## Technical Support Document

***Definition of important terms used in this document:***

1) **Designated "unclassifiable"** – an area where Environmental Protection Agency (EPA) could not determine if there was a violation of the 2008 Lead National Ambient Air Quality Standard (NAAQS) or a contribution to a violation in a nearby area, because there was insufficient air quality data for both 2006-2008 and 2007-2009 and where additional monitoring data for 2010 could not result in a different designation.

2) **Designated "attainment"** – an area which EPA has determined, based on the most recent 3 years of certified air quality data from 2006-2008 or 2007-2009, has no violations of the 2008 Lead NAAQS during 36 consecutive valid 3-month site means; and which EPA has further determined does not contribute to a violation of the 2008 Lead NAAQS in a nearby area and that additional monitoring data from 2010 could not result in a different designation.

3) **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 a violation of the 2008 Lead NAAQS during the most recent three consecutive years of quality-assured, certified air quality data.

4) **Prior nonattainment area** – an area that is currently designated as nonattainment or maintenance for the 1978 Lead Standard (including both current nonattainment areas and maintenance areas).

5) **Recommended nonattainment area** – an area a State or Tribe has recommended to EPA be designated as nonattainment.

6) **Violating monitor** – an ambient air monitor whose design value exceeds 0.15 micrograms per cubic meter ($\mu g/m^3$). As described in Appendix R of part 50, a violation can be based on either Pb-Total Suspended Particulate (TSP) or Pb-Particulate Matter 10 microns or smaller in size (PM10) data and only three months of data are necessary to produce a valid violating design value.

7) **1978 Lead NAAQS** – 1.5 $\mu g/m^3$, National Ambient Air Quality Standard for lead promulgated in 1978. Based on Pb-TSP indicator and averaged over a calendar quarter.

8) **2008 Lead NAAQS** - 0.15 $\mu g/m^3$, 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.

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

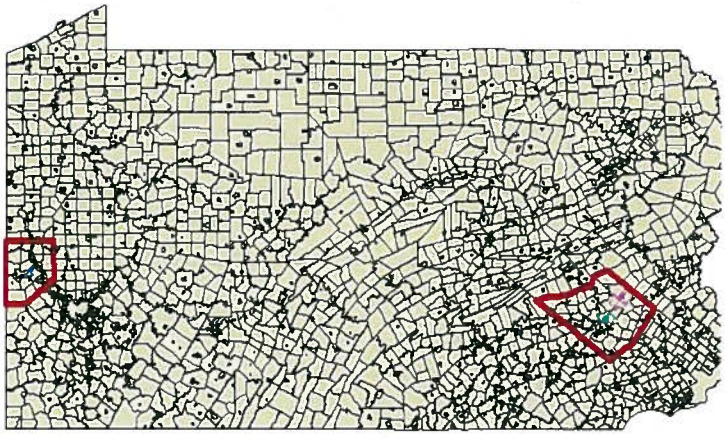
*EPA has revised the level of the primary (health-based) standard from 1.5 micrograms per cubic meter (μg/m³) to 0.15 μg/m³ measured as total suspended particles (TSP). EPA has revised the secondary (welfare-based) standard to be identical in all respects to the primary standard.*

**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 counties or portions of counties in the Commonwealth of Pennsylvania that EPA intends to designate "nonattainment" for the 2008 lead national ambient air quality standard (2008 Lead NAAQS).

**Table 1. Recommended Nonattatinment Areas**

| Area (listed alphabetically) | Pennsylvania's Recommended Nonattainment Counties | Pennsylvania's Recommended Nonattainment Townships/Boroughs | EPA's Designated Nonattainment Counties | EPA's Designated Nonattainment Townships/Boroughs |
|---|---|---|---|---|
| Lower Beaver Valley Area | Beaver County (partial) | Potter and Vanport | Beaver County (partial) | Potter and Vanport |
| Lyons Area | Berks County (partial) | Maxatawny, Richmond, and Lyons | Berks County (partial) | Maxatawny, Richmond, Lyons, and Kutztown |
| North Reading Area | Berks County (partial) | Muhlenberg, Laureldale, and Alsace | Berks County (partial) | Muhlenberg, Laureldale, and Alsace |

**Figure 1. Map of Beaver and Berks Counties in relation to the rest of the Commonwealth of Pennsylvania.**



## Technical Analysis for Lyons Nonattainment Area

### Introduction

This technical analysis for Lyons Nonattainment Area in Berks County 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 previous 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 (e.g., modeling where done appropriately).

On December 17, 2009, Pennsylvania recommended that parts of Berks 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 Federal Reference Method (FRM) or Federal Equivalent Method (FEM) monitors located in the state. As part of Pennsylvania's recommendation they used modeling for drawing the nonattainment area boundaries in Berks County. EPA's review of this modeling can be found in Appendix A of this document. This modeling supports Pennsylvania's recommendation that the Lyons Nonattainment Area and the North Reading Nonattainment Area in Berks County should be two separate nonattainment areas. A conservative approach was used by Pennsylvania where they included the whole Township or Borough that contains any part of the contours of the modeling results at or above half the 2008 Lead NAAQS or 0.075 $\mu g/m^3$. A map of these contour lines showing the two separate nonattainment areas can be found in Figure A-2 in Appendix A of this document.

Based on EPA's technical analysis described below, EPA is intending to designate part of Berks County in Pennsylvania as nonattainment for the 2008 Lead NAAQS as the Lyons Nonattainment Area, based upon currently available information. This County and the Townships/Boroughs included in the nonattainment area are listed above in Table 1.

### Detailed Assessment

#### *Air Quality Data*

This factor considers the lead design values (in $\mu g/m^3$) for air quality monitors in Berks County in the Lyons Area and the surrounding areas based on data for the 2006-2008 and 2007-2009

periods. 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 $\mu g/m^3$. 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.

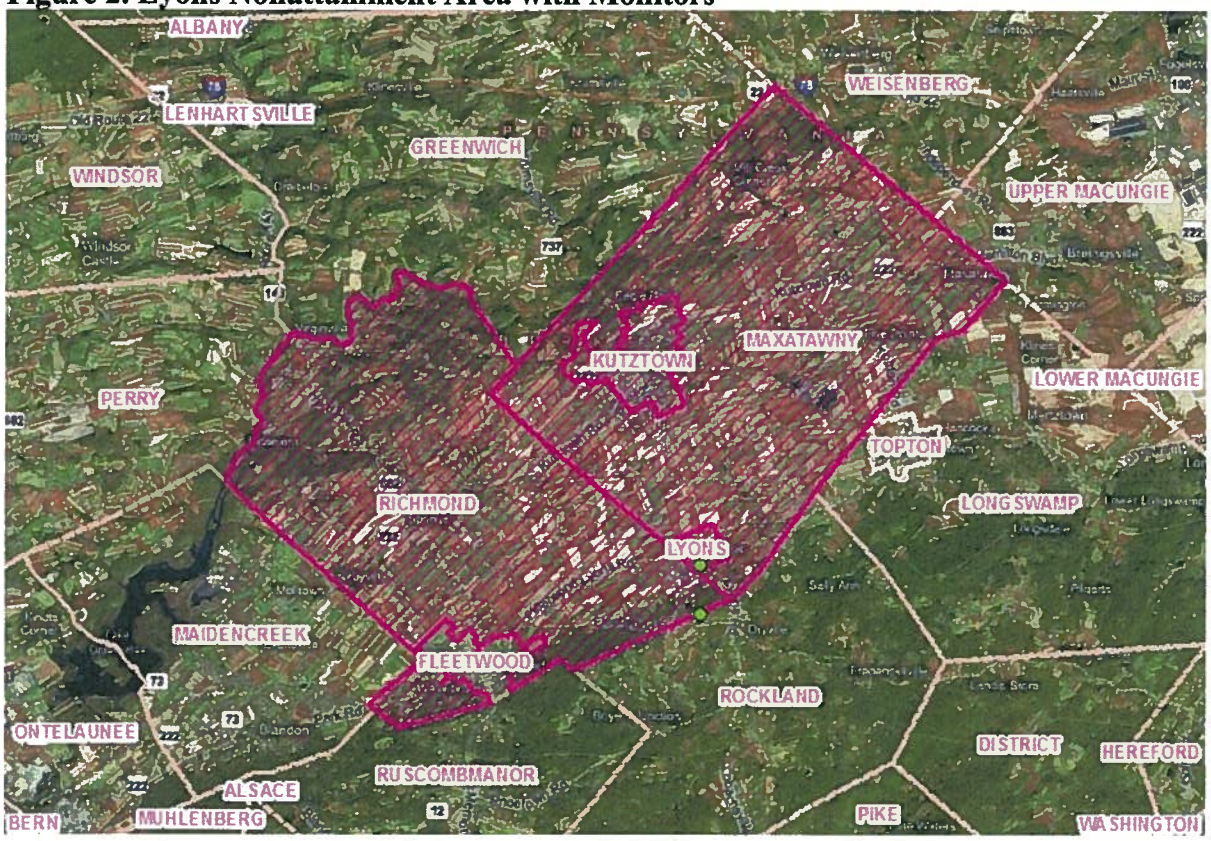
The 2008 Lead NAAQS design values for Berks County in the Lyons Nonattainment Area and surrounding area are shown in Table 2.

**Table 2. Air Quality Data**

| **County** | **State Recommended Nonattainment?** | **Monitor Air Quality System ID** | **Monitor Location** | **Lead Design Value 2006-2008** ($\mu g/m^3$) | **Lead Design Value 2007-2009** ($\mu g/m^3$) |
|---|---|---|---|---|---|
| Berks County, PA | Yes (partial) | 420110005 | Lyons Area | 0.10 | 0.07 |
| | | **420110717** | **Lyons Area** | **0.21** | **0.21** |
| | | 420111717 | North Reading Area | 0.36 | 0.36 |

Monitors in **Bold** have the highest 2007-2009 design value in the respective nonattainment area.

**Figure 2. Lyons Nonattainment Area with Monitors**




The Lyons Nonattainment Area shows a violation of the 2008 Lead NAAQS. Therefore, some area in this county must be designated nonattainment. However, the absence of a violating monitor alone is not a sufficient reason to eliminate nearby areas as candidates for nonattainment status. Each area has been evaluated based on the weight of evidence of the factors and other relevant information.

Figure 2 is a map of the area analyzed showing the locations of air quality monitors in the nonattainment area. Currently, in the Lyons Nonattainment Area, there are two monitors. Of these two monitors, one is violating the 2008 Lead NAAQS and the other is not violating, as shown in Table 2. The monitor that is within Lyons Borough in Figure 2 is the design monitor and is exceeding the 2008 Lead NAAQS. The monitor to the south, located in Richmond Township, is attaining the 2008 Lead NAAQS, therefore, EPA agrees with Pennsylvania that no other Townships/Boroughs to the East of Richmond Township should be included into the Lyons Nonattainment Area.

***Emissions and Emissions-Related Data***

Evidence of lead emissions sources surrounding a violating monitor is 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 population data.

Emissions

Emissions data were derived from the 2005 National Emissions Inventory (NEI), version 2, which was the most up-to-date version of the national inventory available when these data were compiled for the designations process in 2009. See http://www.epa.gov/ttnchie1/net/2005inventory.html. EPA recognizes that for certain counties, emissions may have changed since 2005. For example, certain large sources of emissions in or near this area may have installed emission controls or otherwise significantly reduced emissions since 2005. Some States provided updated information on emissions and emission controls in their comments to EPA. Pennsylvania provided updated emissions information. This updated data is provided in Table 3 below. The data provided by Pennsylvania is the most current emission information available. The lead inventory information from these years allows for a direct comparison between the model results and the most recently available design values since the emissions are from roughly the same time periods; 2007 or 2008 for lead emissions and 2007-09 for monitor design values.

Table 3 shows total emissions of lead (given in tons per year) in and around the Lyons Nonattainment Area for sources emitting (or anticipate to contribute) greater than 0.1 ton per year of lead according to the state emission inventory (Environment Facility Application Compliance Tracking System (eF.A.C.T.S.)) for the years 2007 and 2008. See http://www.dep.state.pa.us/dep/efacts/. Facilities that are part of the Lyons Nonattainment Area for the 2008 Lead NAAQS are shown in **boldface**. Additional facilities whose annual emissions are less than 0.1 ton per year of lead and within the Lyons Nonattainment Area are listed in Table 4 below. The EPA has chosen to accept Pennsylvania's use of the inventory, and also accepts Pennsylvania's use of the highest yearly emissions in its modeling analysis as a conservative approach. See Appendix A of this document for modeling analysis.

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

| County | Facility in State Recommended Nonattainment Area? | Facility Name | 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 Location |
|---|---|---|---|---|---|
| **Berks County, PA** | **Yes** | **EastPenn Manufacturing Co. Inc/Battery Assembly** | **2.47** | **2.49** | **147 Deka Rd.** |
| **Berks County, PA** | **Yes** | **EastPenn Manufacturing Co. Inc/ Smelter Plant** | **0.12** | **0.20** | **147 Deka Rd.** |
| Berks County, PA | No | Exide Tech/ Reading Smelter | 1.474 | 1.441 | 2nd & Washington Sts. |
| Berks County, PA | No | Yuasa Battery Inc/ Laureldale | 0.14 | 0.15 | 2901 Montrose Ave |
| Berks County, PA | No | RRI Energy Mid Atlantic/Titus Gen. Station | 0.12 | 0.12 | 296 Poplar Neck Rd |
| Berks County, PA | No | Lehigh Cement Co. LLC/ Evansville Cement Plant and Quarry | 0.119 | | 537 Evansville Rd. |
| Berks County, PA | No | Boyertown Foundry Co./ FKA EAFCO | | 0.127 | 9th & Rothermal Sts. |

**Table 4. Facility lead emissions less than 0.1 tons per year**

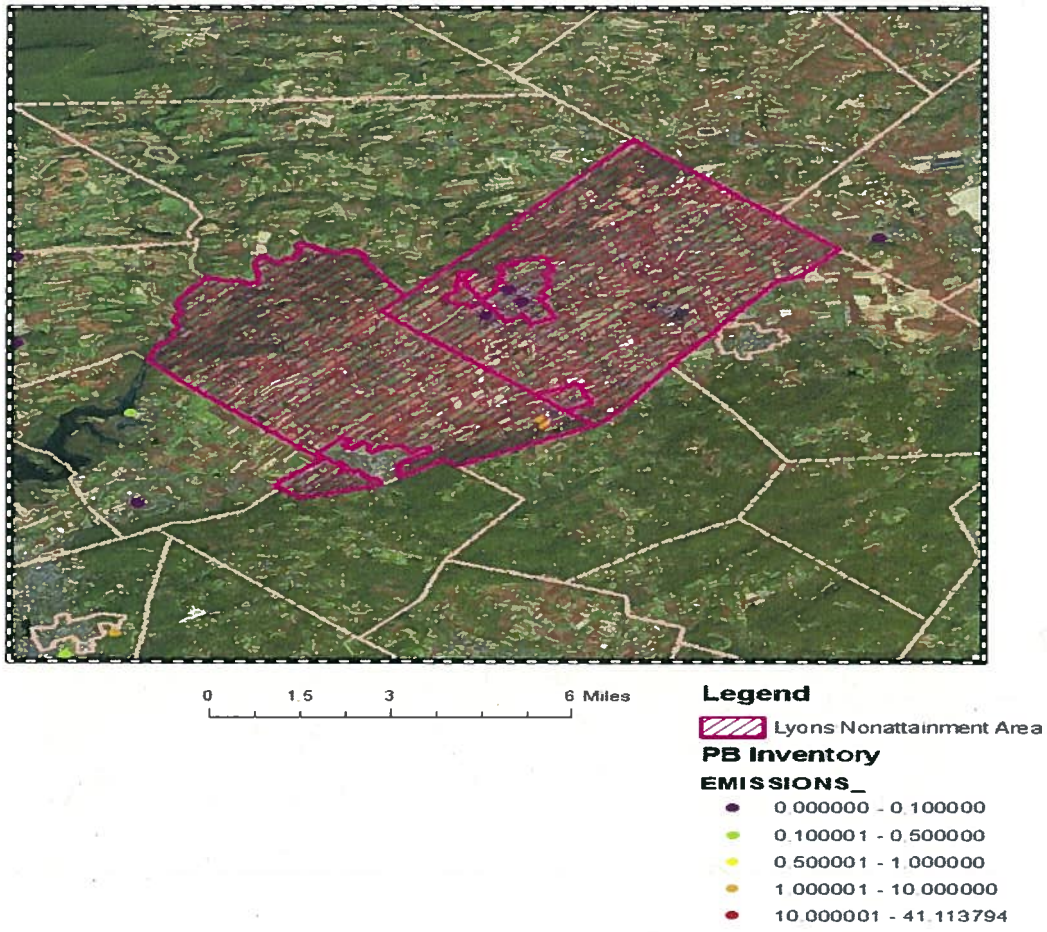
| County | Facility in State Recommended Nonattainment Area? | Facility Name | Facility – Total Air Emissions 2007-eFacts Pennsylvania's State inventory (tons per year) | Facility – Total Air Emissions 2008-eFacts Pennsylvania's State inventory (tons per year) | Facility Location |
|---|---|---|---|---|---|
| Berks County, PA | No | EastPenn Manufacturing Co. INC/ Kutztown | 0.01 | 0.01 | 191 Willow St. |
| Berks County, PA | No | Kutztown University of Pennsylvania | 0.0092 | | Hinterliten Rd. |
| Berks County, PA | No | McConway & Torley LLC/Kutztown Foundry | | 0.0051 | 230 Railroad St. |

There are approximately 20,000 airport facilities in the U.S. at which leaded aviation gasoline is consumed. To evaluate the potential impact of emissions at and near these facilities, EPA recommends that states use the draft 2008 NEI. Data for airport facilities in Berks County which use leaded aviation gasoline are included in Table 5.

**Table 5. Airport Emissions greater than 0.1 tons per year in Berks County, PA**

| County | Airport in State Recommended Nonattainment Area? | Airport Name | Airport – Total Air Emissions Draft 2008 NEI (tons per year) | Airport Location |
|---|---|---|---|---|
| Berks County, PA | No | Kutztown | 0.12 | CLOSED November 2008 |
| Berks County, PA | No | Reading Regional Airport (RDG) | 0.24 | 2501 Bernville Road |

**Figure 3. Lyons Nonattainment Area with facility locations identified by annual emissions in tons per year.**




In Pennsylvania's recommendation, the facilities in Table 4 were not mentioned. It is EPA's determination that Kutztown Borough should be included as part of the Lyons Nonattainment Area because although small in size it does have lead emitting facilities. The locations of the facilities in Kutztown Borough are shown in Figure 3. The Borough currently appears as a hole in the nonattainment area recommended by Pennsylvania, since it is surrounded by Maxatawny Township. EPA agrees with Pennsylvania that Fleetwood Borough should not be included in the

Lyons Nonattainment Area because it does not have any lead emitting facilities and does not contribute to the nonattainment area.

Population Data

Table 6 shows the 2008 population for Berks County. This data helps 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 6. Population Data**

| County | State Recommended Nonattainment? | 2008 Population | 2008 Population Density (pop/sq mi) | Population Change 2000-2008 | Population % Change 2000-2008 |
|---|---|---|---|---|---|
| Berks County, PA | Yes (partial) | 403,595 | 467 | 29,098 | 8% |

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

Growth rates and patterns

Berks County has an increasing population trend between 2000 and 2008. EPA has considered the population growth rate for this area and does not believe that it affects the boundary recommendation.

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 Table 3 and Table 4 represent emissions levels taking into account any control strategies implemented in the Lyons Nonattainment Area before 2007 on stationary sources.

East Penn Manufacturing Company operates a lead/acid storage battery assembly facility and a secondary lead smelter. The six battery assembly plants and lead oxide plant account for most of the lead emissions reported by the facility. Each assembly plant consists of four main operations that result in particulate and lead emissions controlled by fabric collectors. Most fabric filters are followed by a HEPA filter to further reduce the emissions. The entire facility is subject to lead Reasonably Available Control Technology (RACT) in the Pennsylvania State Implementation Plan (SIP). It meets the requirements of the National Emission Standards for Hazardous Air Pollutants (NESHAP) subpart PPPPPP for the Lead and Acid Battery Manufacturing Area Sources and New Source Performance Standards (NSPS) subpart KK for the Standards of Performance for Lead-Acid Battery Manufacturing Plants.

*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 4 and Table 7, 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 4. Wind directions summarized by season for Berks County, PA**

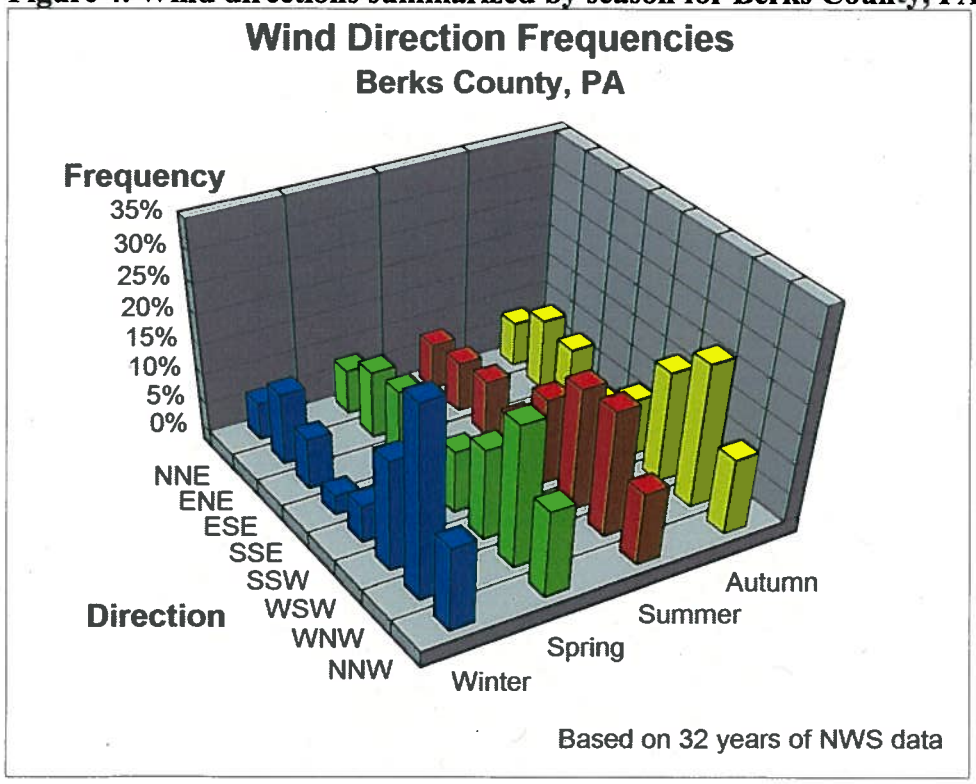



**Table 7. Top two prevailing wind directions by season for Berks County, PA**

| Season | Wind direction | Percent of wind at that direction |
|---|---|---|
| Winter | West, Northwest | 32 |
| Winter | West, Southwest | 18 |
| Spring | West, Northwest | 24 |
| Spring | West, Southwest | 15 |
| Summer | West, Northwest | 21 |
| Summer | West, Southwest | 20 |
| Autumn | West, Northwest | 24 |
| Autumn | West, Southwest | 19 |

As shown in the graph in Figure 4 and Table 7, 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 Lyon Nonattainment Area.

The Lyons 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 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 recommended Lyons Nonattainment Area is constructed using the Township/Borough boundaries within Berks County.

***Other Relevant Information***

The Commonwealth provided modeling to show that the two areas, the Lyons Nonattainment Area and the North Reading Nonattainment Area in Berks County should be separate. The Commonwealth recommended including in the nonattainment area those Townships and Boroughs where the modeling has shown a value of 0.075 $\mu g/m^3$ or higher. Additional review of the modeling submitted by Pennsylvania can be found in Appendix A of this technical analysis document.

**Conclusion**

After considering the factors and information described above, EPA has determined that it is appropriate to include portions of Berks County listed in Table 1 as part of the Lyons Nonattainment Area for the 2008 Lead NAAQS.

EPA is changing Pennsylvania's recommendation by adding the Borough of Kutztown to the Lyons Nonattainment Area. EPA's recommended area includes Kutztown Borough, Lyons Borough, Maxatawny Township, and Richmond Township located with in Berks County. The

Kutztown Borough is being added to Pennsylvania's recommended Lyons Nonattainment Area. EPA determined that Kutztown Borough should be included in the nonattainment area because it is entirely encompassed by the recommended nonattainment area; it has 2 facilities that emit lead within its boundaries; and are in close proximity to the violating monitor.

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 Pb NAAQS.

## Technical Analysis for North Reading Nonattainment Area

### Introduction

This technical analysis for North Reading Nonattainment Area in Berks County 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 previous 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 (e.g., modeling where done appropriately).

On December 17, 2009, Pennsylvania recommended that parts of Berks 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 Federal Reference Method (FRM) or Federal Equivalent Method (FEM) monitors located in the state.

Based on EPA's technical analysis described below, EPA is intending to designate part of Berks County in Pennsylvania as nonattainment for the 2008 Lead NAAQS as the North Reading Nonattainment Area, based upon currently available information. This County and the Townships/Boroughs included in the nonattainment area are listed above in Table 1.

### Detailed Assessment

#### *Air Quality Data*

This factor considers the lead design values (in $\mu g/m^3$) for air quality monitors in North Reading Nonattainment Area in the Berks County and the surrounding area based on data for the 2007 – 2009 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 $\mu g/m^3$. 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.

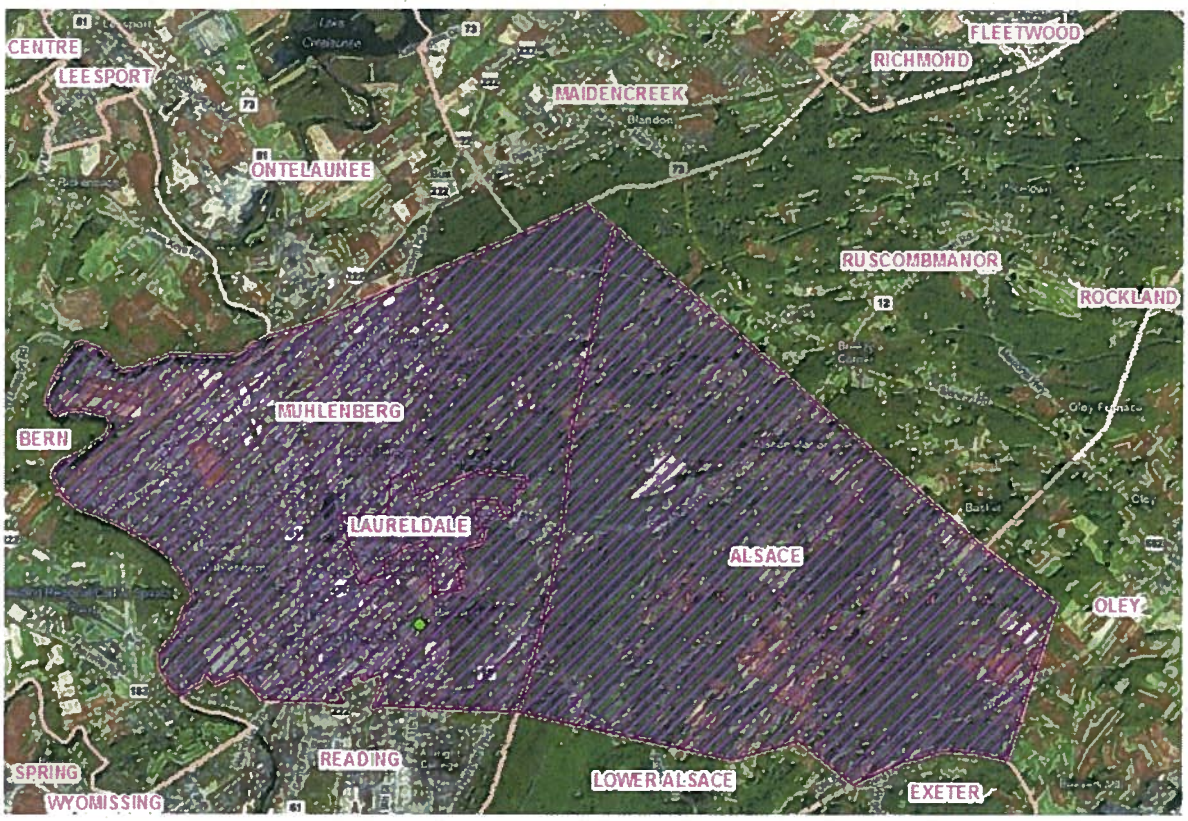
The 2008 Lead NAAQS design values for Berks County in the North Reading Area and surrounding area are shown in Table 8.

**Table 8. Air Quality Data**

| County | State Recommended Nonattainment? | Monitor Air Quality System ID | Monitor Location | Lead Design Value 2006-2008 ($\mu g/m^3$) | Lead Design Value 2007-2009 ($\mu g/m^3$) |
|---|---|---|---|---|---|
| Berks County, PA | Yes (partial) | 420110005 | Lyons Area | 0.10 | 0.07 |
| | | **420110717** | **Lyons Area** | **0.21** | **0.21** |
| | | 420111717 | North Reading Area | 0.36 | 0.36 |

Monitors in **Bold** have the highest 2006-2008 design value in the respective area.

**Figure 5. Area analyzed showing the location of the air quality monitor.**




The North Reading Nonattainment Area shows a violation of the 2008 Lead NAAQS. Therefore, some area in this county must be designated nonattainment. The design value for this

Nonattainment Area is found at the single monitor in Muhlenberg Township, as shown in Figure 5. However, the absence of a violating monitor alone is not a sufficient reason to eliminate nearby areas as candidates for nonattainment status. Each area has been evaluated based on the weight of evidence of the factors and other relevant information.

***Emissions and Emissions-Related Data***

Evidence of lead emissions sources surrounding a violating monitor is 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 population data.

Emissions

Emissions data were derived from the 2005 National Emissions Inventory (NEI), version 2, which is the most up-to-date version of the national inventory available when these data were compiled for the designations process in 2009. See http://www.epa.gov/ttnchie1/net/2005inventory.html. EPA recognizes that for certain counties, emissions may have changed since 2005. For example, certain large sources of emissions in or near this area may have installed emission controls or otherwise significantly reduced emissions since 2005. Some States provided updated information on emissions and emission controls in their comments to EPA. Pennsylvania provided updated emissions information, shown in Table 9. The data provided by Pennsylvania is the most current emission information available. The lead inventory information from these years allows for a direct comparison between the model results and the most recently available design values since the emissions are from roughly the same time periods; 2007 or 2008 for lead emissions and 2007-09 for monitor design values.

Table 9 shows total emissions of lead (given in tons per year) in and around the North Reading Area from sources emitting (or anticipate to contribute) greater than 0.1 ton per year of lead according to the state emission inventory (Environment Facility Application Compliance Tracking System (eF.A.C.T.S.)) for the years 2007 and 2008. See http://www.dep.state.pa.us/dep/efacts/. Facilities that are part of the North Reading Nonattainment Area for the 2008 Lead NAAQS are shown in **boldface**. The facilities listed in Table 8 are mapped in Figure 6. Figure 6 shows the location of Exide Smelter and Yuasa Battery Inc. within the Nonattainment Area boundary and the smaller facilities that do not cause or contribute to the North Reading Nonattainment Area. The EPA has chosen to accept Pennsylvania's use of the inventory, and also accepts Pennsylvania's use of the highest yearly emissions in its modeling analysis as a conservative approach. See Appendix A of this document for modeling analysis.

**Table 9. Facility lead emissions greater than 0.1 tons per year**

| County | Facility in State Recommended Nonattainment Area? | Facility Name | 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 Location |
|---|---|---|---|---|---|
| Berks County, PA | No | EastPenn Manufacturing Co. Inc/Battery Assembly | 2.47 | 2.49 | 147 Deka Rd. |
| Berks County, PA | No | EastPenn Manufacturing Co. Inc/ Smelter Plant | 0.12 | 0.20 | 147 Deka Rd. |
| **Berks County, PA** | **Yes** | **Exide Tech/ Reading Smelter** | **1.474** | **1.441** | **2nd & Washington Sts.** |
| **Berks County, PA** | **Yes** | **Yuasa Battery Inc/ Laureldale** | **0.14** | **0.15** | **2901 Montrose Ave** |
| Berks County, PA | No | RRI Energy Mid Atlantic/Titus Gen. Station | 0.12 | 0.12 | 296 Poplar Neck Rd |
| Berks County, PA | No | Lehigh Cement Co. LLC/ Evansville Cement Plant and Quarry | 0.119 | | 537 Evansville Rd. |
| Berks County, PA | No | Boyertown Foundry Co./ FKA EAFCO | | 0.127 | 9th & Rothermal Sts. |

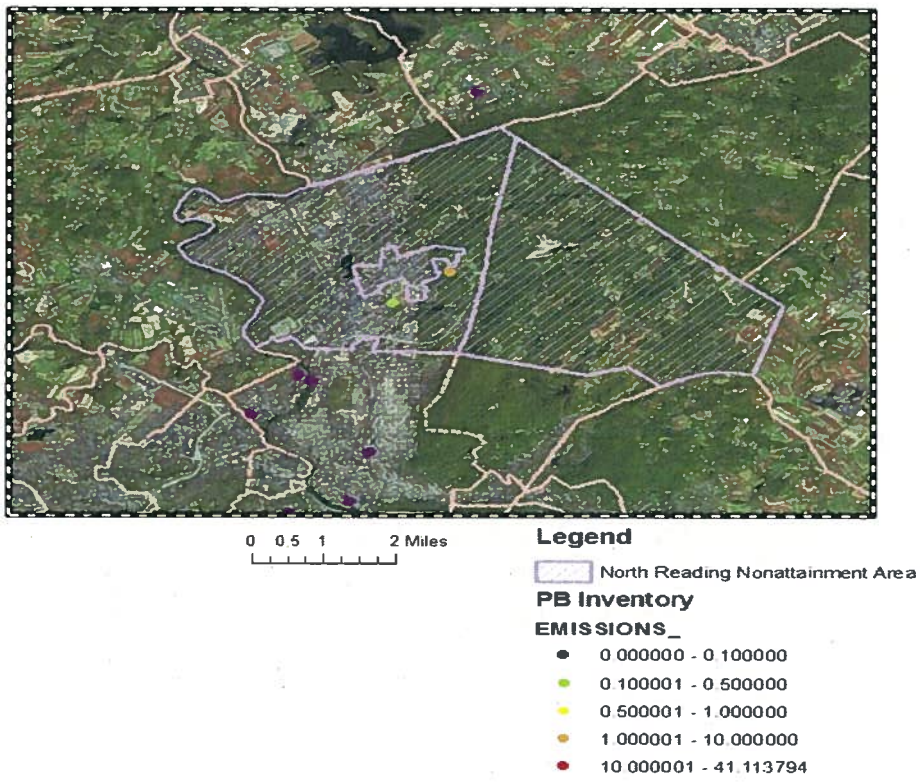
There are approximately 20,000 airport facilities in the U.S. at which leaded aviation gasoline is consumed. To evaluate the potential impact of emissions at and near these facilities, EPA recommends that states use the draft 2008 NEI. Data for airport facilities in Berks County which use leaded aviation gasoline are included in Table 10.

**Table 10. Airport Emissions greater than 0.1 tons per year in Berks County, PA**

| County | Airport in State Recommended Nonattainment Area? | Airport Name | Airport – Total Air Emissions Draft 2008 NEI (tons per year) | Airport Location |
|---|---|---|---|---|
| Berks County, PA | No | Kutztown | 0.12 | CLOSED November 2008 |
| Berks County, PA | No | Reading Regional Airport (RDG) | 0.24 | 2501 Bernville Road |

The RDG airport is located 3.75 kilometers from the violating monitor in the North Reading Nonattainment Area. The Commonwealth has not provided analyses (such as air quality modeling) to examine the potential contribution of lead emissions at RDG to the nonattainment identified by the monitor in Muhlenberg Township. EPA's preliminary modeling suggests emissions from piston-engine aircraft operating out of RDG contribute less than 1% of lead concentrations measured at the violating monitor.

**Figure 6. North Reading Nonattainment Area with facility locations identified by annual emissions in tons per year.**




Population Data

Table 11 shows the 2008 population for each county in the area 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 11. Population Data**

| County | State Recommended Nonattainment? | 2008 Population | 2008 Population Density (pop/sq mi) | Population Change 2000-2008 | Population % Change 2000-2008 |
|---|---|---|---|---|---|
| Berks County, PA | Yes (partial) | 403,595 | 467 | 29,098 | 8% |

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

Growth rates and patterns

Berks County has an increasing population trend between 2000 and 2008. EPA has considered the population growth rate for this area and does not believe that it affects the boundary recommendation.

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 Table 9 represent emissions levels taking into account any control strategies implemented in the North Reading Nonattainment Area before 2007 on stationary sources.

The Exide Facility operates a secondary lead smelter. The facility processes used lead/acid automotive and truck batteries and other lead bearing scrap into metallic lead in one of the two smelting systems. Each system has an identical series of control devices. The area that reports the highest lead emissions is the raw material storage building, which is exhausted to fabric collectors to control particulate and lead. The entire facility is subject to lead RACT in the Pennsylvania SIP.

Yuasa Battery Inc. is a lead battery manufacturing facility. It meets the requirements of the NESHAP subpart PPPPPP for Lead and Acid Battery Manufacturing Area Sources and the NSPS subpart KK Standards of Performance for Lead-Acid Battery Manufacturing Plants.

***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 was taken 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 7 and Table 12, 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 7. Wind directions summarized by season for Berks County, PA**

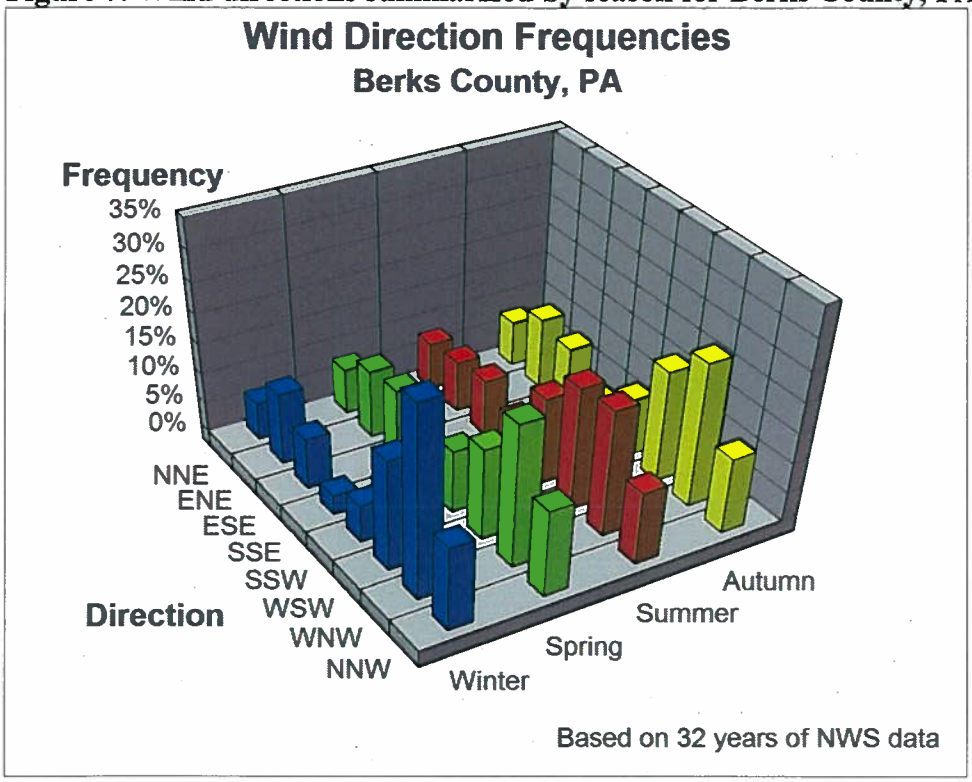



**Table 12. Top two prevailing wind directions by season for Berks County, PA**

| Season | Wind direction | Percent of wind at that direction |
|---|---|---|
| Winter | West, Northwest | 32 |
| Winter | West, Southwest | 18 |
| Spring | West, Northwest | 24 |
| Spring | West, Southwest | 15 |
| Summer | West, Northwest | 21 |
| Summer | West, Southwest | 20 |
| Autumn | West, Northwest | 24 |
| Autumn | West, Southwest | 19 |

As shown in the graph in Figure 7 and Table 12, 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 North Reading Nonattainment Area.

The North Reading 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 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 recommended North Reading Nonattainment Area is constructed using the Township/Borough boundaries within Berks County.

***Other Relevant Information***

The Commonwealth provided modeling to show that the two areas, the Lyons Nonattainment Area and the North Reading Nonattainment Area, in Berks County should be separate. The Commonwealth recommended including in the nonattainment area those Townships and Boroughs where the modeling has shown a value of 0.075 $\mu g/m^3$ or higher. Additional review of the modeling submitted by Pennsylvania can be found in Appendix A of this technical analysis document.

**Conclusion**

After considering the factors and information described above, EPA has determined that it is appropriate to include the portions of Berks County listed in Table 1 as part of the North Reading Nonattainment Area for the 2008 Lead NAAQS.

EPA agrees with Pennsylvania's recommendation for the North Reading Nonattainment Area which includes Alsace Township, Laureldale Borough, and Muhlenberg Township. EPA agrees with Pennsylvania's recommendation to not include Reading City into the North Reading Nonattainment Area.

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 Pb NAAQS.

## Technical Analysis for Lower Beaver Valley Nonattainment Area

### Introduction

This technical analysis for the Lower Beaver Valley Nonattainment Area in Beaver County 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 previous 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 (e.g., modeling where done appropriately).

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 Federal Reference Method (FRM) or Federal Equivalent Method (FEM) monitors located in the state.

Based on EPA's technical analysis described below, EPA is intending to designate part of Beaver County in Pennsylvania as nonattainment for the 2008 Lead NAAQS as the Lower Beaver Valley Nonattainment Area, based upon currently available information. This County and the Townships/Boroughs included in the nonattainment area are listed above in Table 1.

### Detailed Assessment

#### *Air Quality Data*

This factor considers the lead design values (in $\mu g/m^3$) for air quality monitors in Beaver County and the surrounding area based on data for the 2006-2008 and 2007-2009 periods. 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 $\mu g/m^3$. 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 Figure 8 and Table 13.

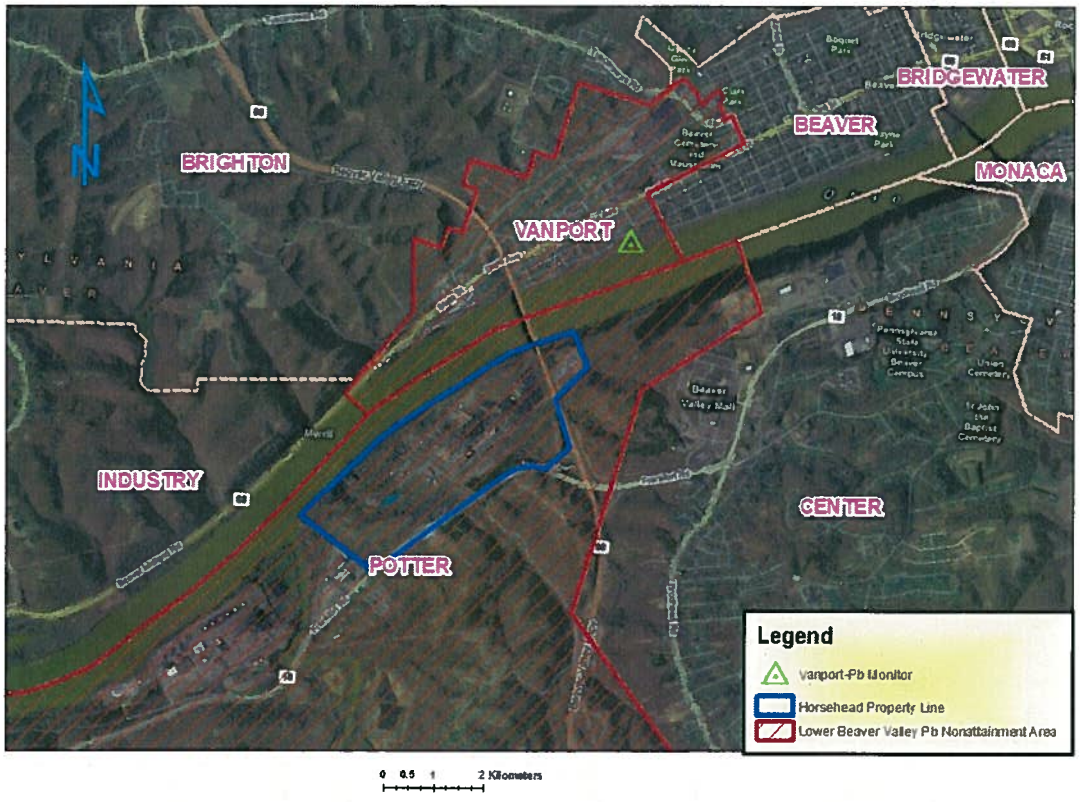
**Table 13. Air Quality Data**

| County | State Recommended Nonattainment? | Monitor Air Quality System ID | Monitor Location | Lead Design Value 2006-2008 ($\mu g/m^3$) | Lead Design Value 2007-2009 ($\mu g/m^3$) |
|---|---|---|---|---|---|
| **Beaver County, PA** | **Yes (partial)** | **420070505** | **TAMAQUI DR** | **0.20** | **0.17** |

Monitors in **Bold** have the highest 2006-2008 design value in the respective nonattainment area.

**Figure 8** is a map of the area analyzed showing the location of the air quality monitor in relation to the Horsehead Facility.

**Figure 8. Lower Beaver Valley Nonattainment Area**




The Lower Beaver Valley Area shows a violation of the 2008 Lead NAAQS. Therefore, some area in this county must be designated nonattainment. However, the absence of a violating

monitor alone is not a sufficient reason to eliminate nearby areas as candidates for nonattainment status. Each area has been evaluated based on the weight of evidence of the factors and other relevant information.

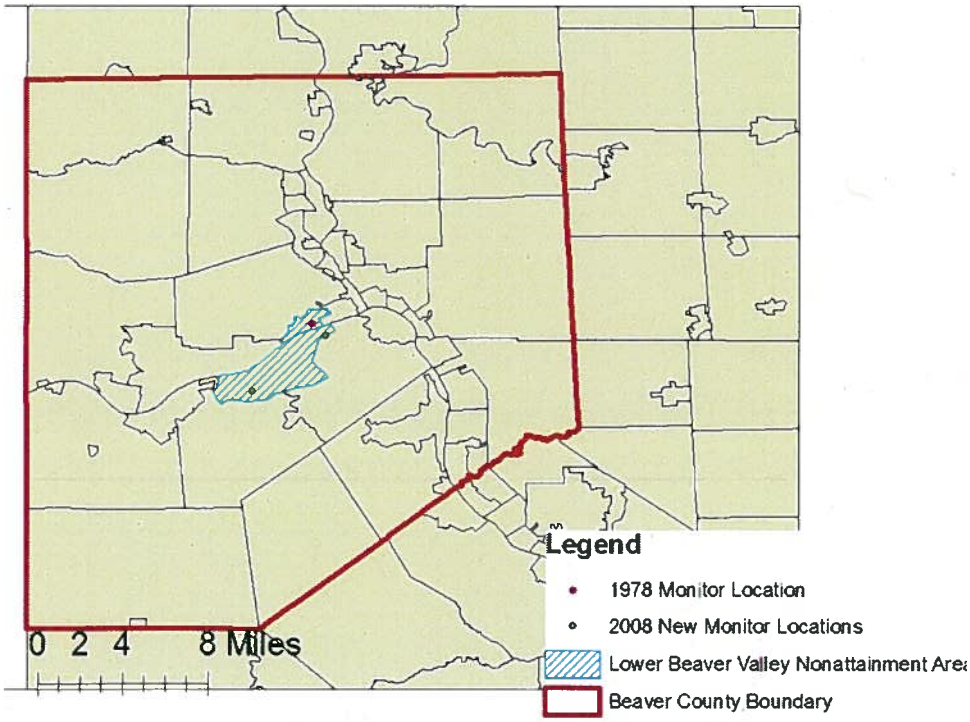
Beaver County will be reevaluated using the same technical analysis in the second round of designations, since new source orientated monitors were to be placed and operational by January 1, 2010 as a requirement of the 2008 Lead NAAQS rule (73 FR 67059). These sites for Beaver County are shown in Figure 9 and listed in Table 14.

**Table 14. Location of Source specific monitors**

| Site Name | Physical Address | Lattitude | Longitude |
|---|---|---|---|
| **Bruce Mansfield** | **206 Mowry Rd., Monaca, PA 15071** | **40.638936°** | **80.365653°** |
| **Horsehead** | **Beaver Valley Mall, Monaca, PA 15071** | **40.676592°** | **80.316369°** |
| Vanport (original Horsehead monitor) | 265 River Ave., Beaver, PA 15009 | 40.685019° | 80.324775° |

New Monitors placed January 1, 2010 are in **Bold**.

**Figure 9. Map of current lead monitor locations as of January 1, 2010**



***Emissions and Emissions-Related Data***

Evidence of lead emissions sources surrounding a violating monitor is 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 population data.

Emissions

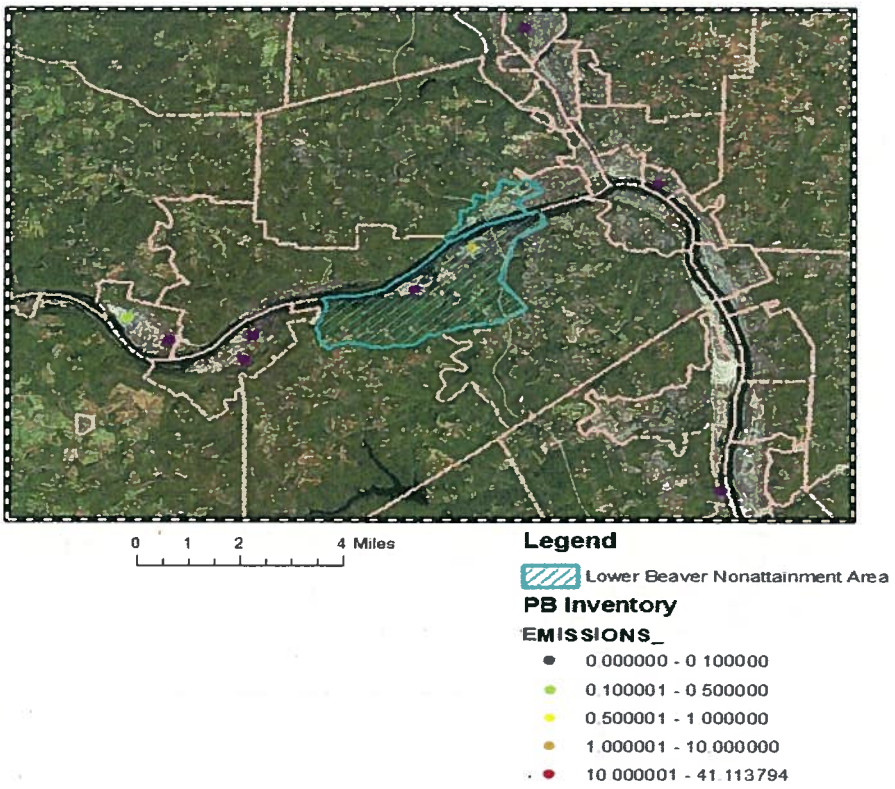
Emissions data were derived from the 2005 National Emissions Inventory (NEI), version 2, which is the most up-to-date version of the national inventory available when these data were compiled for the designations process in 2009. See http://www.epa.gov/ttnchie1/net/2005inventory.html. EPA recognizes that for certain counties, emissions may have changed since 2005. For example, certain large sources of emissions in or near this area may have installed emission controls or otherwise significantly reduced emissions since 2005. Some States provided updated information on emissions and emission controls in their comments to EPA. Pennsylvania provided updated emissions information, provided in Table 15. The data provided by Pennsylvania is the most current emission information available. The lead inventory information from these years allows for a direct comparison between the model results and the most recently available design values since the emissions are from roughly the same time periods; 2007 or 2008 for lead emissions and 2007-09 for monitor design values.

Table 15 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 (Environment Facility Application Compliance Tracking System (eF.A.C.T.S.)) for the years 2007 and 2008. 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, and also accepts Pennsylvania's use of the highest yearly emissions in its modeling analysis as a conservative approach. See Appendix A of this document for modeling analysis. Figure 10 below shows the distance between the First Energy Generation Corp/ Bruce Mansfield Plant and the Lower Beaver Valley Nonattainment Area. During the second round of designations in 2011, Beaver County will be reevaluated with new data provided by the monitors placed in January 2010 to determine if the area should be expanded.

**Table 15. Facility lead emissions greater than 0.1 tons per year**

| County | State Recommended Nonattainment? | Facility Name | 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 Location |
|---|---|---|---|---|---|
| **Beaver County, PA** | **Yes (partial)** | **Horsehead Corp./Monaca Smelter** | **5.64** | **5.38** | **300 Frankfort Rd.** |
| Beaver County, PA | Yes (partial) | First Energy Gen. Corp/ Bruce Mansfield Plant | 1.20 | 0.70 | State Route 168 South |
| Beaver County, PA | Yes (partial) | Jewel Acquisition/ Midland Factory | 0.30 | 0.10 | 12th St. & Midland Ave. |

**Figure 10. Lower Beaver Valley Nonattainment Area with facility locations identified by annual emissions in tons per year.**




Population Data

Table 16 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 16. 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

Growth rates and patterns

Beaver County has a declining population trend between 2000 and 2008. EPA has considered the population growth rate for this area and does not believe that it affects the boundary recommendation.

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 Table 15 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 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 11, and Table 17, 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 11. Wind directions summarized by season for Beaver County, PA**

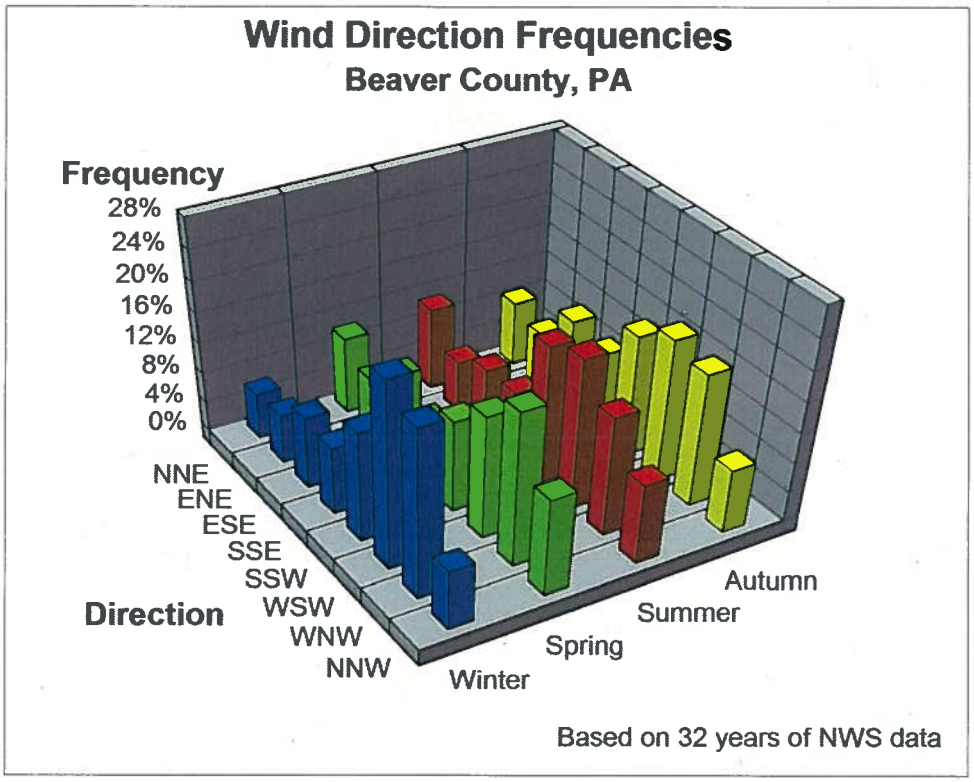



**Table 17. Top two prevailing wind directions by season for Beaver County, PA**

| 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 11 and Table 17, the prevailing surface winds are often from the west, southwest and west, northwest in most 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 recommended Lower Beaver Valley Nonattainment Area is constructed using the Township boundaries within Beaver County.

**Conclusion**

After considering the factors described above, EPA has 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 monitor in Beaver County shows a violation of the 2008 Lead NAAQS, based on 2007-2009 air quality data. EPA agrees with Pennsylvania's recommendation to include Potter and Vanport Townships in the Lower Beaver Valley Nonattainment Area, since the contributing source and violating monitor are located within those Townships.

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 Pb NAAQS.

**Appendix A - Technical Support Document for Pennsylvania's Modeling in Support of Lead Nonattainment Designations**
**EPA Region III – Air Protection Division – Air Monitoring and Analysis**
**June 2010**

This appendix provides a summary of the air-quality modeling the Pennsylvania Department of Environmental Protection (PA DEP) undertook in support of its lead monitoring network. Though this modeling was not conducted for nonattainment delineation purposes, it was used as supporting evidence in PA DEP's eight-factor analysis. In December of 2009, PA DEP submitted its Designation Recommendations for the 2008 Lead National Ambient Air Quality Standard[1] (NAAQS). Information summarized in this appendix was taken from the modeling files forwarded to EPA Region III and discussions with the PA DEP.

Model concentration contours were shown in Figure B-5 and Figure B-6 of PA DEP's recommendation document for two lead sources located in Berks County: East Penn Manufacturing and Exide Technology. PA DEP used this modeling to show the relatively local impacts of these two lead sources in Berks County (thus the two distinct lead nonattainment areas within the county) and to justify PA DEP's use of subcounty (municipal) boundaries for its lead nonattainment designation recommendations.

## Modeling Summary

### Background

PA DEP reviewed its 2007 and 2008 lead inventory and cross referenced these lead emissions with those reported to EPA's Toxics Release Inventory or TRI to identify all sources with lead emissions larger than one (1) ton per year (tpy) within the Commonwealth. A total of twelve (12) lead sources exceeding 1 tpy were identified. Air-dispersion modeling using actual emissions was undertaken for some of these sources to help determine where lead monitors should be deployed.

Only model results for the two Berks County lead sources were presented in PA DEP's nonattainment designation document. Model results contained in the recommendation document were for the model runs using onsite meteorological data and actual (reported) lead emissions. Model results for sources in the Lower Beaver Valley nonattainment area in Beaver County near Pittsburgh, PA were mentioned in PA DEP's nonattainment document but not formally included in the recommendation document.

### Berks County Source Modeling:

PA DEP conducted air-dispersion modeling for two lead sources in Berks County, which are located approximately 60 miles northwest of the City of Philadelphia. The first source is East Penn Manufacturing (East Penn) a secondary lead smelter and battery manufacturing plant located in portions of Richmond and Maxatawny townships and the

[1] See lead designation on http://www.dep.state.pa.us/dep/deputate/airwaste/aq/attain/recommendations.htm

Borough of Lyons. The second modeled source includes Exide Technology, a secondary lead smelter and battery manufacturing plant, and Yuasa which operates a nearby battery manufacturing plant. Both of these facilities are referred to as "Exide" in the modeling analysis. These lead sources are located in portions of the Borough of Laureldale and Muhlenburg Township. East Penn is approximately 10 miles northeast of Exide.

**Air-Dispersion Model:** EPA's AERMOD (version 07026) was used in the air-dispersion analysis. AERMOD is a modeling system comprised of several preprocessors coupled with an air-dispersion model. Several files had to be processed prior to running the dispersion model. This included processing land-use data along with surface and upper-air meteorological data to produce the meteorological files used by AERMOD and processing local elevation data to generate the receptor grid used to calculate local lead concentrations. AERMOD was run in regulatory default mode with building downwash parameters from BPIP (version 04274).

**Modeled Lead Emissions:** PA DEP used actual facility-reported emissions from East Penn and Exide in its modeling analysis. Total facility model emissions were compared with lead emissions from PA DEP's eFacts system[2]. The number of lead sources at East Penn was much larger than Exide. East Penn had a total of 119 lead sources in its model inventory versus Exide's 18 lead sources. The higher number of lead sources at East Penn is due to its significantly larger battery manufacturing operations. Fourteen (14) of East Penn's lead sources were identified as having horizontal or capped stacks. Stack velocities for these sources were set to 0.001 meters per second (m/s) in accordance with model clearinghouse guidance. Emissions for start up/shut down and upset conditions were not considered in the modeling analysis. Fugitive emissions from roads, truck traffic and other smelter processes were also not modeled. All emissions were entered into AERMOD as point sources; fugitive sources were not deemed relevant to establishing nonattainment area extent since their impacts were thought to be confined to areas near the facility.

Actual emissions for East Penn and Exide were based on 2007 and 2008 company reported values with the highest yearly emissions used in the modeling analysis. No attempt was made to examine the possibility of year-to-year emission variability. Modeled emissions for all 119 East Penn sources totaled 3.13 tpy, about twice as high as actual (modeled) emissions at Exide, which were 1.71 tpy.

**Meteorological Data File Construction:** PA DEP's modeling analysis used on-site meteorological (met) data for both East Penn and Exide. The meteorological data sets used in the analysis are summarized below. AERSURFACE (version 08009) was run for each of the met tower sites to determine albedo, Bowen ratio and surface roughness characteristics for the final stage of AERMET (version 06341). AERMET was run with land-use characteristics for 12 equally spaced sectors surrounding the collection point using default distances for computing surface roughness, albedo and Bowen ratios.

[2] See http://www.ahs2.dep.state.pa.us/eFactsWeb/default.aspx

Surface characteristics varied seasonally but no adjustments were made for overly wet or dry periods within the data.

Exide

Exide's on-site met tower appears to have collected met data for an extended period of time. The met tower data is considered on-site though no analysis was presented to determine representativeness under the current guidelines/guidance. PA DEP did analyze local land use data near the Exide tower to confirm it meets the rural model settings described in section 7.3.2 of Appendix W to 40 CFR Part 51 or EPA's *Guideline on Air Quality Models* (Appendix W).

PA DEP's modeling analysis used Exide tower data from May 30, 2003 through August 17, 2008; 1,907 days, which is slightly longer than the five year required time period for NWS data that is listed in Appendix W. Tower data only included wind field information and ambient temperature. This surface met data, therefore, was supplemented with data from the nearby Reading airport (RDG) located approximately four miles west of Exide. Upper-air data for the air-dispersion analysis came from Dulles Airport (IAD) near Sterling, VA (approximately 160 miles southwest of Exide).

PA DEP's lead nonattainment document lists the Exide met tower height as 60 ft. The tower base is listed as 112.8 meters above sea level (ASL) making the wind data collection height roughly 131 meters ASL. Exide's stack heights range from 116 meters to 146 meters ASL with the largest modeled lead emissions source's release height at ~123 meters ASL.

The AERMOD output file indicates over 20% of the on-site data was missing while reported calms accounted for an additional 2% of the observations. While the tower data exceeds the onsite requirements under Appendix W there are substantial gaps in it.

East Penn

East Penn's tower sits on a hill just south of the facility and collects hourly wind, ambient temperature, temperature change (delta T), net radiation and pressure data. The met tower data is considered on-site though no analysis was presented to determine representativeness under the current guidelines/guidance. The anemometer height is listed as 7.9 meters with a tower base of 176.9 meters; thus the height of the wind measurements is roughly 185 meters ASL. East Penn's largest actual emission sources have release heights of approximately 180 meters ASL. The on-site data was supplemented with data from RDG located approximately 12 miles southwest of East Penn. The RDG site is about 70 meters lower in elevation than the East Penn tower. Upper air soundings were taken from Dulles Airport (IAD) located near Sterling, VA, which is approximately 170 miles southwest of East Penn.

AERSURFACE (version 08009) was run to generate the albedo, Bowen ratio and surface roughness numbers based on seasonal averages used in AERMET stage three. Surface characteristics were generated following the same options used for the Exide tower. PA DEP did analyze local land use data near the tower to confirm it meets the rural model settings described in section 7.3.2 of Appendix W. Data from January 1, 2004 through December 31, 2008 was processed with AERMET (version 06341) to produce the two met files needed to run in AERMOD. The met data set is five years in length, which is greater than the on-site requirements listed in Appendix W. AERMOD output indicates only 3.4% of the data is missing with no calm winds reported.

**Receptor Grid:** A total of 12,553 model receptors were placed within a Cartesian grid that extended out ten (10) kilometers in radius from East Penn and Exide. Receptor spacing was 50 meters out to two (2) kilometers, 100 meters from two to five kilometers and 500 meters from five to ten kilometers. Receptor heights and hill-scale heights were calculated by AERMAP (version 09040) using twenty 10-meter Digital Elevation Model (DEM) files (Nad83). East Penn's and Exide's receptor grids are shown in Figure A-1.

No attempt was made to establish either East Penn's or Exide's ambient air boundary in PA DEP's modeling analysis since the modeling was primarily used for lead monitor siting. This means the maximum modeled lead concentrations may not be in what is considered "ambient air." The results were anecdotally used (along with other information such as soil testing surrounding Exide) to show the local nature/extent of East Penn's and Exide's impacts and to justify PA DEP's choice of separate subcounty (nonpresumptive) nonattainment boundaries.

**Model Results:** PA DEP used the 50% lead NAAQS contour (0.075 $\mu g/m^3$) to delineate its nonattainment boundaries in Berks County. This level was chosen as a conservative proxy to the lead NAAQS. All lead monitoring sites for both East Penn and Exide fell inside the modeled 50% lead NAAQS contour. Lead concentrations at these monitors, therefore, appear to fall within predicted model concentrations (greater than 50% of the lead NAAQS) indicating the model is doing a reasonable job of estimating which areas are potentially exceeding the lead NAAQS.

Municipalities through which the 50% contour passed were included in the proposed lead nonattainment areas. This yielded two distinct nonattainment areas in Berks County surrounding the East Penn and Exide facilities. Model contours are show in Figure A-2. The North Reading Nonattainment Area near Exide includes Muhlenberg and Alsace townships and the Borough of Laureldale. The Lyons Nonattainment Area included Maxatawny and Richmond townships and the Borough of Lyons.

**Lower Beaver Valley Source Modeling**

PA DEP modeled sources in and near the Lower Beaver Valley Nonattainment Area to help determine the need for additional lead monitoring sites near facilities with

significant lead emissions. This modeling was not formally included in PA DEP's recommendations. EPA reviewed the modeling analysis for these sources and found that the modeling appeared to underpredict lead concentrations at the lead monitoring site in Vanport Township. Unlike the modeling for Berks County, the Vanport monitor did not fall within the modeled 50% lead NAAQS contour indicating the model may not be doing a reasonable job at estimating the area exceeding the NAAQS. In light of the underprediction of this modeling, EPA did not rely on it in evaluating the state's recommended boundaries for the nonattainment area.

**Figure A-1**

# Berks County Lead Modeling

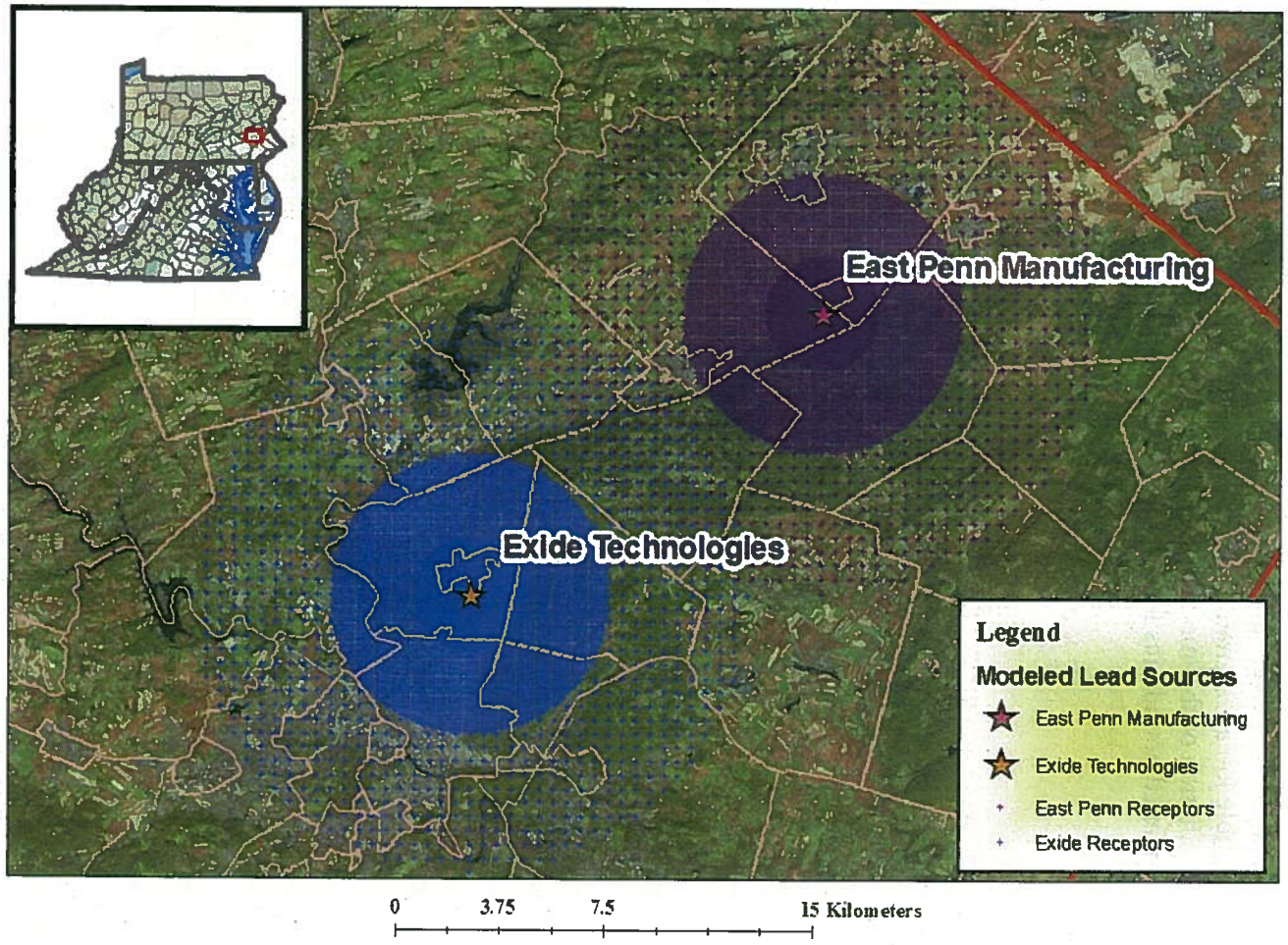


**Figure A-2**

# Berks County Lead Modeling