

Technical Support Document

**Pennsylvania
Area Designations For the
2008 Lead National Ambient Air Quality Standards**

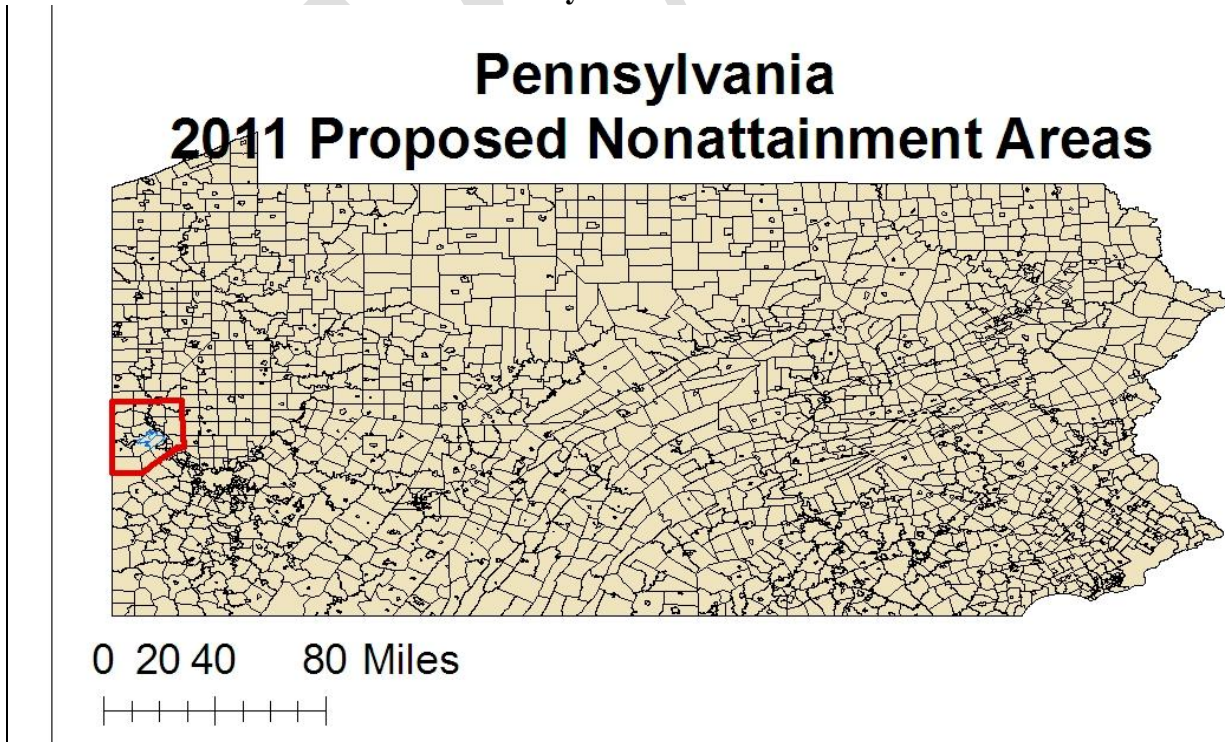
EPA has revised the level of the primary (health-based) standard from 1.5 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) to 0.15 $\mu\text{g}/\text{m}^3$ measured as total suspended particles (TSP). EPA has revised the secondary (welfare-based) standard to be identical in all respects to the primary standard.

Pursuant to section 107(d) of the Clean Air Act, EPA must designate as “nonattainment” those areas that violate the NAAQS and those nearby areas that contribute to violations. The table below identifies the portion of Beaver County in Pennsylvania that EPA intends to designate “nonattainment” for the 2008 lead national ambient air quality standard (2008 Lead NAAQS).

Table 1. Proposed Nonattainment Area for 2011 Designations

Area	Pennsylvania Recommended Nonattainment Counties	Pennsylvania’s Recommended Nonattainment Townships/ Boroughs	EPA’s Proposed Nonattainment Counties	EPA’s Proposed Nonattainment Townships/ Boroughs
Lower Beaver Valley	Beaver County (partial)	Potter and Vanport	Beaver County (partial)	Potter, Vanport and Center

Figure 1. Map of Beaver County containing the Lower Beaver Valley Area in relation to the rest of the Commonwealth of Pennsylvania.



Technical Analysis for The Lower Beaver Valley Area

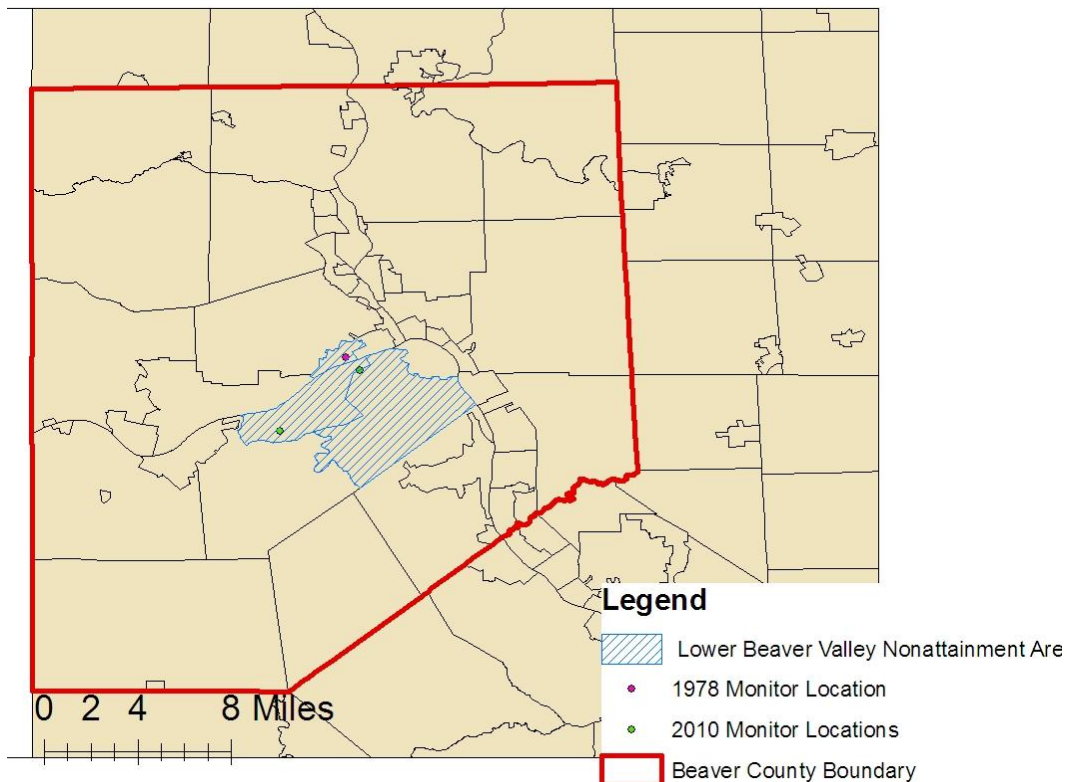
Introduction

This technical analysis for The Lower Beaver Valley Area identifies the partial county with a monitor that violates the 2008 Lead NAAQS and evaluates nearby counties for contributions to lead concentrations in the area. EPA has evaluated these counties based on the weight of evidence of the following factors recommended in previously issued EPA guidance:

- Air quality in potentially included versus excluded areas;
- Emissions and emissions-related data in areas potentially included versus excluded from the nonattainment area, including population data, growth rates and patterns and emissions controls;
- Meteorology (weather/transport patterns);
- Geography/topography (mountain ranges or other air basin boundaries);
- Jurisdictional boundaries (e.g., counties, air districts, reservations, etc.); and
- Any other relevant information submitted to or collected by EPA.

Figure 2 is a map of the area analyzed showing the locations of air quality monitors in the area and the proposed nonattainment area.

Figure 2. Lower Beaver Valley Proposed Nonattainment Area and Air Quality Monitor Locations



On December 17, 2009, Pennsylvania recommended that part of Beaver County be designated as nonattainment for the 2008 Lead NAAQS based on air quality data from 2006 - 2008. Their recommendation was based on data from FRM or FEM monitors located in the state. In 2010, EPA designated part of Beaver County nonattainment, consistent with Pennsylvania's recommendation (75 FR 71033, November 22, 2010).

Pursuant to the revised network design requirements adopted in the Lead NAAQS final rule (73 FR 66964, November 12, 2008), Pennsylvania established new lead monitors, including one in Center Township. Based on EPA's technical analysis described below (including data from the new monitors), EPA is intending to revise the 2010 Nonattainment Designation for parts of Beaver County in Pennsylvania. This county and the townships/boroughs included in the revised proposed nonattainment area is listed above in Table 1.

Detailed Assessment

Air Quality Data

This factor considers the lead design values (in $\mu\text{g}/\text{m}^3$) for air quality monitors in Beaver County in the Lower Beaver Valley Area and the surrounding area based on data for the 2008 - 2010 period. A monitor's design value indicates whether that monitor attains a specified air quality standard. The 2008 Lead NAAQS are met at a monitoring site when the identified design value is valid and less than or equal to $0.15 \mu\text{g}/\text{m}^3$. A design value is only valid if minimum data completeness criteria are met. A lead design value that meets the NAAQS is generally considered valid if it encompasses 36 consecutive valid 3-month site means (specifically for a 3-year calendar period and the two previous months). For this purpose, a 3-month site mean is valid if valid data were obtained for at least 75 percent of the scheduled monitoring days in the 3-month period. A lead design value that does not meet the NAAQS is considered valid if at least one 3-month mean that meets the same 75 percent requirement is above the NAAQS. That is, a site does not have to monitor for three full calendar years in order to have a valid violating design value; a site could monitor just three months and still produce a valid (violating) design value.

The 2008 Lead NAAQS design values for Beaver County in the Lower Beaver Valley Area and surrounding area are shown in Table 2 and illustrated in Figure 2.

Table 2. Air Quality Data

County	State Recommended Nonattainment?	Monitor Name	Monitor Air Quality System ID	Monitor Location	Lead Design Value, 2007 - 2009 ($\mu\text{g}/\text{m}^3$)	Lead Design Value, 2008-2010 ($\mu\text{g}/\text{m}^3$)
Beaver County	Yes (partial)	Monaca (Horsehead Corp.)	42-007-0007	Beaver Valley Mall, Monaca, PA 15071	N/A	0.21
		Vanport (Horsehead Corp.)	42-007-0505	265 River Ave., Beaver, PA 15009	0.17	0.17
		Potter (Bruce Mansfield)	42-007-0006	206 Mowry Rd., Monaca, PA 15071	N/A	Incomplete

Monitors in Bold have the highest 2008-2010 design value in the respective county.

Beaver County shows a violation of the 2008 Lead NAAQS. Therefore, some area in this county must be designated nonattainment. The absence of a violating monitor alone is not a sufficient reason to eliminate nearby counties as candidates for nonattainment status. Each area has been evaluated based on the weight of evidence of the eight factors collectively combined into five like groupings and other relevant information

Emissions and Emissions-Related Data

Evidence of lead emissions sources in the vicinity of a violating monitor are an important factor for determining whether a nearby area is contributing to a monitored violation. For this factor, EPA evaluated county level emission data for lead and any growth in lead emitting activities since the date represented by those emissions data.

Emissions

Emissions data for industrial and airport sources (there are approximately 20,000 airport facilities in the U.S. at which leaded aviation gasoline is consumed) were derived from the 2008 National Emissions Inventory, version 1.5 (NEI08V1.5), which was the most current version of the national inventory available in 2011 when these data were compiled for the designations process. See <http://www.epa.gov/ttn/chief/net/2008inventory.html#inventorydoc>. EPA recognizes that we have no information on any emissions increases that may have occurred since 2008. For example, certain large sources of emissions in or near this area may have installed emission controls or otherwise significantly reduced emissions since 2008. Some States provided updated information on emissions and emission controls in their comments to EPA. Pennsylvania provided updated emissions information, provided in Table 3. The data provided by Pennsylvania was the most current emission information available at the time of their submittal. For 2008 emissions from Pennsylvania and the 2008 NEI are the same for the lead sources in Table 3.

Table 3 shows total emissions of lead (given in tons per year) for violating and potentially contributing townships/boroughs in and around the Lower Beaver Valley Area and sources emitting (or anticipate to contribute) greater than 0.1 ton per year of lead according to the state

emission inventory (eF.A.C.T.S.) for the years 2007, 2008, and 2009. See <http://www.dep.state.pa.us/dep/efacts/>. Facilities that are part of the Lower Beaver Valley Nonattainment Area for the 2008 Lead NAAQS are shown in **boldface**. The EPA has chosen to accept Pennsylvania's use of the inventory. Figure 3 and 4 below shows the distance between the First Energy Generation Corp/Bruce Mansfield Plant and the Lower Beaver Valley Nonattainment Area. During this second round of designations in 2011, Beaver has been reevaluated based on new monitoring data to expand the area as discussed in the 2010 Designation TSD for the 2008 Lead NAAQS.

Table 3. Facility lead emissions greater than 0.1 tons per year

County	Facility in State Recommended Nonattainment Area	Facility Name and Location	Facility – Total Air Emissions 2007-eFacts Pennsylvania's State inventory (tons per year)	Facility – Total Air Emissions 2008-eFacts Pennsylvania's State inventory (tons per year)	Facility – Total Air Emissions 2009-eFacts Pennsylvania's State inventory (tons per year)
Beaver County, PA	Yes	Horsehead Corp./Monaca Smelter 300 Frankfort Rd.	5.64	5.38	3.825.
Beaver County, PA	No	First Energy Gen. Corp/ Bruce Mansfield Plant State Route 168 South	1.20	0.70	0.70
Beaver County, PA	No	Jewel Acquisition/ Midland Factory 12 th St. & Midland Ave.	0.30	0.10	0.10

Figure 3. Lower Beaver Valley Nonattainment Area with facility locations within Beaver County, Pennsylvania.

Lower Beaver Valley Nonattainment Area and Surrounding Sources



0 2.5 5 10 Miles

Legend

-  Beaver County
-  2011 Lower Beaver Valley Nonattainment Area

Pb Emissions Inventory

(tons per year)






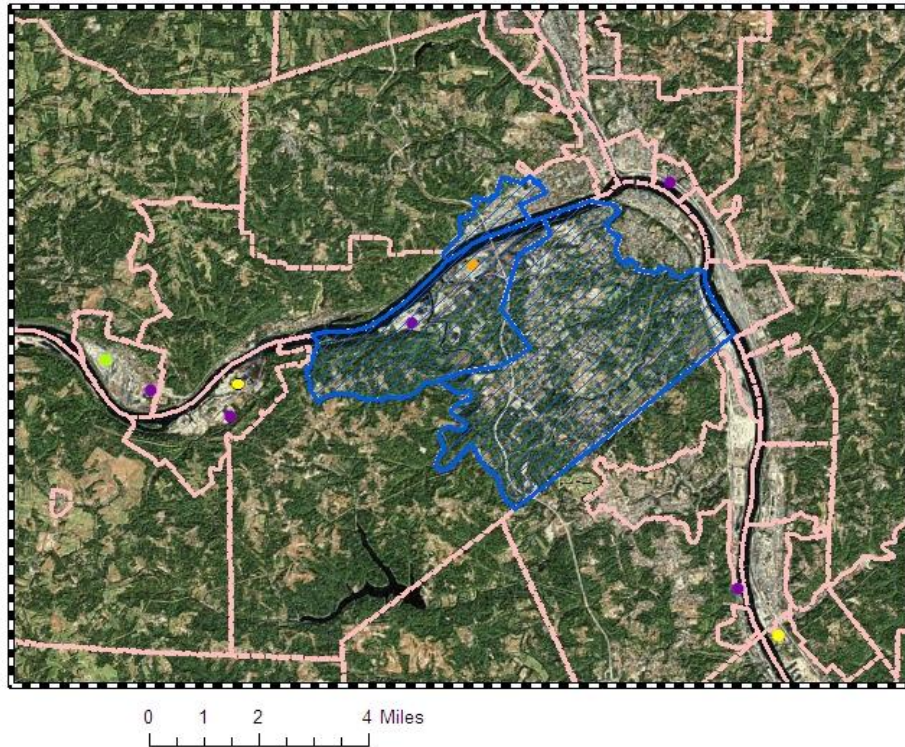
-  0.000000 - 0.100000
-  0.100001 - 0.500000
-  0.500001 - 1.000000
-  1.000001 - 10.000000
-  10.000001 - 41.113794

Figure 4. Lower Beaver Valley Nonattainment Area and Surrounding Sources

Lower Beaver Valley Nonattainment Area and Surrounding Sources








Legend

 2011 Lower Beaver Valley Nonattainment Area

Pb Emissions Inventory

(tons per year)

-  0.000000 - 0.100000
-  0.100001 - 0.500000
-  0.500001 - 1.000000
-  1.000001 - 10.000000
-  10.000001 - 41.113794

Population Data, Growth Rates, and Patterns

Table 4 shows the 2008 population for Beaver County being evaluated, as well as the population density for each county in that area. These data help assess the extent to which the concentration of human activities in the area and concentration of population-oriented commercial development may indicate emissions-based activity contributing to elevated ambient lead levels. This may include ambient lead contributions from activities that would disturb lead that has been

deposited on the ground or on other surfaces. Re-entrainment of historically deposited lead is not reflected in the emissions inventory.

Table 4. Population Data

County	State Recommended Nonattainment?	2008 Population	2008 Population Density (pop/sq mi)	Population Change 2000-2008	Population % Change 2000-2008
Beaver County, PA	Yes (partial)	172,476	389	-8,639	-5%

Source of data: U.S. Census Bureau estimates for 2008 (<http://www.census.gov/popest/datasets.html>) and estimation of the area of U.S. Counties

Beaver County has a declining population trend between 2000 and 2008. EPA has considered the growth rate of population density and related commercial development for this area and does not believe that it affects EPA’s proposed final decision.

Emissions Controls

Under this factor, the existing level of control of emission sources is taken into consideration. The emissions data used by EPA in this technical analysis and provided in Tables 3 represent emissions levels taking into account any control strategies implemented in the Lower Beaver Valley Nonattainment Area before 2007 on stationary sources.

Horsehead Corporation is a zinc processing facility which produces high purity zinc oxide and high grade zinc metal using a two step distillation process. There are two sources responsible for the majority of the lead emissions from the facility: the sintering line and the electrothermic furnace line. Raw materials consisting of crude zinc oxide and other secondary materials are fed to a sintering machine. Under high temperatures, air is drawn through the materials, resulting in fused chunks that become feedstock for the electrothermic furnaces. Various impurities (such as lead) are volatilized during the processing. Emissions from this process are controlled by a baghouse. According to the company, 95 % of the lead emissions from the furnaces are emitted through baghouses, and only 5% escapes as fugitive emissions.

Meteorology (weather/transport patterns)

For this factor, EPA considered data from National Weather Service instruments and other meteorological monitoring sites in the area. Wind direction and wind speed data is from 1960-1992 Solar and Meteorological Surface Observation Network information issued jointly by the U.S. Department of Commerce: National Climatic Data Center and the U.S. Department of Energy: National Renewable Energy Laboratory. This data is summarized in Figure 5 and Table 5, below. This data may provide evidence of the potential for lead emissions sources located upwind of a violating monitor to contribute to ambient lead levels at the violation location.

Figure 5. Wind directions summarized by season for Beaver County, PA

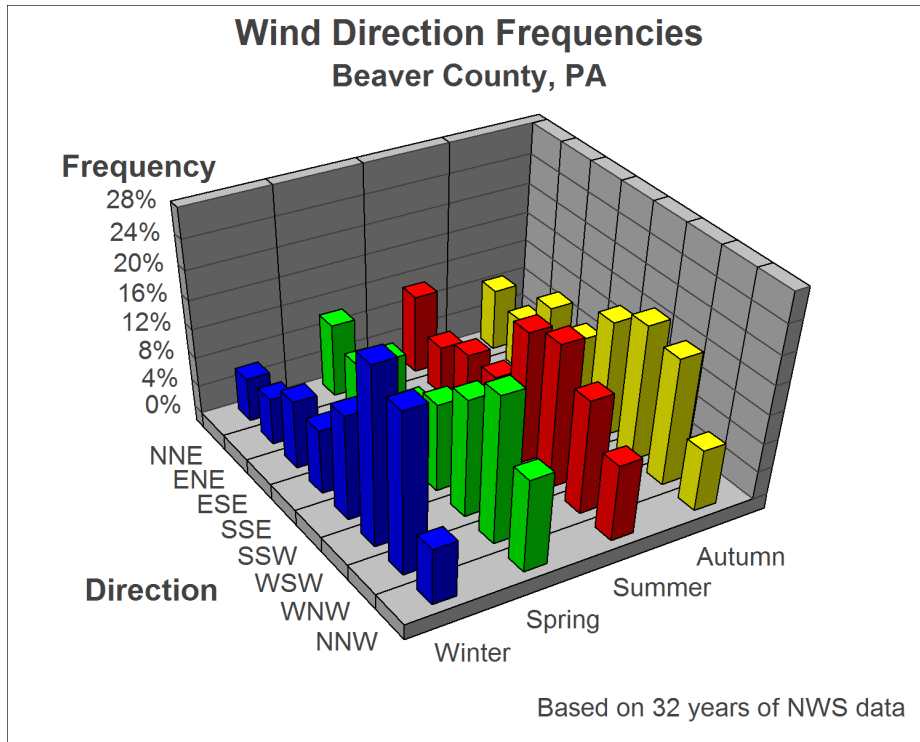


Table 5. Top two prevailing wind directions by season for Beaver County, PA

Season	Wind direction	Percent of wind at that direction
Winter	West, Southwest	25
Winter	West, Northwest	22
Spring	West, Northwest	20
Spring	West, Southwest	16
Summer	West, Southwest	20
Summer	South, Southwest	18
Autumn	West, Southwest	19
Autumn	West, Northwest	18

As shown in the graph in Figure 4 and Table 5, the prevailing surface winds were predominantly from the west, northwest and west, southwest for all four seasons.

Geography/topography (mountain ranges or other air basin boundaries)

The geography/topography analysis evaluates the physical features of the land that might have an effect on the air shed and, therefore, on the distribution of lead over the Lower Beaver Valley Nonattainment Area.

The Lower Beaver Valley Nonattainment Area does not have any geographical or topographical barriers significantly limiting air pollution transport within its air shed. Therefore, this factor did not play a significant role in determining the nonattainment boundary.

Jurisdictional boundaries

Existing jurisdictional boundaries may be helpful in articulating a boundary for purposes of nonattainment designations, and for purposes of carrying out the governmental responsibilities of planning for attainment of the lead NAAQS and implementing control measures. These existing boundaries may include an existing nonattainment or maintenance area boundary, a county or township boundary, a metropolitan area boundary, an air management district, or an urban planning boundary established for coordinating business development or transportation activities.

The proposed Lower Beaver Valley Nonattainment Area is constructed using the township boundaries within Beaver County.

Conclusion

After considering the factors described above, EPA has preliminarily determined that it is appropriate to include the portion of Beaver County, PA listed in Table 1 in the Lower Beaver Valley Nonattainment Area for the 2008 Lead NAAQS.

The air quality monitors in Beaver County show a violation of the 2008 Lead NAAQS, based on 2008 - 2010 air quality data and support the expansion of the previously designated Lower Beaver Valley Nonattainment Area to include Center Township. EPA is modifying Pennsylvania's recommendation by adding Center Township to the Lower Beaver Valley Nonattainment Area. EPA's nonattainment area includes Center Township, Potter Township, and Vanport Township located within Beaver County. Center Township has been added to Pennsylvania's recommended Lower Beaver Valley Area because of the violating new monitor located within this township.

Based on its consideration of all the relevant, available information, as described above, EPA believes that the boundaries described herein encompass the entire area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the 2008 Lead NAAQS.

Definition of important terms used in this document:

- 1) **Designated “nonattainment” area** – an area which EPA has determined, based on a State recommendation and/or on the technical analysis included in this document, has violated the 2008 Lead NAAQS, based on the most recent three years of quality assured air quality monitoring data from 2008-2010 including at least one valid three-month site mean above the level of the 2008 Lead NAAQS, or that contributes to a violation in a nearby area.
- 2) **Designated “unclassifiable/attainment” area** – an area which EPA has determined does not contribute to a violation of the 2008 Lead NAAQS in a nearby area and either: (1) meets the 2008 Lead NAAQS, based on the most recent three years of quality assured air quality monitoring data from 2008-2010 including 36 consecutive valid three-month site means (including the last two months of 2007), or (2) has no monitors or has incomplete air quality monitoring data for 2008-2010 but has no violations of the 2008 Lead NAAQS.
- 3) **Designated “unclassifiable” area** – an area which EPA has determined cannot be classified on the basis of available information as meeting or violating the 2008 Lead NAAQS, based on the most recent three years of quality assured air quality monitoring data from 2008-2010, but for which available monitoring data from the same or a recent period indicate a significant likelihood that the area may be violating the 2008 Lead NAAQS.
- 4) **Recommended nonattainment area** – an area a State or Tribe has recommended to EPA be designated as nonattainment.
- 5) **Violating monitor** – an ambient air monitor whose valid design value exceeds 0.15 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). As described in Appendix R of 40 CFR part 50, a violation can be based on either Pb-TSP or Pb-PM10 data and only three months of data are necessary to produce a valid violating design value.
- 6) **1978 Lead NAAQS** – $1.5 \mu\text{g}/\text{m}^3$, National Ambient Air Quality Standard for lead promulgated in 1978. Based on Pb-TSP indicator and averaged over a calendar quarter.
- 7) **2008 Lead NAAQS** - $0.15 \mu\text{g}/\text{m}^3$, National Ambient Air Quality Standard for lead promulgated in 2008. Based on Pb-TSP indicator and a three-month rolling average. Pb-PM10 data may be used in limited instances, including to show nonattainment.