Revised Lead National Ambient Air Quality Standards
Wisconsin Attainment Designation Recommendations
Draft Technical Support Document

Summary

The U.S. Environmental Protection Agency (EPA) strengthened the national ambient air quality standards (NAAQS) for lead on November 12, 2008 (73 FR 66964). The primary and secondary standards were reduced from 1.5 micrograms per cubic meter ($\mu g/m^3$) to 0.15 $\mu g/m^3$. Section 107(d)(1)(A) of the Clean Air Act (CAA) requires states to provide area designation recommendations based on the revised lead NAAQS to EPA no later than October 15, 2009. **The Wisconsin Department of Natural Resources (WDNR) is recommending that all areas of the state be designated as in attainment of the revised lead NAAQS.**

Background

Lead is a metal found naturally in the environment and present in some manufactured products. The major sources of lead air emissions have historically been motor vehicles and industrial sources. With the phase-out of leaded gasoline, motor vehicle lead emissions have been dramatically reduced. Lead is emitted from metals processing and industries such as: iron and steel foundries; copper smelting; industrial, commercial, and institutional boilers; waste incinerators; glass manufacturing; and cement manufacturing. Lead is still contained in aviation gasoline, but the use of aviation gasoline has been determined to be an insignificant source in Wisconsin. Nationwide, average concentrations of lead in the air have dropped nearly 94 percent between 1980 and 2007.

Based on a review of scientific evidence, EPA determined that the 1978 NAAQS for lead of 1.5 $\mu g/m^3$ is not sufficient to protect public health with an adequate margin of safety. The revised 0.15 $\mu g/m^3$ level was selected to provide increased protection for at-risk-populations against adverse health effects. The secondary standard was also revised to 0.15 $\mu g/m^3$ to provide increased protection against lead-related effects on organisms and ecosystems.

NAAQS Timeline

States are required to make recommendations to EPA for areas to be designated as attainment, nonattainment, or unclassifiable by **October 15, 2009**. Final designations by EPA will be effective no later than **January, 2012**. However, EPA intends to complete initial designations as soon as possible where there are sufficient data from existing monitors. States with nonattainment areas for the revised lead standards are required to submit State Implementation Plans (SIP) outlining how they will reduce pollution to meet the revised NAAQS for lead no later than **June, 2013**. States are required to meet the revised lead NAAQS no later than **January, 2017**.

Determining NAAQS Compliance

As part of the revised lead NAAQS, EPA modified how attainment is determined. A monitor measures attainment when the rolling three-month averages of lead concentrations over a three-year period do not exceed 0.15 $\mu g/m^3$. A rolling three-month average takes into account the 12 three-month periods associated with a given year. The previous lead NAAQS only considered four calendar quarters per year.

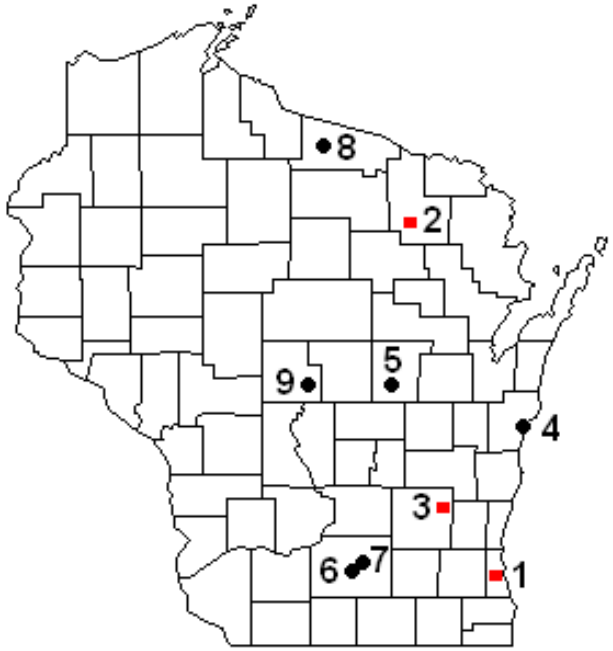
Wisconsin Lead Monitoring Network

Since 2000, there have been nine lead monitoring locations throughout Wisconsin, as shown in Figure 1. Many of the monitors were located near industrial facilities. Currently, there are three operating PM_{10} monitors that are used to measure lead concentrations. The three sites are Mayville (Air Quality System (AQS) - 550270007), Milwaukee 16th St. (AQS - 550790001), and Potawatomi (AQS - 550410007). The sampling frequency varies at each of the sites with daily measurements occurring every sixth day at Mayville, every twelfth day at Milwaukee 16th St., and every thirtieth day at Potawatomi.

The revised lead NAAQS require that the total suspended particles (TSP) monitoring method be used to determine compliance. TSP monitoring measures lead particles of all sizes. Prior to 2007, WDNR used this monitoring method for air toxics monitoring purposes. However, since 2007, high volume PM_{10} filters have been used to determine lead concentrations. PM_{10} monitors only measure lead particles with diameters less than 10 micrograms. EPA requires the use of TSP monitoring as part of the revised NAAQS reflecting evidence that lead particles of all sizes pose potential health risks. Although the monitored PM_{10} lead data at Mayville, Milwaukee 16th St., and Potawatomi can not be used to explicitly satisfy the revised lead NAAQS, the data are indicative of lead concentrations in Wisconsin and can be used to support recommendations on lead attainment designations.

Maximum 24-hour lead concentrations since 2000 have ranged from 0.00 $\mu g/m^3$ to 0.07 $\mu g/m^3$ using both the TSP and PM_{10} monitoring methods (see Figure 1). Based on available lead monitoring data, all of Wisconsin should be classified as in attainment of the revised lead NAAQS. A three-month average lead concentration is used to show compliance with the revised lead NAAQS. Observed maximum 24-hour lead concentrations are less than half of the 0.15 $\mu g/m^3$ threshold, therefore, the three-month average lead concentrations are expected to be much smaller, well below the level of the NAAQS.

Figure 1 – Wisconsin Lead Monitoring Network



Current Monitoring Location

Prior Monitoring Location

TSP Data Source: http://www.epa.gov/air/data/index.html
PM_{10} Data Source: Chemist, Wisconsin DNR

1 – Milwaukee Health Center
(**TSP**: 2000 – 2007), (**PM_{10}**: 2007 – Current)
TSP Daily Maximum = 0.07 µg/m^3
PM_{10}–Lead Daily Maximum = 0.03 µg/m^3

2 – Potawatomi
(**PM_{10}**: 2007 – Current)
PM_{10}–Lead Daily Maximum = 0.01 µg/m^3

3 – Mayville
(**TSP**: 2004 – 2005), (**PM_{10}**: 2007 – Current)
Daily Maximum = 0.04 µg/m^3
PM_{10}–Lead Daily Maximum = 0.07 µg/m^3

4 – Manitowoc
(**TSP**: 2002)
Daily Maximum = 0.01 µg/m^3

5 – Waupaca
(**TSP**: 2001 – 2002)
Daily Maximum = 0.06 µg/m^3

6 – Madison Water Reservoir
(**TSP**: 2001 – 2002)
Daily Maximum = 0.02 µg/m^3

7 – Madison East High
(**TSP**: 2002 – 2005)
Daily Maximum = 0.02 µg/m^3

8 – Trout Lake
(**TSP**: 2001 – 2002)
Daily Maximum = 0.00 µg/m^3

9 – Witter Field
(**TSP**: 2000)
Daily Maximum = 0.01 µg/m^3

Future Lead Monitoring in Wisconsin

EPA is requiring state agencies to conduct lead monitoring taking into account lead sources that are expected to, or have been shown to, exceed the NAAQS. At a minimum, TSP monitors must be placed in areas with sources of lead emissions greater than or equal to one ton or more per year to measure the maximum concentration. TSP lead monitoring is also required in urban areas with populations greater than 500,000 to gather information on the general population's exposure to lead in the air and to ensure protection against sources of airborne dust containing lead. To meet these requirements, WDNR is planning to install three new TSP lead monitors, one source-specific monitor and two urban monitors. Based on previous correspondence between EPA and WDNR, the only source-specific lead monitor required is for the Kohler Company Plant in Kohler, Wisconsin (Sheboygan County). A TSP lead monitor will be operational near this facility by January 1, 2010. Urban TSP monitors are required in Madison and Milwaukee. Final monitoring locations are still being determined; however, TSP lead monitors will be operational in these urban areas by January 1, 2011.

Conclusion

WDNR is recommending that all areas of the state be designated as in attainment of the revised lead NAAQS. Based on lead monitoring data and the overall reduction in lead from the phase-out of leaded gasoline, all counties in Wisconsin are projected to be meeting the revised lead NAAQS of 0.15 $\mu g/m^3$. The WDNR plans to site TSP lead monitors in Madison, Milwaukee, and near the Kohler Company Plant in Kohler, Wisconsin to meet the monitoring requirements of the revised lead NAAQS.