



# INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

*We Protect Hoosiers and Our Environment.*

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Ms. Cheryl Newton, Director  
Air and Radiation Division  
U.S. Environmental Protection Agency  
Region V  
77 West Jackson Boulevard  
Chicago, IL 60604-3950

November 19, 2010

Re: Technical Addendum to the Clean Air Act  
Section 110(I) Demonstration and State  
Implementation Plan Revisions for Clark and  
Floyd Counties, Indiana

Dear Ms. Newton:

The Indiana Department of Environmental Management (IDEM) has prepared this technical addendum to the Clean Air Act 110(I) Demonstration and State Implementation Plan revisions for Clark and Floyd counties, Indiana, to provide additional information to support the discontinuation of the vehicle inspection and maintenance (I/M) program for Clark and Floyd counties. IDEM submitted the non-interference demonstration to the United States Environmental Protection Agency (U.S. EPA) on October 10, 2006, to show that the discontinuation of the vehicle I/M program in these counties would not interfere with the area's ability to attain and maintain compliance with the 8-hour National Ambient Air Quality Standards (NAAQS) for ground-level ozone or reasonable progress towards attainment of the annual fine particles NAAQS.

Enclosed for your review, please find supplemental information prepared by IDEM staff that includes photochemical modeling that shows the area has attained and will continue to maintain compliance with the 1997 annual fine particles, 2006 24-hour fine particles, and 2008 8-hour ozone NAAQS without the vehicle I/M program being in place in Clark and Floyd counties, Indiana. Furthermore, photochemical modeling also indicates that emissions will continue to decline in the future, ensuring the area will continue to maintain compliance with the NAAQS with an increasing margin of safety.

Please also find quality assured ambient air quality monitoring data that demonstrates Clark and Floyd counties, Indiana, as well as the nonattainment area in its entirety, has attained the above mentioned NAAQS.

Ms. Cheryl Newton  
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This area has attained the standards without the I/M program being in place and future year emissions used in the photochemical modeling excludes I/M. Therefore, IDEM believes that this supplemental information, in conjunction with the Clean Air Act 110(l) Demonstration, provides the necessary weight of evidence to demonstrate that the discontinuation of the vehicle emissions testing in Clark and Floyd counties, Indiana, will not interfere with the area's ability to maintain compliance with the following NAAQS:

- 1997 Annual Fine Particles Standard
- 2006 24-Hour Fine Particles Standard
- 2008 8-Hour Ozone Standard

Therefore, IDEM respectfully requests that U.S. EPA proceed with final review and approval of the Clean Air Act Section 110(l) Demonstration for Clark and Floyd counties. If you have any questions or need additional information, please contact Scott Deloney, Chief, Air Programs Branch, at (317) 233-5694 or [sdeloney@idem.in.gov](mailto:sdeloney@idem.in.gov).

Sincerely,



Keith Baugues  
Assistant Commissioner  
Office of Air Quality

KB/sad/ghf  
Attachments

cc: John Summerhays, U.S. EPA  
Frank Acevedo, U.S. EPA  
Steve Rosenthal, U.S. EPA  
John Mooney, U.S. EPA  
Scott Deloney, IDEM  
Chris Pedersen, IDEM  
Gale Ferris, IDEM  
Mark Derf, IDEM  
Ken Ritter, IDEM

# Attachment 1

## Section 110(l) Technical Support Document

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

IDEM's Office of Air Quality has reviewed photochemical modeling to determine whether the discontinuation of the vehicle inspection and maintenance program in Clark and Floyd counties, Indiana would adversely affect the area's ability to attain or maintain compliance with applicable National Ambient Air Quality Standards (NAAQS). The discontinuation of the vehicle inspection and maintenance program does result in an increase of nitrogen oxide (NO<sub>x</sub>) and volatile organic compound (VOC) emissions, and thus could affect ozone and fine particle concentrations.

### **Photochemical Modeling Demonstrations for 8-Hour Ozone NAAQS**

#### **U.S. EPA's Transport Rule Modeling**

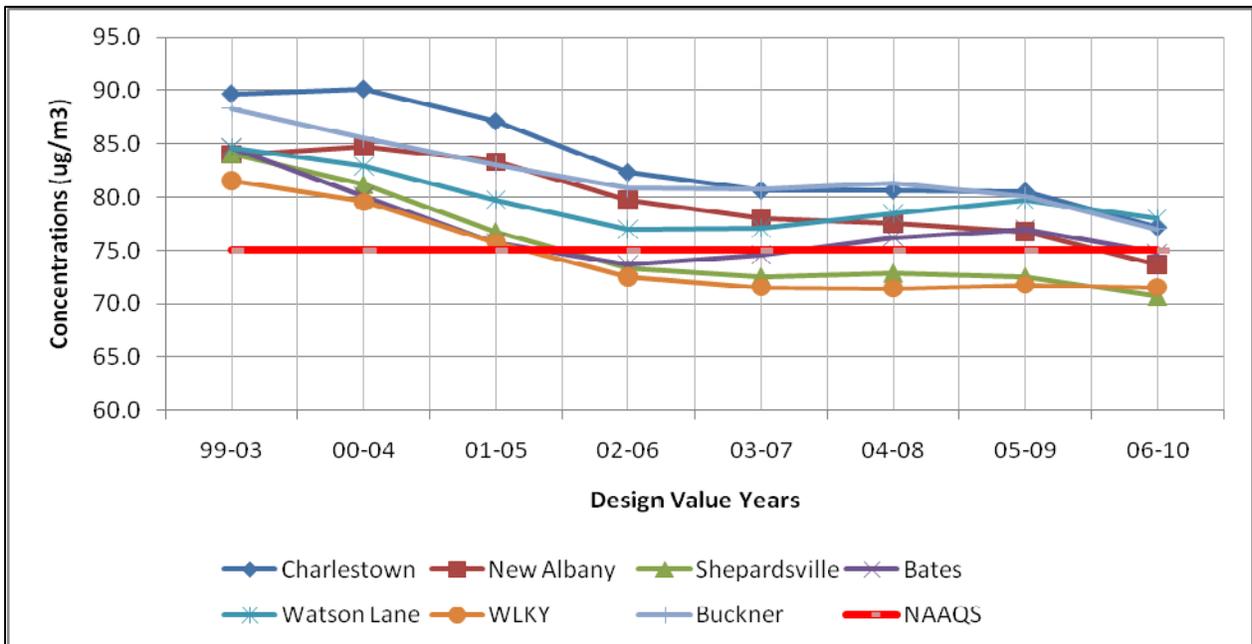
U.S. EPA performed modeling to support the emission reductions associated with the Transport Rule. U.S. EPA used the Comprehensive Air Quality Model with Extension (CAMx, Version 5), applied to the 2005 meteorology, as processed by the Mesoscale Model (MM5), Version 3.7.4. Emissions input into CAMx included sulfur dioxides (SO<sub>2</sub>), NO<sub>x</sub>, VOCs, ammonia (NH<sub>3</sub>), and direct fine particles (PM<sub>2.5</sub>) for 2005. The modeling was based on the 8-hour ozone design values calculated from 2003 through 2005, 2004 through 2006, and 2005 through 2007. Future year modeling was conducted, which included the southern Indiana and Louisville, Kentucky area, and the future year design values for 2012 and 2014 were evaluated for attainment of the 2008 8-hour ozone NAAQS (i.e. below 76 parts per billion (ppb)), as shown in Table 1.1. Ozone concentrations are accounted for by modeling both the base case emissions and then the future year emissions with reductions associated with the Transport Rule.

**Table 1.1**  
**8-Hour Ozone Modeling Results from U.S. EPA for the Transport Rule**

<b>County</b>	<b>State</b>	<b>Monitor ID</b>	<b>2003-2007 Average Design Value</b>	<b>2012 Base Case Average Values</b>	<b>2014 Base Case Average Values</b>
			(ppb)	(ppb)	(ppb)
Clark	Indiana	18-019-0008	80.3	74.4	72.4
Floyd	Indiana	18-043-1004	77.7	72.6	70.8
Bullitt	Kentucky	21-029-0006	74.0	68.8	67.0
Jefferson	Kentucky	21-111-0027	75.3	70.5	68.5
Jefferson	Kentucky	21-111-0051	78.3	73.3	71.7
Jefferson	Kentucky	21-111-1021	71.0	66.9	65.3
Oldham	Kentucky	21-185-0004	83.0	75.3	72.8

U.S. EPA's Transport Rule modeling results for 8-hour ozone are based on design values from 2003 through 2007. Current 8-hour ozone design values have dropped since this design value period, as shown in Chart 1.1. The resulting decrease of the design value from 2003 through 2007 to 2006 through 2010 at the Charlestown monitor in Clark County, Indiana is 3.4 ppb and 4.3 ppb at the New Albany monitor in Floyd County, Indiana. The decrease in the 2006 through 2010 design values for the Louisville area monitors ranged from -0.6 ppb to 3.8 ppb at the Louisville, Kentucky monitoring sites.

**Chart 1.1**  
**Design Values for Southern Indiana/Louisville, Kentucky area, 1999 through 2010**



U.S. EPA's Transport Rule modeling results, using current 2006 through 2010 design values as shown in Table 1.2, shows lower modeled concentrations below the 2008 8-hour ozone NAAQS.

The future year results were divided by the 2003 through 2007 design values from U.S. EPA's base case modeling results to determine relative response factors (RRFs) and those RRFs were multiplied by the 2006 through 2010 design values in order to show the future year results using more current design values for the area.

**Table 1.2**  
**8-Hour Ozone Modeling Results from U.S. EPA for the Transport Rule**  
**(Using Current 2006 through 2010 Design Values)**

County	State	Monitor ID	2006-2010 Average Design Value (ppb)	2012 RRF	2012 Base Case Average Values (ppb)	2014 RRF	2014 Base Case Average Values (ppb)
Clark	Indiana	18-019-0008	77.2	0.927	71.5	0.902	69.6
Floyd	Indiana	18-043-1004	73.7	0.934	68.8	0.911	67.1
Bullitt	Kentucky	21-029-0006	70.7	0.930	65.7	0.905	64.0
Jefferson	Kentucky	21-111-0027	74.8	0.936	70.0	0.910	68.0
Jefferson	Kentucky	21-111-0051	78.0	0.936	73.0	0.916	71.4
Jefferson	Kentucky	21-111-1021	71.6	0.942	67.4	0.920	65.8
Oldham	Kentucky	21-185-0004	77.0	0.907	69.9	0.877	67.5

As can be seen, modeled results are lower when current design values are used to determine future year modeling. Using the 2006 through 2010 design values, all Southern Indiana/Louisville, Kentucky PM<sub>2.5</sub> monitoring sites will not exceed the 2008 8-hour ozone NAAQS of 76 ppb.

**LADCO's Round 6 Modeling**

IDEM is a member of the Midwest Regional Planning Organization (MRPO), which uses photochemical modeling to determine emission control strategies for State Implementation Plans (SIPs) for Indiana, Illinois, Michigan, Wisconsin, and Ohio. The Lake Michigan Air Directors Consortium (LADCO) supports the MRPO and conducted photochemical modeling to determine future year design values. LADCO's modeling used the CAMx model applied to 2005 meteorology, as processed by MM5. Emissions input into CAMx included SO<sub>2</sub>, NO<sub>x</sub>, VOCs, NH<sub>3</sub>, and direct PM<sub>2.5</sub> for 2005. The modeling was based on 2003 through 2007 design values. Future year modeling for 2012 and 2018 was conducted and the future year design values were determined without the CAIR emission reductions (Round 6). Table 1.3 shows the LADCO Round 6 modeling results. Round 6 results show monitoring sites in Clark and Floyd counties in Indiana and Bullitt and Jefferson counties in Kentucky have future year design values in 2012 and 2018 below 76.0 ppb and will be in attainment of the 8-hour ozone NAAQS. Modeling results did indicate that the Oldham County, Kentucky monitoring site has a 2012 modeled future year concentration above the 8-hour ozone NAAQS. However, 2018 future year design values for all monitoring sites in the Louisville Kentucky area fall well below the 2008 8-hour ozone NAAQS.

**Table 1.3**  
**LADCO's Round 6 Modeling Results for 8-Hour Ozone**

County	State	Monitor ID	Design Value 2003-2007	2012 RRF	2012 Future Design Value with CAIR	2018 RRF	2018 Future Design Value with CAIR
			(ppb)		(ppb)		(ppb)
Clark	Indiana	18-019-0003	79.0	0.936	73.9	0.887	70.1
Floyd	Indiana	18-043-1004	77.7	0.944	73.3	0.901	70.0
Bullitt	Kentucky	21-029-0006	74.3	0.935	69.5	0.902	67.0
Jefferson	Kentucky	21-111-0027	75.3	0.941	70.9	0.891	67.1
Jefferson	Kentucky	21-111-0051	78.3	0.948	74.3	0.915	71.7
Jefferson	Kentucky	21-111-1021	71.0	0.944	67.0	0.9	63.9
Oldham	Kentucky	21-185-0004	83.0	0.928	77.0	0.873	72.5

LADCO based their Round 6 8-hour ozone modeling on 2003 through 2007 design values. Current 8-hour ozone design values have dropped since this design value period, as shown previously in Chart 1.1. IDEM has conducted an analysis to determine the future year modeled concentrations using more current and representative 8-hour ozone design values for the area. Table 1.4 shows the results, using the 2006 through 2010 design values multiplied by the modeled RRFs, determined from the CAMx model, to show future year modeled concentrations using current design values for the area.

**Table 1.4**  
**LADCO's Round 6 Modeling Results for 8-Hour Ozone with 2006-2010 Design Values**

County	State	Monitor ID	Design Value 2006-2010	2012 RRF	2012 Future Design Value	2018 RRF	2018 Future Design Value
			(ppb)		(ppb)		(ppb)
Clark	Indiana	18-019-0003	77.2	0.936	72.3	0.887	68.5
Floyd	Indiana	18-043-1004	73.7	0.944	69.5	0.901	66.4
Bullitt	Kentucky	21-029-0006	70.7	0.935	66.1	0.902	63.7
Jefferson	Kentucky	21-111-0027	74.8	0.941	70.4	0.891	66.6
Jefferson	Kentucky	21-111-0051	78.0	0.948	73.9	0.915	71.4
Jefferson	Kentucky	21-111-1021	71.6	0.944	67.5	0.9	64.4
Oldham	Kentucky	21-185-0004	77.0	0.928	71.5	0.873	67.2

As can be seen, modeled results are lower when current design values are used to determine future year modeling. Using the 2006 through 2010 design values, all 2012 and 2018 design values at all Louisville area monitoring sites will fall well below the 2008 8-hour ozone NAAQS of 76 ppb.

### **Photochemical Modeling Demonstrations for Annual PM<sub>2.5</sub>**

#### **U.S. EPA's Transport Rule Modeling**

U.S. EPA performed modeling to support the emission reductions associated with the Transport Rule. U.S. EPA used the CAMx model, applied to the 2005 meteorology, as processed by MM5. Emissions input into CAMx included SO<sub>2</sub>, NO<sub>x</sub>, VOCs, NH<sub>3</sub>, and direct PM<sub>2.5</sub> for 2005. The modeling was based on the annual fine particles design values calculated from 2003 through 2005, 2004 through 2006, and 2005 through 2007. Future year modeling was conducted, which

included the southern Indiana and Louisville, Kentucky areas, and the future year design values for 2012 and 2014 were evaluated for attainment of the annual NAAQS for fine particles of 15.0 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), as shown in Table 1.5. Fine particles concentrations are accounted for by modeling both the base case emissions and then the future year emissions with reductions associated with the Transport Rule.

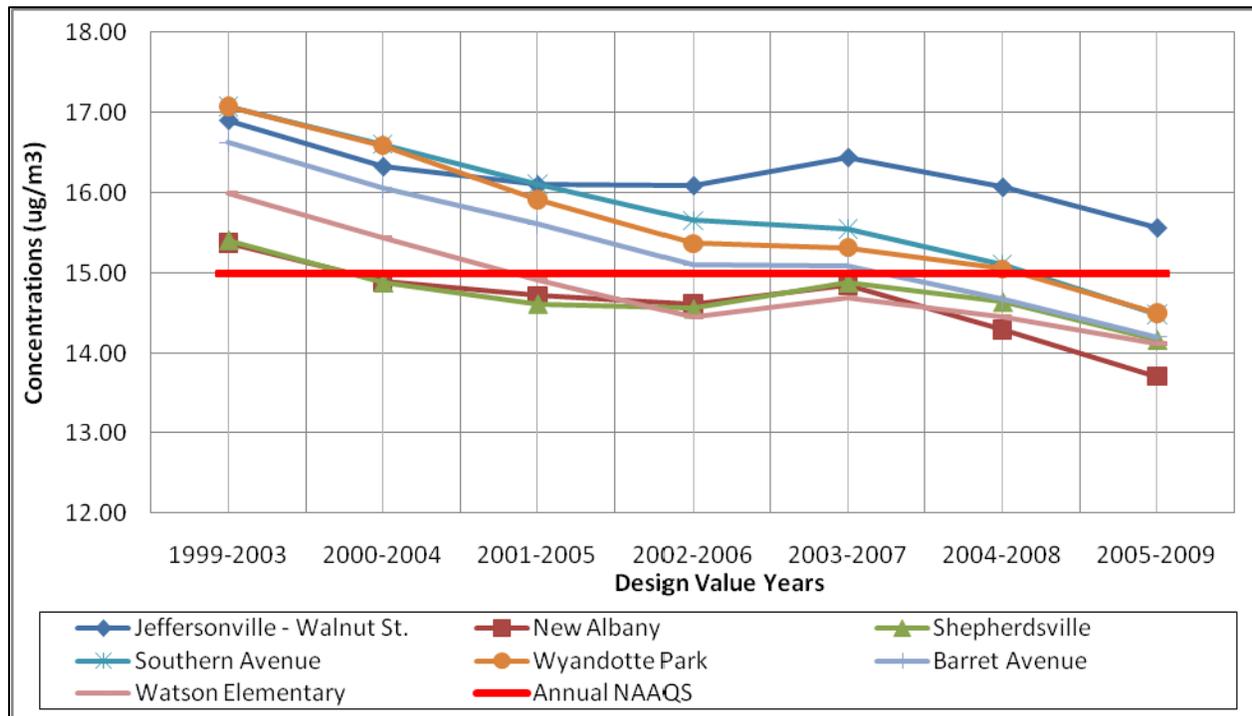
**Table 1.5**  
**U.S. EPA's Modeling Results for the Transport Rule for Annual  $\text{PM}_{2.5}$**

County	State	Monitor ID	Design Value 2003-2007	Future Design Value 2012 Base	Future Design Value 2014 Base
			$(\mu\text{g}/\text{m}^3)$	$(\mu\text{g}/\text{m}^3)$	$(\mu\text{g}/\text{m}^3)$
Clark	Indiana	18-019-0006	16.40	15.96	15.46
Floyd	Indiana	18-043-1004	14.80	14.50	14.04
Bullitt	Kentucky	21-029-0006	14.90	14.58	14.07
Jefferson	Kentucky	21-111-0043	15.53	15.19	14.71
Jefferson	Kentucky	21-111-0044	15.31	14.93	14.45
Jefferson	Kentucky	21-111-0048	15.25	14.87	14.38
Jefferson	Kentucky	21-111-0051	14.70	14.43	13.95

The modeling results show future year design values for fine particles below the annual NAAQS. The Jeffersonville monitor in Clark County, Indiana and the Southern Avenue monitor in Jefferson County, Kentucky were predicted to exceed the annual NAAQS for fine particles. The other monitoring sites in Floyd County, Indiana and in Bullitt and Jefferson counties, Kentucky were predicted to have future year design values below the annual NAAQS. It should be noted that the base year design value used by U.S. EPA was taken from 2003 through 2007 and considered higher than current design values in the area.

Results of U.S. EPA's Transport Rule modeling show modeled concentrations above the annual NAAQS for fine particles at both the Jeffersonville, Indiana and the Jefferson County, Kentucky Southern Avenue  $\text{PM}_{2.5}$  monitors. However, a downward trend in  $\text{PM}_{2.5}$  concentrations in southern Indiana and the Louisville, Kentucky area is evident over the past 11 years. Chart 1.2 shows the comparison of the 1999 through 2003 annual  $\text{PM}_{2.5}$  design values to the maximum 2005 through 2009 design values for monitors in southern Indiana and northern Kentucky.

**Chart 1.2**  
**Annual PM<sub>2.5</sub> Design Value Trends for Southern Indiana/Louisville Kentucky Area:**  
**1999 through 2009**



U.S. EPA based their Transport Rule modeling on design values from 2003 through 2007. Annual PM<sub>2.5</sub> design values have dropped since this design value period. The resulting decrease of the design value from 2003 through 2007 to 2005 through 2009 at the Jeffersonville monitor is 0.87  $\mu\text{g}/\text{m}^3$  and 1.13  $\mu\text{g}/\text{m}^3$  at the New Albany, Indiana PM<sub>2.5</sub> monitor (Floyd County). The annual PM<sub>2.5</sub> design values for the Louisville area monitors have dropped with the 2005 through 2009 design values ranging from 0.71  $\mu\text{g}/\text{m}^3$  and 1.06  $\mu\text{g}/\text{m}^3$  less than the 2003 through 2007 design values modeled by U.S. EPA. Therefore, U.S. EPA's Transport Rule modeling, using the current 2005 through 2009 design values, showed lower modeled concentrations approaching the annual NAAQS for fine particles (15.0  $\mu\text{g}/\text{m}^3$ ). Results of this modeling are shown below in Table 1.6 and are based on the RRFs calculated from the annual PM<sub>2.5</sub> future year base case results divided by the 2003 through 2007 PM<sub>2.5</sub> base case design values. This is a simplistic version of PM<sub>2.5</sub> RRF calculations and is used only as a weight of evidence demonstration of future year modeled results.

**Table 1.6**  
**U.S. EPA's Modeling Results for the Transport Rule for Annual PM<sub>2.5</sub>**  
**(Using Current 2005-2009 Design Values)**

County	State	Monitor ID	Design Value 2005-2009	2012 RRF	Future Design Value 2012 Base	2014 RRF	Future Design Value 2014 Base
			( $\mu\text{g}/\text{m}^3$ )		( $\mu\text{g}/\text{m}^3$ )		( $\mu\text{g}/\text{m}^3$ )
Clark	Indiana	18-019-0006	15.57	0.973	15.15	0.943	14.28
Floyd	Indiana	18-043-1004	13.72	0.980	13.44	0.949	12.75
Bullitt	Kentucky	21-029-0006	14.08	0.979	13.78	0.944	13.01
Jefferson	Kentucky	21-111-0043	14.49	0.978	14.23	0.947	13.44
Jefferson	Kentucky	21-111-0044	14.51	0.975	14.19	0.944	13.44
Jefferson	Kentucky	21-111-0048	14.21	0.975	13.86	0.943	13.08
Jefferson	Kentucky	21-111-0051	14.12	0.982	13.77	0.949	12.98

As can be seen, modeled results are lower when current annual fine particles design values are used to determine future year modeling. Using the 2005 through 2009 design values, all Southern Indiana/Louisville, Kentucky PM<sub>2.5</sub> monitoring sites would not exceed the annual NAAQS for fine particles, except for the Jeffersonville, Indiana monitor, which approaches the annual NAAQS in 2012.

**LADCO's Round 6 Modeling**

LADCO conducted modeling to determine the impact of the Clean Air Interstate Rule (CAIR) in the Midwest. LADCO's modeling used the CAMx model, applied to the year 2005 meteorology, as processed by MM5. Emissions input into CAMx included SO<sub>2</sub>, NO<sub>x</sub>, VOCs, NH<sub>3</sub>, and direct PM<sub>2.5</sub> for 2005. The modeling was based on 2003 through 2007 design values. Round 6 modeling included future year modeling for 2012 and 2018 and the future year design values were determined without the emission reductions associated with CAIR, when CAIR was revoked. Results of the Round 6 modeling are shown in Table 1.7.

**Table 1.7**  
**LADCO's Round 6 Annual PM<sub>2.5</sub> Modeling Results**

County	State	Monitor ID	Monitor Name	Design Value 2003-2007	Base Case 2012	Base Case 2018
				( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )
Clark	Indiana	18-019-0006	Jeffersonville – Walnut St.	16.5	15.6	15.5
Floyd	Indiana	18-043-1004	New Albany	14.9	14.0	13.8
Bullitt	Kentucky	21-029-0006	Carpenter Street	14.9	14.2	14.1
Jefferson	Kentucky	21-111-0043	Southern Avenue	15.6	14.6	14.4
Jefferson	Kentucky	21-111-0044	Wyandotte Park	15.3	14.5	14.4
Jefferson	Kentucky	21-111-0048	Barret Avenue	15.1	14.3	14.2
Jefferson	Kentucky	21-111-0051	Watson Elementary	14.8	13.9	13.8

LADCO based its Round 6 modeling on annual design values from 2003 through 2007. Current annual design values for fine particles have dropped since this design value period, as shown previously in Chart 1.2. A decrease of the design values from 2003 through 2007 to 2005 through 2009 at the Jeffersonville, Indiana PM<sub>2.5</sub> monitor of 0.87  $\mu\text{g}/\text{m}^3$  and 1.13  $\mu\text{g}/\text{m}^3$  at the New Albany, Indiana PM<sub>2.5</sub> monitor occurred. The design values for the Louisville area

monitors have dropped with the 2005 through 2009 design values ranging from 0.71  $\mu\text{g}/\text{m}^3$  and 1.06  $\mu\text{g}/\text{m}^3$  less than the 2003 through 2007 design values modeled by LADCO. The 2005 through 2009 design values were multiplied by the RRFs calculations, based on the future year design values divided by the 2003 through 2007 design value. These results are shown in Table 1.8.

**Table 1.8**  
**LADCO's Round 6 Annual PM<sub>2.5</sub> Modeling Results**  
 (Using 2005-2009 Design Values)

Monitor ID	Monitor Name	County	State	Design Value 2005-2009	2012 RRF	Base Case 2012	2014 RRF	Base Case 2018
				( $\mu\text{g}/\text{m}^3$ )		( $\mu\text{g}/\text{m}^3$ )		( $\mu\text{g}/\text{m}^3$ )
18-019-0006	Jeffersonville – Walnut St.	Clark	Indiana	15.57	0.945	14.7	0.939	14.6
18-043-1004	New Albany	Floyd	Indiana	13.72	0.940	12.9	0.926	12.7
21-029-0006	Carpenter Street	Bullitt	Kentucky	14.08	0.953	13.4	0.946	13.3
21-111-0043	Southern Avenue	Jefferson	Kentucky	14.49	0.936	13.6	0.923	13.4
21-111-0044	Wyandotte Park	Jefferson	Kentucky	14.51	0.948	13.8	0.941	13.7
21-111-0048	Barret Avenue	Jefferson	Kentucky	14.21	0.947	13.5	0.940	13.4
21-111-0051	Watson Elementary	Jefferson	Kentucky	14.12	0.939	13.3	0.932	13.2

As can be seen, annual PM<sub>2.5</sub> modeled results are lower when current design values are used to determine future year modeling. Using the 2005 through 2009 design values, all Southern Indiana/Louisville, Kentucky PM<sub>2.5</sub> monitoring sites will not exceed the annual NAAQS for fine particles.

### Photochemical Modeling Demonstrations for 24-Hour PM<sub>2.5</sub>

#### U.S. EPA's Transport Rule Modeling

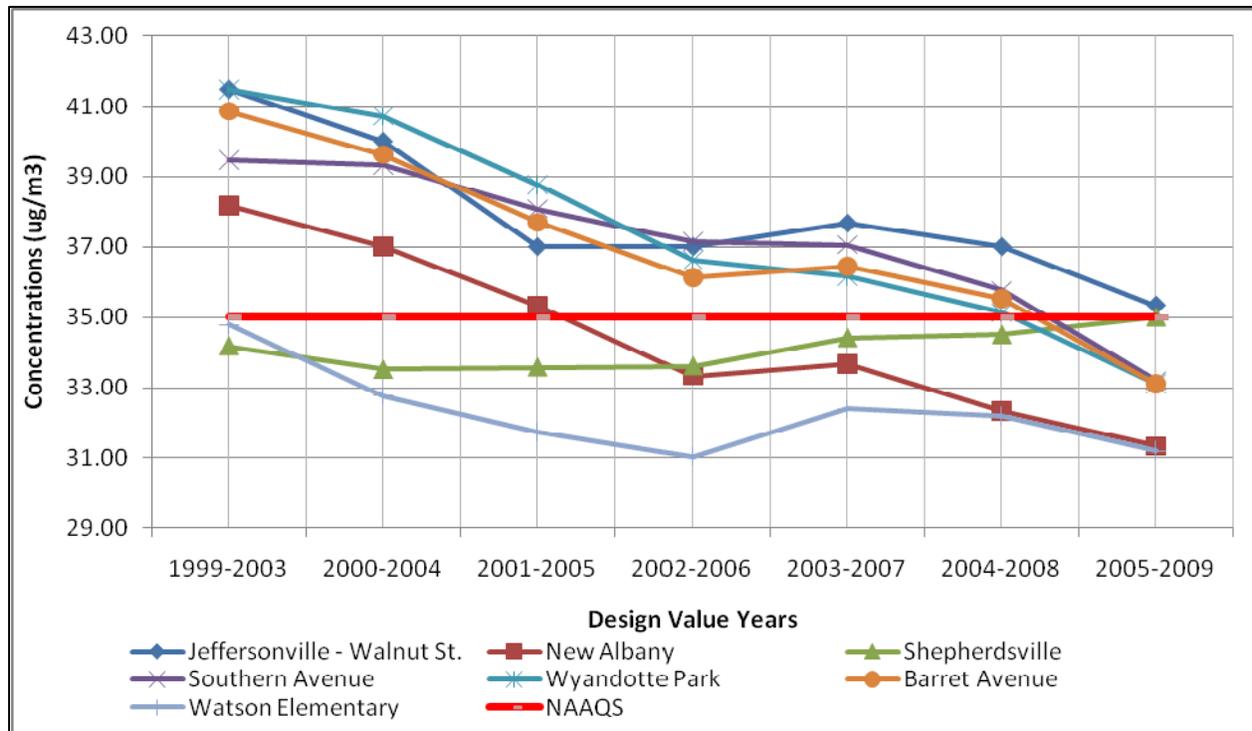
U.S. EPA performed modeling to support the emission reductions associated with the Transport Rule. Future year modeling was conducted, which included the southern Indiana and Louisville, Kentucky areas. The future year design values for 2012 and 2014 were evaluated for attainment of the 24-hour NAAQS for fine particles of 35  $\mu\text{g}/\text{m}^3$ , as shown in Table 1.9. Fine particles concentrations are accounted for by modeling both the base case emissions and then the future year emissions with reductions associated with the Transport Rule.

**Table 1.9**  
**U.S. EPA's Modeling Results for Transport Rule for 24-Hour PM<sub>2.5</sub>**

County	State	Monitor ID	Design Value 2003-2007	Future Design Value 2012 Base	Future Design Value 2014 Base
			( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )
Clark	Indiana	18-019-0006	37.5	38.1	36.1
Floyd	Indiana	18-043-1004	33.2	34.3	32.7
Bullitt	Kentucky	21-029-0006	34.6	35.0	33.1
Jefferson	Kentucky	21-111-0043	35.4	35.8	34.3
Jefferson	Kentucky	21-111-0044	36.1	36.0	34.3
Jefferson	Kentucky	21-111-0048	36.4	35.6	34.0
Jefferson	Kentucky	21-111-0051	32.4	32.3	30.8

U.S. EPA based their Transport Rule modeling on 24-hour PM<sub>2.5</sub> design values from 2003 through 2007. Design values have dropped since this design value period. The resulting decrease of the design values for fine particles from 2003 through 2007 to 2005 through 2009 at the Jeffersonville, Indiana and New Albany, Indiana PM<sub>2.5</sub> monitors was considered significant (2.3 µg/m<sup>3</sup>). The design values for the Louisville area monitors have also decreased with the 2005 through 2009 design values ranging from 1.2 µg/m<sup>3</sup> and 3.9 µg/m<sup>3</sup> less than the 2003 through 2007 design values modeled by U.S. EPA. A downward trend for 24-hour PM<sub>2.5</sub> in southern Indiana and the Louisville, Kentucky area is evident over the past 11 years. Chart 1.3 shows the comparison of the 1999 through 2003 design values to the maximum 2005 through 2009 design values for monitors in southern Indiana and northern Kentucky.

**Chart 1.3**  
**24-Hour PM<sub>2.5</sub> Design Value Trends for Southern Indiana/Louisville Area:**  
**1999 through 2009**



Therefore, U.S. EPA’s Transport Rule modeling using the current 2005 through 2009 24-hour fine particles design values would show lower modeled concentrations approaching the 24-hour fine particles standard of 35.0 µg/m<sup>3</sup>. Results of modeling using the lower design values, shown below in Table 1.10, are based on the RRFs calculated from the PM<sub>2.5</sub> future year base case results divided by the 2003 through 2007 24-hour PM<sub>2.5</sub> base case design values. This is a simplistic version of PM<sub>2.5</sub> RRF calculations and is used only as a weight of evidence demonstration of future year modeled results.

**Table 1.10**  
**U.S. EPA's Modeling Results for the Transport Rule for 24-Hour PM<sub>2.5</sub>**  
**(Using Current 2005-2009 Design Values)**

County	State	Monitor ID	Design Value 2005-2009	2012 RRF	Future Design Value 2012 Base	2014 RRF	Future Design Value 2014 Base
			( $\mu\text{g}/\text{m}^3$ )		( $\mu\text{g}/\text{m}^3$ )		( $\mu\text{g}/\text{m}^3$ )
Clark	Indiana	18-019-0006	35.3	1.016	35.9	0.963	34.0
Floyd	Indiana	18-043-1004	31.3	1.033	32.4	0.985	30.9
Bullitt	Kentucky	21-029-0006	35.0	1.012	35.4	0.957	33.5
Jefferson	Kentucky	21-111-0043	33.2	1.011	33.6	0.969	32.2
Jefferson	Kentucky	21-111-0044	33.1	0.997	33.0	0.950	31.4
Jefferson	Kentucky	21-111-0048	33.1	0.978	32.4	0.934	30.9
Jefferson	Kentucky	21-111-0051	31.2	0.997	31.1	0.951	29.7

As can be seen, 24-hour PM<sub>2.5</sub> modeled results are lower when current design values are used to determine future year modeling. Using the 2005 through 2009 design values, all Southern Indiana/Louisville, Kentucky PM<sub>2.5</sub> monitoring sites will not exceed the 24-hour NAAQS for fine particles, except for the Jeffersonville, Indiana monitor, which approaches the 24-hour PM<sub>2.5</sub> NAAQS in 2012.

**LADCO's Round 6 Modeling**

LADCO conducted modeling to determine the impact of CAIR in the Midwest. LADCO's modeling used the CAMx model, applied to the year 2005 meteorology, as processed by MM5. Emissions input into CAMx included SO<sub>2</sub>, NO<sub>x</sub>, VOCs, NH<sub>3</sub>, and direct PM<sub>2.5</sub> for 2005. The modeling was based on 2003 through 2007 design values. Future year 24-hour fine particles modeling for 2012 and 2018 was conducted and the future year design values were determined without the CAIR emission reductions (Round 6), as shown in Table 1.11.

**Table 1.11**  
**LADCO's Round 6 Modeling Results for 24-Hour PM<sub>2.5</sub>**  
**(Without the Clean Air Interstate Rule emission reductions)**

Monitor ID	Monitor Name	County	State	Design Value 2003-2007	Base-case 2012	Base-case 2018
				( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )
18-019-0006	Jeffersonville – Walnut St.	Clark	Indiana	43	34	35
18-043-1004	New Albany	Floyd	Indiana	33	29	28
21-029-0006	Carpenter Street	Bullitt	Kentucky	34	29	28
21-111-0043	Southern Avenue	Jefferson	Kentucky	35	30	30
21-111-0044	Wyandotte Park	Jefferson	Kentucky	36	31	31
21-111-0048	Barret Avenue	Jefferson	Kentucky	36	31	30
21-111-0051	Watson Elementary	Jefferson	Kentucky	32	27	26

LADCO based its Round 6 modeling on 24-hour fine particles design values from 2003 through 2007. Current design values have dropped since this design value period, as shown previously in Chart 1.1. A decrease of the 24-hour fine particles design values from 2003 through 2007 to 2005 through 2009 of 2.3  $\mu\text{g}/\text{m}^3$  have occurred at the Jeffersonville, Indiana and New Albany, Indiana PM<sub>2.5</sub> monitors. The 24-hour fine particles design values for the Louisville area monitors have decreased with the 2005 through 2009 design values ranging from 1.2  $\mu\text{g}/\text{m}^3$  and

3.9  $\mu\text{g}/\text{m}^3$  lower than the 2003 through 2007 design values modeled by LADCO. The 2005 through 2009 design values were multiplied by the RRFs calculations, base on the future year design values divided by the 2003 through 2007 design values. This is a simplistic version of 24-hour  $\text{PM}_{2.5}$  RRF calculations and is used only as a weight of evidence demonstration of future year modeled results. These results are shown in Table 1.12.

**Table 1.12**  
**LADCO's Round 6 Modeling Results for 24-Hour  $\text{PM}_{2.5}$**   
**(Using Current 2005-2009 design values)**

Monitor ID	Monitor Name	County	State	Design Value 2005-2009	2012 RRF	Base Case 2012	2018 RRF	Base Case 2018
				( $\mu\text{g}/\text{m}^3$ )		( $\mu\text{g}/\text{m}^3$ )		( $\mu\text{g}/\text{m}^3$ )
18-019-0006	Jeffersonville – Walnut St.	Clark	Indiana	35	0.791	28	0.814	29
18-043-1004	New Albany	Floyd	Indiana	31	0.879	28	0.848	27
21-029-0006	Carpenter Street	Bullitt	Kentucky	35	0.853	30	0.824	29
21-111-0043	Southern Avenue	Jefferson	Kentucky	33	0.857	28	0.857	28
21-111-0044	Wyandotte Park	Jefferson	Kentucky	33	0.861	29	0.861	29
21-111-0048	Barret Avenue	Jefferson	Kentucky	33	0.861	29	0.833	28
21-111-0051	Watson Elementary	Jefferson	Kentucky	31	0.844	26	0.813	25

As can be seen, 24-hour fine particles modeled results are lower when current design values are used to determine future year modeling. Using the 2005 through 2009 24-hour design values for fine particles, all Southern Indiana/Louisville, Kentucky  $\text{PM}_{2.5}$  monitoring sites will not exceed the 24-hour NAAQS for fine particles of  $35.0 \mu\text{g}/\text{m}^3$ .

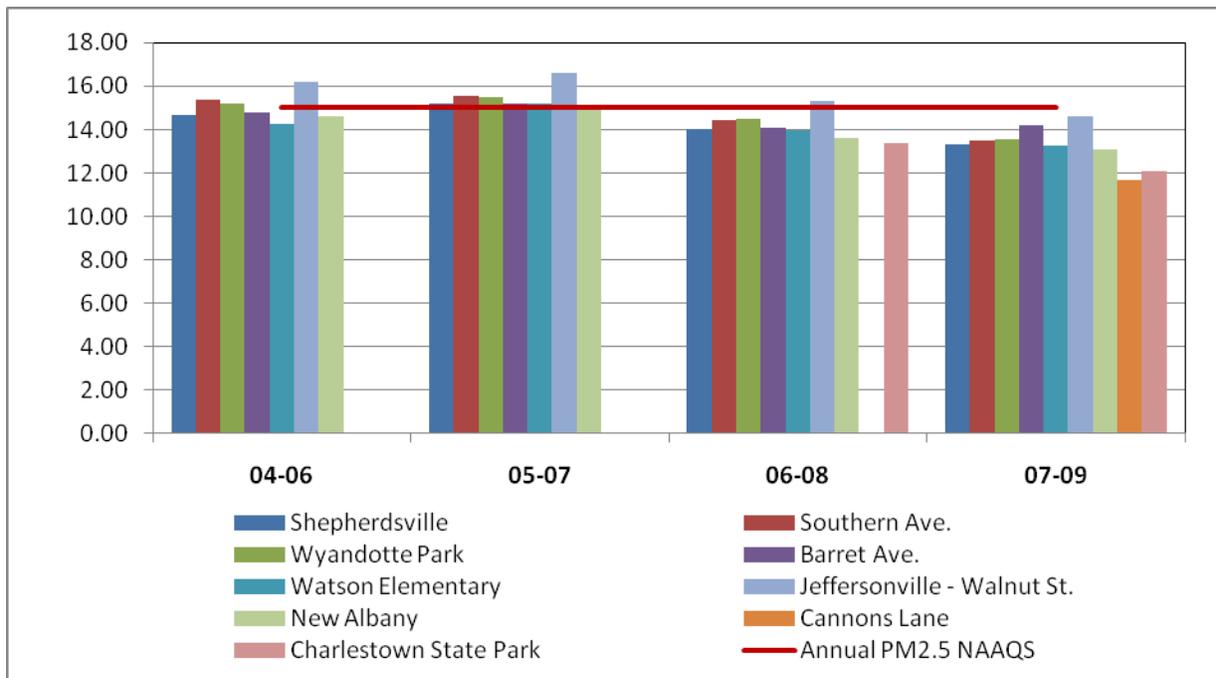
# Attachment 2

## Design Values for the Louisville Area for Annual Fine Particles, 2004 through 2009

Site ID	County	Site Name	Three Year Design Values			
			04-06	05-07	06-08	07-09
21-029-0006	Bullitt	Shepherdsville	14.69	15.20	14.04	13.29
21-111-0043	Jefferson	Southern Ave.	15.38	15.56	14.41	13.49
21-111-0044	Jefferson	Wyandotte Park	15.21	15.48	14.48	13.57
21-111-0048	Jefferson	*Barret Ave.	14.77	15.18	14.09	14.2 <sup>2</sup>
21-111-0051	Jefferson	Watson Elementary	14.26	15.17	13.94	13.25
21-111-0067	Jefferson	Cannons Lane	Site began 1/1/09			11.67 <sup>1</sup>
18-019-0006	Clark	Jeffersonville - Walnut St.	16.2	16.6	15.3	14.6
18-019-0008	Clark	Charlestown State Park	Site began 7/02/08		13.4 <sup>1</sup>	12.1 <sup>2</sup>
18-043-1004	Floyd	New Albany	14.6	14.9	13.6	13.1

\*The Barret Avenue monitor was discontinued on December 31, 2008.

<sup>1</sup> One Year of Data <sup>2</sup> Two Years of Data

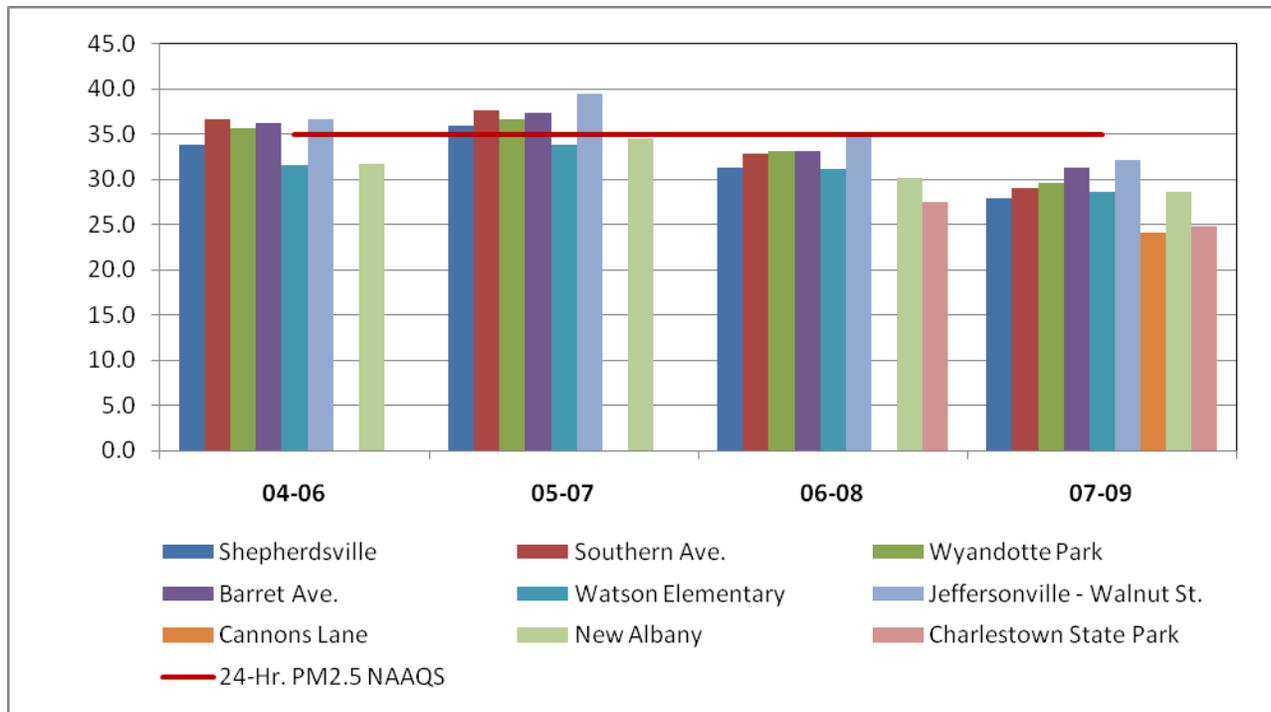


**Design Values for the Louisville Area for 24-Hour Fine Particles, 2004 through 2009**

Site ID	County	Site Name	Three Year Design Values			
			04-06	05-07	06-08	07-09
21-029-0006	Bullitt	Shepherdsville	33.8	35.9	31.3	27.9
21-111-0043	Jefferson	Southern Ave.	36.7	37.7	32.9	29.0
21-111-0044	Jefferson	Wyandotte Park	35.7	36.6	33.1	29.6
21-111-0048	Jefferson	*Barret Ave.	36.2	37.3	33.1	31.3 <sup>2</sup>
21-111-0051	Jefferson	Watson Elementary	31.6	33.8	31.2	28.6
21-111-0067	Jefferson	Cannons Lane	Site began 1/1/09			24.1 <sup>1</sup>
18-019-0006	Clark	Jeffersonville - Walnut St.	36.6	39.5	35.3	32.1
18-019-0008	Clark	Charlestown State Park	Site began 7/02/08		27.5 <sup>1</sup>	24.8 <sup>2</sup>
18-043-1004	Floyd	New Albany	31.7	34.6	30.1	28.6

*\*The Barret Avenue monitor was discontinued on December 31, 2008.*

*<sup>1</sup> One Year of Data <sup>2</sup> Two Years of Data*



**Design Values for the Louisville Area for 8-Hour Ozone, 2005 through 2010**

Site ID	County	Site Name	Three Year Design Values			
			05-07	06-08	07-09	08-10
21-029-0006	Bullitt	Shepherdsville	0.076	0.072	0.070	0.069
21-111-0027	Jefferson	Bates Elementary	0.079	0.077	0.075	0.071
21-111-1021	Jefferson	Mellwood	0.073	0.071	0.070	0.072
21-185-0004	Oldham	Buckner	0.085	0.081	0.076	0.074
21-111-0051	Jefferson	Watson Elementary	0.082	0.079	0.079	0.075
18-019-0008	Clark	Charlestown State Park	0.083	0.081	0.077	0.072
18-043-1004	Floyd	New Albany	0.079	0.077	0.073	0.070

