Technical Support Document for the Recommendation of Nonattainment Boundaries in Kansas for the 2008 Lead National Ambient Air Quality Standard

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Introduction

On October 15, 2008, the U.S. Environmental Protection Agency (EPA) promulgated a revision to the National Ambient Air Quality Standard (NAAQS) for lead, and on November 12, 2008 published the rule in the *Federal Register* at 73 FR 66964. The lead NAAQS rule establishes 0.15 micrograms per cubic meter ($\mu g/m^3$) as the primary and secondary standard for lead (see http://www.epa.gov/air/lead/standards.html). Compliance with the 2008 standard is determined by calculating the monthly average of the lead concentrations at each monitor and averaging that value with the prior two months' averages (e.g. 3-month rolling average). When calculating the 3-month average, concentrations below 0.155 $\mu g/m^3$ are rounded to 0.15 $\mu g/m^3$ and are still in compliance, while concentrations equal to or above 0.155 $\mu g/m^3$ are rounded to 0.16 $\mu g/m^3$ and represent a violation of the standard. It should be noted that compliance with the previous, much higher standard of 1.5 $\mu g/m^3$ was based on a calendar quarterly average. Previous to the 2008 rule's lowering of the lead standard, Kansas had no known areas with exceedances for lead.

Note concerning lead: Lead is a pollutant that, for industrial sources, is primarily emitted from: (1) the combustion of fuel that contains lead; (2) the manufacture or processing of materials, including recycled materials, that contain lead (e.g., batteries); or (3) the conversion of lead ore into refined lead. Since lead is a dense material that is emitted as particulate matter and is not transported significant distances like most other air pollutants, the impact from lead sources is usually in close proximity to the emission source.

As provided under Clean Air Act Subparagraph 107(d)(1)(A), the governor of each state is required to submit to the EPA a recommendation regarding the attainment status of all areas within that state. Each area (or portion thereof) of the state shall be designated as:

- nonattainment for areas that do not meet the NAAQS or contain sources that contribute to nonattainment in a nearby area that does not meet the NAAQS;
- attainment for areas that meet the NAAQS; or
- unclassifiable for areas that cannot be classified attainment or nonattainment based on available information.

In a letter dated September 29, 2009, Governor Parkinson submitted to EPA a recommendation that all areas in the state be classified as being unclassifiable relative to the lead standard. At that time, no lead monitors were in operation in the state.

When EPA revised the lead NAAQS it also revised requirements for lead monitoring, including provisions requiring an expansion of the lead monitoring network. A phased approach for monitor deployment was provided. In the first phase, air quality agencies were required to deploy, by January 1, 2010, lead monitors in areas known or suspected of violating the NAAQS. An emissions-based threshold was established as a component to assist in determining monitor deployment. Sources with lead emissions of 1 ton/yr were to have a monitor sited nearby. This requirement could be waived if it could be demonstrated (through modeling) that ambient air impacts from the source would not exceed 50% of the NAAQS.

An administrative petition was filed with EPA seeking a review of the 1.0 ton/yr threshold. EPA granted the petition and proposed to revise the threshold to 0.5 ton/yr. On December 27, 2010, EPA finalized revisions to the monitoring requirements, lowering the source emissions threshold from 1.0 to 0.5 ton/yr. Should additional sources require monitoring as a result of the lower threshold, the monitors must be operational by December 27, 2011.

Saline County is the single area within Kansas under consideration for nonattainment of the lead NAAQS. All other counties are currently attainment/unclassifiable.

The final lead ambient air monitoring requirements, published December 27, 2010, are summarized at http://www.epa.gov/oaqps001/lead/pdfs/Leadmonitoring_FS.pdf, and are as follows:

- Source-oriented monitors
  - Air quality monitors should be placed near any industrial facility that emits 0.5 tons per year or more of lead.
  - Any new monitors located near an emissions source must be operational no later than December 27, 2011.
  - Source-oriented monitors require the use of the most recent 3-year period for determination of compliance.
- Population ("non-source")-oriented monitors
  - Lead monitoring is required in large urban areas with a population of 500,000 people or more at multi-pollutant ambient monitoring sites (known as the NCore network).
  - Lead monitoring at these sites will begin January 1, 2012.
- Airport-oriented monitors
  - EPA is maintaining a 1.0 ton/yr lead emission threshold for airports. However, EPA is requiring a 1-year monitoring study of 15 additional airports (beyond those currently required to monitor at the existing 1.0 ton/yr emission threshold).

In its *Kansas Ambient Air Monitoring Plan for Airborne Lead (Pb)* document (http://www.epa.gov/region7/air/quality/pdf/ks_revisedleadplan_2009.pdf), the Kansas Department of Health and Environment (KDHE) proposed two source-oriented monitor locations, one at each of the Exide Technologies facilities in Salina and Kansas City, as well as an airport monitor at Wichita Mid-Continent Airport. This proposal has been superseded by the final lead ambient air monitoring requirements so that, based on 2008 through 2010 inventories, the only Kansas source with lead emissions higher than the 0.5 ton threshold is the Exide Technologies - Salina lead acid battery manufacturing facility. The highest lead emissions value for the Exide Technologies - Kansas City facility during the period 2008 to 2010 was 340 lbs (0.17 ton), in 2008. The most recent lead emissions value for the Wichita Mid-Continent Airport is 584 lbs (0.29 ton), based on EPA's estimate for the 2008 National Emissions Inventory.

The purpose of this document is to provide EPA with a recommended geographic lead

nonattainment boundary around the Exide Technologies - Salina facility, and the appropriate technical justification for that boundary.

Nonattainment Boundary Development

For monitors that do not meet the lead NAAQS, the lead NAAQS preamble (73 FR 66964) discusses a presumptive boundary for nonattainment areas. This presumptive boundary is defined as the perimeter of the county containing the violating monitor. However, defining a presumptive nonattainment boundary does not constitute a binding or rigid determination. Deviations may be appropriate or necessary, for example, to ensure the nonattainment area includes not just the sources that are causing the NAAQS violation, but also nearby sources that may contribute to the NAAQS violations.

Lead is a pollutant that is associated with direct emissions from sources and does not readily participate in chemical reactions occurring in the atmosphere. With the elimination of leaded gasoline, lead emissions have been reduced dramatically, and the largest sources of lead are typically associated with emissions from stationary sources. With these facts in mind, it is recognized that there will be cases where the appropriate boundary is smaller than the presumptive county boundary.

In the preamble to the lead NAAQS, EPA identified eight subjects, or factors, for states to consider as they develop recommendations for nonattainment boundaries. No additions or changes were made to the factors in subsequent guidance provided by EPA on August 21, 2009 ("Area Designations for the 2008 Revised Lead National Ambient Air Quality Standards," William T. Harnett, EPA). Should a state choose to deviate from the presumptive boundary, EPA consistently recommends that states conduct an eight-factor analysis. These eight factors influencing the development of a nonattainment boundary are listed below.

1. Emissions data*
2. Level of control of emissions sources
3. Air quality data*
4. Meteorology
5. Jurisdictional boundaries
6. Population density and degree of urbanization
7. Geography/topography
8. Expected growth (including extent, pattern and rate of growth)

**In areas potentially included versus excluded*

As stated in the lead NAAQS rule: "At the revised standard level, EPA expects stationary sources to be the primary contributor to violations of the NAAQS" (73 FR 67032). The final rule also discusses situations for which a single source is causing a NAAQS violation, and that a state may well be able to define a nonattainment boundary that is smaller than the presumptive boundary, provided that the area-specific analysis supports such a determination (73 FR 67033). An area-specific analysis may be supported by results from

an air quality simulation by dispersion modeling (73 FR 67034). An area larger than the presumptive county nonattainment boundary may also be recommended should additional sources or influencing factors outside the county be causing or contributing to the NAAQS violation. As the secondary standard was revised to be identical in all respects to the primary lead standard, it is expected that all areas will have the same designation and boundary for each standard.

The details of the eight-factor analysis are discussed below, followed by a discussion of the dispersion modeling results used to develop the recommended nonattainment boundary.

Factor 1: Emissions Data

Lead is a metal found naturally in the environment as well as in manufactured products and can be emitted into the air in the form of particles small enough to stay suspended in the air, known as total suspended particulates. Lead emitted to the air can be inhaled directly or ingested after it settles onto surfaces or soil. EPA recommends that proposed nonattainment designations for the 2008 lead NAAQS reflect not only the areas of measured violations, but also the nearby areas that contribute to measured violations. The highest levels of lead in air are commonly found near lead smelters. Additional point sources of lead include cement, glass, and lead acid battery manufacturing plants, iron and steel foundries, copper smelters, and metal mines. As well, ambient lead is emitted from the combustion of leaded aviation gasoline ("avgas") in non-commercial small planes.

No complex chemistry is needed to form lead or lead compounds in the ambient air; therefore, concentrations of lead are typically highest near lead sources. Further, lead concentration decreases markedly with distance from the source. According to EPA's last published *Latest Findings on National Air Quality* report, lead concentrations for sites that are not near a source of lead are approximately 10 times less than the typical concentrations near the source (http://www.epa.gov/airtrends/2007/report/trends_report_full.pdf). An example of the degree to which lead concentration decreases with distance in ambient air is characterized in the EPA memo *Selection of Airports for the Airport Monitoring Study*: "The Santa Monica airport monitoring study… reported a three- to four-fold decrease in ambient lead concentrations over a distance of 80 meters between two monitors sited to evaluate the lead gradient downwind from the runway" (http://www.epa.gov/otaq/regs/nonroad/aviation/memo-selc-airport-mon-stdy.pdf).

As stated above, there is one point source in Kansas that emits lead above the 0.5 ton threshold: Exide Technologies - Salina (Exide), in Saline County. Exide manufactures lead acid batteries for automobile, truck, and marine applications. Facility lead emissions were calculated to be 2.17 tons (4,340 lbs) for calendar year 2010. This value was based upon stack test data that the facility uses for its annual compliance demonstration as a Class II permit-by-rule source (i.e., with actual emissions less than 50% of major source thresholds). Table 1 shows Exide's lead emissions for years 2005–2010.

Table 1. Air Emissions of Lead for Exide Technologies - Salina 2005–2010

Year	Lead Air Emissions	
	tons	lbs
2005	3.08	6,160
2006	3.12	6,240
2007	3.31	6,620
2008	2.25	4,500
2009	2.15	4,300
2010	2.17	4,340

A compliance inspection report in Exide's file contains a note that the Salina facility was "running four shifts 24/7" in 2007, the year corresponding to the peak in lead emissions in Table 1. This implies that the facility was operating at full capacity at that time, the *de facto* physical maximum facility emissions of 3.31 tons of lead, even before installation of any new permitted controls.

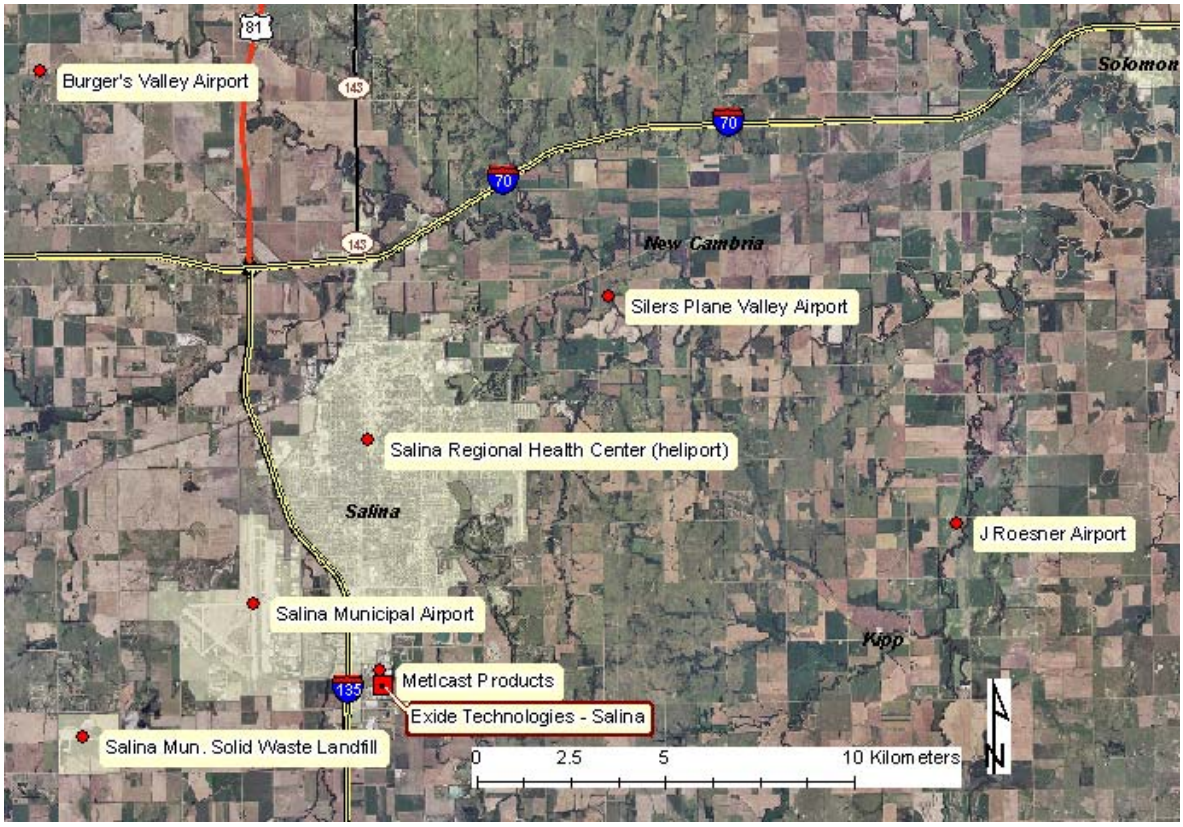
Based on the most recent data available from the Kansas Emissions Inventory (KEI), communications with local air emissions sources, compliance demonstrations, the 2008 National Emissions Inventory (NEI), and EPA's Toxics Release Inventory (TRI), there are 10 additional known air sources of lead within 20 kilometers of the lead monitor near Exide in Saline County (Figure 2 below). Three of these facilities, Philips Lighting, Great Plains Mfg. - Salina, and Great Plains Mfg. - Kipp, had reported lead emissions in the past (40 lbs for Philips Lighting in 2009, 688 lbs for Great Plains Mfg. - Salina in 2009, and 2 lbs for Great Plains - Kipp in 2008), but by inventory year 2010 had modified their operations such that their lead emissions are now zero or close to zero; therefore, these sources have not been considered for this analysis.

Table 2 lists the current known lead sources within 20 km of the Exide monitor with most recent actual emissions greater than zero, along with the latest available emissions values and the sources' distance and relative direction from the monitor. Figure 1 displays the geographical distribution of the same. The KDHE has not identified any upwind sources of lead in or around Saline County that would influence a nonattainment boundary drawn around the Exide facility and nearby monitor. Fugitive lead emissions, should there be any, would be associated with resuspension of previously deposited lead, most likely from emissions from the Exide facility, and will be contained to safe concentrations within the recommended nonattainment boundary according to air dispersion modeling results.

Table 2. Known current sources of lead air emissions within 20 km of the lead monitor sited near Exide Technologies – Salina

Source	Lead Emissions (lbs)	Year	Source	Distance (km)	Relative Direction
Exide Technologies - Salina	4,340	2010	Compliance demonstration	0.1	S
Metlcast Products (3 electric induction furnaces)	283	2010	KEI and calculation using AP-42	0.4	N
Salina Municipal Solid Waste Landfill (waste oil burner)	6.0	2010	Calculation using AP-42	7.7	WSW
Salina Regional Health Center (heliport)	0.70	2008	NEI	6.3	N
Burger's Valley Airport	0.99	2008	NEI	18.6	NW
J Roesner Airport	0.14	2008	NEI	15.8	ENE
Salina Municipal Airport	334	2008	NEI	4.1	WNW
Silers Plane Valley Airport	0.87	2008	NEI	11.9	NE

Figure 1. All known current sources of lead air emissions within 20 km of KDHE monitor sited near Exide Technologies – Salina



Metlcast Products

Metlcast Products operates a gray iron casting facility using three electric induction furnaces. Based on its reported annual production of gray iron, lead emissions may be estimated using an emission factor of 0.0545 lbs of lead per ton of iron produced, which is the midpoint for the range of values of 0.009-0.100 given in Table 12.10-5 in AP-42. The wind rose in Figure 5, which displays the wind direction for the days in 2010 the Exide monitor exceeded 0.15 $\mu g/m^3$, suggests that no source to the north of the monitor was responsible for any of the exceedances. Metlcast's location close by the monitor, however, points to its being included within the nonattainment boundary for the purposes of this determination.

Table 3 shows Metlcast's gray iron production and estimated lead emissions for years 2005–2010.

Table 3. Estimated Air Emissions of Lead for Metlcast Products 2005–2010

Year	Tons gray metal produced	Est. lbs lead
2005	6,330	345
2006	5,788	315
2007	5,510	300
2008	8,142	444
2009	4,586	250
2010	5,190	283

Saline County Airports/Heliport

In the 2008 National Emissions Inventory, EPA estimated the Salina Municipal Airport's annual lead emissions to be 334 lbs (Table 2). The center of the airport's very long (12,300 ft) main north-south runway is located approximately 2.0 km north and 3.4 km west of the Exide facility. Due to the strong southerly nature of winds in the region, the lead emissions from this airport are not expected to impact the Exide lead monitor to any significant degree. Therefore, the lead emissions from the Salina Municipal Airport were not included in determining the nonattainment boundary in this study. Likewise, due to the very low lead emissions values, relatively northern locations, and relatively great distances, the remaining three airports and heliport in Saline County were also not included in determining the nonattainment boundary.

Factor 2: Level of Control of Emissions Sources

Exide Technologies - Salina

This facility is classified as a synthetic minor source, and has a Class II operating permit issued January 15, 2004, authorizing Exide Technologies to operate pursuant to K.A.R. 28-19-564 (Class II operating permits; permits-by-rule; sources with actual emissions less than 50 percent of major source thresholds).

In a January 24, 2011 letter to KDHE (Appendix A), Matthew Spencer, EHS Manager at the Salina facility summarized control activities since 2006 as follows:

1. Five-year project commenced April 2006 to replace the 10 oxide mills. Project included replacement of oxide mills, associated baghouses, and the addition of HEPA filters for each source. Current status:
    - Oxide mills #1 and #2 completed September 2006
    - Oxide mills #3 and #4 completed July 2009
    - Oxide mills #5 and #6 completed October 2010
    - Oxide mills #7 and #8 replacement commenced January 2011
2. Replaced baghouse #3 September 2009
3. Replaced baghouse #2 November 2010
4. Replacement of baghouse #4 commenced January 2011
5. Planned activities indicated in the letter are to:
    - Replace oxide mills #9 and #10
    - Replace baghouse #5
    - Relocate oxide mill diverter valves to lower level in ventilated, enclosed building
    - Upgrade ball mill ventilation

<u>Metlcast Products</u>
Lead emissions for Metlcast have been estimated using the midpoint of a range of emission factor values given in AP-42. Metlcast is subject to the 2008 National Emission Standard for Hazardous Air Pollutants for Iron and Steel Foundries Area Sources, or ZZZZZ MACT standard, which calls for the removal nationwide of lead-containing components in scrap metal used by foundries "to the extent practicable." This area source MACT standard arguably has had and will in future years have the effect of lowering Metlcast's lead emissions below the AP-42-based estimated values.

Factor 3: Air Quality Data
In general, determining if an area is either meeting or violating a NAAQS requires the calculation of a metric referred to as a design value. For many NAAQS pollutants, three years of data are required before a design value can be determined. The lead NAAQS design value is based upon a 3-year period, but since it utilizes a 3-month rolling average, 38 months of data (the most recent 3-year period plus two previous months) are required.

A characteristic of the lead NAAQS is that a design value is not necessary to determine if an area has violated the standard. The averaging time and form of the lead standard is based upon a 3-month rolling average, which is not to exceed 0.15 $\mu g/m^3$. A single 3-month rolling average over the 0.15 $\mu g/m^3$ level constitutes a violation of the standard. Determining that an area has attained the lead standard requires a lead design value that meets the NAAQS, which requires three years (plus two months) of supporting data.

There is one lead monitor operating in Kansas, sited just to the north of the Exide Technologies - Salina facility, that has measured a rolling 3-month average lead concentration that violates the lead NAAQS since its installation in 2010. The Exide lead

monitor is located approximately 100 meters north of the property boundary of Exide Technologies in Saline County, as shown in Figure 2.

Figure 2. Lead monitor site at Exide Technologies - Salina facility

The Exide monitor began collecting data in January 2010. Three years of data have not yet been collected and a true design value is not currently available. As discussed above, however, the lack of a design value does not prevent a determination that a violation of the lead NAAQS has occurred. Three consecutive months of data are required before a comparison against the NAAQS can be made; only one 3-month rolling average above the 0.15 $\mu g/m^3$ standard is needed to violate the lead NAAQS.

Based upon the data available at this time (February 2010–February 2011), the Exide monitor has recorded five 3-month rolling averages violating the lead NAAQS. The highest of these 3-month rolling averages occurred over the period July–September 2010, at 0.42 $\mu g/m^3$. Table 4 lists the three-month rolling averages recorded to date.

Table 4. Three-month rolling averages of lead concentrations at the Exide Technology - Salina monitor, Saline County, Kansas

Time Period	3-Month Rolling Average (µg/m^3)	NAAQS Violation
Feb-Apr 2010	0.10	no
Mar-May 2010	0.10	no
Apr-Jun 2010	0.11	no
May-Jul 2010	0.23	yes
Jun-Aug 2010	0.32	yes
Jul-Sep 2010	0.42	yes (max)
Aug-Oct 2010	0.35	yes
Sep-Nov 2010	0.27	yes
Oct-Dec 2010	0.15	no
Nov-Jan 2011	0.08	no
Dec-Feb 2011	0.09	no

Factor 4: Meteorology

Like all localities within the state, Salina experiences hot, humid summers and cold, dry winters. The average temperature in Salina is 55° F (13° C), and the average relative humidity is 64%. Precipitation averages 32.3 inches (820 mm) per year, and snowfall averages 18.4 inches (467 mm) per year. On average, January is the coolest month, July is the warmest month, and May is the wettest month. Over the course of a year, temperatures range from an average low of 19° F (-7° C) in January to an average high of 93° F (34° C) in July (http://en.wikipedia.org/wiki/Salina,_Kansas).

For pollutant dispersion the most important meteorological parameters are wind speed and wind direction, typically shown in the form of a wind rose. Each vector on a wind rose represents the amount of time the wind blows from one of 16 compass sectors. The length of each vector represents the percentage of time that the wind is blowing from a particular direction. The various colors show the percentage of time that wind from a particular direction is in a particular range of wind speed (knots).

Wind information for Saline County is collected at the Salina Municipal Airport. Figure 3 is a wind rose generated from data collected for years 1999–2009. Wind information for Saline County for 2010, the only complete year for which lead NAAQS exceedances have been recorded so far, is shown in Figure 4. According to this information, the predominant wind directions are south and south-southeast, with the highest frequency of winds blowing from the south.

Figure 3. Wind rose for 1999-2009 for the Salina Municipal Airport, Salina, Kansas (source: WRPLOT View)

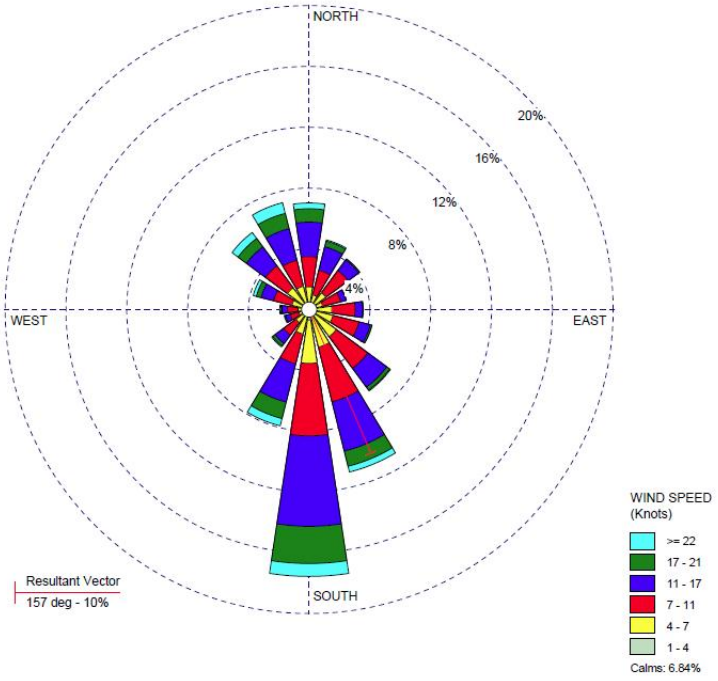


Figure 4. Wind rose for 2010 (all days) for the Salina Municipal Airport, Salina, Kansas (source: WRPLOT View)

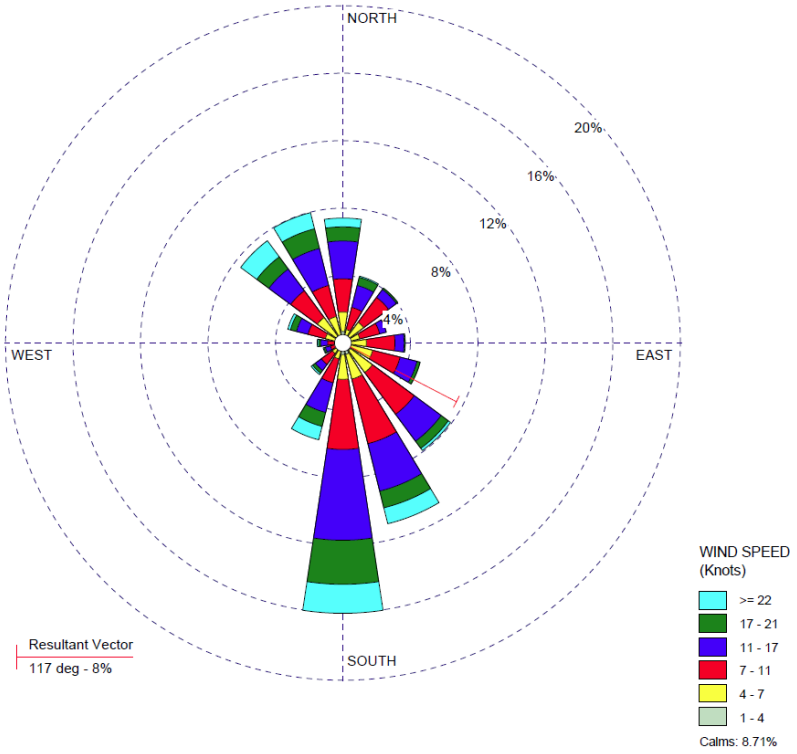
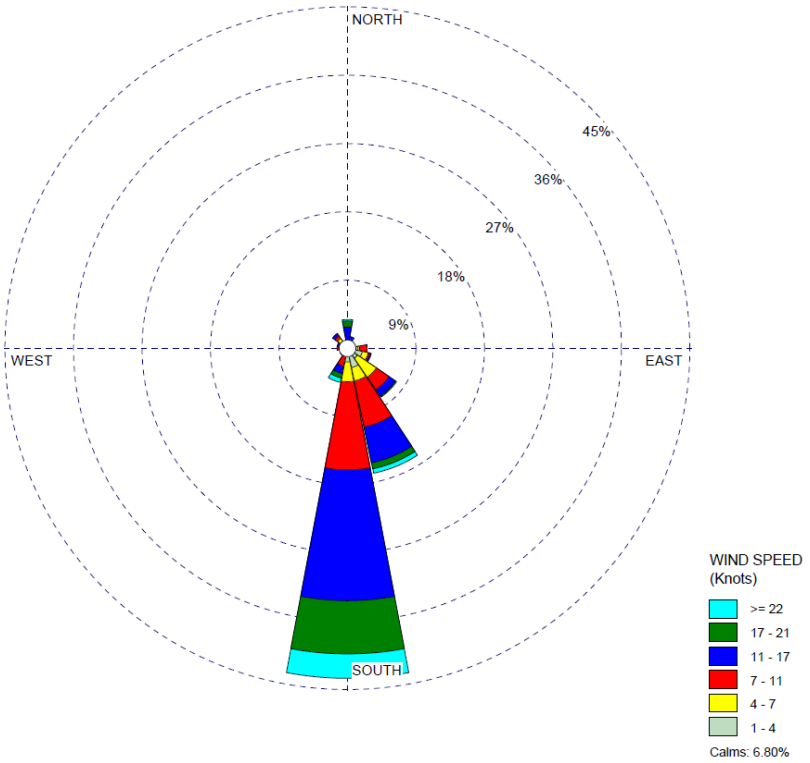


Figure 5 is a wind rose generated for the 21 days in 2010 the lead monitor near Exide recorded lead concentrations exceeding 0.15 µg/m^3. Note the almost total lack of any wind direction with a northerly component, indicating that Exide is essentially the single source responsible for the exceedances recorded.

Figure 5. Wind rose for lead NAAQS exceedance days in 2010 for the Salina Municipal Airport, Salina, Kansas (source: WRPLOT View)



Factor 5: Jurisdictional Boundaries

The final lead NAAQS rule states: "In situations where a single source, rather than multiple sources, is causing a NAAQS violation, the EPA believes that a state may well be able to use area-specific analyses to identify whether a nonattainment area that is smaller than the county boundary is appropriate" (73 FR 67033). The KDHE is the state agency responsible for air quality regulatory programs for Saline County. Since there are no known sources of lead in Saline County upwind of the Exide facility, and since neither Saline County's nor the City of Salina's jurisdictional boundaries conform to the modeled extent of significant lead emissions, KDHE proposes to base the lead nonattainment boundary on the results of air dispersion modeling on the Exide facility alone, using through roads for setting well defined boundaries.

Factor 6: Population Density and Degree of Urbanization

The U.S. Census Bureau estimates for the 2010 Census show that 55,606 people lived in Saline County in 2010 (http://factfinder2.census.gov/). Figure 6 shows the census tracts used for the 2010 Census (magenta) along with the Salina city limits (turquoise). Table 5 shows 2010 population and population density values for Saline County by tract number.

Figure 6. City limits and 2010 Census tracts for Salina, Kansas

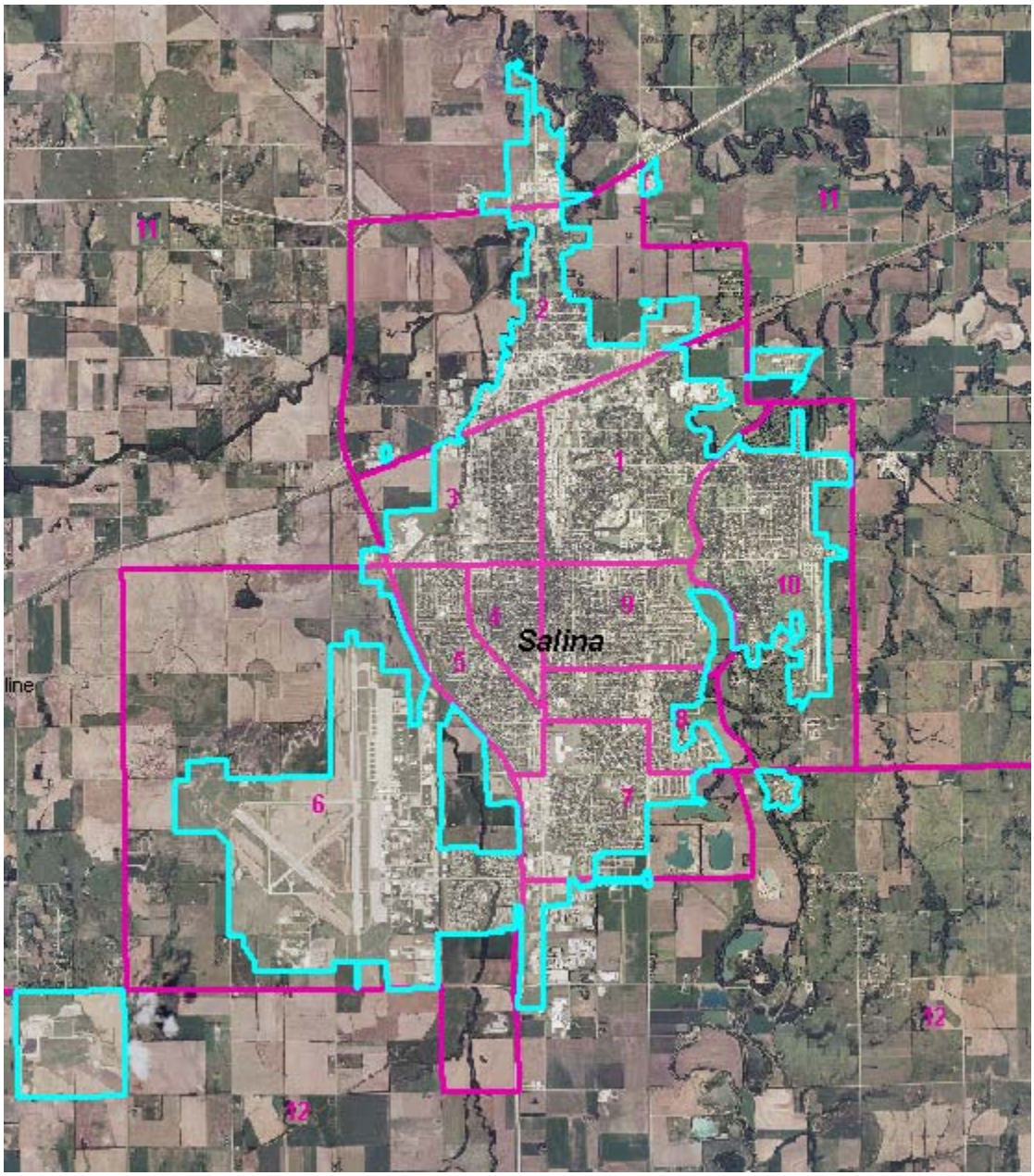


Table 5. 2010 population and population density by census tract for Saline County, Kansas

Geographic Area	Population	Land Area (km^2)	Density (persons/km^2)
Saline County	55,606	1,894.6	29
Census Tract 1	5,598	8.5	662
Census Tract 2	2,643	17.2	153
Census Tract 3	5,734	5.0	1,138
Census Tract 4	3,107	1.8	1,748
Census Tract 5	5,884	3.4	1,751
Census Tract 6	2,718	36.9	74
Census Tract 7	5,912	6.9	855
Census Tract 8	4,035	32.5	124
Census Tract 9	7,092	4.5	1,594
Census Tract 10	5,201	11.4	455
Census Tract 11	4,034	851.5	5
Census Tract 12	3,648	915.0	4

Note that tract 7, the residential tract immediately to the north of the Exide plant, has a population density of approximately half that of tracts 4, 5, and 9 to the north. Salina's downtown area is located approximately 7 km north of the Exide lead monitor, with close to 300 businesses (http://salinadowntown.com/).

Factor 7: Geography/Topography

Kansas is typified by flat to gently rolling terrain. The western two-thirds of the state, which includes Saline County, has a generally flat or undulating surface, with a very gradual increase in elevation westward toward the Rocky Mountains. Total topographic relief across the county is only 160 m, demonstrating the general flatness of the terrain. According to U.S. Department of Agriculture Soil Survey Data, Saline County is characterized by topographic features ranging from level to moderately sloping uplands. The city of Salina, as well as most of Saline County, lies within the Smoky Hills ecoregion. Salina does not have significant topographic features that affect lead pollution transport; therefore, topography is not considered a significant factor in defining the boundary of this lead nonattainment area.

Factor 8: Expected Growth

Salina is a characteristically small Midwestern city with modest growth. Since 2001, its population has grown 3.2 percent; recent job growth is negative, around -1.8% (http://www.bestplaces.net/city/kansas/salina). It is reasonable to expect flat to modest growth over the next decade. Table 6 shows Saline County population for years 2001–2010.

Table 6. Population of Saline County, Kansas 2001–2010
(Source: U.S. Census Bureau)

Year	County Population
2001	53,869
2002	53,988
2003	53,738
2004	53,808
2005	53,888
2006	53,914
2007	54,105
2008	54,109
2009	54,364
2010	55,606

Air Dispersion Modeling

Exide Technologies contracted with ENVIRON International Corporation (ENVIRON) to perform air dispersion modeling for its Salina facility in order to assist in the determination of the nonattainment boundary. ENVIRON's work product, *Air Quality Dispersion Modeling Report for Determination of Lead Non-Attainment Area Extent*, is appended to this document as Appendix B. Please refer to Appendix B for all technical background regarding the modeling portion of this document.

ENVIRON modeled the Exide facility using AERMOD, the approved air dispersion model, in its default regulatory mode with the following control options (from Appendix B):

- Adjust stack heights for stack-tip downwash
- Use upper-bound concentration estimates for sources influenced by building downwash from super-squat buildings
- Incorporate effects of elevated terrain
- Employ the calms processing routine
- Employ the missing data processing routine

<u>Use of Actual Versus Allowable Emissions</u>
In its memo "Use of Allowable Emissions for National Ambient Air Quality Standards (NAAQS) Impact Analyses Under the Requirements for Prevention of Significant Deterioration (PSD)" (http://www.epa.gov/region7/air/nsr/nsrmemos/naaqs.pdf), EPA discusses its preference for using allowable emission values for incorporating into air dispersion model inputs, but also discusses its allowance for using actual emissions values for "long term" NAAQS averaging times, i.e., annual and quarterly averaging times. As the 2008 lead NAAQS incorporates a rolling 3-month average, which is slightly more long

term than a quarterly averaging time, KDHE agreed in its modeling protocol for Exide to use actual values in its modeling inputs for emission rates.

Model Post-Processing

Paragraphs 3.3 and 3.4 of Appendix B discuss the methodology used to apply the recommended 0.01 µg/m^3 lead background concentration to the maximum monthly concentrations for Exide's emission sources generated by AERMOD, and process these values via the LEADPOST program into maximum three-month concentrations for all combined sources ready to input into GIS software for presentation as concentration isopleths. In order to help the reader see how these concentration values compare among different receptors, the table "Maximum Three-Month Average Lead in Air Concentrations for Modeled Receptors from LEADPOST," found in the ENVIRON hard copy report's companion DVD, is presented below in part.

Table 7. Maximum Three-Month Average Lead in Air Concentrations for Modeled Receptors from LEADPOST

UTMx (Meters)	UTMy (Meters)	Receptor Type	Elevation (Meters)	Hill Height Scale (Meters)	Receptor Flagpole Height (m)	Modeled 3-Month Average Lead Concentration (ug/m3)	Recommended Background Lead Concentration (ug/m3)	3-Month Average Lead Concentration with Background (ug/m3)	Source Group	Ending Month and Year
620,967.9	4,292,889.5	Ambient Monitor	380.80	380.80	0	0.36	0.01	0.37	ALL	Sep 2005
619,560.0	4,293,400.0	Schilling School	380.15	380.15	0	0.01	0.01	0.02	ALL	Aug 2008
621,485.0	4,294,430.0	Coronado School	378.68	378.68	0	0.02	0.01	0.03	ALL	Aug 2005
620,000.0	4,291,700.0	Gridded	381.10	381.10	0	0.01	0.01	0.02	ALL	Oct 2005
620,000.0	4,291,800.0	Gridded	381.10	381.10	0	0.01	0.01	0.02	ALL	Oct 2005
620,000.0	4,291,900.0	Gridded	381.10	381.10	0	0.01	0.01	0.02	ALL	Dec 2004
620,000.0	4,292,000.0	Gridded	380.92	380.92	0	0.01	0.01	0.02	ALL	Aug 2006
620,000.0	4,292,100.0	Gridded	381.10	381.10	0	0.01	0.01	0.02	ALL	Aug 2006
620,000.0	4,292,200.0	Gridded	381.10	381.10	0	0.01	0.01	0.02	ALL	Sep 2006
...	...	...	...	...	...	...	...	...	...	...

Recommendation

Figure 3-1 of Appendix B, *Maximum Modeled Three Month Average Lead Concentrations and Proposed Non-Attainment Area,* displays the model's output lead concentration isopleths around the Exide facility at various intervals out to 0.025 µg/m^3. The figure also shows Exide's proposed nonattainment boundary as a rectangle encompassing the standard's 0.15 µg/m^3 isopleth close by the facility's property line—indeed, along the property line on the south and east. In consideration of the use of actual emission rates for modeling as well as for public health reasons, KDHE proposes to extend the nonattainment boundary to that of a rectangle encompassing the 0.075 µg/m^3 isopleth as shown in Figure 7. In descriptive terms, the proposed area is that region in and south of the City of Salina,

Kansas bounded on the north by East Schilling Road, on the east by a north-south line one quarter mile west of South Ohio Street, on the south by East Water Well Road, and on the west by South Ninth Street.

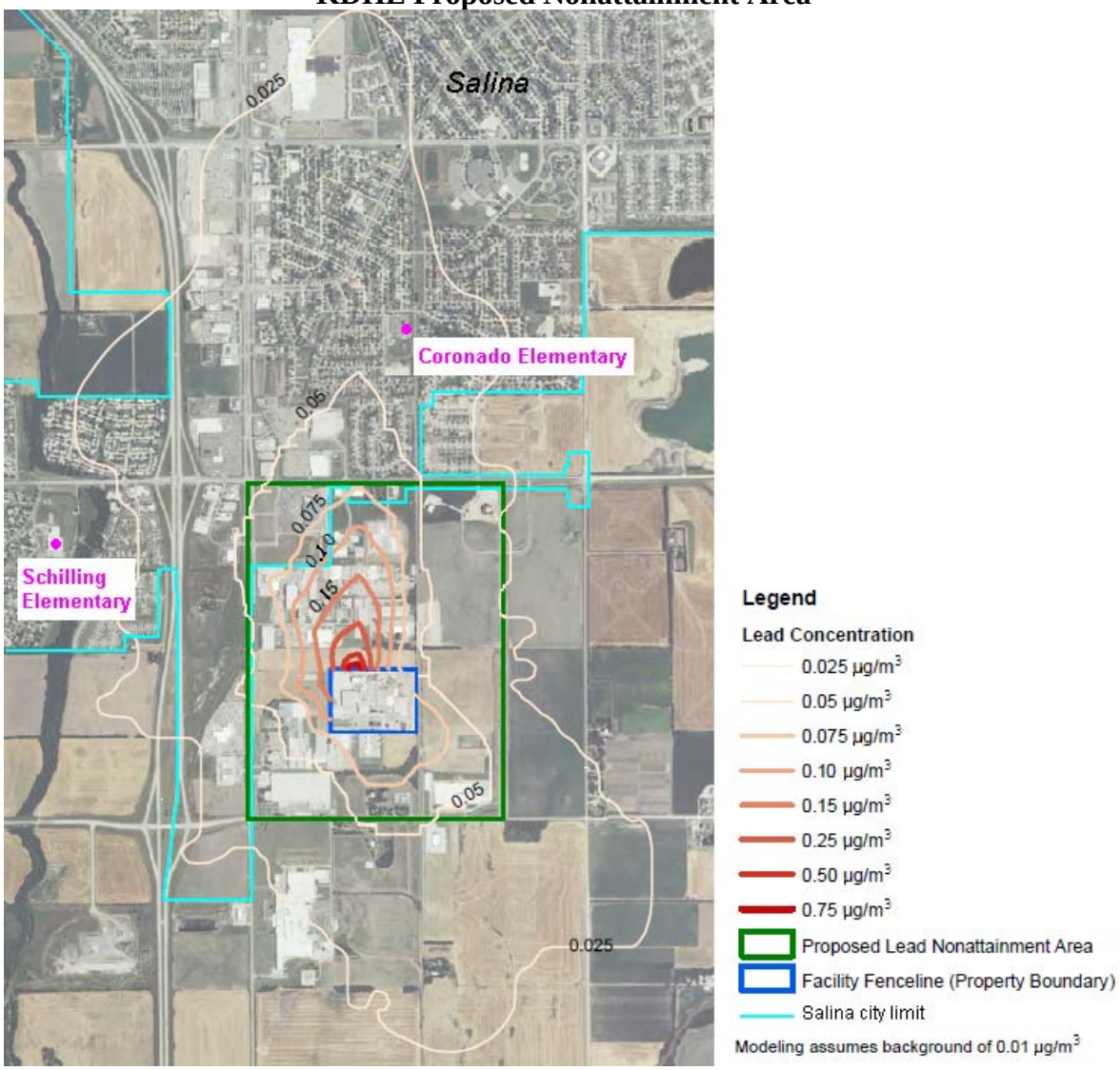



Figure 7. Maximum Modeled Average Lead Concentrations and KDHE Proposed Nonattainment Area