



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

JUNE 29, 2004

REPLY TO THE ATTENTION OF:

R-19J

Honorable Jennifer M. Granholm  
Governor of Michigan  
Lansing, Michigan

Dear Governor Granholm:

Fine-particle pollution represents one of the most significant barriers to clean air facing our nation today. These tiny particles - about 1/30<sup>th</sup> the diameter of a human hair - have been scientifically linked to serious human health problems. Their ability to be suspended in air for long periods of time makes them a public health threat far beyond the source of emissions. An important part of our nation's commitment to clean, healthy air deals with reducing levels of this fine-particle (PM<sub>2.5</sub>) pollution.

We have reviewed the February 13, 2004, letter from Steven E. Chester, Director, Michigan Department of Environmental Quality, submitting Michigan's recommendations on air quality designations for the PM<sub>2.5</sub> standard. We have also reviewed the technical information he submitted to support Michigan's recommendations for areas that differed from the presumptive boundaries. We appreciate the effort the State has made to develop this supporting information. Consistent with the Clean Air Act, this letter is to inform you that the Environmental Protection Agency (EPA) intends to make modifications to Michigan's recommended designations and boundaries.

Your Environmental Director will receive a copy of this letter with a more detailed enclosure containing a description of areas where EPA intends to modify your state recommendations, and the basis for such modification. Should you have additional information that you wish to be considered by EPA in this process, we request that you provide it to us by September 1.

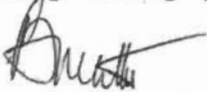
You will hear from us again in November when EPA takes the final step in the PM<sub>2.5</sub> designation process and determines those areas that are in attainment (or unclassifiable) and those areas that are nonattainment. For areas in attainment, the challenge will be not only to maintain, but also to continue the progress you

have made toward clean air. It is a commitment to no backsliding in your State's clean air status for fine particles. EPA will also issue a proposed fine particle implementation rule prior to final designations, which will allow you to proceed with planning to achieve clean air.

The Bush Administration is addressing fine particle pollution with a comprehensive national clean air strategy. This strategy includes EPA's recent rule to reduce pollution from nonroad diesel engines, and the proposed rule to reduce pollution from power plants in the Eastern United States. These two rules are important components of EPA's efforts to help States and localities meet the more protective national fine-particle and 8-hour ozone air quality standards. Together these rules will help all areas of the country achieve cleaner air.

If you have any questions, please do not hesitate to contact me. We look forward to a continued dialogue with you as we work together to implement the PM<sub>2.5</sub> standards.

Very truly yours,



Bharat Mathur,  
Acting Regional Administrator

Enclosure

cc: Steven E. Chester, Director  
Michigan Department of Environmental Quality

Christopher Jones, Director  
Ohio Environmental Protection Agency

**Review of Designations in Michigan  
For the Particulate Matter Air Quality Standard**

The following table identifies the individual areas and counties comprising those areas in Michigan that EPA intends to designate as nonattainment for the fine particulate matter ("PM<sub>2.5</sub>") air quality standard. Following the table is a description of areas where EPA intends to modify Michigan's recommendation and the basis for such modifications. EPA intends to designate as attainment/unclassifiable all counties not identified in the table below.

<b>Area</b>	<b>Michigan Counties in Metropolitan Area</b>	<b>Michigan Recommended Nonattainment Counties</b>	<b>EPA's Intended Nonattainment Counties</b>
<b>Detroit-Ann Arbor-Flint</b>	Monroe Wayne Livingston Macomb Oakland St Clair Washtenaw Genesee Lapeer Lenawee	Monroe Wayne	Monroe Wayne Livingston Macomb Oakland St Clair Washtenaw

## **Nine-Factor Analysis for Detroit-Ann Arbor-Flint**

### **Discussion:**

EPA reviewed the nine factors for the counties within the metropolitan area as well as counties adjacent to the metropolitan area in order to determine the appropriate nonattainment area. There are violating monitors in Monroe and Wayne counties. EPA agrees with the Michigan DEQ to designate Monroe and Wayne counties as nonattainment. However, based upon our nine-factor analysis, EPA believes that in addition to Monroe and Wayne counties, the Detroit nonattainment area should also include Livingston, Macomb, Oakland, St. Clair, and Washtenaw counties as one contiguous area. These counties have significant emissions and the population, population density, and vehicle miles traveled (VMT) are at sufficient levels to be part of the designated area. This is consistent with the national approach of capturing the majority of emissions and population in a metropolitan area. Genesee, Lapeer, and Lenawee counties are also in the Metropolitan area but were excluded upon review of the 9 factors. Except for Genesee County, which is discussed below, these counties have lower emissions, population, population density, and VMT.

Michigan supported its recommendation of attainment for most counties by attributing the violations in Wayne County predominantly to high emissions in Wayne County, and attributing the violation in Monroe County to emissions in Toledo, Ohio. Michigan notes the monitored attainment in Macomb County, and observes that trajectories for high and low concentration days in Wayne County indicate that the highest concentrations occur when winds are from the south and west. Michigan concludes from this evidence that the Wayne County violations arise from a combination of long range transport and very localized emissions, and that counties other than Wayne County do not contribute to violations in Wayne County.

EPA disagrees with Michigan's analysis. EPA's guidance includes a presumption that the entire metropolitan area contributes to the nonattainment problem, reflecting evidence that the various types of emissions that lead to PM<sub>2.5</sub> concentrations have impacts on many distance scales including metropolitan scale. Michigan has not provided a convincing demonstration that EPA's presumption and the underlying understanding of the nature of PM<sub>2.5</sub> is invalid or inapplicable to the Detroit area. The design value in Macomb County is 15.0 micrograms per cubic meter, just barely attaining the standard. While it is evident that Macomb County does not by itself cause violations in Wayne County, the

wind data shown for factor 6 below demonstrate that winds often blow from Macomb County into Wayne County. While the wind blows from the southwest quadrant more frequently than other quadrants, the wind blows from the northwest or northeast quadrants about 40 percent of the time. Trajectory information can often be misleading; since a high fraction of observed  $PM_{2.5}$  concentrations are attributable to long range transport, trajectories for high concentration days tend to be a better measure of whether distant contributions to transported "background" concentrations are high rather than indicating high local contributions. Michigan's analysis also does not address the contributions to Wayne County concentrations from mobile sources that originate in other counties. Although different components of  $PM_{2.5}$  have different geographic scales of impact, EPA continues to believe that emissions throughout a metropolitan area can contribute significantly to observed violations. Since a significant fraction of the Detroit area's emissions occur in Livingston, Macomb, Oakland, St. Clair, and Washtenaw Counties, EPA believes that these contribute to nonattainment in Wayne and Monroe Counties.

The composite emissions score for Genesee County is somewhat higher than that of Washtenaw County. EPA nevertheless believes that Washtenaw County contributes to violations in Wayne and Monroe Counties and Genesee County does not. Washtenaw County is upwind of Wayne and Monroe Counties somewhat more frequently than Genesee County. More importantly, Washtenaw County is closer to Wayne and Monroe Counties and the observed violations, which means that the emissions are likely to have a greater impact and mobile sources are more likely to be traveling into the violating counties. Finally, Washtenaw County is part of the Detroit ozone nonattainment area whereas Genesee County is part of a separate ozone nonattainment area, and the Detroit area metropolitan planning organization includes Washtenaw County and not Genesee County. Therefore, including Washtenaw County in the  $PM_{2.5}$  nonattainment area will facilitate coordinated ozone and  $PM_{2.5}$  planning.

Michigan requested that Wayne and Monroe Counties each be treated as single county nonattainment areas. Michigan has not justified a conclusion that either of these counties may be considered single county nonattainment areas. While Monroe County may sometimes be considered part of the Toledo area (along with Lucas and Wood Counties, Ohio), particularly when winds are from the south, on such occasions Monroe County also contributes to violations in Wayne County. The Detroit area also contributes to violations in Monroe County. Therefore, EPA intends to designate a single Detroit area nonattainment area that includes Monroe

County.

There are seven counties adjacent to the metropolitan area that are not a part of another violating metropolitan area. These counties have relatively low emissions, and no other factors warrant including these counties in the nonattainment area. Therefore, no data are provided for these counties under factors 3 to 9 below.

**Factor 1. Emissions in areas potentially included versus excluded from the nonattainment area:**

The analysis for factor 1 looks at emissions of carbonaceous particles (carbon), inorganic particles (crustal), SO<sub>2</sub>, and NO<sub>x</sub>. EPA computed a composite emission score for each county by multiplying the county's emissions as a fraction of the metropolitan area emissions for each of these pollutants times a corresponding air quality weighting factor. These scores for the metropolitan area counties add to 100. The air quality weighting factors for each area are given below and reflect the percentages of the total estimated "urban excess" value found as carbonaceous particles, miscellaneous inorganic particles (crustal material), ammonium sulfate, and ammonium nitrate. Tables presented under factor 1 provide the carbonaceous particles, inorganic particles, SO<sub>2</sub>, and NO<sub>x</sub> emissions and the composite emission scores for the counties in the corresponding metropolitan area and adjacent counties. Emissions data are derived from the National Emissions Inventory and are for 2001, given in tons per year. Metropolitan area counties are in **bold**. Emissions data indicate the potential for a county to contribute to observed violations, often making the emissions data the most important factor in assessing boundaries of nonattainment areas.

"Urban excess" values are derived by comparing urban monitored component concentrations against rural monitored component concentrations. Concentrations of the four PM<sub>2.5</sub> components are obtained from local data if available (or, if necessary, from the nearest available urban site), and are compared to available rural concentrations. The monitoring sites used for this purpose are identified below. Although this information is air quality information, it is presented under Factor 1 due to its integration into the analysis of emissions information.

<u>County</u>	<u>SO<sub>x</sub></u>	<u>NO<sub>x</sub></u>	<u>Carbon</u>	<u>Crustal</u>	<u>Composite emissions score</u>
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<b>Genesee</b>	<b>3,010</b>	<b>20,648</b>	<b>1,377</b>	<b>1,914</b>	<b>7.5</b>
<b>Lapeer</b>	<b>895</b>	<b>5,202</b>	<b>389</b>	<b>1,109</b>	<b>2.1</b>
<b>Lenawee</b>	<b>642</b>	<b>4,496</b>	<b>554</b>	<b>1,488</b>	<b>2.5</b>
<b>Livingston</b>	<b>701</b>	<b>8,024</b>	<b>852</b>	<b>1,695</b>	<b>4.0</b>
<b>Macomb</b>	<b>4,602</b>	<b>33,482</b>	<b>1,413</b>	<b>1,282</b>	<b>9.5</b>
<b>Monroe</b>	<b>126,037</b>	<b>62,432</b>	<b>1,565</b>	<b>4,834</b>	<b>15.1</b>
<b>Oakland</b>	<b>8,277</b>	<b>44,171</b>	<b>2,264</b>	<b>1,829</b>	<b>13.6</b>
<b>St Clair</b>	<b>72,450</b>	<b>40,659</b>	<b>1,248</b>	<b>2,687</b>	<b>10.4</b>
<b>Washtenaw</b>	<b>2,163</b>	<b>14,980</b>	<b>944</b>	<b>1,502</b>	<b>5.3</b>
<b>Wayne</b>	<b>59,884</b>	<b>107,604</b>	<b>4,435</b>	<b>2,823</b>	<b>29.9</b>
Hillsdale	1,286	3,270	245	812	1.4
Ingham	13,381	17,912	648	1,126	4.9
Jackson	1,093	7,895	599	1,269	3.2
Saginaw	2,812	9,755	978	2,457	4.8
Sanilac	397	2,893	422	1,429	1.9
Shiawassee	768	3,749	318	1,024	1.7
Tuscola	531	3,162	417	1,404	1.9
Fulton, OH	878	5,105	336	692	1.9
Lucas, OH	31,000	36,975	1,370	1,702	10.0

**Urban increment:**

Total mass= 4.3 ug/m<sup>3</sup>

0% sulfates; 54% nitrates; 42% carbon; 4% crustal.

Urban site= 261630001;

Rural site= MKG01 (M.K. Goddard)

**Factor 2. Air quality in potentially included versus excluded areas:**

*The air quality analysis looks at the annual averaged design value for each area based on data for 2001 to 2003. Counties without monitors are not listed.*

<b>County</b>	<b>2001-2003 Design Value</b>
<b>Genesee</b>	<b>12.6</b>
<b>Macomb</b>	<b>13.3</b>
<b>Monroe</b>	<b>15.1</b>
<b>Oakland</b>	<b>14.8</b>
<b>St Clair</b>	<b>13.9</b>
<b>Washtenaw</b>	<b>14.6</b>
<b>Wayne</b>	<b>19.5</b>



Ingham	13.4
Saginaw	11.0
Lucas, OH	15.2

**Factor 3. Population density and degree of urbanization including commercial development in included versus excluded areas:**

*Tables presented under factor 3 show the 2003 population for each metropolitan area, as well as the population density for each county in that area. Population data indicate the likelihood of population-based emissions that might contribute to violations.*

<b>County</b>	<b>2003 Population</b>	<b>Population Density</b>
<b>Genesee</b>	<b>441,423</b>	<b>690</b>
<b>Lapeer</b>	<b>90,776</b>	<b>139</b>
<b>Lenawee</b>	<b>100,145</b>	<b>133</b>
<b>Livingston</b>	<b>168,862</b>	<b>297</b>
<b>Macomb</b>	<b>808,529</b>	<b>1684</b>
<b>Monroe</b>	<b>149,253</b>	<b>271</b>
<b>Oakland</b>	<b>1,202,721</b>	<b>1378</b>
<b>St Clair</b>	<b>167,712</b>	<b>231</b>
<b>Washtenaw</b>	<b>334,351</b>	<b>471</b>
<b>Wayne</b>	<b>2,045,540</b>	<b>3331</b>

**Factor 4. Traffic and commuting patterns:**

*The traffic and commuting analysis looks at the number of commuters in each county who drive to another county within the metropolitan area ("Number"), the percent of total commuters in each county who commute to other counties within the metropolitan area ("percent"), as well as the total Vehicle Miles Traveled (VMT) for each county in thousands of miles. A county with numerous commuters is generally an integral part of the area, and would be an appropriate part of the domain of some mobile source strategies, thus warranting inclusion in the nonattainment area.*

*Note that the percent of commuters traveling to counties within the metropolitan area is based on the total number of commuters from that county. This total includes commuters who may travel outside the metropolitan area from their county of origin.*

<u>County</u>	<u>Number</u>	<u>Percent</u>	<u>County VMT (Thousands)</u>
Genesee	4,842	18	33,966
Lapeer	1,139	50	20,118
Lenawee	908	22	10,026
Livingston	1,804	54	42,858
Macomb	6,964	41	156,343
Monroe	1,679	28	19,372
Oakland	10,758	28	167,943
St Clair	2,029	35	26,992
Washtenaw	3,521	21	35,525
Wayne	20,171	24	201,563

**Factor 5. Expected growth:**

*The expected growth analysis looks at the percent growth for counties in each metropolitan area from 1990 to 2000.*

<u>County</u>	<u>Percent growth 1990-2000</u>
Genesee	1
Lapeer	18
Lenawee	8
Livingston	36
Macomb	10
Monroe	9
Oakland	10
St Clair	13
Washtenaw	14
Wayne	-2

**Factor 6. Meteorology:**

*The meteorology analysis looks at wind data gathered over a ten year period by the National Weather Service. Tables presented under factor 6 list the year round average prevailing wind directions by quadrant for each county in the corresponding metropolitan area. These data show that annual average PM<sub>2.5</sub> concentrations are influenced by emissions in any direction at various times, but these data may also suggest that emissions in some directions relative to the violation may be more prone to contribute than emissions in other directions.*

	<u>Average percent of wind direction by quadrant</u>			
<u>County</u>	<u>Northwest</u>	<u>Southwest</u>	<u>Southeast</u>	<u>Northeast</u>
<b>Genesee</b>	24	42	18	16
<b>Lapeer</b>	25	40	18	17
<b>Lenawee</b>	25	40	16	19
<b>Livingston</b>	26	40	18	17
<b>Macomb</b>	26	39	18	18
<b>Monroe</b>	25	40	16	19
<b>Oakland</b>	25	39	18	18
<b>St Clair</b>	25	39	18	18
<b>Washtenaw</b>	26	39	17	19
<b>Wayne</b>	26	38	17	19

**Factor 7. Geography/topography:**

*The geography/topography analysis looks at physical features of the land that might have an effect on the airshed, and therefore, the distribution of particulate matter over an area. The State of Michigan has no features that significantly influenced EPA's recommended nonattainment areas.*

There are no geographical features (mountain ranges, abrupt changes in land elevation, etc.) that affect this area. The state provided no information about geography/topography for this area.

**Factor 8. Jurisdictional boundaries:**

*The analysis of jurisdictional boundaries looks at the planning and organizational structure of an area to determine if the implementation of controls in a potential nonattainment area can be carried out in a cohesive manner.*

The Southeast Michigan Council of Governments (SEMCOG ) is the Metropolitan Planning Organization (MPO) for Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne counties.

-source: SEMCOG webpage, <http://www.semcoq.org/>

This metropolitan area is divided into two ozone nonattainment areas. The Detroit area includes the following counties:

Lenawee, Livingston, Macomb, Monroe, Oakland, St Clair, Washtenaw, and Wayne.

The Flint area includes the following counties:

Genesee and Lapeer.

**Factor 9. Level of control of emission sources:**

*The level of control analysis looks at what controls are currently implemented in each area.*

The state provided no information about the level of control of emission sources for this area.