control rates are expected to be uniform during this time period for this source category, this approach should be relatively accurate.

IV. Nonroad Mobile

The table below summarizes typical ozone season weekday nonroad mobile source emissions for the Michigan redesignation counties for the years 2002, 2009 and 2018.

DAILY TOTAL VOC (TONS)

MDEQ NMIM Modeling Results

VOC	2002	2005	2009	2018
Berrien	11.60	10.91	9.79	7.69
Cass	5.05	5.04	4.68	3.48
Genesee	13.62	11.67	9.51	8.08
Lapeer	6.77	6.68	6.16	4.64
Muskegon	10.26	10.10	9.36	7.38
NOx				
Berrien	4.07	3.87	3.43	2.34
Cass	1.60	1.53	1.37	0.89
Genesee	7.30	6.83	5.81	3.32
Lapeer	2.33	2.24	1.97	1.26
Muskegon	4.24	4.06	3.68	2.65

LADCO Marine, Aircraft and Rail

VOC	2002	2005	2009	2018
Berrien	0.07	0.07	0.07	0.08
Cass	0.02	0.02	0.02	0.02
Genesee	0.12	0.12	0.12	0.12
Lapeer	0.04	0.04	0.04	0.04
Muskegon	0.15	0.16	0.16	0.18
NOx				
Berrien	0.73	0.67	0.58	0.52
Cass	0.46	0.39	0.30	0.28
Genesee	1.42	1.24	0.99	0.95
Lapeer	0.64	0.55	0.43	0.40
Muskegon	2.24	2.21	2.16	2.08

Total Non-Road Emissions

VOC	2002	2005	2009	2018
Berrien	11.67	10.98	9.86	7.77
Cass	5.07	5.06	4.70	3.50
Genesee	13.74	11.79	9.63	8.20
Lapeer	6.81	6.72	6.20	4.68
Muskegon	10.41	10.26	9.52	7.56
NOx				
Berrien	4.80	4.54	4.01	2.86
Cass	2.06	1.92	1.67	1.17
Genesee	8.72	8.07	6.80	4.27
Lapeer	2.97	2.79	2.40	1.66
Muskegon	6.48	6.27	5.84	4.73

A. Nonroad Emissions Estimation exclusive of Locomotive, Shipping, and Aircraft Emissions

Emission estimates for nonroad sources were obtained from the EPA's National Mobile Inventory Model (NMIM). The model uses a database to store the information about individual counties, referred to as the NMIM County Database (NCD); the current version is NCD20051207.

Recent updates to the model were made by the EPA and can be found at: www.epa.gov/omswww/models/nonrdmdl/nonrdmdl2005/readme.htm , (NONROAD2005 Update Chronology).

One of the updates included in this modeling was a correction in the NONROAD.EXE file that includes modifications for permeation. Changes were also made in the external files (15 files) to incorporate recommendations of LADCO consultants regarding fuel data. Program files for emissions and population data were modified. These changes were made to improve the accuracy of the model estimates and to produce emission values that will be consistent with those that will be used for future ozone and fine particulate SIP demonstrations.

NMIM was used to model summer day nonroad future year estimates for VOC and NOx for 2005, 2009, and 2018, as well as the 2002 base year. Summer day values for VOC and NOx are obtained by selecting June/July/August and dividing the annual tons output by 92 to obtain tons/day. The nonroad emissions modeling included all fuels and segments. Modeling did not utilize advanced features requiring additional input files nor the diesel retrofit option.

B. 2002 Aircraft Emissions Estimation

In order to estimate nonroad aircraft emissions, aircraft activity information was obtained from the MDOT. This aircraft activity operations information received from the MDOT consisted of the following:

Scheduled air carrier arrivals for commercial aircraft (as of the week of December 31, 2002)

Airport annual local and itinerant operations for year 2002

Military annual local and itinerant operations for year 2002

Due to need to have aircraft operations information expressed as landing/take-off (LTO) cycles, the following assumptions were made:

For commercial aircraft activity, the number of weekly scheduled aircraft arrivals equals the number of weekly departures, thereby representing the number of weekly LTO cycles. The weekly LTO cycle frequency was then adjusted to provide expected weekday, Saturday, Sunday, and yearly LTO cycles.

For the annual local and itinerant airport operations, each respective operations total was divided by 2 to obtain the corresponding year local and itinerant LTO cycles. The expected daily local and itinerant LTO cycles then were obtained by dividing these annual totals by 365.

For military annual local and itinerant operations, each respective operations total was divided by 2 to obtain the corresponding year local and itinerant LTO cycles. The expected military daily local and itinerant LTO cycles then were obtained by dividing these annual totals by 365.

Airport LTO cycles were further categorized into commercial aircraft by plane and engine type, general aviation itinerant aircraft of unknown aircraft type, general aviation local aircraft of unknown aircraft type, and military aircraft. This was necessary in order to utilize the U.S. Department of Transportation, Federal Aviation Administration EDMS 4.0 Emissions and Dispersion Modeling System. A description of this model can be found in the Federal Aviation Administration publication entitled: Emissions and Dispersion Modeling System (EDMS) Reference Manual. Emissions were determined by each commercial aircraft type using the EDMS 4.0 emissions model where possible. In most cases, default commercial aircraft taxi and queue times were used in the EDMS 4.0 model for all airports with the exception of Wayne County's Detroit Metropolitan Airport. Due to the volume of commercial aircraft LTOs at this airport, a major connecting hub for Northwest Airlines, and the potential for air traffic delays, additional information was obtained from airport operations personnel regarding longer taxi and queue times. These longer taxi and queue contributed to greater aircraft emissions.

For those commercial aircraft types that could not be determined using the EDMS 4.0 emissions model, aircraft emission factors from the year 1999 inventory were then used to estimate their emissions. These included general aviation itinerant aircraft of unknown aircraft type, general aviation local aircraft of unknown aircraft type, and military aircraft. This former 1999 inventory relied upon a FAA aircraft Emissions Factor database, and fleet average emission factors. These fleet average factors were again used where aircraft types were unknown.

Aircraft emissions were then obtained by adding emissions contributions from commercial, itinerant general, and local general aircraft, and were reported using the following SCC codes.

Michigan Aircraft Emission SCC Codes

Aircraft Type	SCC
Military	2275001000
Commercial	2275020000
General Aviation	2275050000

C. 2002 Locomotive and Shipping Emissions Estimation

The 2002 nonroad locomotive emissions are based on work and a follow-up report (Environ Report for LADCO, April 2004, 2002 Locomotive Emissions Sources) completed by Environ supporting LADCO's efforts to prepare a 2002 Air Emissions Inventory. The report describes Environ efforts to develop a locomotive 2002 air emissions estimates to support air quality modeling. The Environ report is too long to be included in this document, but it can be provided upon request or downloaded at:

http://ladco.org/reports/rpo/MWRPOprojects/Emissions/Environ_Final_Report_non-road.pdf

D. 2002 Shipping Emissions Estimation

The 2002 nonroad shipping emissions are based on work and a follow-up report (Environ Report for LADCO, April 2004, 2002 Shipping Emissions Sources) completed by Environ supporting the LADCO's efforts to prepare a 2002 Air Emissions Inventory. The report describes Environ efforts to develop a shipping 2002 air emissions estimates to support air quality modeling. The Environ report is too long to be included in this document, but it can be provided upon request or downloaded at:

http://ladco.org/reports/rpo/MWRPOprojects/Emissions/Environ_Final_Report_non-road.pdf

E. Year 2005, 2009 and 2018 Nonroad Mobile Source Emission Inventory Projections:

The nonroad source categories exclusive of locomotive, shipping, and aircraft were grown in the EPA Mobile source model NMIM. The locomotive, shipping, and aircraft non-NMIM source categories were grown using growth factors provided in the report (E.H. Pechan & Associates, Inc., Development of Growth and Control Factors for Lake Michigan Air Directors Consortium, Final Report, December 14, 2004) done by E.H. Pechan & Associates, Inc. for LADCO and available upon request.

The 2005 inventory is not due to EPA until June 2007 and has not been completed yet. Therefore, an estimate of 2005 locomotive, shipping, and aircraft emissions was made by interpolating between the 2002 and 2009 inventories. Since growth and control rates are expected to be uniform during this time period for this source category, this approach should be relatively accurate.

V. Onroad Mobile

The table below summarizes typical ozone season weekday onroad mobile source emissions for the ozone redesignation counties for the years 2002, 2009 and 2018.

DAILY TOTAL VOC (TONS)

COUNTY	2002	2005	2009	2018
Berrien	11.11	7.45	6.54	3.44
Cass	2.45	1.66	1.47	0.74
Genesee	26.68	17.71	15.34	8.07
Lapeer	4.84	3.39	2.84	1.69
Muskegon	7.67	5.08	4.66	2.27

DAILY TOTAL NOX (TONS)

COUNTY	2002	2005	2009	2018
Berrien	20.45	14.49	13.27	4.57
Cass	4.52	2.97	3.03	0.94
Genesee	40.80	29.98	26.57	9.40
Lapeer	9.82	6.10	6.32	2.03
Muskegon	11.93	8.91	8.19	2.74

The 2002 and 2009 summer day emissions described here represent the Midwest Planning Organization's typical summer weekday. The meteorological conditions on July 12, 2002, which occurred during a significant ozone episode, were chosen to represent the typical summer day. Conditions on this day will not only be used for this demonstration, but will be used for comparisons during the development of 8-hour ozone attainment demonstrations throughout the Midwest region. The future year projections take into account existing mobile source control. These inventories are taken from the LADCO base K inventories, as posted in March 2006. The LADCO On-Road NMIM input files used to generate the 2002 emission inventory are too long to be included in this report, but can be provided upon request. Network information was supplied to LADCO by MDOT.

Following are describes of MDOT procedures for estimating the attainment year (2005) and maintenance year (2018) onroad emissions:

V.1 Benton Harbor - MI (Berrien County)

MDOT prepared the on-highway motor vehicle emissions estimates using Federal Highway Administration (FHWA) and the EPA approved methodology. The methodology MDOT followed included:

Estimates of 2005 and 2018 VMT were by interpolation of VMT taken from the air quality conformity section of the Twin Cities Area Long Range Plan 2005 – 2030, April 2005.

Development of emissions factors using the EPA Mobile6.2 model.

Development of 2005 and 2018 Vehicle Miles of Travel (VMT) and Speeds

To derive the VMT for year 2005, an average growth rate was determined for each scaled VMT by National Functional Classification (NFC) from year 2002 to 2009. The 2002 and 2009 VMT and vehicle hours of travel (VHT) were obtained from the above mentioned conformity document analysis. The growth rates by NFC were applied to the 2002 VMTs to achieve estimated VMTs in 2005. Then the VMTs by NFC are collapsed into four groups, to meet the requirements of Mobile6.2. These groups are: 1) rural interstate, 2) rural major and minor arterials/collectors/local streets, 3) urban interstate/freeway, and 4) urban principal and minor arterials/collectors/local streets. The same procedures were applied to VHTs to determine year 2005 values. The modeled speeds were derived by dividing each grouped VMT by the equivalent grouped VHT. The scaled travel demand modeled VMTs and speeds for the county are summarized in Table V.1.1.

Table V.1.1
Berrien County 2005 Vehicle Miles of Travel and Speed

NFC	VMT 2002*	VMT 2005	VMT 2009*	Speed 2002*	Speed 2005	Speed 2009*
Rural Interstate/Freeway	1,211,504	1,316,970	1,457,592	69.7	69.3	68.9
Rural Major & Minor Arterial/Collector/Local Street	2,086,984	2,108,615	2,137,456	51.8	52.3	52.9
Urban Interstate/Freeway	658,446	688,651	728,924	71.6	71.7	71.9
Urban Principal & Minor Arterial/Collector/Local Street	1,550,903	1,595,012	1,653,824	43.1	43.1	43.2
Total	5,507,837	5,709,248	5,977,796	53.5	53.9	54.4

*Source: Twin Cities Area Long Range Plan 2005 – 2030, April 2005.

To derive the VMT for year 2018 an average growth rate was determined for each scaled VMT by National Functional Classification (NFC) from year 2015 to 2020. The same methodology and source document as used above are used to derive the interpolated 2018 VMT and speeds. The scaled travel demand modeled VMTs and speeds for the county are summarized in Table V.1.2.

Table V.1.2
Berrien County 2018 Vehicle Miles of Travel and Speed

NFC	VMT 2015*	VMT 2018	VMT 2020*	Speed 2015*	Speed 2018	Speed 2020*
Rural Interstate/Freeway	1,577,132	**1,639,650**	1,681,328	68.1	**67.6**	67.2
Rural Major & Minor Arterial/Collector/Local Street	2,289,249	**2,365,948**	2,417,081	53.3	**53.4**	53.4
Urban Interstate/Freeway	803,488	**840,903**	865,846	72.1	**72.0**	72.0
Urban Principal & Minor Arterial/Collector/Local Street	1,699,792	**1,740,169**	1,767,087	43.1	**43.0**	43.0
Total	6,369,661	**6,586,670**	6,731,342	54.6	**54.6**	54.5

*Source: Twin Cities Area Long Range Plan 2005 – 2030, April 2005.

Moble6.2 Input Assumptions

Mobile6.2 calculates emission factors for eight individual vehicle types in two regions of the country. Mobile6.2 emission factor estimates depend on various conditions such as ambient temperatures, average travel speed, operating modes, fuel volatility, and mileage accrual rates. Many of the variables affecting vehicle emissions can be specified by the user.

A summary of critical Moble6.2 input assumptions are shown below:

1. Temperature:
   Ambient temperature = 86.8^{o} F
   Maximum temperature = 95.0^{o} F
   Minimum temperature = 65.0^{o} F

2. The Reid Vapor Pressure (RVP) value = 9.0

3. Emission factors are based on an average day during the month of July.

4. Where speed values are above the maximum allowed modeling input (65MPH for freeway without ramps, and 60.8 for freeways with ramps), actual modeled speeds were truncated and entered into the model as the maximum allowed value.

Mobile6.2 - Inputs

The inputs to the Mobile6.2 emissions factor model are VMT and average speed by NFC grouped, for years 2005 and 2018, as shown in Tables V.1.1 and V.1.2.

Mobile6.2 - Results

Tables V.1.3 and V.1.4 provides the results of Mobile6.2 emissions.

Table V.1.3
2005 Emissions by County in Tons per Day

	Emissions in tons/day	
County	**VOC**	**NO_x**
Berrien	**7.4468**	**14.4911**

Table V.1.4
2018 Emissions by County in Tons per Day

	Emissions in tons/day	
County	**VOC**	**NO_x**
Berrien	**3.4397**	**4.5713**

V.2 Cass County

MDOT prepared the on-highway motor vehicle emissions estimates using Federal Highway Administration (FHWA) and the EPA approved methodology. The methodology MDOT followed included:

Estimates of 2005 and 2018 VMT were by interpolation of VMT taken from the air quality conformity section of the Niles – Buchanan – Cass Area Transportation Study Long Range Plan 2005 – 2030, April 2005.

Development of emissions factors using the EPA Mobile6.2 model.

Development of 2005 and 2018 Vehicle Miles of Travel (VMT) and Speeds

To derive the VMT for year 2005 an average growth rate was determined for each scaled VMT by National Functional Classification (NFC) from year 2002 to 2007. The 2002 and 2007 VMT and vehicle hours of travel (VHT) were obtained from the above-mentioned conformity document analysis. The growth rates by NFC were applied to the 2002 VMTs to achieve estimated VMTs in 2005. Then the VMTs by NFC are collapsed into four groups to meet the requirements of Mobile6.2. These groups are: 1) rural interstate, 2) rural major and minor arterials/collectors/local streets, 3) urban interstate/freeway, and 4) urban principal and minor arterials/collectors/ local streets. The same procedures were applied to VHTs to determine year 2005 values. The modeled speeds were derived by dividing each grouped VMT by the equivalent grouped VHT. The scaled travel demand modeled VMTs and speeds for the county are summarized in Table V.2.1.

Table V.2.1
Cass County 2005 Vehicle Miles of Travel and Speed

NFC	VMT 2002*	VMT 2005	VMT 2007*	Speed 2002*	Speed 2005	Speed 2007*
Rural Interstate/Freeway	0	0	0	0	0	0
Rural Major & Minor Arterial/Collector/Local Street	1,061,304	1,100,213	1,126,152	53.3	53.4	53.4
Urban Interstate/Freeway	0	0	0	0	0	0
Urban Principal & Minor Arterial/Collector/Local Street	161,921	169,517	174,581	45.1	45.1	45.1
Total	1,223,225	1,269,730	1,300,733	52.1	52.1	52.1

*Source: Niles – Buchanan – Cass Area Transportation Study Long Range Plan 2005 – 2030, April 2005.

To derive the VMT for year 2018 an average growth rate was determined for each scaled VMT by National Functional Classification (NFC) from year 2015 to 2020. The same methodology and source document as used above are used to derive the interpolated 2018 VMT and speeds. The scaled travel demand modeled VMTs and speeds for the county are summarized in Table V.2.2.

Table V.2.2
Cass County 2018 Vehicle Miles of Travel and Speed

NFC	VMT 2015*	VMT 2018	VMT 2020*	Speed 2015*	Speed 2018	Speed 2020*
Rural Interstate/Freeway	0		0	0.0	**0.0**	0.0
Rural Major & Minor Arterial/Collector/Local Street	1,214,433	**1,255,616**	1,283,070	53.4	**53.4**	53.4
Urban Interstate/Freeway	0		0	0.0	**0.0**	0.0
Urban Principal & Minor Arterial/Collector/Local Street	191,461	**197,241**	201,094	45.0	**45.0**	45.0
Total	1,405,894	**1,452,857**	1,484,164	52.1	**52.1**	52.1

*Source: Niles – Buchanan – Cass Area Transportation Study Long Range Plan 2005 – 2030, April 2005.

Moble6.2 Input Assumptions

Mobile6.2 calculates emission factors for eight individual vehicle types in two regions of the country. Mobile6.2 emission factor estimates depend on various conditions such as ambient temperatures, average travel speed, operating modes, fuel volatility, and mileage accrual rates. Many of the variables affecting vehicle emissions can be specified by the user.

A summary of critical Moble6.2 input assumptions are shown below:

1. Temperature:
   Ambient temperature = 86.8^o F
   Maximum temperature = 95.0^o F
   Minimum temperature = 65.0^o F

2. The Reid Vapor Pressure (RVP) value = 9.0

3. Emission factors are based on an average day during the month of July.

4. Where speed values are above the maximum allowed modeling input (65MPH for freeway without ramps, and 60.8 for freeways with ramps), actual modeled speeds were truncated and entered into the model as the maximum allowed value.

Mobile6.2 - Inputs

The inputs to the Mobile6.2 emissions factor model are VMT and average speed by NFC grouped, for years 2005 and 2018, as shown in Tables V.2.1 and V.2.2.

Mobile6.2 - Results

Tables V.2.3 and V.2.4 provide the results of Mobile6.2 emissions.

Table V.2.3
2005 Emissions by County in Tons per Day

	Emissions in tons/day	
County	**VOC**	**NO_x**
Cass	**1.6558**	**2.9731**

Table V.2.4
2018 Emissions by County in Tons per Day

	Emissions in tons/day	
County	**VOC**	**NO_x**
Cass	**0.7370**	**0.9449**

V.3 Flint – MI (Genesee and Lapeer Counties)

MDOT prepared the on-highway motor vehicle emissions estimates using Federal Highway Administration (FHWA) and the EPA approved methodology. The methodology MDOT followed included:

Estimates of 2005 and 2018 VMT were by interpolation of VMT taken from the air quality conformity section of the Flint – Genesee County 2030 Long Range Plan, Amendment November 2005.

Development of emissions factors using the EPA Mobile6.2 model.

Development of 2005 and 2018 Vehicle Miles of Travel (VMT) and Speeds

To derive the VMT for year 2005, an average growth rate was determined for each scaled VMT by National Functional Classification (NFC) from year 2002 to 2008. The 2002 and 2008 VMT and vehicle hours of travel (VHT) were obtained from the above-mentioned conformity document analysis. The growth rates by NFC were applied to the 2002 VMTs to achieve estimated VMTs in 2005. Then the VMTs by NFC are collapsed into four groups, to meet the requirements of Mobile6.2. These groups are: 1) rural interstate, 2) rural major and minor arterials/collectors/local streets, 3) urban interstate/freeway, and 4) urban principal and minor arterials/collectors/ local streets. The same procedures were applied to VHTs to determine year 2005 values. The modeled speeds were derived by dividing each grouped VMT by the equivalent grouped VHT. The scaled travel demand modeled VMTs and speeds for Genesee County are summarized in Table V.3.1 and Lapeer County in Table V.3.2.

Table V.3.1
Genesee County 2005 Vehicle Miles of Travel and Speed

NFC	VMT 2002*	VMT 2005	VMT 2008*	Speed 2002*	Speed 2005	Speed 2008*
Rural Interstate/Freeway	541,654	570,560	599,466	64.6	64.6	64.6
Rural Major & Minor Arterial/Collector/Local Street	1,624,180	1,706,105	1,788,029	45.0	44.6	44.1
Urban Interstate/Freeway	3,624,004	3,726,405	3,828,806	55.5	55.6	55.7
Urban Principal & Minor Arterial/Collector/Local Street	6,834,533	7,008,732	7,182,932	40.3	39.9	39.5
Total	12,624,371	13,011,802	13,399,233	45.2	44.9	44.6

*Source: Flint – Genesee County 2030 Long Range Plan, Amendment November 2005.

Table V.3.2
Lapeer County 2005 Vehicle Miles of Travel and Speed

NFC	VMT 2002*	VMT 2005	VMT 2008*	Speed 2002*	Speed 2005	Speed 2008*
Rural Interstate/Freeway	630,178	675,146	720,114	69.7	69.6	69.5
Rural Major & Minor Arterial/Collector/Local Street	1,489,600	1,561,217	1,632,835	45.6	45.4	45.3
Urban Interstate/Freeway	0	0	0	0.0	0.0	0.0
Urban Principal & Minor Arterial/Collector/Local Street	292,730	305,648	318,566	39.6	39.3	39.1
Total	2,412,508	2,542,011	2,671,515	49.1	49.0	48.9

*Source: Flint – Genesee County 2030 Long Range Plan, Amendment November 2005.

To derive the VMT for year 2018, an average growth rate was determined for each scaled VMT by National Functional Classification (NFC) from year 2015 to 2020. The same methodology and source document as used above are used to derive the interpolated 2018 VMT and speeds. The scaled travel demand modeled VMTs and speeds for Genesee County are summarized in Table V.3.3 and Lapeer County in Table V.3.4.

Table V.3.3
Genesee County 2018 Vehicle Miles of Travel and Speed

NFC	VMT 2015*	VMT 2018	VMT 2020*	Speed 2015*	Speed 2018	Speed 2020*
Rural Interstate/Freeway	674,785	**710,486**	734,286	64.4	**64.3**	64.2
Rural Major & Minor Arterial/Collector/Local Street	1,976,656	**2,040,962**	2,083,832	43.2	**42.9**	42.8
Urban Interstate/Freeway	4,108,589	**4,213,152**	4,282,861	55.1	**55.0**	54.9
Urban Principal & Minor Arterial/Collector/Local Street	7,611,845	**7,859,989**	8,025,418	39.2	**39.1**	39.0
Total	14,371,875	**14,824,589**	15,126,397	44.2	**44.1**	44.0

*Source: Flint – Genesee County 2030 Long Range Plan, Amendment November 2005.

Table V.3.4
Lapeer County 2018 Vehicle Miles of Travel and Speed

NFC	VMT 2015*	VMT 2018	VMT 2020*	Speed 2015*	Speed 2018	Speed 2020*
Rural Interstate/Freeway	808,095	**839,728**	860,817	69.1	**68.9**	68.8
Rural Major & Minor Arterial/Collector/Local Street	1,830,347	**1,914,719**	1,970,966	42.6	**40.9**	40.0
Urban Interstate/Freeway	0	**0**	0	0.0	**0.0**	0.0
Urban Principal & Minor Arterial/Collector/Local Street	354,615	**369,059**	378,688	38.4	**38.1**	38.0
Total	2,993,057	**3,123,506**	3,210,471	46.8	**45.5**	44.7

*Source: Flint –Genesee County 2030 Long Range Plan, Amendment November 2005.

Moble6.2 Input Assumptions

Mobile6.2 calculates emission factors for eight individual vehicle types in two regions of the country. Mobile6.2 emission factor estimates depend on various conditions such as ambient temperatures, average travel speed, operating modes, fuel volatility, and mileage accrual rates. Many of the variables affecting vehicle emissions can be specified by the user.

A summary of critical Moble6.2 input assumptions are shown below:

1. Temperature:
   Ambient temperature = 86.8^o F
   Maximum temperature = 95.0^o F
   Minimum temperature = 65.0^o F

2. The Reid Vapor Pressure (RVP) value = 9.0

3. Emission factors are based on an average day during the month of July.

4. Where speed values are above the maximum allowed modeling input (65MPH for freeway without ramps, and 60.8 for freeways with ramps), actual modeled speeds were truncated and entered into the model as the maximum allowed value.

Mobile6.2 - Inputs

The inputs to the Mobile6.2 emissions factor model are VMT and average speed by NFC grouped, for years 2005 and 2018, as shown in Tables V.3.1 and V.3.2.

Mobile6.2 - Results

Tables V.3.5 and V.3.6 provide the results of Mobile6.2 emissions.

Table V.3.5
2005 Emissions by County in Tons per Day

	Emissions in tons/day*	
County	**VOC**	**NO_X**
Genesee	17.7056	29.9788
Lapeer	3.3869	6.0998
Total Nonattainment Area	21.0925	36.0786

Table V.3.6
2018 Emissions by County in Tons per Day

	Emissions in tons/day*	
County	**VOC**	**NO_X**
Genesee	8.0687	9.3984
Lapeer	1.6924	2.0251
Total Nonattainment Area	9.7611	11.4235

V.4 Muskegon County - MI

MDOT prepared the on-highway motor vehicle emissions estimates using Federal Highway Administration (FHWA) and the EPA approved methodology. The methodology MDOT followed included:

Estimates of 2005 and 2018 VMT were by interpolation of VMT taken from the air quality conformity section of the WestPlan 2030 Long Range Plan, December 2005.

Development of emissions factors using the EPA Mobile6.2 model.

Development of 2005 and 2018 Vehicle Miles of Travel (VMT) and Speeds

To derive the VMT for year 2005, an average growth rate was determined for each scaled VMT by National Functional Classification (NFC) from year 2002 to 2006. The 2002 and 2006 VMT and vehicle hours of travel (VHT) were obtained from the above-mentioned conformity document analysis. The growth rates by NFC were applied to the 2002 VMTs to achieve estimated VMTs in 2005. Then the VMTs by NFC are collapsed into four groups, to meet the requirements of Mobile6.2. These groups are: 1) rural interstate, 2) rural major and minor arterials/collectors/local streets, 3) urban interstate/freeway, and 4) urban principal and minor arterials/collectors/ local streets. The same procedures were applied to VHTs to determine year 2005 values. The modeled speeds were derived by dividing each grouped VMT by the equivalent grouped VHT. The scaled travel demand modeled VMTs and speeds for the county are summarized in Table V.4.1.

Table V.4.1
Cass County 2005 Vehicle Miles of Travel and Speed

NFC	VMT 2002*	VMT 2005	VMT 2006*	Speed 2002*	Speed 2005	Speed 2006*
Rural Interstate/Freeway	112,531	115,076	115,925	69.1	69.1	69.1
Rural Major & Minor Arterial/Collector/Local St.	1,186,327	1,231,931	1,247,132	57.4	57.9	58.0
Urban Interstate/Freeway	576,002	582,721	584,961	54.9	55.0	55.0
Urban Principal & Minor Arterial/Collector/Local St.	1,795,203	1,858,672	1,879,829	42.3	39.8	39.0
Total	3,670,063	3,788,400	3,827,847	48.8	47.2	46.7

*Source: WestPlan 2030 Long Range Plan, December 2005.

To derive the VMT for year 2018, an average growth rate was determined for each scaled VMT by National Functional Classification (NFC) from year 2015 to 2025. The same methodology and source document as used above are used to derive the interpolated 2018 VMT and speeds. The scaled travel demand modeled VMTs and speeds for the county are summarized in Table V.4.2.

Table V.4.2
Muskegon County 2018 Vehicle Miles of Travel and Speed

NFC	VMT 2015*	VMT 2018	VMT 2025*	Speed 2015*	Speed 2018	Speed 2025*
Rural Interstate/Freeway	125,314	**128,361**	135,469	68.9	**68.9**	68.8
Rural Major & Minor Arterial/Collector/Local Street	1,372,165	**1,414,572**	1,513,522	57.6	**57.4**	56.9
Urban Interstate/Freeway	632,136	**649,169**	688,913	54.6	**54.4**	53.9
Urban Principal & Minor Arterial/Collector/Local Street	1,996,088	**2,038,302**	2,136,802	39.0	**39.5**	40.5
Total	4,125,703	**4,230,404**	4,474,706	46.7	**47.0**	47.6

*Source: WestPlan 2030 Long Range Plan, December 2005.

Moble6.2 Input Assumptions

Mobile6.2 calculates emission factors for eight individual vehicle types in two regions of the country. Mobile6.2 emission factor estimates depend on various conditions such as ambient temperatures, average travel speed, operating modes, fuel volatility, and mileage accrual rates. Many of the variables affecting vehicle emissions can be specified by the user.

A summary of critical Moble6.2 input assumptions are shown below:

1. Temperature:
   Ambient temperature = 86.8^{o} F
   Maximum temperature = 95.0^{o} F
   Minimum temperature = 65.0^{o} F

2. The Reid Vapor Pressure (RVP) value = 9.0

3. Emission factors are based on an average day during the month of July.

4. Where speed values are above the maximum allowed modeling input (65MPH for freeway without ramps, and 60.8 for freeways with ramps), actual modeled speeds were truncated and entered into the model as the maximum allowed value.

Mobile6.2 - Inputs

The inputs to the Mobile6.2 emissions factor model are VMT and average speed by NFC grouped, for years 2005 and 2018, as shown in Tables V.4.1 and V.4.2.

Mobile6.2 - Results

Tables V.4.3 and V.4.4 provide the results of Mobile6.2 emissions.

Table V.4.3
2005 Emissions by County in Tons per Day

	Emissions in tons/day	
County	**VOC**	**NO_x**
Muskegon	**5.0766**	**8.9092**

Table V.4.4
2018 Emissions by County in Tons per Day

	Emissions in tons/day	
County	**VOC**	**NO_x**
Muskegon	**2.2671**	**2.7386**

APPENDIX B

PUBLIC HEARING RECORD

PROPOSED REDESIGNATION TO ATTAINMENT AND REVISION TO THE MICHIGAN STATE IMPLEMENTATION PLAN FOR THE 8-HOUR OZONE NATIONAL AMBIENT AIR QUALITY STANDARD

FOR

LAPEER, GENESEE, MUSKEGON, BERRIEN, AND CASS COUNTIES, MICHIGAN

Michigan Department of Environmental Quality
Air Quality Division

June 2006

PUBLIC HEARING ATTENDANCE

Constitution Hall Building
Con-Con Room
525 W. Allegan, Lansing, Michigan

May 30, 2006

MDEQ: G. Vinson Hellwig, Division Chief, Air Quality Division

Marion Hart, Hearing Officer

Mary Maupin, Air Quality Division

Others Present: Lisa Hainstock, Michigan Department of Agriculture

Hearing Comments: None

Written Comments: Charles Hatten, Region 5, U.S. Environmental Protection Agency

Patrick Wilson, Little River Band of Ottawa Indians

NOTICE OF PUBLIC HEARING
DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

OZONE REDESIGNATION AND MAINTENANCE PLAN

The Michigan Department of Environmental Quality (MDEQ) has prepared a proposal for a redesignation petition and maintenance plan for five counties in association with the 8-hour National Ambient Air Quality Standards (NAAQS) for ozone. At the conclusion of the 2005 ozone season, all monitors in five nonattainment counties measured air quality that meets the NAAQS for ozone. The MDEQ plans to submit the redesignation petition and maintenance plan for Genesee, Lapeer, Muskegon, Berrien, and Cass counties to the U.S. Environmental Protection Agency to formally request that the five counties be redesignated to attainment under the 8-hour NAAQS for ozone.

A public hearing will be held at 2:00 p.m. on May 30, 2006, at the Constitution Hall Con-Con Conference Room, 525 West Allegan Street, Lansing, Michigan.

Copies of the proposed redesignation petition and maintenance plan can be viewed on the Internet at http://www.michigan.giv/deqair under "Announcements." The proposed document can also be reviewed and copied at the following locations:

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- LANSING: MDEQ, Air Quality Division, Constitution Hall, 3rd floor North, 525 West Allegan Street.

All interested persons are invited to attend the public hearing or provide written comment on the proposed redesignation petition and maintenance plan. It is requested that all statements be submitted in writing for the hearing record. Written comments must be received by 5:00 p.m. on May 30, 2006. Comments may be mailed, faxed, or emailed to the following:

Attention: Mary Maupin
MDEQ – Air Quality Division
P.O. Box 30260
Lansing, Michigan 48909
Fax: (517) 241-7499
Email: maupinm@michigan.gov

Persons needing accommodations for effective participation in the meeting should contact Air Quality Division at 517-241-9059 one week in advance to request mobility, visual, hearing or other assistance.

Barbara Rosenbaum, Acting for

G. Vinson Hellwig, Chief
Air Quality Division

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G. VINSON HELLWIG, Chief
Air Quality Division

PUBLISH: April 29, 2006

STATE OF MICHIGAN
County of Muskegon ss.

Gary Ostrom being duly sworn deposes and says that he is the Publisher of the MUSKEGON CHRONICLE, a newspaper printed in Muskegon County and circulated within the Counties of Muskegon, Ottawa, Newaygo, Mason, and Oceana; that the annexed notice was duly printed and published in said MUSKEGON CHRONICLE for one (1) day(s); that is to say, on the 29th day(s) of April 2006, and the _____ day(s) of _____ 200____, and the _____ day(s) of _____ 200____, and that said publication was continued during said time without any intermission or omission, and that he has a personal knowledge of the facts above set forth.

Subscribed and sworn to before me this 2nd day of May A.D. 2006.

CAROL A. KEUR
NOTARY PUBLIC-STATE OF MICHIGAN
COUNTY OF MUSKEGON
My Commission Expires APRIL 9, 2011
Acting in the County of _____

Carol A. Keur
Notary Public, Muskegon County, Mich.

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MAY 09 2006
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AFFIDAVIT OF PUBLICATION

NOTICE OF PUBLIC HEARING DEPARTMENT OF ENVIRONMENTAL QUALITY AIR QUALITY DIVISION

OZONE REDESIGNATION AND MAINTENANCE PLAN

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G. Vinson Hellwig, Chief
Air Quality Division
HP/adv April 28, 2006

Legals

STATE OF MICHIGAN

COUNTY OF BERRIEN} SS

Jennifer Lyon, being duly sworn and says that she is Inside Sales Supervisor of The Herald-Palladium, a newspaper published, printed and circulated in the County of Berrien, State of Michigan: That the annexed printed notice has been printed and published in said newspaper 1 times. Same being on the following days, to wit:

April 28, 2006

Jennifer Lyon
(Signature)

Subscribed and sworn to me this 3rd Day of May A.D. 2006.

Lynne Christian
NOTARY PUBLIC, Berrien County, Michigan
My commission expires 4-10 2012

THE FLINT JOURNAL

INTOUCH INDEPTH INVOLVED

Affidavit of Publication

(STATE OF MICHIGAN)
(COUNTY OF GENESEE) SS.

I, Samuel M. Harris, being duly sworn says: I am Director of Administration/Interim Advertising Director of The Flint Journal, a newspaper printed and published in said county. The annexed is a printed copy of a notice which was published in said paper on the following date, to wit:

April 28 A.D. 2006

A.D.

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A.D.

A.D.

A.D.

A.D.

A.D.

A.D.

x Sam Harris

Subscribed and sworn to before me this 1 Day of May, A.D. 2006

HAROLD C. MC INTYRE
Notary Public, State of Michigan
County of Genesee
My Commission Expires May 29, 2012
Acting in the County of Genesee

Harold C. McIntyre
NOTARY PUBLIC

MY COMMISSION EXPIRES: 05-29, A.D. 12

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NOTICE OF PUBLIC HEARING
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_____ A.D. _____

_____ A.D. _____

_____ A.D. _____

x _____

Subscribed and sworn to before me this 1 Day of May, A.D. 2006

HAROLD C. MC INTYRE
Notary Public, State of Michigan
County of Genesee
My Commission Expires May 29, 2012
Acting in the County of Genesee

NOTARY PUBLIC

MY COMMISSION EXPIRES: 05-29, A.D. 12

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G. Vinson Hellwig, Chief
Air Quality Division

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

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MAY 3 0 2006

REPLY TO THE ATTENTION OF:
(AR-18J)

Mary Maupin
Air Quality Division
Michigan Department of Environmental Quality
P.O. Box 30260
Lansing, MI 48909

Dear Ms. Maupin:

Thank you for providing us with a copy of Michigan's proposed state implementation plan revision consisting of a request to redesignate five Michigan counties to attainment for the 8-hour ozone standard and the associated maintenance plan for these areas. We appreciate the opportunity to provide comments on the document. Our most significant comments relate to the completeness of the monitoring data for Cass County and the transportation conformity portion of your submittal.

The completeness criteria for ambient monitoring data, set forth in 40 CFR 50, Appendix H, require a minimum completeness of 75 percent annually and 90 percent over each three year period. The monitoring data summarized in the redesignation submittal show that monitors representing Muskegon, Berrien, Genesee, and Lapeer counties meet the annual and three-year data completeness criteria. The monitoring data for Cass County, however, does not meet the minimum annual completeness criteria for the year 2003 or the three-year completeness criteria for the 2003-2005 time period. The Michigan Department of Environmental Quality (MDEQ) will need to address this issue in the final submittal.

With respect to the transportation conformity portion of your submittal, EPA has the following comments on your Motor Vehicle Emissions Budgets (MVEBs) listed in Table 7.1. In general, maintenance plans establish MVEBs for an area based on the projected level of controlled emissions from the transportation sector (mobile sources). Budgets are established by beginning with projected mobile source emissions in the out-year of the inventory, in this case, 2018. To allow for unexpected growth

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in the transportation sector, this budget may be increased by using the safety margin established in the 2018 inventory. However, the MVEB must not exceed the sum of the 2018 mobile source inventory and the safety margin. Calculation errors appear to have been made when determining the MVEBs because they exceed the maximum level which could be allocated. These budgets will have to be revised in the final submittal in order to meet EPA guidance regarding redesignations and MVEB's.

In addition, EPA has identified a calculation error in "Table 6.1 Maintenance Plan Emission Inventories 2005-2009-2018." When calculating the total volatile organic compounds (VOC) emissions for Berrien County, year 2018, the total VOC should be 22.99 tons per day rather than 20.59 tons per day. This correction would require the safety margin to be re-calculated to be 6.36 tons per day (tpd) rather than 8.76 tpd.

If you have any questions regarding our comments, please feel free to call me at (312) 886-6031 or Michael Leslie at (312) 353-6680.

Sincerely,

Charles Hatten

Charles Hatten, Environmental Engineer
Criteria Pollutant Section

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Review of MDEQ's Ozone Redesignation Petition and Maintenance Plan

Submitted by
Patrick Wilson
Tribal Ogema
Little River Band of Ottawa Indians

With the help of
Jeremy Howe
Air Quality Specialist
Little River Band of Ottawa Indians

And
Frank Beaver
GAP Coordinator
Little River Band of Ottawa Indians

And
Jo Anne House
Attorney
Little River Band of Ottawa Indians

On behalf of
Tribal Members of
Little River Band of Ottawa Indians

May 5, 2006

Little River Band of Ottawa Indians
375 River St
Manistee, MI 49660

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May 5, 2006

Honorable Steven E. Chester
Director
Michigan Department of Environmental Quality
Air Quality Division
P.O. Box 30260
Lansing, Michigan 48909-7760

Dear Director Chester:

After having read the notice that was published in the DEQ Calendar on May 1, 2006 regarding the proposed Ozone Redesignation Petition and Maintenance Plan for five Michigan counties, I have a list of concerns to register with the Michigan Department of Environmental Quality (MDEQ) before this plan is submitted to the Environmental Protection Agency (EPA) for consideration. While this letter deals with my concerns for the county nearest to the tribe (Muskegon), certainly the following arguments could be extended to the other four counties that are affected by this plan.

First and foremost, I want to strongly urge you to not petition the EPA to redesignate Muskegon County for the 8-hour National Ambient Air Quality Standards (NAAQS) for ozone. I am stressing that redesignation at this time would be premature because the data are misleading.

The three year average for Muskegon County during the period of 2003-2005 was less than 0.085 parts per million (ppm), we agree that this puts the county into Attainment for the ozone 8-hour NAAQS. Although, I wish to point out that it is just barely below the NAAQS as the three year average is 0.08467 ppm or ⅓ of a part per billion (ppb) below the NAAQS.

While the three year averages determine the NAAQS, and I am not disputing this whatsoever, we should be looking closer at the numbers that determine the three year averages with more scrutiny which are the single year 4th highest 8-hour average. But, as with our comments filed in regards to Manistee and Mason Counties, I point out that 2004 was a statistical outlier.

The yearly values show Non-Attainment for Muskegon County from 1992 to 2005, <u>except</u> for 1993, 1997, 2000 and 2004. Thus, <u>out of fourteen years only four are in compliance</u> for the ozone NAAQS. It is my belief that by using this statistic there is a 71% chance that Muskegon County will have a 4th highest 8-hour average this year above the 0.085 ppm NAAQS. Furthermore, after this year MDEQ will not be able to use the abnormally low 2004 data any longer. In which case, if this occurs Muskegon County will once again not meet the qualifications for redesignation.

This brings me to my second point. I maintain that the reason for the low yearly values for 2004 in Muskegon County has little to do with the State of Michigan or other entities' control efforts to reduce pollution. This much is clear, the vast majority of ozone precursors in this county are coming across Lake Michigan from the Milwaukee – Chicago – Gary area. I don't think anyone has disputed this.

I urge you to look at the data which shows that in some years the ozone 4th highest 8-hour average increases from the previous year and some years it decreases from the previous year. Obviously the EPA did not relax its control efforts during the years that ozone was higher in these counties. Rather, I believe it has more to do with the weather than with control efforts as was stated in MDEQ's *2004 Annual Air Quality Report for Michigan.*

The 1st and 2nd paragraphs on page 39 of the Report in particular are very insightful. The following segment was exceptionally informative:

> *This comparison shows the influence of temperature with respect to elevated O3 levels. Over the past 22 years, a typical summer would have 12 1/2 days with the maximum daily temperature exceeding 90°F. Over the time period from 1980 through 2004, the highest number of 90°F days occurred in 1988 (39 days), while the lowest number occurred in 2000 (one day). For 2004, cooler temperatures prevailed again with only three 90°F days, giving all the monitoring sites, with the exception of three, the lowest readings since 1995. In addition, when the number of 8-hour O3 readings above 0.085 ppm was divided by the number of monitors that were in operation, 2004 had the lowest average (0.15) overall.* ***Also for 2004, when all the sites had their three-year averages calculated, there were only eight (out of 27) sites in Michigan that were above the 8-hour O3 NAAQS. … In 2003, there were a total of 21 monitoring sites out of 27 that were above the 8-hour O3 NAAQS.*** *[Emphasis added.]*

Clearly, as was stated in your own agency's report, weather and not necessarily control efforts has a larger effect on yearly ozone values. Again, as we stated in our comments in regards to Manistee and Mason Counties, since we can not control the weather, MDEQ should hold off on petitioning the EPA until there is a point in the future that it can better ascertain the true condition of air quality in these counties.

I reiterate for this proposed redesignation - clean air is a quality we both strive to maintain, while there are many actions that are out of our control in order to obtain clean air, this is not one of those actions. Redesignation should occur where we have done something to affect that change; clearly we have done nothing of that nature in this case.

I urge you to look closely at what is causing air quality levels in Muskegon County and determine that it is not in the best interests of the State, the County or the citizens living in these areas to request redesignation at this time.

Sincerely,

Patrick Wilson
Tribal Ogema

SUMMARY OF COMMENTS SUBMITTED AND MDEQ RESPONSE

COMMENT FROM LITTLE RIVER BAND OF OTTAWA INDIANS: Redesignation is premature because the data are misleading. There is a 71 percent chance that Muskegon County will have a 4th highest 8-hour average in 2006 that is not in attainment with the ozone NAAQS. The year 2004 was a statistical outlier. The low yearly values in Muskegon for 2004 have little to do with control efforts, and more to do with the weather. The MDEQ is urged not to petition the EPA to redesignate.

MDEQ RESPONSE: The ozone NAAQS was designed to be a robust standard. The rolling 3-year average form of the standard provides stability from year-to-year variability in meteorology. A 3-year time period to determine attainment is consistent with a 3-year time period that was considered in designating nonattainment areas. It is true that ambient temperatures and ozone levels were lower during 2004 than in many previous years. However, the other two years in the design value average, 2003 and 2005, had more typical summer weather, and Muskegon is attaining the NAAQS.

Ozone precursor emissions have declined both in Michigan and in upwind states. Emissions will continue to decline in future years as described in this petition for redesignation. If a violation of the ozone NAAQS should occur after an area is redesignated to attainment, one or more contingency measures from the maintenance plan will be implemented to promptly reduce emissions.

COMMENTS FROM THE EPA: There are calculation errors in Tables 6.1 and 7.1. The minimum completeness criterion for ambient air monitoring data for the Cass County monitor has not been met.

MDEQ response: The calculation errors have been corrected for the Transportation Conformity Emissions Budgets, and for projected emissions totals for Berrien County, and are in bold font.

Although the Cassopolis monitor was not functioning for a portion of the 2003 ozone season, the MDEQ has made an adequate demonstration of ozone NAAQS attainment through representative data at the surrounding monitors in Coloma, Kalamazoo, and South Bend, as detailed in Section 3 of this document. An analysis of data for the missing collection days at the Cassopolis monitor showed only two days with concentrations over 85 ppb at any of the surrounding monitors. On those two days, only one of the three monitors was over 85 ppb. Probable levels of ozone at Cassopolis were derived by assessing the locations and ozone measurements of all three monitors on the two days. The 4th highest 8-hour average for 2003 would not have been higher than 85 ppb. All 4 highest ozone values for the upwind South Bend monitor occurred in June in 2003. The Cassopolis monitor was operational during the entire month of June in 2003. There is no question that the 8-hour ozone NAAQS has been attained at the Cass County monitor in Cassopolis. Federal regulation provides the EPA Region Five Administrator with the authority to use discretion in considering meteorology or ambient data on missing days of collection. The MDEQ has provided such data to enable the EPA to make a determination of attainment.