REVISIONS TO THE STATE OF TEXAS AIR QUALITY IMPLEMENTATION PLAN FOR THE CONTROL OF LEAD AIR POLLUTION

COLLIN COUNTY LEAD NONATTAINMENT AREA

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
P.O. BOX 13087
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2011 COLLIN COUNTY ATTAINMENT DEMONSTRATION STATE IMPLEMENTATION PLAN REVISION FOR THE 2008 LEAD NATIONAL AMBIENT AIR QUALITY STANDARD

2011-001-SIP-NR

Proposal
June 22, 2011

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EXECUTIVE SUMMARY

On October 15, 2008, the United States Environmental Protection Agency (EPA) substantially strengthened the National Ambient Air Quality Standard (NAAQS) for lead. The new standard 0.15 micrograms per cubic meter ($\mu g/m^3$), measured as a rolling three-month average, is 10 times more stringent than the previous standard of 1.5 $\mu g/m^3$ measured as a quarterly average. On October 14, 2009, the governor of Texas submitted to the EPA a recommendation that a portion of Collin County, surrounding the Exide Technologies' (Exide) battery recycling plant located in Frisco, Texas, be designated as a lead nonattainment area. This recommendation was based on 2006 through 2008 monitoring data, air dispersion modeling, and analysis of additional factors as prescribed by the EPA. On October 12, 2010, the governor of Texas submitted an updated recommendation which reflected a permit amendment lowering Exide's maximum permitted allowable emission rate and the resulting smaller nonattainment area. On November 22, 2010, the EPA designated the final recommended portion of Collin County as nonattainment for the 2008 lead NAAQS, effective December 31, 2010 (75 *Federal Register* [FR] 71033).

Section 191(a) of the Federal Clean Air Act (FCAA) requires that states with lead nonattainment areas submit to the EPA an attainment demonstration state implementation plan (SIP) revision within 18 months of the effective designation date. The state is required to submit to the EPA an attainment demonstration SIP revision for lead by June 30, 2012, and to demonstrate that the area will reach attainment of the 2008 lead NAAQS by the December 31, 2015, attainment date.

This SIP revision demonstrates attainment using air dispersion modeling that includes control strategies already in use at the Exide site as well as additional measures being proposed concurrently with this SIP revision. This SIP revision also contains FCAA-required elements, including a reasonably available control measures analysis, a reasonably available control technology analysis, demonstration of reasonable further progress, and a contingency plan.

The control measures and contingency measures that have been identified for this proposed SIP revision will be enforceable through an agreed order between the Texas Commission on Environmental Quality (TCEQ) and Exide (see Appendix A: *Agreed Order 2011-0521-MIS*), the only lead source in the nonattainment area. To ensure compliance with the 2008 lead NAAQS, the Agreed Order is being proposed concurrently with this SIP revision. The Agreed Order provides enforceable measures to reduce emissions necessary for the Collin County lead nonattainment area to attain the 2008 lead NAAQS by November 1, 2012, and contains contingency measures designed to ensure continued compliance with the standard.

SECTION V: LEGAL AUTHORITY

A. General

The Texas Commission on Environmental Quality (TCEQ) has the legal authority to implement, maintain, and enforce the National Ambient Air Quality Standards (NAAQS) and to control the quality of the state's air, including maintaining adequate visibility.

The first air pollution control act, known as the Clean Air Act of Texas, was passed by the Texas Legislature in 1965. In 1967, the Clean Air Act of Texas was superseded by a more comprehensive statute, the Texas Clean Air Act (TCAA), found in Article 4477-5, Vernon's Texas Civil Statutes. The legislature amended the TCAA in 1969, 1971, 1973, 1979, 1985, 1987, 1989, 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, and 2009. In 1989, the TCAA was codified as Chapter 382 of the Texas Health and Safety Code.

Originally, the TCAA stated that the Texas Air Control Board (TACB) was the state air pollution control agency and the principal authority in the state on matters relating to the quality of air resources. In 1991, the legislature abolished the TACB effective September 1, 1993, and its powers, duties, responsibilities, and functions were transferred to the Texas Natural Resource Conservation Commission (TNRCC). With the creation of the TNRCC, the authority over air quality is found in both the Texas Water Code and the TCAA. Specifically, the authority of the TNRCC is found in Chapters 5 and 7. Chapter 5, Subchapters A - F, H - J, and L, include the general provisions, organization, and general powers and duties of the TNRCC, and the responsibilities and authority of the executive director. Chapter 5 also authorizes the TNRCC to implement action when emergency conditions arise and to conduct hearings. Chapter 7 gives the TNRCC enforcement authority. In 2001, the 77th Texas Legislature continued the existence of the TNRCC until September 1, 2013, and changed the name of the TNRCC to the Texas Commission on Environmental Quality (TCEQ). In 2009, the 81st Texas Legislature, during a special session, amended section 5.014 of the Texas Water Code, changing the expiration date of the TCEQ to September 1, 2011, unless continued in existence by the Texas Sunset Act.

The TCAA specifically authorizes the TCEQ to establish the level of quality to be maintained in the state's air and to control the quality of the state's air by preparing and developing a general, comprehensive plan. The TCAA, Subchapters A - D, also authorize the TCEQ to collect information to enable the commission to develop an inventory of emissions; to conduct research and investigations; to enter property and examine records; to prescribe monitoring requirements; to institute enforcement proceedings; to enter into contracts and execute instruments; to formulate rules; to issue orders taking into consideration factors bearing upon health, welfare, social and economic factors, and practicability and reasonableness; to conduct hearings; to establish air quality control regions; to encourage cooperation with citizens' groups and other agencies and political subdivisions of the state as well as with industries and the federal government; and to establish and operate a system of permits for construction or modification of facilities.

Local government authority is found in Subchapter E of the TCAA. Local governments have the same power as the TCEQ to enter property and make inspections. They also may make recommendations to the commission concerning any action of the TCEQ that affects their territorial jurisdiction, may bring enforcement actions, and may execute cooperative agreements with the TCEQ or other local governments. In addition, a city or town may enact and enforce ordinances for the control and abatement of air pollution not inconsistent with the provisions of the TCAA and the rules or orders of the commission.

Subchapters G and H of the TCAA authorize the TCEQ to establish vehicle inspection and maintenance programs in certain areas of the state, consistent with the requirements of the Federal Clean Air Act; coordinate with federal, state, and local transportation planning agencies to develop and implement transportation programs and measures necessary to attain and maintain the NAAQS; establish gasoline volatility and low emission diesel standards; and fund and authorize participating counties to implement vehicle repair assistance, retrofit, and accelerated vehicle retirement programs.

B. Applicable Law

The following statutes and rules provide necessary authority to adopt and implement the state implementation plan (SIP). The rules listed below have previously been submitted as part of the SIP.

Statutes

All sections of each subchapter are included, unless otherwise noted.

TEXAS HEALTH & SAFETY CODE, Chapter 382	September 1, 2009
TEXAS WATER CODE	September 1, 2009

Chapter 5: Texas Natural Resource Conservation Commission

- Subchapter A: General Provisions
- Subchapter B: Organization of the Texas Natural Resource Conservation Commission
- Subchapter C: Texas Natural Resource Conservation Commission
- Subchapter D: General Powers and Duties of the Commission
- Subchapter E: Administrative Provisions for Commission
- Subchapter F: Executive Director (except §§5.225, 5.226, 5.227, 5.2275,5.231, 5.232, and 5.236)
- Subchapter H: Delegation of Hearings
- Subchapter I: Judicial Review
- Subchapter J: Consolidated Permit Processing
- Subchapter L: Emergency and Temporary Orders (§§5.514, 5.5145, and 5.515 only)
- Subchapter M: Environmental Permitting Procedures (§5.558 only)

Chapter 7: Enforcement

- Subchapter A: General Provisions (§§7.001, 7.002, 7.0025, 7.004, and 7.005 only)
- Subchapter B: Corrective Action and Injunctive Relief (§7.032 only)
- Subchapter C: Administrative Penalties
- Subchapter D: Civil Penalties (except §7.109)
- Subchapter E: Criminal Offenses and Penalties: §§7.177, 7.179-7.183

Rules

All of the following rules are found in 30 Texas Administrative Code, as of the following latest effective dates:

Chapter 7: Memoranda of Understanding, §§7.110 and 7.119	December 13, 1996 and May 2, 2002
Chapter 19: Electronic Reporting	March 15, 2007
Chapter 35: Subchapters A-C, K: Emergency and Temporary Orders and Permits; Temporary Suspension or Amendment of Permit Conditions	July 20, 2006

Chapter 39: Public Notice, §§39.201; 39.401; 39.403(a) and (b)(8)-(10); 39.405(f)(1) and (g); 39.409; 39.411 (a), (b)(1)-(6), and (8)-(10) and (c)(1)-(6) and (d); 39.413(9), (11), (12), and (14); 39.418(a) and (b)(3) and (4); 39.419(a), (b), (d), and (e); 39.420(a), (b) and (c)(3) and (4); 39.423 (a) and (b); 39.601-39.605	June 24, 2010
Chapter 55: Requests for Reconsideration and Contested Case Hearings; Public Comment, §§55.1; 55.21(a) - (d), (e)(2), (3), and (12), (f) and (g); 55.101(a), (b), and (c)(6) - (8); 55.103; 55.150; 55.152(a)(1), (2), and (6) and (b); 55.154; 55.156; 55.200; 55.201(a) - (h); 55.203; 55.205; 55.209, and 55.211	June 24, 2010
Chapter 101: General Air Quality Rules	May 12, 2011
Chapter 106: Permits by Rule, Subchapter A	May 12, 2011
Chapter 111: Control of Air Pollution from Visible Emissions and Particulate Matter	July 19, 2006
Chapter 112: Control of Air Pollution from Sulfur Compounds	July 16, 1997
Chapter 113: Standards of Performance for Hazardous Air Pollutants and for Designated Facilities and Pollutants	May 14, 2009
Chapter 114: Control of Air Pollution from Motor Vehicles	December 13, 2010
Chapter 115: Control of Air Pollution from Volatile Organic Compounds	February 17, 2011
Chapter 116: Permits for New Construction or Modification	March 3, 2011
Chapter 117: Control of Air Pollution from Nitrogen Compounds	May 12, 2011
Chapter 118: Control of Air Pollution Episodes	March 5, 2000
Chapter 122: §122.122: Potential to Emit	December 11, 2002
Chapter 122: §122.215: Minor Permit Revisions	June 3, 2001
Chapter 122: §122.216: Applications for Minor Permit Revisions	June 3, 2001
Chapter 122: §122.217: Procedures for Minor Permit Revisions	December 11, 2002
Chapter 122: §122.218: Minor Permit Revision Procedures for Permit Revisions Involving the Use of Economic Incentives, Marketable Permits, and Emissions Trading	June 3, 2001

SECTION VI: CONTROL STRATEGY

A. Introduction (No change)
B. Ozone (No Change)
C. Particulate Matter (No change)
D. Carbon Monoxide (No change)
E. Lead (Revised)
    1. 1980 State Implementation Plan for the Control of Lead Air Pollution (No change)
    2. 1993 Lead SIP Revisions for Collin County (No change)
    3. 1999 Lead SIP Revisions for Collin County (No change)
    4. 2009 Collin County Maintenance Plan for Lead (No change)
    5. 2011 Collin County Attainment Demonstration SIP Revision for the 2008 Lead NAAQS (New)
F. Oxides of Nitrogen (No change)
G. Sulfur Dioxide (No change)
H. Conformity with the National Ambient Air Quality Standards (No change)
I. Site Specific (No change)
J. Mobile Sources Strategies (No change)
K. Clean Air Interstate Rule (No change)
L. Transport (No change)
M. Regional Haze (No change)

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LIST OF ACRONYMS

ADEC	Alaska Department of Environmental Conservation
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
ASOS	Automated Surface Observing System
AQS	Air Quality System
AQS ID	Air Quality System Identification
BPIPPRM	The Building Profile Input Program for Plume Rise Model Enhancements
CFR	Code of Federal Regulations
DEMs	digital elevation models
EAF	electric arc furnaces
EPA	United States Environmental Protection Agency
FCAA	Federal Clean Air Act
FR	Federal Register
GEP	good engineering practice
GPS	Global Position System
HEPA	high efficiency particulate air
ISHD	Integrated Surface Hourly Data
IQ	Intelligence Quotient
km	kilometer
lb/hr	pounds per hour
$lb/hr \cdot m^2$	pounds per hour per square meter
m/sec	meters per second
mph	miles per hour
NAAQS	National Ambient Air Quality Standards
NCDC	National Climactic Data Center
NLCD	National Land Cover Database
NWS	National Weather Service
PTFE	polytetrafluoroethylene
psia	pounds per square inch absolute
R^2	correlation coefficient
SIP	state implementation plan
SSE	south-southeast
TAC	Texas Administrative Code

TACB	Texas Air Control Board
TCAA	Texas Clean Air Act
TCEQ	Texas Commission on Environmental Quality (commission)
TNRCC	Texas Natural Resource Conservation Commission
tons/hr	tons per hour
tpd	tons per day
USGS	United States Geological Survey
$\mu g/m^3$	micrograms per cubic meter
WESP	Wet Electrostatic Precipitation

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CHAPTER 1: GENERAL

1.1 BACKGROUND

The *History of the Texas State Implementation Plan (SIP)*, a comprehensive overview of the SIP revisions submitted to the United States Environmental Protection Agency (EPA) by the State of Texas, is available on the Texas Commission on Environmental Quality's (TCEQ) SIP Introduction Web page (http://www.tceq.texas.gov/airquality/sip/sipintro.html).

1.2 INTRODUCTION

The EPA designated a portion of Collin County as a lead nonattainment area for the 1978 Lead National Ambient Air Quality Standard (NAAQS) on November 6, 1991 (56 *Federal Register* [FR] 56694). The EPA approved the Collin County lead attainment demonstration SIP revision for the 1978 NAAQS on November 29, 1994 (59 FR 60930). The EPA redesignated the area to attainment and approved the first 10-year maintenance plan in October 15, 1999 (64 FR 55421). In 2009, the TCEQ submitted to the EPA the second and final 10-year maintenance plan for the 1978 lead NAAQS. The maintenance plan included contingency measures to promptly correct any violation of the 1978 lead NAAQS. Because there is only one significant lead source in the nonattainment area, all measures are directed at this source. The contingency measures included in the 2009 maintenance plan would require Exide Technologies' battery recycling plant (Exide) to do one of the following if the area monitored lead concentrations above the 1978 lead NAAQS:

- automate the scale and feed for the reverberatory furnace;
- expand the existing water misting dust suppression system; or
- implement an alternative measure that will provide, at a minimum, emissions reductions equivalent to those listed previously.

On November 12, 2008, the EPA substantially strengthened the NAAQS for lead. The new standard, set at 0.15 micrograms per cubic meter ($\mu g/m^3$) measured as a rolling three-month average, is 10 times more stringent than the previous standard of 1.5 $\mu g/m^3$ measured as a quarterly average (73 FR 66964). On November 22, 2010, the EPA designated a portion of Collin County surrounding Exide as nonattainment for the 2008 lead NAAQS, effective December 31, 2010 (75 FR 71033). The 2008 lead NAAQS final rule contained a revised method for calculating averaging time for the purposes of comparing monitored data to the NAAQS. Compliance with the 2008 lead NAAQS is based on 36 three-month rolling averages. For an ambient air monitoring site to meet this standard, no three-month rolling average for the previous 36 months prior to the attainment date may exceed 0.15 $\mu g/m^3$. Therefore, Collin County must monitor attainment of the NAAQS beginning November 1, 2012, to meet the December 31, 2015, attainment deadline. Appendix B: *Monitoring Data from Collin County Lead Monitors* describes available monitoring data in Collin County from the past 36 months.

1.3 CURRENT SIP REVISION

Effective December 15, 2010, the EPA designated a 1.28 square mile area surrounding Exide in Frisco, Texas, as nonattainment for the 2008 lead NAAQS (75 FR 71033). The nonattainment area is a portion of Collin County located in the City of Frisco that is bounded to the north by latitude 33.153, to the east by longitude -96.822, to the south by latitude 33.131, and to the west by longitude -96.837. Figure 1-1*: Map of Collin County Lead Nonattainment Area* provides a visual representation of the nonattainment area. Lead nonattainment areas designated in 2010, are required to attain the 2008 lead NAAQS as expeditiously as practicable but no later than December 31, 2015. The state must submit a SIP revision addressing the lead nonattainment area requirements of the Federal Clean Air Act (FCAA) by June 30, 2012. To ensure that the Collin County nonattainment area attains the 2008 lead NAAQS as expeditiously as practicable, this SIP revision includes control measures implemented during SIP development but prior to proposal as agreed upon by Exide.

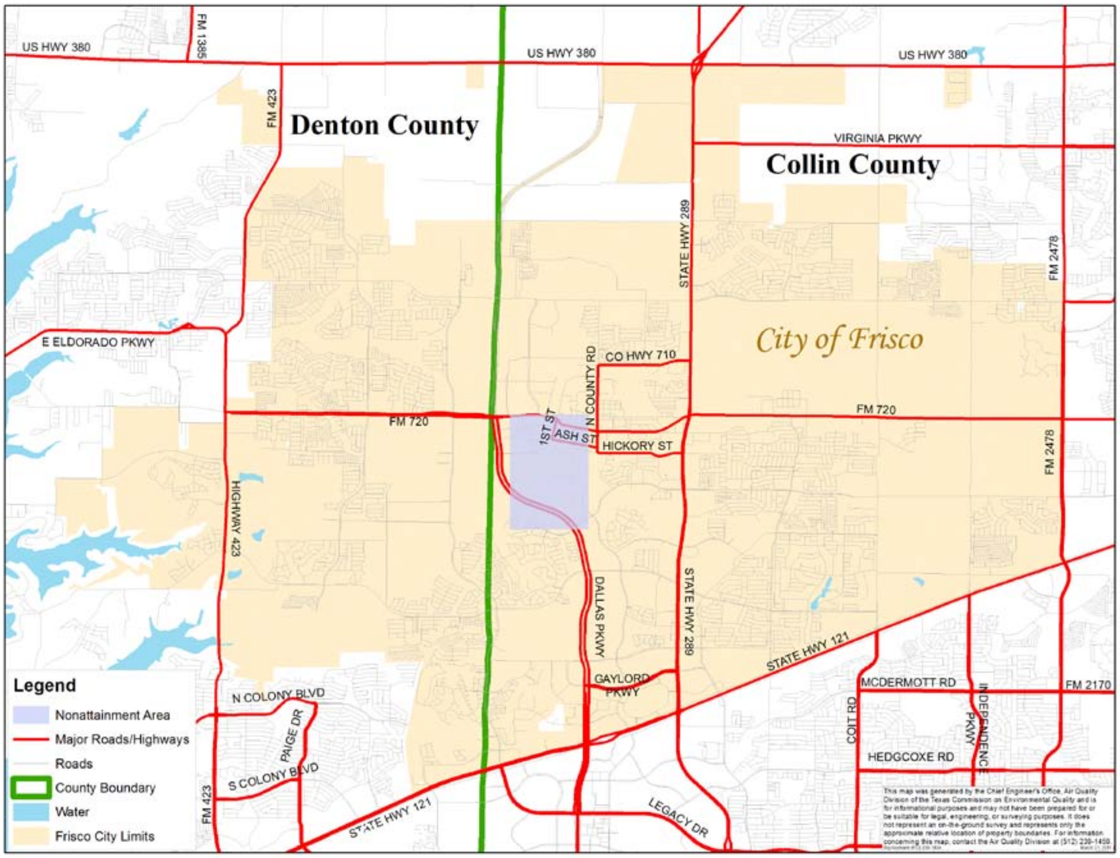

Figure 1-1: Map of Collin County Lead Nonattainment Area

This proposed SIP revision demonstrates attainment of the 2008 lead NAAQS using an air dispersion modeling analysis and contains control measures necessary to bring Collin County into attainment by November 1, 2012. In addition to control measures included to demonstrate attainment by November 1, 2012, this proposed SIP revision contains contingency measures to be implemented if the area fails to meet that deadline or fails to meet reasonable further progress (RFP) requirements. As required by the FCAA and the EPA's implementation guidance for the 2008 lead NAAQS, this proposed SIP revision also contains a reasonably available control technology analysis, a reasonably available control measures analysis, and an RFP demonstration.

The control measures and contingency measures that have been identified for this proposed SIP revision would be enforceable through Agreed Order 2011-0521-MIS between the TCEQ and Exide, the only lead source in the nonattainment area. To ensure compliance with the 2008 lead NAAQS, the Agreed Order is being proposed concurrently with this SIP revision. The Agreed Order provides enforceable measures to reduce emissions necessary for the Collin County lead nonattainment area to attain the 2008 lead NAAQS by November 1, 2012, and contains contingency measures designed to ensure continued compliance with the standard.

1.4 SUMMARY OF MEASURED LEAD CONCENTRATIONS IN FRISCO

The 2008 lead NAAQS final rule contained a revised method for calculating averaging time for the purposes of comparing monitored data to the NAAQS. Compliance with the 2008 lead NAAQS is based on 36 three-month rolling averages. For an ambient air monitoring site to meet this standard, no three-month rolling average for the previous 36 months may exceed 0.15 $\mu g/m^3$. Collin County must monitor attainment of the NAAQS beginning with the November 1, 2012, through January 31, 2013, three-month rolling average to meet the December 31, 2015, attainment date.

As of May 20, 2011, the lead design value for Collin County is 0.71 $\mu g/m^3$. Table 1-2: *Monitoring Data from Collin County Lead Monitors* describes the most recent 36-month period of lead monitoring data in Collin County.

Table 1-1: Monitoring Data from Collin County Lead Monitors

Monitor/Air Quality System Identification Number	Highest 3-month ambient air concentration average in the most recent 36-month period ($\mu g/m^3$)	Most recent three-month rolling average ($\mu g/m^3$)
Eubanks 480850009	0.71	0.49
Ash Street 480850007	0.15	0.11
Parkwood 480850003	0.37	0.11
Stonebrook 480850029	0.15	0.15

1.5 HEALTH EFFECTS

On October 15, 2008, the EPA substantially strengthened the NAAQS for lead. According to the EPA's final rule for the 2008 lead NAAQS (73 FR 66964), scientific evidence about lead and health has expanded dramatically since the EPA issued the initial standard of 1.5 $\mu g/m^3$ in 1978. More than 6,000 new studies on lead health effects, environmental effects, and lead in the air have been published since 1990. Evidence from health studies shows that adverse effects occur at much lower levels of lead in blood than previously thought.

Lead that is emitted into the air can be inhaled directly or ingested after it settles onto surfaces or soils. However, for the general population, exposure to lead occurs primarily via ingestion through contact with contaminated soils or other surfaces. Once taken into the body, lead distributes throughout the body in the blood and accumulates in the bones. Depending on the level of exposure, lead can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems, and the cardiovascular system. Lead exposure also affects the oxygen-carrying capacity of the blood.

Lead effects most commonly encountered in current populations are neurological effects in children and cardiovascular effects (e.g., high blood pressure and heart disease) in adults. Children are at a higher risk of exposure to lead when compared to adults. The risk of exposure is higher because children tend to put their hands and other objects, which may contain lead, into their mouths (e.g., lead-based paint chips from older homes). Children also have a higher risk of adverse effects because their brains are still developing. Infants and young children are especially sensitive to low levels of lead, which may contribute to behavioral problems, learning deficits, and lowered Intelligence Quotient (IQ).

1.6 PUBLIC COMMENT AND STAKEHOLDER PARTICIPATION

1.6.1 Stakeholder Meetings

The TCEQ held a lead stakeholder meeting to discuss concepts for potential control strategies for the Collin County lead nonattainment area and to present an overview of the SIP development process. The meeting was held at the City of Frisco Council Chambers on January 19, 2011. TCEQ staff from the Toxicology, Air Permits, and Air Quality Divisions presented information. Staff was also on hand to answer questions. Staff presented stakeholders with an overview of the health effects of lead, an update on the 2008 lead NAAQS and the associated SIP revision, an overview of the role of modeling in demonstrating attainment, and a draft list of potential control strategies. The presentation and additional information about the lead stakeholder meeting can be found at the Lead Stakeholder Group Web page (http://www.tceq.texas.gov/airquality/sip/stakeholders/pb_stakeholder).

1.6.2 Public Hearings and Comment Information

The commission will hold a public hearing for the proposed 2011 Collin County Attainment Demonstration SIP Revision for the 2008 Lead NAAQS, which includes Agreed Order 2011-0521-MIS, at the following time and location:

Table 1-2: Public Hearing Information

City	Date	Time	Location
Frisco	July 28, 2011	6:00 PM	Frisco City Council Chambers 6101 Frisco Square Boulevard Frisco, TX 75034

The public comment period will open on June 24, 2011, and close on August 8, 2011. Written comments will be accepted via mail, fax, or through the eComments system. All comments should reference the "**2011 Collin County Attainment Demonstration SIP Revision for the 2008 Lead NAAQS**" and **Project Number 2011-001-SIP-NR**. Comments may be submitted to C. Holly Brightwell, MC 206, State Implementation Plan Team, Chief Engineer's Office, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas, 78711-3087 or faxed to (512) 239-5687. Electronic comments may be submitted through the eComments system (http://www5.tceq.texas.gov/rules/ecomments). File size restrictions may apply to comments being submitted via the eComments system. Comments must be received by close of business August 8, 2011.

1.7 SOCIAL AND ECONOMIC CONSIDERATIONS

No significant fiscal implications are anticipated for the TCEQ or other units of state or local governments as a result of administration or enforcement of proposed Agreed Order 2011-0521-MIS. Because Exide is the sole source contributing to the nonattainment area, all controls to reach attainment will be borne by this source. As such, any economic impacts will be limited to the single lead source associated with this SIP revision. The proposed Agreed Order is expected to have significant fiscal impact to Exide. The citizens of a portion of Collin County will benefit from reduced exposure to ambient lead emissions.

1.8 FISCAL AND MANPOWER

The TCEQ has determined that its fiscal and manpower resources are adequate and will not be adversely affected through implementation of this plan.

CHAPTER 2: EMISSIONS INVENTORY

2.1 INTRODUCTION

The Federal Clean Air Act, §172(c)(3) requires the development of emissions inventories (EI) for nonattainment areas. The Texas Commission on Environmental Quality (TCEQ) maintains a point source EI with up-to-date information on major lead sources. The EI identifies the types of emissions sources present in an area, the amount of each pollutant emitted, and the types of processes and control devices employed at each plant or source category.

On November 22, 2010, the Environmental Protection Agency (EPA) designated a portion of Collin County, located in Frisco, Texas, as a lead nonattainment area, effective December 31, 2010 (75 *Federal Register* [FR] 71033). This nonattainment area surrounds Exide Technologies' (Exide) lead battery recycling plant, a point source that submits annual emissions inventory data to the TCEQ. This chapter discusses general EI development for the point source category. Contributions from non-point sources were found to be insignificant. See section 2.3 *Other Source Categories* for more information about emissions from non-point source categories.

2.2 POINT SOURCES

2.2.1 Emissions Inventory Development

Stationary point source emissions data are collected annually from sites that meet the reporting requirements of 30 Texas Administrative Code §101.10. To collect the data, the TCEQ sends emissions inventory questionnaires (EIQ) to all sites identified as meeting the reporting requirements. Companies are required to report emissions data and to provide samples of calculations used to determine the emissions. Information characterizing the process equipment, the abatement units, and the emission points is also required. All data submitted in the EIQ are reviewed for quality assurance purposes and then stored in the State of Texas Air Reporting System database.

2.2.2 Updated 2010 Emissions Inventory

The TCEQ requested that Exide submit an expedited 2010 lead emissions inventory for all lead-emitting sources located at the company's battery recycling plant in Frisco, Texas. Exide submitted the 2010 lead emissions inventory data to the TCEQ on February 24, 2011. Total reported lead emissions for 2010 are 1.09 tons per year. No other lead-emitting point sources have been identified in the lead nonattainment area.

The 2010 lead emissions inventory that Exide submitted on February 24, 2011, is reproduced in Appendix C: *Annual Emissions Inventory Update for Exide Technologies' Frisco Lead Battery Recycling Plant*.

2.3 OTHER SOURCE CATEGORIES

According to the Air Emissions Reporting Requirements (73 FR 76539), only annual point source emissions are required to be reported to EPA for the 2010 inventory year. Since the next triennial reporting year is 2011, the mobile and area source periodic emissions inventories were not developed for 2010. However, a review of 2008 data indicated an insignificant contribution of lead emissions (less than 0.1%) from these non-point sources. Therefore, the point source category is the only inventory category developed for the inventory year as Exide Technologies' battery recycling plant in Frisco is the only point source reporting lead emissions in the nonattainment area.

CHAPTER 3: AIR DISPERSION MODELING

3.1 INTRODUCTION

Two dispersion modeling analyses were performed for the 2011 Collin County Attainment Demonstration State Implementation Plan (SIP) Revision for the 2008 Lead National Ambient Air Quality Standard (NAAQS). One was an analysis of current conditions (base case). The other analysis examined the potential effectiveness of proposed emission controls (future case).

The base case evaluated a reasonable estimate of maximum actual emissions to determine the sources that contribute most to the highest predicted concentrations. This determination helps identify the sources that may contribute most to actual monitored concentrations. The sources identified as likely contributors to predicted maximum concentrations are targeted in the proposed Agreed Order 2011-0521-MIS that is associated with this proposed SIP revision.

The future case evaluated control strategies listed in section 4.4 *New Control Measures* of this proposed SIP revision and described in Agreed Order 2011-0521-MIS between the Texas Commission on Environmental Quality (TCEQ) and Exide Technologies (Exide). Dispersion modeling was used to validate that the proposed control strategies will bring the Collin County lead nonattainment area into compliance with the 2008 lead National Ambient Air Quality Standard (NAAQS).

3.2 MODELING APPROACH

The dispersion modeling analysis was performed using the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) modeling system. There are two input data processors that are regulatory components of the AERMOD modeling system: AERMET, a meteorological data preprocessor that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, and AERMAP, a terrain data preprocessor that incorporates complex terrain using United States Geological Survey (USGS) Digital Elevation Data. The Building Profile Input Program for Plume Rise Model Enhancements (BPIPPRM), a multi-building dimensions program incorporating the good engineering practice (GEP) technical procedures for PRIME applications was also used.

Both the base and future case analyses used identical model programs, model settings, meteorological data, downwash data, and receptor grids. The selections made for these analyses are summarized below.

- AERMOD (Version 09292) was used with default regulatory settings. Since the current version of AERMOD is not capable of calculating rolling three-month average concentrations, the EPA post-processor LeadPost was used. The input values to LeadPost are monthly average values at each receptor in the POSTFILE output format from AERMOD.
- AERMET (Version B10300) was used to process meteorological data for the period 2006 through 2010.
- Downwash parameters were generated using BPIPPRM (Version 04274). Building and point source locations were derived from global positioning system (GPS) measurements by TCEQ regional staff and validated by TCEQ Air Permits staff using aerial photography.
- The receptor grid used in the modeling analyses consisted of receptors with 100 meter spacing and extended approximately 3 kilometers (km) from the Exide site property line in all directions. Discrete receptors were used for the locations of the existing ambient air monitoring stations.
- Terrain elevations within the modeling domain were determined using AERMAP (Version 09040). The input data used for this analysis were USGS seamless data covering the

following digital elevation models (DEMs): Little Elm, Frisco, Lewisville East, and Hebron data sets.

3.2.1 Meteorology for Base Case and Future Case

In order to generate meteorological input data for use with AERMOD, surface characteristics (Bowen ratio, noontime albedo, and surface roughness length) of the modeling domain must be obtained for input for AERMET. Values for Bowen ratio and surface roughness length for the modeling domain were calculated using the methodology proposed by the Alaska Department of Environmental Conservation (ADEC) described in *ADEC Guidance re AERMET Geometric Means, How to Calculate the Geometric Mean Bowen Ratio and the Inverse-Distance Weighted Geometric Mean Surface Roughness Length in Alaska*,[1] with input of land cover data from the USGS National Land Cover Database (NLCD) 2001. The ADEC guidance provided an equivalent calculation method to the surface characteristic pre-processor program AERSURFACE (Version 08009), which requires the input of land cover data from the USGS NLCD 1992. The ADEC guidance is for use with land cover data other than the 1992 NLCD.

The 2001 NLCD was used rather than the 1992 NLCD due to the rapid growth of the Frisco area. From United States Census Bureau data, the 1990 population of Frisco was less than 10,000, the 2000 population was over 30,000, and the 2010 population was over 116, 000. For this reason, the 1992 NLCD was deemed not representative of current land cover characteristics. The 2001 NLCD is the most recent available dataset, so it was used for this modeling analysis.

Using the 1992 NLCD classifications obtained from the AERSURFACE User's Guide[2], land cover data from 2001 were reclassified to reasonably equivalent 1992 NLCD classifications using documentation from the NLCD 1992/2001 Retrofit Land Cover Change Product[3]. Representative Bowen ratio and surface roughness length values were calculated using the reclassified 2001 NLCD with the ADEC guidance. The noontime albedo value was calculated using the reclassified 2001 NLCD for all land classifications within a 10 km square, as specified by the AERSURFACE User's Guide, surrounding the Exide site. The Bowen ratio calculated was 0.76, surface roughness was 0.234 meters, and albedo was 0.174.

Meteorological raw input data were used with generalized surface characteristics of the application site and processed with AERMET (Version B10300). This beta version was obtained from the United States Environmental Protection Agency (EPA) Region 6. This version of AERMET integrates one-minute Automated Surface Observing System (ASOS) wind data with Integrated Surface Hourly Data (ISHD) using the EPA's AERMINUTE program. ISHD and one-minute ASOS wind data were obtained from the National Climactic Data Center (NCDC). The upper air data was obtained from the National Oceanic Atmospheric Administration Earth System Research Laboratory.

Meteorological data from 2006 through 2010 from the Dallas-Fort Worth surface station (Station # 03927) and the Fort Worth upper air station (Station # 03990) were used in these analyses. Missing data from the Dallas-Fort Worth surface station were replaced with available 2006 through 2010 data from the McKinney Airport surface station (Station # 53914). The McKinney Airport was selected because it is the nearest National Weather Service (NWS) station to the lead nonattainment area. The McKinney Airport ISHD and one-minute ASOS wind data were processed in conjunction with Fort Worth upper air data using AERMET. Any hours that contained missing data in the Dallas-Fort Worth input file were replaced with the corresponding hourly data in the McKinney Airport input file when available. Table 3-1: *Missing and Calm Hours in Meteorological Data* lists the number of hours with missing and filled data. A "calm" is defined as a reported wind speed less than three knots.

Table 3-1: Missing and Calm Hours in Meteorological Data

Year	Total Hours	Missing Hours Before Fill	Missing Hours After Fill	Calm Hours Before Fill	Calm Hours After Fill
2006	8760	202	166	28	29
2007	8760	314	294	37	39
2008	8784	211	183	117	119
2009	8760	95	83	19	20
2010	8760	62	42	63	63

3.2.2 Meteorology Sensitivity Analysis

A sensitivity analysis was performed using the base case emissions with unfilled and filled meteorological input data. The rolling 3-month average lead concentrations were compared receptor by receptor. At the location of the highest predicted concentration, the difference in concentration was 0.07%. For all receptors within 1 km of the Exide site, the difference was less than 2% except for five receptors. At those five receptors, the difference was less than 2.5%. Due to the small number of missing hours of data, small number of hours with calms compared to the total number of hours , the highest predicted concentration being at or near the site property line, and the rolling three-month averaging time for predicted concentrations, additional filling of meteorological data would not significantly impact the modeling results.

3.3 BASE CASE ANALYSIS

The base case analysis compared modeled predicted rolling three-month, monthly, and 24-hour average concentrations to monitored concentrations during the same period. The modeled base case was a reasonable attempt to replicate actual conditions. The purpose of modeling actual conditions was to determine if all sources were accounted for and appropriately characterized in the modeling. If all sources were accounted for and characterized, the modeling results should reasonably agree qualitatively with the monitoring data. Qualitative agreement would not be exact agreement between modeled and monitored concentrations in time and space but would represent similarity in concentration trends over time and dispersion patterns in a general area. Once the current actual conditions have been sufficiently replicated, the effectiveness of the control strategies can be estimated through the future case analysis.

3.3.1 Base Case Emissions Inventory

3.3.1.1 Source Characterizations and Emission Rates

Sources 18, 21, 22, 23, 37, 38, 39, 45, and 48, authorized by Exide Permit 1147A, are stacks that were characterized as point sources in the model. Reference Table 3-2: *Exide Source Description List*, for a list of emission points referenced in this proposed SIP revision. The actual height and diameter for each source was modeled. The stack exit temperature and velocity for each source was based on stack test data provided by Exide for each stack. The emission rates modeled were the highest hourly emission rate from the most recent stack test. Stack test-based exit temperatures, velocities, and emission rates were used for the base case analysis because they are representative of actual routine operations.

Emissions from sources 10, 35, 36, 41, 42, 43, 44, 52, and 53, also authorized by Exide Permit 1147A, are all fugitive in nature and were characterized as area sources. Fugitive emissions sources are those emissions that are not emitted to the atmosphere through a vent, stack, or discrete emission point. The dimensions of the sources are representative of the areas where the emissions are generated. The height of release for Exide sources 10, 35, 36, 44, and 52 was based on the height where the emissions escape a structure. The release height for sources Exide 41, 42, and 43 (vehicle traffic) was set to 1 meter, which is a reasonable height for road generated emissions. The release height of source 53 was the height of the conveyance system to the blast furnace.

In order to simplify the modeling analysis, Exide sources 10 and 35 were combined. The modeling analysis used for the lead nonattainment area designation (designation modeling) shows that source 10 has a higher contribution than source 35 at the location of the maximum predicted concentration. The combined emissions from both sources were represented as coming from only source 10. Sources 41, 42, and 43 were also combined. The designation modeling shows that source 41 has a higher contribution than sources 42 or 43 at the location of the maximum predicted concentration. The combined emissions from all three sources were represented as coming from only source 41. A modeling analysis is considered more conservative when all emissions are assumed to come from one source with the highest predicted concentration rather than apportioned to multiple sources.

Sources 11, 12, 13, 14, 15, 16, 17, 24, 25, and 26, authorized by Exide Permit 3048A, are stacks that were characterized as point sources. The actual height and diameter for each source was modeled. The stack exit temperature and velocity for each source was based on stack test data for each stack. The emission rates modeled were the highest hourly emission from the most recent stack test. The rationale for using the stack test results for stack exit temperatures, velocities, and emission rates was the same as for sources authorized by Exide Permit 1147A.

Emissions from sources 27 and 28, also authorized by Exide Permit 3048A, are all fugitive in nature and were characterized as area sources. The dimensions of the sources are representative of the areas where the emissions are generated. The height of release for sources 27 and 28 was based on the height where the emissions escape a structure.

Table 3-2: Exide Source Description List

Emission Point Number	Source Name
10	Furnace Fugitives
11	Oxide Reactor No. 3 Baghouse Stack
12	Oxide Reactor No. 2 Baghouse Stack
13	Oxide Reactor No. 1 Baghouse Stack
14	Oxide Hygiene Baghouse Stack (MELTPOT1, MELTPOT2, MELTPOT3)
15	North Hammerhill Baghouse Stack
16	Oxide Reactor No. 4 Baghouse Stack
17	South Hammerhill Baghouse Stack
18	Hard Lead Ventilation Baghouse Stack
21	Soft Lead Ventilation Baghouse Stack
22	Specialty Alloy Baghouse Stack
23	Refining Building Vacuum Stack
24	Oxide Reactor No. 5 Baghouse Stack
25	Oxide Reactor No. 6 Baghouse Stack
26	Oxide Reactor No. 7 Baghouse Stack
27	West Truck Loading Fugitives
28	East Truck Loading Fugitives
35	Furnace Fugitives
36	Refining/Casting
37	Reverbatory/Blast Furnaces Fugitives Baghouse Stack
38	Reverbatory/Blast Furnaces Metallurgical Scrubber Stack
39	Slag Fixation Baghouse Stack
41	Vehicle Traffic
42	Vehicle Traffic
43	Vehicle Traffic
44	Raw Material Storage
45	Raw Material Storage/Shredder Baghouse Stack
48	Battery Breaker Scrubber Stack
52	Slag Handling
53	Material Handling
999	Battery Breaker Operation

3.3.1.2 Other Sources

In comparing monitoring data to modeling results considering only the sources authorized by Exide Permits 1147A and 3048A, there was a disparity between some actual and predicted concentrations. The actual concentrations were significantly higher than those predicted given certain meteorological conditions. The commission concluded that a source or sources were not accounted for in the modeling. Based on the review and analysis of actual and predicted 24-hour concentrations, there appeared to be an unaccounted source to the south-southeast (SSE) of the Frisco Eubanks monitor (Air Quality System Identification [AQS ID] 480850009). When winds were blowing from the SSE, the Frisco Eubanks monitor tended to record concentrations significantly higher (one order of magnitude higher) than the other two existing monitors which are located northeast and southeast of the Frisco Eubanks monitor. In addition, higher wind speeds from the SSE tended to result in higher monitored concentrations.

Exide management informed TCEQ staff that the unaccounted source could be the fugitive emissions from the battery breaking operation. The fugitive emissions from the battery breaking operations for the lead battery recycling industry were previously believed to be negligible due to the large amount of liquid in the batteries suppressing particulate emissions. However, ambient air monitoring conducted at the Exide Technologies site in Vernon, California, show that emissions from the battery breaker operation provided to the TCEQ by Exide were a large contributor to monitored concentrations.

Monitoring data from Exide's Frisco, Texas, and Vernon, California, sites was used to develop an emission rate from the battery breaker operation for the base case. Data from three monitored samples for each site were considered. The data consisted of the 24-hour average monitored concentration of lead and 1-hour average wind speeds. All six sample days experienced winds predominantly blowing from the battery breaker operation to the monitor. Winds during all six sample days were high enough that atmospheric stability was assumed to be neutral.

The SCREEN3 (version 96043) dispersion screening model was used to estimate the emission rate necessary to result in the monitored concentration given the distance from the operation to the monitor, wind speed, and neutral stability for that day. The source was represented as an area source the size of the battery breaker operation for the appropriate site. The emission rates in pounds per hour (lb/hr) were converted to an emissions flux in pounds per hour per square meter ($lb/hr \cdot m^2$). The six data points were plotted as emission flux ($lb/hr \times m^2$) versus wind speed in miles per hour (mph). A power series correlation was performed on the six data points. The resulting equation to estimate emissions was emission flux = $2.0 \times 10^{-6} \times (\text{wind speed})^{1.9822}$. The correlation coefficient (R^2) value for the correlation was 0.9807 which suggests a strong correlation. An R^2 value of 1 would denote a perfect correlation.

The base case modeling was performed again considering the emissions from the battery breaker operation. The source (999) was represented as an area source with dimensions representative of the operation. Since the emissions from this source were assumed to be wind generated, wind category scalars were used in the modeling to account for this behavior. The scalar values were determined from the equation emission flux = $2.0 \times 10^{-6} \times (\text{wind speed})^{1.9822}$. The scalar values for each upper bound wind speed in meters per second (m/sec) were 1.00 for 1.54 m/sec, 4.03 for 3.09 m/sec, 11.14 for 5.14 m/sec, 28.56 for 8.24 m/sec, and 49.18 for 10 m/sec.

3.3.1.3 Background Sources

The largest nearby source of lead emissions is approximately 50 km from the Exide site with annual reported emissions approximately 10% of the annual emissions reported by Exide. Due to the great distance to the Exide site and the small reported emission rate, no other sources of lead emissions would have a significant contribution near the Exide site or the modeling domain used for this analysis.

3.3.2 Source Input Parameters

Table 3-3: *Base Case Point Source Parameters* contains input parameters for all point sources modeled for the base case. Table 3-4: *Base Case Area Source Parameters* contains input parameters for all area sources modeled for the base case. The total annual lead emissions represented is 4.39 tpy, based on a representative worst case 24-hour period. The modeling assumes that emission rates are continuous 24 hours a day, 365 days a year. Because Exide's process rate varies from day to day, the continuous emissions assumption predicts a higher ambient concentration than would be expected in reality.

Table 3-3: Base Case Point Source Parameters

Source ID	Easting (meters)	Northing (meters)	Elevation (meters)	Height (meters)	Temp (Kelvin)	Velocity (meters per second)	Diameter (meters)	Emission Rate (pound per hour)
11	702713	3668797	194.89	16.76	369	12.04	0.3048	0.0069
12	702713	3668794	194.87	16.76	369	8.50	0.3048	0.0134
13	702713	3668792	194.85	15.85	391	13.17	0.3048	0.0015
14	702721	3668793	194.95	16.76	328	27.96	0.5334	0.0061
15	702725	3668808	195.17	16.76	350	14.17	0.3810	0.0031
16	702718	3668803	195	17.37	369	13.47	0.2530	0.0030
17	702729	3668780	194.88	16.76	355	14.02	0.3810	0.0058
18	702628	3668768	193.7	30.63	313	4.98	1.6154	0.0400
21	702627	3668739	193.59	31.24	311	18.08	1.5210	0.0600
22	702686	3668804	194.63	22.86	304	15.05	0.8108	0.0200
23	702637	3668765	193.77	7.70	351	14.19	0.1778	0.0004
24	702722	3668783	194.85	16.46	369	11.49	0.3810	0.0010
25	702722	3668778	194.8	16.46	358	9.45	0.3810	0.0015
26	702736	3668783	194.97	9.14	355	11.58	0.1524	0.0015
37	702683	3668810	194.63	22.86	309	19.15	1.6764	0.0500
38	702620	3668772	193.65	50.29	315	15.94	1.3716	0.0952
39	702546	3668731	193.17	19.10	0*	45.00	0.4877	0.0530
45	702623	3668714	193.5	32.16	303	12.92	1.8044	0.0700
48	702585	3668771	193.38	15.77	0*	12.28	1.0097	0.0025

*Denotes ambient temperature

Table 3-4: Base Case Area Source Parameters

Source ID	Easting (meters)	Northing (meters)	Elevation (meters)	Height (meters)	East - West Length (meters)	North - South Length (meters)	Rotation Angle	Emission Rate (pounds per hour)
10	702643	3668771	193.87	4.57	28.956	24.384	-2	0.0800
27	702734	3668768	194.80	4.57	0.914	0.914	0	0.0010
28	702756	3668782	195.40	4.57	0.914	0.914	0	0.0010
35	702654	3668740	193.79	4.57	22.860	30.480	-2	0.0000
36	702646	3668755	193.80	4.57	32.004	15.240	-2	0.0100
41	702518	3668769	193.03	1.00	94.488	21.336	40	0.0388
42	702625	3668693	193.42	0.30	80.772	44.196	-2	0.0000
43	702703	3668745	194.26	0.30	62.484	39.624	-2	0.0000
44	702591	3668760	193.42	3.99	24.384	41.148	-2	0.0300
52	702632	3668766	193.72	4.57	21.336	16.764	-2	0.0100
53	702616	3668762	193.58	1.83	16.764	19.812	-2	0.1300
999	702555	3668760	193.21	1.00	40	40	-2	0.0380

3.3.3 Base Case Modeling Results

Table 3-5: *Base Case Source Contribution at Location of Maximum Predicted Concentration* lists the contributions of each source at the location of the maximum rolling three-month predicted concentration in microgram per cubic meter (μg/m^3). These results suggest which sources require controls and to what extent in order for the Exide Frisco Site to operate in compliance with the 2008 lead NAAQS. The sources with the highest contributions are 10, 41, 44, 53, and 999. The contribution of these five sources at the location of the maximum predicted concentration is 1.2922 μg/m^3. The contribution from all other sources is 0.1493 μg/m^3.

The post-processor LeadPost reports results were rounded to three decimal places. In order to display the rolling three-month concentrations to five decimal places, output files from AERMOD using the MAXIFILE option for monthly averages with a reporting threshold of 0.00001 μg/m^3 were generated. The three-month rolling averages to five decimal places were calculated from the monthly averages reported by the MAXIFILE output.

Table 3-5: Base Case Source Contribution at Location of Maximum Predicted Concentration

Source ID	Source Contribution (µg/m3)	Source Contribution Percent of Maximum
10	0.19758	13.71%
11	0.00375	0.26%
12	0.00789	0.55%
13	0.00084	0.06%
14	0.00219	0.15%
15	0.00141	0.10%
16	0.00157	0.11%
17	0.00274	0.19%
18	0.00878	0.61%
21	0.00794	0.55%
22	0.00616	0.43%
23	0.00039	0.03%
24	0.00052	0.04%
25	0.00081	0.06%
26	0.00126	0.09%
27	0.00178	0.12%
28	0.00163	0.11%
36	0.02303	1.60%
37	0.00781	0.54%
38	0.00517	0.36%
39	0.02714	1.88%
41	0.08894	6.17%
44	0.07487	5.19%
45	0.01068	0.74%
48	0.00165	0.11%
52	0.02412	1.67%
53	0.32835	22.78%
999	0.60249	41.80%
ALL	1.44149	100.00%

3.4 FUTURE CASE ANALYSIS

The future case modeling analysis evaluated the proposed emission controls that demonstrate attainment of the 2008 lead NAAQS in the current lead nonattainment area surrounding the Exide site. The emission controls represented in the future case analysis are:

- fully enclose under negative pressure of the battery breaker operation and raw material storage area (sources 44 and 999). This change will eliminate fugitive emissions from these areas. The collected emissions will be routed to a new baghouse (source 10A and 35A);
- fully enclose under negative pressure of the blast furnace and reverberatory furnace areas (sources 10 and 35). This change will eliminate fugitive emissions from these areas. The collected emissions from the blast furnace area will be routed to a new baghouse (source 10A). The collected emissions from the reverberatory furnace area will be routed to a new baghouse (source 35A). In addition, the emissions generated in the reverberatory furnace area will be reduced by replacing the hydraulic ram loader with a rotary screw;
- fully enclose, under negative pressure, the slag handling area, material handling area, and refining/casting area (sources 52, 53, and 36). This change will eliminate the fugitive emissions from these areas. The collected emissions from the slag handling and material handling areas will be routed to a new baghouse (source 10A). The collected emissions from the refining/casting area will be routed to a new baghouse (source 35A);
- relocate the slag treatment building and replacement of the existing slag fixation baghouse (source 39) with a new baghouse. The new baghouse will be fitted with polytetrafluoroethylene (PTFE) membrane media and improved setting design. This change will reduce emissions due to improved emissions collection; and
- reroute the truck traffic (sources 41, 42, and 43). This change will reduce emissions from truck traffic due to the route not going through the process areas. The emissions from the new route (source ROAD) will replace emissions from sources 41, 42, and 43.

Additional emission control measures not taken into consideration for the future case analysis are:

- replacement of bag media, with polytetrafluoroethylene (PTFE) membrane media, in sources 18, 22, 23, and 37. This change would reduce emissions from these sources due to improved collection of particulate matter;
- replacement of tube sheeting in sources 18, 21, 22, 23, 37, and 39. This change would reduce emissions from these sources due improved collection of particulate matter; and
- installation of secondary high efficiency particulate air (HEPA) filtration on all baghouses that receive lead emissions (sources 11 through 18, 21 through26, 37, and 39) except for the reverbatory and blast furnace baghouse (source 38).

The reduction in emissions due to the tube sheeting and new baghouse media has not been quantified due to engineering design specifications not being available. Though a reduction in emissions is expected, no reduction in emissions has been attributed to these emission control measures.

3.4.1 Future Case Emissions Inventory

For the future case, all baghouse stacks associated with the soft lead and hard lead production (sources 18, 21, 22, 23, 37, 38, 39, 45, and 48) were represented exactly as they were for the base case with the exception of the emission rates. The emission rates modeled were based on stack tests data, the production rate at the time of the stack tests, and the maximum permitted daily production of 400 tons of finished lead product. Details of the stack test are contained in Table 3-6: *Stack Test Details from Baghouses Covered Under Permit 1147A.*

Table 3-6: Stack Test Details from Baghouses Covered Under Exide Permit 1147A

Source ID	Modeled Rate (pound per hour)	Stack Test Date	Production (tons per day)	Corrected Max. Rate (pound per hour)	Avg. Test Rate (pound per hour)	Test Rate (pound per hour)
18	0.0275	2003	226	0.0160	0.0090	0.0116
						0.0113
						0.0042
		2005	221	0.0198	0.0110	0.0118
						0.0105
						0.0106
		2007	221	0.0225	0.0124	0.0070
						0.0115
						0.0188
		2009	230	0.0519	0.0298	0.0435
						0.0256
						0.0203
21	0.1743	2003	235	0.7730	0.4542	0.3800
						0.4875
						0.4950
		2005	216	0.0340	0.0184	0.0141
						0.0147
						0.0263
		2007	216	0.4074	0.2200	0.2100
						0.2300
		2009	235	0.0815	0.0479	0.0359
						0.0566
						0.0511
22	0.0086	2003	220	0.0101	0.0056	0.0062
						0.0047
						0.0058
		2005	226	0.0062	0.0035	0.0039
						0.0037
						0.0029
		2007	226	0.0077	0.0043	0.0040
						0.0050
						0.0040
		2009	236	0.0105	0.0062	0.0161
						0.0020
						0.0004

Source ID	Modeled Rate (pound per hour)	Stack Test Date	Production (tons per day)	Corrected Max. Rate (pound per hour)	Avg. Test Rate (pound per hour)	Test Rate (pound per hour)
37	0.0450	2003	235	0.0323	0.0190	0.0199
						0.0169
						0.0202
		2005	221	0.0594	0.0328	0.0234
						0.0370
						0.0380
		2007	221	0.0761	0.0421	0.0541
						0.0350
						0.0372
		2009	236	0.0122	0.0072	0.0098
						0.0026
						0.0093
38	0.1005	2003	230*	0.1658	0.0953	0.0920
						0.0820
						0.1120
		2005	230*	0.0151	0.0087	0.0030
						0.0030
						0.0200
		2007	243	0.1500	0.0911	0.0695
						0.0455
						0.1584
		2009	223	0.0712	0.0397	0.0338
						0.0210
						0.0642
45	0.0688	2003	220	0.0944	0.0519	0.0523
						0.0536
						0.0498
		2005	223	0.0676	0.0377	0.0473
						0.0353
						0.0305
		2007	223	0.0533	0.0297	0.0357
						0.0331
						0.0203
		2009	347	0.0599	0.0519	0.0459
						0.0379
						0.0720

Source ID	Modeled Rate (pound per hour)	Stack Test Date	Production (tons per day)	Corrected Max. Rate (pound per hour)	Avg. Test Rate (pound per hour)	Test Rate (pound per hour)
23	0.0006	2003	226	0.0006	0.0004	0.0004
						0.0003
						0.0004
39	0.0513	2010	230*	0.0513	0.0295	0.0155
						0.0515
						0.0216
48	0.0037	2010	230*	0.0037	0.0021	0.0025
						0.0025
						0.0013

* Default value due to daily production value not being available

Stack test data from 2003, 2005, 2007, 2009, and 2010 were considered for sources 18, 21, 22, 23, 37, 38, 39, 45, and 48. The average emission rate for each stack test and the associated daily production on the date of the stack test were used to calculate a maximum 24-hour emission rate. The average emission rate was multiplied by the maximum permitted daily production divided by actual daily production on the date of the stack test. For example, if the average emission rate for the stack test was 1.0 lb/hr and the daily production on the day of the stack test was 200 tons, then the value 2.0 lb/hr = (1.0 lb/hr) × (400 tons/200 tons) was used. The emission rate modeled for a source was the average rate for all stack tests.

Production data were not available for all stack tests. A default value of 230 tons was used for all days when the daily production value was not available. The average daily production for days during stack tests was 232 tons, therefore 230 tons is a reasonable value.

For source 21, stack tests from 2005, 2007, and 2009 were considered. The data from the 2003 stack tests were not considered as the calculated rates were over a 10 times higher than any other test. Since the 2003 values are so much higher than other tests, they are judged to be anomalies and not indicative of normal operations.

All baghouse stacks associated with the lead oxide reactors (sources 11, 12, 13, 16, 24, and 25) were represented exactly as they were for the base case with the exception of the emission rates. The emission rates modeled were based the stack tests for that source and the maximum permitted hourly production of 2,300 lb/hr of lead oxide. Details of the stack test are contained in Table 3-7: *Stack Test Details from Baghouses Covered Under Exide Permit 3048A*.

Table 3-7: Stack Test Details from Baghouses Covered Under Exide Permit 3048A

Source ID	Modeled Rate (lb/hr)	Stack Test Date	Production (lb/hr)	Corrected Max. Rate (lb/hr)	Avg. Test Rate (lb/hr)	Test Rate (lb/hr)
14	0.0055	1995	No Data Available	0.0055	0.0055	0.0061
						0.0055
						0.0050
26	0.0004	1994	No Data Available	0.0004	0.0004	0.0004
						0.0006
						0.0003
13	0.0012	1994	2232	0.0014	0.0014	0.0015
						0.0013
						0.0014
		1995	2232*	0.0010	0.0010	0.0010
						0.0010
						0.0009
12	0.0043	1994	2227	0.0018	0.0017	0.0029
						0.0012
						0.0011
		1995	2227*	0.0068	0.0066	0.0134
						0.0026
						0.0037
11	0.0021	1994	2173	0.0008	0.0007	0.0005
						0.0006
						0.0011
		1995	2173*	0.0034	0.0032	0.0069
						0.0015
						0.0011
16	0.0014	1994	2227	0.0012	0.0012	0.0008
						0.0015
						0.0012
		1995	2227*	0.0017	0.0016	0.0030
						0.0008
						0.0010

Source ID	Modeled Rate (lb/hr)	Stack Test Date	Production (lb/hr)	Corrected Max. Rate (lb/hr)	Avg. Test Rate (lb/hr)	Test Rate (lb/hr)
24	0.0017	1994	2214	0.0005	0.0005	0.0003
						0.0005
						0.0006
		1995	2214*	0.0030	0.0029	0.0070
						0.0006
						0.0010
25	0.0010	1994	2192	0.0014	0.0013	0.0015
						0.0012
						0.0013
		1995	2192*	0.0007	0.0007	0.0009
						0.0005
						0.0006
17	0.0017	1994	6639	0.0030	0.0029	0.0058
						0.0023
						0.0005
		1995	6639*	0.0005	0.0005	0.0005
						0.0007
						0.0003
15	0.0025	1994	6460	0.0023	0.0022	0.0015
						0.0029
						0.0021
		1995	6460*	0.0027	0.0025	0.0028
						0.0031
						0.0017

* Default value due to daily production value not being available

The remaining baghouses associated with lead oxide production (sources 14, 15, 17, and 26) were represented exactly as they were for the base case with the exception of the emission rates. The emission rates modeled were based the stack tests for that source and the maximum permitted hourly production of 6,900 pound per hour of lead oxide.

The maximum hourly rates are used for the lead oxide sources rather than a 24-hour rate because there are only hourly and annual production limits in the existing permit 3048A.

Stack test data from 1994 and 1995 were considered for sources 11, 12, 13, 14, 15, 16, 17, 24, 25, and 26. The 1994 and 1995 data were the only data available. The average emission rate for each stack test and the associated hourly production on the date of the stack test were used to calculate a maximum hourly emission rate. The average emission rate was multiplied by the maximum permitted hourly production divided by actual hourly production during the stack test. For example, if the average emission rate for the stack test was 1.0 lb/hr and the hourly production during the stack test was 1,000 lb/hr, then the value 2.3 lb/hr = (1.0 lb/hr) × (2,300 lb/1,000 lb) was used. The emission rate modeled for a source was the average rate for all stack tests for that source.

Production data were not available for the 1995 stack tests. The production values for the 1994 stack test were assumed to be typical and were used with the 1995 stack test data.

Emissions from the sources 27, 28, and ROAD (vehicle traffic), are all fugitive in nature and were characterized as area sources. The dimensions of the sources are representative of the areas were the emissions are generated. The height of release for sources 27 and 28 is based on the height where the emissions escape a structure. The release height for source ROAD was set to 1 meter, which is a reasonable release height for road generated emissions.

The emission rate used for source 27 was based on a maximum hourly loading rate of 12 tons per hour (tons/hr) of lead oxide. The emission rate used for sources 28 was based on a maximum hourly loading rate of 24 tons/hr of lead oxide. The emission rate used for source ROAD was based on the anticipated number of vehicles.

3.4.2 Background Sources

The largest nearby source of lead emissions is approximately 50 km from the Exide site with annual reported emissions approximately 10% of the annual emissions reported by Exide. Due to the distance from the Exide site and the small reported emissions, no other sources of lead emissions would have a significant contribution near the Exide site or the modeling domain used for this analysis.

3.4.3 Source Input Parameters

Table 3-6: *Future Case Point Parameters* contains input parameters for all point sources modeled for the future case. Table 3-7: *Future Case Area Source Parameters*, Table 3-8: *Future Case AreaPoly Source Parameters,* and Table 3-9: *Vertices of AreaPoly Source ROAD* all contain input parameters for all area sources modeled for the future case. The total annual lead emissions represented is 2.39 tons and is based on a representative worst case 24-hour period. The modeling assumes that emission rates are continuous 24 hours a day, 365 days a year. In reality, the process rate varies from day to day.

Table 3-8: Future Case Point Parameters

Source ID	Easting (meters)	Northing (meters)	Elevation (meters)	Height (meters)	Temp (Kelvin)	Velocity (meters per second)	Diameter (meters)	Emission Rate (pound per hour)
11	702713	3668797	194.89	16.76	369	12.04	0.3048	0.0021
12	702713	3668794	194.87	16.76	369	8.50	0.3048	0.0043
13	702713	3668792	194.85	15.85	391	13.17	0.3048	0.0012
14	702721	3668793	194.95	16.76	328	27.96	0.5334	0.0055
15	702725	3668808	195.17	16.76	350	14.17	0.3810	0.0025
16	702718	3668803	195.00	17.37	369	13.47	0.2530	0.0014
17	702729	3668780	194.88	16.76	355	14.02	0.3810	0.0017
18	702628	3668768	193.70	30.63	313	4.98	1.6154	0.0275
21	702627	3668739	193.59	31.24	311	18.08	1.5210	0.1743
22	702686	3668804	194.63	22.86	304	15.05	0.8108	0.0086
23	702637	3668765	193.77	7.70	351	14.19	0.1778	0.0006
24	702722	3668783	194.85	16.46	369	11.49	0.3810	0.0017
25	702722	3668778	194.80	16.46	358	9.45	0.3810	0.0010
26	702736	3668783	194.97	9.14	355	11.58	0.1524	0.0004
37	702683	3668810	194.63	22.86	309	19.15	1.6764	0.0450
38	702620	3668772	193.65	50.29	315	15.94	1.3716	0.1005
39	702659	3668833	194.34	30.48	0*	21.560	0.9144	0.0513
45	702623	3668714	193.50	32.16	303	12.92	1.8044	0.0688
48	702585	3668771	193.38	15.77	0*	12.28	1.0097	0.0037
10A	702636	3668804	193.96	30.48	0*	16.82	1.5240	0.0103
35A	702683	3668739	194.00	30.48	0*	19.80	2.1336	0.0238
48A	702618	3668794	193.70	15.77	0*	12.28	1.5240	0.0047

* Denotes ambient temperature

Table 3-9: Future Case Area Source Parameters

Source ID	Easting (meters)	Northing (meters)	Elevation (meters)	Height (meters)	East - West Length (meters)	North - South Length (meters)	Rotation Angle	Emission Rate (lb/hr)
27	702734	3668768	194.80	4.57	0.914	0.914	0	0.0006
28	702756	3668782	195.40	4.57	0.914	0.914	0	0.0013

Table 3-10: Future Case AreaPoly Source Parameters

Source ID	Easting (meters)	Northing (meters)	Elevation (meters)	Height (meters)	Vertices	Emission Rate (lb/hr)
ROAD	702532	3668809	193.02	1.00	9	0.0017

Table 3-11: Vertices of AreaPoly Source ROAD

Vertex	Easting (meters)	Northing (meters)
1	702532	3668809
2	702807	3668880
3	702811	3668755
4	702867	3668755
5	702865	3668778
6	702830	3668776
7	702825	3668904
8	702527	3668833
9	702532	3668812

3.4.4 Future Case Modeling Results

The maximum predicted three-month rolling concentration for the future case was 0.147 µg/m^3 (0.14739 µg/m^3). The post-processor LeadPost reports results were rounded to three decimal places. In order to display the three-month rolling concentrations to five decimal places, output files from AERMOD using the MAXIFILE option for monthly averages with a reporting threshold of 0.00001 µg/m^3 were generated. The three-month rolling averages to five decimal places were calculated from the monthly averages reported by the MAXIFILE output.

Since the maximum predicted three-month rolling concentration is less than 0.15 µg/m^3, attainment of the 2008 lead NAAQS is expected, based upon implementation of proposed emission controls.

Table 3-10: *Future Case Source Contribution at Location of Maximum Predicted Concentration* lists the contributions of each source at the location of the maximum rolling 3-month predicted concentration.

Table 3-12: Future Case Source Contribution at Location of Maximum Predicted Concentration

Source ID	Source Contribution (µg/m3)	Source Contribution Percent of Maximum
10A	0.00378	2.56%
11	0.00139	0.94%
12	0.00294	1.99%
13	0.00080	0.54%
14	0.00282	1.91%
15	0.00150	1.02%
16	0.00090	0.61%
17	0.00098	0.67%
18	0.00957	6.49%
21	0.04009	27.20%
22	0.00413	2.80%

Source ID	Source Contribution (µg/m3)	Source Contribution Percent of Maximum
23	0.00052	0.35%
24	0.00105	0.71%
25	0.00062	0.42%
26	0.00032	0.22%
27	0.00059	0.40%
28	0.00134	0.91%
35A	0.00712	4.83%
37	0.01424	9.66%
38	0.00891	6.04%
39	0.01902	12.91%
45	0.01843	12.50%
48	0.00255	1.73%
48A	0.00157	1.07%
ROAD	0.00221	1.50%
ALL	0.14739	100.00%

3.5 REFERENCES

1. "ADEC Guidance re AERMET Geometric Means, How to Calculate the Geometric Mean Bowen Ratio and the Inverse-Distance Weighted Geometric Mean Surface Roughness Length in Alaska," Alaska Department of Environmental Conservation, Revised June 17, 2009.
2. "AERSURFACE User's Guide", EPA-454/B-08-001, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Air Quality Assessment Division, Air Quality Modeling Group, Research Triangle Park, North Carolina, January 2008.
3. "NLCD 1992/2001 Retrofit Land Cover Change Product", website http://www.mrlc.gov/multizone.php, U.S. Department of the Interior, U.S. Geological Survey, February 25, 2008.

CHAPTER 4: CONTROL STRATEGY AND REQUIRED ELEMENTS

4.1 INTRODUCTION

The Collin County nonattainment area for the 2008 lead National Ambient Air Quality Standard (NAAQS) consists of a 1.28 square mile area surrounding the Exide Technologies, Inc. (Exide) lead-acid battery recycling operations in Frisco, Texas. Exide is the sole contributor to ambient air lead emissions in the area. In addition to permits 1147A and 3048A held by Exide for the secondary lead smelting and lead oxide operations at the lead-acid battery recycling facility, the Texas Commission on Environmental Quality (TCEQ) has made control measures and contingency measures enforceable through agreed orders adopted as part of the 1993 Lead state implementation plan (SIP) for Collin County, the 1999 Collin County Redesignation and Maintenance Plan for Lead, and the 2009 Collin County Maintenance Plan for Lead.

As part of this proposed SIP revision, the TCEQ is pursuing Agreed Order 2011-0521-MIS as a means to establish enforceable control measures and operational work practices to reduce lead emissions from point and fugitive lead-dust sources in support of achieving attainment of the 2008 lead NAAQS by the December 31, 2015, compliance date.

In support of the agreed order and SIP revision, the TCEQ commissioned third-party contractor Eastern Research Group, Inc. (ERG) to perform a comprehensive evaluation of air quality control technologies for lead-acid battery recycling operations with secondary lead smelters and lead oxide facilities. On April 25, 2011, ERG submitted their report, *Comprehensive Evaluation of Air Quality Control Technologies used for Lead-Acid Battery Recycling* (http://www.tceq.texas.gov/airquality/sip/stakeholders/pb_stakeholder). The report evaluated available control measures and work practices for the reduction of lead emissions from point sources and fugitive lead-dust emissions and identified control measure recommendations specific to the sources of lead emissions at the Exide facilities. The TCEQ has analyzed the recommended control technologies and measures in the report and is proposing as part of Agreed Order 2011-0521-MIS those measures that were found to advance attainment as soon as practicable and meet the criteria of reasonably available control technology (RACT) and reasonably available control measures (RACM). For further information regarding individual control measures please see Appendix D: *Reasonably Available Control Technology and Reasonably Available Control Measure Analysis.*

This chapter describes existing lead emission control measures in place at Exide, control measures implemented as part of the agreed order associated with this proposed SIP revision, as well as how Texas is proposing to meet lead nonattainment area SIP requirements of RACT, RACM, and contingency measures.

4.2 EXISTING CONTROL MEASURES

30 Texas Administrative Code (TAC) Chapter 113 previously incorporated the existing federal regulations for control of hazardous air pollutants (HAP) from lead smelting facilities that include the National Emission Standards for Hazardous Air Pollutants (NESHAP) for secondary lead smelting (40 Code of Federal regulations [CFR] Part 63, Subpart X). The United States Environmental Protection Agency (EPA) published a proposed revision to NESHAP for secondary lead smelting in the May 19, 2011 *Federal Register* (76 FR 29032). In addition, Texas has maintained enforceable controls measures for Exide through a series of agreed orders for the facility. Prior to being operated by Exide, the secondary lead smelter and battery recycling facility in Frisco, Texas, was operated by Gould National Battery, Inc., and by GNB Technologies, Inc (GNB). In 1992, GNB entered into Agreed Board Order 92-09(k) with the

Texas Air Control Board (TACB), a predecessor agency to the TCEQ, and special provisions were included in amendments to Air Quality Permits R-1147A and R-5466D to assure maintenance of the 1978 lead NAAQS and to resolve notices of violations regarding exceedances of the 1978 lead NAAQS.

GNB subsequently amended Air Quality Permits 1147A and issued new permit 3048A to incorporate provisions in Agreed Board Order 92-09(k) (Order 92-09k) as permanent and enforceable control measures. The maximum allowable emission rate of lead in these permits ensured that lead emissions would not exceed 4.27 tons per year (tpy). In 1993, GNB entered into Agreed Board Order 93-12 (Order 93-12) with the TACB to establish contingency measures related to the 1993 Lead SIP for Collin County.

As part of the 1999 Collin County Redesignation and Maintenance Plan for Lead, GNB entered into Agreed Order 99-0351-SIP, which terminated Orders 93-12 and 92-09(k); however, GNB agreed to continue implementation of these measures, or to implement additional measures or control technologies proposed by GNB that were judged by the TCEQ executive director to be similarly effective in controlling lead emissions from the plant. Exide acquired the GNB plant in Collin County in 2000.

The state maintained permanence of the earlier reductions through Agreed Order 2009-0071-MIS, in which Exide agreed to abide by representations made by GNB to continue implementation of the requirements of paragraph eight in Order 92-09(k) as incorporated in permits 1147A and 3048A or to implement additional proposed measures or control technologies judged by the executive director to be similarly effective in controlling lead emissions from the plant.

In 2009, Exide entered into Agreed Order 2009-0071-MIS with the executive director as part of the second ten-year maintenance plan for the 1978 lead NAAQS. As part of that agreed order, Exide agreed to continue implementation of measures previously implemented. Exide also agreed to maintain records for the period of the second ten-year maintenance plan (2009 through 2019) and make those records available upon request by the TCEQ or any other air pollution control agency with jurisdiction.

Below is a list of the existing control measures applicable to the Collin County lead nonattainment area under Agreed Order 2009-0071-MIS:

- addition of a supplemental ventilation baghouse to the reverberatory and blast furnace metallurgical operations area;
- installation of covers over blast furnace bins and water spray system over the bin area;
- installation of a baghouse and supporting ventilation and ducting at the raw materials storage building;
- installation of a feed dryer and baghouse at the reverberatory furnace charging area to reduce the possibility of reverberatory furnace explosions due to wet feed;
- development and implementation of a detailed site operation and maintenance plan for all site baghouse operations;
- installation of a Tri-bo Flow® System in all baghouse ducts to detect upset emissions;
- maintenance of compliance with all emission limits and standard operating procedures for process sources, process fugitive sources, and fugitive dust sources from the National Emissions Standards for Hazardous Air Pollutants from Secondary Lead Smelters under 40 CFR Part 63 Subpart X;
- maintenance of records from the second (2009) maintenance plan sufficient to demonstrate compliance with control measures and requirements under the Agreed Orders;

- restrictions on any increase in actual emissions above 4.27 tpy without qualification and approved amendments to permits 1147A and 3048A or through a the issuance of a new permit pursuant to 30 TAC Chapter 116, along with executive director approved dispersion modeling demonstrating that such an increase will not cause a violation of the lead NAAQS; and
- continue to maintain all air pollution control and monitoring equipment in good working order and operate it properly during normal operation.

In addition to the above control measures, Agreed Order 2009-0071-MIS includes contingency measures to be implemented in the event that an exceedance of the 1978 lead NAAQS is measured at any TCEQ ambient air quality monitoring site in Collin County, or Exide reports an exceedance of 4.27 tpy in the annual emissions inventory and that exceedance of 4.27 tpy was not the result of a permitted increase in lead emissions. If at any time during the second 10-year maintenance period one of the above exceedances occurs, Exide will implement one of the following contingency measures within 180 days of notification by the executive director:

- automation of the scale and feed for the reverberatory furnace;
- installation of water misting dust suppression system beyond the system already required under permit 1147A; or
- an alternative measure proposed by Exide that results in emission reductions which, at a minimum, must be equivalent to the emissions reductions achievable by the above contingency measures and approved by the executive director.

4.3 RACT AND RACM ANALYSIS

As published in the November 12, 2008, issue of the *Federal Register* (73 FR 67035), states containing areas designated as nonattainment are required to submit a SIP revision demonstrating that the associated enforceable control measures fulfill the RACT and RACM requirements for sources of ambient lead concentrations.

In the September 17, 1979, issue of the *Federal Register* (44 FR 53762) RACT is defined as the lowest emissions limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility. Section 172(c)(1) of the Federal Clean Air Act (FCAA) requires states to provide for implementation of all RACM, including RACT, as expeditiously as practicable. In the General Preamble for implementation of the FCAA Amendments published in the April 16, 1992, issue of the *Federal Register* (57 FR 13498), the EPA explains that it interprets §172(c)(1) of the FCAA as a requirement that states incorporate into their SIP all RACM that would advance a region's attainment date. However, regions are obligated to adopt only those measures that are reasonably available for implementation considering local circumstances. In the preamble for the lead NAAQS final rule (73 FR 67035, November 12, 2008) the EPA provided guidelines to help states determine which measures should be considered reasonably available:

> *If it can be shown that measures, considered both individually as well as in a group, are unreasonable because emissions from the affected sources are insignificant (i.e. de minimis), than the measures may be excluded from further consideration...the resulting control measures should then be evaluated for reasonableness, considering their technological feasibility and the cost of control in the area to which the SIP applies...In the case of public sector sources and control measures, this evaluation should consider the impact of the reasonableness of the measures on the municipal, or other governmental entity that must assume the responsibility for their implementation.*

The TCEQ used a two-step process to develop the list of potential control strategies evaluated during the RACT and RACM analyses. First, the TCEQ developed a draft list of potential control strategy concepts based on an evaluation of the existing point and fugitive sources of lead at Exide, the one contributing lead source in the Collin County lead nonattainment area. The draft list of potential control strategy concepts was presented to stakeholders for comment at a stakeholder meetings held in Frisco, Texas, on January 19, 2011. The TCEQ requested comment on the potential control strategies and invited stakeholders to suggest any additional strategies that might help advance attainment of the Collin County nonattainment area. The final list of potential control strategy concepts for the RACT and RACM analyses includes the strategies presented to stakeholders, the strategies suggested by stakeholders during the informal stakeholder comment process, and control measures proposed or implemented at similar secondary lead smelting facilities in other states.

Each potential control measure identified through this control strategy development process was evaluated to determine if the measure would meet established criteria to be considered reasonably available. In addition to the criteria previously mentioned, the TCEQ also considered whether the potential control measure could be implemented prior to the November 1, 2012, date that Collin County must begin monitoring attainment in order to meet the December 31, 2015, attainment date. As such, suggested control measures that could not be implemented by November 1, 2012, were not considered RACM because the measures would not advance attainment. However, Collin County must make progress toward attainment of the 2008 lead NAAQS as expeditiously as practicable. Therefore, if a control measure can be implemented earlier than November 1, 2012, and will help the area make progress toward attainment of the 2008 lead NAAQS earlier than November 1, 2012, the measure should be implemented as early as feasible.

The TCEQ also considered whether the control measure was similar or identical to control measures already in place at Exide. If the suggested control measure would not provide substantive and quantifiable benefit over the existing control measure, then the suggested control measure was not considered RACM because comparable reasonable controls were already in place. The control measures determined to be RACT or RACM would be made enforceable through the adoption by the commission of Agreed Order 2011-0521-MIS.

4.3.1 Results of RACT and RACM Analysis

For RACM analysis, all potential applicable control measures for lead source types relevant to the Collin County lead nonattainment area were evaluated to determine if these control measures could be considered RACT and RACM and that the current proposed control measures outlined in this SIP revision fulfill the EPA RACT and RACM requirements (73 FR 67036).

In order to develop a comprehensive list of potential control strategies for the RACT and RACM analysis, the commission solicited comment and input from stakeholders, including an informal comment and discussion at a stakeholder meeting held in Frisco, Texas, on January 19, 2011. In addition, the commission evaluated existing and potential measures at the Exide facility in Frisco and analyzed control measures proposed or implemented at similar secondary lead smelting facilities in other states. This analysis included the evaluation of existing and proposed control measures at similar facilities such as the Exide Technologies facility in Vernon, California; the Quemetco, RSR facility in City of Industry, California; Gopher Resources in Eagan, Minnesota; Exide Technologies in Muncie, Indiana; and the Envirofocus facility in Tampa, Florida. The TCEQ also commissioned a study of *Air Control Technologies for Lead-Acid Battery Recycling* by ERG and analyzed the control measures contained in the South Coast

Air Quality management District Rule 1420.1, Emissions Standard for Lead from Large Lead-Acid Battery Recycling Facilities.

Please see Appendix D: *Reasonably Available Control Technology and Reasonably Available Control Measure Analysis* for a complete list of control measures and RACT and RACM determinations.

4.3.1.1 RACT and RACM Determination

The TCEQ has determined that full enclosures with negative ventilation sufficient to ensure that area fugitive emissions are routed to a high efficiency control device, in most cases a polytetrafluoroethylene (PTFE) membrane baghouse, is RACM and RACT for secondary lead smelting operations, including battery breaking operations, blast and reverberatory furnaces, refining and casting operations, slag treatment and fixation, and raw materials storage and handling areas. For some operations, high efficiency cartridge filters are used instead of high efficiency PTFE membrane baghouses. Due to equivalent control efficiencies, cartridge filters used in place of PTFE membrane baghouses are considered RACM (including RACT).

The TCEQ has determined that operational work practices and housekeeping requirements that minimize fugitive lead-dust emissions to the ambient air, including traffic plans for materials loading and unloading, traffic plans that avoid areas with the potential to create fugitive lead-dust, inspection and immediate removal of leaking lead-acid batteries upon delivery, and the cleaning of equipment that is contaminated with lead inside of a permanent total enclosure prior to moving such equipment to a maintenance building is RACM and RACT for lead-acid battery recycling operations with secondary lead smelting and lead oxide operations.

The TCEQ has determined that wet scrubbers for battery breaker operations stacks and metallurgical scrubbers for furnace operations stacks with high efficiency PTFE membrane baghouses is RACM and RACT.

The TCEQ has determined that partial enclosure with negative pressure hooding and ducting to high efficiency PTFE membrane baghouses of lead oxide operations areas is RACM and RACT. The small amount of fugitive lead-dust emissions associated with these operations justifies partial enclosures of lead oxide operational areas as a reasonable control measure.

The TCEQ has determined that wet electrostatic precipitation (WESP) is not RACM or RACT for lead-acid battery recycling operations with secondary lead smelting and lead oxide operations. WESP is not considered to be RACM or RACT due to its high cost and unproven performance with large particle sizes in the stack emissions of some secondary lead smelting operations. WESP has been installed at other facilities that include secondary lead smelting operations in the United States to comply with the AB2588 Toxics Hot Spots program, a unique regulatory requirement which specifically addresses cancer risk from arsenic and other heavy metal emissions. In that case, WESP may be a reasonable control technology and measure for facilities that operate electric arc furnaces (EAF) as part of the secondary lead smelting process. EAFs operate at much higher temperatures (2500-3000 degrees Fahrenheit) than the blast furnaces used at Exide in Frisco. This higher heat volatilizes compounds such as arsenic and other heavy metals, while arsenic and other heavy metals (such as lead) are not volatilized in secondary lead smelting operations using blast and reverberatory furnaces. There is not sufficient information to substantiate that WESP is reasonable for secondary lead smelting facilities using blast and reverberatory furnaces at the additional cost of $17 to $25 million with the potential associated lead reduction efficiencies estimated at 85 to 95%. In addition, the time required to design and install a WESP system would not allow for the associated lead emission reductions to be implemented before the date require for attainment of the NAAQS, disqualifying WESP as RACT and RACM.

Agreed Order 2011-0521-MIS, which is associated with this SIP revision, requires the installation of high efficiency particulate air (HEPA) filters where technologically feasible as secondary control measures in addition to the primary control measure of high efficiency PTFE baghouses. The TCEQ has determined that the combination of HEPA filters as secondary control measures in addition to high efficiency PTFE membrane baghouses is not RACT or RACM. The level of estimated reductions and cost per ton of reductions of lead emissions associated with the addition of HEPA filters as a secondary control measure is not reasonable when compared to the reduction of lead emissions from the primary control of high efficiency PTFE baghouses used alone. This requirement is included in Agreed Order 2011-0521-MIS as a voluntary control measures and is beyond RACT and RACM.

The TCEQ has determined that full enclosure of lead oxide operations in conjunction with negative ventilation sufficient to ensure that area fugitives are routed to a high efficiency control device is neither RACM nor RACT. The amount of fugitive lead-dust emissions associated with lead oxide operations is insignificant and not sufficient to justify the determination of this control measure as RACM or RACT.

The TCEQ has determined that partial enclosure of lead oxide operations areas in conjunction negative pressure hooding and ducting to high efficiency PTFE membrane baghouses is RACM and RACT. The small amount of fugitive lead-dust emissions associated with these operations justifies partial enclosures of lead oxide operational areas as a reasonable control measure.

The TCEQ has determined that the replacement of the hydraulic ram with a rotary screw feeder for the reverberatory furnace charging process is not RACM or RACT because it is not economically feasible given the minimal estimated emissions reductions. The level of reductions and cost per ton of reductions of fugitive lead-dust emissions associated with this control measure is not reasonable for all secondary lead smelters. In addition, any emissions associated with this source would be controlled through the furnace area enclosure. The measure was included in the Agreed Order as a voluntary control measure to advance and maintain attainment as expeditiously as practicable and is beyond RACT and RACM.

4.4 NEW CONTROL MEASURES

The new control measures needed for this proposed SIP revision to demonstrate attainment for the 2008 lead NAAQS in the Collin County nonattainment area would be made enforceable by Agreed Order 2011-0521-MIS.

Agreed Order 2011-0521-MIS includes primary control measures and the associated implementation schedule as well as contingency measures to be triggered in the event of an exceedance "condition" (as defined in Agreed Order stipulation #10) of the 2008 lead NAAQS after November 1, 2012.

Primary control measures for attainment are included in the Agreed Order under order stipulations 15 through 27. Following is a list of primary control measures incorporated in the agreed order and their associated implementation dates.

- Relocate the slag treatment building to a location adjacent to the furnace and refining operations to reduce fugitive emissions. Replace the existing baghouse at the slag fixation operation stack (source 39) with a new baghouse fitted with PTFE membrane media and improved seating design or an equivalent or superior design if approved by the executive director, to be accomplished as expeditiously as practicable but no later than March 31, 2012. All baghouses must be maintained in good working order at all times.

- Fully enclose the battery breaker and covered raw materials storage area. This change will include the full enclosure of the battery breaker operations and contiguous covered raw materials storage area, the installation of negative pressure ventilation sufficient to ensure that the battery breaker and covered raw materials storage area fugitives are routed to the new baghouse, the installation of a new point source, and installation of a new baghouse with PTFE filter media and improved seating design bags, or an equivalent or superior design if approved by the executive director. The enclosure performance shall be consistent with the requirements of 40 CFR §§63.544(b) and 63.547(e) as of March 7, 2011. This measure is to be completed and operational as expeditiously as possible but no later than March 31, 2012.
- Fully enclose and place under negative pressure ventilation the blast and reverberatory furnace area, including the refining/casting area (sources 10, 35, 36, and 37) as expeditiously as possible, but no later than November 1, 2012. This change will include the full enclosure of the blast and reverberatory furnace area, including the refining/casting area, the installation of negative pressure ventilation sufficient to ensure that blast and reverberatory furnace area fugitives, along with the refining/casting area fugitives are routed to the new baghouse, the installation of a new point source, and installation of a new baghouse with PTFE filter media and improved seating design bags or an equivalent or superior design if approved by the TCEQ. The enclosure performance shall be consistent with the requirements of 40 CFR §§63.544(b) and 63.547(e) as of March 7, 2011.
- Complete the retrofitting of baghouses (sources 18, 21, 22, 23, 37, 38). Exide will replace all bags in the identified baghouses with PTFE membrane media and replace all of the baghouse tube sheets with improved seating design as expeditiously as possible, but no later than April 30, 2011, or an equivalent or superior design if approved by the executive director. All baghouses must be maintained in good working order at all times.
- Operate under a traffic plan for trucks unloading batteries at the facility and for traffic to, from, and across the on-site landfill. Exide will relocate the spent battery loading docks to the north side of the battery breaker operation and reconfigure the traffic route such that the spent battery delivery trucks enter and leave along the north route and never enter the center of the facility. Traffic excluded from this plan includes chemical delivery trucks, plant service vehicles, and other scrap delivery vehicles. This measure is to be completed and operational as expeditiously as possible, but not later than March 31, 2012.
- Replace the existing seals on the blast furnace “doghouse” emissions capture and ventilation hooding system (source 10) as expeditiously as possible, but no later than April 30, 2011.
- Replace the reverberatory furnace (source 35) hydraulic ram feeder with a rotary screw as expeditiously as possible but no later than April 30, 2011.
- Install a non-fouling area misting system in the blast and reverberatory furnace area (sources 10 and 35) as expeditiously as possible, but no later than July 31, 2011. This misting system will stay in place until the furnace area enclosure is completed and the negative ventilation is operational.
- Fix and seal all holes and cracks greater than 15 square centimeters in surface area and at least 1.0 centimeter wide along the entire length of the opening in the existing secondary lead process and lead oxide operational area enclosures as expeditiously as possible but no later than March 31, 2012. Holes and cracks are defined as unintended openings in roofs and walls that occur due to corrosion or damage.
- Install secondary HEPA filtration at all of the baghouses that receive lead emissions (sources 11 through 18, 21 through 26, and 37 through 39) as expeditiously as possible, but no later than November 31, 2012. All filters shall be HEPA filters rated by the manufacturer to

achieve a minimum of 99.97% capture efficiency for 0.3 micron particles and larger. For the full enclosures with negative ventilation, at least once each shift with each event not less than four hours apart, negative pressure monitoring must be conducted according to 40 CFR §§63.544(b) and 63.547(e) as of March 7, 2011.

- Notification to the TCEQ's Chief Engineer's Office prior to submitting an application for a permit amendment that would allow Exide to increase site-wide actual lead emissions above currently permitted levels in order to determine whether an amendment to Agreed Order 2011-0521-MIS or issuance of a new agreed order with corresponding SIP revisions are needed.
- Continued maintenance of all air pollution abatement equipment to the level of good working order.
- Upon receipt, any lead acid battery or palletized group of batteries that is cracked or leaking and is readily visible without removing shipping material, shall immediately be sent to the battery breaking area for processing or stored in a full enclosure kept under negative pressure with emissions routed to a control device.
- Replace the existing roll-up doors in the raw material storage building, as expeditiously as possible but no later than November 1, 2012.
- Process or mobile equipment that is contaminated with lead shall be initially cleaned inside of a permanent total enclosure prior to being moved to the maintenance building. This measure shall be implemented by March 31, 2012.

Contingency measures are included under Agreed Order 2011-0521-MIS stipulations 10(A) and 10(B). In the event that on or after the three-month period beginning November 1, 2012, an exceedance of the 2008 lead NAAQS is monitored at any TCEQ-approved ambient monitor, Exide will be required to implement one or more of the following contingency measures as soon as is expeditiously practicable.

- Full enclosure of the lead oxide operational area and installation of negative pressure ventilation and either a baghouse or cartridge filter (sources 11 - 17, 24-26, 46, 56-58). This will include the full enclosure of the lead oxide operational area, the installation of negative pressure ventilation sufficient to ensure that lead oxide operational area fugitives are routed to the new baghouse, the installation of a new point source, and installation of a new baghouse with PTFE filter media and improved seating design bags (see Attachment A), or equivalent or superior design if approved by the TCEQ. The enclosure performance shall be consistent with the requirements of 40 CFR §63.544(b) and 63.547(e) as of March 7, 2011.
- Installation of vacuum hooding over lead oxide loading operations (currently Sources 27 and 28).
- Designate that wheeled and powered plant equipment such as forklifts used inside a fully enclosed area will not be used outside of such an area.

4.5 MONITORING NETWORK

States are required by 40 CFR, Part 58, Subpart B, to submit an annual air monitoring network review (ANR) to the EPA by July 1 of each year. This network review is required to provide the framework for establishment and maintenance of an air quality surveillance system. The annual monitoring network review must be made available for public inspection and comment for at least 30 days prior to submission to the EPA. The review and any comments received during the 30-day inspection period are then forwarded to the EPA for final review and approval. The TCEQ posted the 2010 plan for public comment from June 1 through June 30, 2010. The TCEQ then submitted the plan to the EPA on July 1, 2010, for review and approval. The ANR document presented the current Texas network of ambient air quality monitors in Texas for which the TCEQ uploads data to the EPA's Air Quality System (AQS), a national database of air quality data.

4.5.1 Lead Monitoring Sites in Frisco

From 1981 until mid-1999, the TCEQ monitored lead levels at a residential location on Hickory Street in Collin County, Texas (EPA AQS site identification code 480850001), approximately one-half mile northeast of the Exide plant. Monitoring site 480850007, located at 6931 Ash Street, replaced the Hickory Street site in mid-1999. Monitor 480850007 is a population-oriented site located in a neighborhood. Another site (480850009) was located on Exide property inside Exide's security fence near the northern property line, and a third site (480850003) was located on Exide property outside Exide's security fence west of 5th Street. In July 2010, after meeting with the EPA to determine a location that EPA-Region 6 found acceptable for the maximum-concentration, source-oriented monitor required by the rule establishing the 2008 lead NAAQS, 480850009 was moved off Exide property and outside the company's security fence so that it could be used to monitor ambient air. As defined in Title 40 Code of Federal Regulations (CFR) Part 50.1, ambient air means that portion of the atmosphere, external to buildings, to which the general public has access. To meet EPA criteria for regulatory ambient air monitoring data, the following EPA criteria must be met:

- use federal reference method (FRM), federal equivalent method (FEM), or approved regional methods (ARM) (40 CFR Part 58, Appendix C);
- meet siting criteria (40 CFR Part 58, Appendix E);
- meet quality assurance (QA) requirements (40 CFR Part 58, Appendix A); and
- meet data certification criteria (40 CFR Part 58, Subpart B).

Monitoring site 480850009 is currently located approximately 15 feet north of its previous location on the exterior side of the Exide property fence line. In August 2010, site 480850003 moved to the east side of 5th Street in Frisco, and is now located on City of Frisco property.

In addition to the monitors required by the EPA, the TCEQ installed a fourth lead monitor (480850029) located south of the Exide plant at the Frisco Police Station on Stonebrook Parkway. Site 480850029 commenced operations in January of 2011.

Figure 4-1: *Collin County Lead (Pb) Nonattainment Area* shows ambient lead monitoring locations in the Collin County lead nonattainment area, Frisco, Texas.

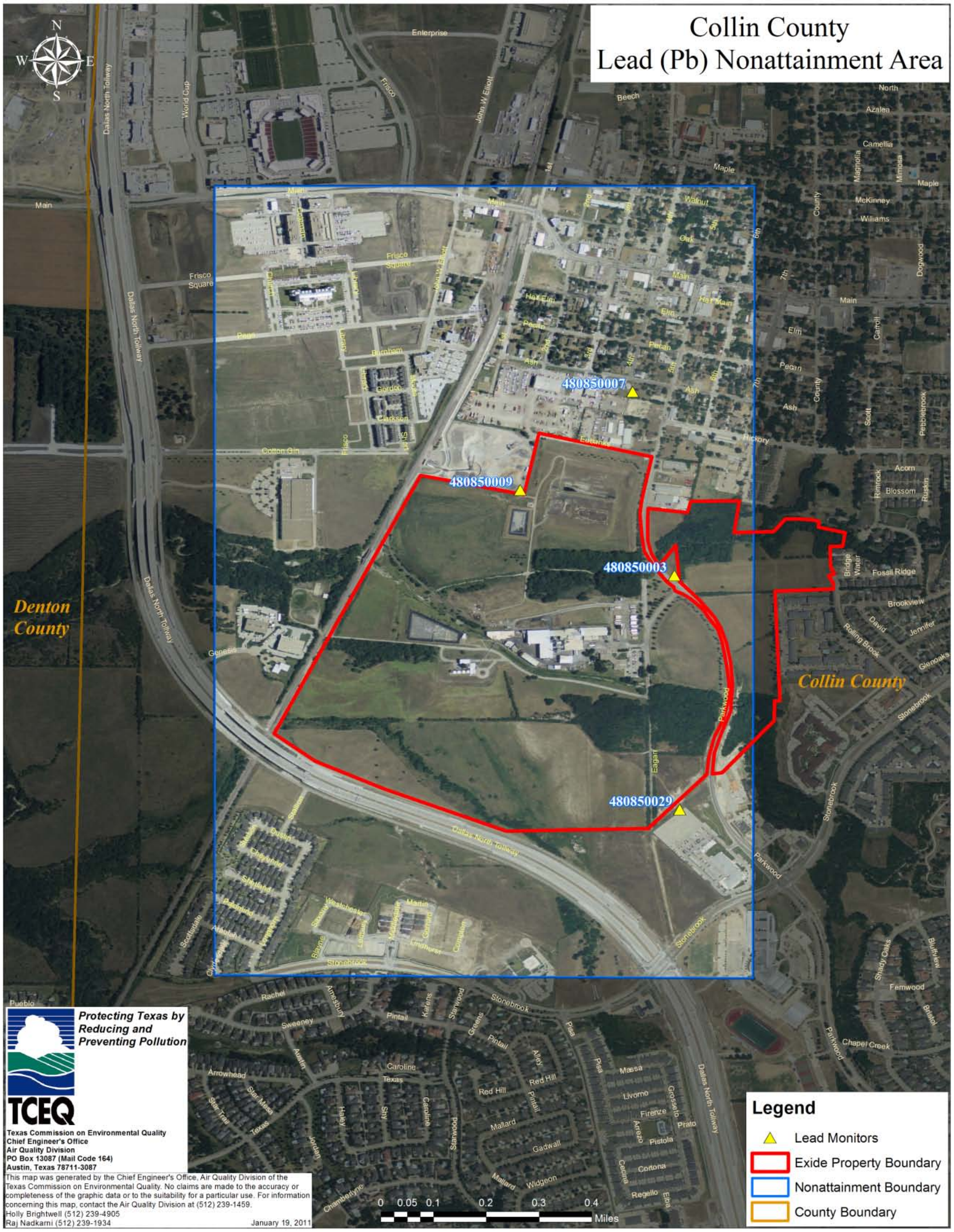

Figure 4-1: Collin County Lead (Pb) Nonattainment Area

4.6 CONTINGENCY PLAN

SIP revisions for nonattainment areas are required by §172(c)(9) of the FCAA to provide for specific measures to be implemented should a nonattainment area fail to meet reasonable further progress (RFP) requirements or maintain the 2008 lead NAAQS by the attainment date set by the EPA. The contingency plan must be enforceable and should identify measures to be adopted, a schedule and procedure for adoption and implementation, and a specific time constraint on action to be taken by the state. Additionally, the plan should identify specific indicators or triggers that will be used to determine when the contingency measures are to be implemented. The intent of the indicators and triggers is to allow the state and Exide to take early action to remedy an actual or potential violation of the 2008 lead NAAQS prior to the attainment date.

The contingency measures are made enforceable in Agreed Order 2011-0521-MIS.

4.6.1 Contingency Measures

4.6.1.1 Contingency Measure Requirements

- Full enclosure of the lead oxide operational area and installation of negative pressure ventilation, new point source, and filtration media (either a baghouse or cartridge filter) (sources 11 through 17, 24 through 26, 46, and 56 through 58). The enclosure performance shall be consistent with the requirements of 40 CFR §63.544(b) and 63.547(e) as of March 7, 2011.
- Installation of vacuum hooding over lead oxide loading operations (currently sources 27 and 28).
- Designate that wheeled and powered plant equipment such as forklifts used inside a fully enclosed area will not be used outside of such an area.

4.6.1.2 Contingency Trigger Levels

A contingency measure would be triggered upon failure to meet RFP requirements or failure to attain the 2008 lead NAAQS.

CHAPTER 5: REASONABLE FURTHER PROGRESS

5.1 GENERAL

Section 172(c)(2) the Federal Clean Air Act (FCAA) requires areas that have been designated nonattainment for criteria pollutants to include a demonstration of reasonable further progress (RFP) in attainment demonstrations. RFP is defined in FCAA §172(c)(2) as such annual incremental reductions in emissions of the relevant air pollution as are required by part D, or may reasonably be required by the United States Environmental Protection Agency for the purpose of ensuring attainment of the applicable National Ambient Air Quality Standard (NAAQS) by the applicable attainment date.

The 2011 Collin County Attainment Demonstration State Implementation Plan (SIP) Revision for the 2008 Lead National Ambient Air Quality Standard proposal would fulfill RFP for the Collin County lead nonattainment area through an ambitious compliance schedule which yields consistent and periodic significant emission reductions. This demonstration includes a detailed schedule for compliance of reasonably available control measures (RACM) including reasonably available control technologies (RACT) in the nonattainment area.

5.2 RFP DEMONSTRATION

As stated in the final lead rule (73 FR 67039), RFP is satisfied by the strict adherence to an ambitious compliance schedule which is expected to periodically yield significant emission reductions. The control measures for attainment of the 2008 lead NAAQS included in proposed Agreed Order 2011-0521-MIS (Appendix A) under stipulations 15 through 37, and listed under 4.4, New Control Measures section of this proposed SIP revision have been modeled to achieve attainment of the 2008 lead NAAQS as described in Chapter 3: *Air Dispersion Modeling*. The stipulations of Agreed Order 2011-0521-MIS require these control measures and resulting emissions reductions to be achieved as expeditiously as practicable, but no later than November 1, 2012.

5.3 RACM AND RACT

The control measures for attainment of the 2008 lead NAAQS included in proposed Agreed Order 2011-0521-MIS under order stipulations numbers 15 through 27, listed under Chapter 4 Control Strategy and Required Elements section 4.4, New Control Measures, detailed under Chapter 4 Control Strategy and Required Elements section 4.3, RACT and RACM Analysis, and included in Appendix D: *Reasonably Available Control Technology and Reasonably Available Control Measure Analysis* of this proposed SIP revision are required to be implemented as soon as practicable but no later than November 1, 2012.

The Texas Commission on Environmental Quality (TCEQ) has developed a detailed implementation schedule of the RACM (including RACT) control measures required in proposed Agreed Order 2011-0521-MIS. This schedule involves the expeditious implementation of all control measures to assure attainment of the 2008 lead NAAQS by November 1, 2012. For the associated changes in ambient lead concentrations and percent contribution to ambient lead levels in the Collin County lead nonattainment area, please see Appendix E: *RACM (including RACT) Control Measure Implementation Schedule for Reasonable Further Progress*.

Appendices Available Upon Request

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