



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

*We make Indiana a cleaner, healthier place to live.*

Mitchell E. Daniels, Jr.  
Governor

Thomas W. Easterly  
Commissioner

100 North Senate Avenue  
Indianapolis, Indiana 46204  
(317) 232-8603  
(800) 451-6027  
www.idem.IN.gov

October 10, 2006

Mr. Bharat Mathur  
Acting Regional Administrator  
U.S. EPA, Region 5  
77 W. Jackson Blvd.  
Chicago, IL 60604

Re: Clean Air Act Section 110(l)  
Demonstration and State  
Implementation Plan Revision for  
Clark and Floyd Counties, Indiana

Dear Mr. Mathur:

Enclosed is a revision to the *Request for Redesignation and Maintenance Plan for Attainment in the Indiana Portion of the Louisville Basic Nonattainment Area*. Also enclosed for your review, please find a non-interference demonstration consistent with Section 110(l) of the Clean Air Act to support the discontinuation of the vehicle inspection and maintenance program for Clark and Floyd counties. IDEM has revised the petition and maintenance plan in order to move the vehicle inspection and maintenance program from Section 6.2, where it was listed as a measure to remain in place over the course of the maintenance plan, to Section 8.0, where it is listed as a contingency measure. IDEM has also revised Section 6.0 to clarify that local and statewide RACT rules have applied to new/existing VOC emission sources locating in Clark and Floyd Counties as required by Section 172 of the CAAA.

Indiana House Enrolled Act No. 1798, effective on July 1, 2003, amended IC 13-17-5 to eliminate the applicability of the vehicle emissions testing rule to Clark and Floyd counties after December 31, 2006, and prohibit the Indiana Air Pollution Control Board from adopting rules to extend the program in those counties after that date.

B. Mathur

Page 2.

In order to support the discontinuation of the vehicle inspection and maintenance program in Clark and Floyd counties, IDEM has prepared a demonstration that meets the requirements of Section 110(l) of the Clean Air Act, hereinafter referred to as the Section 110(l) demonstration. This demonstration is supported by photochemical modeling. Photochemical modeling shows that NO<sub>x</sub> and VOC emissions will slightly increase with the discontinuation of the vehicle inspection and maintenance program. Despite this fact, 2007 total emissions are projected to be less than the total 2003 (base year) emission levels. The 2010 and 2020 total emission levels are also projected to be less than total 2003 emissions levels. Therefore, the discontinuation of the vehicle emissions testing program will not interfere with attainment of the 8-hour ozone standard in Clark and Floyd counties. Furthermore, this demonstration shows that the discontinuation of the vehicle emissions testing program will not interfere with the area's reasonable progress towards attainment of the National Ambient Air Quality Standard for fine particles (PM 2.5).

The revised 8-Hour Redesignation Petition and Maintenance Plan for Clark and Floyd counties, as well as the Section 110(l) demonstration, are enclosed. These documents are currently subject to public review. A public hearing concerning this matter is scheduled for November 6, 2006, and IDEM will submit the final documents to the U.S. EPA by December 1, 2006. IDEM requests that the U.S. EPA parallel process the revised State Implementation Plan.

If you have any comments or questions regarding this request, please contact Ms. Kathy Watson, Branch Chief in the Office of Air Quality, at (317) 233-5694 or Mr. Gale Ferris, Environmental Manager, at (317) 234-3653.

Sincerely,



Thomas W. Easterly  
Commissioner

**Attachments**

cc: Steve Rosenthal, US EPA (w/enclosures)  
Jay Bortzer, U.S. EPA (w/enclosures)  
John Mooney, U.S. EPA (w/enclosures)

# Clean Air Act Section 110(l) Demonstration

## To Support

### Discontinuation of the Vehicle Inspection and Maintenance Program in Clark and Floyd counties, Indiana

#### Overview

The Indiana Department of Environmental Management (IDEM) has prepared a revision to the Redesignation Petition and Maintenance Plan for Clark and Floyd counties in conjunction with the 8-hour ozone standard. This revision is to accommodate the discontinuation of the vehicle inspection and maintenance program for Clark and Floyd counties. Section 110(l) of the Clean Air Act states that the Administrator (of the United States Environmental Protection Agency) shall not approve a revision of a plan (State Implementation Plan or SIP) if the revision would interfere with any applicable requirement concerning attainment or reasonable further progress (of a National Ambient Air Quality Standard). Therefore, IDEM has also prepared a demonstration that shows that the discontinuation of the vehicle emissions testing program will not interfere with the applicable requirements of the National Ambient Air Quality Standards for 8-hour ozone and fine particles.

#### Background

IDEM recently submitted an 8-Hour Ozone Redesignation Petition and Maintenance Plan for Clark and Floyd counties (dated July 2006) to the U.S. EPA requesting that these counties be redesignated to attainment of the standard. Clark and Floyd counties, along with the remaining portion of the Louisville nonattainment area, have attained the NAAQS standard for ozone. Indiana has performed an analysis that shows the air quality improvements are due to permanent and enforceable measures and that significant regional NO<sub>x</sub> reductions following implementation of Phase II of the NO<sub>x</sub> SIP Call and the Clean Air Interstate Rule will ensure continued compliance (maintenance) with the standard.

Indiana's petition includes a long-term maintenance plan that will be implemented to ensure that the area continues to meet the 8-hour standard for ground-level ozone through the year 2020. Indiana also committed to maintain all emission control measures necessary to ensure continued compliance with the standard following redesignation.

The vehicle inspection and maintenance program was first initiated in 1984 in accordance with the Clean Air Act (CAA). This program was augmented in 1997 to a fully enhanced vehicle inspection and maintenance program and was incorporated within Indiana's 1-hour ozone State Implementation Plan in 1996. Although the U.S. EPA revoked the 1-hour ozone standard on June 15, 2005, Clark and Floyd counties were designated nonattainment for the eight-hour ozone standard effective June 15, 2004. Therefore, the program is required to be in place until all applicable Clean Air Act requirements are met. The vehicle inspection and maintenance program is authorized by state statute, IC 13-17-5, paid for by the general fund, and implemented through rules promulgated by the Air Pollution Control Board at 326 IAC

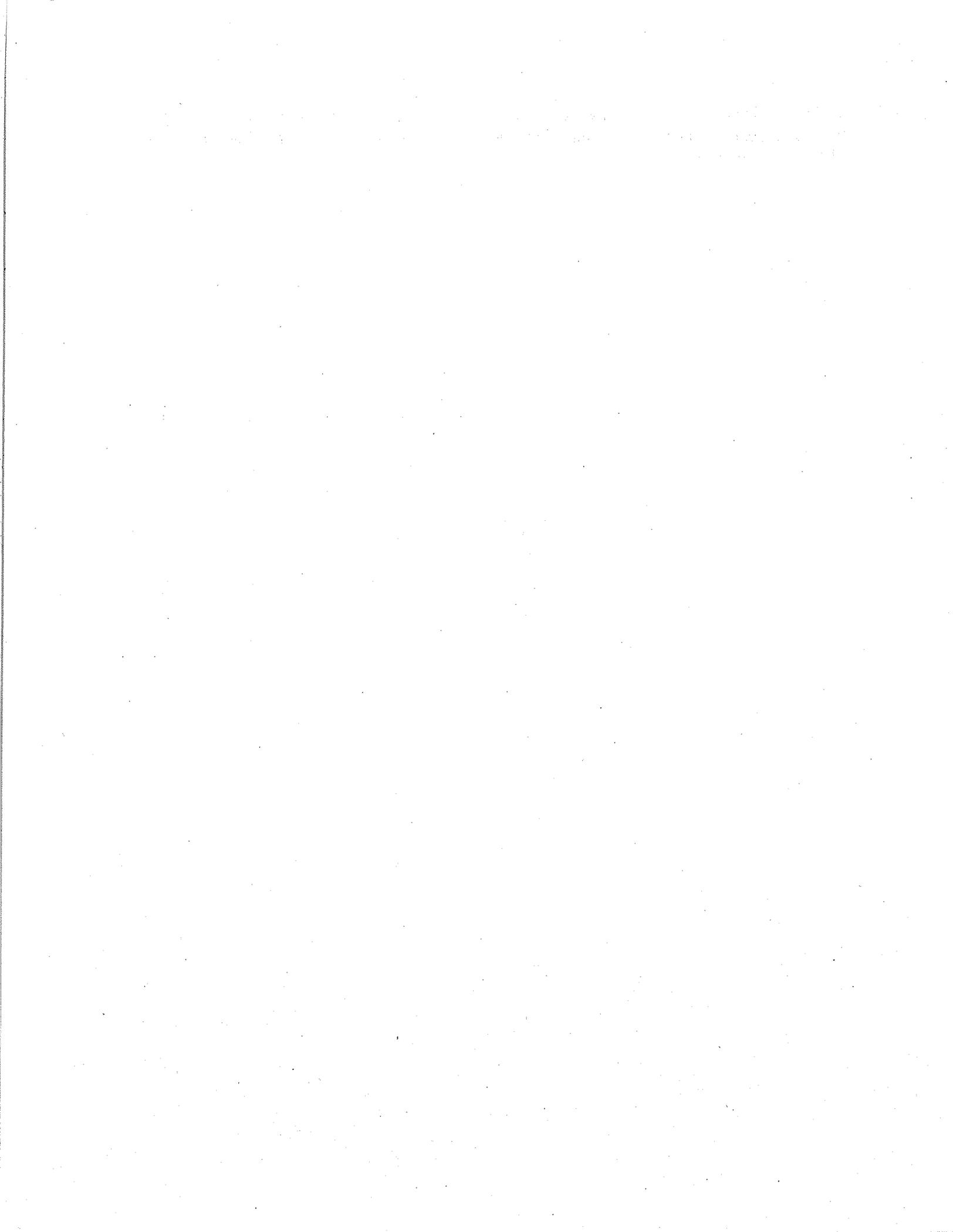
13-1.1. This program tests approximately 7% of the registered automobiles in the Greater Louisville Basic Ozone Nonattainment Area and costs the State of Indiana approximately one million dollars per year to operate and maintain. The program yields less than a 1% reduction in total NO<sub>x</sub> and VOC emissions for the nonattainment area.

On July 1, 2003, an amendment to IC 13-17-5 became effective that terminates Indiana's vehicle inspection and maintenance rule for Clark and Floyd counties after December 31, 2006, and directs the Air Pollution Control Board to amend 326 IAC 13-1.1 to reflect this change. IDEM is in the process of amending the state rule to accommodate the discontinuation of the vehicle inspection and maintenance program in Clark and Floyd counties. IDEM has also revised the 8-Hour Redesignation Petition and Maintenance Plan for Clark and Floyd counties in order to move the vehicle inspection and maintenance program from Section 6.2 where it was listed as a measure to remain in place over the course of the maintenance plan, to Section 8.0 where it is listed as a contingency measure. IDEM has also revised Section 6.0 to clarify that Indiana in the mid-1990s promulgated rules specific to Clark and Floyd counties that require RACT for new/existing emission sources of VOCs locating in these counties.

In order to support the revision to the 8-Hour Redesignation Petition and Maintenance Plan for Clark and Floyd counties, IDEM has prepared a demonstration that meets the requirements of Section 110(l) of the Clean Air Act, hereinafter referred to as the Section 110(l) demonstration. This demonstration is supported by photochemical modeling and an emissions analysis. Photochemical modeling shows that NO<sub>x</sub> emissions will increase by 0.78 tons per summer day and 0.82 tons per winter day with the discontinuation of the vehicle inspection and maintenance program. VOC emissions will also increase by 0.79 tons per summer day and 1.49 tons per winter day. Despite this fact 2007 total emissions are projected to be less than the total 2002 emission levels (base year for PM 2.5), 2003 total emission levels (base year for the ozone maintenance plan), and 2009 total emission levels (deadline for monitoring attainment under the PM 2.5 standard). The 2010 and 2020 total emission levels referenced in the ozone maintenance plan are also projected to be less than the total 2003 emissions levels. Therefore, the discontinuation of the vehicle emissions testing program will not interfere with attainment of the 8-hour ozone standard in Clark and Floyd counties, or elsewhere within the nonattainment area. Furthermore, this demonstration shows that the discontinuation of the vehicle emissions testing program will not interfere with the area's reasonable progress towards attainment of the National Ambient Air Quality Standard for fine particles (PM 2.5)

The vehicle inspection and maintenance program was implemented as a volatile organic compound (VOC) emission control measure specifically in association with the 1-hour ozone standard (revoked effective June 15, 2005). The program does not fail motor vehicles for exceeding tailpipe standards for oxides of nitrogen (NO<sub>x</sub>) emissions. However, since VOC and NO<sub>x</sub> are precursors for ozone, IDEM's 110(l) demonstration assesses the potential impact of both precursors on future ozone concentrations. Although the vehicle inspection and maintenance program was not implemented as a control mechanism for particulate matter or fine particles, IDEM's 110(l) demonstration assesses the potential impact that the discontinuation of the program may have on the area's ability to attain the annual standard for fine particles. However,

since VOC is not considered a precursor for fine particles, NO<sub>x</sub> is the only precursor included in the assessment, even though the vehicle inspection and maintenance program does not serve as a NO<sub>x</sub> control measure.



## **Section 110(I) Technical Support Document**

### **Introduction for Photochemical Modeling for Ozone and PM<sub>2.5</sub> Assessment**

IDEM's Office of Air Quality conducted photochemical modeling to determine whether the discontinuation of the vehicle inspection and maintenance program in Clark and Floyd counties would adversely affect the area's ability to attain or maintain compliance with applicable National Ambient Air Quality Standards. The discontinuation of the vehicle inspection and maintenance program does result in the loss of NO<sub>x</sub> and VOC emission reductions, and thus could affect ozone and fine particle concentrations. This potential increase in emissions was determined using local travel demand model data and emission factors deriving from MOBILE6. The increased emissions were added to the existing emission profiles for Clark and Floyd counties and were modeled and compared to the previous modeling results that included the vehicle inspection and maintenance program in Clark and Floyd counties. Any difference between the two model runs represents the impact on future year design values for ozone or PM<sub>2.5</sub> monitors located in Clark and Floyd counties.

### **Emissions Estimation and Photochemical Modeling Methodologies**

IDEM is a member of the Midwest Regional Planning Organization (MRPO), which uses photochemical modeling to determine emission control strategies for attainment State Implementation Plans (SIPs) for Indiana, Illinois, Michigan, Wisconsin and Ohio. The Lake Michigan Air Directors Consortium (LADCO) supports the MRPO and supplied emissions, meteorological and chemistry files as well as photochemical model source codes used in this analysis. Indiana followed the U.S. EPA guidance in all modeling and attainment demonstration methods for this analysis.

#### **Emissions Estimation Methodology**

IDEM's Office of Air Quality adjusted the emissions in order to determine the impact of the discontinuation of the vehicle inspection and maintenance program in Clark and Floyd counties. LADCO provided the 2002 base case emissions and future year emissions for 2009 as well as the weighting factors to interpolate 2007 emissions between the 2002 and 2009 emissions. Future year 2009 emissions were created to account for economic growth and emission control strategies that will be in place by 2009 for all emissions sectors. Modeling results show the downward trend for each modeled year and validates this analysis.

LADCO provided a computer software patch to calculate 2007 emissions for all emissions sectors. The emissions adjustments for 2007 were an estimation of all emission sectors between the known (2002) and calculated (2009) future emission levels. The weighting factor consists of the fraction of the number of years from each time period. The weighting factors used for determining the 2007 emissions are 0.285 (2/7<sup>th</sup> of the emissions from 2002) for 2002 emissions and 0.714 (5/7<sup>th</sup> of the emissions from 2009) for 2009 emissions. The weighting factors were applied to the motor vehicle, low-level point, area sources (marine-air-rail, nonroad and other) and ammonia emissions. The weighting factors were not applied to the elevated point source

emissions because no significant emission changes are expected to that particular source sector between 2007 and 2009. Therefore, 2009 elevated point source emissions were used. Each emission sector file was quality assured to determine specific pollutant emissions in gram-moles/day, kilograms/day and tons/day. Once emission adjustments were made, all emissions sectors were merged to create 2007 emissions.

LADCO has a computer program that adjusts emissions for a specific county and emission sector. For the purpose of this analysis, the discontinuation of the vehicle inspection and maintenance program in Clark and Floyd counties only affected mobile emissions; therefore the mobile emissions were the only emission sector analyzed. The difference between the total 2007 emissions and the total 2007 emissions with Clark and Floyd counties emissions zeroed-out, represent the mobile emissions for Clark and Floyd counties. Table 1.1 shows the modeled mobile source emissions for Clark and Floyd counties for the years 2002, 2007 and 2009. All emissions data include the vehicle inspection and maintenance program in Clark and Floyd counties. The quality assured results of these emissions adjustments can be found in Appendix A. Also referenced in Appendix A are the total 2007 emissions, 2007 emissions minus the Clark County emissions and the 2007 emissions minus the Floyd County emissions.

**Table 1.1  
2002, 2007 and 2009 Mobile Source Emissions from Modeling Inventories**

		2002 - summer		2007 - summer		2009 - summer	
		Clark	Floyd	Clark	Floyd	Clark	Floyd
		tons/day	tons/day	tons/day	tons/day	tons/day	tons/day
NOx	12km	13.74	5.43	10.4	3.95	8.43	3.37
	36km	20.96	5.38	15.45	3.88	13.26	3.28
VOC	12km	9.46	4.00	7.93	3.03	6.11	2.65
	36km	12.63	3.38	9.77	2.54	8.65	2.21
		2002 - winter		2007 - winter		2009 - winter	
		Clark	Floyd	Clark	Floyd	Clark	Floyd
		tons/day	tons/day	tons/day	tons/day	tons/day	tons/day
NOx	36km	23.6	6.09	17.39	4.39	14.93	3.72
VOC	36km	13.73	3.67	10.63	2.76	9.39	2.39

Based on the MOBILE6 emission modeling conducted to determine the impact on NOx and VOC emissions from the discontinuation of the vehicle inspection and maintenance program in Clark and Floyd counties, for the year 2007, the increase in NOx emissions was 0.78 tons per summer day and 0.82 tons of NOx per winter day. VOC emissions were calculated to increase by 0.79 tons per summer day and 1.49 tons per winter day. This change in the NOx and VOC emissions was then used to determine multipliers in order to adjust the mobile inventory in the modeling files. The multipliers were for both Clark and Floyd counties: NOx – 1.047 for summer and 1.048 for winter; VOC – 1.125 for summer and 1.134 for winter. The emission estimates were calculated for the six winter months of October, November, December, January, February and March and the six summer months of April, May, June, July, August and September. The emission adjustments were then made to the 2007 mobile modeling files with

Clark County NOx and VOC emissions adjusted first and the Floyd County NOx and VOC emissions adjusted second to account for the discontinuation of the vehicle inspection and maintenance program in those counties. This created the new 2007 mobile emission files which were quality assured and pre-processed with the other emission source categories for use in CAMx.

### **Photochemical Modeling Methodology**

The Comprehensive Air Quality Model with extensions (CAMx) was the photochemical model used; this model is accepted by the U.S. EPA. The meteorology used was the summer of 2002 for ozone and the entire year of 2002 for PM<sub>2.5</sub>. Three separate modeling runs were conducted; one model run to determine base year (2002) concentrations, one future year (2007) model run included additional NOx and VOC emissions from the discontinuation of the vehicle inspection and maintenance program (without I/M), and one future year (2007) model run with the NOx and VOC emission reductions associated with the vehicle inspection and maintenance program (with I/M). The 2007 ozone and PM<sub>2.5</sub> modeled results were post-processed and evaluated using the U.S. EPA's attainment test guidelines. Future year design values were calculated from the modeling runs with and without the vehicle inspection and maintenance program being in place. The impact on the future year design values for ozone and PM<sub>2.5</sub> monitors in Clark and Floyd counties was determined.

### **Photochemical Modeling Results for Ozone**

The results of the 8-hour ozone attainment test compared the 2007 design values for Clark and Floyd counties with the vehicle inspection and maintenance program in place to the 2007 design values for Clark and Floyd counties assuming the discontinuation of the vehicle inspection and maintenance program. The difference in the future year design values were modeled at the Charlestown, Clark County and New Albany, Floyd County ozone monitors, as well as for the additional sites within the nonattainment area. The difference is an increase in the future year design value for ozone of +0.0001 ppm at the Charlestown ozone monitor. No difference in the future year design value for the New Albany site or other sites within the nonattainment area was determined. All design values are projected to be below the standard of 0.085 ppm. Table 1.2 lists the modeled results from the ozone attainment test and the difference in future year design values as a result of the discontinuation of the vehicle inspection and maintenance program for Clark and Floyd counties. Since only the third significant digit is used in computation and the modeled difference for the Charlestown site affects the fourth significant digit, there is virtually no difference in the modeled design values for any monitoring site. IDEM used the average of three design values (2000-2002, 2001-2003, and 2002-2004) for this assessment. The period of time associated with the average design value encompasses the design value that was used in designating the area nonattainment (2001-2003) and the design value used to support IDEM's redesignation petition for Clark and Floyd counties (2003-2005, with 2003 representing the base year).

**Table 1.2**  
**8-hour Ozone Attainment Results for Nonattainment Area**

Monitor ID	ST	County	00_02	01_03	02_04	AVGDV	RRF	2007 FYDV	2007 No IM FYDV	Difference
			ppm	ppm	ppm	ppm		ppm	ppm	ppm
1801900031	IN	Clark	0.090	0.092	0.088	0.090	0.93	0.083	0.083	+0.0001
1804310041	IN	Floyd	0.083	0.086	0.084	0.084	0.93	0.078	0.078	0.0000
2102900061	KY	Bullitt	0.085	0.081	0.076	0.080	0.94	0.076	0.076	0.0000
2111100271	KY	Jefferson	0.085	0.079	0.075	0.085	0.94	0.075	0.075	0.0000
2111100511	KY	Jefferson	0.084	0.084	0.080	0.084	0.94	0.077	0.077	0.0000
2111110211	KY	Jefferson	0.083	0.079	0.076	0.083	0.94	0.074	0.074	0.0000
2118500041	KY	Oldham	0.087	0.086	0.083	0.085	0.93	0.079	0.079	0.0000

**00\_02** – design value from (2000-2002),

**01\_03** – design value from (2001-2003),

**02\_04** – design value from (2002-2004),

**AVGDV** – average of the 3 design values,

**RRF** – relative reduction factor – ratio of future year and base year modeling,

**2007 FYDV** – future year design value with Clark/Floyd I&M program, and

**2007 No IM FYDV** – future year design value without Clark/Floyd I&M program,

**Difference** – the part per million differences between the future year design values.

It should be noted that the ozone model performance is within the U.S. EPA guidance and is considered State Implementation Plan (SIP) quality. Information on the attainment test, calculating relative reduction factors and other additional 8-hour ozone documentation was taken from the “Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-hour Ozone NAAQS.

Photochemical modeling was conducted by the U.S. EPA and LADCO in support of the Clean Air Interstate Rule (CAIR). The modeling results show future year design values for 8-hour ozone well within the 8-hour ozone NAAQS of 0.085 parts per million (ppm). Table 1.3 shows the U.S. EPA modeling results for CAIR. All sites in Clark and Floyd counties and in Bullitt, Jefferson and Oldham Counties in Kentucky are predicted to have future year design values in 2010 and 2015 below 0.085 ppm and will be in attainment.

**Table 1.3**  
**8-Hour Ozone Modeling Results from U.S. EPA for the Clean Air Interstate Rule**

County	State	MSA/CMSA	Design Value 1999-2003	Future Design Value 2010 with CAIR	Future Design Value 2015 with CAIR
			(ppm)	(ppm)	(ppm)
Clark	Indiana	Louisville	0.0893	0.0784	0.0735
Floyd	Indiana	Louisville	0.0837	0.0752	0.0703
Bullitt	Kentucky	Louisville	0.0837	0.0731	0.0693
Jefferson	Kentucky	Louisville	0.0843	0.0749	0.0711
Oldham	Kentucky	Louisville	0.0880	0.0756	0.0710

Table 1.4 shows the LADCO – Round 4 modeling results for CAIR. All sites in Clark and Floyd counties and in Bullitt, Jefferson and Oldham Counties in Kentucky are predicted to have future year design values in 2009, 2012 and 2018 below 0.085 ppm and will be in attainment.

**Table 1.4**  
**LADCO's Round 4 8-Hour Ozone Modeling Results for the Clean Air Interstate Rule**

Monitor ID	County	State	Design Value 2000-2004 (ppm)	2009 Future Design Value with CAIR (ppm)	2012 Future Design Value with CAIR (ppm)	2018 Future Design Value with CAIR (ppm)
180190003	Clark	Indiana	0.0900	0.0825	0.0792	0.0763
180431004	Floyd	Indiana	0.0843	0.0774	0.0757	0.0725
210290006	Bullitt	Kentucky	0.0807	0.0748	0.0720	0.0680
211110027	Jefferson	Kentucky	0.0797	0.0739	0.0709	0.0680
211110051	Jefferson	Kentucky	0.0827	0.0763	0.0744	0.0708
211111021	Jefferson	Kentucky	0.0793	0.0733	0.0717	0.0691
211850004	Oldham	Kentucky	0.0853	0.0776	0.0743	0.0715

Table 1.5 compares projected 2007 total emissions for Clark and Floyd counties with 2003 total emissions for Clark and Floyd counties. The 2007 and 2009 emission projections account for the discontinuation of the vehicle inspection and maintenance program. The base year for Indiana's request for Clark and Floyd counties to be redesignated to attainment under the 8-hour ozone standard is 2003. As Table 1.5 illustrates, the total emissions for 2007 and 2009 are projected to be less than 2003 emission levels, despite the mobile source VOC and NO<sub>x</sub> emissions increasing by less than a ton each per summer day. The 2010 and 2020 emissions referenced in the maintenance plan remain below 2003 emissions as well, and have not been revised since the vehicle emissions testing program was excluded from the calculations. As illustrated in Table 1.6, once the 2007 emission reduction benefit for the vehicle emissions testing program is compared to the 2003 (base year) total emissions for the entire nonattainment area, the program yields well less than a 1% emission reduction benefit for VOC and NO<sub>x</sub>. Historically, photochemical modeling sensitivity tests have shown that a local reduction of 15%-25% VOC is required to reduce ozone by 1 ppb.

**Table 1.5**  
**2003 and 2007 Emissions Comparison**  
**Clark and Floyd counties (tons per summer day)**

	2003	2007	2009
<b>VOC</b>	29.26	28.59	26.33
<b>NO<sub>x</sub></b>	51.77	41.89	38.82

Note: 2003 emissions include the vehicle inspection and maintenance program, 2007 emissions exclude the program.

**Table 1.6**

**Percentage Impact of I/M Emission Reduction on Base Year Emissions for Entire Nonattainment Area (tons per summer day)**

	<b>2003 Total</b>	<b>I/M Benefit</b>	<b>% Impact</b>
<b>VOC</b>	133.11	0.79	0.6%
<b>NOx</b>	238.77	0.78	0.3%

**Photochemical Modeling Results for Fine Particles**

The attainment test for PM<sub>2.5</sub> compared the 2007 design values for Clark and Floyd counties with the vehicle inspection and maintenance program in place to the 2007 design values for Clark and Floyd counties assuming the discontinuation of the vehicle inspection and maintenance program. This test was also conducted for the other sites within the nonattainment area. The difference in the future year design values was modeled at the Jeffersonville, Clark County and New Albany, Floyd County PM<sub>2.5</sub> monitors as well as for the additional sites in Bullitt and Jefferson Counties in Kentucky. Table 1.7 lists the modeled results from the PM<sub>2.5</sub> attainment test and the difference in future year design values as a result of the discontinuation of the vehicle inspection and maintenance program. The attainment test for PM<sub>2.5</sub> offered speciation of the PM<sub>2.5</sub> composition. This speciation includes sulfates, nitrates, organic and elemental carbon, ammonia and soil. The impact on the annual future year design value for PM<sub>2.5</sub> was -0.1 ug/m<sup>3</sup> at the Jeffersonville and New Albany PM<sub>2.5</sub> monitors, as well as at several of the Kentucky sites. These results reflect an insignificant benefit resulting from the photochemical sensitivity associated with the affected species. The speciated modeling results of PM<sub>2.5</sub> mass showed a minor impact for nitrates and ammonia from discontinuation of the vehicle inspection and maintenance program for Clark and Floyd counties. There are no 24-hour PM<sub>2.5</sub> nonattainment areas in Indiana, so the 24-hour PM<sub>2.5</sub> future year design values were not calculated.

**Table 1.7**

**Annual PM<sub>2.5</sub> Attainment Results for Clark and Floyd counties**

Monitor ID	ST	County	Winter	Spring	Summer	Fall	2002 BYDV	2007 FYDV	2007 No IM FYDV	Difference
			ug/m <sup>3</sup>	ug/m <sup>3</sup>						
180190005	IN	Clark	15.9	16.7	20.5	15.5	17.2	15.7	15.6	-0.1
180431004	IN	Floyd	13.4	14.8	19.5	11.9	14.9	13.4	13.3	-0.1
210290006	KY	Bullitt	13.2	15	19.9	11.4	14.9	13.5	13.4	-0.1
211110043	KY	Jefferson	13.1	15.8	21.8	12.9	15.9	14.4	14.4	0.0
211110044	KY	Jefferson	14.2	16.1	22.5	13.5	16.6	15.1	15.0	-0.1
211110048	KY	Jefferson	13.3	15.5	22.2	13.2	16.1	14.6	14.5	-0.1

**Winter** – Winter quarterly modeled average for Base Year,

**Spring** – Spring quarterly modeled average for Base Year,

**Summer** – Summer quarterly modeled average for Base Year,

**Fall** – Fall quarterly modeled average for Base Year,

**BYDV** – Modeled Base Year Design Value,

**2007 FYDV** – future year design value with Clark/Floyd I&M program,

**2007 No IM FYDV** – future year design value without Clark/Floyd I&M program, and

**Difference** – the microgram per cubic meter differences between the future year design values.

It is worth noting that the PM<sub>2.5</sub> model performance is outside the bounds for the bias, error, fractional bias and fractional error matrices, as per U.S. EPA photochemical modeling criteria. Improvement in the PM<sub>2.5</sub> model performance is necessary. These modeling results may change with improved model performance, however, the impacts on the annual PM<sub>2.5</sub> future year design values are expected to be minimal. The information on the attainment test and other additional PM<sub>2.5</sub> documentation was taken from the "Guidance for Demonstrating Attainment of Air Quality Goals for PM<sub>2.5</sub> and Regional Haze".

Photochemical modeling was conducted by the U.S. EPA and LADCO in support of the Clean Air Interstate Rule (CAIR). The modeling results show future year design values for annual PM<sub>2.5</sub> within the annual PM<sub>2.5</sub> NAAQS of 15.0 micrograms per cubic meter (ug/m<sup>3</sup>). Table 1.8 shows the U.S. EPA modeling results for CAIR. Floyd County in Indiana and Bullitt County in Kentucky are projected to attain the annual PM<sub>2.5</sub> NAAQS by 2010. All sites in Clark and Floyd counties and in Bullitt County in Kentucky are predicted to have future year design values in 2015 below 15.0 ug/m<sup>3</sup> and will be in attainment. Jefferson County in Kentucky is predicted to exceed the annual PM<sub>2.5</sub> NAAQS. However, it is within 3% of the standard in 2010 and 1% of the standard in 2015.

**Table 1.8**

**Annual PM<sub>2.5</sub> Modeling Results from U.S. EPA for the Clean Air Interstate Rule**

County	State	MSA/CMSA	Design Value 1999-2003 (ug/m3)	Future Design Value 2010 with CAIR (ug/m3)	Future Design Value 2015 with CAIR (ug/m3)
Clark	Indiana	Louisville	16.90	15.15	14.79
Floyd	Indiana	Louisville	15.35	13.54	13.27
Bullitt	Kentucky	Louisville	15.61	13.67	13.13
Jefferson	Kentucky	Louisville	17.07	15.44	15.13

Table 1.9 shows the LADCO – Round 4 modeling results for CAIR. All sites in Clark and Floyd counties and in Bullitt, Jefferson and Oldham Counties in Kentucky are predicted to have future year design values in 2009, 2012 and 2018 below 15.0 ug/m3 and in attainment.

**Table 1.9**

**LADCO's Round 4 Annual PM<sub>2.5</sub> Modeling Results for the Clean Air Interstate Rule**

Monitor ID	County	State	Design Value 2000-2004 (ug/m3)	2009 Future Design Value with CAIR (ug/m3)	2012 Future Design Value with CAIR (ug/m3)	2018 Future Design Value with CAIR (ug/m3)
180190006	Clark	Indiana	16.5	14.5	14.0	13.7
180431004	Floyd	Indiana	14.9	13.2	12.8	12.3
210290006	Bullitt	Kentucky	15.0	13.3	12.8	12.2
211110043	Jefferson	Kentucky	16.8	14.2	13.8	13.3
211110044	Jefferson	Kentucky	16.5	14.8	14.4	13.7
211110048	Jefferson	Kentucky	16.0	14.3	13.9	13.9

Table 1.10 summarizes total NO<sub>x</sub> emissions for Clark and Floyd counties for the years 2002 (base year for the PM<sub>2.5</sub> standard with I/M in place), 2007 (assuming the discontinuation of the I/M program), and 2009 (the deadline for monitoring attainment of the standard). As Table 1.10 illustrates, total NO<sub>x</sub> emissions for the years 2007 and 2009, with the reductions associated with the vehicle emissions testing program excluded, are less than the total NO<sub>x</sub> emissions in 2002 (the base year for the standard) when the program was in place.

**Table 1.10**

**NO<sub>x</sub> Emissions Analysis for PM<sub>2.5</sub>  
Clark and Floyd counties (tons per day)**

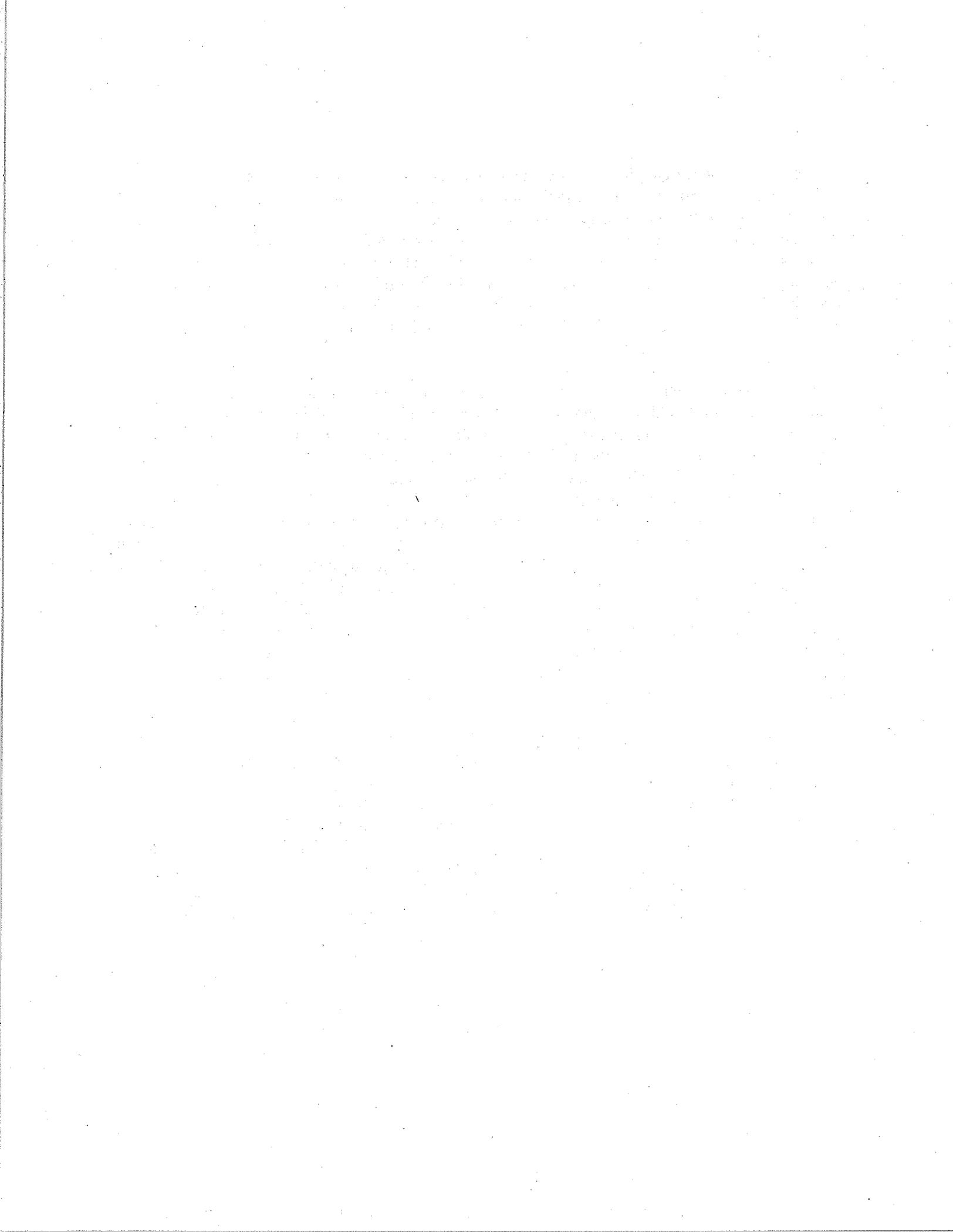
	2002	2007	2009
<b>NO<sub>x</sub></b>	57.59	41.89	38.82

## Conclusions

IDEM's Office of Air Quality conducted an ozone and PM<sub>2.5</sub> assessment to determine if there would be impacts from additional mobile source VOC and NO<sub>x</sub> emissions as a result of the discontinuation of the vehicle inspection and maintenance program for Clark and Floyd counties. Photochemical modeling was conducted for the summer of 2002 for ozone and the entire year of 2002 for PM<sub>2.5</sub>. CAMx is the U.S. EPA accepted photochemical model used in conjunction with emissions and chemistry files obtained from the MRPO. Emission adjustments were made to the 2002/2009 emission files in order to create a 2007 emissions profile. The motor vehicle emissions for Clark and Floyd counties were determined and the anticipated increase in NO<sub>x</sub> and VOC emissions were added to the 2007 emissions inventory.

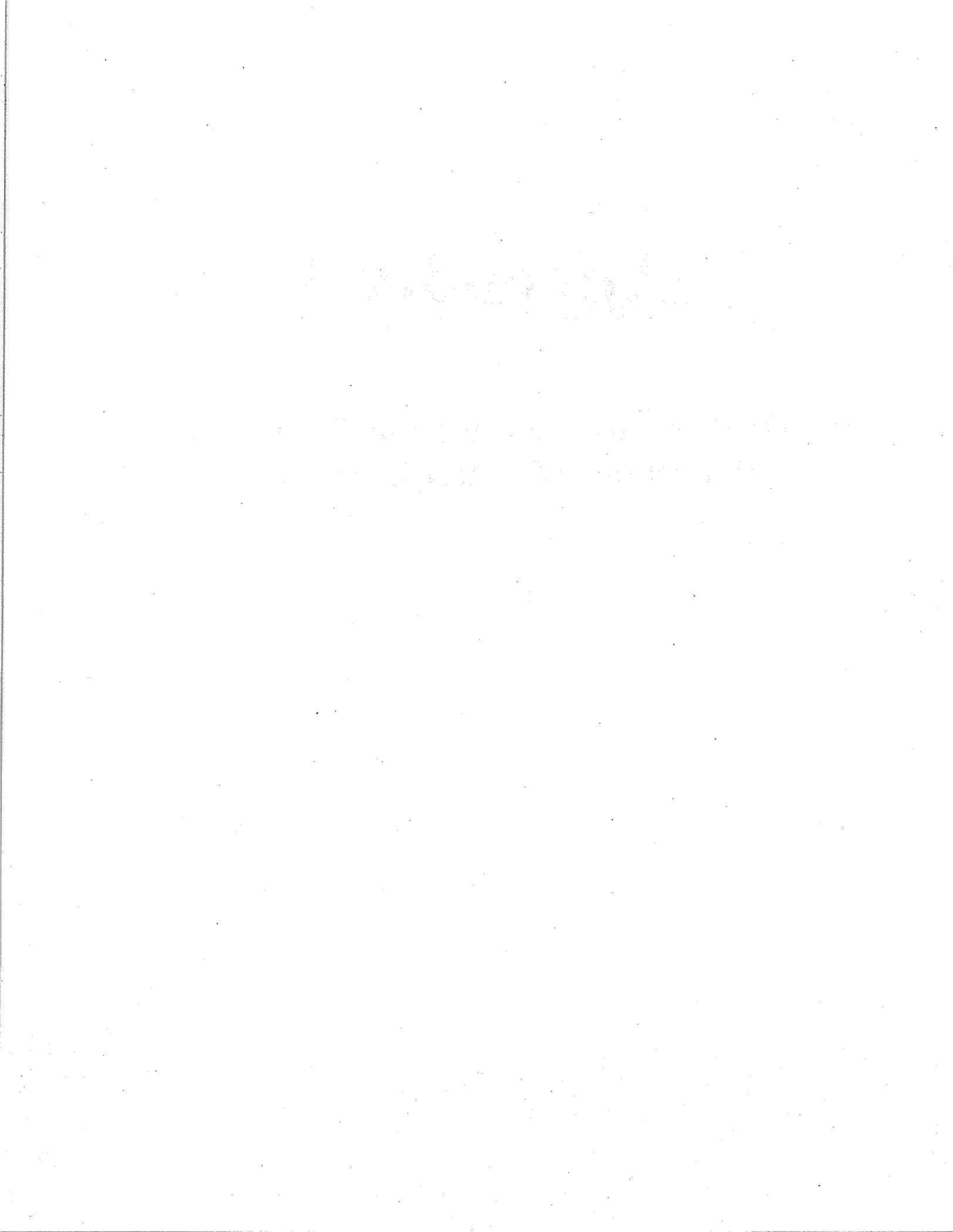
Modeling results were used in the U.S. EPA attainment tests for 8-hour ozone and annual PM<sub>2.5</sub> to determine if additional VOC and NO<sub>x</sub> emissions associated with the discontinuation of the vehicle inspection and maintenance program would impact the ozone and PM<sub>2.5</sub> monitors in the nonattainment area. Based on the attainment tests, there was an increase of +0.0001 ppm for the future year ozone design value at the Charlestown ozone monitor. Since only the third significant digit is used in computation and the modeled difference for the Charlestown site affects the fourth significant digit (.0001), there is virtually no difference in the modeled design values for either site in Clark and Floyd counties. The projected design value for 2007 (.084 ppm) is below the 8-hour ozone standard and identical to the design value that serves as the base year in the redesignation petition and maintenance plan (2003-2005, with 2003 serving as the base year). More importantly, once the discontinuation of the vehicle inspection and maintenance program is accounted for, 2007 VOC and NO<sub>x</sub> emissions are projected to be lower than 2003 NO<sub>x</sub> and VOC emission levels. Therefore, the discontinuation of the vehicle inspection and maintenance program for Clark and Floyd counties will not interfere with attainment of the 8-hour ozone standard (or any other applicable requirement of the Clean Air Act).

A difference of -0.1 ug/m<sup>3</sup> of the annual future year design values for several monitors within the nonattainment area was found, with the difference coming from nitrate concentrations. Though this reflects a potential benefit, a one-tenth of a microgram per cubic meter impact is negligible. More importantly, an emissions analysis demonstrates that total NO<sub>x</sub> emissions for the years 2007 and 2009, with the reductions associated with the vehicle emissions testing program excluded, are less than the total NO<sub>x</sub> emissions in 2002 (the base year for the standard) when the program was in place. Therefore, the discontinuation of the vehicle inspection and maintenance program for Clark and Floyd counties will not interfere with the area's ability to achieve reasonable progress towards attainment of standard by its assigned deadline (April 5, 2010).



# **Appendix A**

**Quality Assured Emission File Results  
for Summer/Winter Days – 2007**



**Winter Day – Mobile emissions for  
entire modeling domain – 36 km**

motv.020111.4rpos.36.2007K+.ld.bin

Species	gram-moles/day	kg/day	tons/day
NO	288062048	8641862	9526
NO2	32007432	1472342	1623
OLE	9963396	318829	351
PAR	357766432	5724263	6310
TOL	8032591	899650	992
XYL	8268437	1058360	1167
FORM	13321202	213139	235
ALD2	18473362	591148	652
ETH	407420	13037	14
MEOH	0	0	0
ETOH	1097193	35110	39
ISOP	279785	22383	25
NR	25365910	405855	447
CO	5028080640	140786272	155188
SO2	188995	12096	13
FPRM	0	0	0
CPRM	0	0	0
NH3	52352260	889988	981
TERPB	0	0	0
SULF	48619	49	0
PEC	176041552	176042	194
PNO3	0	0	0
POA	118978376	118978	131
PSO4	0	0	0
FCRS	0	0	0
CCRS	0	0	0

**Winter Day – Mobile emissions with  
Clark County emissions zeroed out – 36 km**

motv.020111.4rpos.36.2007K+cwin\_zero.ld.bin

Species	gram-moles/day	kg/day	tons/day	Clark Co. tons/day
NO	287612864	8628386	9511	14.85
NO2	31957528	1470046	1620	2.53
OLE	9953105	318499	351	0.36
PAR	357394432	5718311	6303	6.56
TOL	8024211	898712	991	1.03
XYL	8259809	1057256	1165	1.22
FORM	13307504	212920	235	0.24
ALD2	18454594	590547	651	0.66
ETH	407080	13027	14	0.01
MEOH	0	0	0	0.00
ETOH	1096044	35073	39	0.04
ISOP	279493	22359	25	0.03
NR	25339346	405430	447	0.47
CO	5028080640	140786272	155188	0.00
SO2	188995	12096	13	0.00
FPRM	0	0	0	0.00
CPRM	0	0	0	0.00
NH3	52352260	889988	981	0.00
TERPB	0	0	0	0.00
SULF	48619	49	0	0.00
PEC	176041552	176042	194	0.00
PNO3	0	0	0	0.00
POA	118978376	118978	131	0.00
PSO4	0	0	0	0.00
FCRS	0	0	0	0.00
CCRS	0	0	0	0.00

**Winter Day – Mobile emissions with  
Floyd County emissions zeroed out - 36 km**

motv.020111.4rpos.36.2007K+fwin\_zero.id.bin

Species	gram-moles/day	kg/day	tons/day	Floyd Co. tons/day
NO	287948672	8638461	9522	3.75
NO2	31994834	1471762	1622	0.64
OLE	9960725	318743	351	0.09
PAR	357669952	5722720	6308	1.70
TOL	8030421	899407	991	0.27
XYL	8266199	1058074	1166	0.32
FORM	13317644	213082	235	0.06
ALD2	18468482	590991	651	0.17
ETH	407328	13034	14	0.00
MEOH	0	0	0	0.00
ETOH	1096896	35101	39	0.01
ISOP	279709	22377	25	0.01
NR	25359030	405745	447	0.12
CO	5028080640	140786272	155188	0.00
SO2	188995	12096	13	0.00
FPRM	0	0	0	0.00
CPRM	0	0	0	0.00
NH3	52352260	889988	981	0.00
TERPB	0	0	0	0.00
SULF	48619	49	0	0.00
PEC	176041552	176042	194	0.00
PNO3	0	0	0	0.00
POA	118978376	118978	131	0.00
PSO4	0	0	0	0.00
FCRS	0	0	0	0.00
CCRS	0	0	0	0.00

**Winter Day – Mobile emissions with Clark  
Floyd County emissions without I&M – 36 km**

motv.020111.4rpos.36.2007K+c\_fpm.id.bin

Species	gram-moles/day	kg/day	tons/day	C/F diff tons/day
NO	288089120	8642674	9527	0.90
NO2	32010446	1472481	1623	0.15
OLE	9965143	318885	352	0.06
PAR	357829568	5725274	6311	1.11
TOL	8034014	899810	992	0.18
XYL	8269902	1058548	1167	0.21
FORM	13323531	213177	235	0.04
ALD2	18476546	591250	652	0.11
ETH	407478	13039	14	0.00
MEOH	0	0	0	0.00
ETOH	1097389	35116	39	0.01
ISOP	279835	22387	25	0.00
NR	25370410	405927	447	0.08
CO	5028080640	140786272	155188	0.00
SO2	188995	12096	13	0.00
FPRM	0	0	0	0.00
CPRM	0	0	0	0.00
NH3	52352260	889988	981	0.00
TERPB	0	0	0	0.00
SULF	48619	49	0	0.00
PEC	176041552	176042	194	0.00
PNO3	0	0	0	0.00
POA	118978376	118978	131	0.00
PSO4	0	0	0	0.00
FCRS	0	0	0	0.00
CCRS	0	0	0	0.00

**Summer Day - Mobile emissions for  
entire modeling domain - 12 km**  
motv.020712.upmw.12.2007K2.ld.bin

Species	gram-moles/day	kg/day	tons/day
NO	111611632	3348349	3691
NO2	12401304	570460	629
OLE	3752603	120083	132
PAR	133924480	2142792	2362
TOL	2996181	335572	370
XYL	3083521	394691	435
FORM	5036290	80581	89
ALD2	7066395	226125	249
ETH	181709	5815	6
MEOH	0	0	0
ETOH	407877	13052	14
ISOP	104010	8321	9
NR	9429708	150875	166
CO	1366784512	38269968	42185
SO2	67196	4301	5
FPRM	0	0	0
CPRM	0	0	0
NH3	16705059	283986	313
TERPB	0	0	0
SULF	16892	17	0
PEC	71047504	71048	78
PNO3	0	0	0
POA	40842556	40843	45
PSO4	0	0	0
FCRS	0	0	0
CCRS	0	0	0

**Summer Day - Mobile emissions with  
Clark County emissions zeroed out - 12km**  
motv.020712.upmw.12.2007K2temp.ld.bin

Species	gram-moles/day	kg/day	tons/day	Clark Co. tons/day
NO	111354872	3340646	3682	8.89
NO2	12372777	569148	627	1.51
OLE	3745729	119863	132	0.27
PAR	133677896	2138847	2358	4.89
TOL	2990649	334953	369	0.77
XYL	3077828	393962	434	0.90
FORM	5027103	80434	89	0.18
ALD2	7053625	225716	249	0.51
ETH	181423	5806	6	0.01
MEOH	0	0	0	0.00
ETOH	407122	13028	14	0.03
ISOP	103817	8305	9	0.02
NR	9412249	150596	166	0.35
CO	1366784512	38269968	42185	0.00
SO2	67196	4301	5	0.00
FPRM	0	0	0	0.00
CPRM	0	0	0	0.00
NH3	16705059	283986	313	0.00
TERPB	0	0	0	0.00
SULF	16892	17	0	0.00
PEC	71047504	71048	78	0.00
PNO3	0	0	0	0.00
POA	40842556	40843	45	0.00
PSO4	0	0	0	0.00
FCRS	0	0	0	0.00
CCRS	0	0	0	0.00

**Summer Day – Mobile emissions with  
Floyd County emissions zeroed out – 12km**

motv.020712.upmw.12.2007K2fwin\_zero.ld.bin

Species	gram-moles/day	kg/day	tons/day	Floyd Co. tons/day
NO	111509512	3345286	3687	3.38
NO2	12389948	569938	628	0.58
OLE	3749647	119989	132	0.10
PAR	133818712	2141100	2360	1.87
TOL	2993809	335307	370	0.29
XYL	3081079	394378	435	0.35
FORM	5032338	80517	89	0.07
ALD2	7060891	225949	249	0.19
ETH	181583	5811	6	0.00
MEOH	0	0	0	0.00
ETOH	407553	13042	14	0.01
ISOP	103927	8314	9	0.01
NR	9422213	150755	166	0.13
CO	1366784512	38269968	42185	0.00
SO2	67196	4301	5	0.00
FPRM	0	0	0	0.00
CPRM	0	0	0	0.00
NH3	16705059	283986	313	0.00
TERPB	0	0	0	0.00
SULF	16892	17	0	0.00
PEC	71047504	71048	78	0.00
PNO3	0	0	0	0.00
POA	40842556	40843	45	0.00
PSO4	0	0	0	0.00
FCRS	0	0	0	0.00
CCRS	0	0	0	0.00

**Summer Day – Mobile emissions with Clark  
Floyd County emissions without I&M – 12 km**

motv.020712.upmw.12.2007K2clarkfloyd.ld.bin

Species	gram-moles/day	kg/day	tons/day	C/F diff tons/day
NO	111628600	3348858	3691	0.56
NO2	12403185	570547	629	0.10
OLE	3753843	120123	132	0.04
PAR	133969032	2143505	2363	0.79
TOL	2997180	335684	370	0.12
XYL	3084549	394822	435	0.14
FORM	5037952	80607	89	0.03
ALD2	7068703	226199	249	0.08
ETH	181761	5816	6	0.00
MEOH	0	0	0	0.00
ETOH	408014	13056	14	0.00
ISOP	104045	8324	9	0.00
NR	9432855	150926	166	0.06
CO	1366784512	38269968	42185	0.00
SO2	67196	4301	5	0.00
FPRM	0	0	0	0.00
CPRM	0	0	0	0.00
NH3	16705059	283986	313	0.00
TERPB	0	0	0	0.00
SULF	16892	17	0	0.00
PEC	71047504	71048	78	0.00
PNO3	0	0	0	0.00
POA	40842556	40843	45	0.00
PSO4	0	0	0	0.00
FCRS	0	0	0	0.00
CCRS	0	0	0	0.00

**Summer Day – Mobile emissions for  
entire modeling domain – 36km**

motv.020712.4rpos.36.2007K+.ld.bin

Species	gram-moles/day	kg/day	tons/day
NO	246790736	7403723	8161
NO2	27421140	1261373	1390
OLE	8496039	271873	300
PAR	303624512	4857993	5355
TOL	6798299	761410	839
XYL	6996867	895599	987
FORM	11392839	182285	201
ALD2	15943375	510188	562
ETH	396935	12702	14
MEOH	0	0	0
ETOH	926190	29638	33
ISOP	236180	18894	21
NR	21412068	342593	378
CO	3101154816	86832336	95715
SO2	159118	10184	11
FPRM	0	0	0
CPRM	0	0	0
NH3	52263464	888479	979
TERPB	0	0	0
SULF	47402	47	0
PEC	175457440	175457	193
PNO3	0	0	0
POA	118578632	118579	131
PSO4	0	0	0
FCRS	0	0	0
CCRS	0	0	0

**Summer Day – Mobile emissions with  
Clark County emissions zeroed out – 36km**

motv.020712.4rpos.36.2007K+csum\_zero.ld.bin

Species	gram-moles/day	kg/day	tons/day	Clark Co. tons/day
NO	246391648	7391750	8148	13.20
NO2	27376806	1259333	1388	2.25
OLE	8486554	271570	299	0.33
PAR	303282464	4852520	5349	6.03
TOL	6790603	760548	838	0.95
XYL	6988941	894585	986	1.12
FORM	11380171	182083	201	0.22
ALD2	15925922	509630	562	0.62
ETH	396590	12691	14	0.01
MEOH	0	0	0	0.00
ETOH	925136	29604	33	0.04
ISOP	235911	18873	21	0.02
NR	21387724	342204	377	0.43
CO	3101154816	86832336	95715	0.00
SO2	159118	10184	11	0.00
FPRM	0	0	0	0.00
CPRM	0	0	0	0.00
NH3	52263464	888479	979	0.00
TERPB	0	0	0	0.00
SULF	47402	47	0	0.00
PEC	175457440	175457	193	0.00
PNO3	0	0	0	0.00
POA	118578632	118579	131	0.00
PSO4	0	0	0	0.00
FCRS	0	0	0	0.00
CCRS	0	0	0	0.00

**Summer Day – Mobile emissions with  
Floyd County emissions zeroed out – 36km**

motv.020712.4rpos.36.2007K+fsum\_zero.ld.bin

Species	gram-moles/day	kg/day	tons/day	Floyd Co. tons/day	C/F diff tons/day
NO	246690448	7400714	8158	3.32	0.77
NO2	27409998	1260860	1390	0.57	0.13
OLE	8493574	271794	300	0.09	0.05
PAR	303535744	4856572	5353	1.57	0.95
TOL	6796303	761186	839	0.25	0.15
XYL	6994810	895336	987	0.29	0.18
FORM	11389541	182233	201	0.06	0.04
ALD2	15938810	510042	562	0.16	0.10
ETH	396839	12699	14	0.00	0.00
MEOH	0	0	0	0.00	0.00
ETOH	925917	29629	33	0.01	0.01
ISOP	236110	18889	21	0.01	0.00
NR	2140558	342492	378	0.11	0.07
CO	3101154816	86832336	95715	0.00	0.00
SO2	159118	10184	11	0.00	0.00
FPRM	0	0	0	0.00	0.00
CPRM	0	0	0	0.00	0.00
NH3	52263464	888479	979	0.00	0.00
TERPB	0	0	0	0.00	0.00
SULF	47402	47	0	0.00	0.00
PEC	175457440	175457	193	0.00	0.00
PNO3	0	0	0	0.00	0.00
POA	118578632	118579	131	0.00	0.00
PSO4	0	0	0	0.00	0.00
FCRS	0	0	0	0.00	0.00
CCRS	0	0	0	0.00	0.00

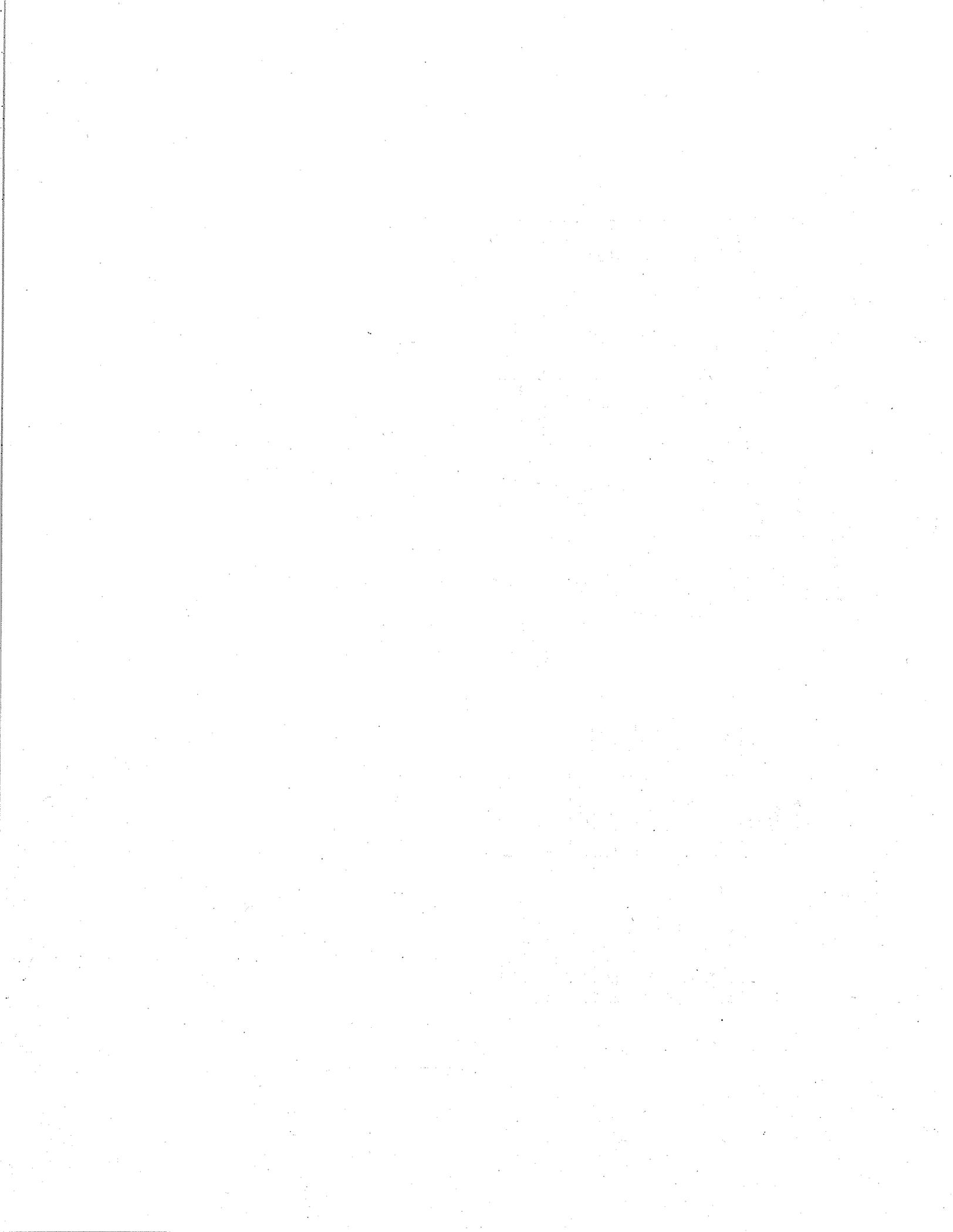
**Summer Day – Mobile emissions with Clark  
Floyd County emissions without I&M – 36 km**

motv.020712.4rpos.36.2007K+c\_fm.ld.bin

Species	gram-moles/day	kg/day	tons/day	C/F diff tons/day
NO	246814160	7404425	8162	0.77
NO2	27423748	1261493	1391	0.13
OLE	8497535	271921	300	0.05
PAR	303678656	4858859	5356	0.95
TOL	6799520	761546	839	0.15
XYL	6998121	895760	987	0.18
FORM	11394848	182318	201	0.04
ALD2	15946143	510277	562	0.10
ETH	396990	12704	14	0.00
MEOH	0	0	0	0.00
ETOH	926357	29643	33	0.01
ISOP	236222	18898	21	0.00
NR	21415934	342655	378	0.07
CO	3101154816	86832336	95715	0.00
SO2	159118	10184	11	0.00
FPRM	0	0	0	0.00
CPRM	0	0	0	0.00
NH3	52263464	888479	979	0.00
TERPB	0	0	0	0.00
SULF	47402	47	0	0.00
PEC	175457440	175457	193	0.00
PNO3	0	0	0	0.00
POA	118578632	118579	131	0.00
PSO4	0	0	0	0.00
FCRS	0	0	0	0.00
CCRS	0	0	0	0.00

Emissions by Source Category for Clark and Floyd Counties (tons per summer day)

	NOx				VOC			
	2007		2009		2007		2009	
	Clark	Floyd	Clark	Floyd	Clark	Floyd	Clark	Floyd
area_other	0.31	0.13	0.31	0.14	4.73	1.38	4.58	1.35
area_nonroad	3.03	0.73	2.81	0.68	3.97	0.87	3.43	0.74
area_mar	5.99	1.73	6.01	1.73	0.47	0.12	0.47	0.12
motv	15.45	3.88	13.26	3.28	9.77	2.54	8.65	2.21
lowp	0.09	0.1	0.08	0.07	1.17	0.51	1.19	0.53
PTSR_nonEGU	1.23	0.28	1.23	0.28	1.56	0.62	1.56	0.62
PTSR_EGU	2.75	5.41	2.75	5.41	0.05	0.03	0.05	0.03
TOTAL	28.84	12.27	26.44	11.60	21.72	6.07	19.93	5.60
No C/F I&M	0.78				0.79			
	<b>2007</b>		<b>2009</b>		<b>2007</b>		<b>2009</b>	
Clark/Floyd TOTAL	41.89		38.82		28.59		26.33	



REQUEST FOR REDESIGNATION AND  
MAINTENANCE PLAN FOR  
OZONE ATTAINMENT  
IN THE INDIANA PORTION OF THE  
LOUISVILLE BASIC OZONE  
NONATTAINMENT AREA

Clark and Floyd Counties, Indiana

Developed By:  
The Indiana Department of Environmental Management

July 2006  
(Revised September 2006)

This page left intentionally blank

## TABLE OF CONTENTS

<b>1.0 INTRODUCTION</b> .....	1
1.1 Background.....	1
1.2 Geographical Description .....	2
1.3 Status of Air Quality .....	2
<b>2.0 REQUIREMENTS FOR REDESIGNATION</b> .....	3
2.1 General.....	3
2.2 Ozone Monitoring.....	3
2.3 Emission Inventory .....	3
2.4 Modeling Demonstration .....	4
2.5 Controls and Regulations.....	4
2.6 Corrective Actions for Potential Future Violations of the Standard.....	4
<b>3.0 OZONE MONITORING</b> .....	5
3.1 Ozone Monitoring Network.....	5
3.2 Ambient Ozone Monitoring Data .....	6
3.3 Quality Assurance.....	8
3.4 Continued Monitoring.....	9
<b>4.0 EMISSION INVENTORY</b> .....	9
4.1 Emission Trends.....	9
4.2 Base Year Inventory.....	14
4.3 Emission Inventories.....	14
4.4 Demonstration of Maintenance.....	18
4.5 Permanent and Enforceable Emission Reductions.....	19
4.6 Provisions for Future Updates .....	19
<b>5.0 TRANSPORTATION CONFORMITY BUDGETS</b> .....	19
5.1 Overview.....	19
5.2 Emission Estimations.....	20

<b>6.0 CONTROL MEASURES AND REGULATIONS</b> .....	21
6.1 Reasonably Available Control Technology (RACT).....	21
6.2 Implementation of past SIP revisions .....	21
6.3 Nitrogen Oxides (NO <sub>x</sub> ) Rule.....	23
6.4 Measures Beyond Clean Air Act Requirements .....	24
6.5 Controls to Remain in Effect .....	25
6.6 New Source Review (NSR) Provisions .....	25
<b>7.0 MODELING</b> .....	25
7.1 Summary of Modeling Results for National Emission Control Strategies in Final Rulemakings .....	26
7.2 Summary of Modeling Results to Support Rulemakings.....	27
7.3 Summary of Existing Modeling Results.....	28
7.4 Temperature Analysis for Clark and Floyd Counties.....	29
7.5 Summary of Meteorological Conditions.....	31
<b>8.0 CORRECTIVE ACTIONS</b> .....	32
8.1 Commitment to Revise Plan .....	32
8.2 Commitment for Contingency Measures .....	32
8.3 Contingency Measures.....	33
<b>9.0 PUBLIC PARTICIPATION</b> .....	34
<b>10.0 CONCLUSIONS</b> .....	34

## FIGURES

Figure 3.1 Louisville Basic Nonattainment Area.....	5
---	---

## TABLES

Table 3.1 Monitoring Data for Clark and Floyd Counties 2003 – 2005 .....	6
Table 4.1 Comparison of 2003 and 2020 Projected Emission Estimates in Tons Per Summer Day, Clark and Floyd Counties, Indiana.....	17
Table 4.2 Comparison of 2003 and 2020 Projected Emission Estimates in Tons Per Summer Day for Entire Nonattainment Area.....	17
Table 5.1 Emission Estimations for On-Road Mobile Sources .....	20
Table 5.2 Mobile Vehicle Emission Budgets.....	20
Table 6.1 Trends in EGU Ozone Season NO <sub>x</sub> Emissions Statewide in Indiana .....	23
Table 7.1 Modeling Results from U.S. EPA HDE Rulemaking for Clark and Floyd Counties...26	
Table 7.2 LADCO Modeling Results for 8-Hour Ozone Assessment.....	27
Table 7.3 Modeling Results from U.S. EPA for the Clean Air Interstate Rule .....	28
Table 7.4 LADCO's Round 3 Modeling Results for the Clean Air Interstate Rule .....	28
Table 7.5 Analysis of Maximum Temperatures for Clark and Floyd Counties, Indiana (Percent Change from Maximum Temperature (°F) Normals (1971-2000)) .....	29
Table 7.6 Comparison of Days with 90° F and 8-hour Ozone Exceedance Days.....	30

## GRAPHS

Graph 3.1 2003-2005 Design Values for Clark and Floyd Counties (Indiana's Portion of Nonattainment Area).....	7
Graph 3.2 2003-2005 Design Values for Kentucky's Portion of Nonattainment Area .....	7
Graph 3.3 Trends in Clark and Floyd Counties, Indiana 8-Hour Design Values 1997 through 2005.....	8
Graph 4.1 Clark and Floyd Counties, Indiana VOC Point Source Emissions 1996 – 2003 .....	10
Graph 4.2 Clark and Floyd Counties, Indiana NO <sub>x</sub> Point Source Emissions 1996 – 2003 .....	10
Graph 4.3 Statewide NO <sub>x</sub> Emissions from Electric Generating Units 1999 - 2005 .....	11
Graph 4.4 VOC Emissions Trends, 1996 - 2003, All Sources in Clark and Floyd Counties .....	12
Graph 4.5 Total VOC Emissions Trends, 1996 – 2003, Entire Nonattainment Area.....	12
Graph 4.6 NO <sub>x</sub> Emissions Trends, 1996 - 2003, All Sources in Clark and Floyd Counties.....	13
Graph 4.7 Total NO <sub>x</sub> Emissions Trends, 1996 – 2003, Entire Nonattainment Area .....	13
Graph 4.8 Comparison of 2003, 2011 and 2020 Projected VOC Emissions for Clark and Floyd Counties .....	15
Graph 4.9 Comparison of 2003, 2011 and 2020 Projected VOC Emissions for Entire Nonattainment Area .....	16
Graph 4.10 Comparison of 2003, 2011 and 2020 Projected NO <sub>x</sub> Emissions from Clark and Floyd Counties .....	16

Graph 4.11 Comparison of 2003, 2011 and 2020 Projected NO<sub>x</sub> Emissions for Entire  
Nonattainment Area .....17  
Graph 7.1 Comparison of Days with 90° F and 8-Hour Ozone Exceedance Days .....31

**APPENDICES**

- A Aerometric Information Retrieval System (AIRS) Data
- B Emissions Inventories
- C 2011 and 2020 Projected Emissions Inventory Clark and Floyd Counties
- D Public Participation Documentation
- E. Mobile Input/Output Calculation Files Clark and Floyd Counties, Indiana

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

**CLARK AND FLOYD COUNTIES, INDIANA**

**1.0 INTRODUCTION**

This document supports Indiana's request that Clark and Floyd Counties, which are part of the Louisville basic ozone nonattainment area, be redesignated from nonattainment to attainment of the 8-hour ozone standard. In addition, the State of Kentucky also intends to submit a request for the Kentucky portion of the Louisville basic ozone nonattainment area to be redesignated from nonattainment to attainment of the 8-hour ozone standard. The Louisville area has recorded three years of complete, quality assured ambient air quality monitoring data for 2003 – 2005 demonstrating attainment with the 8-hour standard.

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

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

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

**1.1 Background**

The Clean Air Act Amendments of 1990 (CAAA) required areas failing to meet the National Ambient Air Quality Standard (NAAQS) for ozone to develop SIPs to expeditiously attain and maintain the standard. In 1997 the United States Environmental Protection Agency (U.S. EPA) revised the air quality standards for ozone replacing the 1979 1-hour standard with an 8-hour ozone standard set at 0.08 parts per million (ppm). The standard was challenged legally and upheld by the U.S. Supreme Court in February of 2001. The U.S. EPA designated areas under the 8-hour ozone standard on April 15, 2004 as attainment, nonattainment, or unclassifiable.

Historically two (2) monitors have been operated by the IDEM's Office of Air Quality in Clark and Floyd Counties. In Clark County, the Charlestown monitor (Airs ID 18-019-0003) has operated continuously since prior to 1980. In Floyd County, the New Albany monitor (Airs ID 18-043-1004) has been operated continuously since 1995. On April 15, 2004, U.S. EPA designated Clark and Floyd Counties Basic nonattainment and subject to the new 8-hour ozone requirements, including development of a plan to reduce volatile organic compound (VOC) and oxides of nitrogen (NO<sub>x</sub>) emissions and a demonstration that the area will meet the 8-hour ozone standard for ozone by June 15, 2009.

## 1.2 Geographical Description

Following is a brief description of the Louisville basic nonattainment area.

Jefferson, Bullitt and Oldham Counties located in north central Kentucky and Clark and Floyd Counties located in southeastern Indiana are part of the Louisville metropolitan statistical area. This area is surrounded by the Kentucky counties of Hardin, Henry, Nelson, Shelby, Spencer, and Trimble and the Indiana counties of Harrison, Jefferson, Scott, and Washington. The Ohio River flows along the border between Kentucky and Indiana and the area lies within the Ohio River Valley. The Louisville Basic Nonattainment Area is shown in Figure 3.1.

The Indiana Department of Environmental Management (IDEM), on behalf of the State of Indiana, is requesting redesignation for Clark and Floyd Counties in Indiana. The Air Pollution Control District of Jefferson County (APCD) is responsible for Jefferson County (Louisville) in north central Kentucky. The Kentucky Department of Environmental Protection (KDEP) is responsible for Bullitt and Oldham Counties in Kentucky. The Kentucky Department of Environmental Protection is requesting redesignation of Kentucky's portion of the nonattainment area, including Bullitt, Oldham and Jefferson Counties, from U.S. EPA Region IV, concurrently.

## 1.3 Status of Air Quality

Ozone monitoring data for the most recent three (3) years, 2003 through 2005, demonstrates that air quality has met the NAAQS for ozone in this Basic nonattainment area. This fact, accompanied by the permanent and enforceable reductions in emission levels discussed in Section 4.0, justifies a redesignation to attainment for the subject area based on Section 107(d) (3) (E) of the CAAA.

## 2.0 REQUIREMENTS FOR REDESIGNATION

### 2.1 General

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

### 2.2 Ozone Monitoring

#### 107(d)(3)(E)(i)

- 1) A demonstration that the NAAQS for ozone, as published in 40 CFR 50.4, have been attained. Ozone monitoring data must show that violations of the ambient standard are no longer occurring.
- 2) Ambient monitoring data quality assured in accordance with 40 CFR 58.10, recorded in the U.S. EPA Air Quality System (AQS) database, and is available for public view.
- 3) A showing that the three-year average of the fourth highest values, based on data from all monitoring sites in the area or its affected downwind environs, is below 85 parts per billion (ppb). This showing must rely on three (3) complete, consecutive calendar years of quality assured data.
- 4) A commitment that, once redesignated, the State will continue to operate an appropriate monitoring network to verify the maintenance of the attainment status.

### 2.3 Emission Inventory

#### 107(d)(3)(E)(iii)

- 1) A comprehensive emission inventory of the precursors of ozone completed for the base year.
- 2) A projection of the emission inventory for a year at least 10 years following redesignation.
- 3) A demonstration that the projected level of emissions is sufficient to maintain the ozone standard.

- 4) A demonstration that improvement in air quality between the year violations occurred and attainment was achieved is based on permanent and enforceable emission reductions and not on temporary adverse economic conditions or unusually favorable meteorology.
- 5) Provisions for future annual updates of the inventory to enable tracking of the emission levels including an annual emission statement from major sources.

#### 2.4 Modeling Demonstration

While no modeling is required for redesignating ozone nonattainment areas, IDEM has incorporated photochemical modeling information as part of this document to further support its request for Clark and Floyd Counties to be redesignated to attainment.

#### 2.5 Controls and Regulations

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

- 1) A U.S. EPA-approved SIP control strategy that includes Reasonably Available Control Technology (RACT) requirements for existing stationary sources covered by Control Technology Guidelines (CTG) and non-CTG RACT for all major sources.
- 2) Evidence that control measures required in past ozone SIP revisions have been fully implemented.
- 3) Acceptable provisions to provide for new source review.
- 4) Assurances that existing controls will remain in effect after redesignation, unless the State demonstrates through photochemical modeling that the standard can be maintained without one (1) or more controls.
- 5) If appropriate, a commitment to adopt a requirement that all transportation plans conform to, and are consistent with, the SIP.

#### 2.6 Corrective Actions for Potential Future Violations of the Standard

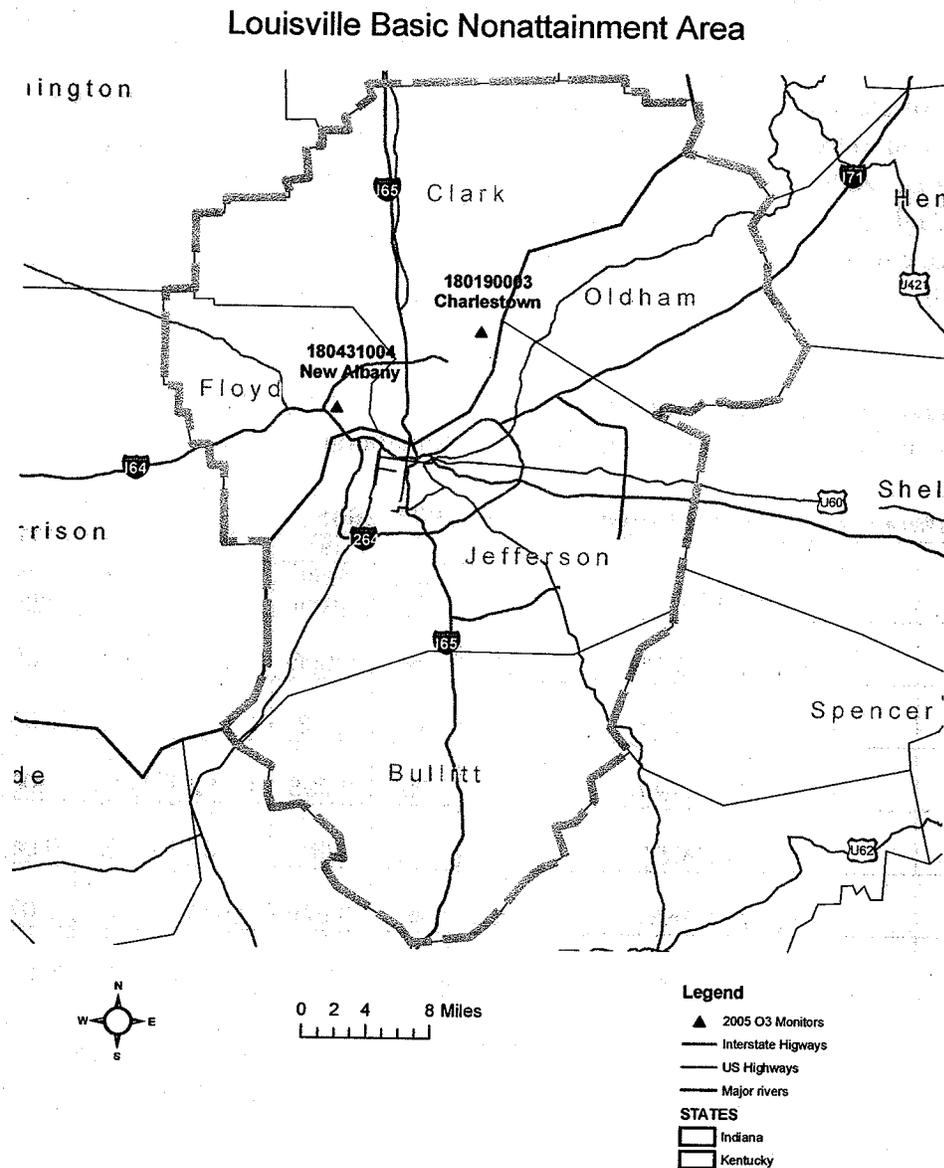
- 1) A commitment to submit a revised plan eight (8) years after redesignation.
- 2) A commitment to expeditiously enact and implement additional contingency control measures in response to exceeding specified predetermined levels (triggers) or in the event that future violations of the ambient standard occurs.
- 3) A list of potential contingency measures that would be implemented in such an event.
- 4) A list of VOC and NO<sub>x</sub> sources potentially subject to future controls.

### 3.0 OZONE MONITORING

#### 3.1 Ozone Monitoring Network

There are two (2) monitors measuring ozone concentrations in Clark and Floyd Counties. These monitors are currently operated by IDEM's Office of Air Quality (OAQ). A listing of the existing monitors' four (4) highest readings from 2003 through 2005 is shown in Table 3.1 and was retrieved from the U.S. EPA's Air Quality System (AQS). The locations of the monitoring sites for Clark and Floyd Counties are shown on Figure 3.1.

**Figure 3.1**



### 3.2 Ambient Ozone Monitoring Data

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

Three (3) complete years of ozone monitoring data are required to demonstrate attainment at a monitoring site. The 8-hour primary and secondary ozone ambient air quality standards are met at an ambient air quality monitoring site when the three (3) year average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than or equal to 0.08 ppm. When this occurs, the site is said to be in attainment. Three (3) significant digits must be carried in the computations. Because the third decimal digit, in ppm, is rounded, 0.084 ppm is the largest concentration that is less than, or equal to 0.08 ppm. Therefore, for the purposes of this request, the 8-hour standard is considered to be 0.085 ppm. Values below 0.085 ppm meet the standard, values equal to or greater than 0.085 ppm exceed the standard. These data handling procedures are applied on an individual basis at each monitor in the area. An area is in compliance with the 8-hour ozone NAAQS if, and only if, every monitoring site in the area meets the NAAQS. An individual site's three (3) year average of the annual fourth highest daily maximum 8-hour average ozone concentration is also called the site's *design value*. The air quality design value for the area is the highest design value among all monitoring sites in the area.

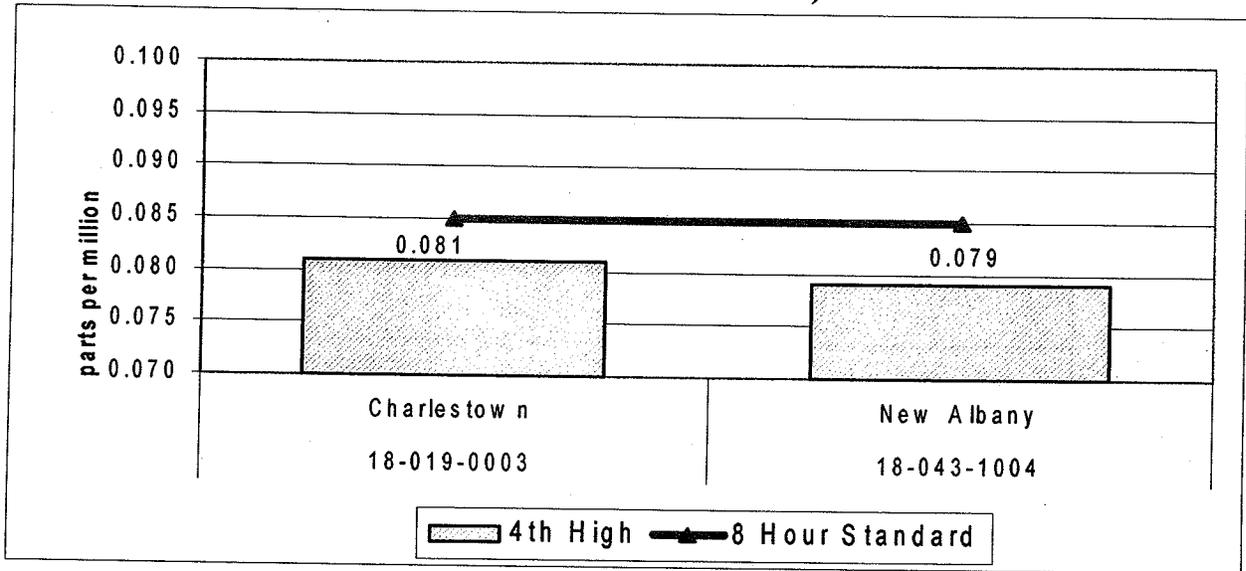
Table 3.1 shows the annual fourth highest values by site and the 2003-2005 design values for both of the ozone monitoring sites in Indiana's portion of the nonattainment area.

**Table 3.1 Monitoring Data for Clark and Floyd Counties 2003-2005**

SITE ID	COUNTY	ADDRESS	YEAR	%OBS	1ST 8-HR (ppm)	2 <sup>ND</sup> 8-HR (ppm)	3RD 8-HR (ppm)	4TH 8-HR (ppm)	2003-2005 AVERAGE (ppm)
18-019-0003	CLARK	CHARLESTOWN	2003	99	0.096	0.092	0.092	0.090	
18-019-0003	CLARK	CHARLESTOWN	2004	99	0.08	0.078	0.076	0.074	
18-019-0003	CLARK	CHARLESTOWN	2005	95	0.098	0.092	0.086	0.080	0.081
18-043-1004	FLOYD	NEW ALBANY	2003	100	0.097	0.097	0.092	0.086	
18-043-1004	FLOYD	NEW ALBANY	2004	96	0.079	0.078	0.077	0.071	
18-043-1004	FLOYD	NEW ALBANY	2005	94	0.092	0.086	0.081	0.080	0.079

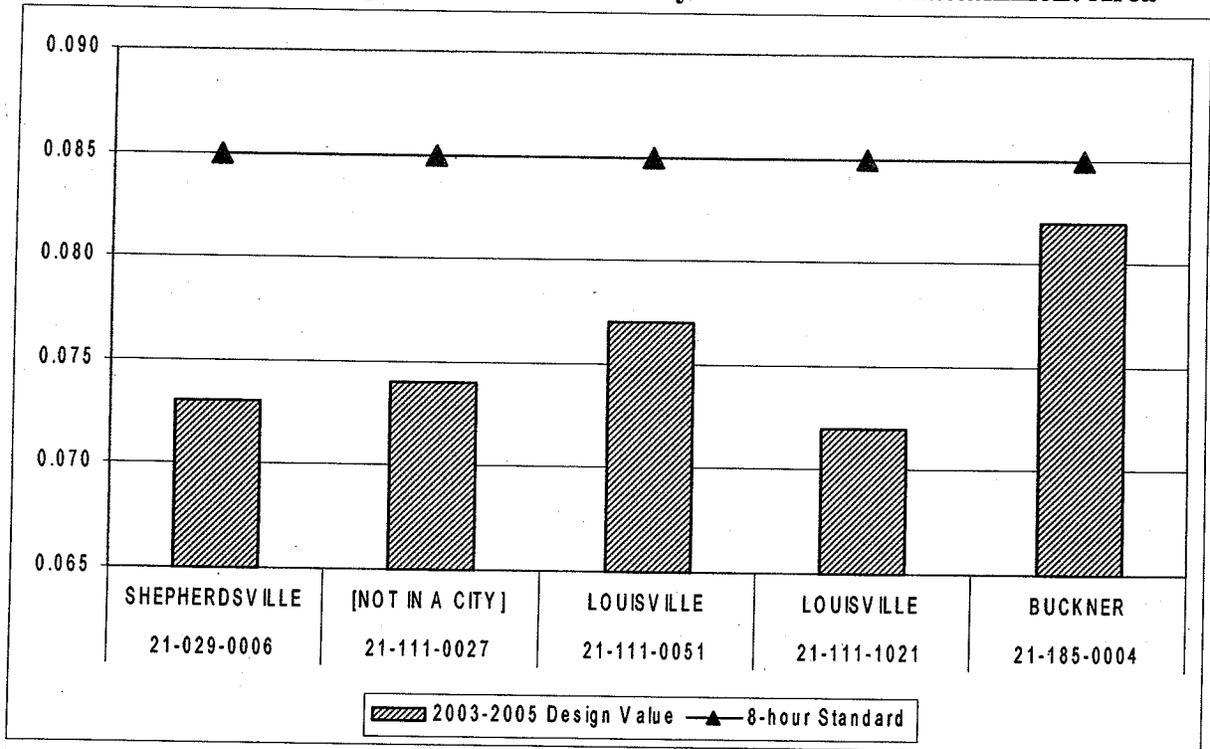
Graph 3.1 visually demonstrates the design values for Indiana's portion of the nonattainment area.

**Graph 3.1 - 2003-2005 Design Values for Clark and Floyd Counties  
(Indiana's Portion of Nonattainment Area)**



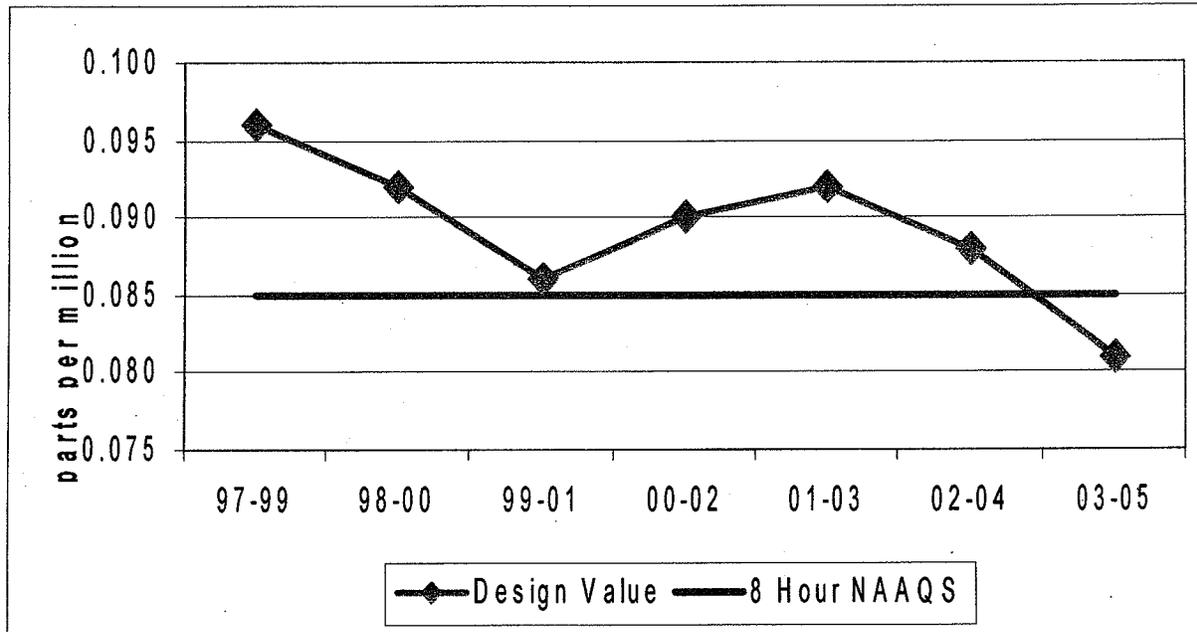
Graph 3.2 illustrates the design values for the Kentucky portion of the nonattainment area.

**Graph 3.2 - 2003-2005 Design Values for Kentucky's Portion of Nonattainment Area**



The design values for Clark and Floyd counties, along with the nonattainment area in its entirety, demonstrate that the NAAQS for ozone have been attained.

**Graph 3.3 1997 through 2005 8-hour Design Values for Clark and Floyd Counties**



Graph 3.3 shows the trend in design values for Clark and Floyd Counties over the past seven years. The Charlestown monitor, in Clark County, Indiana, has traditionally served as the controlling ozone monitor for the Louisville basic ozone nonattainment area. A comprehensive list of the sites' design values is in Appendix A. The area's design value has trended downward as emissions have declined due to such programs as the Acid Rain program and cleaner automobiles and fuels both regionally and locally. U.S. EPA's rule to control nitrogen oxides from specific source categories (40 CFR Parts 51, 72, 75 and 96, published on October 17, 1998 and referred to as the "NO<sub>x</sub> SIP Call") has significantly reduced emissions from large electric generating units (EGUs), industrial boilers, and cement kilns. Indiana's NO<sub>x</sub> Rule was adopted on June 6, 2001 (326 IAC 10-3 and 10-4). An analysis of meteorological conditions and monitoring values is in Section 7.0 and supports the conclusion that attainment of the standard as of 2005 is not the result of unusually favorable meteorological conditions. It is expected that this downward trend will continue as the above programs continue and the U.S. EPA Clean Air Interstate Rule is implemented.

### 3.3 Quality Assurance

IDEM has quality assured all data shown in Appendix A in accordance with 40 CFR 58.10 and the Indiana Quality Assurance Manual. IDEM has recorded the data in the AQS database and, thus, they are available to the public.

### 3.4 Continued Monitoring

Indiana commits to continue monitoring ozone levels at or near the sites indicated in Table 3.1 and Appendix A. IDEM will consult with U.S. EPA Region V staff prior to making changes to the existing monitoring network, should changes be necessary in the future. IDEM will continue to quality assure the monitoring data to meet the requirements of 40 CFR 58. Connection to a central station and updates to the IDEM website<sup>1</sup> will provide real time availability of the data and knowledge of any exceedances. IDEM will enter all data into AQS on a timely basis in accordance with federal guidelines.

## 4.0 EMISSION INVENTORY

Clark and Floyd Counties are part of the Louisville metropolitan area but account for a relatively small portion of the overall emissions inventory. The impact of the NO<sub>x</sub> SIP call on monitor values in Clark and Floyd Counties demonstrate the area is affected by transport. Therefore, regional emission reductions affect ozone levels in Clark and Floyd Counties far more so than emission reductions within the counties themselves. Graphs 4.2 and 4.7 demonstrate the most relevant regional reduction in NO<sub>x</sub> that is attributable to the lowered ozone concentrations in Clark and Floyd Counties. Because of the significance of regional emissions reductions, Section 4.0 summarizes both regional and local emissions information.

U.S. EPA's Redesignation Guidance requires the submittal of a comprehensive inventory of ozone precursor emissions (VOC and NO<sub>x</sub>) representative of the year when the area achieves attainment of the ozone air quality standard. Indiana must also demonstrate that the improvement in air quality between the year that violations occurred and the year that attainment was achieved is based on permanent and enforceable emission reductions. Other emissions inventory related requirements include a projection of the emission inventory to a year at least ten (10) years following redesignation, a demonstration that the projected level of emissions is sufficient to maintain the ozone standard, and a commitment to provide future updates of the inventory to enable tracking of emission levels during the ten (10) year maintenance period.

The following subsections address each of these requirements.

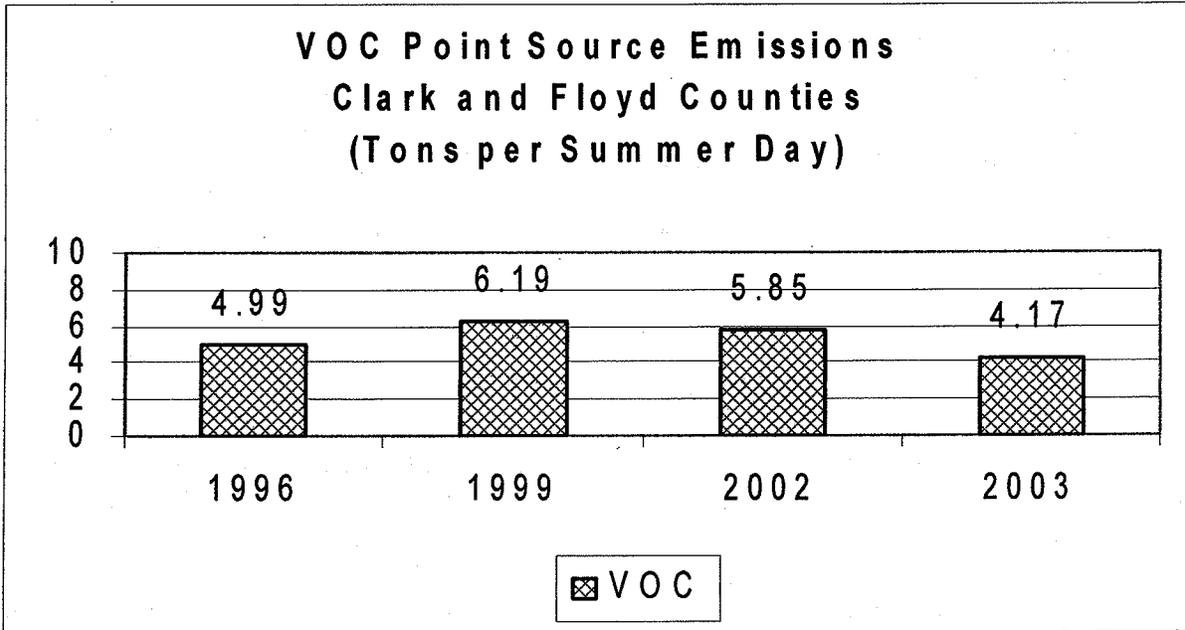
### 4.1 Emission Trends

Graphs 4.1 and 4.2 show the trend in point source emissions of VOC and NO<sub>x</sub> respectively that generally correspond to the years of monitored values referenced in this petition. The point source data are taken from Indiana's annual emissions reporting program.

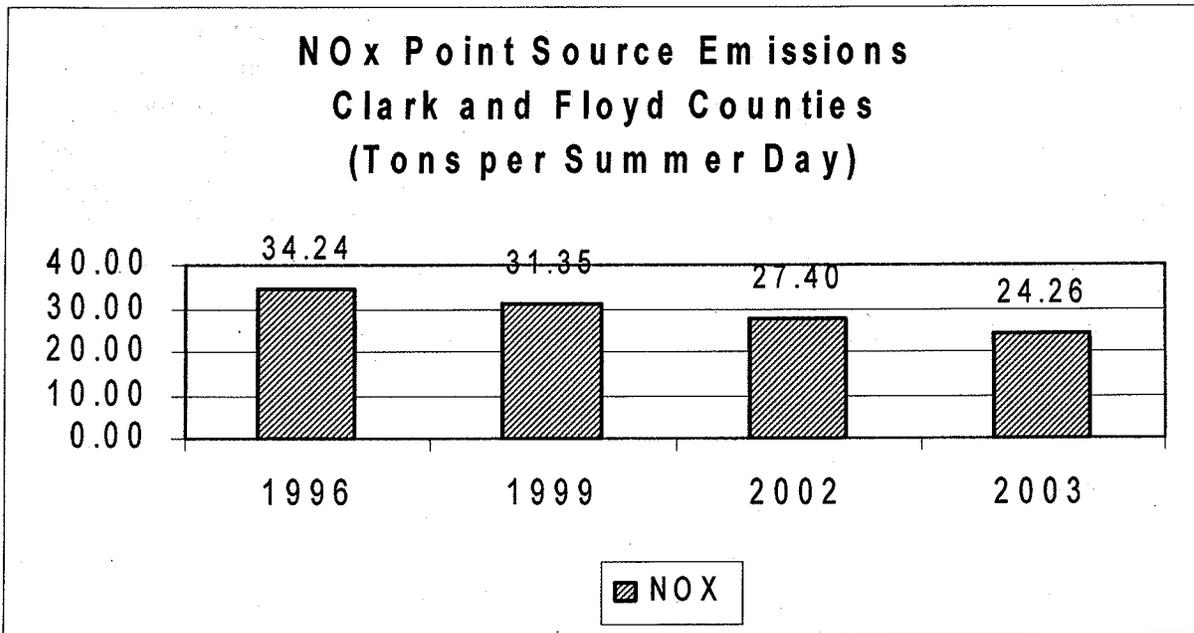
---

<sup>1</sup> [www.in.gov/idem/](http://www.in.gov/idem/)

**Graph 4.1 Clark and Floyd Counties, Indiana VOC Point Source Emissions 1996 - 2003**



**Graph 4.2 Clark and Floyd Counties, Indiana NO<sub>x</sub> Point Source Emissions 1996 - 2003**



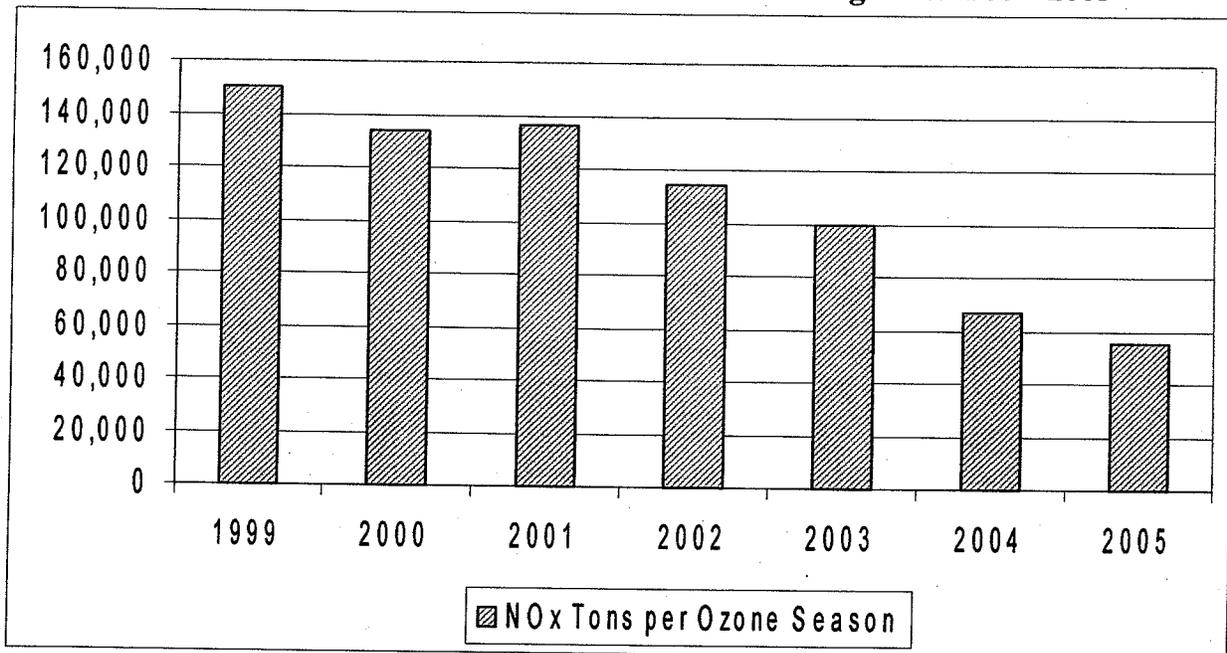
EGU Sources

Graph 4.3 depicts the trends in statewide NO<sub>x</sub> emissions from EGUs. While ozone and its precursors are transported into this region from outside the area, this information does provide some indication of the impact that Indiana sources may have on the nonattainment area. The emissions are decreasing substantially in response to national programs affecting all EGUs such as the Acid Rain program and the NO<sub>x</sub> SIP Call. Other sectors of the inventory also impact ozone formation, but large regional sources such as EGUs have a substantial impact on the formation of ozone.

These data were taken from U.S. EPA's Clean Air Markets database<sup>2</sup>. Data are available sooner for these units than other point sources in the inventory because of the NO<sub>x</sub> SIP Call budget and trading requirements. Information from 2003 is significant because some EGUs started operation of their NO<sub>x</sub> SIP Call controls in order to generate Early Reduction Credits for their future year NO<sub>x</sub> budgets. The first season of the SIP Call budget period began May 31, 2004.

As part of the NO<sub>x</sub> SIP Call, the states were required to adopt into their rules a budget for all large EGUs. Indiana's budget is referenced in 326 IAC 10-4. The budget represents a statewide cap on NO<sub>x</sub> emissions. Although each unit is allocated emissions based upon historic heat input, utilities can meet this budget by over-controlling certain units or purchasing credits from the market to account for overages at other units. To summarize, NO<sub>x</sub> emissions have dramatically decreased over the years represented on these graphs. These emissions, capped by the state rule, should remain at least this low through the maintenance period covered by this request.

**Graph 4.3 Statewide NO<sub>x</sub> Emissions from Electric Generating Units 1999 - 2005**

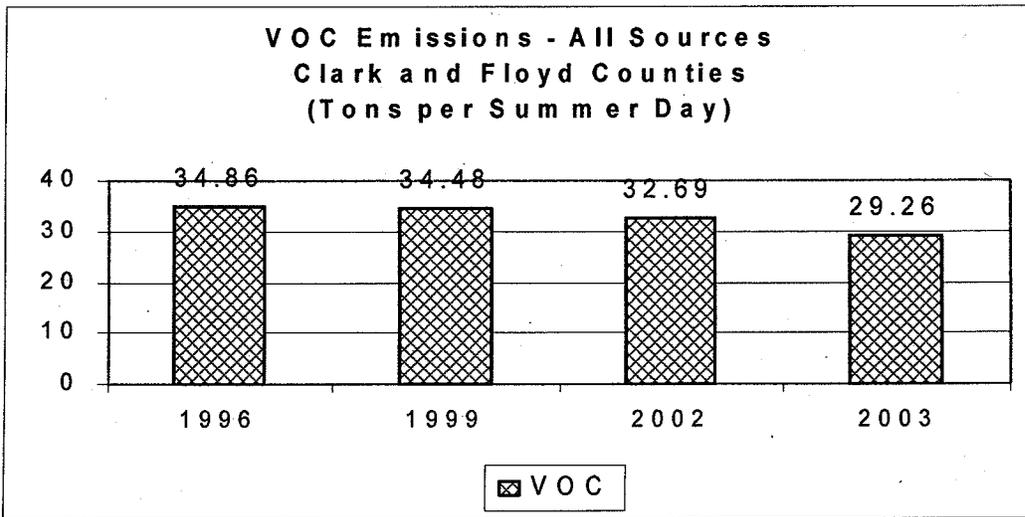


<sup>2</sup> <http://www.epa.gov/airmarkets>

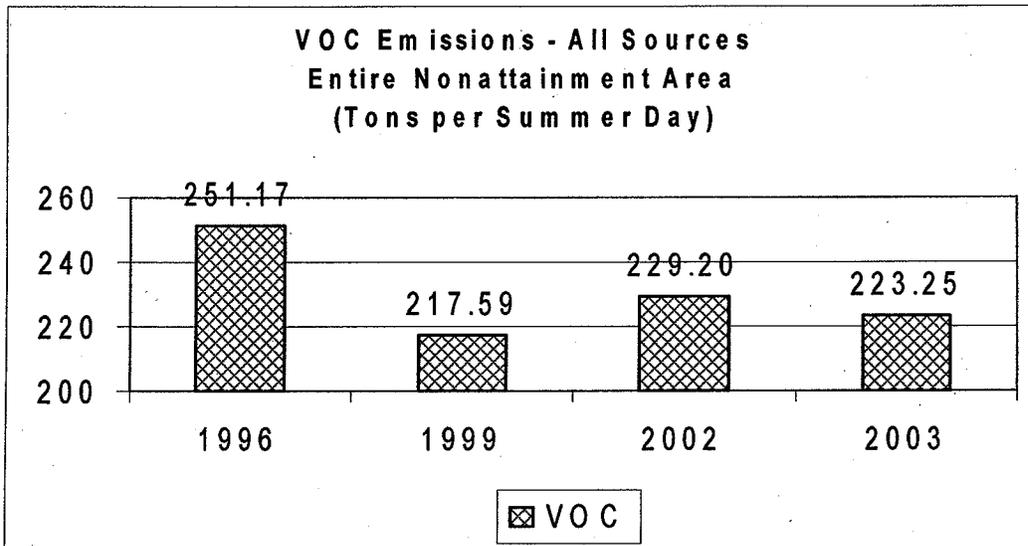
All Anthropogenic Sources

Periodic inventories, which include emissions from all sectors - mobile, area, non-road, and point sources – were prepared for 1996, 1999, 2002 and 2003. Graphs 4.4 and 4.6 show the trend for the total emissions for all anthropogenic source categories in these years. Graphs 4.5 and 4.7 below show the trend in VOC and NO<sub>x</sub> emissions, respectively, for the entire nonattainment area, which also roughly follow the years of monitored trends discussed in Section 3.0. Graphs and data tables for emissions for each source category are available in Appendix B.

**Graph 4.4 VOC Emissions Trends, 1996 - 2003, All Sources in Clark and Floyd Counties, Indiana**

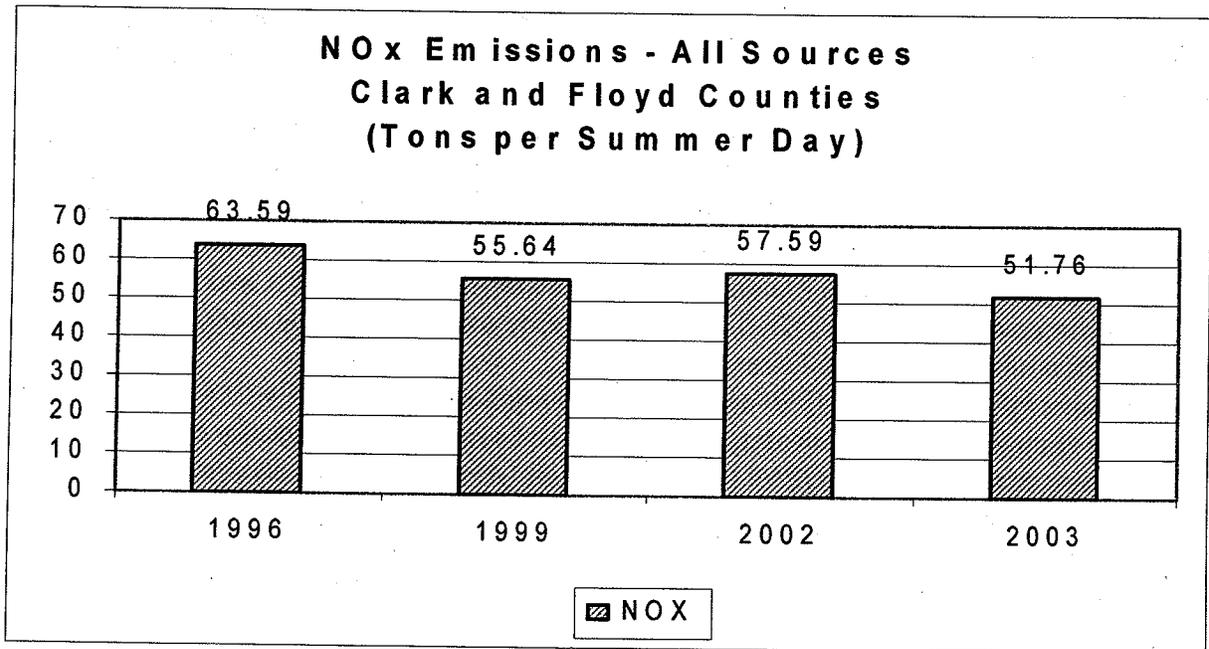


**Graph 4.5 Total VOC Emissions Trends, 1996 - 2003, Entire Nonattainment Area**

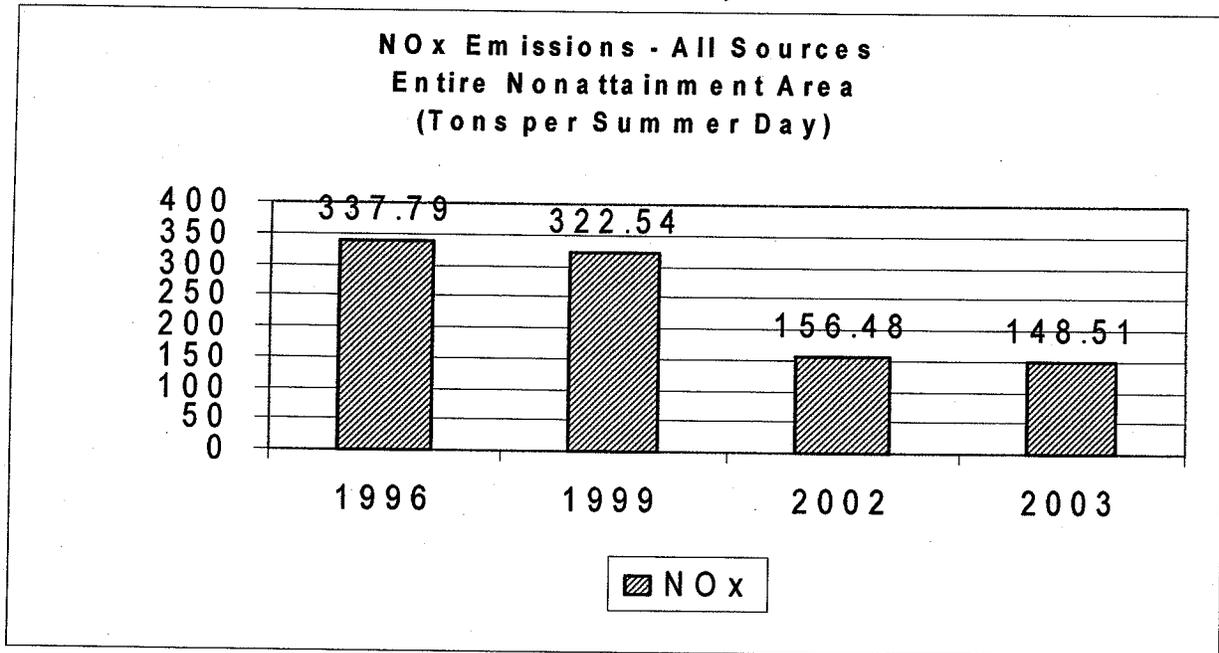


Note: Kentucky emissions data is preliminary and subject to possible change.

**Graph 4.6 NO<sub>x</sub> Emissions Trends, 1996 - 2003, All Sources in Clark and Floyd Counties, Indiana**



**Graph 4.7 Total NO<sub>x</sub> Emissions Trends, 1996 - 2003, Entire Nonattainment Area**



Note: Kentucky emissions data is preliminary and subject to possible change.

Graph 4.4 shows a consistent decrease in VOC emissions for Clark and Floyd Counties. Although graph 4.6 shows a slight increase in NO<sub>x</sub> emissions for Clark and Floyd Counties from 1999 to 2002, the overall reduction of VOC and NO<sub>x</sub> emissions for the entire nonattainment area clearly demonstrate the downward emissions trend for the area.

## 4.2 Base Year Inventory

IDEM prepared a comprehensive inventory for Clark and Floyd Counties, including Area, Mobile, and Point sources for precursors of ozone (volatile organic compounds and nitrogen oxides) for base year 2003.

- Area source emissions for the 1996 and 1999 inventories were generated by U.S. EPA and are part of the National Emissions Inventory (NEI). The 2003 area sources were projected from the Indiana 2002 periodic inventory submitted to U.S. EPA. These projections were derived by applying growth factors developed under contract for LADCO modeling.
- Mobile source emissions for 1996 and 1999 were generated by U.S. EPA and are part of the National Emissions Inventory (NEI). The 2003 mobile source emissions were calculated from MOBILE6 produced emission factors.
- Point source information for 1996 and 1999 was compiled from IDEM's 1996 and 1999 annual emissions statement database. Point source information for the 2003 analysis was compiled from IDEM's 2003 annual emissions statement database and the 2003 U.S. EPA Air Markets acid rain database<sup>3</sup>.
- Biogenic emissions are not included in these summaries.
- Non-road emissions for 1996 and 1999 were generated by U.S. EPA and are part of the National Emissions Inventory (NEI). The 2003 emissions were generated by IDEM using the new non-road estimation model provided by U.S. EPA. To address concerns about the accuracy of some of the categories in U.S. EPA's Non-road emissions model, the Lake Michigan Air Directors' Consortium (LADCO) (Midwest Regional Planning Organization), contracted with two (2) companies to review the base data and make recommendations. Emissions were estimated for commercial marine vessels and railroads. Recreational motorboat population and spatial surrogates (used to assign emissions to each county) were significantly updated. The populations for the construction equipment category were reviewed and updated based upon surveys completed in the Midwest and the temporal allocation for agricultural sources was also updated. One of the contractors also estimated emissions for two (2) non-road categories not included in U.S. EPA's Non-road model.

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

## 4.3 Emission Projections

In consultation with the U.S. EPA and other stakeholders, IDEM selected the year 2020 as the maintenance year for this redesignation request. This document contains projected emission inventories for 2011 and 2020.

---

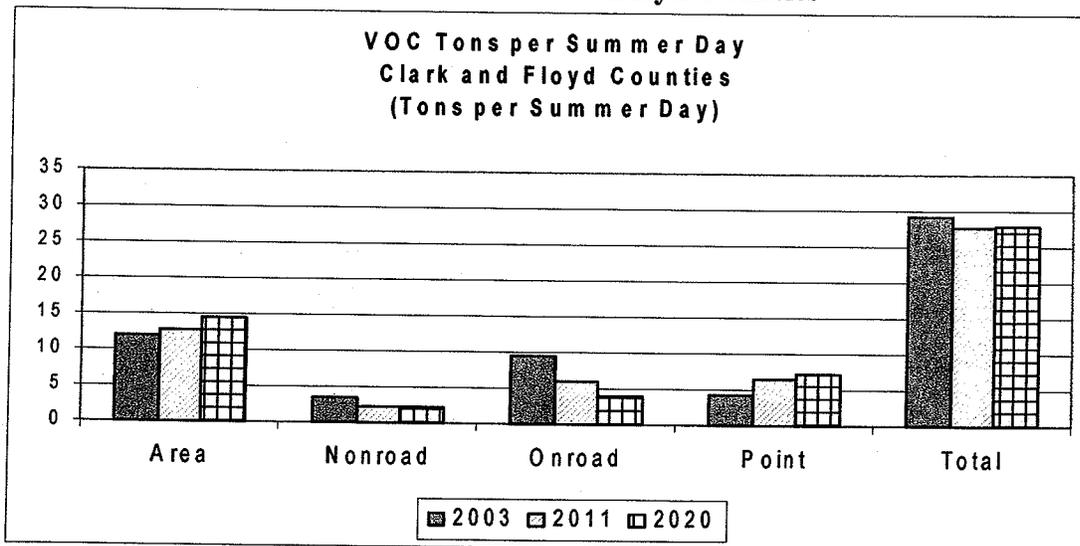
<sup>3</sup> <http://www.epa.gov/airmarkets/acidrain>

IDEM performed emission projections for Clark and Floyd Counties using the following approaches:

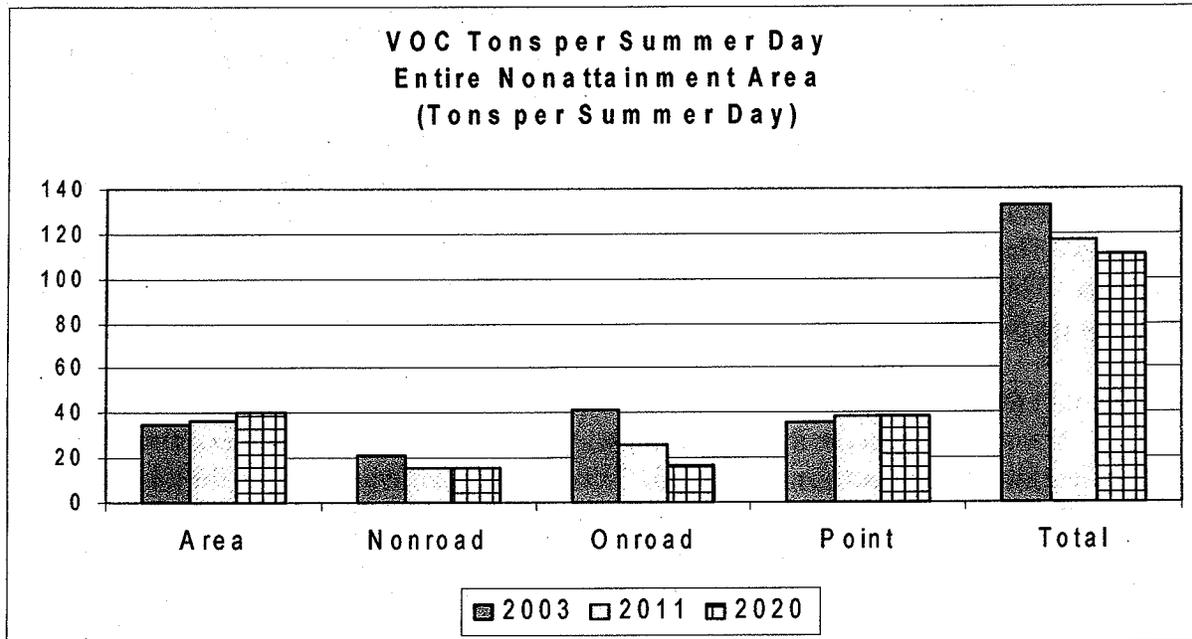
- Mobile source emission projections are based on the U.S. EPA MOBILE6 model. The analysis is described in more detail in Section 5.0. All projections were made in accordance with “Procedures for Preparing Emissions Projections”; U.S. EPA-45/4-91-019.
- Mobile source emission projections for 2011 and 2020 exclude reductions associated with the State of Indiana’s vehicle inspection and maintenance program currently in place in Clark and Floyd Counties, Indiana.
- Emission inventories are required to be projected to future dates to assess the influence growth and future controls will have. The Midwest Regional Planning Organization (Midwest RPO) has developed growth and control files for Point, Area, and Non-road categories. These files were used to develop the future year emissions estimates used in this document. This was done so that the inventories used for redesignation are consistent with modeling performed in the future.

The detailed inventory information for Clark and Floyd Counties for 2011 and 2020 is in Appendix B. Emission trends are an important gauge for continued compliance of the ozone standard. Therefore, IDEM performed an initial comparison of the inventories for the base year (2003), interim year (2011), and maintenance year (2020) for Clark and Floyd Counties, as well as the entire nonattainment area. Graphs 4.8 and 4.10 visually compare the 2003 (base year) estimated emissions with the 2011 and 2020 projected emissions for Clark and Floyd Counties. Graphs 4.9 and 4.11 visually compare the 2003 (base year) estimated emissions with the 2011 and 2020 projected emissions for the entire nonattainment area. Mobile Source emission inventories are described in Section 5.0. In addition to the Midwest RPO’s estimates, emissions were projected based upon the statewide EGU NO<sub>x</sub> budgets from the Indiana NO<sub>x</sub> rule for affected sources.

**Graph 4.8 Comparison of 2003, 2011 and 2020 Projected VOC Emissions for Clark and Floyd Counties**

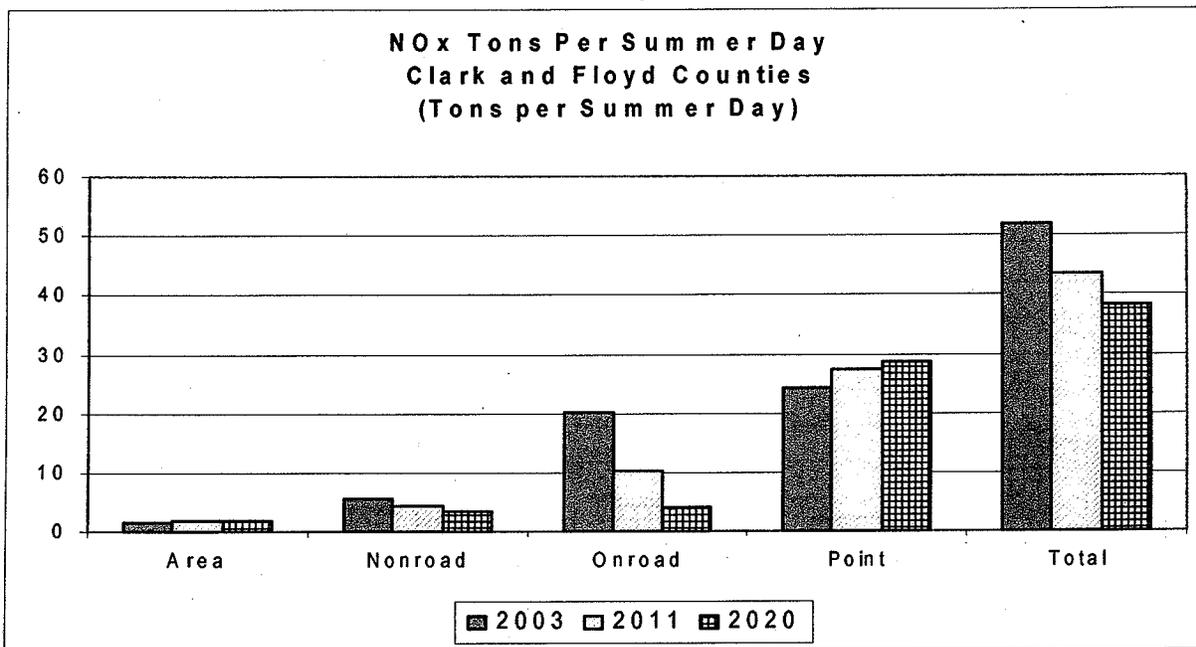


**Graph 4.9 Comparison of 2003 Estimated and 2011 and 2020 Projected VOC Emissions for Entire Nonattainment Area**

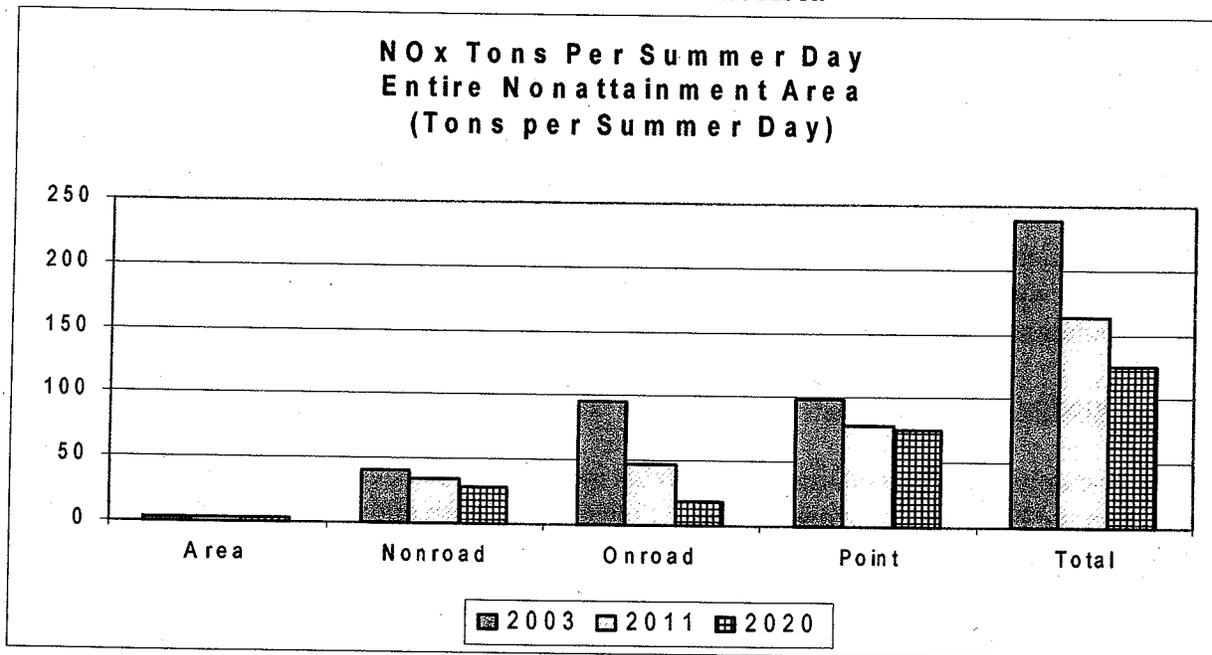


Note: Kentucky emissions data is preliminary and subject to possible change.

**Graph 4.10 Comparison of 2003, 2011 and 2020 Projected NO<sub>x</sub> Emissions for Clark and Floyd Counties**



**Graph 4.11 Comparison of 2003 Estimated and 2011 and 2020 Projected NO<sub>x</sub> Emissions for Entire Nonattainment Area**



Note: Kentucky emissions data is preliminary and subject to possible change.

**TABLE 4.1 Comparison of 2003 and 2020 Projected Emission Estimates in Tons per Summer Day, Clark and Floyd Counties, Indiana**

	2003	2020	Change	% Change
VOC	29.26	27.91	-1.35	-4.61
NO <sub>x</sub>	51.77	38.10	-13.67	-26.40

**TABLE 4.2 Comparison of 2003 and 2020 Projected Emission Estimates in Tons per Summer Day for Entire Nonattainment Area**

	2003	2020	Change	% Change
VOC	133.11	110.97	-22.14	-16.66
NO <sub>x</sub>	238.77	126.25	-112.52	-47.12

Note: Kentucky emissions data is preliminary and subject to possible change.

VOC emissions within Clark and Floyd Counties are projected to decline by nearly 5% between 2003 and 2020. VOC emissions within the entire nonattainment area are projected to decrease by over 16%. Areas source emissions, and, to a lesser extent, point sources show an increase due to expectations that population will grow considerably in Clark and Floyd Counties.

NO<sub>x</sub> emissions within Clark and Floyd Counties are projected to decrease by over 26% between 2003 and 2020. NO<sub>x</sub> emissions within the entire nonattainment area are projected to decrease by over 47%. In 2003, mobile sources comprised over 58% of the inventory. Emission reduction benefits from U.S. EPA rules covering the NO<sub>x</sub> SIP Call, Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements<sup>4</sup>, Highway Heavy-Duty Engine Rule<sup>5</sup> and Non-Road Diesel Engine Rule<sup>6</sup> are factored into the changes. Further, due to implementation of the NO<sub>x</sub> SIP Call across the eastern United States, NO<sub>x</sub> and ozone levels entering this area will also decrease. The Clean Air Interstate Rule (CAIR), issued in March 2005 and to be implemented in late 2006, will reduce regional EGU NO<sub>x</sub> emissions by approximately another 15% in 2015. Since CAIR is a regional cap and trade program, it cannot be predicted at this time what effect this will have on EGU units located in Floyd County or other upwind counties. Therefore, potential reductions are not included in Graph 4.6 or Table 4.1.

#### 4.4 Demonstration of Maintenance

Ambient air quality data from all monitoring sites indicate that air quality in Clark and Floyd Counties met the NAAQS for ozone in 2005. Furthermore, ambient air quality data from all monitoring sites within the entire nonattainment area indicate that air quality met the NAAQS for ozone in 2005. U.S. EPA's Redesignation Guidance (Page 9) states, "A state may generally demonstrate maintenance of the NAAQS by either showing that future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory, or by modeling to show that the future mix of sources and emissions rates will not cause a violation of the NAAQS." Emissions projections outlined in Section 4.0 of this document clearly illustrate that VOC and NO<sub>x</sub> emissions will continue to decline between the years of 2003 (base year) and 2020. The NO<sub>x</sub> SIP rule will result in major reductions of EGU emissions (see Section 6.3). Section 7.0 further discusses the implications of these emissions trends and provides an analysis to support these conclusions. Therefore, air quality should meet the ozone NAAQS through the projected year of 2011 and 2020.

In Indiana, major point sources in all counties are required to submit air emissions information once every three (3) years or annually, if VOC potential to emit is greater than 250 tons or NO<sub>x</sub> greater than 2500 tons, in accordance with the Emission Statement Rule, 326 IAC 2-6. IDEM prepares a new periodic inventory for all ozone precursor emission sectors every three (3) years. These ozone precursor inventories will be prepared for 2005, 2008, and 2011, as necessary, to comply with the inventory reporting requirements established in the CAAA. Emissions information will be compared to the 2003 base year and the 2020 projected maintenance year inventories to assess emission trends, as necessary, to assure continued compliance with the ozone standard.

---

<sup>4</sup> <http://www.epa.gov/fedrgstr/EPA-AIR/2000/February/Day-10/a19a.htm>

<sup>5</sup> <http://www.epa.gov/fedrgstr/EPA-AIR/1997/October/Day-21/a27494.htm>

<sup>6</sup> <http://www.epa.gov/fedrgstr/EPA-AIR/1998/October/Day-23/a24836.htm>

#### 4.5 Permanent and Enforceable Emissions Reductions

Permanent and enforceable reductions of volatile organic compounds and oxides of nitrogen have contributed to the attainment of the 8-hour ozone standard. Some of these reductions were due to the application of RACT rules and some were due to the application of tighter federal standards on new vehicles. Also, Title IV of the Clean Air Act and the NO<sub>x</sub> SIP Call required the reduction of oxides of nitrogen from affected sources. Section 6.0 identifies the emission control measures specific to Clark and Floyd Counties, as well as the implementation status of each measure.

#### 4.6 Provisions for Future Updates

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

### **5.0 TRANSPORTATION CONFORMITY BUDGETS**

The following is a summary of the detailed mobile input and output calculation files located in Appendix E.

#### 5.1 Overview

The Kentuckiana Regional Planning and Development Agency (KIPDA) is the Metropolitan Planning Organization (MPO) for Clark and Floyd Counties in Indiana as well as Jefferson, Bullitt and Oldham Counties in Kentucky. This organization has a travel demand forecasting model that is used to simulate the traffic in the area and is used to predict what that traffic would be like in future years given growth expectations. The model is used mostly to identify where travel capacity will be needed and to determine the infrastructure requirements necessary to meet that need. It is also used to support the calculation of mobile source emissions. The travel demand forecasting model is used to predict the total daily Vehicle Miles Traveled (VMT) and an EPA software program called MOBILE6 is used to calculate the emissions per mile. The product of these two outputs, once combined, is the total amount of pollution emitted by the on-road vehicles for the particular analyzed area.

For the Louisville nonattainment area, a number of agencies are involved in the emissions analysis. The Louisville Metro Air Pollution Control District (APCD) is the local air quality agency. Staff at this agency create the MOBILE6 input files used to determine the emission factors for the nonattainment area other than Bullitt and Oldham Counties. KIPDA determines the average summer weekday VMT using output from the travel model and the APCD emission factors are used to calculate the emissions for Clark, Floyd and Jefferson (KY) Counties. The Kentucky Division for Air Quality (KYDAQ) determines the emission factors and the final emission totals for Bullitt and Oldham Counties using VMT and speed estimates developed by the Kentucky Transportation Cabinet (KYTC).

## 5.2 Emission Estimations

Table 5.1 outlines the on-road emission estimates for the entire nonattainment area for the years 2003, 2011, and 2020. The 2003 emission estimates are based on the actual travel demand model network for the year 2003. The 2020 emission estimates are based on the travel demand model network projected to exist for 2020 under the 2030 Transportation Plan. The 2011 emission estimates are interpolated values based on the travel demand model network projected to exist for 2009 and 2012 under the 2030 Transportation Plan. The emission estimates for Bullitt and Oldham Counties have been developed by KYDAQ using VMT and speed data from the KYTC.

**Table 5.1 - Emission Estimations for On-Road Mobile Sources**

<b>Louisville NA Area</b>	<b>2003</b>	<b>2011</b>	<b>2020</b>
VOC (tons/day)	40.97	25.69	16.89
NOx (tons/day)	95.51	47.53	19.62
<b>Clark &amp; Floyd subtotal</b>			
VOC (tons/day)	9.60	6.12	3.98
NOx (tons/day)	20.27	10.20	4.15
<b>Clark &amp; Floyd subtotal %</b>			
VOC (tons/day)	23.4%	23.8%	23.6%
NOx (tons/day)	21.2%	21.5%	21.2%

Table 5.2 contains the 2020 motor vehicle emissions budget for the nonattainment area.

**Table 5.2 – Mobile Vehicle Emission Budgets**

	<b>2003</b>	<b>2020</b>
<b>VOC (tons/day)</b>	40.97	22.92
<b>NOx (tons/day)</b>	95.51	29.46

This document creates a single motor vehicle emissions budget for 2003 for the entire nonattainment area that describes the maximum on-road emissions that cannot be exceeded between the years 2003 and 2020. This budget is equal to the on-road emissions calculated for 2003 and is consistent with the methodology and assumptions used for the 2020 budget described below.

This document also creates a single motor vehicle emissions budget for 2020 for the entire nonattainment area. This budget can not be exceeded in conformity analyses for the year 2020 or later conformity-analysis years. This budget includes the emission estimates calculated for 2020 and an additional margin of safety. The safety margins include 6.03 tons/day for VOC and 9.84 tons/day for NOx. These correspond to approximately a 36% and 50% increase from the 2020 on-road emissions, respectively. Margins of safety are used to accommodate the wide array of assumptions that are factored into the calculation process. Since assumptions change over time, it

is necessary to have a margin of safety that will accommodate the impact of refined assumptions in the process. This budget ensures that the 2020 emissions for both VOC and NO<sub>x</sub> will be below the nonattainment area's base year emissions shown in Table 4.2.

All methodologies, latest planning assumptions and the safety margins were determined through the interagency consultation process.

## 6.0 CONTROL MEASURES AND REGULATIONS

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

### 6.1 Reasonably Available Control Technology (RACT)

As required by Section 172 of the CAAA, Indiana in the mid-1990s promulgated rules requiring RACT for VOC emission sources. Local and statewide RACT rules have applied to new/existing sources locating in Clark and Floyd Counties since that time. The Indiana rules are found in 326 IAC 8. The following is a listing of applicable statewide rules:

- 326 IAC 8-1-6 BACT for non-specific sources
- 326 IAC 8-2 Surface Coating Emission Limitations
- 326 IAC 8-3 Organic Solvent Degreasing Operations
- 326 IAC 8-4 Petroleum Sources
- 326 IAC 8-5 Miscellaneous Operation
- 326 IAC 8-6 Organic Solvent Emission Limitations

RACT rules specific to Clark and Floyd Counties are summarized in Section 6.2.

### 6.2 Implementation of Past SIP Revisions

Clark and Floyd Counties were previously nonattainment under the 1-hour ozone standard. The area met all of its 1-hour SIP obligations, and was redesignated to attainment in September of 2001. All of the control measures outlined within the 15% rate of progress (ROP) plan have been fully implemented. Since the area was designated nonattainment for ozone under the 8-hour standard in 2004 and its attainment plan is not due until 2007, now that the area has attained the standard, no further SIP revisions are required.

The following outlines the measures implemented in association with previous SIP submittals that have resulted in permanent and enforceable emission reductions in Clark and Floyd Counties:

### Fifteen Percent Rate of Progress (ROP) Plan

Indiana's final 15% ROP plan was approved by U.S. EPA on May 7, 1997. The measures included a mix of point, area, and mobile source control measures:

**Mandatory Measures:** The CAAA mandates certain control measures that may be included in a state's 15% plan. These measures include tighter controls on a number of categories of industrial and area sources. The mandatory measures that apply to Clark and Floyd Counties and were included in the 15% plan are:

- controls on automobile refinishing operations,
- wood furniture coatings,
- shipbuilding and ship repair operations,
- architectural and industrial maintenance coatings, and
- volatile organic liquids storage facilities.

All of these measures have been fully adopted and are effective within Clark and Floyd Counties, with the exception of the architectural and industrial maintenance coatings rule. US EPA indicated in a September 10, 1993 memo from John Seitz, Director of Air Quality Planning and Standards, to Regional US EPA Offices, that states may take credit for this federal rule without conducting state rulemaking. The administrative code citations for the state rules are as follows:

- 326 IAC 8-10. Automobile Refinishing;
- 326 IAC 8-11. Wood furniture Coatings;
- 326 IAC 8-12. Shipbuilding or Ship Repair Operations; and,
- 326 IAC 8-9. Volatile Organic Liquid Storage Vessels.

**Additional Measures:** In order to achieve the necessary emission reductions, additional measures were selected by Indiana for implementation in Clark and Floyd Counties. The additional measures were:

- Stage II Vapor Recovery at service stations,
- gasoline with lower Reid Vapor Pressure (RVP) than is required under the federal RVP program,
- ~~an upgraded Inspection and Maintenance program for cars and light duty trucks.~~
- a ban on residential open burning,
- installation of gas collection and combustion equipment at municipal solid waste landfills,
- a ridesharing program, and
- the installation of thermal incinerators at a printing facility in Clark County.

### 6.3 Nitrogen Oxides (NO<sub>x</sub>) Rule

The U.S. EPA NO<sub>x</sub> SIP Call required twenty-two (22) states to adopt rules that would result in significant emission reductions from large EGUs, industrial boilers, and cement kilns in the eastern United States. Indiana adopted this rule in 2001. Beginning in 2004, this rule will account for a reduction of approximately thirty-one percent (31%) of all NO<sub>x</sub> emissions statewide compared to previous uncontrolled years.

Twenty-one other states have also adopted these rules. The result is that significant reductions will occur upwind and within the nonattainment area because of the number of large electric utilities located in southern Indiana, Illinois, Kentucky, and Tennessee. U.S. EPA and IDEM performed modeling that indicates this area will attain the 8-hour ozone standard with the implementation of the NO<sub>x</sub> SIP Call. Controls for EGUs formally commenced May 31, 2004. From Graph 4.3, "Statewide NO<sub>x</sub> Emissions from Electric Generating Units" it can be seen that emissions covered by this program have been generally trending downward since 1998 with larger reduction occurring in 2002 and 2003. Table 6.1, compiled from data taken from the U.S. EPA Clean Air Markets website, quantifies the gradual NO<sub>x</sub> reductions that have occurred in Indiana as a result of Title IV of the Clean Air Act Amendments and the beginning of the NO<sub>x</sub> SIP Call Rule. This cap will stay in place through 2008, at which time the CAIR program will supersede it.

Further, U.S. EPA has recently published Phase II of the NO<sub>x</sub> SIP Call, that establishes a budget for large (greater than 1 ton per day emissions) stationary internal combustion engines. This rule will decrease emissions statewide from natural gas compressor stations by 4,263 tons during the ozone season. This rule has been adopted and became effective February 26, 2006. Implementation of this rule will be in 2007.

**TABLE 6.1 Trends in EGU Ozone Season NO<sub>x</sub> Emissions Statewide in Indiana**

Year	NO <sub>x</sub> Emissions (tons/ozone season)
1997	152,834
1998	159,931
1999	149,827
2000	133,881
2001	136,052
2002	113,996
2003	99,283
2004	66,568
2005	55,486
Cap 2004-2015	43,654
2015 and Beyond	39,273

#### 6.4 Measures Beyond Clean Air Act Requirements

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

##### Tier II Emission Standards for Vehicles and Gasoline Sulfur Standards

In February 2000, U.S. EPA finalized a federal rule to significantly reduce emissions from cars and light trucks, including sport utility vehicles (SUVs). Under this proposal, automakers will be required to sell cleaner cars, and refineries will be required to make cleaner, lower sulfur gasoline. This rule will apply nationwide. The federal rules will phase in between 2004 and 2009. U.S. EPA has estimated that NO<sub>x</sub> emission reductions will be approximately seventy-seven percent (77%) for passenger cars, eighty-six percent (86%) for smaller SUVs, light trucks, and minivans, and sixty-five to ninety-five percent (65-95%) reductions for larger SUVs, vans, and heavier trucks. VOC emission reductions will be approximately twelve percent (12%) for passenger cars, eighteen percent (18%) for smaller SUVs, light trucks, and minivans, and fifteen percent (15%) for larger SUVs, vans, and heavier trucks.

##### Heavy-Duty Diesel Engines

In July 2000, U.S. EPA issued a final rule for Highway Heavy Duty Engines, a program that includes low-sulfur diesel fuel standards, and will be phased in from 2004 through 2007. This rule applies to heavy-duty gasoline and diesel trucks and buses. This rule will result in approximately a forty percent (40%) reduction in NO<sub>x</sub> from diesel trucks and buses, a large sector of the mobile sources NO<sub>x</sub> inventory.

##### Clean Air Non-Road Diesel Rule

In May 2004, U.S. EPA issued the Clean Air Non-Road Diesel Rule. This rule applies to diesel engines used in industries such as construction, agriculture, and mining. It also contains a cleaner fuel standard, similar to the highway diesel program. The new standards will cut emissions from non-road diesel engines by over ninety percent (90%). Non-road diesel equipment, as described in this rule, currently accounts for forty-seven percent (47%) of diesel particulate matter (PM) and twenty-five percent (25%) of nitrogen oxides (NO<sub>x</sub>) from mobile sources nationwide. Sulfur levels will be reduced in non-road diesel fuel by ninety-nine percent (99%) from current levels, from approximately three-thousand (3,000) parts per million (ppm) now to (fifteen) 15 ppm in 2010. New engine standards take effect, based on engine horsepower, starting in 2008.

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

## 6.5 Controls to Remain in Effect

Indiana commits to maintain the control measures necessary to maintain attainment of the ozone standard in Clark and Floyd Counties after redesignation. Indiana will submit to U.S. EPA as a SIP revision any changes to its rules or emission limits applicable to VOC or NO<sub>x</sub> sources contained in Indiana's SIP.

The vehicle inspection and maintenance program for Clark and Floyd Counties is currently in effect and will remain so until December 31, 2006. House Enrolled Act No. 1798, effective on July 1, 2003, amended IC 13-17-5 to void the applicability of the vehicle emissions testing rule in Clark and Floyd counties after December 31, 2006. IDEM is preparing a comprehensive photochemical modeling analysis to support a revision to the State Implementation Plan to accommodate the discontinuation of the vehicle inspection and maintenance program for Clark and Floyd counties. This revision to the State Implementation Plan will be submitted to the U.S. EPA for review and consideration later this year, and IDEM will ensure that all applicable Clean Air Act requirements are adequately addressed within the revision.

**IDEM has prepared a photochemical modeling-based demonstration that shows that the vehicle inspection and maintenance program for Clark and Floyd counties is not necessary to maintain compliance with the 8-hour ozone standard. Therefore, IDEM has moved the vehicle inspection and maintenance program from Section 6.2 to Section 8 where it is now listed as a possible contingency measure.**

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

## 6.6 New Source Review Provisions

Indiana has a long standing and fully implemented New Source Review (NSR) program that is outlined in rule 326 IAC 2. The rule includes provisions for the Prevention of Significant Deterioration (PSD) permitting program in 326 IAC 22. Indiana's PSD program was conditionally approved on March 3, 2003 (68 FR 9892) and received approval on May 20, 2004 (69 FR 29071) by U.S. EPA as part of the SIP.

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

## 7.0 MODELING

Although U.S. EPA's redesignation guidance does not require modeling for ozone nonattainment areas seeking redesignation, extensive modeling has been performed covering southern Indiana to determine the effect of national emission control strategies on ozone levels. These modeling analyses have determined that Clark and Floyd Counties are significantly impacted by ozone and ozone precursor transport, and regional NO<sub>x</sub> reductions are an effective way to attain the 8-hour standard in this area. Future year modeled ozone concentrations are expected to be reduced by 10% to 20% from baseline design values. Examples of these modeling analyses are listed below.

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

U.S. EPA Modeling Analysis for HDE Final Rulemaking

U.S. EPA conducted modeling for Tier II vehicles and low-sulfur fuels. This analysis was performed in 2000 to support final rulemaking for the Heavy Duty Engine (HDE) and Vehicle Standards and Highway Diesel Fuel and its expected impact on ozone levels. "Technical Support Document for the Heavy Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements: Air Quality Modeling Analyses" (EPA420-R-00-028) was referenced in support of this ozone redesignation for the two counties. Base year emissions from 1996 were modeled for three ozone episodes: June 12-24, 1995; July 5-15, 1995; and August 7-21, 1995. Results of this modeling show that ozone impacts from these fuel emission control measures, as well as the NO<sub>x</sub> SIP call, would be substantial in Clark and Floyd County. Relative Reduction Factors (RRF) were calculated for each monitor in Clark and Floyd County for future years 2007 and 2020. These RRFs were applied to the three-year (2001-2003) design values of 92.0 ppb in Clark County and 86.3 ppb in Floyd County. The resulting future year design values for 2007 and 2020 were calculated and shown below in Table 7.1. The modeled future year design values for all monitors in Clark and Floyd Counties were reduced by 11% to 13% of the 2001-2003 design values and will attain the 8-hour ozone NAAQS of 85 ppb.

**Table 7.1 - Modeling Results from U.S. EPA HDE Rulemaking for Clark and Floyd Counties**

Monitor ID	Monitor Name	County	Design Value 2001-2003	Modeled Relative Reduction Factor (RRFs)	Future Design Value	Modeled Relative Reduction Factor (RRFs)	Future Design Value
				2007 Base		2020 Base	
180190003	Charlestown	Clark	92.0	0.8857	81.5	0.8729	80.3
180431004	New Albany	Floyd	86.3	0.8914	77.0	0.8859	76.5

LADCO Modeling Analysis for 8-Hour Ozone Standard Assessment

The Lake Michigan Air Directors Consortium (LADCO) performed modeling to evaluate the effect of the NO<sub>x</sub> SIP Call and Tier II / Low Sulfur rule for future-year 2007 ozone, which included Clark and Floyd Counties. This modeling was originally designed to assess the 1-hour ozone standard. Further analysis was conducted and documented in LADCO's White Paper "8-Hour Ozone Assessment," dated May 2, 2001. Base year design values used were the average of the design values for the three 3-year periods (1994-1996, 1995-1997, and 1996-1998). Base year emissions were taken from 1996 and four ozone episodes were evaluated: June 22-28, 1991; July 14-21, 1991; June 13-25, 1995; and July 7-18, 1995. Results are shown in Table 7.2.

**Table 7.2 LADCO Modeling Results for 8-Hour Ozone Assessment**

Monitor ID	Monitor Name	County	Base Year Average Design Value (ppb)	Future Design Value
			'94-'96, '95-'97, '96-'98	2007
180190003	Charlestown	Clark	93	84
180431004	New Albany	Floyd	91	84

The resulting future year design values were calculated at 84 ppb for Clark County and Floyd County, respectively. The modeled future year design values will attain the 8-hour ozone NAAQS of 85 ppb with future year concentrations decreasing by 8% to 10%. Base-year average design values (1994-1996, 1995-1997, 1996-1998) used in the LADCO modeling were 6 to 8 ppb greater than current base-year average design values (2001-2003, 2002-2004, 2003-2005) for most monitors. Therefore, the modeling results would be even lower if the current base year average design values were used. The trend for the design values at both monitors has trended downward over this time period.

It should be noted that this modeling was conducted in the year 2000 and used 1996 emission inventories. More recent modeling uses updated emission inventories from 2002 with revised growth factors and control reductions for future year modeling purposes, as well as photochemical modeling updates that better characterize ozone formation and transport. These factors would account for the differences between the older modeling results and current modeling for the NO<sub>x</sub> SIP call and CAIR.

7.2 Summary of Modeling Results to Support Rulemakings

U.S. EPA Modeling for Clean Air Interstate Rule (CAIR), 2005

On March 10, 2005, the U.S. EPA finalized the Clean Air Interstate Rule (CAIR). NO<sub>x</sub> emissions from power plants will be cut by 1.7 million tons by 2009 and emissions will be reduced by 1.3 million tons in 2015 in 28 eastern states and the District of Columbia. Compared to a 2003 baseline, Indiana will reduce NO<sub>x</sub> emissions by 113,000 tons by 2009 and 149,000 tons by 2015.

U.S. EPA performed modeling to support the associated emission reductions. The modeling was based on 1999 – 2003 design values. Future year modeling was conducted, including Clark and Floyd Counties, and the future year design values for 2010 and 2015 were evaluated for attainment of the 8-hour ozone NAAQS, as shown below in Table 7.3. This future year modeling excluded reductions associated with the State of Indiana's vehicle inspection and maintenance program currently in place in Clark and Floyd Counties, Indiana. Results of the CAIR modeling show that both counties will attain the 8-hour ozone NAAQS in 2010 with modeled concentrations reduced by 10 % to 12% and remain below 85 ppb. With further reductions projected in CAIR for 2015, all design values continue to decrease by 16% to 18% and continue to attain the 8-hour ozone NAAQS.

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

County	MSA/CMSA	Design Value	Future	Future
		(ppb)	Design Value	Design Value
		1999-2003	2010 with CAIR	2015 with CAIR
Clark	Louisville	89.3	78.4	73.5
Floyd	Louisville	83.7	75.2	70.3

LADCO modeling for Clean Air Interstate Rule (CAIR)

LADCO conducted modeling in March of 2006 to determine the impact of CAIR in the Midwest. The modeling was based on 2000-2004 design values. Future year modeling for 2009 and 2012 was conducted and the future year design values were determined, as shown below in Table 7.4.

**Table 7.4 LADCO's Round 4 Modeling Results for the Clean Air Interstate Rule**

Monitor ID	Monitor Name	County	Design Value	Basecase	Basecase
			2000-2004	with CAIR -	with CAIR -
			(ppb)	2009	2012
180190003	Charlestown	Clark	90.0	82.5	79.2
180431004	New Albany	Floyd	84.3	77.4	75.7

Results of LADCO's most recent CAIR modeling show Clark and Floyd Counties will attain the 8-hour ozone NAAQS of 85 ppb in 2009. Future year modeled ozone concentrations for 2009 will be 8% lower than baseline ozone design values and 12% lower in 2012. Ozone concentrations are predicted to continue to decrease and remain in attainment of the 8-hour ozone NAAQS of 85 ppb.

7.3 Summary of Existing Modeling Results

U.S. EPA and LADCO modeling for future year design values have consistently shown that existing national emission control measures will bring Clark and Floyd Counties into attainment of the 8-hour ozone NAAQS. Rulemakings to be implemented in the next several years will provide even greater assurance that air quality will continue to meet the standard into the future. Modeling support for the NO<sub>x</sub> SIP Call, Heavy Duty Engine and Highway Diesel Fuel and Tier II/Low Sulfur Fuel and Clean Air Interstate Rule has shown that future year design values for Clark and Floyd Counties will attain the ozone standard with modeled future year design values below 85 ppb. U.S. EPA has modeled base case future years with existing emission controls only and shown that Clark and Floyd Counties will attain the 8-hour ozone NAAQS without additional national emission control strategies. Future national and local emission control strategies will ensure that each county's attainment will be maintained with an increasing margin of safety over time.

#### 7.4 Temperature Analysis for Clark and Floyd County

Meteorological conditions are one of the most important factors that influence ozone development and transport. A temperature analysis has been conducted to determine how the temperatures during the ozone conducive months of April, May, June, July, August, September and October compare to normal temperatures for the Southern Indiana. Temperature information was taken from the Charlestown Ordinance Plant in Clark County, Indiana and National Weather Service Station at Standiford International Airport in Louisville, Kentucky. Available normal maximum temperatures by summer months from 1971-2000 for the Southern Indiana/ Louisville, Kentucky area are as follows:

April – 66.8° F  
 May – 75.4° F  
 June – 83.3° F  
 July – 87.0° F  
 August – 85.8° F  
 September – 79.4° F  
 October – 68.4° F  
 May - September – 82.2° F

Louisville's monthly maximum temperatures for the previous 8 years (1998 – 2005) during the summer months are compared to normal summer month temperatures in Table 7.5. Overall, the temperatures during the 1998, 1999, 2002 and 2005 summer months of May, June, July, August, and September were 2% to 4% above normal while temperatures during the 2000, 2001, 2003 and 2004 summer months were at normal or 1% lower than the normal temperatures. Table 7.5 shows the average temperatures in Southern Indiana for each of the past eight years and the percent difference from normal for each year.

**Table 7.5 Analysis of Maximum Temperatures for Clark/Floyd Counties**  
 (Percent Change from Maximum Temperature (°F) Normals (1971 – 2000))

	Normal	1998		1999		2000		2001	
	Max	Max	%	Max	%	Max	%	Max	%
April	68.0	64.0	-4	67.6	+1	65.7	-2	72.6	+9
May	77.2	78.8	+5	78.1	+4	78.7	+4	77.6	+3
June	84.7	82.7	-1	82.8	-1	83.8	+1	82.4	-1
July	88.5	84.1	-3	91.9	+6	84.6	-3	86.6	0
August	87.2	86.4	+1	88.6	+3	85.4	0	87	+1
September	80.6	86.5	+9	85.4	+8	77.4	-3	77.5	-2
October	70.1	70.6	+3	70.7	+3	73.2	+7	68.8	+1
<b>AVE. May-Sept.</b>	<b>83.6</b>	<b>83.7</b>	<b>+2</b>	<b>85.4</b>	<b>+4</b>	<b>82</b>	<b>0</b>	<b>82.2</b>	<b>0</b>
<b>AVERAGE</b>									
<b>April-Oct.</b>	<b>79.5</b>	<b>79.0</b>	<b>+1</b>	<b>80.7</b>	<b>+3</b>	<b>78.4</b>	<b>+1</b>	<b>78.9</b>	<b>+1</b>

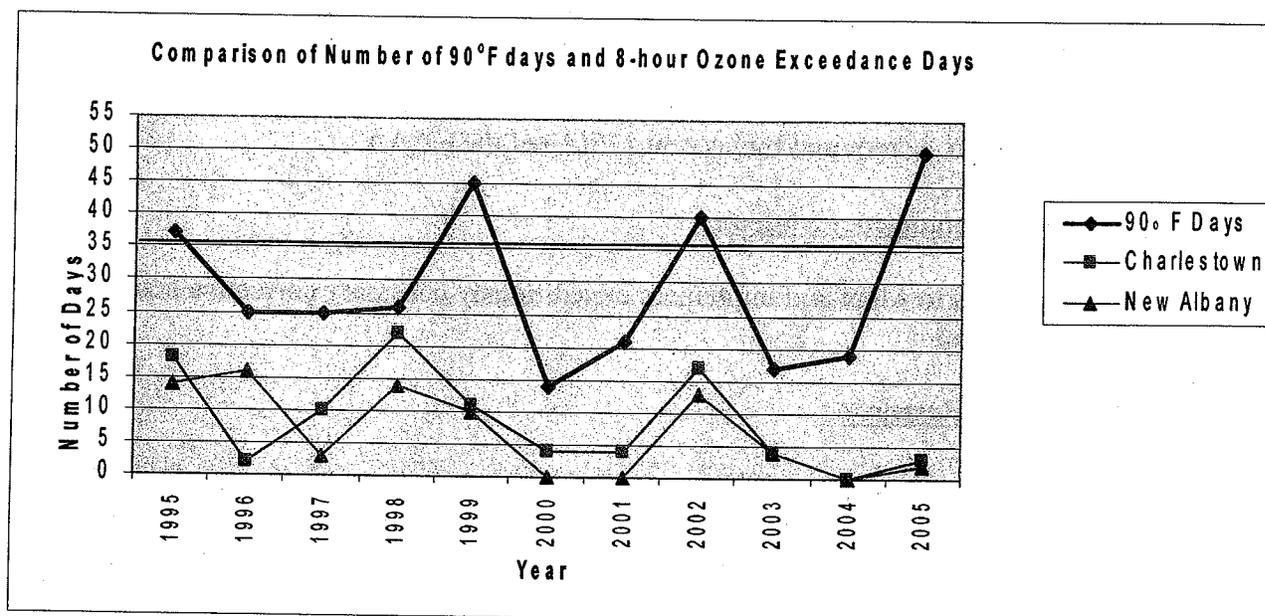
	Normal	2002		2003		2004		2005	
	Max	Max	%	Max	%	Max	%	Max	%
April	68.0	69.5	+4	69.9	+5	69.2	+4	69.1	+3
May	77.2	73.3	-3	74.5	-1	80.7	+7	75.3	0
June	84.7	85	+2	80.3	-4	84.8	+2	86.3	+4
July	88.5	88.7	+2	86.3	-1	86.1	-1	88.4	+2
August	87.2	88.9	+4	83.0	-3	76.8	-10	90.1	+5
September	80.6	83.4	+5	82.0	+3	77.9	-2	84.0	+6
October	70.1	63.7	-7	70.3	+3	69.5	+2	70.5	+3
<b>AVE. May-Sept.</b>	<b>83.6</b>	<b>83.8</b>	<b>+2</b>	<b>81.2</b>	<b>-1</b>	<b>81.3</b>	<b>-1</b>	<b>84.8</b>	<b>+3</b>
<b>AVERAGE April-Oct.</b>	<b>79.5</b>	<b>78.9</b>	<b>+1</b>	<b>78.0</b>	<b>0</b>	<b>77.9</b>	<b>0</b>	<b>80.5</b>	<b>+3</b>

The number of days with temperatures of 90° F and higher was collected from the National Weather Service Station at Standiford International Airport and compared to the normal number of days collected from the Charlestown ORD Plant in Clark County, Indiana and calculated from 1971 through 2000. The average number of 90° F and higher days for the Louisville area is 35.2. Table 7.6 shows a comparison of 8-hour ozone exceedances and temperatures while Graph 7.2 shows the correlation graphically.

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

Number of Days with Temperatures of 90° F and higher												
	Normal	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
# of 90° F days	35.2	37	25	25	26	45	14	21	40	17	19	50
Number of 8-Hour Exceedance Days at Clark/Floyd County and Louisville area ozone monitors												
Monitor	County	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Charlestown	Clark	18	2	10	22	11	4	4	17	4	0	3
New Albany	Floyd	14	16	3	14	10	0	0	13	4	0	2

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



As can be seen, a greater number of ozone exceedance days per year correlate with a greater number of 90° F days per year. The effects of national control measures appear to have an impact on the number of ozone exceedance days per year. This is evident in that 2005 had a greater number of days with temperatures of 90° F or more but the number of 8-hour exceedance days was low. While other meteorological factors may have influenced this to some degree, it appears that the lower emissions helped to keep 8-hour exceedance days lower during the ozone-conducive conditions of 2005.

### 7.5 Summary of Meteorological Conditions

The analysis of the departure from normal of the maximum temperatures during the summer months shows variation in the number of 90° F days per year as illustrated in Table 7.6. The analysis shows that 30 or more days with temperatures of 90° F and higher occurred in 1995, 1999, 2002 and 2005. The number of 8-hour ozone exceedance days for those years shows a greater correlation to the number of higher temperature days. However, the years with a lesser number of 90° F days still yielded 8-hour ozone exceedance days. Ozone formation in the future will be influenced less by meteorological conditions. Lower ozone values correspond to lowered local and regional ozone precursor emissions. This is why U.S. EPA developed the 8-hour standard as a 4th high ozone value averaged over 3 years to account for variations in temperature. Despite such variations, ozone values in Clark and Floyd counties have steadily decreased since 1995.

## 8.0 CORRECTIVE ACTIONS

### 8.1 Commitment to Revise Plan

As noted in Section 4.6 above, Indiana hereby commits to review its Maintenance Plan eight (8) years after redesignation, as required by Section 175(A) of the CAAA.

### 8.2 Commitment for Contingency Measures

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

#### Warning Level Response

A Warning Level Response shall be prompted whenever an annual (1-year) fourth high monitored value of .089 ppm occurs in a single ozone season, or a two (2)-year average fourth high monitored value of .085 parts per million (ppm) or greater occurs within Indiana's portion of the maintenance area. A Warning Level Response will consist of a study to determine whether the ozone value indicates a trend toward higher ozone values or whether emissions appear to be increasing. The study will evaluate whether the trend, if any, is likely to continue and, if so, the control measures necessary to reverse the trend taking into consideration ease and timing for implementation, as well as economic and social considerations. Implementation of necessary controls in response to a Warning Level Response trigger will take place as expeditiously as possible, but in no event later than twelve (12) months from the conclusion of the most recent ozone season (September 30).

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

#### Action Level Response

An Action Level Response shall be prompted whenever a violation of the standard (three (3)-year average fourth high monitored value of .085 parts per million (ppm) or greater) occurs within the maintenance area. In the event that the Action Level is triggered and is not found to be due to an exceptional event, malfunction, or noncompliance with a permit condition or rule requirement, IDEM will determine additional control measures needed to assure future attainment of NAAQS for ozone. In this case, measures that can be implemented in a short time will be selected in order to be in place within eighteen (18) months from the close of the ozone season that prompted the Action Level.

## Control Measure Selection and Implementation

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

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

### 8.3 Contingency Measures

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

- 1) **Centralized vehicle inspection and maintenance program (Clark and Floyd Counties).**
- 2) Broader geographic applicability of existing measures.
- 3) Tighten RACT on existing sources covered by U.S. EPA Control Technique Guidelines issued in response to the 1990 CAAA.
- 4) Apply RACT to smaller existing sources.
- 5) One or more transportation control measures sufficient to achieve at least half a percent (0.5%) reduction in actual area wide VOC emissions. Transportation measures will be selected from the following based upon the factors listed above after consultation with affected local governments:
  - a) Trip reduction programs, including, but not limited to, employer based transportation management plans, area wide rideshare programs, work schedule changes, and telecommuting.
  - b) Transit improvements.

Traffic flow improvements.

- c) Other new or innovative transportation measures not yet in widespread use that affects state and local governments deemed appropriate.
- 6) Alternative fuel and diesel retrofit programs for fleet vehicle operations.
- 7) Controls on consumer products consistent with those adopted elsewhere in the United States.
- 8) Require VOC or NO<sub>x</sub> emission offsets for new and modified major sources.
- 9) Require VOC or NO<sub>x</sub> emission offsets for new and modified minor sources.
- 10) Increase the ratio of emission offsets required for new sources.
- 11) Require VOC or NO<sub>x</sub> controls on new minor sources (less than 100 tons).

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

## 9.0 PUBLIC PARTICIPATION

In accordance with Section 100 (a) (2) of the CAAA, notice of availability of the ozone redesignation documents and the time and date of the public hearing was published in the *Indianapolis Star* (Indianapolis, Indiana), *The New Albany Tribune*, (New Albany, Indiana) and *The Jeffersonville Evening News* (Jeffersonville, Indiana) for the Indiana portion of the Louisville nonattainment area (Clark and Floyd Counties) on May 15, 2006.

The public hearing to receive comments on the redesignation request was held on June 14, 2006, at Indiana University Southeast in the Multi-Purpose Room, located at 4201 Grant Line Road, in New Albany, Indiana. The public comment period closed on June 21, 2006. A summary of the comments received and IDEM's responses thereto are included in Appendix D as part of the submittal to the U.S. EPA. Appendix D also includes a copy of the public notice, certifications of publication, and the transcript from the public hearing.

**Public participation/comment information concerning revision to be included upon completion of process.**

## 10.0 CONCLUSIONS

Clark and Floyd Counties, along with the remaining portion of the Louisville basic ozone nonattainment area, have attained the NAAQS standard for ozone. This petition demonstrates that Clark and Floyd Counties have complied with the applicable provisions of the 1990

Amendments to the Clean Air Act regarding redesignation of basic ozone nonattainment areas. IDEM has prepared a State Implementation and Maintenance Plan that meets the requirement of Section 110 (a) (1) of the 1990 Clean Air Act.

Indiana has performed an analysis that shows the air quality improvements are due to permanent and enforceable measures. In addition, significant regional NO<sub>x</sub> reductions will ensure continued compliance (maintenance) with the standard and that all CAAA requirements necessary for redesignation have been met.

Indiana has performed an analysis that shows the air quality improvements are due to permanent and enforceable measures and that significant regional NO<sub>x</sub> reductions following implementation of Phase II NO<sub>x</sub> and CAIR will ensure continued compliance (maintenance) with the standard. Based on this presentation, Indiana's portion of the nonattainment area (Clark and Floyd Counties) meets the requirements for redesignation under the CAA (Section 107 (d)(3)) and U.S. EPA guidance. Furthermore, because this area is subject to significant transport of pollutants, significant regional NO<sub>x</sub> reductions will ensure continued compliance (maintenance) with the standards with an increasing margin of safety.

Consistent with the authority granted to the U.S. EPA, the State of Indiana hereby requests that Clark and Floyd Counties be redesignated to attainment simultaneously with U.S. EPA approval of the Indiana State Implementation and Maintenance Plan provisions contained herein.



# APPENDIX A

## Aerometric Information Retrieval System (AIRS) Data

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

Dec. 28, 2005

EXCEPTIONAL DATA TYPES

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

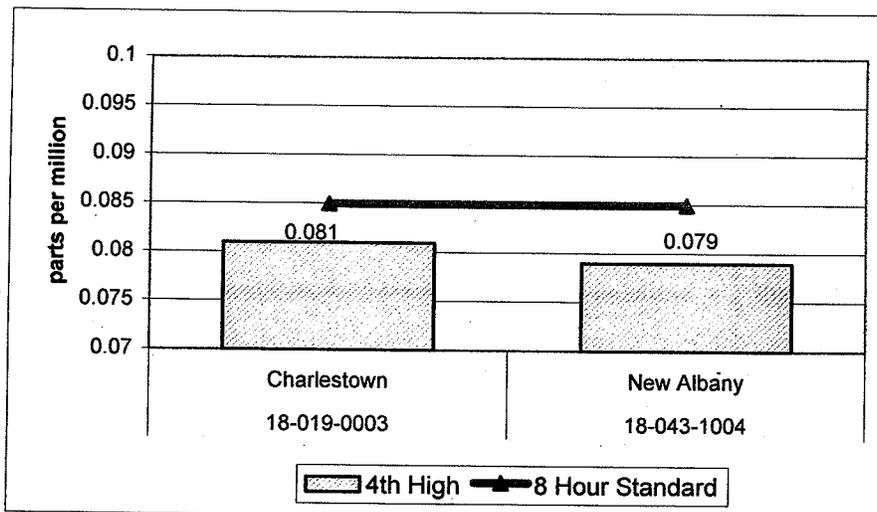
Note: The \* indicates that the mean does not satisfy summary criteria.

Page 2 of 5

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

SITE ID	P O C	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	%OBS	VALID DAYS MEAS	NUM DAYS REQ	PPM (007)				DAY MAX 0.085	CERT	EDT
											1ST MAX 8-HR	2ND MAX 8-HR	3RD MAX 8-HR	4TH MAX 8-HR			
18-019-0003	1	520	Charlestown	Clark	ARMY AMMUNITION PLA	2003	47	99	182	183	0.096	0.092	0.092	0.09	4	Y	0
18-019-0003	1	520	Charlestown	Clark	ARMY AMMUNITION PLA	2004	47	99	182	183	0.08	0.078	0.076	0.074	0		0
18-019-0003	1	520	Charlestown	Clark	ARMY AMMUNITION PLA	2005	47	95	173	183	0.098	0.092	0.086	0.08	3		0
18-043-1004	1	520	New Albany	Floyd	2230 GREEN VALLEY R	2003	47	100	183	183	0.097	0.097	0.092	0.086	4	Y	0
18-043-1004	1	520	New Albany	Floyd	2230 GREEN VALLEY R	2004	47	96	175	183	0.079	0.078	0.077	0.071	0		0
18-043-1004	1	520	New Albany	Floyd	2230 GREEN VALLEY R	2005	47	94	172	183	0.092	0.086	0.081	0.08	2		0

City	Site Name	Three Year 8-hr Design Values (ppm)		
		2001-2003	2002-2004	2003-2005
Charlestown	Army Ammunition	0.092	0.088	0.081
New Albany	Green Valley School	0.086	0.084	0.079



### Four Highest Daily Values

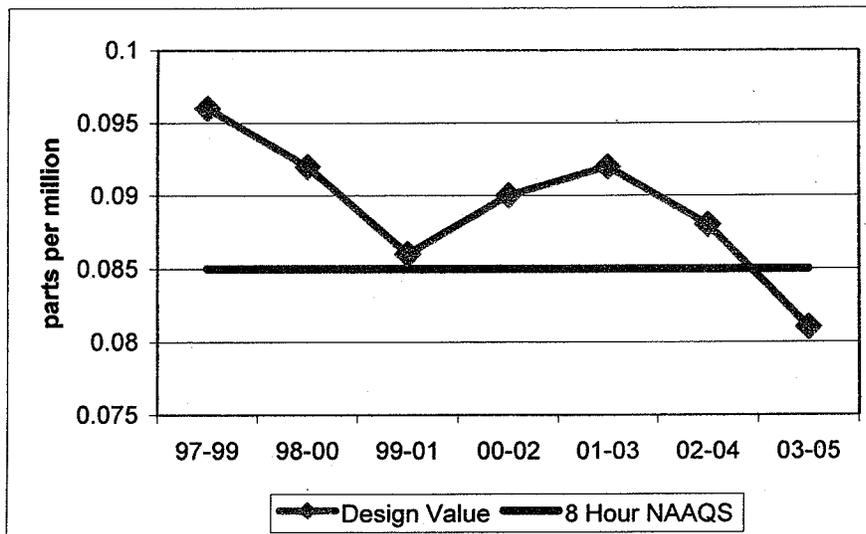
SITE ID	COUNTY	ADDRESS	YEAR	%OBS	1ST 8-HR	2ND 8-HR	3RD 8-HR	4TH 8-HR	2003-2005 AVERAGE
18-019-0003	CLARK	CHARLESTOWN	2003	99	0.096	0.092	0.092	0.090	
18-019-0003	CLARK	CHARLESTOWN	2004	99	0.08	0.078	0.076	0.074	
18-019-0003	CLARK	CHARLESTOWN	2005	95	0.098	0.092	0.086	0.080	0.081
18-043-1004	FLOYD	NEW ALBANY	2003	100	0.097	0.097	0.092	0.086	
18-043-1004	FLOYD	NEW ALBANY	2004	96	0.079	0.078	0.077	0.071	
18-043-1004	FLOYD	NEW ALBANY	2005	94	0.092	0.086	0.081	0.080	0.079

### Annual 4<sup>th</sup> High Values

City	Site Name	Yearly Annual 8-hr Values										
		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Charlestown	Army Ammunition	.100	.081	.097	.104	.089	.085	.086	.100	.090	.074	.080
New Albany	Green Valley School	.094	.092	.084	.100	.094	.077	.076	.097	.086	.071	.080

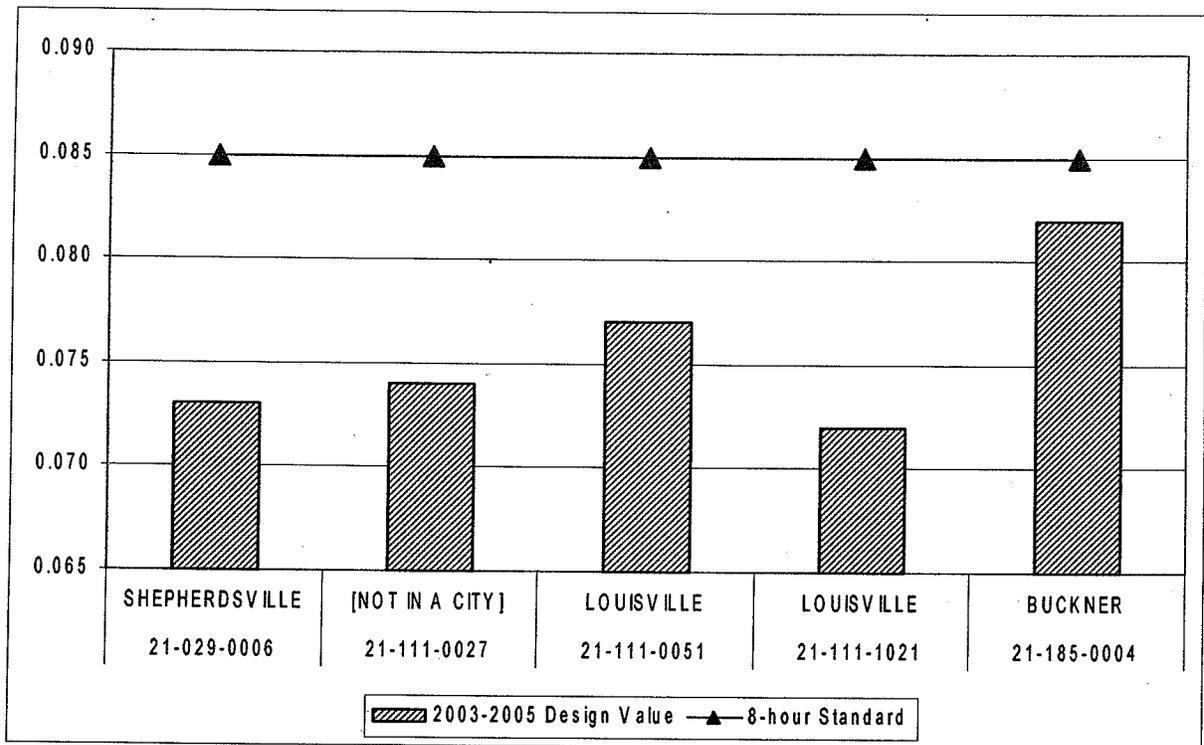
### Historic Design Values

City	Site Name	Three Year 8-hr Design Values								
		95-97	96-98	97-99	98-00	99-01	00-02	01-03	02-04	03-05
Charlestown	Army Ammunition	0.092	0.094	0.096	0.092	0.086	0.090	0.092	0.088	0.081
New Albany	Green Valley School	0.090	0.092	0.092	0.090	0.082	0.083	0.086	0.084	0.079



## Local Monitoring (Design Value) Data for Bullitt, Jefferson, and Oldham Counties, Kentucky 2003-2005

SITE ID	COUNTY	ADDRESS	YEAR	%OBS	1ST 8-HR	2ND 8-HR	3RD 8-HR	4TH 8-HR	2003-2005 AVERAGE
21-029-0006	BULLITT	SHEPHERDSVILLE	2003	99	0.076	0.073	0.072	0.072	
21-029-0006	BULLITT	SHEPHERDSVILLE	2004	97	0.102	0.078	0.070	0.068	
21-029-0006	BULLITT	SHEPHERDSVILLE	2005	97	0.083	0.081	0.081	0.080	0.073
21-111-0027	JEFFERSON	[NOT IN A CITY]	2003	100	0.096	0.082	0.076	0.072	
21-111-0027	JEFFERSON	[NOT IN A CITY]	2004	98	0.093	0.071	0.071	0.070	
21-111-0027	JEFFERSON	[NOT IN A CITY]	2005	100	0.083	0.079	0.079	0.079	0.074
21-111-0051	JEFFERSON	LOUISVILLE	2003	100	0.084	0.081	0.079	0.075	
21-111-0051	JEFFERSON	LOUISVILLE	2004	96	0.073	0.071	0.071	0.070	
21-111-0051	JEFFERSON	LOUISVILLE	2005	100	0.091	0.086	0.086	0.085	0.077
21-111-1021	JEFFERSON	LOUISVILLE	2003	100	0.081	0.079	0.074	0.073	
21-111-1021	JEFFERSON	LOUISVILLE	2004	100	0.072	0.071	0.069	0.068	
21-111-1021	JEFFERSON	LOUISVILLE	2005	100	0.088	0.084	0.076	0.074	0.072
21-185-0004	OLDHAM	BUCKNER	2003	100	0.088	0.085	0.082	0.082	
21-185-0004	OLDHAM	BUCKNER	2004	99	0.078	0.077	0.076	0.076	
21-185-0004	OLDHAM	BUCKNER	2005	100	0.094	0.094	0.093	0.089	0.082

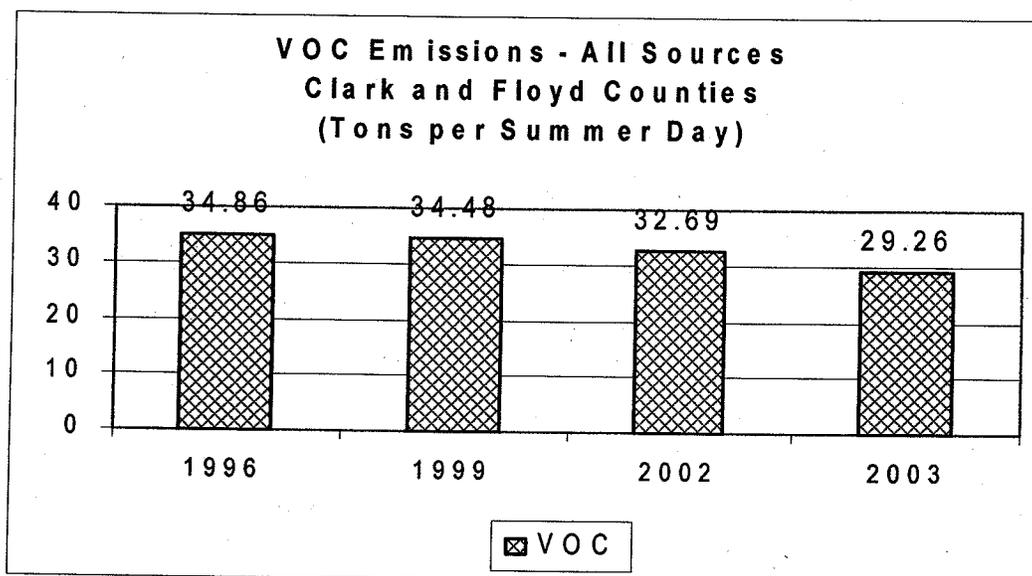
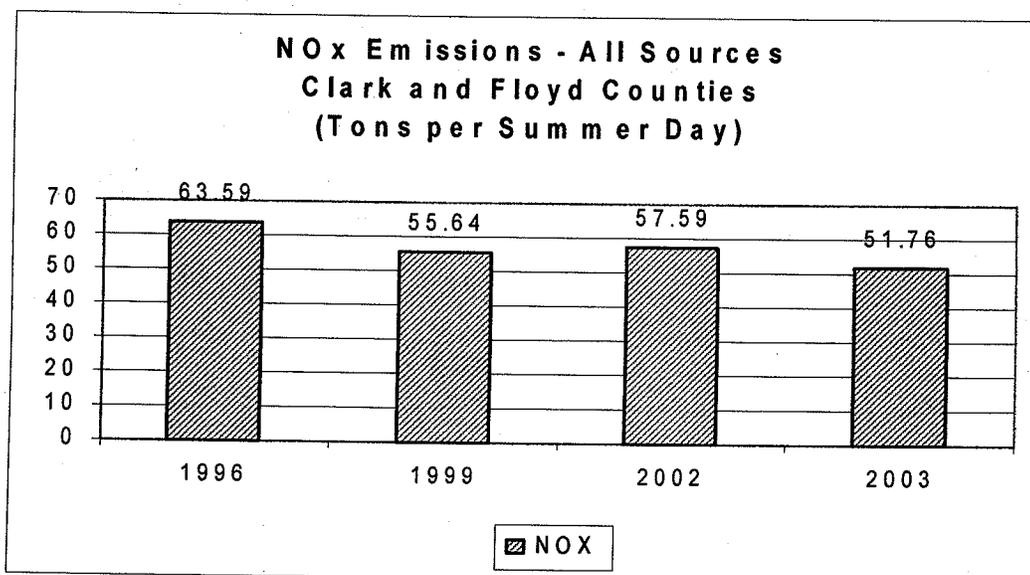




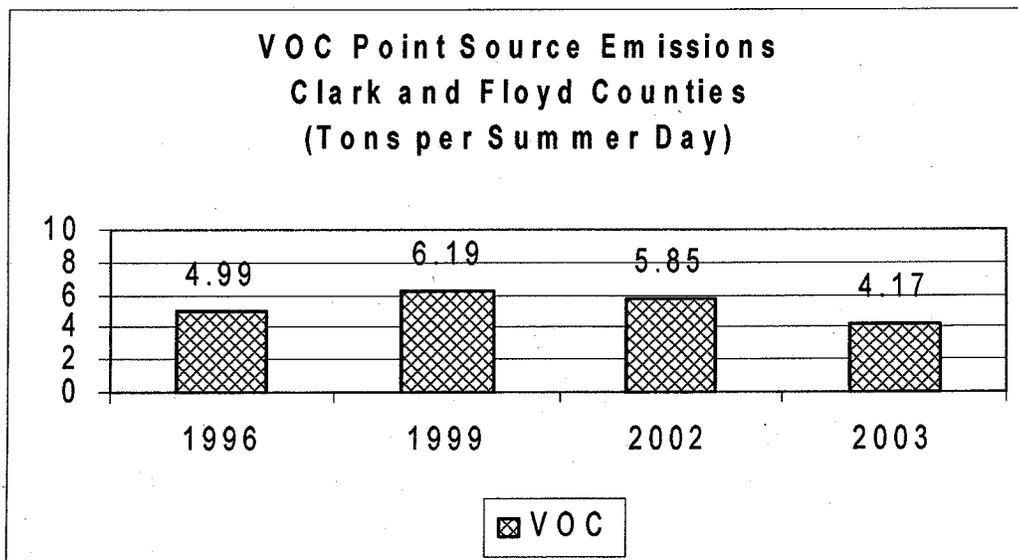
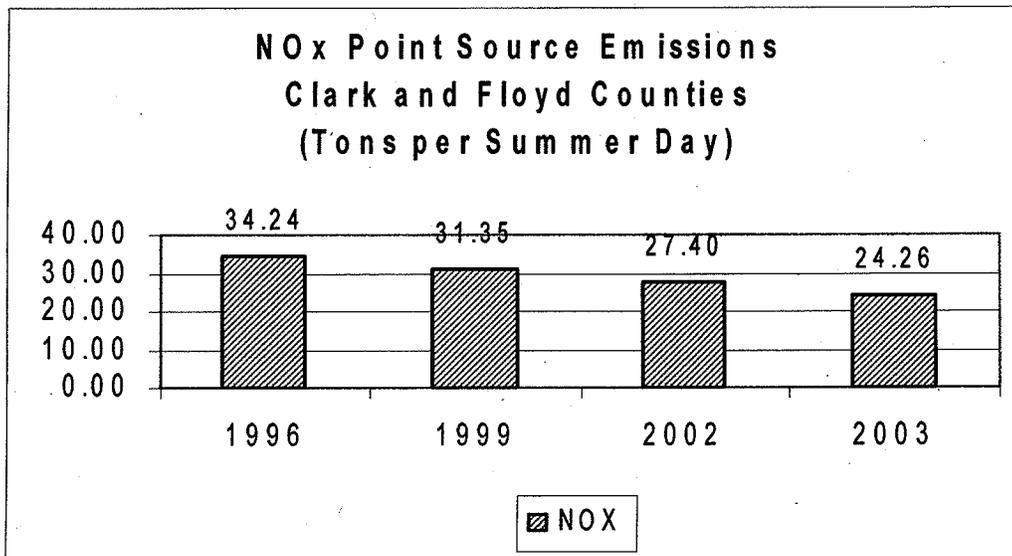
# APPENDIX B

## Emissions Inventories

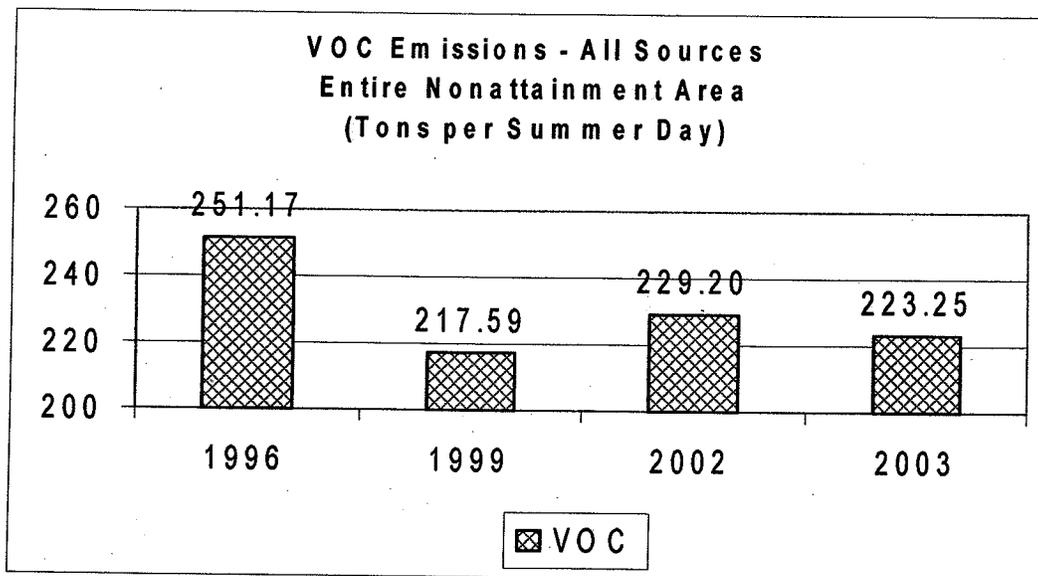
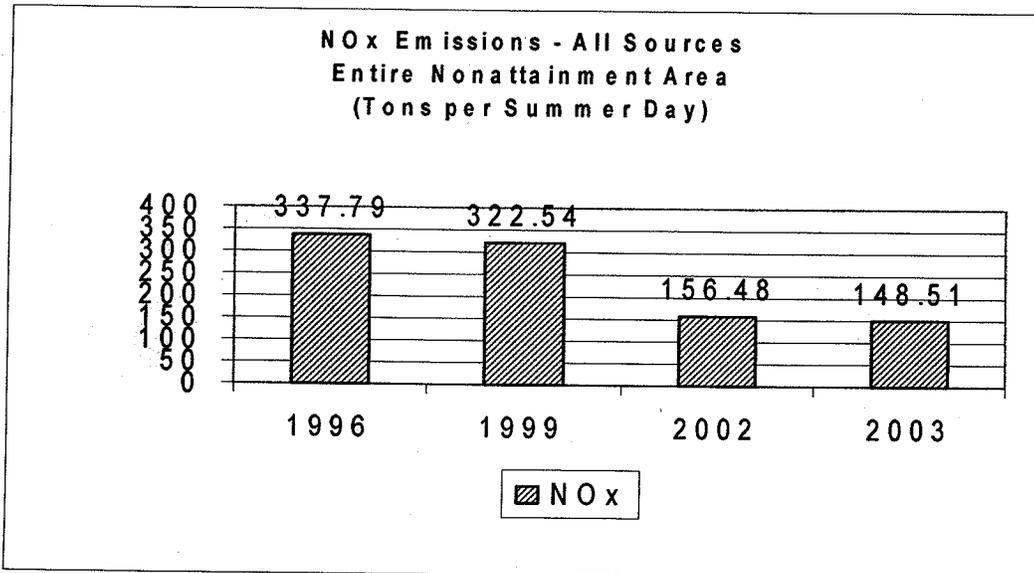
TOTAL - Clark and Floyd Counties		
Year	NOX	VOC
1996	63.59	34.86
1999	55.64	34.48
2002	57.59	32.69
2003	51.76	29.26



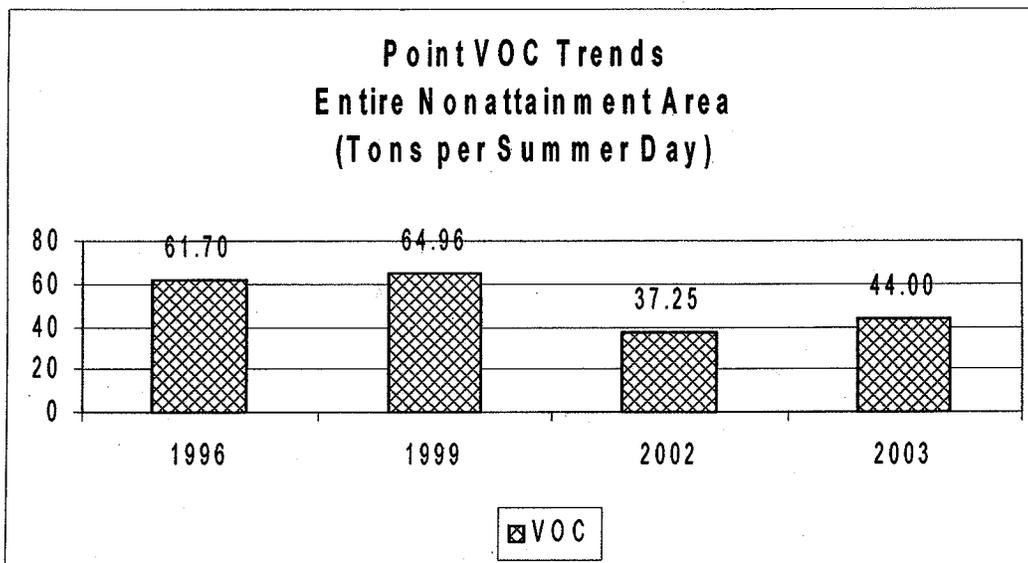
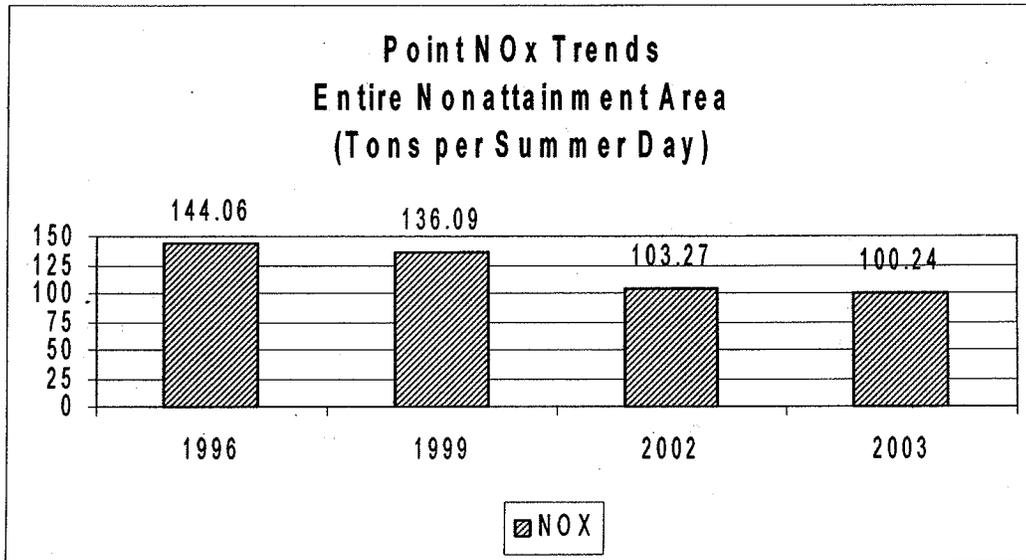
POINT - Clark and Floyd Counties		
Year	NOX	VOC
1996	34.24	4.99
1999	31.35	6.19
2002	27.40	5.85
2003	24.26	4.17



Entire Nonattainment Area		
Year	NOX	VOC
1996	337.79	251.17
1999	322.54	217.59
2002	156.48	229.20
2003	148.51	223.25

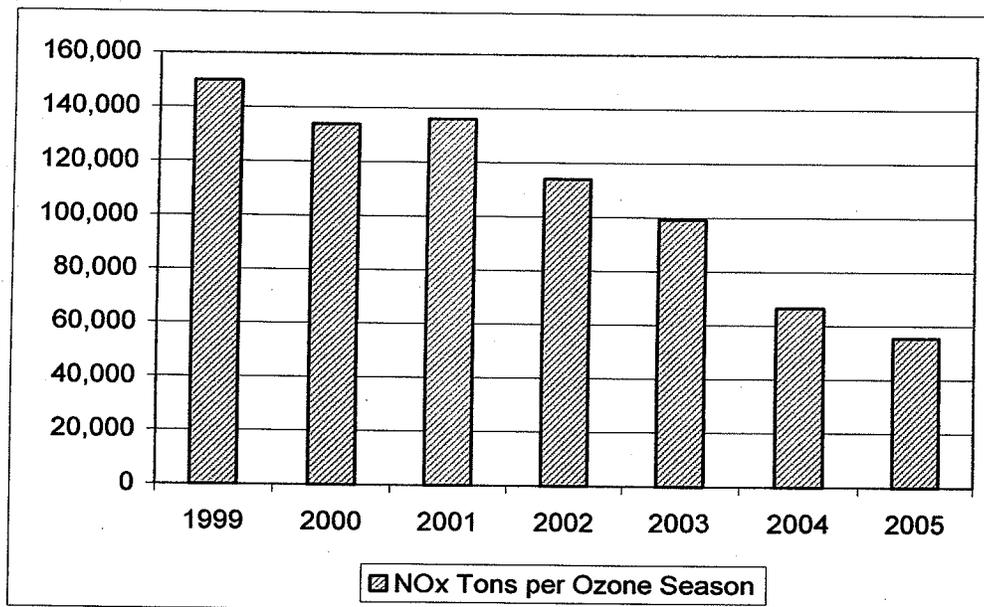


Point Trends -Entire Area		
Year	NOX	VOC
1996	144.06	61.70
1999	136.09	64.96
2002	103.27	37.25
2003	100.24	44.00



# STATEWIDE EGU NO<sub>x</sub> TRENDS

Year	NO <sub>x</sub> Tons per Ozone Season
1999	149,827
2000	133,881
2001	136,052
2002	113,996
2003	99,283
2004	66,568
2005	55,486

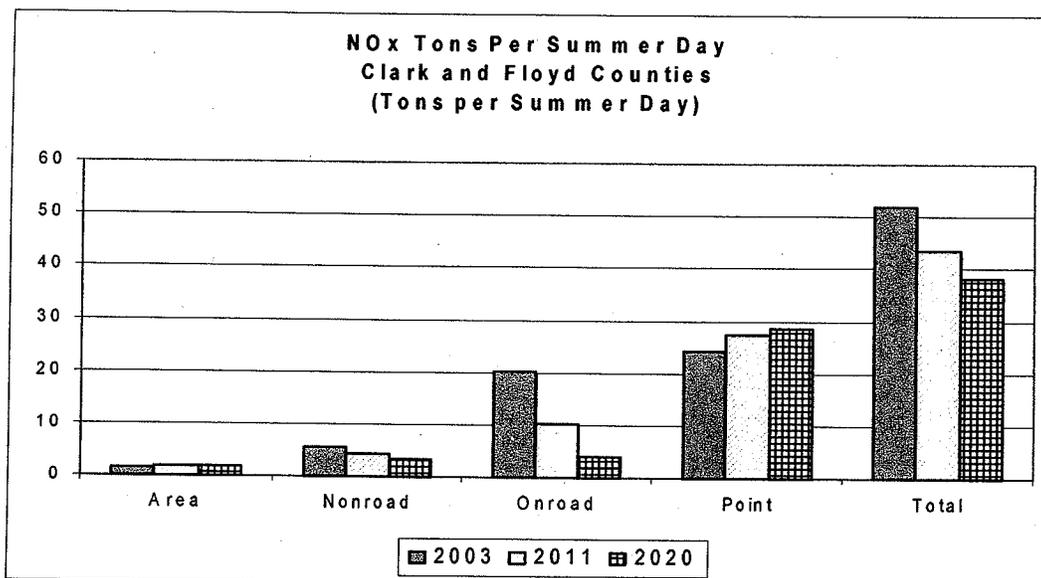




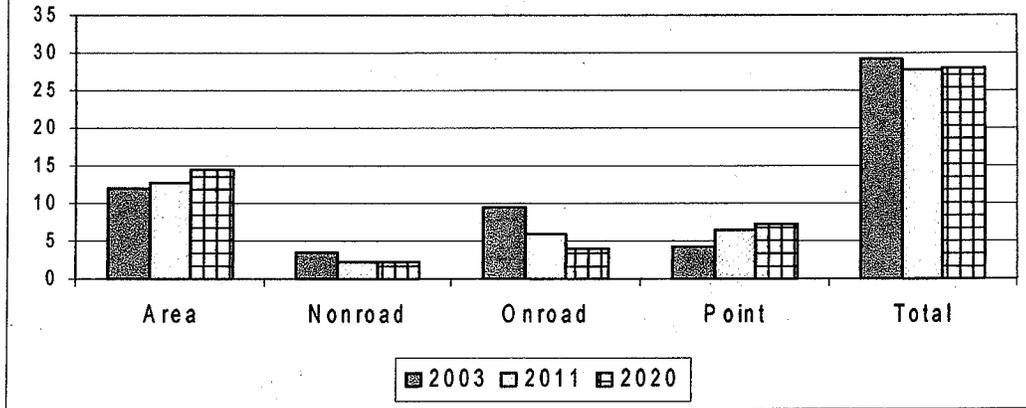
# APPENDIX C

## 2011 and 2020 Projected Emissions Inventory Clark and Floyd Counties

Sector	NOX 2003	NOX 2011	NOX 2020
Area	1.60	1.71	1.80
Non-road	5.63	4.43	3.49
On-road	20.27	10.20	4.15
Point	24.26	27.29	28.66
Total	51.77	43.63	38.10
Sector	VOC 2003	VOC 2011	VOC 2020
Area	11.94	12.77	14.59
Non-road	3.55	2.35	2.20
On-Road	9.60	6.12	3.98
Point	4.17	6.61	7.14
Total	29.26	27.85	27.91

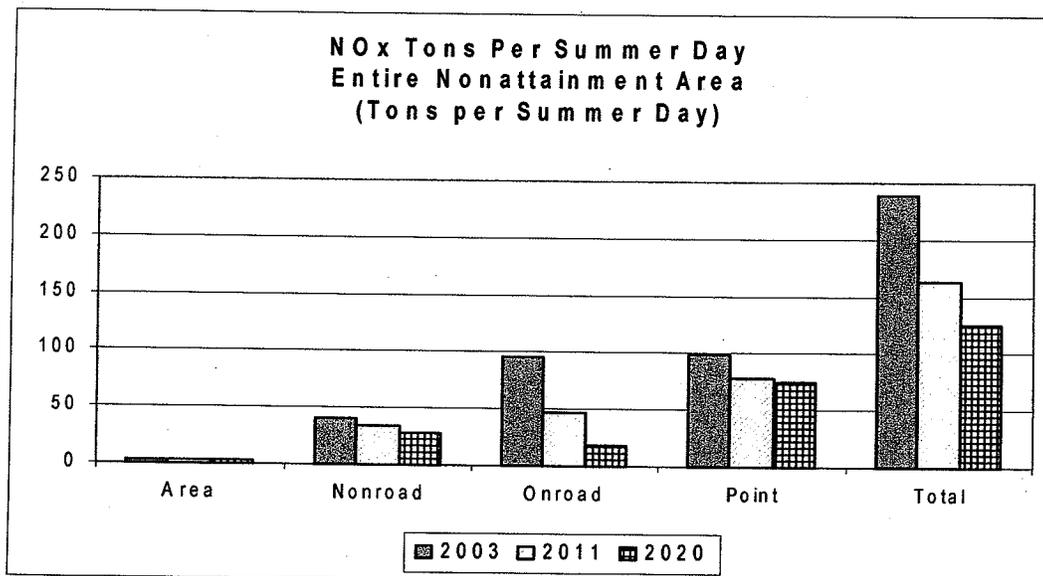


VOC Tons per Summer Day  
Clark and Floyd Counties  
(Tons per Summer Day)

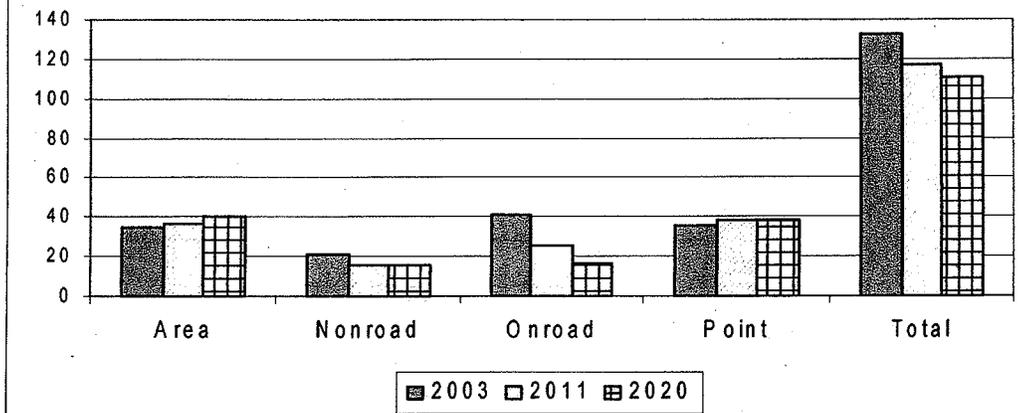


## 2011 and 2020 Projected Emissions Inventory Entire Nonattainment Area

Sector	NOX 2003	NOX 2011	NOX 2020
Area	2.54	2.66	2.80
Non-road	41.00	34.77	27.88
On -road	95.51	47.53	19.62
Point	99.71	78.93	75.95
Total	238.77	163.89	126.25
Sector	VOC 2003	VOC 2011	VOC 2020
Area	35.07	36.93	40.01
Non-road	21.17	15.87	15.26
On -road	40.97	25.69	16.89
Point	35.90	38.30	38.81
Total	133.11	116.80	110.97



VOC Tons per Summer Day  
Entire Nonattainment Area  
(Tons per Summer Day)



# APPENDIX D

## Public Participation Documentation

### Summary of and Response to Comments Received

#### Legend

- Comment
- IDEM's Response

#### **Jeff Kling, Duke Energy Indiana, Gallagher Station**

- Duke Energy Indiana strongly supports the Clark and Floyd County ozone redesignation request.
- No comment necessary.

2000

1000

1000

1000

1000

1000

1000

# **APPENDIX E**

## **Mobile Input/Output Calculation Files Clark and Floyd Counties, Indiana**

This rest of this page left intentionally blank

# Vehicle Miles Traveled (VMT)

Louisville Metro APCD

01/31/2006 GLF

KIPDAVMT\_Jan\_2006\_summer.XLS

*From new VMT data provided by KIPDA 09/22/2005 and 01/27/2006.*

*(Raw data pages adapted to new format of NETEBOUT.yyA KIPDA files)*

**Summer Daily VMT from KIPDA Travel Demand Model, adjusted to HPMS (2000 base year)**

Bullitt, KY	1999	2195902	Jefferson, KY	1999	21980490
	2002	2330708		2002	20433203
	2003	2398169		2003	20691774
	2009	2848714		2009	22345601
	2012	3079053		2012	23044370
	2020	3682127		2020	24739314
	2030	4448245		2030	27262669
Clark, IN	1999	3994580	Oldham, KY	1999	1349429
	2002	3909739		2002	1382441
	2003	3979739		2003	1417884
	2009	4548497		2009	1645793
	2012	4773077		2012	1769263
	2020	5489054		2020	2135071
	2030	6329459		2030	2569829
Floyd, IN	1999	2376049			
	2002	2604741			
	2003	2637975			
	2009	2957904			
	2012	3212334			
	2020	3529747			
	2030	4103313			

# Emission Factors 1

2003	MOBILE6	Summer	Overall	Factors	Composites for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.291	17.895	3.165		0.97	14.089	2.961
2003	MOBILE6	Summer	Overall	Factors	Composites for	Clark	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.3	16.121	2.804		0.987	12.3	2.595
2003	MOBILE6	Summer	Overall	Factors	Composites for	Floyd	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.341	16.043	2.741		1.027	12.2	2.532
2003	MOBILE6	Summer	Overall	Factors	Composites for	Jefferso	KY
MPH	VOC	CO	NOX		NONSTART: VOC	n	NOX
ALL	1.111	13.658	2.775		0.837	10.486	2.579
2003	MOBILE6	Summer	Overall	Factors	Composites for	Oldham	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.27	16.723	3.03		0.954	13.029	2.828
2005	MOBILE6	Summer	Overall	Factors	NO VET Composites	Bullitt	KY
MPH	VOC	CO	NOX		for	CO	NOX
ALL	1.048	14.079	2.612		NONSTART: VOC	11.189	2.454
2005	MOBILE6	Summer	Overall	Factors	NO VET Composites	Clark,	IN
MPH	VOC	CO	NOX		for	CO	NOX
ALL	1.045	12.211	2.294		NONSTART: VOC	9.317	2.135
2005	MOBILE6	Summer	Overall	Factors	NO VET Composites	Floyd,	IN
MPH	VOC	CO	NOX		for	CO	NOX
ALL	1.077	12.107	2.244		NONSTART: VOC	9.204	2.084
2005	MOBILE6	Summer	Overall	Factors	NO VET Composites	Jeffers	KY
MPH	VOC	CO	NOX		for	CO	NOX
ALL	0.984	12.149	2.347		NONSTART: VOC	9.504	2.189
2005	MOBILE6	Summer	Overall	Factors	NO VET Composites	Oldham,	KY
MPH	VOC	CO	NOX		for	CO	NOX
ALL	1.041	13.384	2.512		NONSTART: VOC	10.56	2.353
2008	MOBILE6	Summer	Overall	Factors	NO VET Composites	Bullitt	KY
MPH	VOC	CO	NOX		for	CO	NOX
ALL	0.835	10.644	1.884		NONSTART: VOC	8.311	1.761
2008	MOBILE6	Summer	Overall	Factors	NO VET Composites	Clark,	IN
MPH	VOC	CO	NOX		for	CO	NOX
ALL	0.887	10.139	1.725		NONSTART: VOC	7.712	1.597
2008	MOBILE6	Summer	Overall	Factors	NO VET Composites	Floyd,	IN
MPH	VOC	CO	NOX		for	CO	NOX
ALL	0.911	10.056	1.686		NONSTART: VOC	7.62	1.558
2008	MOBILE6	Summer	Overall	Factors	NO VET Composites	Jefferso	KY
					for	n	

MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.79	9.332	1.708		0.623	7.173	1.586
2008	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Oldham	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.831	10.132	1.808		0.658	7.85	1.686
2011	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.655	8.885	1.284		0.515	6.927	1.185
2011	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.696	8.454	1.19		0.55	6.448	1.087
2011	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.731	8.405	1.171		0.585	6.391	1.068
2011	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Jefferso	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.616	7.832	1.178		0.483	6.006	1.079
2011	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Oldham,	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.642	8.462	1.23		0.505	6.543	1.132
2014	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.501	7.656	0.824		0.387	5.922	0.743
2014	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.535	7.25	0.776		0.414	5.5	0.692
2014	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.561	7.217	0.767		0.44	5.46	0.683
2014	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Jefferso	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.473	6.741	0.764		0.363	5.121	0.683
2014	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Oldham,	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.492	7.288	0.794		0.379	5.588	0.713
2017	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.421	6.921	0.552		0.322	5.305	0.487
2017	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.443	6.626	0.538		0.339	5.005	0.469

2017 MPH ALL	MOBILE6 VOC 0.475	Summer CO 6.608	Overall NOX 0.531	Factors	NO VET Composites for NONSTART: VOC 0.37	Floyd, CO 4.978	IN NOX 0.463
2017 MPH ALL	MOBILE6 VOC 0.396	Summer CO 6.13	Overall NOX 0.522	Factors	NO VET Composites for NONSTART: VOC 0.301	Jefferso n CO 4.618	KY NOX 0.458
2017 MPH ALL	MOBILE6 VOC 0.411	Summer CO 6.565	Overall NOX 0.533	Factors	NO VET Composites for NONSTART: VOC 0.313	Oldham, CO 4.981	KY NOX 0.468

## Emission Factors 2

2002	MOBILE6	Summer	Overall	Factors	Composites for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.378	19.139	3.345		1.031	15.009	3.126
2002	MOBILE6	Summer	Overall	Factors	Composites for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.389	17.188	2.954		1.049	12.968	2.731
2002	MOBILE6	Summer	Overall	Factors	Composites for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.431	17.183	2.891		1.09	12.939	2.667
						Jefferso	
2002	MOBILE6	Summer	Overall	Factors	Composites for	n	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.191	14.877	2.945		0.889	11.334	2.733
2002	MOBILE6	Summer	Overall	Factors	Composites for	Oldham	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.356	18.027	3.218		1.014	13.98	3.001
					NO VET Composites		
2009	MOBILE6	Summer	Overall	Factors	for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.772	10.02	1.672		0.61	7.818	1.559
					NO VET Composites		
2009	MOBILE6	Summer	Overall	Factors	for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.823	9.548	1.538		0.653	7.263	1.419
					NO VET Composites		
2009	MOBILE6	Summer	Overall	Factors	for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.844	9.47	1.506		0.673	7.176	1.387
					NO VET Composites	Jefferso	
2009	MOBILE6	Summer	Overall	Factors	for	n	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.731	8.787	1.521		0.576	6.746	1.407
					NO VET Composites		
2009	MOBILE6	Summer	Overall	Factors	for	Oldham,	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.768	9.541	1.607		0.608	7.386	1.494
					NO VET Composites		
2012	MOBILE6	Summer	Overall	Factors	for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.595	8.383	1.095		0.466	6.526	1.001
					NO VET Composites		
2012	MOBILE6	Summer	Overall	Factors	for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.633	7.954	1.022		0.498	6.063	0.923
					NO VET Composites		
2012	MOBILE6	Summer	Overall	Factors	for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.663	7.91	1.007		0.529	6.012	0.908
					NO VET Composites	Jefferso	
2012	MOBILE6	Summer	Overall	Factors	for	n	KY

MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.559	7.389	1.008		0.436	5.655	0.915
2012	MOBILE6	Summer	Overall	Factors	NO VET Composites	Oldham,	KY
MPH	VOC	CO	NOX		for	CO	NOX
ALL	0.583	7.983	1.051		NONSTART: VOC	6.163	0.958
					0.456		
2020	MOBILE6	Summer	Overall	Factors	NO VET Composites	Bullitt	KY
MPH	VOC	CO	NOX		for	CO	NOX
ALL	0.37	6.52	0.424		NONSTART: VOC	4.99	0.37
					0.279		
2020	MOBILE6	Summer	Overall	Factors	NO VET Composites	Clark,	IN
MPH	VOC	CO	NOX		for	CO	NOX
ALL	0.389	6.227	0.419		NONSTART: VOC	4.7	0.362
					0.293		
2020	MOBILE6	Summer	Overall	Factors	NO VET Composites	Floyd,	IN
MPH	VOC	CO	NOX		for	CO	NOX
ALL	0.418	6.217	0.415		NONSTART: VOC	4.681	0.358
					0.322		
2020	MOBILE6	Summer	Overall	Factors	NO VET Composites	Jefferso	KY
MPH	VOC	CO	NOX		for	n	NOX
ALL	0.349	5.774	0.404		NONSTART: VOC	4.34	0.35
					0.262		
2020	MOBILE6	Summer	Overall	Factors	NO VET Composites	Oldham,	KY
MPH	VOC	CO	NOX		for	CO	NOX
ALL	0.362	6.183	0.411		NONSTART: VOC	4.683	0.357
					0.273		
2030	MOBILE6	Summer	Overall	Factors	NO VET Composites	Bullitt	KY
MPH	VOC	CO	NOX		for	CO	NOX
ALL	0.329	6.206	0.326		NONSTART: VOC	4.738	0.283
					0.247		
2030	MOBILE6	Summer	Overall	Factors	NO VET Composites	Clark,	IN
MPH	VOC	CO	NOX		for	CO	NOX
ALL	0.343	5.957	0.328		NONSTART: VOC	4.499	0.283
					0.259		
2030	MOBILE6	Summer	Overall	Factors	NO VET Composites	Floyd,	IN
MPH	VOC	CO	NOX		for	CO	NOX
ALL	0.382	6.039	0.329		NONSTART: VOC	4.572	0.284
					0.297		
2030	MOBILE6	Summer	Overall	Factors	NO VET Composites	Jefferso	KY
MPH	VOC	CO	NOX		for	n	NOX
ALL	0.307	5.535	0.316		NONSTART: VOC	4.156	0.273
					0.229		
2030	MOBILE6	Summer	Overall	Factors	NO VET Composites	Oldham,	KY
MPH	VOC	CO	NOX		for	CO	NOX
ALL	0.317	5.859	0.317		NONSTART: VOC	4.421	0.274
					0.237		

# KIPDA Mobile Data

## Louisville Metro APCD

County	VMT from KIPDA TDM Current Jan 2006		MOBILE6 Emission Factors From APCD suite 62SIP_D7			County Emissions					
	Year	KIPDA VMT/day	VOC g/mi	CO g/mi	NOx g/mi	VOC kg/day	CO kg/day	NOx kg/day	VOC TPSD	CO TPSD	NO TPSI
Bullitt, KY	2002	2330708	1.378	19.139	3.345	3212	44607	7796 1154	3.54	49.17	8.5
Clark, IN	2002	3909739	1.389	17.188	2.954	5431	67201	9	5.99	74.07	12.7
Floyd, IN	2002	2604741	1.431	17.183	2.891	3727	44757	7530	4.11	49.34	8.3
Jefferson, KY	2002	20433203	1.191	14.877	2.945	24336	303985	6017	26.83	335.08	66.3
Oldham, KY	2002	1382441	1.356	18.027	3.218	1875	24921	4449	2.07	27.47	4.9
5-County Area	2002	30660832	1.258	15.834	2.984	38580	485471	9150 0	<b>42.53</b>	535.13	<b>100.8</b>
1-hr NAA	2002	28588370				35739	446569	8465 5	39.40	492.25	93.3
New 8-hr "ring"	2002	2072462				2841	38902	6845	<b>3.13</b>	42.88	<b>7.5</b>
Bullitt, KY	2003	2398169	1.291	17.895	3.165	3096	42915	7590 1115	3.41	47.31	8.3
Clark, IN	2003	3979739	1.300	16.121	2.804	5174	64157	9	5.70	70.72	12.3
Floyd, IN	2003	2637975	1.341	16.043	2.741	3538	42321	7231	3.90	46.65	7.9
Jefferson, KY	2003	20691774	1.111	13.658	2.775	22989	282608	5742	25.34	311.52	63.2
Oldham, KY	2003	1417884	1.270	16.723	3.030	1801	23711	0	1.98	26.14	4.7
5-County Area	2003	31125541	1.176	14.641	2.817	36596	455713	8769 6	<b>40.34</b>	502.33	<b>96.6</b>
1-hr NAA	2003	28995360				33861	418418	8104 9	37.32	461.22	89.3
New 8-hr "ring"	2003	2130181				2735	37295	6647	<b>3.02</b>	41.11	<b>7.3</b>
Bullitt, KY	2005	2548351	1.048	14.079	2.612	2671	35878	6656	2.94	39.55	7.3
Clark, IN	2005	4169325	1.045	12.211	2.294	4357	50912	9564	4.80	56.12	10.5
Floyd, IN	2005	2744618	1.077	12.107	2.244	2956	33229	6159	3.26	36.63	6.7
Jefferson, KY	2005	21243050	0.984	12.149	2.347	20903	258082	4985	23.04	284.48	54.9
Oldham, KY	2005	1493854	1.041	13.384	2.512	1555	19994	7	1.71	22.04	4.1
5-County Area	2005	32199197				32442	398094	7599 0	<b>35.76</b>	438.82	<b>83.7</b>
1-hr NAA	2005	29941977				30081	366830	7016 8	33.16	404.35	77.3
New 8-hr	2005	2257220				2360	31264	5822	<b>2.60</b>	34.46	<b>6.4</b>

"ring"

Note: *Italicized VMT estimates above are interpolated-- others are directly from KIPDA travel demand model*

**Louisville Metro APCD**

County	VMT from KIPDA TDM Current Jan 2006		MOBILE6 Emission Factors From APCD suite 62SIP_D7			County Emissions					
	Year	KIPDA VMT/day	VOC g/mi	CO g/mi	NOx g/mi	VOC kg/day	CO kg/day	NOx kg/day	VOC TPSD	CO TPSD	NO TPSI
Bullitt, KY	2008	2773623	0.835	10.644	1.884	2316	29522	5226	2.55	32.54	5.7
Clark, IN	2008	4453704	0.887	10.139	1.725	3950	45156	7683	4.35	49.78	8.4
Floyd, IN	2008	2904583	0.911	10.056	1.686	2646	29208	4897	2.92	32.20	5.4
Jefferson, KY	2008	22069963	0.790	9.332	1.708	17435	205957	3769	19.22	227.02	41.5
Oldham, KY	2008	1607808	0.831	10.132	1.808	1336	16290	2907	1.47	17.96	3.2
5-County Area	2008	33809681				27684	326134	5840	<b>30.52</b>	359.50	<b>64.3</b>
1-hr NAA New 8-hr "ring"	2008	31361902				25643	300488	5385	28.27	331.23	59.3
	2008	2447779				2041	25646	4551	<b>2.25</b>	28.27	<b>5.0</b>
Bullitt, KY	2009	2848714	0.772	10.020	1.672	2199	28544	4763	2.42	31.46	5.2
Clark, IN	2009	4548497	0.823	9.548	1.538	3743	43429	6996	4.13	47.87	7.7
Floyd, IN	2009	2957904	0.844	9.470	1.506	2496	28011	4455	2.75	30.88	4.9
Jefferson, KY	2009	22345601	0.731	8.787	1.521	16335	196351	3398	18.01	216.44	37.4
Oldham, KY	2009	1645793	0.768	9.541	1.607	1264	15703	2645	1.39	17.31	2.9
5-County Area	2009	34346509	0.758	9.085	1.539	26038	312038	5284	<b>28.70</b>	343.96	<b>58.2</b>
1-hr NAA New 8-hr "ring"	2009	31835211				24102	287266	4870	26.57	316.65	53.6
	2009	2511298				1935	24772	4146	<b>2.13</b>	27.31	<b>4.5</b>
Bullitt, KY	2011	3002273	0.655	8.885	1.284	1966	26675	3855	2.17	29.40	4.2
Clark, IN	2011	4698217	0.696	8.454	1.190	3270	39719	5591	3.60	43.78	6.1
Floyd, IN	2011	3127524	0.731	8.405	1.171	2286	26287	3662	2.52	28.98	4.0
Jefferson, KY	2011	22811447	0.616	7.832	1.178	14052	178659	2687	15.49	196.93	29.6
Oldham, KY	2011	1728106	0.642	8.462	1.230	1109	14623	2126	1.22	16.12	2.3
5-County Area	2011	35367568				22684	285963	4210	<b>25.00</b>	315.22	<b>46.4</b>
1-hr NAA New 8-hr "ring"	2011	32724074				20964	262838	3875	23.11	289.72	42.7
	2011	2643493				1720	23125	3348	<b>1.90</b>	25.49	<b>3.6</b>

Note: *Italicized VMT estimates above are interpolated-- others are directly from KIPDA travel demand model*

**Louisville Metro APCD**

County	VMT from KIPDA TDM Current Jan 2006		MOBILE6 Emission Factors From APCD suite 62SIP_D7			County Emissions					
	Year	KIPDA VMT/day	VOC g/mi	CO g/mi	NOx g/mi	VOC kg/day	CO kg/day	NOx kg/day	VOC TPSD	CO TPSD	NO TPSI
Bullitt, KY	2012	3079053	0.595	8.383	1.095	1832	25812	3372	2.02	28.45	3.7
Clark, IN	2012	4773077	0.633	7.954	1.022	3021	37965	4878	3.33	41.85	5.3
Floyd, IN	2012	3212334	0.663	7.910	1.007	2130	25410	3235	2.35	28.01	3.5
Jefferson, KY	2012	23044370	0.559	7.389	1.008	12882	170275	9	14.20	187.69	25.6
Oldham, KY	2012	1769263	0.583	7.983	1.051	1031	14124	1859	1.14	15.57	2.0
5-County Area	2012	35878097	0.582	7.625	1.019	20896	273585	3657	<b>23.03</b>	301.57	<b>40.3</b>
1-hr NAA	2012	33168506				19295	251222	3	21.27	276.92	37.0
New 8-hr "ring"	2012	2709591				1602	22363	3364	<b>1.77</b>	24.65	<b>3.2</b>
Bullitt, KY	2014	3229822	0.501	7.656	0.824	1618	24728	2661	1.78	27.26	2.9
Clark, IN	2014	4952071	0.535	7.250	0.776	2649	35903	3843	2.92	39.58	4.2
Floyd, IN	2014	3291687	0.561	7.217	0.767	1847	23756	2525	2.04	26.19	2.7
Jefferson, KY	2014	23468106	0.473	6.741	0.764	11100	158199	1793	12.24	174.38	19.7
Oldham, KY	2014	1860715	0.492	7.288	0.794	915	13561	0	1.01	14.95	1.6
5-County Area	2014	36802401				18130	256146	2843	<b>19.98</b>	282.35	<b>31.3</b>
1-hr NAA	2014	33957743				16713	234706	6	18.42	258.72	28.7
New 8-hr "ring"	2014	2844658				1417	21439	2612	<b>1.56</b>	23.63	<b>2.5</b>
Bullitt, KY	2017	3455974	0.421	6.921	0.552	1455	23919	1908	1.60	26.37	2.1
Clark, IN	2017	5220563	0.443	6.626	0.538	2313	34591	2809	2.55	38.13	3.1
Floyd, IN	2017	3410717	0.475	6.608	0.531	1620	22538	1811	1.79	24.84	2.0
Jefferson, KY	2017	24103710	0.396	6.130	0.522	9545	147756	1258	10.52	162.87	13.8
Oldham, KY	2017	1997893	0.411	6.565	0.533	821	13116	2	0.91	14.46	1.1
5-County Area	2017	38188857				15754	241920	2017	<b>17.37</b>	266.67	<b>22.2</b>
1-hr NAA	2017	35141597				14481	221183	4	15.96	243.81	20.4
								1851			
								1			

New 8-hr "ring"	2017	3047260				1273	20737	1663	<b>1.40</b>	22.86	<b>1.8</b>
--------------------	------	---------	--	--	--	------	-------	------	-------------	-------	------------

Note: *Italicized VMT estimates above are interpolated-- others are directly from KIPDA travel demand model*

### Louisville Metro APCD

County	VMT from KIPDA TDM Current Jan 2006		MOBILE6 Emission Factors From APCD suite 62SIP_D7			County Emissions					
	Year	KIPDA VMT/day	VOC g/mi	CO g/mi	NOx g/mi	VOC kg/day	CO kg/day	NOx kg/day	VOC TPSD	CO TPSD	NO TPSI
Bullitt, KY	2020	3682127	0.370	6.520	0.424	1362	24007	1561	1.50	26.46	1.7
Clark, IN	2020	5489054	0.389	6.227	0.419	2135	34180	2300	2.35	37.68	2.5
Floyd, IN	2020	3529747	0.418	6.217	0.415	1475	21944	1465	1.63	24.19	1.6
Jefferson, KY	2020	24739314	0.349	5.774	0.404	8634	142845	9995	9.52	157.46	11.0
Oldham, KY	2020	2135071	0.362	6.183	0.411	773	13201	878	0.85	14.55	0.9
5-County Area	2020	39575313	0.363	5.968	0.409	14380	236178	1619	<b>15.85</b>	260.34	<b>17.8</b>
1-hr NAA	2020	36325452				13186	215346	1483	14.53	237.37	16.3
New 8-hr "ring"	2020	3249861				1194	20832	1364	<b>1.32</b>	22.96	<b>1.5</b>
Bullitt, KY	2030	4448245	0.329	6.206	0.326	1463	27606	1450	1.61	30.43	1.6
Clark, IN	2030	6329459	0.343	5.957	0.328	2171	37705	2076	2.39	41.56	2.2
Floyd, IN	2030	4103313	0.382	6.039	0.329	1567	24780	1350	1.73	27.31	1.4
Jefferson, KY	2030	27262669	0.307	5.535	0.316	8370	150899	8615	9.23	166.33	9.5
Oldham, KY	2030	2569829	0.317	5.859	0.317	815	15057	815	0.90	16.60	0.9
5-County Area	2030	44713515	0.322	5.726	0.320	14386	256046	1430	<b>15.86</b>	282.24	<b>15.7</b>
1-hr NAA	2030	40792174				13111	232152	1303	14.45	255.90	14.3
New 8-hr "ring"	2030	3921341				1275	23894	1267	<b>1.41</b>	26.34	<b>1.4</b>

Note: *Italicized VMT estimates above are interpolated-- others are directly from KIPDA travel demand model*

# Jefferson County

02/27/2006  
GLF/DSF

Louisville Metro APCD

## Summary of Projected Summer Emission Inventories for Jefferson County, KY

### Tons per Summer Day Emissions

<b>VOC</b>	<b>2003</b>	<b>2005</b>	<b>2008</b>	<b>2011</b>	<b>2014</b>	<b>2017</b>	<b>2020</b>
Onroad Mobile	25.34	23.04	19.22	15.49	12.24	10.52	9.52
Nonroad Mobile	14.31	13.14	11.50	10.62	10.41	10.45	10.64
Point Sources	23.63	23.42	23.33	23.11	22.93	22.74	22.51
Nonpoint Sources	17.33	17.41	17.51	17.59	17.67	17.76	17.85
Total All Sources	80.61	77.01	71.56	66.81	63.25	61.47	60.51
<b>NOx</b>	<b>2003</b>	<b>2005</b>	<b>2008</b>	<b>2011</b>	<b>2014</b>	<b>2017</b>	<b>2020</b>
Onroad Mobile	63.29	54.96	41.55	29.62	19.76	13.87	11.02
Nonroad Mobile	31.94	31.11	29.36	27.37	25.26	23.44	22.17
Point Sources	74.78	53.95	53.63	50.91	51.76	51.24	46.49
Nonpoint Sources	0.75	0.76	0.76	0.76	0.76	0.76	0.76
Total All Sources	170.76	140.77	125.30	108.66	97.54	89.31	80.45

# Kentucky Department for Air Quality Data

## LOUISVILLE REDESIGNATION REQUEST EMISSIONS AND PROJECTION SUMMARY: 2002, 2003, 2005, 2008, 2011, 2014, 2017, AND 2020 Bullitt and Oldham Counties

Note: All emissions reflect any applicable Federal or State controls.

	POINT SOURCE EMISSIONS (in tons per day)																
	2002 Baseyear		2003 Attainment		2005 Projected		2008 Projected		2011 Projected		2014 Projected		2017 Projected		2020 Projected		
	VOC	CO	NOx	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
Bullitt	7.78	0.17	0.56	8.10	0.60	8.21	0.21	0.64	8.58	0.21	0.65	8.77	0.23	0.68	8.95	0.24	0.71
Oldham	0.55	0.01	0.01	0.00	0.05	0.07	0.05	0.07	0.00	0.05	0.08	0.00	0.06	0.08	0.00	0.06	0.08
VOC	8.33	0.18	0.57	8.10	0.26	8.28	0.26	0.71	8.58	0.26	0.73	8.77	0.29	0.76	8.95	0.30	0.79
CO																	
NOx																	

	AREA SOURCE EMISSIONS (in tons per day)																
	2002 Baseyear		2003 Attainment		2005 Projected		2008 Projected		2011 Projected		2014 Projected		2017 Projected		2020 Projected		
	VOC	CO	NOx	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
Bullitt	3.31	1.31	0.11	3.34	1.36	3.43	1.41	0.11	3.60	1.48	0.12	3.92	1.59	0.13	4.08	1.66	0.13
Oldham	2.40	0.89	0.07	2.46	0.90	2.55	0.94	0.07	2.70	0.97	0.07	2.82	1.01	0.07	3.01	1.10	0.09
VOC	5.71	2.20	0.18	5.80	2.26	5.98	2.35	0.18	6.30	2.45	0.19	6.73	2.64	0.22	7.25	2.76	0.22
CO																	
NOx																	

	HIGHWAY MOBILE SOURCE EMISSIONS (in tons per day)																
	2002 Baseyear		2003 Attainment		2005 Projected		2008 Projected		2011 Projected		2014 Projected		2017 Projected		2020 Projected		
	VOC	CO	NOx	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
Bullitt	3.69	45.82	7.48	3.74	45.84	7.52	33.54	5.99	3.75	1.53	0.13	3.92	1.59	0.13	4.08	1.66	0.13
Oldham	2.22	26.66	4.36	2.29	26.93	4.43	24.58	4.36	1.79	0.23	0.28	1.45	19.23	2.34	1.40	18.70	1.99
VOC	5.91	72.50	11.84	6.03	72.57	11.95	53.77	9.57	4.08	49.13	7.71	3.75	48.03	6.18	3.68	48.88	5.13
CO																	
NOx																	

	NON-HIGHWAY SOURCE EMISSIONS (in tons per day)																
	2002 Baseyear		2003 Attainment		2005 Projected		2008 Projected		2011 Projected		2014 Projected		2017 Projected		2020 Projected		
	VOC	CO	NOx	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
Bullitt	1.68	11.67	1.81	1.77	12.06	1.81	12.81	1.78	1.81	13.63	1.70	1.82	14.25	1.60	1.48	14.98	1.35
Oldham	1.58	16.56	1.63	1.54	16.92	1.63	17.46	1.59	1.18	18.10	1.49	1.08	18.74	1.37	1.05	19.38	1.22
VOC	3.26	28.23	3.44	3.31	28.98	3.44	30.27	3.37	2.90	32.99	2.97	2.73	34.01	2.97	2.53	35.07	2.42
CO																	
NOx																	

## TOTAL EMISSIONS (in tons per day)

	2002 Baseyear		2003 Attainment		2005 Projected		2008 Projected		2011 Projected		2014 Projected		2017 Projected		2020 Projected		
	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx		
Bullitt	18.46	58.97	9.95	16.95	59.26	10.04	16.77	48.86	8.45	16.67	46.25	6.12	16.70	47.04	5.39	16.82	48.52
Oldham	6.75	44.14	6.07	6.29	44.80	6.20	6.09	43.03	5.09	5.67	39.35	5.21	5.46	38.27	4.40	36.72	3.73
VOC	23.21	103.11	16.03	23.24	104.06	16.24	23.07	91.89	13.54	22.33	85.60	11.33	22.16	85.31	9.79	22.55	52.24
CO																	
NOx																	

Note: Biogenic emission totals not included in this summary.

# IDEM Mobile Calculations

## On-road mobile emissions

VOC emissions (tons/summer day)			
	2003	2011	2020
Clark, IN	5.70	3.60	2.35
Floyd, IN	3.90	2.52	1.63
Jefferson, KY	25.34	15.49	9.52
Bullitt, KY	3.74	2.52	2.05
Oldham, KY	2.29	1.56	1.34
<b>Total</b>	<b>40.97</b>	<b>25.69</b>	<b>16.89</b>
IN subtotal	9.60	6.12	3.98
Ky subtotal	31.37	19.57	12.91
NOx emissions (tons/summer day)			
	2003	2011	2020
Clark, IN	12.30	6.16	2.54
Floyd, IN	7.97	4.04	1.61
Jefferson, KY	63.29	29.62	11.02
Bullitt, KY	7.52	4.83	2.73
Oldham, KY	4.43	2.88	1.72
<b>Total</b>	<b>95.51</b>	<b>47.53</b>	<b>19.62</b>
IN subtotal	20.27	10.20	4.15
Ky subtotal	75.24	37.33	15.47

Bullitt and Oldham emissions provided by KDAQ  
 Clark, Floyd and Jefferson emissions provided by KIPDA

- (1) "Normal" using APCD/KIPDA and KYDAQ/KYTC procedure
- (2) "Normal" using only APCD/KIPDA procedures
- (3) "NoBuild" -- Approach 1 using modified APCD/KIPDA procedures
- (4) "NoBuild" -- Approach 2 using modified APCD/KIPDA procedures

Louisville Area	2003	2011	2020
VOC (tons/day)	40.97	25.69	16.89
NOx (tons/day)	95.51	47.53	19.62
Clark&Floyd subtotal			
VOC (tons/day)	9.60	6.12	3.98
NOx (tons/day)	20.27	10.20	4.15
Clark&Floyd subtotal %			
VOC (tons/day)	23.4%	23.8%	23.6%
NOx (tons/day)	21.2%	21.5%	21.2%

# Clark/Floyd County and Entire Nonattainment Area Working Emissions

2003			
COUNTY_NAM	Category	NOx	VOC
Clark County	Area	0.87	6.98
	Nonroad	3.46	2.07
	Onroad	12.30	5.70
	Point	7.01	5.53
Floyd County	Area	0.73	4.96
	Nonroad	2.17	1.48
	Onroad	7.97	3.90
	Point*	17.13	0.85
<b>TOTAL</b>		<b>51.64</b>	<b>31.47</b>

POINT totals include EGUs

No EGUs in Clark County; only Floyd County

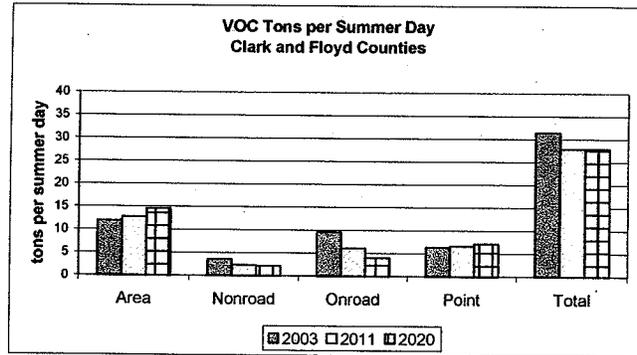
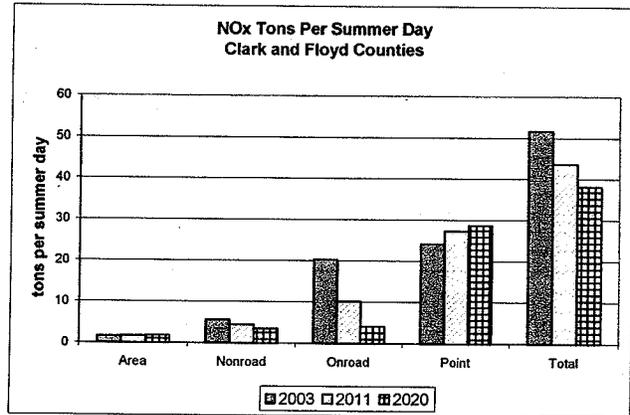
TOTALS-Clark and Floyd Only			
Sector	NOX2003	NOX2011	NOX2020
Area	1.60	1.71	1.80
Nonroad	5.63	4.43	3.49
Onroad	20.27	10.20	4.15
Point	24.14	27.29	28.66
<b>Total</b>	<b>51.64</b>	<b>43.63</b>	<b>38.10</b>
Sector	VOC 2003	VOC 2011	VOC 2020
Area	11.94	12.77	14.59
Nonroad	3.55	2.35	2.20
Onroad	9.60	6.12	3.98
Point	6.38	6.61	7.14
<b>Total</b>	<b>31.47</b>	<b>27.85</b>	<b>27.91</b>

2011			
COUNTY_NAM	Category	NOx	VOC
Clark County	Area	0.93	7.38
	Nonroad	2.83	1.47
	Onroad	6.16	3.60
	Point	7.25	5.64
Floyd County	Area	0.78	5.39
	Nonroad	1.60	0.88
	Onroad	4.04	2.52
	Point*	20.04	0.97
<b>TOTAL</b>		<b>43.63</b>	<b>27.85</b>

2020			
COUNTY_NAM	Category	NOx	VOC
Clark County	Area	0.98	8.53
	Nonroad	2.33	1.30
	Onroad	2.54	2.35
	Point	8.62	5.92
Floyd County	Area	0.82	6.06
	Nonroad	1.16	0.90
	Onroad	1.61	1.63
	Point*	20.04	1.22
<b>TOTAL</b>		<b>38.10</b>	<b>27.91</b>

Rate of Change	Clark and Floyd			
Table 4.1	2003	2020	Change	%change
NOX	51.64	38.10	-13.5	-26.2
VOC	31.47	27.91	-3.6	-11.3

Rate of Change	Entire Nonattainment Area			
Table 4.1	2003	2020	Change	%change
NOX	238.65	126.25	-112.4	-47.1
VOC	135.32	110.97	-24.4	-18.0



ENTIRE NONATTAINMENT AREA  
KY Data

WORKSHEET for Entire Nonattainment Area - INand KY

2003 VOC Entire Nonattainment Area				
VOC	Area	NR	On Road	Point
Clark	6.98	2.07	5.70	5.53
Floyd	4.96	1.48	3.90	0.85
Jefferson, KY	17.33	14.31	25.34	23.63
Bullitt, KY	3.34	1.77	3.74	8.10
Oldham, KY	2.46	1.54	2.29	0.00
TOTAL	35.07	21.17	40.97	38.11

2003 NOX				
	Area	NR	On Road	Point
Clark	0.87	3.46	12.30	7.01
Floyd	0.73	2.17	7.97	17.13
Jefferson, KY	0.75	31.94	63.29	74.78
Bullitt, KY	0.11	1.81	7.52	0.60
Oldham, KY	0.07	1.63	4.43	0.07
TOTAL	2.54	41.00	95.51	99.59

2011 VOC Entire Nonattainment Area				
VOC	Area	NR	On Road	Point
Clark	7.38	1.47	3.60	5.64
Floyd	5.39	0.88	2.52	0.97
Jefferson, KY	17.59	10.62	15.49	23.11
Bullitt, KY	3.75	1.82	2.52	8.58
Oldham, KY	2.82	1.08	1.56	0.00
TOTAL	36.93	15.87	25.69	38.30

2011 Nox				
	Area	NR	On Road	Point
Clark	0.93	2.83	6.16	7.25
Floyd	0.78	1.60	4.04	20.04
Jefferson, KY	0.76	27.37	29.62	50.91
Bullitt, KY	0.12	1.60	4.83	0.65
Oldham, KY	0.07	1.37	2.88	0.08
TOTAL	2.66	34.77	47.53	78.93

2020 VOC Entire Nonattainment Area				
VOC	Area	NR	On Road	Point
Clark	8.53	1.30	2.35	5.92
Floyd	6.06	0.90	1.63	1.22
Jefferson, KY	17.85	10.64	9.52	22.51
Bullitt, KY	4.26	1.35	2.05	9.16
Oldham, KY	3.32	1.07	1.34	0.00
TOTAL	40.01	15.26	16.89	38.81

2020 Nox				
	Area	NR	On Road	Point
Clark	0.98	2.33	2.54	8.62
Floyd	0.82	1.16	1.61	20.04
Jefferson, KY	0.76	22.17	11.02	46.49
Bullitt, KY	0.14	1.27	2.73	0.72
Oldham, KY	0.09	0.95	1.72	0.08
TOTAL	2.80	27.88	19.62	75.95

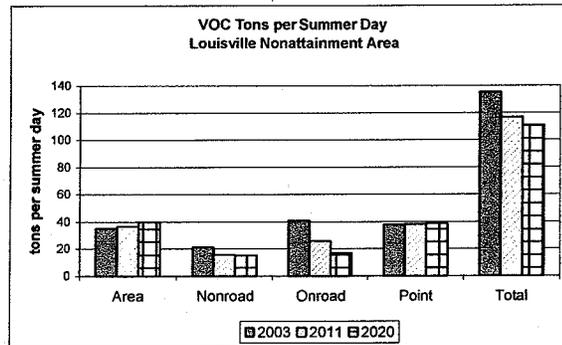
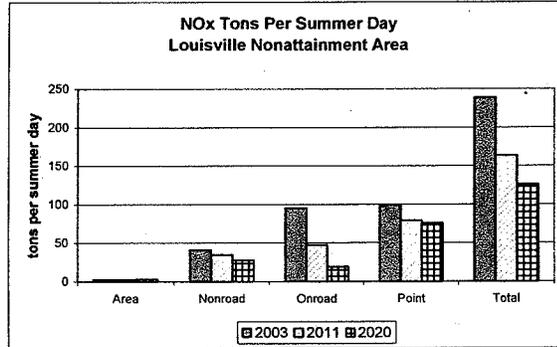
SOURCE DATA

Entire Nonattainment Area

Sector	NOX 2003	NOX 2011	NOX 2020
Area	2.54	2.66	2.80
Non-road	41.00	34.77	27.88
On road	95.51	47.53	19.62
Point	99.59	78.93	75.95
Total	238.65	163.89	126.25

Sector	VOC 2003	VOC 2011	VOC 2020
Area	35.07	36.93	40.01
Non-road	21.17	15.87	15.26
On road	40.97	25.69	16.89
Point	38.11	38.30	38.81
Total	135.32	116.80	110.97



# KIPDA Budget Summary

Regional (5-County) Emission Estimates							
(See Notes and Conclusions Below)							
				VOCs	VOCs	NOx	NOx
				(kg/day)	(tons/day)	(kg/day)	(tons/day)
<b>2003 Emission Estimates</b>							
	(1) "Normal" using APCD/KIPDA and KYDAQ/KYTC procedures			37170	40.97	86651	95.51
	(2) "Normal" using only APCD/KIPDA procedures			36596	40.34	87696	96.67
<b>2030 Emission Estimates</b>							
	(1) "Normal" using APCD/KIPDA and KYDAQ/KYTC procedures			15298	16.86	15422	17.00
	(2) "Normal" using only APCD/KIPDA procedures			14386	15.86	14306	15.77
	(3) "NoBuild" -- Approach 1 using modified APCD/KIPDA procedures			14683	16.18	14395	15.87
	(4) "NoBuild" -- Approach 2 using modified APCD/KIPDA procedures			14971	16.50	14707	16.21
<b>2035 Emission Estimates</b>							
	(1) Non-Model Approach -- Estimated by KIPDA based on conformity data from 2005 Transportation Plan Update			18904	20.84	24296	26.78

Notes: (a) "Normal" means using the ordinary methodology for the procedure listed.

APCD/KIPDA means using the KIPDA travel model for VMT and speeds and the APCD (speed bin, county of origin) approach for emission factors. This procedure is always used for Clark (IN), Floyd (IN), and Jefferson (KY) counties. This procedure is used for Bullitt and Oldham counties when only APCD/KIPDA procedures were used and for the "NoBuild" approaches.

KYDAQ/KYTC means using KYTC estimates for VMT and speeds and the KYDAQ approach for emission factors. This procedure is used for Bullitt and Oldham counties when both APCD/KIPDA and KYDAQ/KYTC procedures were used and for the data used for the Non-Model Approach (2035).

(b) "No-Build" means using the "Normal" APCD/KIPDA procedure except the 2003 highway network and 2003 transit trip table (approach 1 only) are used.

(c) Non-Model Approach means using regression with data for 2002, 2009, 2012, 2020, and 2030 from the data developed during the conformity analysis for the 2005 Transportation Plan Update. That data was developed using the "Normal" approach with both APCD/KIPDA procedures and KYDAQ/KYTC procedures.

# Mobile Budget Summary

## 2020 Budget

	KIPDA/DAQ		KIPDA Only		Growth From	2035 KIPDA
	2020 Build	2030 Build	2030 Build	2030 No-Build	No-Build	
VOC	16.89	16.86	15.86	16.50	4.1%	20.84
NOx	19.62	17.00	15.77	16.21	2.8%	26.78
% Change from 2020 Build		-0.14%				23.39%
		-13.34%				36.52%

DAQ + 2035 KIPDA Plus 10%	Safety Margin	% of Gap Used	% Over 2020 Build
22.92	6.03	24.8%	35.7%
29.46	9.84	8.8%	50.2%

# Clean Air Act Section 110(l) Demonstration

## To Support

### Discontinuation of the Vehicle Inspection and Maintenance Program in Clark and Floyd counties, Indiana

#### Overview

The Indiana Department of Environmental Management (IDEM) has prepared a revision to the Redesignation Petition and Maintenance Plan for Clark and Floyd counties in conjunction with the 8-hour ozone standard. This revision is to accommodate the discontinuation of the vehicle inspection and maintenance program for Clark and Floyd counties. Section 110(l) of the Clean Air Act states that the Administrator (of the United States Environmental Protection Agency) shall not approve a revision of a plan (State Implementation Plan or SIP) if the revision would interfere with any applicable requirement concerning attainment or reasonable further progress (of a National Ambient Air Quality Standard). Therefore, IDEM has also prepared a demonstration that shows that the discontinuation of the vehicle emissions testing program will not interfere with the applicable requirements of the National Ambient Air Quality Standards for 8-hour ozone and fine particles.

#### Background

IDEM recently submitted an 8-Hour Ozone Redesignation Petition and Maintenance Plan for Clark and Floyd counties (dated July 2006) to the U.S. EPA requesting that these counties be redesignated to attainment of the standard. Clark and Floyd counties, along with the remaining portion of the Louisville nonattainment area, have attained the NAAQS standard for ozone. Indiana has performed an analysis that shows the air quality improvements are due to permanent and enforceable measures and that significant regional NO<sub>x</sub> reductions following implementation of Phase II of the NO<sub>x</sub> SIP Call and the Clean Air Interstate Rule will ensure continued compliance (maintenance) with the standard.

Indiana's petition includes a long-term maintenance plan that will be implemented to ensure that the area continues to meet the 8-hour standard for ground-level ozone through the year 2020. Indiana also committed to maintain all emission control measures necessary to ensure continued compliance with the standard following redesignation. The vehicle inspection and maintenance program was one of those emission control measures.

The vehicle inspection and maintenance program was first initiated in 1984 in accordance with the Clean Air Act (CAA). This program was augmented in 1997 to a fully enhanced vehicle inspection and maintenance program and was incorporated within Indiana's 1-hour ozone State Implementation Plan in 1996. Although the U.S. EPA revoked the 1-hour ozone standard on June 15, 2005, Clark and Floyd counties were designated nonattainment for the eight-hour ozone standard effective June 15, 2004. Therefore, the program is required to be in place until all applicable Clean Air Act requirements are met. The vehicle inspection and maintenance program is authorized by state statute, IC 13-17-5, paid for by the general fund,

and implemented through rules promulgated by the Air Pollution Control Board at 326 IAC 13-1.1. This program tests approximately 7% of the registered automobiles in the Greater Louisville Basic Ozone Nonattainment Area and costs the State of Indiana approximately one million dollars per year to operate and maintain. The program yields less than a 1% reduction in total NOx and VOC emissions for the nonattainment area.

On July 1, 2003, an amendment to IC 13-17-5 became effective that terminates Indiana's vehicle inspection and maintenance rule for Clark and Floyd counties after December 31, 2006, and directs the Air Pollution Control Board to amend 326 IAC 13-1.1 to reflect this change. IDEM is in the process of amending the state rule to accommodate the discontinuation of the vehicle inspection and maintenance program in Clark and Floyd counties. IDEM has also revised the 8-Hour Redesignation Petition and Maintenance Plan for Clark and Floyd counties in order to move the vehicle inspection and maintenance program from Section 6.2 where it was listed as a measure to remain in place over the course of the maintenance plan, to Section 8.0 where it is listed as a contingency measure. IDEM has also revised Section 6.0 to clarify that Indiana in the mid-1990s promulgated rules specific to Clark and Floyd counties that require RACT for new/existing emission sources of VOCs locating in these counties.