August 3, 2016

Mr. Will Stone
Kansas Department of Health and Environment
Bureau of Air
1000 SW Jackson, Suite 310
Topeka, KS 66612-1366

Re: Construction Permit Revision and Approval Application
Ventilation System Upgrade and New Curing Ovens
Exide Technologies (Source ID: 1690035)

Dear Mr. Stone:

Exide Technologies (Exide) is pleased to present this letter and application requesting two permitting actions at its facility in Salina, Kansas (Source ID: 1690035). The first request is the modification of construction permit C-12206 issued by the Kansas Department of Health and Environment (KDHE) on August 18, 2014. The second request is an approval application for the installation of 14 new curing ovens.

Facility History

Exide owns and operates a lead-acid storage batteries manufacturing facility in Salina, Kansas. On October 15, 2008, EPA lowered the NAAQS for lead to 0.15 $\mu g/m^3$ on a rolling 3-month average. On November 22, 2011, portions of Saline County were designated as nonattainment with the new lead standard. Exide proposed a control strategy and conducted air dispersion modelling to demonstrate attainment with the 2008 lead NAAQS. These control strategies and modelling are included in the Kansas State Implementation Plan (SIP) lead attainment demonstration submitted to EPA Region VII. Additionally, Exide received a construction permit (C-12206) on August 18, 2014, in order to implement federally enforceable limitations and conditions used in the control strategy and in the air model. Exide is in compliance with the plan requirements, and there have been no violations of the standard on KDHE's ambient air monitor since this permit was issued.

Exide operates under a Class II Permit-by-Rule Operating Permit, Sources with Actual Emissions less than 50% of Major Source Thresholds, issued by KDHE on January 15, 2004. Exide will continue to comply with this permit and no modifications are requested at this time.

Ventilation System Upgrade

As part of ongoing facility improvement efforts to abate shortcomings in engineering controls to reduce workplace exposures to lead, a Health Response Team (HRT) from the Occupational Safety and Health Administration (OSHA) recommended a comprehensive ventilation evaluation in May 2015. Since that time, Exide has retained Ramboll Environ to assess the facility's ventilation systems and, where necessary, design improvements to the ventilation systems, including source hooding, in the Salina facility, with particular focus on the Barton Mill (Oxide Room), Paste Mixing, and Pasting areas.

In general, the findings of the ventilation study and subsequent design identified a need to increase the airflow drawn from certain process areas to serve additional source hooding and/or to increase the effectiveness of existing hooding. The ventilation system changes include the replacement of fans in Baghouse #2 (BH2), Baghouse #3 (BH3) and Baghouse #5 (BH5), new ductwork arrangements involving

baghouses 2, 3, 4, and 5, modifications to existing makeup air (MUA) systems, and installation of new MUA systems.

New fans in BH2 and BH3 will increase the airflow to 120,000 acfm through each of these baghouses. A new fan in BH5 will increase the fan static pressure capability to 23" H_2O. Future lead emission rates from BH2 and BH3 are calculated by increasing the current emission limit proportionally with the proposed airflow increases. Expected future actual emission rates are still below existing permit limits, however, the margin between the two values becomes thin. In order to maintain a consistent and sufficient margin between expected actual and modelled future allowable emission rates, Exide is requesting emission limit increases for BH2 and BH3. Emission limits and air flows are shown in Table 1. Expectations on future actual emission rates from these affected baghouses is based upon the logic that exhaust concentration should remain constant and therefore, the mass emission rate increases in proportion to the airflow change. A complete facility-wide tabulation is included in Appendix 1. As shown in Appendix 1, the proposed and expected levels of emission change place the expected level of actual lead emission increase at about 6 percent of the facility-wide current allowable annual lead emissions.

Table 1. Emission Limits and Air Flows

Source ID	Source Description	Current Lead Emission Limit (lb/hr)	Proposed Lead Emission Limit (lb/hr)	Current Modelled Air Flow (acfm)	New Air Flow (acfm)
BH1	Baghouse 1	2.94E-02		80,002	
BH2	**Baghouse 2**	**1.37E-02**	**2.00E-02**	55,882	120,000
BH3	**Baghouse 3**	**4.46E-02**	**1.00E-01**	65,020	120,000
BH4	Baghouse 4	1.47E-01		137,261	
BH5	Baghouse 5	1.29E-02		108,106	

Permit Condition D. of C-12206 requires Exide to remodel and document compliance with the 2008 lead NAAQS if any changes are proposed to source and stack parameters used for the dispersion modelling analysis, including but not limited to stack heights, stack diameters, exhaust temperatures, emission rates, and exit velocities. A revised model demonstrating compliance and maintenance with the 2008 lead NAAQS using the new parameters is included as Appendix 4.

In addition to emission limit changes, the ventilation system upgrade is changing which sources are controlled by which baghouse. A red-lined version of Construction Permit C-12206 is included in Appendix 2 to reflect these new source and emission point associations.

Curing Ovens

Exide is also requesting approval for the installation of 14 new hydroset curing ovens. The new curing ovens will be utilized as an alternate curing process for product specification purposes and will not result in an increase in the facility's production capacity. Approximately 14,000 acfm of exhaust from the new hydroset curing oven rooms will be routed to BH4. The 12 hydroset curing ovens requested in Construction Approval application dated Nov. 20, 2015 will also be routed to BH4. Routing all curing oven rooms to BH4 will require increasing the duct diameter of the main trunk serving this department from 26" to 32". Lead concentrations in the air drawn from the curing oven rooms will be similar to that of in-plant room air at this facility. The new curing ovens will result in an increase in combustion

emissions only. Airflow, expected actual emissions, and lead emission limits from BH4, serving all 26 curing ovens, will not change.

The proposed hydroset curing ovens are equipped with one 0.5 mmBtu/hr natural gas-fired burner each. The potential to emit (PTE) of products of combustion from these burners in included in Table 2 and in Appendix 1.

Table 2. PTE for New Curing Ovens

Pollutant	Emission Rate (lb/hr)	Annual Emissions (tpy)
NO_x	0.6863	3.006
CO	0.5765	2.525
SO_2	0.0041	0.018
VOC	0.0377	0.165
$PM/PM_{10}/PM_{2.5}$	0.0522	0.228
CO_2	823.66	3,607.6
CH_4	0.0155	0.068
N_2O	0.0016	0.007
CO_2e	824.5	3,611.3

The PTE from the proposed curing ovens is less than construction permit and approval thresholds in K.A.R. 28-19-300, however the ovens will be subject to the federal New Source Performance Standard (NSPS) in 40 CFR 60, Subpart KK, *Standards of Performance for Lead-Acid Battery Manufacturing Plants,* and the National Emission Standard for Hazardous Air Pollutants (NESHAP) in 40 CFR 63, Subpart PPPPPP*, Lead Acid Battery Manufacturing Area Sources*. Per K.A.R. 28-19-300(b)(3)(A), if an emission unit is subject to a standard pursuant to K.A.R. 28-19-720, NSPS, or K.A.R. 28-19-735, NESHAP, the facility is required to apply for a construction approval. The required Construction Approval forms for these 14 ovens are included in Appendix 3.

Regulatory Applicability

The Project will be subject to the following Kansas Administrative Regulations (K.A.R.):

K.A.R. 28-19-20. Particulate Matter Emissions Limitations

K.A.R. 28-19-501(d). Operating Permits, control equipment requirements

K.A.R. 28-19-650. Emissions Opacity Limits

K.A.R. 28-19-720. New source performance standards.

- 40 CFR Part 60 Subpart KK, *Standards of Performance for Lead-Acid Battery Manufacturing Plants*
- *40 CFR Part 60, Subpart A, General Provisions*

K.A.R. 28-19-735. National Emission Standards Hazardous Air Pollutants

- 40 CFR Part 63 Subpart PPPPPP*, Lead Acid Battery Manufacturing Sources*
- *40 CFR Part 63, Subpart A, General Provisions*

Performance Testing

As required by §60.8, Exide will conduct performance testing on BH2, BH3 and BH4 within 60 days after achieving maximum rate, but no later than 180 days after startup of the new equipment.

If you have any questions or require additional information during the course of your review, please contact Mr. Brandon Budke, Exide Salina, at (785) 823-4025.

Sincerely,

Bob Snow
Plant Manager
Exide Technologies

List of Appendices

Appendix 1: Detailed Emission Calculations
Appendix 2: Red-Lined Version of Construction Permit C-12206
Appendix 3: Notification of Construction or Modification Form
Appendix 4: Dispersion Modeling Report

APPENDIX 1

Emission Calculations

Appendix 1
Exide Technologies
Emission Rate Increase Calculations

Table A1-1. Lead Emitting Point Sources Included in Dispersion Modeling Analysis

	A	B	C	D	E	F	G	H	I	J
AERMOD Source Group ID	**Modeled Lead Emission Rate (lb/hr)**	**FUTURE ALLOWABLE (lb/hr)**	**Last Stack Test (lb/hr)**	**at LOD (lb/hr)**	**Expected Future Actual (lb/hr)**	**Modeled: expected multiple**	**Future allowable: expected multiple**	**Modeled Air Flow (acfm)**	**Last Stack Test Flow (acfm)**	**DESIGN flow (acfm)**
BH1	2.94E-02	2.94E-02	1.28E-02	1.28E-02	1.28E-02	2.30	2.30	80,002	51,321	
BH2	1.37E-02	2.00E-02	< 0.00346	3.46E-03	6.25E-03	2.19	3.20	55,882	66,385	120,000
BH3	4.46E-02	1.00E-01	1.61E-02	1.61E-02	3.53E-02	1.26	2.83	65,020	54,699	120,000
BH4	1.47E-01	1.47E-01	4.20E-02	4.20E-02	4.20E-02	3.49	3.49	137,261	137,217	
BH5	1.29E-02	1.29E-02	< 0.00378	3.78E-03	3.78E-03	3.42	3.42	108,106	108,079	
BH11	6.99E-03	6.99E-03	< 9.43E-4	9.43E-04	9.43E-04	7.42	7.42	6,632	6,624	
BH12	6.99E-03	6.99E-03	2.35E-05	2.35E-05	2.35E-05	297.61	297.61	5,734	1,720	
BH13	6.99E-03	6.99E-03	< 0.000533	5.33E-04	5.33E-04	13.12	13.12	3,664	3,659	
BH14	6.99E-03	6.99E-03	< 0.000785	7.85E-04	7.85E-04	8.91	8.91	4,832	4,827	
BH15	6.99E-03	6.99E-03	< 0.000595	5.95E-04	5.95E-04	11.75	11.75	3,680	3,680	
OM	6.72E-02	6.72E-02	1.90E-03	1.90E-03	1.90E-03	35.35	35.35	37,269	18,399	
TOTAL (lb/hr)	3.50E-01	4.11E-01		8.29E-02	1.05E-01					
TOTAL (tpy)	1.53E+00	1.80E+00		3.63E-01	4.60E-01					
	% increase =	18		% increase =	27					

Expected Actual Increase (tpy) = 6.3 % of current allowed emissions in tpy

Table A1-2. PTE for 14 Curing Ovens

Burner Data

Size:	0.5	mmBtu/hr
Quantity:	14	ovens
Total Heat Input:	7	mmBtu/hr
Operating Rate:	8760	hrs/year

Pollutant	Emission Factor [a]	Unit	Emission Factor [b]	Unit
NO_x	100	lb/mmcf	0.09804	lb/mmBtu
CO	84	lb/mmcf	0.08235	lb/mmBtu
SO_2	0.6	lb/mmcf	0.00059	lb/mmBtu
VOC	5.5	lb/mmcf	0.00539	lb/mmBtu
$PM/PM_{10}/PM_{2.5}$ [c]	7.6	lb/mmcf	0.00745	lb/mmBtu
CO_2	120,019	lb/mmcf	117.665	lb/mmBtu
CH_4	2.3	lb/mmcf	0.00222	lb/mmBtu
N_2O	0.23	lb/mmcf	0.00022	lb/mmBtu
CO_2e [d]				

Pollutant	Emission Rate (lb/hr)	Annual Emissions (tpy)
NO_x	0.6863	3.006
CO	0.5765	2.525
SO_2	0.0041	0.018
VOC	0.0377	0.165
$PM/PM_{10}/PM_{2.5}$	0.0522	0.228
CO_2	823.66	3,607.6
CH_4	0.0155	0.068
N_2O	0.0016	0.007
CO_2e	824.5	3,611.3

[a] AP-42 Emission Factors (Section 1.4, Revised 7/1998)

[b] Natural Gas Heat Capacity: 1,020 BTU/scf (based on AP-42 Chapter 1.4.1)

[c] Total PM is the sum of the filterable PM and condensable PM. Per AP-42 Table 1.4-2, Footnote c, all PM is assumed to be less than 1.0 micrometer in diameter. Therefore the sum of the condensable and filterable emission factors are used to estimate PM, PM_{10}, and $PM_{2.5}$.

[d] 40 CFR 98.2 & Table A-1: CO2e = CO2 + GWPCH4*CH4 + GWPN2O*N2O; (GWPCH4=25, GWPN2O=298), where GWP = global warming potential

APPENDIX 2

Red-Lined Version of Construction Permit C-12206

AIR EMISSION SOURCE CONSTRUCTION PERMIT

Source ID No.: 1690035

Effective Date: 8/18/2014

Source Name: Exide Technologies

SIC Code: 3691, Storage Batteries

NAICS Code: 335911, Battery Manufacturing

Source Location: 413 E. Berg Rd.
Salina, KS

Mailing Address: 413 E. Berg Rd.
Salina, KS 67401

Contact Person: James T. Thomas
Plant Manager
Exide Technologies
Office: +1 785-825-6276
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E-mail: jim.thomas@exide.com

I. Authority

KDHE, as the permitting authority, is issuing this permit pursuant to K.S.A. 65-3008 and K.A.R. 28-19-300 *et seq.* and as authorized by K.S.A. 65-3005. All documents related to applications for permits or approvals shall be submitted to the Permits Section in the Bureau of Air.

KDHE is the compliance and enforcement authority, and all documents related to compliance activities such as reports, tests, and notifications shall be submitted to the Compliance and Enforcement Section in the Bureau of Air.

II. General Information

The purpose of this document is to implement federally enforceable limitations and conditions applicable to Exide Technologies within the 2008 Lead NAAQS nonattainment area in Salina, Kansas. This comprehensive construction permit authorizes Exide modifications and improvement activities at the Salina plant to reduce lead emissions and support attainment of the 2008 Lead NAAQS.

The conditions of this permit supplement all air construction and operation permits and approvals previously issued to this source. Unless otherwise specified, these conditions are in addition to all other applicable permit or approval conditions and regulations.

This permit is based on information provided by the owner or operator of the subject air emission sources. Each emission unit or stationary source is required to be operated in compliance with all applicable requirements of the Kansas Air Quality Act and the federal Clean Air Act.

III. Facility Description

Exide Technologies operates a lead acid battery and lead oxide manufacturing facility in Salina, Kansas (Saline County). The Exide property is approximately 46 acres in size and is located about six kilometers south of downtown Salina. This facility operates under a Class II Operating Permit issued on January 15, 2004, and is a non-major source of hazardous air pollutant (HAP) emissions.

The production operations at this facility consist of 7 pasting lines, 5 ball mills and 10 oxide mills with emissions controlled by 15 process baghouses, 16 battery assembly lines, and 41 lead reclaim pots with 29 of those lead reclaim pots emissions controlled by 5 baghouses. Pressure differential is monitored across each fabric filter control device for these sources.

General process and control equipment description:

> In grid casting, lead alloy ingots are charged to a melting pot, from which the molten lead flows into molds that form the battery grids. Paste is made in a batch process. A mixture of lead oxide powder, water, and sulfuric acid produces a positive paste, and the same ingredients in a slightly different proportion with the addition of an expander make the negative paste. Pasting machines then force the pastes into the interstices of the grids, which are then made into plates. The pasted plates are then cured through alternating cycles of steaming and drying. From the ovens, the cured plates are loaded into the assembly process where they are automatically stacked in an alternating positive/negative order. Emissions from the battery manufacturing process are controlled by baghouses.

IV. Project Summary

Exide is completing various improvement projects to reduce lead emissions. Projects include: oxide mill replacements; baghouse replacements; new stacks and stack height increases; and fugitive emissions controls (production facility and roadways). Performance results from these improvement projects were used for the air dispersion modeling to demonstrate compliance with the 2008 Lead NAAQS of 0.15 $\mu g/m^3$ on a rolling 3-month average basis.

V. Significant Applicable Air Pollution Control Regulations

The facility is subject to the Kansas Administrative Regulations Chapter 28 Article 19 relating to air pollution control.

The state and federal regulations that may have associated requirements include, but are not limited to:

> K.A.R. 28-19-650 Emissions Opacity Limits.
>
> K.A.R. 28-19-20 Particulate Matter Emission Limitations.

40 C.F.R. Part 60, Subpart KK, Standards of Performance for Lead-Acid Battery Manufacturing Processing Plants, which is adopted by reference in K.A.R. 28-19-720 New Source Performance Standards.

40 C.F.R. Part 60, Subpart A, General Provisions.

40 C.F.R. Part 63, Subpart PPPPPP, National Emission Standards for Hazardous Air Pollutants for Lead Acid Battery Manufacturing Area Sources, which is adopted by reference in K.A.R. 28-19-750 Hazardous Air Pollutants; Maximum Achievable Control Technology.

40 C.F.R. Part 63, Subpart A, General Provisions.

VI. Permit Conditions

The following conditions apply to all emissions sources in section VII of this permit:

A. Emission control practices shall be implemented and air pollution control equipment shall be operated continuously while operating the associated emission unit or units. [K.A.R. 28-19-501(d)(l)]

B. A written air pollution control equipment maintenance plan shall be maintained on-site to assure proper operation of the air pollution control equipment. [K.A.R. 28-19-501(d)(2)]

C. The owner or operator shall maintain records showing the date of all routine or other maintenance or repairs of the control equipment, the action taken on such date, and any corrective action or preventive measures taken. [K.A.R. 28-19-501(d)(3)]

D. Source and stack parameters, including but not limited to stack heights, stack diameters, exhaust temperatures, emission rates, and exit velocities, shall be consistent with data provided for the dispersion modeling analysis. Actual operational conditions shall be consistent with data provided for the dispersion modeling analysis. If significant changes are proposed, or modeling parameters are not representative of site conditions, the owner or operator shall re-model, document compliance with the 2008 Lead NAAQS and any other applicable NAAQS, and submit documentation of compliance to KDHE prior to making the changes. Mitigation shall be required if modeling indicates a potential NAAQS exceedance.

E. The owner or operator shall comply with the emissions limits listed in Tables 2, 4, and 7.

F. The owner or operator shall conduct performance testing to demonstrate compliance with the emissions limits in Tables 2, 4, and 7 in Section VII of this permit. For each test, the owner or operator shall submit a performance test protocol, which includes a description of the test and applicable test methods, to the KDHE Air Compliance and Enforcement Section at least 30 days prior to testing. A written report of the performance test results shall be submitted to KDHE within 30 days following each test. Performance testing shall be conducted as follows:

1. Stack testing for the Oxide Mill (OM) was conducted in 2013 and shall be conducted every fifth year thereafter.

2. Stack testing for Baghouse #1 (BH1) shall be conducted in 2014, after installation and commissioning, and then every fifth year thereafter.

3. Stack testing for Baghouse #3 (BH3) shall be conducted in 2014 and every fifth year thereafter.

4. Stack testing for Baghouse #2 (BH2) shall be conducted in 2015 and every fifth year thereafter.

5. Stack testing for Baghouse #4 (BH4) shall be conducted in 2016 and every fifth year thereafter.

6. Stack testing for Baghouse #5 (BH5) and for each Ball Mill Baghouse (BH11 through BH15) shall be conducted in 2017 and every fifth year thereafter.

7. For any stack test result that exceeds the respective emissions limit (as provided in Tables 2, 4, and 7 in Section VII of this permit), a retest shall be required within 60 days of the test date for which the limit was exceeded.

8. For any calendar year, January through December, in which the annual number of pounds of lead processed by the facility increased by fifteen (15) percent or more above the annual rate during the year of the last stack test, the owner or operator shall conduct stack testing within the first three months of the following calendar year for Baghouses 1 through 5 (BH1-BH5), Oxide Mill (OM: OM1-0M10), and Ball Mill Baghouses 11 through 15 (BH11-BH15).

The performance test schedule is illustrated in Table 1 below.

Table 1. Schedule for Required Performance Testing.

	Source ID										
Year	BH1	BH2	BH3	BH4	BH5	OM	BH11	BH12	BH13	BH14	BH15
2013						✓					
2014	✓		✓								
2015		✓									
2016				✓							
2017					✓		✓	✓	✓	✓	✓
2018						✓					
2019	✓		✓								
2020		✓									
2021				✓							
2022					✓		✓	✓	✓	✓	✓

VII. Activities and Plant-wide Enforceable Conditions for the Attainment and Maintenance of the 2008 Lead NAAQS

Exide's NAAQS compliance projects are summarized in Attachment 1.

A. Facility Baghouses

Facility Baghouse Replacement

This project includes replacing existing environmental (facility) baghouses with new high-efficiency Pulse-Jet Dust Collector systems. Table 2 lists each facility baghouse and provides the completion date for each baghouse replacement. Table 2 also identifies the applicable point source emissions limits, as developed and modeled for demonstrating ambient impacts less than the 2008 Lead NAAQS and for meeting the applicable federal New Source Performance Standard (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP).

Table 2. Facility Baghouses with Respective Enforceable Emissions Limits.

Source ID	Source Description	Facility Emissions Controlled	Replacement Status	Lead Emission Limit, grams/second (g/s)	Lead Emissions Limit, pounds/hour (lb/hr)
BH3	Baghouse #3	COS / Assembly U-Lines 1~~, 4~~5, 10-12, 17, 18 Stacker; and break room air shower	Completed September 2009	~~5.63 E-03~~ 1.26 E-02	~~4.47 E-02~~ 1.00 E-01
BH2	Baghouse#2	~~COS / Assembly U-Lines 2, 3, 5, 10, and 11; and COS / Assembly department roof drop near offices~~ Oxide (Barton) Mill Process and General Exhaust Ventilation; Pasting Lines 4-7	Completed November 2010	~~1.73 E-03~~ 2.52 E-03	~~1.37 E-02~~ 2.00 E-02
BH4	Baghouse #4	Pasting Lines 1-~~6~~3; ~~Oxide Mill roof drop;~~ Ball Mill Exhaust Ventilation; ~~roof drop;~~ Oxide Mill General Exhaust; Carborandum room; Storage Bins bin vent; Curing Rooms/Ovens (26); and Central Vacuums 3 and 4	Completed July 2011	1.85 E-02	1.47E-01
BH5	Baghouse #5	COS / Assembly Lines 15 and 16; Grid Casting; RLS Barcaster; Cominco Re-melt Pot; ~~Pasting Line 7;~~ Pasting Mixers; Flash Dry Ovens; Metals department~~; and one roof drop~~	Completed May 2012	1.63 E-03	1.29 E-02
BH1	Baghouse #1	Cast On Strip (COS) / Assembly U-Lines 6, 7, 8, and 9; 18 Repair Table; QC Lab Drop; and Central Vacuums 1 and 2	Installation Completed February 19, 2014	3.71 E-03	2.94 E-02

Baghouse #1 Replacement:

Exide's Notice of Construction or Modification for the replacement of Baghouse #1 was received by KDHE on May 28, 2013. Ref# C-11313.

The following equipment or equivalent is approved for the replacement of Baghouse #1:

One (1) 390-bag GE Energy baghouse, using Spunbonded Polyester filters.

Exide shall replace Baghouse #1 and shall increase the stack height to 80 feet as modeled for the attainment of the 2008 Lead NAAQS in the State Implementation Plan Attainment Demonstration for the Salina Nonattainment Area.

Performance Testing Requirements for Baghouse #1 Replacement:

The control equipment is being replaced and, therefore, a performance test is required to demonstrate compliance with the emissions limit in Table 2 for the exhaust from the final outlet, Baghouse #1 stack, to the atmosphere. The stack emissions subject to the NSPS require performance testing in accordance with 40 C.F.R. 60.8(a). Performance testing is required to be completed within 60 days after achieving the maximum production rate, but no later than 180 days after the initial startup of the new Baghouse #1.

The owner or operator shall conduct the performance test in accordance with the test methods described in 40 C.F.R. 60.374 or any other test method approved by KDHE to demonstrate compliance with the permitted emissions limitation in Table 2.

The owner or operator shall submit a performance test protocol which includes a description of the test and applicable test methods to the KDHE Air Compliance and Enforcement Section at least 30 days prior to testing.

A written report of the performance test results shall be submitted to KDHE within 30 days following the test.

Notifications Required for Baghouse #1 Replacement:

The following notifications are to be submitted, in accordance with 40 C.F.R. 60.7(a), to the KDHE Air Compliance and Enforcement Section in Topeka, KS.

1. The actual date of the initial start-up of Baghouse #I, postmarked within 15 days after that date;

2. Maximum production rate achieved; and

3. Scheduled date for performance testing and protocol 30 days prior to testing.

The owner or operator shall notify the Air Program Field Staff at the North Central District Office in Salina at (785) 827-9639 when installation of Baghouse #1 is complete so that an evaluation can be conducted.

Facility Baghouses (BH1-BH5) Monitoring Requirements:

The following requirements apply to any emission source subject to 40 C.F.R. Part 63, Subpart PPPPPP, with emissions controlled by a fabric filter.

1. The owner or operator shall perform semiannual inspections and maintenance of each fabric filter as specified in 40 C.F.R. 63.11423(b)(2)(i); and

2. The owner or operator shall meet the monitoring requirements of 40 C.F.R. 63.11423(b)(2)(ii).

B. Oxide Mill

<u>Oxide Mill Replacements</u>

This project replaces existing oxide reactors with new Eagle/Linklater M1500 Oxide Reactors with automated controls for the oxide operations. This includes replacement of the process Oxide Mills (OM1 through OM10), associated process baghouses, and the addition of HEPA filters to the emissions controls for an overall efficiency of 99.97%. Table 3 lists the Oxide Mills, OM1 through OM10, and the respective replacement completion dates.

Table 3. Oxide Mill Replacements.

Source ID	Source Description	Replacement Completed
OM1 & OM2	Oxide Mills #1 & #2	September 2006
OM3 & OM4	Oxide Mills #3 & #4	July 2009
OM5 & OM6	Oxide Mills #5 & #6	October 2010
OM7	Oxide Mill #7	January 2011
OM8	Oxide Mill #8	February 2011
OM9 & OM10	Oxide Mills #9 & #10	March 2011

Oxide Mill Stack Modifications

The following table (Table 4) describes Oxide Mill stack modifications as modeled for attainment of the 2008 Lead NAAQS in the State Implementation Plan Attainment Demonstration for the Salina Nonattainment Area. Exide shall manifold ten Oxide Mill (OM1-OM10) stacks to one new combined Oxide Mill (OM) stack, and the OM stack height shall be 65 feet from ground level. Table 4 also identifies the applicable lead emissions limit for the combined emissions from the new single Oxide Mill (OM) stack.

Table 4. Oxide Mill Stack Modification Requirements and Enforceable Emissions Limit.

Source ID	Source Description	Approved Stack Height	Status	Lead Emissions Limit, grams/second (g/s)	Lead Emissions Limit, pounds/hour (lb/hr)
OM: Oxide Mill (OM-OM10), Oxide Mill Stacks	Manifold ten OM stacks to one new combined OM stack.	65 feet from ground level	Completed October 1, 2013. Stack test completed November 22, 2013.	8.47 E-03	6.72 E-02

Performance Testing Requirements:

The stack emissions subject to the NSPS require performance testing in accordance with 40 C.F.R. 60.8(a). Performance tests for the Oxide Mill combined stack were conducted on November 22, 2013.

Oxide Mill Corrective / Preventive Action

The action identified in Table 5 below is designed to eliminate the potential for a leak from the oxide mill building to the outside environment in the event of a release resulting from a malfunction of the lead oxide conveyance system within the building. This action fulfills Exide's commitment to KDHE for corrective action measures in response to a minor lead oxide release event in October 2010.

Table 5. Action Taken to Prevent Lead Oxide Escape from Oxide Mill.

Activity	Description	Status

Relocate Oxide Mill Diverter Valves	Implement a new oxide delivery layout with an auxiliary set of valves installed in a parallel system. Exide shall enclose sections of the oxide mill building where the highest potential exists for the escape of lead oxide.	Completed July 2012

Inspection and Repair Requirements:

Exide shall inspect the Oxide Mill building structure/enclosure at least once every other month. Exide shall repair any gaps, breaks, separations, leak points or other possible routes for emissions of lead to the atmosphere within 30 days of identification. If a repair cannot be completed within 30 days, then the repair shall be completed within the shortest amount of time practically achievable and the reason(s) for the delay shall be recorded. Inspection and repair information shall be recorded and records kept on site for a minimum of two years. Records shall be made available to KDHE upon request.

C. Ball Mill

Ball Mill Stack Modifications

The following table (Table 6) identifies the Ball Mill stack modifications project as modeled for attainment of the 2008 Lead NAAQS in the State Implementation Plan Attainment Demonstration for the Salina Nonattainment Area.

Table 6. Ball Mill Stack Modifications.

Project	Action	Status
Baghouses 11-15 (BH1 -BH15), Ball Mill Stacks	Stack heights shall be increased by 37 feet.	Completed July 19, 2013. Stack test completed November 22, 2013.

Table 7 lists each Ball Mill Baghouse, the stack heights approved by KDHE, and the lead emissions limit that applies, as modeled for the attainment of the 2008 Lead NAAQS in the State Implementation Plan Attainment Demonstration for the Salina Nonattainment Area.

Table 7. Stack Height Requirements and Enforceable Emissions Limits for Ball Mill Baghouses.

Source ID	Source Description	Approved Stack Height, meters (m)	Approved Stack Height, feet (ft)	Lead Emission Limit, grams/second (g/s)	Lead Emission Limit, pounds/hour (lb/hr)
BH11	Ball Mill 11 Baghouse	24.512	80.420	8.82 E-04	7.00E-03
BH12	Ball Mill 12 Baghouse	24.559	80.574	8.82 E-04	7.00E-03
BH13	Ball Mill 13 Baghouse	24.533	80.489	8.82 E-04	7.00E-03
BH14	Ball Mill 14 Baghouse	24.512	80.420	8.82 E-04	7.00E-03
BH15	Ball Mill 15 Baghouse	24.788	81.325	8.82 E-04	7.00E-03

Performance Testing Requirements:

The stack emissions subject to the NSPS require performance testing in accordance with 40 C.F.R. 60.8(a). Performance tests for the Ball Mill stacks were conducted on November 22, 2013.

Ball Mill Baghouses (BH11-BH15) Monitoring Requirements:

The following requirements apply to any emission source subject to 40 C.F.R. Part 63, Subpart PPPPPP, with emissions controlled by a fabric filter.

1. The owner or operator shall perform semiannual inspections and maintenance of each fabric filter as specified in 40 C.F.R. 63.11423(b)(2)(i); and

2. The owner or operator shall meet the monitoring requirements of 40 C.F.R. 63.11423(b)(2)(ii).

Ball Mill Fugitive Emissions Reduction

The improvement activities in Table 8 below are designed to reduce fugitive dust impact on KDHE ambient air monitors.

Table 8. Ball Mill Improvement Activities to Reduce Fugitive Dust.

Activity	Description	Status
Plant Process Fugitive Control (Ball Mill)	Establish negative pressure Ball Mill building ventilation and maintain local exhaust ventilation at process points.	Completed September 2011
Upgrade Ball Mill Ventilation	Improve ventilation in Ball Mill room by bringing fresh air in and evacuating some of the heat without risk of oxide fugitives escaping the room.	Completed November 2011

Ball Mill Process Fugitive Emissions Control Requirements:

Ball Mill process emissions shall be contained in a negative pressure total enclosure with maintained local exhaust ventilation at process points, reducing the Ball Mill process fugitive emissions by 99 percent from 338 pounds of lead per year to 3.38 pounds of lead per year. Total enclosure means that the building is completely enclosed with a floor, walls, and a roof to prevent exposure to the elements and to assure containment of lead bearing material with limited openings to allow access and egress for people and vehicles. The total enclosure must provide an effective barrier against fugitive dust emissions with the direction of air flow being inward through any openings and with the enclosure being maintained under constant negative pressure. Ball Mill process fugitive emissions of lead shall be less than or equal to 4.86 x 10^{-5} grams per second (3.86 x 10^{-4} pounds per hour; 3.38 pounds per year), as modeled for the attainment of the 2008 Lead NAAQS. Negative pressure shall be maintained in the total enclosure at all times. The Ball Mill total enclosure standards are identified below under Inspection and Repair Requirements.

Inspection and Repair Requirements:

1. The total enclosure must be free of significant cracks, gaps, corrosion, or other deterioration that could cause lead bearing material to be released from the primary barrier.

2. Measures must be in place to prevent the tracking of lead bearing material out of the enclosure by personnel or equipment.

3. The total enclosure must be ventilated to ensure negative pressure values of at least 0.013 mm of mercury (0.007 inches of water).

4. An inward flow of air must be maintained through all natural draft openings.

5. The total enclosure must be inspected at least once per month. Any gaps, breaks, separations, leak points, or other possible routes for emissions of lead to the atmosphere must be repaired within 30 days of identification unless an approval for an extension is obtained from KDHE before the repair period is exceeded. Inspection and repair records shall be kept on site for a minimum of two years and shall be made available to KDHE upon request.

D. Plant Roadways

The following table (Table 9) describes a plant roadways improvement activity that is designed to reduce fugitive dust impact on KDHE ambient air monitors.

Table 9. Roadways Improvement Activity to Reduce Fugitive Dust.

Activity	Description	Status
Paving Plant Roadways	Pave all internal roadways and parking lots subject to vehicular traffic on the northwest section. Total area to be paved is 15,220 square yards.	This paving project shall be completed by July 31, 2014.

Paving Plant Roadways:

Exide's Notice of Construction or Modification for the Paving Plant Roadways project was received by KDHE on May 28, 2013. Ref# C-11314. This project is aimed at reducing the silt load and lead content to the levels similar to the dust loading and lead content on other paved roadways on the property and reducing the fugitive dust impact on KDHE ambient air monitors, as modeled for the attainment of the 2008 Lead NAAQS.

Requirements for Paving Plant Roadways and for Fugitive Emission Reduction:

All internal roadways and parking lots subject to vehicular traffic on the northwest section of the fenced plant site, a total area of 15,200 square yards, shall be paved to achieve the necessary results per the State Implementation Plan attainment demonstration modeling, which demonstrates a roadways fugitive lead emission reduction of 0.04 tons (80 pounds) per year, from 0.056 tons of lead per year to 0.016 tons of lead per year. This paving project shall be completed by July 31, 2014. A map of the area to be paved is included as Attachment 2.

Notifications Required for the Paving Project:

Exide shall notify the KDHE Bureau of Remediation in Topeka, KS, at least 30 days prior to paving the roadways and parking lots on the northwest section of the site.

Exide shall notify the KDHE Air Compliance and Enforcement Section in Topeka, KS, of the actual date of the paving project completion, postmarked within 15 days after that date.

Sampling Required After Paving Project Completion:

Within six months following completion of the paving project, the following shall be completed.

Exide shall conduct a silt content analysis, using sampling locations identical to those for which results were used in the attainment demonstration modeling.

Exide shall submit to KDHE the sampling results and a demonstration of the effect on roadway fugitive emissions, with a roadway fugitive lead emissions limitation of 0.016 tons per year.

Reporting Excess Emissions

All emission limits and standards (applicable regulations in Section V and Tables 2, 4, and 7 in Section VII) apply at all times, including during startup and shutdown periods. K.A.R. 28-19-11, Exceptions Due to Breakdowns or Scheduled Maintenance, is not an applicable regulation. In lieu of K.A.R. 28-19-11, the following requirements apply.

A. *Notification Required for Excess Emissions Due to Maintenance, Startup, and Shutdown:*

Exide shall notify the KDHE Bureau of Air at least ten days prior to any maintenance, startup, or shutdown activity that is expected to cause an excess release of emissions. If notification cannot be given ten days prior, notification shall be given as soon as practicable prior to the maintenance, startup, or shutdown activity that is expected to cause excess emissions. If prior notification is not given for any maintenance, startup, or shutdown activity that resulted in an excess release of emissions, notification shall be given within two business days of the release. In all cases, the notification shall be a written report and shall include, but not be limited to, the following:

1. Name and location of the affected source or emissions unit.

2. Name and telephone number of the person responsible for the affected source or emissions unit.

3. Identity of the equipment involved in the maintenance, startup, or shutdown activity.4. Time and duration of the period of excess emissions.

5. Type of activity and the reason for the maintenance, startup or shutdown.

6. Estimate of the magnitude of the excess emissions and the operating data and computations used in estimating the magnitude.

7. Measures taken to mitigate the extent and duration of the excess emissions.

8. Measures taken to correct the situation that caused the excess emissions and measures taken or planned to prevent recurrence.

B. *Notification Required for Excess Emissions Due to Malfunction:*

Exide must notify KDHE by telephone, facsimile, or electronic mail transmission within two working days following the discovery of any failure of air pollution control equipment, process equipment, or of the failure of any process to operate in a normal manner, resulting in excess emissions. A written notification shall be submitted within ten days of the event and shall include the following:

1. A description of the malfunctioning equipment or abnormal operation.

2. The date of the initial malfunction and the period of time of excess emissions due to the malfunction.

3. The cause of the malfunction and the methods utilized to mitigate emissions and restore normal operations.

4. An estimate of the magnitude of the excess emissions and the data and computations used in estimating the magnitude.

Compliance with this malfunction notification shall not automatically absolve the owner or operator of liability for the excess emissions resulting from such event.

C. *The following criteria will be considered by KDHE in evaluating whether or not excess emissions due to malfunction warrant KDHE enforcement action:*

1. Whether the excess emissions were caused by a sudden, unavoidable, breakdown of technology beyond the control of the owner or operator;

2. Whether the excess emissions did not stem from any activity or event that could have been foreseen and avoided, or planned for, and could not have been avoided by better operation and maintenance practices;

3. Whether, to the extent practicable, the air pollution control equipment or processes were maintained and operated in a manner consistent with good practices for minimizing emissions;

4. Whether repairs were made in an expeditious fashion when the operator knew or should have known that excess emissions were occurring. Off-shift labor and overtime must have been utilized, to the extent practicable, to ensure that such repairs were made as expeditiously as practicable;

5. Whether the amount and duration of the excess emissions (including any bypass) were minimized to the maximum extent practicable during periods of such emissions;

6. Whether all possible steps were taken to minimize the impact of the excess emissions on ambient air quality;

7. Whether all monitoring systems were kept in operation if at all possible;

8. Whether the owner or operator's actions in response to the excess emissions were documented by properly signed, contemporaneous operating logs, or other relevant evidence;

9. Whether the excess emissions were not part of a recurring pattern indicative of inadequate design, operation, or maintenance; and

10. Whether the owner or operator properly and promptly notified the appropriate regulatory authority.

D. *Summary reports of excess emissions shall be submitted semi-annually to the KDHE Air Compliance and Enforcement Section and shall include the following information:*

1. The magnitude of excess emissions, including the computations and conversion factors used, and the date and time of commencement and completion of each time period of excess emissions.

2. Specific identification of each period of excess emissions that occurs during startups, shutdowns, maintenance, and malfunctions of the facility. The nature and cause of any malfunction (if known), the corrective action taken or preventive measures adopted.

3. The date and time identifying each period during which a continuous monitoring system or monitoring device was inoperative (except for zero and span checks) and the nature of the system or device repairs or adjustments.

E. *Records of excess emissions shall be kept on site for a minimum of two years and made available to KDHE upon request.*

VIII. <u>Emissions Inventory Reporting</u>

Annual Emissions Inventory Required:

Exide shall, on or before April of each year, submit to KDHE an annual emissions inventory. If April 1 falls on a Saturday, Sunday, or legal holiday, then the submission shall be due on or before the next business day after April 1. The information required shall be submitted on the KDHE Emissions Inventory Class I forms.[1] Criteria pollutant emissions that must be reported include oxides of nitrogen (NO_X), particulate matter with diameter of 10 micrometers or less (PM_{10}), particulate matter with diameter of 2.5 micrometers or less ($PM_{2.5}$), volatile organic compounds (VOCs), sulfur dioxide (SO_2), carbon monoxide (CO), and ammonia (NH_3) emissions. The hazardous air pollutants (HAPs) listed in K.A.R. 28-19-201(a) must be reported, including lead (Pb) and lead compounds.

IX. Reasonable Further Progress (RFP) Requirements for Attainment of the 2008 Lead NAAQS

Reasonable further progress for Exide, as the primary contributor to lead emissions in the Salina nonattainment area, will be monitored and evaluated by KDHE and will be based on the following:

A. Achieving a highest 3-month rolling average KDHE ambient air monitor value less than or equal to 0.15 $\mu g/m^3$ for any 3-month period beginning after July 31, 2014 (i.e., beginning with the 3-month rolling average for Aug-Oct 2014).

B. On-schedule completion of projects, which include those listed below in Table 10.

Table 10. Projects Required to be Completed for Reasonable Further Progress.

Project	Action	Completion Date
Baghouses 11-15 Stacks (BH11-BH15)	Increase Ball Mill stack heights by 37 feet as demonstrated in attainment modeling.	Completed July 19, 2013 Stack test November 22, 2013
Oxide Mill Stacks (OM1-OM10)	Manifold to new stack, 65 feet from ground level per attainment demonstration.	Completed October 1, 2013 Stack test November 22, 2013
Baghouse 1 (BH1)	Replace baghouse and increase height to 80 feet per attainment demonstration modeling.	Installation Completed February 19, 2014. Stack test March 20, 2014
Paving Plant Roadways	Pave all internal roadways and parking lots subject to vehicular traffic on the northwest section per attainment demonstration modeling. Total area to be paved is 15,220 square yards. (See map - Attachment 1)	Shall be completed by July 31, 2014.

Section 172(c)(9) of the federal Clean Air Act requires the implementation of specific measures if the nonattainment area fails to maintain reasonable further progress. *Upon failure to achieve and maintain reasonable further progress (RFP), root cause analysis and corrective/preventive action provisions shall be implemented in accordance with Table 11, Section XII.*

X. Contingency Measures

Within 60 days after the effective date of this permit, Exide shall develop, and submit to KDHE for approval, compliance plans that shall be implemented in accordance with section XII of this permit and include the following:

[1] Emission inventory forms are available on KDHE's website, http://www.kdheks.gov/emission!forms.html.

A. An analysis of site conditions and operations that potentially may impact, directly or indirectly, KDHE ambient air monitors. The analysis shall include, but not be limited to: a description of the site's root cause analysis and corrective/preventive action process as it relates to attaining and maintaining the 0.15 $\mu g/m^3$ standard; potential improvements to work practices or procedures; possible modifications to operating conditions or controls; ideas for optimization of plant logistics; possible improvements to startup/shutdown procedures and preventive maintenance; and any other improvements that may become evident based on identified potential sources of lead emissions. Each measure identified in the analysis shall be assigned an implementation timeline and may be ranked with respect to ease of implementation, cost, and effectiveness.

B. A fugitive dust control plan for the site that shall include an implementation timeline for each measure. The plan may include, but not be limited to, the following: new enclosures, total enclosures with negative pressure (not already existing) and/or improvements to existing negative pressure enclosures; regular, periodic inspections of plant buildings, material handling and storage areas, plant roadways, groundcover conditions, etc.; accidental release measures – preventive and corrective; roadway treatment – paving, cleaning; vehicular traffic – logistics, control; work practices for minimizing fugitive dust emissions during maintenance activities; and countermeasures during periods of adverse meteorological conditions and/or agricultural conditions and practices on grounds surrounding the plant that may affect fugitive dust impact on KDHE ambient air monitors.

C. Identification and prioritization of measures, as developed per paragraphs A. and B. of this section, that shall be implemented immediately upon notification by KDHE of the first Lead NAAQS violation. Also included shall be a contingent list of measures (e.g., projects, procedures, etc.), as developed per paragraphs A. and B. of this section, that shall be implemented upon notification by KDHE of any subsequent Lead NAAQS violations. The contingent list of measures may be modified upon approval by KDHE of more effective measures identified by the root cause analysis conducted by Exide in accordance with Table 11 in Section XII of this permit.

XI. Contingency Measures Implementation

Section 172(c)(9) of the federal Clean Air Act requires the implementation of specific measures if the nonattainment area fails to maintain reasonable further progress (see Section X) or to attain the NAAQS by the applicable attainment date.

Contingency measures shall be triggered upon the following determination made by KDHE:

KDHE ambient air monitoring shows that the nonattainment area fails to meet the 0.15 $\mu g/m^3$ based on a 3-month rolling average for any 3-month period beginning after July 31, 2014 (i.e., beginning with the 3-month rolling average for Aug-Oct 2014).

Table 11. Contingency Measures to be Implemented and Allotted Time Frames for Completion

Measures	Completion Time
• *For each NAAQS violation on the KDHE ambient air monitor* (i.e., 3-month rolling average greater than 0.15 $\mu g/m^3$) *or for failure to maintain reasonable further progress,* Exide shall develop and submit to KDHE a root cause analysis, which shall include but not be limited to: the investigation of production/operations performance, including startup, shutdown, malfunction and maintenance periods and the resulting data and discussion; meteorological data for the site and surrounding area; Exide's fence line site monitoring data; and any other conditions or events that may be relevant to lead emissions and/or that may	30 days after KDHE notifies Exide of Lead NAAQS violation

influence or impact KDHE ambient air monitor results. Exide shall develop and submit to KDHE documentation of corrective actions taken for each occurrence for which there is found to be a controllable or preventable contributing factor or root cause. • In addition to the above-mentioned root cause analysis and corrective/preventive action process, Exide shall implement selected and approved contingency measures as outlined in the compliance plans developed by Exide per Section XI (Contingency Measures) of this permit. Exide shall submit to KDHE documentation of implemented measures, including identification of measures and timeline for implementation and effect.	To be implemented in accordance with KDHE-approved schedule as part of compliance plans developed per Section XI Contingency Measures
• Exide shall compile analyses and results from the contingency measures described above in addition to performing the following: o Exide shall implement further compliance plan measures for controls on sources and areas of lead emissions on site that were identified pursuant to Section XI of this permit or as a result of Exide's root cause analysis and corrective/preventive action process or other analyses. Exide shall submit to KDHE documentation of implemented measures, including identification of measures and timeline for implementation and effect. o Exide shall implement measures from the fugitive dust control plan for the site as developed by Exide per Section XI of this permit. Exide shall submit to KDHE documentation of implemented measures, including identification of measures and timeline for implementation and effect.	To be implemented in accordance with KDHE-approved schedule as part of compliance plans developed per Section XI Contingency Measures
• Exide shall conduct stack testing on an increased frequency as determined by KDHE. The scope and frequency of the increased stack tests will be based on an evaluation by KDHE of the information submitted in the root cause analysis triggered by a violation of the lead standard. The supplemental stack tests required by KDHE will be limited to those stacks that the root cause analysis shows have the potential to contribute to the increase in monitored lead concentrations. KDHE will reduce the required frequency to the frequencies outlined in Table 1 of this permit once the additional stack tests demonstrate that the stacks in question do not show a significant increase above their baseline stack test rates.	Upon notification by KDHE to Exide
• Exide shall re-model with proposed changes to emission rates and/or work practices, improvements to the remainder of roadways and parking lots within plant boundaries, and any proposed changes to other parameters or conditions (which may include throughput). Exide shall submit to KDHE for approval a revised demonstration for the timely attainment and maintenance of the 2008 Lead NAAQS, which shall include the implemented changes and a timeline for implementation and effect.	60 days after KDHE notifies Exide

XII. General Provisions

A. Pursuant to K.A.R. 28-19-300, a construction permit or approval must be issued by KDHE prior to commencing any construction or modification of equipment or processes.

B. Upon presentation of credentials and other documents as may be required by law, representatives of KDHE (including authorized contractors of KDHE) shall be allowed to:

1. Enter upon the premises where a regulated facility or activity is located or conducted or where records must be kept under conditions of this document;
2. Have access to and copy, at reasonable times, any records that must be kept under conditions of this document;
3. Inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment) practices or operations regulated or required under this document; and
4. Sample or monitor, at reasonable times, for the purposes of assuring compliance with this document or as otherwise authorized by the Secretary of KDHE, any substances or parameters at any location.

C. The emission units or stationary sources that are the subject of this document shall be operated in compliance with all applicable requirements of the Kansas Air Quality Act and the federal Clean Air Act.

D. This document is subject to periodic review and amendment as deemed necessary to fulfill the intent and purpose of the Kansas Air Quality Statutes and Regulations and rules promulgated in accordance therewith.

E. This document does not relieve the facility of the obligation to obtain any other approvals, permits, licenses or documents of sanction that may be required by other federal, state or local government agencies.

F. Issuance of this document does not relieve the owner or operator of any requirement to obtain an air quality operating permit under any applicable provision of K.A.R. 28-19-500.

Permit Writer

Melissa D. Weide
Environmental Scientist, Planning Section

Date Signed

Authorized By

Marian Massoth, P.E.
Section Chief, Air Permitting

Date Signed

c: Stan Marshall, NCDO
C – 12206

APPENDIX 3

Notification of Construction or Modification Form

Kansas Department of Health and Environment
Bureau of Air and Radiation
Phone (785) 296-1570 Fax (785) 291-3953

Notification of Construction or Modification

(K.A.R. 28-19-300 Construction permits and approvals; applicability)

Check one: ☐Applying for a Permit under K.A.R. 28-19-300(a) ☒Applying for an Approval under K.A.R. 28-19-300(b)*

1) Source ID Number: 1690035

2) Mailing Information:
   Company Name: Exide Technologies
   Address: 413 E. Berg Rd.
   City, State, Zip: Salina, KS 67401

3) Source Location:
   Street Address: 413 E. Berg Rd.
   City, County, State, Zip: Salina, Saline, KS 67401
   Section, Township, Range: Section 1, T15S, R3W
   Latitude & Longitude Coordinates: 38.7742, -97.6061

4) NAICSC/SIC Code (Primary): 3691, Storage Batteries

5) Primary Product Produced at the Source: Storage Batteries

6) Would this modification require a change in the current operating permit for your facility? ☐Yes ☒No

   If no, please explain:

7) Is a permit fee being submitted? ☐Yes ☒No

   If yes, please include the facility's federal employee identification number (FEIN #)

8) Person to Contact at the Site: Justin Harness Phone: (785) 823-4029
   Title: EHS Manager

9) Person to Contact Concerning Permit: Justin Harness Phone: (785) 823-4029
   Title: EHS Manager
   Email: justin.harness@exide.com Fax: (785) 823-4048

Please read before signing:

Reporting forms provided may not adequately describe some processes. Modify the forms if necessary. Include a written description of the activity being proposed, a description of where the air emissions are generated and exhausted and how they are controlled. A simple diagram showing the proposed activity addressed in this notification which produces air pollutants at the facility (process flow diagrams, plot plan, etc.) with emission points labeled must be submitted with reporting forms. Information that, if made public, would divulge methods or processes entitled to protection as trade secrets may be held confidential. See the reverse side of this page for the procedure to request information be held confidential. A copy of the Kansas Air Quality Statutes and Regulations will be provided upon request.

Name and Title : Bob Snow, Plant Manager
Address: 413 E. Berg Rd., Salina, KS 67401

Signature: Robert M Snow Date: 8/4/16 Phone: (785) 825-6276

* If you do not know whether to apply for a permit or an approval, follow approval application procedures.

Procedures For Requesting Information To Be Held Confidential

An applicant may request that information submitted to the Department, other than emission data or information in any air quality permit or approval, be treated as confidential if the information would divulge methods or processes entitled to protection as trade secrets.

A request to designate information within the Department's air quality files as confidential must include:

(1) An uncensored copy of the document clearly marked as confidential;

(2) A copy of the document, or copies if more than one is required to be filed with the Department, with the confidential information masked;

(3) Specification of the type of information to be held as confidential (i.e., product formulations, process rates);

(4) Specification and justification of the reason the information is qualified by statute to be treated as confidential (competitive advantage, company developed secret formulation, trade secret); and

(5) A reference at each place in the document or documents where information is masked referring to the specification of the type of information masked and the specification and justification the information is qualified by statute to be treated as confidential.

ONLY THE CONFIDENTIAL INFORMATION ON ANY DOCUMENT MAY BE MASKED. ALL INFORMATION ON ANY DOCUMENT WHICH IS NOT CONFIDENTIAL MUST REMAIN LEGIBLE.

The information will be treated as confidential until the secretary has acted upon the request and the owner or operator has had the opportunity to exhaust any available remedies if the secretary determines the information is not confidential.

Complete this and all reporting forms and submit to:

Kansas Department of Health and Environment
Bureau of Air and Radiation
1000 SW Jackson, Suite 310
Topeka, KS 66612-1366
(785) 296-1570

Sources located in Wyandotte County should obtain forms from, and submit forms to:

Unified Government of Wyandotte County
Department of Air Quality
619 Ann Avenue
Kansas City, KS 66101
(913) 573-6700

CALCULATING THE CONSTRUCTION PERMIT APPLICATION FEE

[These requirements are found at K.A.R. 28-19-304(b).]

Calculate the construction permit application fee as follows:

Estimated capital cost of the proposed activity for which the application is made, including the total cost of equipment and services to be capitalized.	**Line 1** $_____	
Multiply by .05% (.0005)		**x**_____.0005
Total	**Line 2** $_____	
If Line 2 is less than $100, enter $100 on Line 3. If Line 2 is greater than $4,000, enter $4,000 on Line 3.		
Otherwise, copy Line 2 to Line 3.		
Construction permit application fee.	**Line 3** $_____	Minimum fee is $100

Certifier of Capital Cost

_____
(Print)

_____ _____
(Signature) Date

K.A.R. 28-19-350 is a complex regulation pertaining to prevention of significant deterioration (PSD). An additional fee of $1,500 will be required if a PSD review is necessary. If you believe the proposed activity in this Notification of Construction or Modification will be subject to the requirements of K.A.R. 28-19-350, contact the Department for further evaluation.

For purposes of construction permit or approval applications, the following are not considered modifications:

1. Routine maintenance or parts replacement.
2. An increase or decrease in operating hours or production rates if:
   a. production rate increases do not exceed the originally approved design capacity of the stationary source or emissions unit; and
   b. the increased potential-to-emit resulting from the change in operating hours or production rates do not exceed any emission or operating limitations imposed as a permit condition.

Kansas Department of Health and Environment
Division of Environment
Bureau of Air and Radiation

OVEN / DRYER

1) Source ID Number: 1690035

2) Company/Source Name: Exide Technologies

3) Emission Unit Identification: Curing Ovens 13-26

4) Equipment type: Oven X Dryer ____
Manufacturer: _____ Model No.: _____

Date of installation or latest modification: _____
Heating unit operating schedule: _____ hours/year
Maximum design heat-input rate: 500,000 BTU/hr per oven - 14 ovens at 0.5 mmBtu/hr each = 7 mmBtu/hr total
Attach a diagram of the burner configuration if available.

5) Material dried/baked/cured: p asted battery plates Plant operations: 8760 hours/yr
Rated capacity (of material processed): _____ lbs. or tons/hr. (circle the appropriate units)
If process is cyclical: Length of drying cycle: _____ No. of cycles per day: _____
Otherwise: Hours in operation per year: _____

6) Primary Fuel: natural gas Secondary Fuel: _____
or Heat used is recovered from: _____

7) Fuel Specific Data: Natural Gas - pipeline quality? Yes ☐ If no, heating value: _____ BTU/cu. ft.
Coal: % Sulfur: _____ % Ash: _____ Heating value: _____ BTU/lb.
Fuel Oil: % Sulfur: _____ Grade: _____ Heating value: _____ BTU/gal.
Density: _____ lb. / gal.
Other (attach appropriate data): _____ % Sulfur: _____ % Ash: _____
Heating value: _____ BTU/gal. Density: _____ lb. / _____

8) Emissions discharged to atmosphere _____ ft. above grade through stack _____ ft. diameter at _____°F temperature, with _____ cfm flow rate and _____ fps velocity.

9) Did construction, modification, or reconstruction commence after April 23, 1986; and, is the plant associated with the minerals' industry? Yes ☐ No ☑
If yes, this plant may be subject to NSPS, 40 CFR Part 60, Subpart UUU.

10) For emission control equipment, use the appropriate CONTROL EQUIPMENT form and duplicate as needed. Be sure to indicate the emission unit that the control equipment is affecting.

APPENDIX 4

Dispersion Modeling Report

Prepared for:
Kansas Department of Health and Environment

Prepared By:
Ramboll Environ US Corporation
Atlanta, Georgia

Date
August 2016

Project Number
07-39541A

AIR QUALITY DISPERSION MODELING REPORT

EXIDE TECHNOLOGIES
SALINA, KANSAS

RAMBOLL ENVIRON

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1. INTRODUCTION

Exide Technologies (Exide) owns and operates a lead-acid battery and lead oxide manufacturing facility (Exide Facility) at 413 East Berg Street in Salina, Kansas (Saline County). This facility operates under a Class II Operating Permit (Source ID Number 1690035) issued by the Bureau of Air and Radiation of the Kansas Department of Health and Environment (KDHE) on January 15, 2004. The Exide site is a non-major source for HAP emissions.

On November 8, 2011, the U.S. Environmental Protection Agency (EPA) designated part of the city of Salina and Saline county, Kansas (bounded by East Schilling Road on the north, a north-south line one quarter mile west of South Ohio Street on the east, East Water Well Road on the south, and South Ninth Street on the west) as nonattainment for the 2008 lead National Ambient Air Quality Standard (NAAQS) of 0.15 $\mu g/m^3$ on a consecutive three-month average. In order to demonstrate Saline County attainment with the 2008 lead NAAQS, Exide proposed a control strategy and performed air dispersion modeling. These control strategies and associated modeling demonstration are included in the Kansas State Implementation Plan (SIP) Revision for the

Implementation, Maintenance, and Enforcement of the 2008 Lead National Ambient Air Quality Standard Attainment Demonstration submitted to EPA Region VII in July 2014. Additionally, Exide received a construction permit (C-12206) on August 18, 2014, in order to implement federally enforceable limitations and conditions used in the control strategy and air model.

A recent citation issued by the United States Department of Labor's Occupational Safety & Health Administration (OSHA) to the Exide facility is necessitating a redesign of some ventilation and associated air pollution control systems. As part of this redesign, Exide is proposing to replace the fans and motors on baghouses BH2 and BH3 which would increase the airflow to 120,000 actual cubic feet per minute (acfm) through each baghouse. Due to the proposed increase in exhaust flow and to maintain a consistent and sufficient margin between actual and modeled emission rates, Exide is also requesting a lead emission limit increase for BH2 and BH3.

Permit Condition D. of C-12206 requires Exide to remodel and document compliance with the 2008 lead NAAQS if any changes are proposed to source and stack parameters used for the dispersion modeling analysis, including but not limited to stack heights, stack diameters, exhaust temperatures, emission rates, and exit velocities. In compliance with Permit Condition D., this report contains a description of the revised air dispersion model used to demonstrate attainment with the lead NAAQS as well as a presentation of the results of the revised model. The revised attainment demonstration includes the background lead concentration in air, the impact of emissions from Exide operations, and the impact of emissions from other lead-emitting facilities within the designated non-attainment area. It is our understanding that the only other lead-emitting source in the non-attainment area is Metlcast Products Inc. (Metlcast).

1.1 Description of Current Operations

The Exide facility is approximately 46 acres in size and is located about 6 kilometers south of downtown Salina, Kansas in Saline County. Figure 1-1 provides an illustration of the site's location.

The Exide facility manufactures lead-acid batteries. The production operations at this facility consist of assembly, oxide, casting, pasting, formation, and finishing.

Metlcast is another lead emitting facility located within the designated non-attainment area. It is our understanding that several small electric induction furnaces are the primary sources of lead emissions on site, and that these emissions are exhausted from the building and treated as fugitive emissions for the purpose of modeling.

1.2 Location

The Saline County Non-attainment area is approximately 475 acres in size (1.6 kilometers north to south and 1.2 kilometers east to west) bounded by East Schilling Road on the north, a north-south line one quarter mile west of South Ohio Street on the east, East Water Well Road on the south, and South Ninth Street on the west. Figure 1-2 provides an illustration of the designated nonattainment area.

The Exide Technologies property is located in Saline County, Kansas approximately 6 kilometers south of downtown Salina. The property is located approximately 1,000 meters northeast of the Water Well Road exit off Interstate 135 (see Figure 1-1).

The following locational information is for the approximate center of the Exide Facility:

Exide Technologies, 413 East Berg Street, Salina, KS 67401

USGS Topographic Map Quadrant = Salina, KS

UTM Coordinates (NAD83); Zone = 14; Easting = 621,100 meters; Northing = 4,292,650 meters

Base Elevation = 381 meters above Mean Sea Level (MSL)

Metlcast Products Inc. is located in Saline County, Kansas, less than 500 m to the north of Exide Technologies. The following information is available for the approximate location of the Metlcast facility:

Metlcast Products Inc, 401 E Avenue B, Saline KS 67401

USGS Topographic Map Quadrant = Salina, KS

UTM Coordinates (NAD83); Zone = 14; Easting = 620,944 meters; Northing = 4,293,109 meters

Base Elevation = 380.5 meters above Mean Sea Level (MSL)

1.3 Document Organization

This revised SIP Attainment Demonstration Report is divided into five sections as follows:

Section 1.0 – Introduction: describes the purpose and scope of the Ambient Air Quality Modeling and outlines the report organization.

Section 2.0 – Modeling Methodologies, Settings, and Input: discusses the emissions estimate to be used for dispersion modeling, the selection of the dispersion model, the data used in the dispersion model (terrain, meteorology, source characterization) and the identification of receptors evaluated in this analysis.

Section 3.0 – Model Input, Output, and Results Submittal: discusses the documentation that will be provided with this report for KDHE review.

Section 4.0 – Uncertainties: summarizes some of the uncertainties resulting from various assumptions used in the air dispersion evaluation as well as those used in the emission inventory development.

Section 5.0 – References: includes all references cited in this report.

1.4 Contact Information

Exide Technologies has contracted with Ramboll Environ to perform the air quality analyses for this project. The Ramboll Environ contact for this project is:

Mr. Russell Kemp, PE
Ramboll Environ
1600 Parkwood Circle
Suite 310
Atlanta, GA 30339
Tel: (678) 388-1654
Email: rkemp@ramboll.com

2. MODELING METHODOLOGIES, SETTINGS, AND INPUT

This section of this document summarizes our selection of the dispersion model used in this analysis along with its operational settings and input. During the development of the Saline County lead SIP and associated construction permit C-12206 in 2013 and 2014, air dispersion modeling was prepared in accordance with the August 2013 modeling protocol approved by KDHE. This updated modeling was performed using settings and approaches consistent with that protocol with the exception of updated AERMOD software, more recent meteorological data, the proposed changes to BH2 and BH3 emission rates and stack parameters, and the results of the project to pave the balance of onsite roadways.

2.1 Model Selection and Settings

The ambient air lead concentrations within the nonattainment area were estimated using dispersion modeling techniques. To estimate off-property ambient air concentrations, Ramboll Environ has employed the most recent version of AERMOD (version 15181), the USEPA's recommended air dispersion model (USEPA 2004a and USEPA 2009c).

AERMOD is appropriate for use in estimating ground-level short-term ambient air concentrations resulting from non-reactive buoyant emissions from sources located in simple and complex terrain. This analysis was conducted using AERMOD with all regulatory defaults.

Modeled air concentrations were estimated using AERMOD in conjunction with information about the site, the locations of the lead emitting sources, nearby land uses, representative meteorological data, and receptors.

This dispersion modeling project utilized the Universal Transverse Mercator (UTM) Coordinate System which includes the inherent benefit of not using negative numbers or east/west designations. In addition, the UTM coordinate system provides a constant distance relationship anywhere on the map or domain. This project utilized Zone 14 of the North American Datum of 1983 (NAD83) in the UTM coordinate system. The units of the coordinates were meters.

2.2 Modeled Pollutants and Averaging Periods

The only pollutant that was modeled was lead (CAS Number: 7439-92-1). Calculation of chemical concentrations for use in demonstrating attainment of the 2008 Lead NAAQS (USEPA 2008b) required the selection of appropriate concentration averaging times. To demonstrate attainment of the 2008 Lead NAAQS, Ramboll Environ executed the AERMOD model and generated POST files using a monthly averaging period. These POST files were then processed through the USEPA's LEADPOST (Version 12114) Fortran based computer program to generate consecutive three-month averages for comparison against the lead NAAQS.

2.3 Modeled Sources and Their Release Parameters

The Source Group Identifiers for Point Sources used in this AERMOD modeling were chosen based on the designations used by the facility. Table 2-1a includes a listing of the point sources that were included in this modeling exercise and their release parameters in the AERMOD Model; Table 2-1b shows the same for volume sources.

2.3.1 Point Sources

This modeling analysis included the lead emitting sources currently at the Exide facility including the proposed changes to two general purpose bag houses (BH2 and BH3). Please see Figure 2-1a, which depicts the point sources modeled and property line.

Exide point source emission rates for existing sources have been determined based on the lead mass emission rates outlined in Exide's Air Emission Source Construction Permit (Effective 8/18/2014). For BH2 and BH3, the lead mass emission rates have been modeled at the requested revised allowable limits. The proposed lead emission rate for BH2 and BH3 are based on a multiplier of approximately three times the expected future actuals as estimated using the proposed increased flowrate for each baghouse.

2.3.2 Volume Sources

Fugitive emissions from the Ball Mill process, from the neighboring facility Metlcast, and from roadway sources on site were modeled as volume sources (locations and release parameters are detailed in Table 2-1b).

BALLFUG

The source designated BALLFUG was included to represent fugitive emissions from the facility's processes. The Exide facility's lead processing operations are located within a negative pressure total enclosure and are fitted with local exhaust ventilation (LEV) in order to minimize workplace exposures to airborne lead. Based upon correspondence from EPA Region 7 to Missouri DNR, negative pressure total enclosures with maintained local exhaust ventilation can be credited with 99% effectiveness in reducing fugitive emissions. Based on this information and the assumption that 10% of emissions from process exhausts are released as fugitives, the modeled emission rate for BALLFUG was determined to be 4.86 x 10-5 g/s.

BALLFUG will be modeled as a volume source. Per the USEPA guidance (USEPA 1995), the initial lateral dimension was set as the length of the building side (geometric mean of building length and width) divided by 4.3, and the initial vertical dimension was set as the building height divided by 2.15. The volume source will be positioned concentric to the Ball Mill building (see Figure 2-1b).

Metlcast

Metlcast's annual lead emission quantity was modeled as the volatilized fraction (conservatively assumed to be 5%) of the lead fraction (estimated at 0.001%) of their 2011 production (estimated at 6910 tons). This quantity of lead was released over a 4380 hour annual operating period (12 hours per day, assumed to be 07:00 to 19:00, over all the days in a year) resulting in a modeled emission rate of 2.07 x 10-4 g/s.

Since Metlcast's operations can be described as occurring in an open building with wall and roof vents (KDHE, 2012), it was represented in the AERMOD model by a volume source (USEPA, 2009c). The dimensions of this volume source were defined according to USEPA guidance (USEPA 1995): the initial lateral dimension was set as the length of the building side (geometric mean of building length and width) divided by 4.3, and the initial vertical dimension was set as the building height divided by 2.15. The volume source was positioned concentric to the Metlcast building (see Figure 2-1b).

Roadways

Traffic on-site follows two primary routes which have been designated the Delivery Route and the Shipping Route. Most delivery vehicles check in at the security building at the southwest corner of the property and proceed clockwise around the facility to drop off or pick up their delivery. This route is designated Delivery Route (see Figure 2-1c). Trucks picking up batteries check in with security then proceed along Berg Road which is the southern boundary of the facility to the Eastern Distribution Center (DC) then return along a similar route along Berg Road. This route is designated Shipping Route in the model and is depicted on Figure 2-1d.

Vehicular fugitive emissions were modeled as ground level adjacent volume sources. Volume source input parameters were calculated using the USEPA's recommended approach in Table 3-1 of USEPA 2004a and according to the guidance provided in the USEPA's Haul Road Workgroup Final Report (USEPA, 2012b). Road fugitive volume sources were calculated using a vehicle height of 3 meters above grade level and a vehicle width of 3 meters. Sections passing along Berg Road along the southern boundary of the site were modeled using a two lane approach with a road width of 6 meters. The model used a total of 144 volume sources on the Delivery Route and 82 volume sources on the Shipping Route. Delivery Route sources were included in source groups DELRDP1, DELRDP2, DELRDP3, DELRDP4, DELRDU1, DELRDU2, and volume sources on the Shipping Route were included in the model source group called SHPRD1.

Traffic fugitive emissions were quantified using the Paved Roads section of Chapter 13.2.1 from AP-42 (USEPA 2011). The equations in AP-42 require site specific data including the fleet average vehicle weight and a silt loading value for Paved Roads. Recent site-specific silt and lead content sampling was conducted for the Salina facility on December 11, 2014 subsequent to completion of the paving of the balance of the site roadways. A total of six on-site paved roadway dust samples were collected at six locations as depicted in Figure 2-1e.

The fleet average weight and vehicle activity (path length, and number of passes / year) were used to estimate annual emissions of TSP, and then the percentage of particulate measured to be lead was used to estimate the annual lead emissions from each roadway segment. The total annual lead emissions were distributed evenly throughout the day, and amongst each of the volumes representing the line source associated with each segment of roadway. Details of the calculations are provided as attachment 1.

2.4 Terrain Data

Terrain elevations were incorporated into the model using version 11103 of AERMAP, AERMOD's terrain preprocessor, as per USEPA guidance (2009). Terrain elevation data for the entire modeling domain were extracted from 1/3-arc second National Elevation Data (NED) files with a resolution of approximately 10 meters. These NED files were obtained from the U.S. Geological Survey's Seamless Data Server (http://seamless.usgs.gov). AERMAP was configured to assign elevations for all sources, buildings, and receptors in the modeling domain. The extent of the terrain file to be used is presented in Figure 2-2.

For applications involving elevated terrain, the user must input a hill height scale along with the receptor elevation. To accomplish this, AERMAP was configured to automatically calculate and assign Hill Height Scale values for all receptors.

2.5 Building Downwash

Building downwash algorithms incorporated into AERMOD account for the plume dispersion effects of the aerodynamic wakes and eddies produced by buildings and structures. The Building Profile Input Program - Plume Rise Model Enhancements (BPIPPRM) model (incorporated into AERMOD) is used to determine the direction-specific building downwash parameters.

Ramboll Environ modeled onsite buildings from Exide owned structures for downwash analysis. These buildings were placed into the model then the BPIPPRM program (Version 04274) was executed on the point sources. Table 2-5 shows the height of each building that was incorporated into the model. Figure 2-1f presents labeled building locations. In addition to permanent structures, Exide's facility contains several outdoor fabric filter bag houses used to control process emissions. These structures are physically large due to the quantity and configuration of the fabric filter bags used to filter the process exhaust. The bag houses were input into the model as buildings to allow for the model to account for the anticipated plume downwash from the filter bag assemblies.

Table 2-5: Buildings Incorporated into AERMOD

AERMOD Building ID	Description	Building Elevation (meters) [a]	Building Height (feet)	Building Height (meters)
1	East DC	381.10	30	9.14
2	West DC	381.00	35	10.67
3	Break Room	381.10	27	8.23
4	Main Plant	381.10	25	7.62
5	Cover Shed	381.07	20	6.10
6	Ball Mill	380.99	47	14.33
7	Oxide Mill	381.02	39	11.89
8	Acid Farm	381.20	24	7.32
9	Offices & QC Lab	381.10	15	4.57
10	Main Storage	381.20	20	6.10
11	BH1 Fabric Filter Housing	381.10	31.92	9.73
12	BH2 Fabric Filter Housing	381.10	36.33	11.07
13	BH3 Fabric Filter Housing	381.10	36.33	11.07
14	BH4 Fabric Filter Housing	381.09	32.58	9.93
15	BH5 Fabric Filter Housing	381.10	32	9.75
16	Metlcast	380.50	20	6.10

Notes:

[a] Building Elevations assigned by AERMAP.

2.6 Meteorological Data Set

AERMOD requires a meteorological input file to characterize the transport and dispersion of pollutants in the atmosphere. Surface and upper air meteorological data inputs as well as surface parameter data describing the land use and surface characteristics near the site are first processed using AERMET (version 12345), the meteorological preprocessor to AERMOD. The output file generated by AERMET is the meteorological input file required by AERMOD. Details of AERMET and AERMOD meteorological data needs are described in USEPA guidance documents (USEPA 2004a, 2004b). The KDHE Bureau of Air has provided current (2011-2015) surface parameter (SFC) and wind profile (PFL) files for use with AERMOD. Section 2.6.1 briefly describes this data.

2.6.1 Surface and Upper Air Meteorological Data

The focus of this analysis is the characterization of ambient lead concentrations in the nonattainment area surrounding the Exide Salina Facility. As such, meteorological data for air dispersion modeling was chosen by KDHE based upon spatial and temporal representativeness of conditions in the immediate vicinity of the Exide Facility. Wind speed, wind direction, ambient temperature, atmospheric pressure, and cloud cover data were chosen from the Salina Municipal Airport (SLN) meteorological station for the five years from 2011 to 2015 as the most representative available data for use in the air dispersion analysis of the Exide Facility. The SLN meteorological station is located approximately 4.5 kilometers northwest of the Exide Property (see Figure 1-1). The coordinates and elevation for this location are 38.7798° North Latitude, 97.6445° West Longitude, and 382.5 meters above sea level according to information from the National Climatic Data Centers and NOAA National Weather Service.

Upper air data for the period of 2011 to 2015 was selected by KDHE staff from the Topeka, KS

Airport station (TOP) which is approximately 175 kilometers east northeast of the Exide facility.

2.7 Land Use Analysis

AERMOD can evaluate the effect of heat islands from urban areas on atmospheric transport and dispersion using an urban boundary layer option. As per USEPA guidance (USEPA 2005a, 2005b, 2009b), Ramboll Environ used Auer's method of classifying land-use as either rural or urban (Auer 1978). These methods call for analysis of the land within a three-kilometer radius from the meteorological station and primary project area to determine if the majority of the land can be classified as either rural (i.e. undeveloped) or urban.

In the previous air dispersion model conducted in support of the SIP Revision, Ramboll Environ used the USGS NLCD 1992 Land Cover Data (USGS 2003) obtained as part of the surface parameter determination discussed above to evaluate areas around the Exide Facility and the SLN meteorological station. AERSURFACE was used with a radius of three kilometers for the Surface Roughness. Table 2-6 shows the total area of each Auer land use designation and its percentage of total.

As shown in Table 2-6, approximately 81% of the area circumscribed by the three-kilometer radius circle around the SLN meteorological station consists of Auer land-use rural land types. Table 2-6 also shows the land use analysis around the Exide Facility (including the entire nonattainment area) as approximately 87% rural. Thus, the urban boundary layer option in the model was not selected.

Table 2-6: Land Use Areas for Auer Analysis

Auer Land Use Classification	Auer Land Use Description	Urban or Rural Classification	3km Circle Around SLN	3km Circle Around Exide
A1	Metropolitan Natural	Rural	12.93%	3.98%
A2	Agricultural Rural	Rural	44.09%	52.59%
A3	Undeveloped	Rural	22.22%	22.01%
A4	Undeveloped	Rural	0.24%	0.36%
A5	Water Surfaces	Rural	0.15%	2.93%
R1	Common Residential	Rural	1.55%	4.75%
R2, R3	Compact Residential	Urban	2.16%	5.94%
I1, I2, C1	Industrial and Commercial	Urban	16.66%	7.44%
		Rural Total	81.81%	86.62%
		Urban Total	18.82%	13.38%

2.8 Receptors

Ground-level lead concentrations located inside the facility boundaries were excluded from the impact assessment because the general public does not have ready access to the Exide property. The Exide Technologies property within the fenced perimeter was considered on-site for purposes of determining the property line as recommended by KDHE and USEPA in their comments on the modeling protocol submitted "For Determination of Attainment Area". The unfenced undeveloped land west of the fenced production area that is owned by Exide was considered off-site and receptors were placed on this land. Ground level receptors were placed along the property line at 50 meter spacing intervals (see Figures 2-1a-f for a depiction of the Property Line).

In addition to the property line receptors, Ramboll Environ utilized a Cartesian grid of receptors with 50 m spacing across the nonattainment area to determine the location of maximum impact. In addition to the above property line and gridded discrete receptors, two ground-level discrete receptors were placed in the model for the approximate center of the main building for each of the following nearby elementary schools. One discrete receptor was also placed at the location of the ambient lead monitor as indicated below.

Schilling Elementary School
3131 Canterbury, Salina, KS
UTMx = 619,560 meters
UTMy = 4,293,400 meters

Coronado Elementary School
518 East Neal Avenue, Salina, KS
UTMx = 621,185 meters
UTMy = 4,294,430 meters

KDHE Ambient Lead Monitor
UTMx = 620,967.95 meters
UTMy = 4,292,889.60 meters

All receptor elevations and Hill Height Scales were assigned by AERMAP (Version 11103) using NED 1/3 Arc Second resolution elevation data from USGS's Seamless Data Server.

Figure 2-6 depicts the property line receptors in light blue, the gridded discrete receptors as orange dots, Schilling Elementary School, Coronado Elementary School, and the ambient lead monitor as green dots.

The Metlcast facility was included in the area considered ambient air for the attainment demonstration modeling.

3. MODEL INPUT, OUTPUT, AND RESULTS SUBMITTAL

3.1 Modeling File Submittal

The dispersion modeling input, output and post processing files have been submitted to KDHE with this report to document the modeling methodology and results. A computer disc has been attached to this report and contains all model input and output files and supporting emission calculations. The disc also includes LEADPOST post processing data files. Meteorological and BPIPPRM input files have been included on the disc as well.

3.2 Background Lead Concentrations

The USEPA's draft Integrated Science Assessment (ISA) for Lead indicates that the median national non-source oriented monthly ambient lead concentration is 0.01 µg/m^3. Table 3-13 of the ISA provides detailed statistics based upon the national monitoring network (USEPA, 2012c). Since other lead emitting sources in the vicinity of the Exide facility have been identified and included in the model, the draft ISA reported national monthly averaged value of 0.01 µg/m^3 was used as the background concentration in the attainment demonstration modeling.

3.3 Post Processing in LEADPOST

As stated previously in this document, AERMOD was executed to generate POST output data files for each source group identified in Tables 1a and 1b. The averaging period chosen for this model was monthly as recommended by USEPA (2009d) for use with USEPA's LEADPOST software program. The POST files were processed through the LEADPOST program to calculate three month average lead concentrations for each receptor location. The software created two output text files corresponding to total receptor average concentrations across all source groups (a Source Group ALL will be created to represent facility-wide emissions) and receptor average concentrations for each source group to allow for culpability analyses.

3.4 Description of Modeling Results

The LEADPOST output file of modeled maximum three month average lead concentrations for all source groups was used, plus the background value of 0.01 µg/m^3, to determine the cumulative impact at each receptor. This data was then plotted to generate a contour map of the three month average lead concentrations (shown in Figure 3-1). Table 3-1, including the maximum impacted receptor and other sensitive receptors, is presented to demonstrate attainment of the lead NAAQS.

Table 3-1: Summary of Predicted Impacts at Maximum and Sensitive Receptors

Receptor	Location	Maximum Impact (including 0.01 µg/m³ background concentration)
Lead NAAQS	-	0.15 µg/m³
Maximum Impact	UTMx = 621,000.00 meters UTMy = 4,293,000.00 meters	0.1305 µg/m³
KDHE Ambient Lead Monitor	UTMx = 620,967.94 meters UTMy = 4,292,889.60 meters	0.120 µg/m³
Shilling Elementary School	UTMx = 619,560 meters UTMy = 4,293,400 meters	0.019 µg/m³
Coronado Elementary School	UTMx = 621,185 meters UTMy = 4,294,430 meters	0.026 µg/m³

4. UNCERTAINTIES

Understanding the degree of uncertainty associated with each component of a dispersion modeling analysis is critical to interpreting the results of the analysis. Ramboll Environ has evaluated the uncertainties associated with this analysis, including emissions estimation and air dispersion modeling. The following sections summarize the critical uncertainties associated with the air dispersion modeling analysis.

4.1 Estimation of Emissions

There are a number of uncertainties associated with the estimation of emissions from the Exide Facility that may affect the subsequent estimation of ambient concentrations. This section briefly describes many of uncertainties that may affect emissions estimates. Point source emissions were based on compliance stack tests and assume sources continuously emit at those levels.

Fugitive emissions from manufacturing buildings used in this analysis were based on previous estimates used by the facility in its emission inventory and were based on the best information available at that time. Site specific silt and lead content data from several paved sections of roadway at the Exide Facility for use in estimating road fugitives from on-site vehicular traffic. Fugitive road emissions were calculated using the best information available on nominal delivery counts and approximate truck weights.

Emissions were quantified using the USEPA's preferential calculation equations for Paved Roads in AP-42. The equations in these AP-42 sections were determined based on field tests of paved road surfaces. The on-site traffic is within the range of source conditions (silt content/loading, vehicle weight, and speed) listed in AP-42's sections which are from the underlying field tests and are expected to retain the emission factor quality rating of A as stated in the Paved Roads section.

4.2 Estimation of Ambient Concentrations

4.2.1 Estimates from Air Dispersion Models

As discussed in Section 2.1, the USEPA-recommended dispersion model AERMOD was used to estimate average off-site lead ambient ground level concentrations at the various offsite receptor locations. This model uses the Gaussian plume equation to calculate ambient air concentrations from emission sources. For this model, the magnitude of error for the maximum concentration is estimated to range from 10 to 40% (USEPA 2005b). Therefore, off-site ambient concentrations used in this analysis represent approximate off-site ambient concentrations.

4.2.2 Source Representation

The source parameters (i.e., release velocity and release temperature, etc.) used to model emission points are sources of uncertainty. For the point sources in the model, source parameters were provided directly from Exide from compliance Stack Emission Testing Reports. There might be variability in source parameters from the most recent compliance test; therefore, off-site concentrations used in this assessment represent approximate off-site ambient concentrations. Manufacturing building fugitives are characterized by an elevated volume source to represent the various points where fugitives could be released from the buildings. Road fugitive emissions are characterized by several ground level volume sources aligned to represent emissions from a line source or road. The volume source input values were selected to be representative tractor trailer trucks which comprise the majority of on-site traffic. Though the height, width, as well as empty and

loaded weights of on-site vehicles can vary based on the type of delivery/truck, the use of average parameters is recommended in guidance and results in approximate off-site ambient concentrations.

4.2.3 Meteorological Data Selection

Uncertainty also exists in the meteorological data used in the AERMOD air dispersion model. These uncertainties are related to the use of meteorological data that is not collected onsite, and use of surface parameters for the meteorological station as opposed to the Exide Property. Missing data substitution in the meteorological data set was not performed in this analysis; however, there was minimal missing data in the meteorological data set.

On-site meteorological data were not available for the Exide facility. Therefore, the meteorological data used in this analysis was based on surface meteorological data from National Climatic Data Center/National Weather Service station at Salina Municipal Airport (approximately 4.5 km north-northwest of the Exide facility) and upper air data from the Topeka, KS upper air station. Surface parameters supplied to AERMET, the meteorological preprocessor to AERMOD, were specified by KDHE staff for the area surrounding the meteorological monitoring site (Salina Airport), rather than the Exide Property, as recommended by USEPA (USEPA 2005a). Since land uses surrounding the meteorological station and the Exide facility are similar (see Section 2.8 for a discussion of the geographical domain of land use analysis), the surface parameters calculated around Salina Airport should be representative of the Exide facility. The uncertainties due to the use of off-site meteorological data and use of surface parameters for the meteorological station resulted in approximate ambient concentrations.

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APPENDIX 1
TABLES

Table 1-1A: Lead Emitting Point Sources Included in Dispersion Modeling Analysis									
AERMOD Source Group ID	**Source Description**	**Easting (meters) [1]**	**Northing (meters) [1]**	**Elevation (meters) [2]**	**Lead Emission Rate (gram/ second) [3,4]**	**Stack Height (meters) [5]**	**Stack Temperature (Kelvin) [6]**	**Exit Velocity (meters /second) [7]**	**Stack Diameter (meters) [8]**
BH1	Bag House 1	621077.79	4292731.83	381.10	3.71E-03	24.384	294.26	11.643	2.032
BH2	Bag House 2	621094.61	4292748.65	381.10	2.52E-03	24.384	297.22	15.841	2.134
BH3	Bag House 3	621074.19	4292747.26	381.10	1.26E-02	22.860	307.22	23.476	1.753
BH4	Bag House 4	621062.00	4292743.15	381.10	1.85E-02	24.384	325.56	13.696	2.454
BH5	Bag House 5	620996.47	4292665.43	381.10	1.63E-03	24.384	326.11	19.419	1.829
BH11	Bag House for Ball Mill 11	621005.31	4292715.11	381.00	8.82E-04	24.512	354.44	14.682	0.521
BH12	Bag House for Ball Mill 12	620998.00	4292715.72	381.00	8.82E-04	24.559	371.11	12.693	0.521
BH13	Bag House for Ball Mill 13	620990.38	4292715.42	381.00	8.82E-04	24.533	324.44	8.110	0.521
BH14	Bag House for Ball Mill 14	620983.67	4292715.42	381.00	8.82E-04	24.512	369.44	10.698	0.521
BH15	Bag House for Ball Mill 15	620973.61	4292718.16	380.98	8.82E-04	24.788	308.33	8.569	0.508
OM	Oxide Mills	621016.13	4292731.45	381.00	8.47E-03	19.812	327.22	30.035	0.864

Notes:

[1] Easting and Northing Coordinates for Point Sources are in UTM Zone 14, NAD83 Datum.

[2] Elevation is assigned by AERMAP (Version 11103) using NED 1/3 Arc second resolution elevation data from USGS's Seamless Data Server.

[3] Lead emission rates for BH1, BH4, and BH5 are based on 3.5 times actual stack emission test data from recent compliance tests. The proposed lead emission rates for BH2 and BH3 are based on a ratio of approximately 3X between the expected future actuals and proposed permit limit. Lead emission rates for BH11-BH15 are set at 8.82 x 10 -4 g/s.

[4] The lead emission rate for the source OM is based on 3.5 times the sum of sources OM1-OM10 actual stack emission test data from recent compliance tests. All tests have been accepted by KDHE.

[5] Represents existing stack heights

[6] The stack temperature for OM is the flowrate-weighted temperature of OM1-OM10 exhausts.

[7] All sources exhaust vertically upward without evase stack tip or rain caps (i.e., unobstructed release). BH2 & BH3 proposed exhaust flow based on ventilation redesign for OSHA compliance. OM is a design velocity.

[8] OM stack diameter is calculated from the design velocity and sum of flowrates from existing OM1-OM10 stacks.

Table 1-1B: Lead Emitting Volume Sources Included in Dispersion Modeling Analysis									
AERMOD Source Group ID	AERMOD Source Group ID	Source Description	Easting (meters) [1]	Northing (meters) [1]	Elevation (meters) [2]	Lead Emission Rate (gram /second) [3]	Release Height (meters) [4]	Initial Lateral Dimension (meters) [5]	Initial Vertical Dimension (meters) [6]
BALLFUG	BALLFUG	Fugitive Emissions from Ball Mill	620986.66	4292721.52	381.00	4.86E-05	7.16	7.32	6.66
METLCAST	METLCAST	Fugitive Emissions from MetlCast	620943.71	4293093.27	380.50	2.07E-04	7.32	12.04	3.40
L0071211	DELRDP4	DELRDP4.16	621172.31	4292463.59	381.16	3.58E-07	2.550	5.58	2.370
L0071212	DELRDP4	DELRDP4.17	621160.31	4292463.67	381.16	3.58E-07	2.550	5.58	2.370
L0071213	DELRDP4	DELRDP4.18	621148.31	4292463.74	381.15	3.58E-07	2.550	5.58	2.370
L0071214	DELRDP4	DELRDP4.19	621136.31	4292463.82	381.15	3.58E-07	2.550	5.58	2.370
L0071215	DELRDP4	DELRDP4.20	621124.31	4292463.9	381.15	3.58E-07	2.550	5.58	2.370
L0071216	DELRDP4	DELRDP4.21	621112.31	4292463.97	381.15	3.58E-07	2.550	5.58	2.370
L0071217	DELRDP4	DELRDP4.22	621100.31	4292464.05	381.14	3.58E-07	2.550	5.58	2.370
L0071218	DELRDP4	DELRDP4.23	621088.31	4292464.13	381.14	3.58E-07	2.550	5.58	2.370
L0071219	DELRDP4	DELRDP4.24	621076.31	4292464.2	381.14	3.58E-07	2.550	5.58	2.370
L0071220	DELRDP4	DELRDP4.25	621064.31	4292464.28	381.14	3.58E-07	2.550	5.58	2.370
L0071221	DELRDP4	DELRDP4.26	621052.31	4292464.36	381.13	3.58E-07	2.550	5.58	2.370
L0071222	DELRDP4	DELRDP4.27	621040.31	4292464.43	381.13	3.58E-07	2.550	5.58	2.370
L0071223	DELRDP4	DELRDP4.28	621028.31	4292464.51	381.13	3.58E-07	2.550	5.58	2.370
L0071224	DELRDP4	DELRDP4.29	621016.31	4292464.59	381.13	3.58E-07	2.550	5.58	2.370
L0071225	DELRDP4	DELRDP4.30	621004.31	4292464.67	381.12	3.58E-07	2.550	5.58	2.370
L0071226	DELRDP4	DELRDP4.31	620992.31	4292464.74	381.12	3.58E-07	2.550	5.58	2.370
L0071227	DELRDP4	DELRDP4.32	620980.31	4292464.82	381.12	3.58E-07	2.550	5.58	2.370
L0071228	DELRDP4	DELRDP4.33	620968.31	4292464.9	381.12	3.58E-07	2.550	5.58	2.370
L0071229	DELRDP4	DELRDP4.34	620956.32	4292464.97	381.11	3.58E-07	2.550	5.58	2.370
L0071230	DELRDP4	DELRDP4.35	620944.32	4292465.05	381.11	3.58E-07	2.550	5.58	2.370
L0071231	DELRDP4	DELRDP4.36	620932.32	4292465.13	381.11	3.58E-07	2.550	5.58	2.370
L0071232	DELRDP4	DELRDP4.37	620920.32	4292465.2	381.11	3.58E-07	2.550	5.58	2.370
L0071233	DELRDP4	DELRDP4.38	620908.32	4292465.28	381.10	3.58E-07	2.550	5.58	2.370
L0071234	DELRDP4	DELRDP4.39	620896.32	4292465.36	381.10	3.58E-07	2.550	5.58	2.370
L0071091	DELRDP1	DELRDP1.1	620882.68	4292478.62	381.10	2.61E-07	2.550	4.19	2.370
L0071092	DELRDP1	DELRDP1.2	620887.43	4292486.27	381.10	2.61E-07	2.550	4.19	2.370
L0071093	DELRDP1	DELRDP1.3	620895.06	4292489.11	381.10	2.61E-07	2.550	4.19	2.370
L0071094	DELRDP1	DELRDP1.4	620904.04	4292489.7	381.10	2.61E-07	2.550	4.19	2.370
L0071095	DELRDP1	DELRDP1.5	620913.02	4292490.29	381.10	2.61E-07	2.550	4.19	2.370
L0071096	DELRDP1	DELRDP1.6	620922	4292490.88	381.10	2.61E-07	2.550	4.19	2.370
L0071097	DELRDP1	DELRDP1.7	620930.99	4292491.47	381.10	2.61E-07	2.550	4.19	2.370
L0071098	DELRDP1	DELRDP1.8	620939.97	4292492.06	381.10	2.61E-07	2.550	4.19	2.370
L0071099	DELRDP1	DELRDP1.9	620948.95	4292492.65	381.10	2.61E-07	2.550	4.19	2.370
L0071100	DELRDP1	DELRDP1.10	620957.93	4292493.24	381.10	2.61E-07	2.550	4.19	2.370
L0071101	DELRDP1	DELRDP1.11	620966.91	4292493.83	381.10	2.61E-07	2.550	4.19	2.370
L0071102	DELRDP1	DELRDP1.12	620975.89	4292494.42	381.10	2.61E-07	2.550	4.19	2.370
L0071103	DELRDP1	DELRDP1.13	620976.98	4292503.33	381.10	2.61E-07	2.550	4.19	2.370
L0071104	DELRDP1	DELRDP1.14	620978.05	4292512.26	381.10	2.61E-07	2.550	4.19	2.370
L0071105	DELRDP1	DELRDP1.15	620979.12	4292521.2	381.10	2.61E-07	2.550	4.19	2.370
L0071106	DELRDP1	DELRDP1.16	620980.18	4292530.14	381.10	2.61E-07	2.550	4.19	2.370
L0071107	DELRDP1	DELRDP1.17	620981.25	4292539.07	381.10	2.61E-07	2.550	4.19	2.370
L0071108	DELRDP1	DELRDP1.18	620982.31	4292548.01	381.10	2.61E-07	2.550	4.19	2.370
L0071109	DELRDP1	DELRDP1.19	620983.38	4292556.95	381.10	2.61E-07	2.550	4.19	2.370
L0071110	DELRDP1	DELRDP1.20	620979.81	4292563.13	381.10	2.61E-07	2.550	4.19	2.370
L0071111	DELRDP1	DELRDP1.21	620971.46	4292566.49	381.10	2.61E-07	2.550	4.19	2.370
L0071112	DELRDP1	DELRDP1.22	620963.11	4292569.85	381.10	2.61E-07	2.550	4.19	2.370
L0071113	DELRDP1	DELRDP1.23	620954.76	4292573.2	381.10	2.61E-07	2.550	4.19	2.370
L0071114	DELRDP1	DELRDP1.24	620946.41	4292576.56	381.10	2.61E-07	2.550	4.19	2.370
L0071115	DELRDP1	DELRDP1.25	620938.05	4292579.92	381.10	2.61E-07	2.550	4.19	2.370
L0071116	DELRDP1	DELRDP1.26	620929.7	4292583.27	381.10	2.61E-07	2.550	4.19	2.370
L0071117	DELRDP1	DELRDP1.27	620921.95	4292587.69	381.08	2.61E-07	2.550	4.19	2.370
L0071118	DELRDU1	DELRDU1.1	620914.76	4292593.1	381.06	1.76E-07	2.550	4.19	2.370
L0071119	DELRDU1	DELRDU1.2	620913.57	4292601.48	381.04	1.76E-07	2.550	4.19	2.370
L0071120	DELRDU1	DELRDU1.3	620913.64	4292610.48	381.03	1.76E-07	2.550	4.19	2.370
L0071121	DELRDU1	DELRDU1.4	620913.71	4292619.48	381.01	1.76E-07	2.550	4.19	2.370
L0071122	DELRDU1	DELRDU1.5	620913.77	4292628.48	381.00	1.76E-07	2.550	4.19	2.370
L0071123	DELRDU1	DELRDU1.6	620913.84	4292637.48	380.99	1.76E-07	2.550	4.19	2.370
L0071124	DELRDU1	DELRDU1.7	620913.91	4292646.48	380.97	1.76E-07	2.550	4.19	2.370
L0071125	DELRDU1	DELRDU1.8	620913.98	4292655.48	380.96	1.76E-07	2.550	4.19	2.370
L0071126	DELRDU1	DELRDU1.9	620914.05	4292664.48	380.95	1.76E-07	2.550	4.19	2.370
L0071127	DELRDU1	DELRDU1.10	620914.12	4292673.48	380.93	1.76E-07	2.550	4.19	2.370
L0071128	DELRDU1	DELRDU1.11	620914.19	4292682.48	380.92	1.76E-07	2.550	4.19	2.370
L0071129	DELRDU1	DELRDU1.12	620914.26	4292691.48	380.91	1.76E-07	2.550	4.19	2.370
L0071130	DELRDU1	DELRDU1.13	620914.6	4292700.46	380.90	1.76E-07	2.550	4.19	2.370
L0071131	DELRDU2	DELRDU2.1	620915.39	4292709.43	380.90	3.80E-07	2.550	4.19	2.370
L0071132	DELRDU2	DELRDU2.2	620916.18	4292718.39	380.90	3.80E-07	2.550	4.19	2.370
L0071133	DELRDU2	DELRDU2.3	620916.98	4292727.36	380.90	3.80E-07	2.550	4.19	2.370
L0071134	DELRDU2	DELRDU2.4	620920.11	4292734.68	380.90	3.80E-07	2.550	4.19	2.370
L0071135	DELRDU2	DELRDU2.5	620928.28	4292738.46	380.91	3.80E-07	2.550	4.19	2.370
L0071136	DELRDU2	DELRDU2.6	620936.45	4292742.23	380.92	3.80E-07	2.550	4.19	2.370

AERMOD Source Group ID	AERMOD Source Group ID	Source Description	Easting (meters) [1]	Northing (meters) [1]	Elevation (meters) [2]	Lead Emission Rate (gram /second) [3]	Release Height (meters) [4]	Initial Lateral Dimension (meters) [5]	Initial Vertical Dimension (meters) [6]
L0071137	DELRDU2	DELRDU2.7	620944.62	4292746.01	380.93	3.80E-07	2.550	4.19	2.370
L0071138	DELRDU2	DELRDU2.8	620952.78	4292749.79	380.94	3.80E-07	2.550	4.19	2.370
L0071139	DELRDP2	DELRDP2.1	620960.95	4292753.57	380.95	1.60E-07	2.550	4.19	2.370
L0071140	DELRDP2	DELRDP2.2	620969.9	4292753.77	380.95	1.60E-07	2.550	4.19	2.370
L0071141	DELRDP2	DELRDP2.3	620978.9	4292753.75	380.95	1.60E-07	2.550	4.19	2.370
L0071142	DELRDP2	DELRDP2.4	620987.9	4292753.73	380.95	1.60E-07	2.550	4.19	2.370
L0071143	DELRDP2	DELRDP2.5	620996.9	4292753.71	380.96	1.60E-07	2.550	4.19	2.370
L0071144	DELRDP2	DELRDP2.6	621005.9	4292753.68	380.96	1.60E-07	2.550	4.19	2.370
L0071145	DELRDP2	DELRDP2.7	621014.9	4292753.66	380.96	1.60E-07	2.550	4.19	2.370
L0071146	DELRDP2	DELRDP2.8	621023.9	4292753.64	380.96	1.60E-07	2.550	4.19	2.370
L0071147	DELRDP2	DELRDP2.9	621032.9	4292753.62	380.96	1.60E-07	2.550	4.19	2.370
L0071148	DELRDP2	DELRDP2.10	621041.9	4292753.6	380.96	1.60E-07	2.550	4.19	2.370
L0071149	DELRDP2	DELRDP2.11	621050.9	4292753.58	380.97	1.60E-07	2.550	4.19	2.370
L0071150	DELRDP2	DELRDP2.12	621059.9	4292753.55	380.97	1.60E-07	2.550	4.19	2.370
L0071151	DELRDP2	DELRDP2.13	621068.9	4292753.53	380.97	1.60E-07	2.550	4.19	2.370
L0071152	DELRDP2	DELRDP2.14	621077.9	4292753.51	380.97	1.60E-07	2.550	4.19	2.370
L0071153	DELRDP2	DELRDP2.15	621086.9	4292753.49	380.97	1.60E-07	2.550	4.19	2.370
L0071154	DELRDP2	DELRDP2.16	621095.9	4292753.47	380.97	1.60E-07	2.550	4.19	2.370
L0071155	DELRDP2	DELRDP2.17	621104.9	4292753.45	380.97	1.60E-07	2.550	4.19	2.370
L0071156	DELRDP2	DELRDP2.18	621113.9	4292753.43	380.98	1.60E-07	2.550	4.19	2.370
L0071157	DELRDP2	DELRDP2.19	621122.9	4292753.4	380.98	1.60E-07	2.550	4.19	2.370
L0071158	DELRDP2	DELRDP2.20	621131.9	4292753.38	380.98	1.60E-07	2.550	4.19	2.370
L0071159	DELRDP2	DELRDP2.21	621140.9	4292753.36	380.98	1.60E-07	2.550	4.19	2.370
L0071160	DELRDP2	DELRDP2.22	621149.9	4292753.34	380.98	1.60E-07	2.550	4.19	2.370
L0071161	DELRDP2	DELRDP2.23	621158.9	4292753.32	380.98	1.60E-07	2.550	4.19	2.370
L0071162	DELRDP2	DELRDP2.24	621167.9	4292753.3	380.99	1.60E-07	2.550	4.19	2.370
L0071163	DELRDP2	DELRDP2.25	621176.9	4292753.28	380.99	1.60E-07	2.550	4.19	2.370
L0071164	DELRDP2	DELRDP2.26	621185.9	4292753.25	380.99	1.60E-07	2.550	4.19	2.370
L0071165	DELRDP2	DELRDP2.27	621194.9	4292753.23	380.99	1.60E-07	2.550	4.19	2.370
L0071166	DELRDP2	DELRDP2.28	621203.9	4292753.21	380.99	1.60E-07	2.550	4.19	2.370
L0071167	DELRDP2	DELRDP2.29	621212.9	4292753.19	380.99	1.60E-07	2.550	4.19	2.370
L0071168	DELRDP2	DELRDP2.30	621221.9	4292753.17	380.99	1.60E-07	2.550	4.19	2.370
L0071169	DELRDP2	DELRDP2.31	621230.9	4292753.15	381.00	1.60E-07	2.550	4.19	2.370
L0071170	DELRDP2	DELRDP2.32	621239.9	4292753.12	381.00	1.60E-07	2.550	4.19	2.370
L0071171	DELRDP2	DELRDP2.33	621248.9	4292753.1	381.00	1.60E-07	2.550	4.19	2.370
L0071172	DELRDP2	DELRDP2.34	621255.62	4292749.56	380.99	1.60E-07	2.550	4.19	2.370
L0071173	DELRDP2	DELRDP2.35	621259.29	4292741.35	380.97	1.60E-07	2.550	4.19	2.370
L0071174	DELRDP2	DELRDP2.36	621262.96	4292733.13	380.95	1.60E-07	2.550	4.19	2.370
L0071175	DELRDP2	DELRDP2.37	621266.64	4292724.91	380.93	1.60E-07	2.550	4.19	2.370
L0071176	DELRDP2	DELRDP2.38	621270.31	4292716.7	380.90	1.60E-07	2.550	4.19	2.370
L0071177	DELRDP3	DELRDP3.1	621269.12	4292708.09	380.90	4.86E-08	2.550	4.19	2.370
L0071178	DELRDP3	DELRDP3.2	621266.8	4292699.4	380.90	4.86E-08	2.550	4.19	2.370
L0071179	DELRDP3	DELRDP3.3	621264.48	4292690.7	380.90	4.86E-08	2.550	4.19	2.370
L0071180	DELRDP3	DELRDP3.4	621261.87	4292682.12	380.90	4.86E-08	2.550	4.19	2.370
L0071181	DELRDP3	DELRDP3.5	621257.45	4292674.28	380.92	4.86E-08	2.550	4.19	2.370
L0071182	DELRDP3	DELRDP3.6	621253.03	4292666.45	380.94	4.86E-08	2.550	4.19	2.370
L0071183	DELRDP3	DELRDP3.7	621248.6	4292658.61	380.95	4.86E-08	2.550	4.19	2.370
L0071184	DELRDP3	DELRDP3.8	621244.18	4292650.77	380.97	4.86E-08	2.550	4.19	2.370
L0071185	DELRDP3	DELRDP3.9	621239.75	4292642.93	380.99	4.86E-08	2.550	4.19	2.370
L0071186	DELRDP3	DELRDP3.10	621236.26	4292634.84	381.00	4.86E-08	2.550	4.19	2.370
L0071187	DELRDP3	DELRDP3.11	621236.04	4292625.84	381.00	4.86E-08	2.550	4.19	2.370
L0071188	DELRDP3	DELRDP3.12	621235.82	4292616.84	381.00	4.86E-08	2.550	4.19	2.370
L0071189	DELRDP3	DELRDP3.13	621235.59	4292607.85	381.00	4.86E-08	2.550	4.19	2.370
L0071190	DELRDP3	DELRDP3.14	621235.37	4292598.85	381.00	4.86E-08	2.550	4.19	2.370
L0071191	DELRDP3	DELRDP3.15	621235.15	4292589.85	381.00	4.86E-08	2.550	4.19	2.370
L0071192	DELRDP3	DELRDP3.16	621234.93	4292580.85	381.00	4.86E-08	2.550	4.19	2.370
L0071193	DELRDP3	DELRDP3.17	621234.7	4292571.86	381.00	4.86E-08	2.550	4.19	2.370
L0071194	DELRDP3	DELRDP3.18	621234.48	4292562.86	381.00	4.86E-08	2.550	4.19	2.370
L0071195	DELRDP3	DELRDP3.19	621234.26	4292553.86	381.00	4.86E-08	2.550	4.19	2.370
L0071196	DELRDP4	DELRDP4.1	621234.04	4292544.87	381.00	3.58E-07	2.550	4.19	2.370
L0071197	DELRDP4	DELRDP4.2	621233.81	4292535.87	381.00	3.58E-07	2.550	4.19	2.370
L0071198	DELRDP4	DELRDP4.3	621233.64	4292526.87	380.99	3.58E-07	2.550	4.19	2.370
L0071199	DELRDP4	DELRDP4.4	621233.48	4292517.87	380.98	3.58E-07	2.550	4.19	2.370
L0071200	DELRDP4	DELRDP4.5	621233.32	4292508.87	380.97	3.58E-07	2.550	4.19	2.370
L0071201	DELRDP4	DELRDP4.6	621233.17	4292499.87	380.96	3.58E-07	2.550	4.19	2.370
L0071202	DELRDP4	DELRDP4.7	621233.01	4292490.88	380.95	3.58E-07	2.550	4.19	2.370
L0071203	DELRDP4	DELRDP4.8	621232.85	4292481.88	380.94	3.58E-07	2.550	4.19	2.370
L0071204	DELRDP4	DELRDP4.9	621232.12	4292473.19	380.94	3.58E-07	2.550	4.19	2.370
L0071205	DELRDP4	DELRDP4.10	621224.65	4292468.17	381.01	3.58E-07	2.550	4.19	2.370
L0071206	DELRDP4	DELRDP4.11	621217.13	4292463.3	381.09	3.58E-07	2.550	4.19	2.370
L0071207	DELRDP4	DELRDP4.12	621208.13	4292463.36	381.11	3.58E-07	2.550	4.19	2.370
L0071208	DELRDP4	DELRDP4.13	621199.13	4292463.42	381.12	3.58E-07	2.550	4.19	2.370
L0071209	DELRDP4	DELRDP4.14	621190.13	4292463.47	381.14	3.58E-07	2.550	4.19	2.370

AERMOD Source Group ID	AERMOD Source Group ID	Source Description	Easting (meters) [1]	Northing (meters) [1]	Elevation (meters) [2]	Lead Emission Rate (gram /second) [3]	Release Height (meters) [4]	Initial Lateral Dimension (meters) [5]	Initial Vertical Dimension (meters) [6]
L0071210	DELRDP4	DELRDP4.15	621181.13	4292463.53	381.15	3.58E-07	2.550	4.19	2.370
L0071009	SHIPRD1	SHIPRD1.1	620882.27	4292468.75	381.10	7.82E-07	2.550	4.19	2.370
L0071010	SHIPRD1	SHIPRD1.2	620885.5	4292477.15	381.10	7.82E-07	2.550	4.19	2.370
L0071011	SHIPRD1	SHIPRD1.3	620888.73	4292485.55	381.10	7.82E-07	2.550	4.19	2.370
L0071012	SHIPRD1	SHIPRD1.4	620896.51	4292487.25	381.10	7.82E-07	2.550	4.19	2.370
L0071013	SHIPRD1	SHIPRD1.5	620905.51	4292487.16	381.10	7.82E-07	2.550	4.19	2.370
L0071014	SHIPRD1	SHIPRD1.6	620914.51	4292487.07	381.10	7.82E-07	2.550	4.19	2.370
L0071015	SHIPRD1	SHIPRD1.7	620923.51	4292486.98	381.10	7.82E-07	2.550	4.19	2.370
L0071016	SHIPRD1	SHIPRD1.8	620932.51	4292486.89	381.10	7.82E-07	2.550	4.19	2.370
L0071017	SHIPRD1	SHIPRD1.9	620941.51	4292486.8	381.10	7.82E-07	2.550	4.19	2.370
L0071018	SHIPRD1	SHIPRD1.10	620950.51	4292486.71	381.10	7.82E-07	2.550	4.19	2.370
L0071019	SHIPRD1	SHIPRD1.11	620959.51	4292486.62	381.10	7.82E-07	2.550	4.19	2.370
L0071020	SHIPRD1	SHIPRD1.12	620968.13	4292485.75	381.10	7.82E-07	2.550	4.19	2.370
L0071021	SHIPRD1	SHIPRD1.13	620973.85	4292478.79	381.10	7.82E-07	2.550	4.19	2.370
L0071022	SHIPRD1	SHIPRD1.14	620979.56	4292471.84	381.10	7.82E-07	2.550	4.19	2.370
L0071023	SHIPRD1	SHIPRD1.15	620986.19	4292464.49	381.10	7.82E-07	2.550	5.58	2.370
L0071024	SHIPRD1	SHIPRD1.16	620998.19	4292464.38	381.11	7.82E-07	2.550	5.58	2.370
L0071025	SHIPRD1	SHIPRD1.17	621010.19	4292464.26	381.12	7.82E-07	2.550	5.58	2.370
L0071026	SHIPRD1	SHIPRD1.18	621022.19	4292464.15	381.12	7.82E-07	2.550	5.58	2.370
L0071027	SHIPRD1	SHIPRD1.19	621034.19	4292464.03	381.13	7.82E-07	2.550	5.58	2.370
L0071028	SHIPRD1	SHIPRD1.20	621046.19	4292463.92	381.14	7.82E-07	2.550	5.58	2.370
L0071029	SHIPRD1	SHIPRD1.21	621058.19	4292463.8	381.14	7.82E-07	2.550	5.58	2.370
L0071030	SHIPRD1	SHIPRD1.22	621070.19	4292463.69	381.15	7.82E-07	2.550	5.58	2.370
L0071031	SHIPRD1	SHIPRD1.23	621082.19	4292463.57	381.15	7.82E-07	2.550	5.58	2.370
L0071032	SHIPRD1	SHIPRD1.24	621094.19	4292463.46	381.16	7.82E-07	2.550	5.58	2.370
L0071033	SHIPRD1	SHIPRD1.25	621106.18	4292463.34	381.17	7.82E-07	2.550	5.58	2.370
L0071034	SHIPRD1	SHIPRD1.26	621118.18	4292463.22	381.17	7.82E-07	2.550	5.58	2.370
L0071035	SHIPRD1	SHIPRD1.27	621130.18	4292463.11	381.18	7.82E-07	2.550	5.58	2.370
L0071036	SHIPRD1	SHIPRD1.28	621142.18	4292462.99	381.19	7.82E-07	2.550	5.58	2.370
L0071037	SHIPRD1	SHIPRD1.29	621154.18	4292462.88	381.19	7.82E-07	2.550	5.58	2.370
L0071038	SHIPRD1	SHIPRD1.30	621166.18	4292462.76	381.20	7.82E-07	2.550	5.58	2.370
L0071063	SHIPRD1	SHIPRD1.31	621172.28	4292465.29	381.18	7.82E-07	2.550	4.19	2.370
L0071064	SHIPRD1	SHIPRD1.32	621179.7	4292470.38	381.14	7.82E-07	2.550	4.19	2.370
L0071065	SHIPRD1	SHIPRD1.33	621187.12	4292475.48	381.11	7.82E-07	2.550	4.19	2.370
L0071066	SHIPRD1	SHIPRD1.34	621190.25	4292483.58	381.10	7.82E-07	2.550	4.19	2.370
L0071067	SHIPRD1	SHIPRD1.35	621192.5	4292492.29	381.10	7.82E-07	2.550	4.19	2.370
L0071068	SHIPRD1	SHIPRD1.36	621193.8	4292501.11	381.10	7.82E-07	2.550	4.19	2.370
L0071069	SHIPRD1	SHIPRD1.37	621193.53	4292510.11	381.10	7.82E-07	2.550	4.19	2.370
L0071070	SHIPRD1	SHIPRD1.38	621193.27	4292519.11	381.10	7.82E-07	2.550	4.19	2.370
L0071071	SHIPRD1	SHIPRD1.39	621193	4292528.1	381.10	7.82E-07	2.550	4.19	2.370
L0071072	SHIPRD1	SHIPRD1.40	621196.15	4292536.53	381.07	7.82E-07	2.550	4.19	2.370
L0071073	SHIPRD1	SHIPRD1.41	621199.32	4292544.95	381.04	7.82E-07	2.550	4.19	2.370
L0071074	SHIPRD1	SHIPRD1.42	621203.23	4292552.18	381.02	7.82E-07	2.550	4.19	2.370
L0071075	SHIPRD1	SHIPRD1.43	621212.18	4292551.19	381.01	7.82E-07	2.550	4.19	2.370
L0071076	SHIPRD1	SHIPRD1.44	621221.13	4292550.2	381.00	7.82E-07	2.550	4.19	2.370
L0071077	SHIPRD1	SHIPRD1.45	621225.46	4292543.26	381.00	7.82E-07	2.550	4.19	2.370
L0071078	SHIPRD1	SHIPRD1.46	621228.65	4292534.84	381.00	7.82E-07	2.550	4.19	2.370
L0071079	SHIPRD1	SHIPRD1.47	621231.85	4292526.43	381.00	7.82E-07	2.550	4.19	2.370
L0071080	SHIPRD1	SHIPRD1.48	621233.46	4292517.75	380.99	7.82E-07	2.550	4.19	2.370
L0071081	SHIPRD1	SHIPRD1.49	621233.13	4292508.76	380.98	7.82E-07	2.550	4.19	2.370
L0071082	SHIPRD1	SHIPRD1.50	621232.79	4292499.77	380.96	7.82E-07	2.550	4.19	2.370
L0071083	SHIPRD1	SHIPRD1.51	621232.46	4292490.77	380.95	7.82E-07	2.550	4.19	2.370
L0071084	SHIPRD1	SHIPRD1.52	621232.12	4292481.78	380.94	7.82E-07	2.550	4.19	2.370
L0071085	SHIPRD1	SHIPRD1.53	621227.63	4292474.97	380.97	7.82E-07	2.550	4.19	2.370
L0071086	SHIPRD1	SHIPRD1.54	621220.41	4292469.6	381.02	7.82E-07	2.550	4.19	2.370
L0071087	SHIPRD1	SHIPRD1.55	621213.19	4292464.22	381.08	7.82E-07	2.550	4.19	2.370
L0071088	SHIPRD1	SHIPRD1.56	621204.47	4292463.42	381.11	7.82E-07	2.550	4.19	2.370
L0071089	SHIPRD1	SHIPRD1.57	621195.47	4292463.46	381.12	7.82E-07	2.550	4.19	2.370
L0071090	SHIPRD1	SHIPRD1.58	621186.47	4292463.51	381.14	7.82E-07	2.550	4.19	2.370
L0071039	SHIPRD1	SHIPRD1.59	621172.31	4292463.59	381.16	7.82E-07	2.550	5.58	2.370
L0071040	SHIPRD1	SHIPRD1.60	621160.31	4292463.67	381.16	7.82E-07	2.550	5.58	2.370
L0071041	SHIPRD1	SHIPRD1.61	621148.31	4292463.74	381.15	7.82E-07	2.550	5.58	2.370
L0071042	SHIPRD1	SHIPRD1.62	621136.31	4292463.82	381.15	7.82E-07	2.550	5.58	2.370
L0071043	SHIPRD1	SHIPRD1.63	621124.31	4292463.9	381.15	7.82E-07	2.550	5.58	2.370
L0071044	SHIPRD1	SHIPRD1.64	621112.31	4292463.97	381.15	7.82E-07	2.550	5.58	2.370
L0071045	SHIPRD1	SHIPRD1.65	621100.31	4292464.05	381.14	7.82E-07	2.550	5.58	2.370
L0071046	SHIPRD1	SHIPRD1.66	621088.31	4292464.13	381.14	7.82E-07	2.550	5.58	2.370
L0071047	SHIPRD1	SHIPRD1.67	621076.31	4292464.2	381.14	7.82E-07	2.550	5.58	2.370
L0071048	SHIPRD1	SHIPRD1.68	621064.31	4292464.28	381.14	7.82E-07	2.550	5.58	2.370
L0071049	SHIPRD1	SHIPRD1.69	621052.31	4292464.36	381.13	7.82E-07	2.550	5.58	2.370
L0071050	SHIPRD1	SHIPRD1.70	621040.31	4292464.43	381.13	7.82E-07	2.550	5.58	2.370
L0071051	SHIPRD1	SHIPRD1.71	621028.31	4292464.51	381.13	7.82E-07	2.550	5.58	2.370
L0071052	SHIPRD1	SHIPRD1.72	621016.31	4292464.59	381.13	7.82E-07	2.550	5.58	2.370

AERMOD Source Group ID	AERMOD Source Group ID	Source Description	Easting (meters) [1]	Northing (meters) [1]	Elevation (meters) [2]	Lead Emission Rate (gram /second) [3]	Release Height (meters) [4]	Initial Lateral Dimension (meters) [5]	Initial Vertical Dimension (meters) [6]
L0071053	SHIPRD1	SHIPRD1.73	621004.31	4292464.67	381.12	7.82E-07	2.550	5.58	2.370
L0071054	SHIPRD1	SHIPRD1.74	620992.31	4292464.74	381.12	7.82E-07	2.550	5.58	2.370
L0071055	SHIPRD1	SHIPRD1.75	620980.31	4292464.82	381.12	7.82E-07	2.550	5.58	2.370
L0071056	SHIPRD1	SHIPRD1.76	620968.31	4292464.9	381.12	7.82E-07	2.550	5.58	2.370
L0071057	SHIPRD1	SHIPRD1.77	620956.32	4292464.97	381.11	7.82E-07	2.550	5.58	2.370
L0071058	SHIPRD1	SHIPRD1.78	620944.32	4292465.05	381.11	7.82E-07	2.550	5.58	2.370
L0071059	SHIPRD1	SHIPRD1.79	620932.32	4292465.13	381.11	7.82E-07	2.550	5.58	2.370
L0071060	SHIPRD1	SHIPRD1.80	620920.32	4292465.2	381.11	7.82E-07	2.550	5.58	2.370
L0071061	SHIPRD1	SHIPRD1.81	620908.32	4292465.28	381.10	7.82E-07	2.550	5.58	2.370
L0071062	SHIPRD1	SHIPRD1.82	620896.32	4292465.36	381.10	7.82E-07	2.550	5.58	2.370

Notes:

[1] Easting and Northing Coordinates for Point Sources are in UTM Zone 14, NAD83 Datum.

[2] Elevation is assigned by AERMAP (Version 11103) using NED 1/3 Arc second resolution elevation data from USGS's Seamless Data Server.

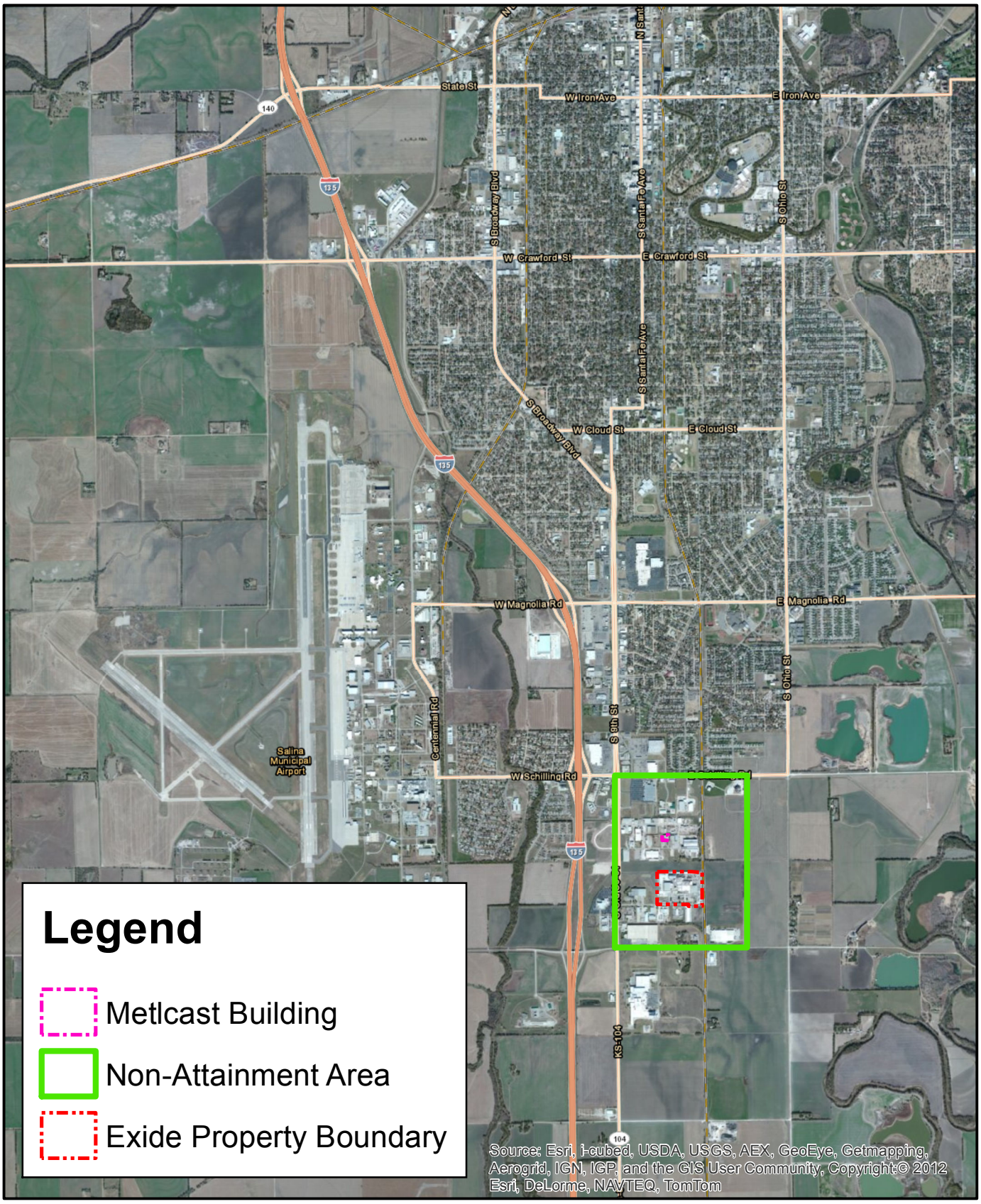
[3] Lead Emission Rate for road traffic fugitive sources is determined using equations in AP-42, Paved Roads. Silt and lead content were measured in December 11, 2014 at Exide's Salina facility.

[4] The Release Height for the traffic fugitives was estimated as half of the plume height, which in turn is calculated as 1.7 times the height of the vehicle (3

[5] Initial Lateral Dimension for road fugitives (Line Source Represented by Separated Volume Sources) is calculated from the roadway width plus 6 meters

[6] The Initial Vertical Dimension (σz) for the road fugitives is based on a plume height of 5.1 meters then divided by 2.15 per USEPA 2012.

APPENDIX 2
FIGURES



RAMBOLL

Drawn By:HDT

Date: 7/14/2016

Site and Nonattainment Area Location Map: Wide View

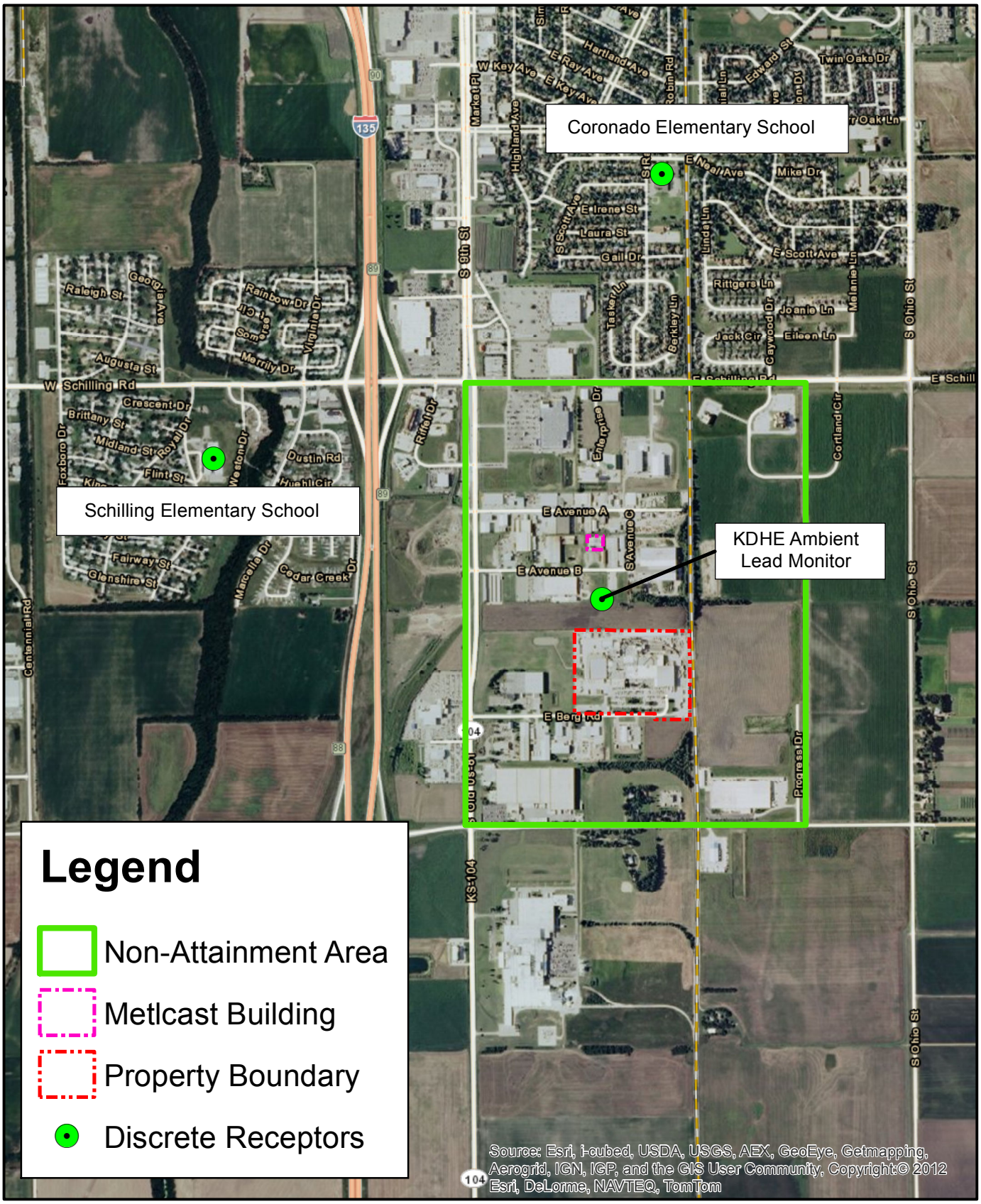
Exide Technologies

Salina, Kansas Battery Plant

N W E S

0 0.5 1 Km

Figure 1-1



RAMBOLL

Drawn By: HDT

Date: 7/14/2016

Site and Nonattainment Area Location Map: Close View

Exide Technologies

Salina, Kansas Battery Plant

N W E S

0 0.25 0.5 Km

Figure 1-2

RAMBOLL

Drawn By: HDT

Date: 7/14/2016

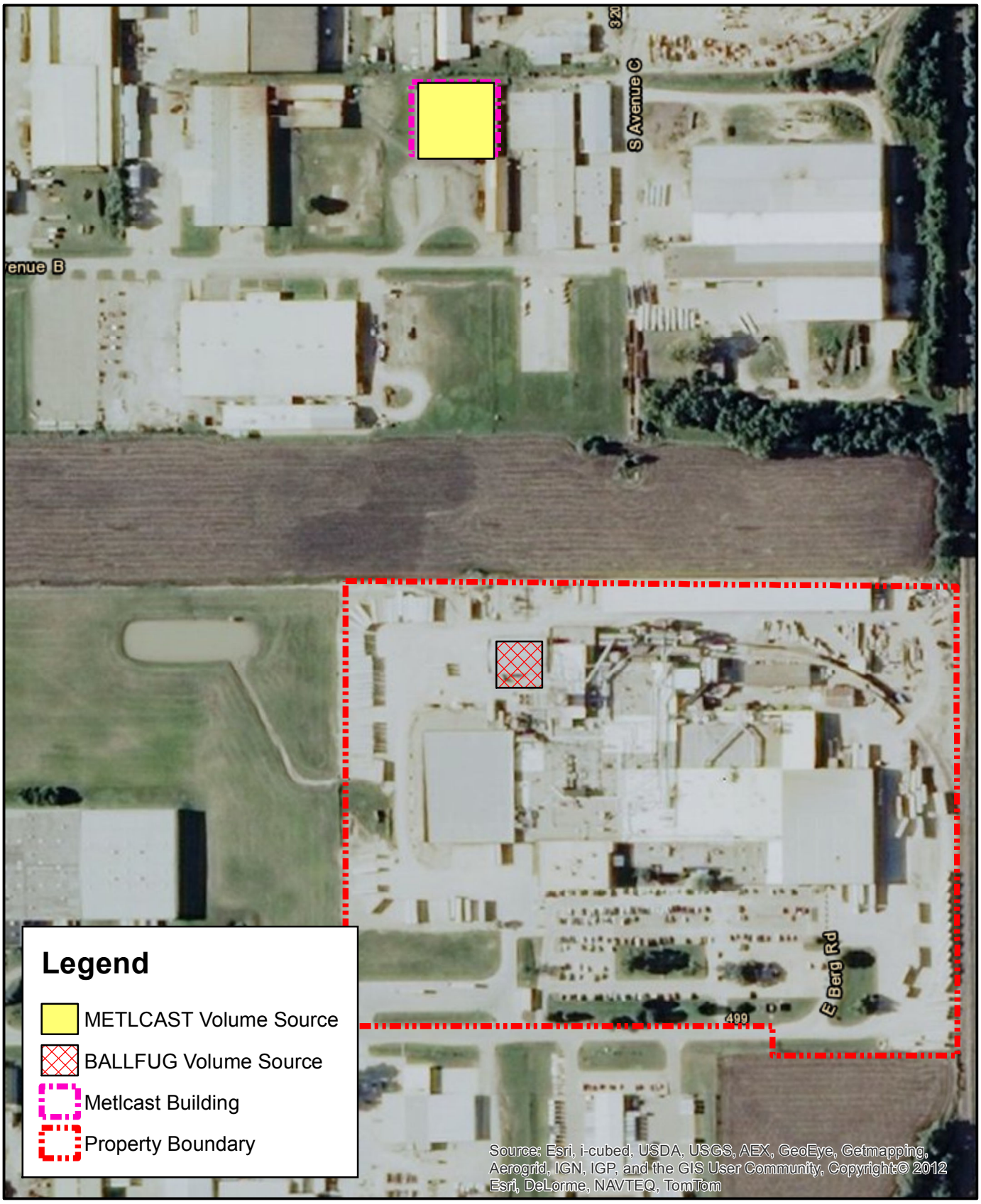
Location of Point Sources

Exide Technologies
Salina, Kansas Battery Plant

N W E S

0 40 80 Meters

Figure 2-1a



RAMBOLL

Drawn By: HDT

Date: 7/14/2016

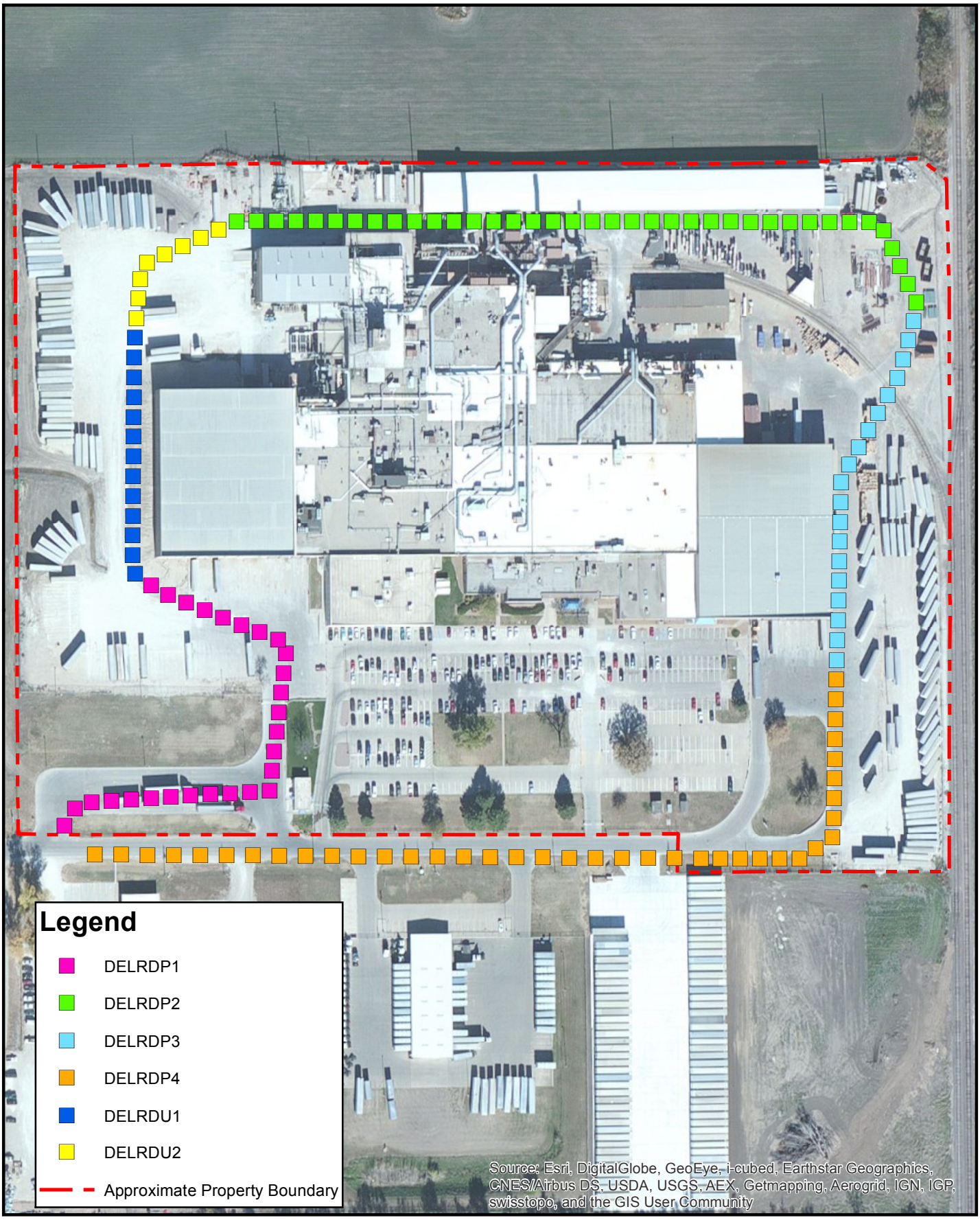
Location of Volume Sources

Exide Technologies
Salina, Kansas Battery Plant

N W E S

0 55 110 Meters

Figure 2-1b



P:\ArcGIS\Air Modeling\Exide Salina, KS\arcproj\Delivery_Routes.mxdt

RAMBOLL

Drawn By: HDT

Date: 7/14/2016

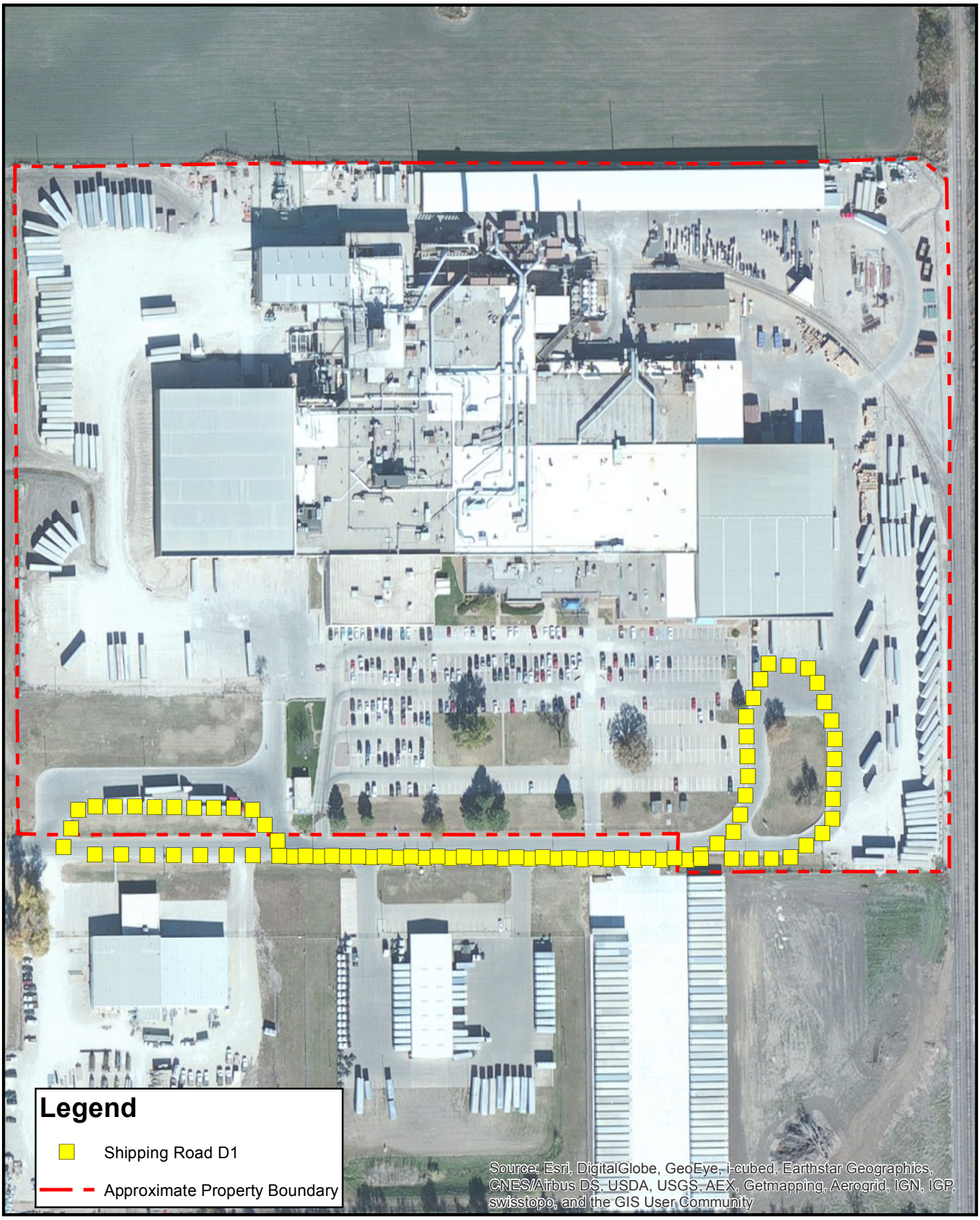
Location of Volume Sources:
Delivery Routes

Exide Technologies
Salina, Kansas Battery Plant

N W E S

0 30 60 Meters

Figure 2-1c



P:\ArcGIS\Air Modeling\Exide Salina, KS\arcproj\Shipping_Routes.mxdt

RAMBOLL

Drawn By: HDT

Date: 7/14/2016

Location of Volume Sources:
Shipping Route

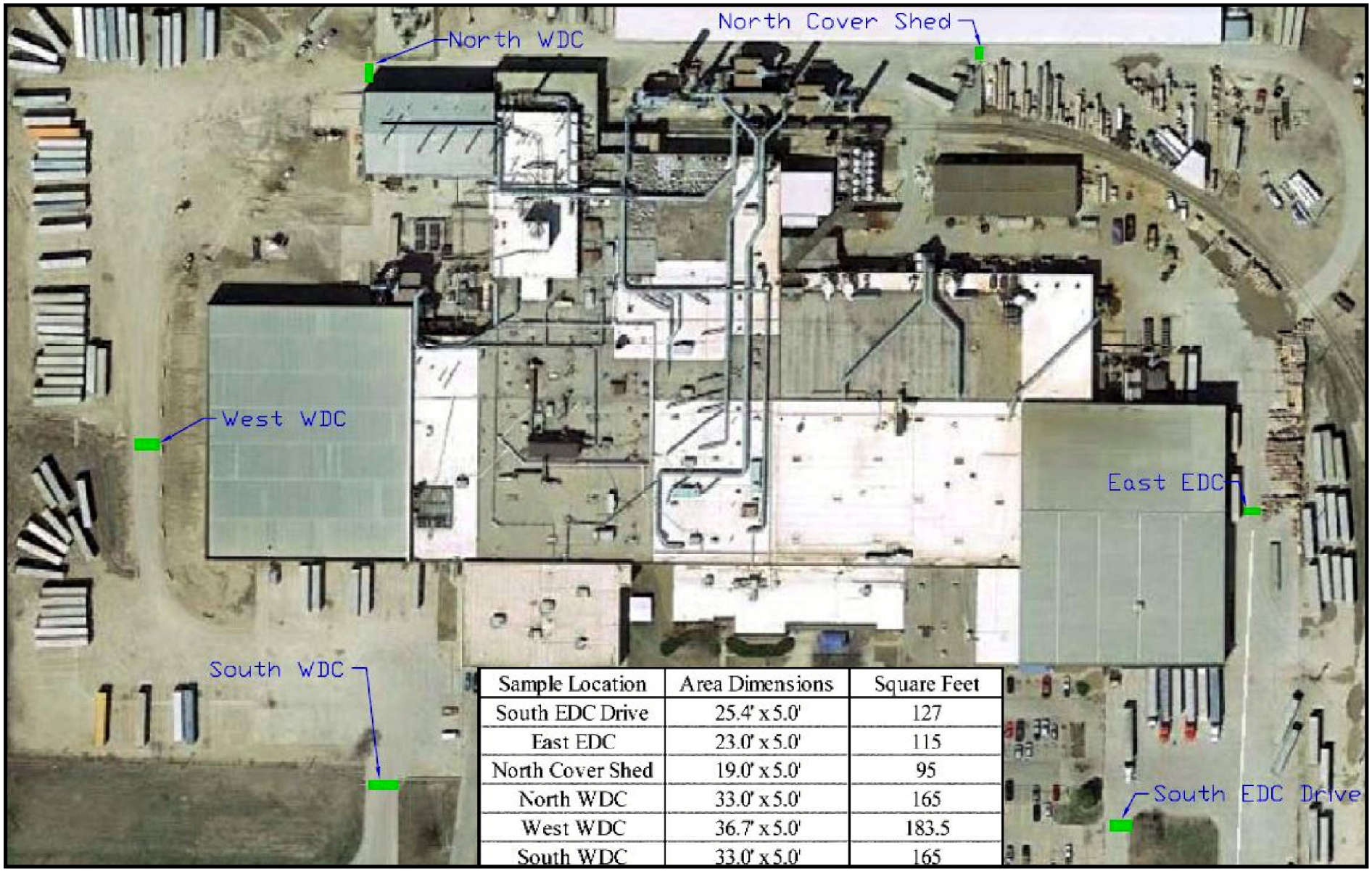
Exide Technologies
Salina, Kansas Battery Plant

N
W E
S

0 30 60 Meters

Figure 2-1d

P:\ArcGIS\Air Modeling\Exide Salina, KS\arcproj\Silt_Loading_Results.mxd



Sample Location	Area Dimensions	Square Feet
South EDC Drive	25.4' x 5.0'	127
East EDC	23.0' x 5.0'	115
North Cover Shed	19.0' x 5.0'	95
North WDC	33.0' x 5.0'	165
West WDC	36.7' x 5.0'	183.5
South WDC	33.0' x 5.0'	165

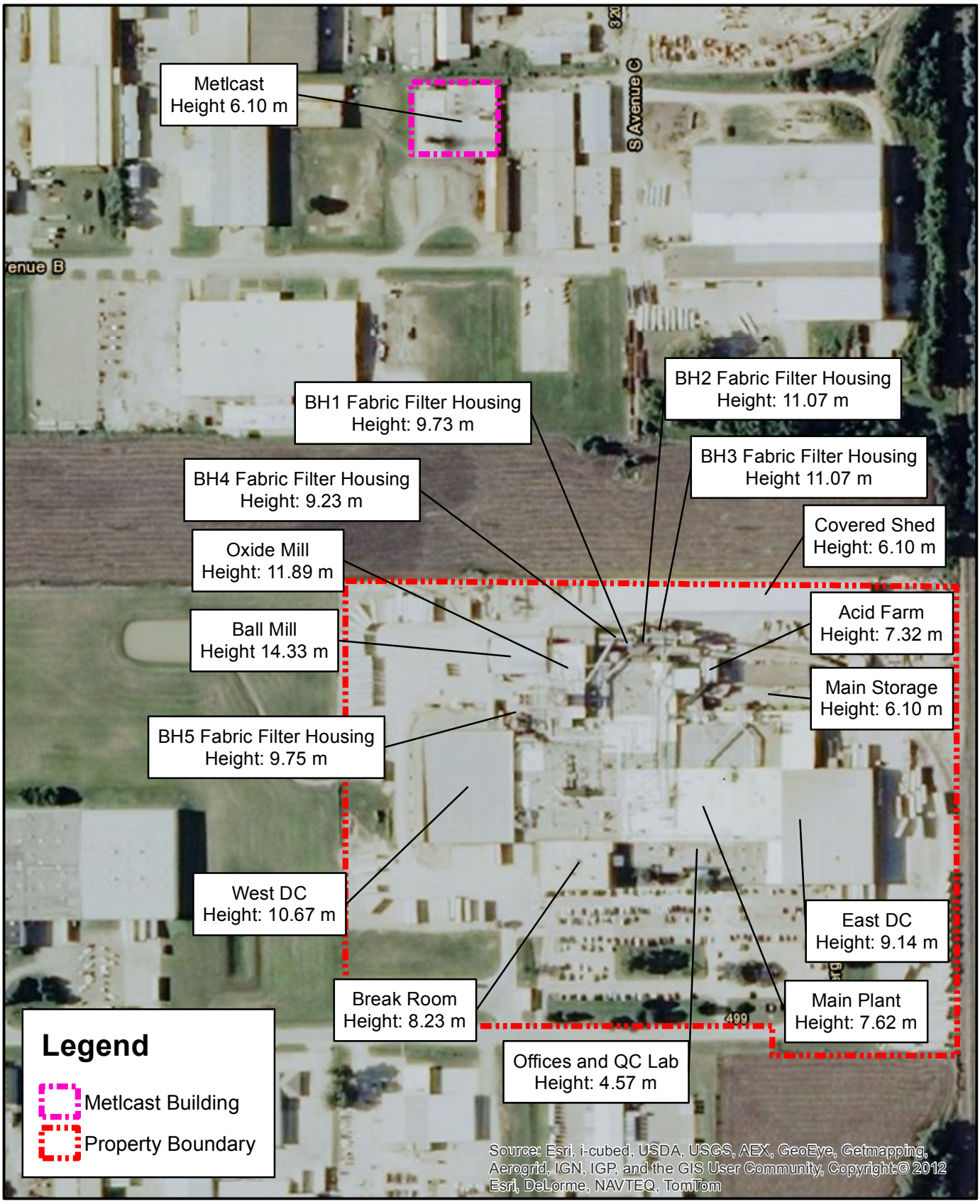
RAMBOLL ENVIRON

DRAFTED BY: HDT | DATE: 7/14/2016

SILT LOAD SAMPLING LOCATIONS
Exide Technologies
Kansas Battery Plant
Salina, Kansas

FIGURE
2-1e

07-39541A



RAMBOLL

Drawn By: HDT

Date: 7/14/2016

Location of Buildings and Property Line

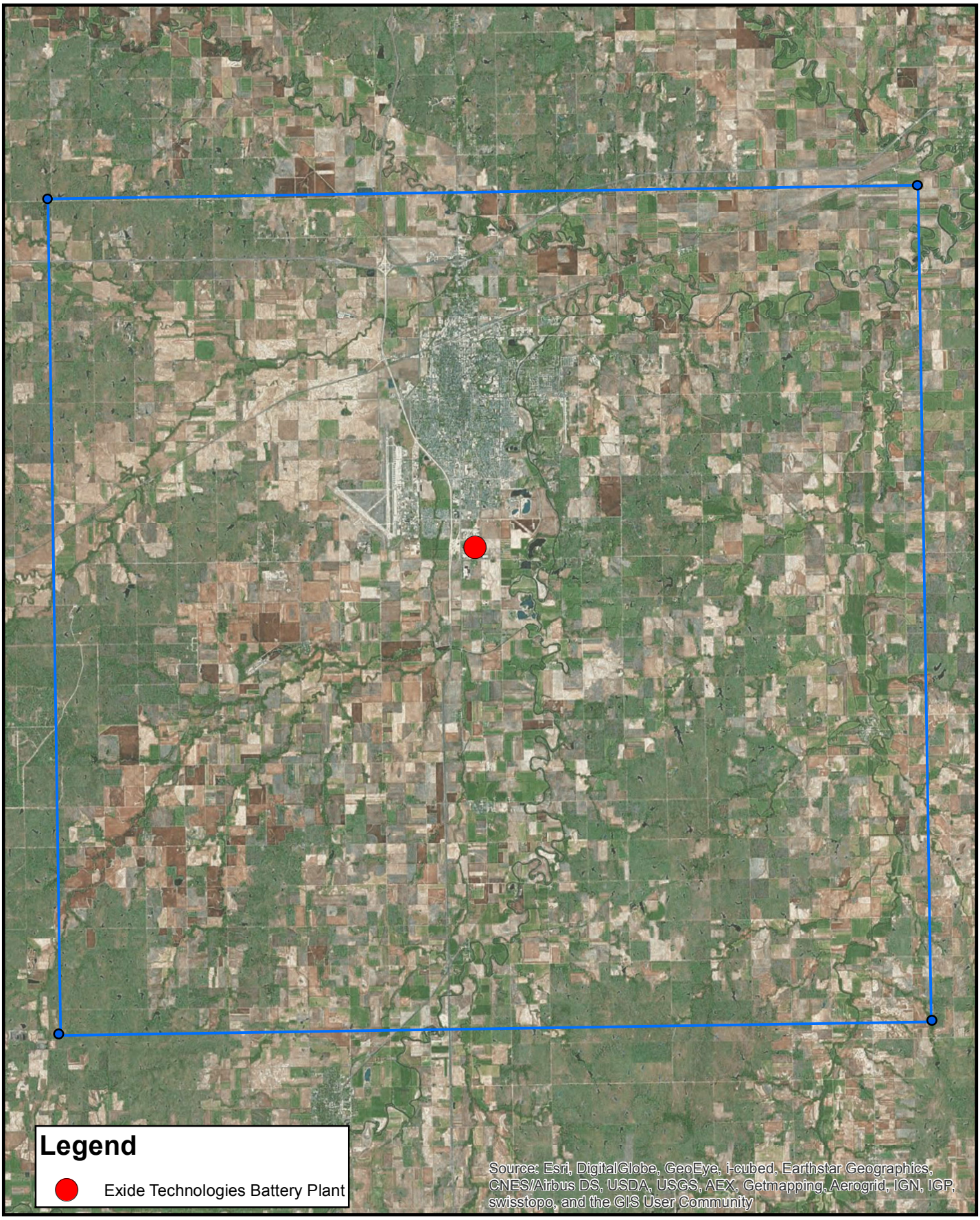
Exide Technologies

Salina, Kansas Battery Plant

N W E S

0 55 110 Meters

Figure 2-1f



P:\ArcGIS\Air Modeling\Exide Salina, KS\arcproj\ElevationDataDomain.mxdt

RAMBOLL

Drawn By: HDT

Date: 7/14/2016

Elevation Data Domain Imported into AERMAP

Exide Technologies
Salina, Kansas Battery Plant

N W E S

0 2.5 5 Kilometers

Figure 2-2

RAMBOLL

Drawn By: HDT

Date: 7/14/2016

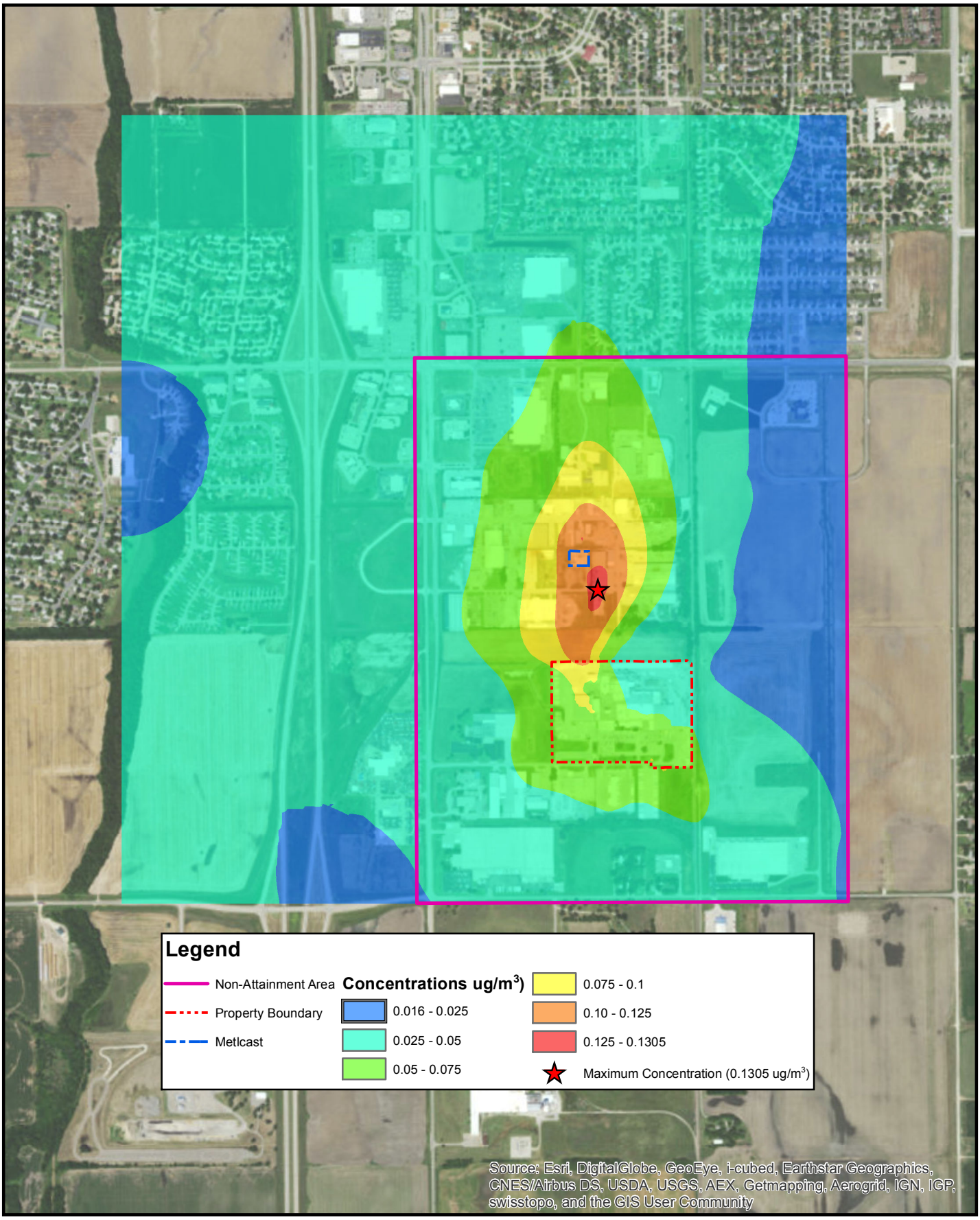
Receptor Placement Used for Modeling Analysis

Exide Technologies
Salina, Kansas Battery Plant

N W E S

0 245 490 Meters

Figure 2-6



P:\ArcGIS\Air Modeling\Exide Salina, KS\arcproj\lsopleth.mxdt

RAMBOLL

Drawn By: HDT

Date: 7/14/2016

Maximum Concentration at Each Receptor
(including 0.01 ug/m^3 background)
Exide Technologies
Salina, Kansas Battery Plant

N W E S

0 200 400 Meters

Figure 3-1

APPENDIX 3
FUGITIVE TRAFFIC EMISSION ESTIMATES

Fugitive Traffic Emission Estimates [post paving project]
All roadways are paved
AP-42 Chapter 13.2.1 has been used to estimate emissions from Paved Poads.

Paved Roads

AP-42 Section 13.2.1

$$E = (k(sL)^{0.91} \times (W^{1.02})) \times (1 - N / 4P)$$

where:
E = emission factor (lb/VMT)
k = particle size multiplier (lb/VMT)
sL = road surface silt loading (g/m^2)
W = average weight of vehicles traveling the road (tons)
N = number of precipitation days (>0.01in) over the averaging period
P = number of days in the averaging period
VMT = vehicle miles traveled

Constant	Value	Units
lb to g	453.5924	
ft^2 to m^2	0.09290304	
mg/kg	0.000001	
lb to tons	0.0005	
m to yards	1.09361	
ft to miles	0.000189394	
seconds per year	31536000	
seconds / minute	60	
minutes / hour	60	
hours/year	8760	
milligram / gram	1000	
Meters / foot	0.3048	
k (PM30) (paved)	0.011	lb/VMT
N	80	rainy days/yr
P	365	days/yr
sL exponent	0.91	
W exponent	1.02	
a	0.7	
b	0.45	
k (PM30) (unpaved)	4.9	
W (DELIVERIES)	26.3	tons/truck
W (SHIPPING)	28	tons/truck

Site Parameters **sL and lead content per AGC report dated January 28, 2015 presenting results of sampling conducted December 11, 2014**

Name	Sector	sL (g/m^2)	Lead (mg/kg)	Lead fraction	% of Route Length per Segment	Volume Sources
South EDC Drive	1	4.170	318	0.032%	35%	70
East EDC	2	0.290	520	0.052%	16%	32
North Cover Shed	3	0.363	1600	0.160%	28%	56
South WDC	4	2.362	449	0.045%	21%	42
West WDC	5	2.399	409	0.041%	40%	14
North WDC	6	0.444	1680	0.168%	60%	21

Traffic Pattern Explanation
Traffic on-site generally enters from the southwest and checks in at the security station. All deliveries except finished product pick-ups generally proceed clockwise around property to their designated location then continue clockwise and leave along Berg Road south of the facility (this is designated as DELIVERIES).

Trucks picking up finished batteries and duff batteries check in at security, proceed along Berg Road south of the plant to the southeastern part of the building then return to Berg Road to leave (this is designated SHIPPING).

DELIVERIES Route

Incoming Lead Pigs/Ingots and Rolled Lead Strip. Incoming Plastic Cases / Covers

17 Trucks Lead Pigs/Ingots Per Day + 2 Trucks of Rolled Lead Strip + 6 Plastic Trucks per Day

W = 26 tons (average of loaded 36 tons and unloaded 16 tons)

VMT_{Paved} =				
3905 feet around plant =	0.740 miles around plant	25 trucks	365 days	6749 miles
5280 feet per mile		day	year	year
$VMT_{Unpaved}$ =				
720 feet around plant =	0.136 miles around plant	25 trucks	365 days	1244 miles
5280 feet per mile		day	year	year

Incoming Paper Separators, Lead Oxide, and Duff Batteries (Contain Lead but Not Formed) and Outgoing Scrap Waste (to Smelters)

5 Paper Separator Trucks per week + 18 Duff Battery Trucks per Week + 5 Scrap Waste (to Smelter) Trucks per Week + 8 Lead Oxide Trucks per Week

W = 28 tons (average of loaded 40 tons and unloaded 16 tons)

VMT_{Paved} =				
3905 feet around plant =	0.740 miles around plant	36 trucks	52 weeks	1385 miles
5280 feet per mile		week	year	year
$VMT_{Unpaved}$ =				
720 feet around plant =	0.136 miles around plant	36 trucks	52 weeks	255 miles
5280 feet per mile		week	year	year

Trucks	Trips / Day	Unloaded Weight	Loaded Weight	Average Weight
Lead Pigs	17	16	36	26
Ingots	2	16	36	26
Plastic	6	16	36	26
Paper Separator	0.71	16	40	28
Duff Battery	2.57	16	40	28
Scrap Waste	0.71	16	40	28
Lead Oxide	1.14	16	40	28
Total	30.14	Fleet Average Weight =		26.3

[NOTE: descriptions in VMT calculations above retain reference to "unpaved" segments for consistency with baseline calculations.

Segments now are actually paved and the Emission Factor for Paved Roads is now substituted in and being used for those segments.]

The DELiveries RoaD Paved (DELRDP#) segements have been labelled 1 - 4 with emissions estimated based on sector sample characteristics

Segment	Sector Used	sL (g/m^2)	Lead fraction	% of Route Length per Segment	E (lb/VMT) PM30	VMT (miles/yr)	Emissions (tons TSP / yr)	Emissions (lb Lead / yr)	Emissions (lb Lead /hr)	Emissions (g Lead / sec)
DELRDP1	4	2.362	0.045%	21%	0.64	1708	0.55	0.49	5.60E-05	7.05E-06
DELRDP2	3	0.363	0.16%	28%	0.12	2277	0.13	0.4	4.84E-05	6.09E-06
DELRDP3	2	0.290	0.05%	16%	0.09	1301	0.06	0.06	7.32E-06	9.23E-07
DELRDP4	1	4.170	0.032%	35%	1.07	2847	1.53	0.97	1.11E-04	1.40E-05
DELRDU1	5	2.399	0.041%	40%	0.65	600	0.19	0.16	1.82E-05	2.29E-06
DELRDU2	6	0.444	0.168%	60%	0.14	900	0.06	0.2	2.41E-05	3.04E-06
Total Delivery Route							2.5	**2.32**	2.65E-04	3.34E-05

SHIPPING Route

Outgoing Finished and Duff Batteries (Shipping Route, SHIPRD on Figure)

30 Finished Battery Trucks Per Day + 10 Duff Battery Trucks Per Day
W = 28 tons (average of loaded 40 tons and unloaded 16 tons)

VMT =

2825 feet around plant =	0.535 miles around plant	40 trucks	365 days	7812 miles
5280 feet per mile		day	year	year

All driving is on paved surfaces

Segment	Sector Used	sL (g/m^2)	Lead fraction	% of Route Length per	E (lb/VMT)	VMT (miles/yr)	Emissions (tons TSP / yr)	(lb Lead /yr)	(lb Lead / hr)	(g Lead / sec)
SHIPRD	1	4.2	0.032%	100%	1.14	7812	4.5	**2.83**	3.24E-04	6.41E-05

Facility Wide Emissions

Segment	Emissions (tons TSP / yr)	(lb Lead /yr)	(lb Lead / hr)	(g Lead / sec)
Total Delivery Route	2.5	**2.32**	2.65E-04	3.34E-05
Total Shipping Route	4.5	**2.83**	3.24E-04	6.41E-05
Facility Wide Total	**7.0**	**5.15**	**5.88E-04**	**9.75E-05**