APPENDIX A: LEAD MODELING ANALYSES

Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To:	David Brymer Air Quality Planning Division	Date:	June 22, 2009
Thru:	Robert Opiela, P.E., Technical Specialist Technical Program Support Section Air Permits Division		
From:	Matthew Kovar, Megan Cox Air Dispersion Modeling Team Air Permits Division		

Subject: Modeling Analysis of Lead for Asarco LLC (RN101701654)

1.0 Project Identification Information.

On November 12, 2008, the U.S. Environmental Protection Agency (EPA) finalized the new 0.15 microgram per cubic meter ($\mu g/m^3$) NAAQS for lead based on a rolling three-month average (73 *Federal Register* 66964). In general, the rule requires source-oriented ambient air lead monitoring by January 1, 2010, at sites with actual annual lead emissions of one or more tons per year. Asarco LLC was identified as having emissions at or above this level based on the reported 2007 TCEQ Emissions Inventory and/or 2006 Toxics Release Inventory. The rule further requires that this monitoring be conducted at or near the maximum off-site ambient air lead concentration, as predicted by modeling, that results from sources with annual lead emissions of one or more tons.

The TCEQ conducted air dispersion modeling of all the lead emission sources at the site using the most current modeling parameters and associated permitted allowable emissions rates. The TCEQ will use the dispersion modeling results to determine the optimal location of any required source-oriented monitors.

ArcReader Published Map:

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2.0 Report Summary.

The predicted maximum ground level concentration (GLCmax) is 0.21 $\mu g/m^3$ for a rolling three-month average. The location of the GLCmax is along the southeastern property line. All predicted concentrations exceeding the NAAQS are located to the southeast of the Asarco LLC site and extended less than 150 meters from the site property line. Table 1 lists the location of the predicted GLCmax. The location coordinates are in the UTM Zone 14 North, North American Datum of 1927 (NAD27) coordinate system.

Table 1. Modeling Results for Lead

Location Easting (meters)	Location Northing (meters)	Averaging Time	GLC ($\mu g/m^3$)	Standard ($\mu g/m^3$)
252500	3906900	rolling three-month	0.21	0.15

3.0 Land Use and Terrain.

A land use/land cover analysis was performed using AERSURFACE consistent with guidance given in the AERMOD Implementation Guide (March 19, 2009). The recommended input data, the National Land Cover Data 1992 archives (NLCD92), were used for this analysis.

Terrain elevations within the modeling domain were determined using AERMAP (Version 09040). The input data used for this analysis were United States Geological Survey (USGS) digital elevation models (DEMs) for Pullman, Amarillo East, Mayer, and Pleasant Valley data sets.

4.0 Modeling Emissions Inventory.

The modeled emission source parameters and emission rates were provided by Asarco LLC. The source locations were validated by ADMT using aerial photography. Only source 7A has a listed maximum allowable emission rate for lead. For the other three sources, emissions estimates were submitted by Asarco LLC and then validated by APD permit reviewing staff for use in this analysis. The emission rates represent worst case 1-hour average emission rates and may be more conservative than 24-hour or monthly average emission rates. The emission source coordinates are in the UTM Zone 14 North, North American Datum of 1927 (NAD27) coordinate system.

Table 2. On-Property Point Source Parameter Information

ID	Easting (meters)	Northing (meters)	Stack Height (meters)	Stack Temp (K)	Stack Exit Velocity (meters/sec)	Stack Diameter (meters)
7A	251881.8	3907527.8	24.99	456.48	1.19	5.49
4B	251554.8	3907622.8	38.71	310.37	12.31	1.22
6A	251623.8	3907942.8	30.48	388.71	0.65	5.49
6D	251732.8	3907896.8	30.48	408.15	0.87	5.49

Table 3. On-Property Source Modeled Emission Rates

Source ID	Pollutant	Averaging Time	Emission Rates (lb/hr)
7A	Lead	1-hr	4.27
4B	Lead	1-hr	0.48
6A	Lead	1-hr	0.02
6D	Lead	1-hr	0.04

5.0 Building Wake Effects (Downwash).

Input data to Building Profile Input Program Prime (BPIP-PRM Version 04274) were provided by Asarco LLC. The building locations were validated by ADMT using aerial photography.

6.0 Meteorological Data.

Surface Station and ID: Amarillo, TX (Station #: 23047)

Upper Air Station and ID: Amarillo, TX (Station #: 23047)

Meteorological Dataset: 1987, 1988, 1989, 1990, 1991

Profile Base Elevation: 3591 feet

The AERSURFACE analysis conducted of the area surrounding the Asarco LLC site resulted in a calculated roughness length of 0.155 meters. The vast majority of the area considered industrial and urbanized (and with a higher roughness length) is concentrated near the emission sources. The dispersion of emissions from the sources will be highly influenced by this higher roughness length. A representative roughness length for the area would be approximately 0.5 meters. For this reason, the meteorological data set used for this analysis was developed using a roughness length of 0.5 meters.

7.0 Receptor Grid.

The receptor grid used in the modeling analysis consisted of receptors with 100 meter spacing and extended approximately 2 kilometers (km) from the Asarco LLC site property line in all directions. The purpose of the receptor grid was to determine a representative maximum ground-level concentration and the extent of ground-level concentrations at or above half of the lead NAAQS standard.

8.0 Model Used and Modeling Techniques.

AERMOD (Version 07026) was used in a refined screening mode. For refined screening, National Weather Service (NWS) meteorological raw input data are used with generalized surface characteristics of the application site. 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.

Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To:	David Brymer Air Quality Planning Division	Date:	June 29, 2009
Thru:	Robert Opiela, P.E., Technical Specialist Technical Program Support Section Air Permits Division		
From:	Matthew Kovar, Megan Cox Air Dispersion Modeling Team Air Permits Division		

Subject: Modeling Analysis of Lead for ECS Refining Texas LLC (RN100804467)

1.0 Project Identification Information.

On November 12, 2008, the U.S. Environmental Protection Agency (EPA) finalized the new 0.15 microgram per cubic meter ($\mu g/m^3$) NAAQS for lead based on a rolling three-month average (73 *Federal Register* 66964). In general, the rule requires source-oriented ambient air lead monitoring by January 1, 2010, at sites with actual annual lead emissions of one or more tons per year. ECS Refining Texas LLC was identified as having emissions at or above this level based on the reported 2007 TCEQ Emissions Inventory and/or 2006 Toxics Release Inventory. The rule further requires that this monitoring be conducted at or near the maximum off-site ambient air lead concentration, as predicted by modeling, that results from sources with annual lead emissions of one or more tons.

The TCEQ conducted air dispersion modeling of all the lead emission sources at the site using the most current modeling parameters and associated permitted allowable emissions rates. The TCEQ will use the dispersion modeling results to determine the optimal location of any required source-oriented monitors.

ArcReader Published Map:

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2.0 Report Summary.

The predicted maximum ground level concentration (GLCmax) is 4.06 $\mu g/m^3$ for a rolling three-month average. The location of the GLCmax is along the northern property line. All predicted concentrations exceeding the NAAQS are located within approximately 1.1 kilometers (km) to the north, 0.7 km to the west, 0.6 km to the south, and 0.3 km to the east of the site property line. Table 1 lists the location of the predicted GLCmax. The location coordinates are in the UTM Zone 14 North, North American Datum of 1927 (NAD27) coordinate system.

Table 1. Modeling Results for Lead

Location Easting (meters)	Location Northing (meters)	Averaging Time	GLC ($\mu g/m^3$)	Standard ($\mu g/m^3$)
751500	362440	rolling three-month	4.06	0.15

3.0 Land Use and Terrain.

A land use/land cover analysis was performed using AERSURFACE consistent with guidance given in the AERMOD Implementation Guide (March 19, 2009). The recommended input data, the National Land Cover Data 1992 archives (NLCD92), were used for this analysis.

Terrain elevations within the modeling domain were determined using AERMAP (Version 09040). The input data used for this analysis was the United States Geological Survey (USGS) National Elevation Dataset (NED) for Terrell North, Terrell South, Forney North, and Forney South quadrangles.

4.0 Modeling Emissions Inventory.

The modeled emission source parameters and emission rates were provided by ECS Refining Texas LLC. The source locations were validated by ADMT using aerial photography. The source emission rates modeled were consistent with the maximum allowable emission rates authorized through permit 19430. The emission rates represent worst case 1-hour average emission rates and may be more conservative than 24-hour or monthly average emission rates. The emission source coordinates are in the UTM Zone 14 North, North American Datum of 1927 (NAD27) coordinate system.

Table 2. On-Property Point Source Parameter Information

ID	Easting (meters)	Northing (meters)	Stack Height (meters)	Stack Temp (K)	Stack Exit Velocity (meters/sec)	Stack Diameter (meters)
P6	751508.5	3624260.2	16.04	310.04	8.84	0.78
P12	751514.5	3624253.2	12.85	303.87	16.74	1.07
P14	751488.5	3624262.2	17.63	305.15	12.93	1.12
P15	751494.5	3624268.2	17.28	308.15	13.47	0.66

ID	Easting (meters)	Northing (meters)	Stack Height (meters)	Stack Temp (K)	Stack Exit Velocity (meters/sec)	Stack Diameter (meters)
P17	751464.5	3624251.2	11.4	312.32	6.1	0.48

Table 3. On-Property Source Modeled Emission Rates

Source ID	Pollutant	Averaging Time	Emission Rates (lb/hr)
P6	Lead	1-hr	0.32
P12	Lead	1-hr	0.04
P14	Lead	1-hr	1.01
P15	Lead	1-hr	0.1
P17	Lead	1-hr	0.11

5.0 Building Wake Effects (Downwash).

Input data to Building Profile Input Program Prime (BPIP-PRM Version 04274) were provided by ECS Refining Texas LLC. The building locations were validated by ADMT using aerial photography.

6.0 Meteorological Data.

Surface Station and ID: Dallas/Fort Worth, TX (Station #: 03927)

Upper Air Station and ID: Stephenville, TX (Station #: 13091)

Meteorological Dataset: 1985, 1987, 1988, 1989, 1990

Profile Base Elevation: 551 feet

The AERSURFACE analysis conducted of the area surrounding the ECS Refining Texas LLC site resulted in a calculated roughness length of 0.109 meters. Since the AERSURFACE analysis used land cover data from 1992 and since the area near the site has become more developed and urbanized since 1992 based on comparing the land cover data to 2004 aerial photography, a representative roughness length for the area would be approximately 0.5 meters. For this reason, the meteorological data set used for this analysis was developed using a roughness length of 0.5 meters.

7.0 Receptor Grid.

The receptor grid used in the modeling analysis consisted of receptors with 100 meter spacing and extended approximately 3 kilometers (km) from the ECS Refining Texas LLC site property line in all directions. The purpose of the receptor grid was to determine a representative maximum ground-level concentration and the extent of ground-level concentrations at or above half of the lead NAAQS standard.

8.0 Model Used and Modeling Techniques.

AERMOD (Version 07026) was used in a refined screening mode. For refined screening, National Weather Service (NWS) meteorological raw input data are used with generalized surface characteristics of the application site. 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.

Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To: David Brymer
Air Quality Planning Division

Date: October 8, 2010

Thru: Robert Opiela, P.E., Technical Specialist
Technical Program Support Section
Air Permits Division

From: Matthew Kovar, Megan Cox
Air Dispersion Modeling Team
Air Permits Division

Subject: Modeling Analysis of Lead for Exide Technologies, Frisco Battery Recycling Plant (RN100218643)

1.0 Project Identification Information.

On November 12, 2008, the U.S. Environmental Protection Agency (EPA) finalized the new 0.15 microgram per cubic meter ($\mu g/m^3$) NAAQS for lead based on a rolling three-month average (73 *Federal Register* 66964). In general, the rule requires source-oriented ambient air lead monitoring by January 1, 2010, at sites with actual annual lead emissions of one or more tons per year. Exide Technologies, Frisco Battery Recycling Plant was identified as having emissions at or above this level based on the reported 2007 TCEQ Emissions Inventory and/or 2006 Toxics Release Inventory. The rule further requires that this monitoring be conducted at or near the maximum off-site ambient air lead concentration, as predicted by modeling, that results from sources with annual lead emissions of one or more tons.

In 2009, the TCEQ conducted air dispersion modeling of all the lead emission sources at the site using the most current modeling parameters and associated permitted allowable emissions rates. In October 2010, Exide Technologies submitted information to the TCEQ documenting a reduction in permitted allowable emission rates for some sources. Some of these reductions will be validated through stack testing at a future date. This modeling analysis addresses those emission reductions and supersedes the previous modeling analysis report (NSRG document #9136). The TCEQ will use the dispersion modeling results to determine the optimal location of any required source-oriented monitors.

Since monitoring already exists at and near the Exide Technologies site, and monitored values exceeding the new lead standard have been recorded, the dispersion modeling results will also be used to determine the proposed boundaries of a lead non-attainment area.

ArcReader Published Map:

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2.0 Report Summary.

The predicted maximum ground level concentration (GLCmax) is 0.837 μg/m^3 for a rolling three-month average. The location of the GLCmax is the same as the location of monitor 480850009 on the north property line of the Exide Technologies site. Predicted concentrations exceeding the NAAQS extended approximately 0.8 kilometers (km) to the north, 0.5 km to the south, 0.5 km to the west, and 0.2 km to the east of the site property line. All predicted concentrations greater than the NAAQS are located within Collin County. Table 1 lists the predicted concentrations at the current monitor locations and proposed monitor location near the intersection of 1st Street and Ash Street.

Table 1. Modeling Results for Lead

Monitor ID	Averaging Time	GLC (μg/m^3)	Standard (μg/m^3)
480850009	rolling three-month	0.837	0.15
480850003	rolling three-month	0.477	0.15
480850007	rolling three-month	0.292	0.15
Proposed	rolling three-month	0.311	0.15

3.0 Land Use and Terrain.

A land use/land cover analysis was performed using AERSURFACE consistent with guidance given in the AERMOD Implementation Guide (March 19, 2009). The recommended input data, the National Land Cover Data 1992 archives (NLCD92), were used for this analysis.

Terrain elevations within the modeling domain were determined using AERMAP (Version 09040). The input data used for this analysis were United States Geological Survey (USGS) digital elevation models (DEMs) for Little Elm, Frisco, Lewisville East, and Hebron data sets.

4.0 Modeling Emissions Inventory.

The modeled emission source parameters and emission rates were provided by Exide Technologies. The source locations were validated by ADMT using aerial photography. The source emission rates modeled were consistent with the maximum allowable emission rates authorized through permits 3048A and 1147A. Several source emissions rates were revised through a permit alteration submitted October 2010. The revised emission rates are highlighted in Table 4. The emission source coordinates are in the UTM Zone 14 North, North American Datum of 1927 (NAD27) coordinate system.

Table 2. On-Property Point Source Parameter Information

ID	Easting (meters)	Northing (meters)	Stack Height (meters)	Stack Temp (K)	Stack Exit Velocity (meters/sec)	Stack Diameter (meters)
11	702713.06	3668796.5	16.764	369.26	12.0396	0.3048
12	702713.25	3668793.75	16.764	369.26	8.5039	0.3048
13	702713.25	3668791.5	15.8496	391.48	13.1674	0.3048
14	702721	3668792.75	16.764	327.59	27.9624	0.5334
15	702725.31	3668807.5	16.764	349.82	14.1732	0.381
16	702717.88	3668803	17.3736	369.26	13.4722	0.253
17	702728.88	3668779.5	16.764	355.37	14.0208	0.381
18	702628.13	3668767.75	30.6324	303.71	5.1206	1.6154
21	702626.88	3668739.25	31.242	304.82	16.5811	1.521
22	702685.69	3668804.25	22.86	0	15.1486	0.8108
23	702637.38	3668764.5	6.096	0	1.8288	0.3048
24	702721.88	3668782.5	16.4592	369.26	11.491	0.381
25	702721.75	3668777.75	16.4592	358.15	9.4488	0.381
26	702736.31	3668782.75	9.144	355.37	11.5824	0.1524
37	702682.56	3668810	22.86	298.15	19.6901	1.6764
38	702620.19	3668771.75	33.8328	315.37	16.7945	1.3716
39	702544.5	3668727.75	10.668	0	0.0009	1.524
45	702623.06	3668713.75	32.1564	0	14.0238	1.8044
48	702585	3668771	11.2776	0	1.6764	0.1707

Table 3. Area Source Parameter Information

ID	Easting (meters)	Northing (meters)	Release Height (meters)	Easterly Length (meters)	Northerly Length (meters)	Degrees from north (◦)
10	702642.65	3668770.8	4.572	28.956	24.384	-2
27	702733.81	3668767.5	4.572	0.9144	0.9144	0
28	702756.31	3668782	4.572	0.9144	0.9144	0
35	702654.26	3668740.35	4.572	22.86	30.48	-2
36	702645.75	3668754.8	4.572	32.004	15.24	-2
41	702518.28	3668768.73	0.3048	94.488	21.336	40
42	702625.1	3668693.38	0.3048	80.772	44.196	-2
43	702702.77	3668745.25	0.3048	62.484	39.624	-2
44	702590.79	3668760.22	3.9929	24.384	41.148	-2
52	702631.81	3668765.63	4.572	21.336	16.764	-2
53	702615.56	3668762.28	1.8288	16.764	19.812	-2

Table 4. On-Property Source Allowable Emission Rates

Scenario ID	Pollutant	Averaging Time	Emission Rates (lb/hr)
10	Lead	1-hr	0.08
11	Lead	1-hr	0.05
12	Lead	1-hr	0.03
13	Lead	1-hr	0.05
14	Lead	1-hr	0.03
15	Lead	1-hr	0.05
16	Lead	1-hr	0.02

Scenario ID	Pollutant	Averaging Time	Emission Rates (lb/hr)
17	Lead	1-hr	0.05
18	Lead	1-hr	0.07
21	Lead	1-hr	0.25
22	Lead	1-hr	0.02
23	Lead	1-hr	0.03
24	Lead	1-hr	0.006
25	Lead	1-hr	0.004
26	Lead	1-hr	0.001
27	Lead	1-hr	0.001
28	Lead	1-hr	0.001
35	Lead	1-hr	0.08
36	Lead	1-hr	0.01
37	Lead	1-hr	0.09
38	Lead	1-hr	0.2
39	Lead	1-hr	0.12
41	Lead	1-hr	0.0388
42	Lead	1-hr	0.0388
43	Lead	1-hr	0.0388
44	Lead	1-hr	0.03
45	Lead	1-hr	0.25
48	Lead	1-hr	0.06
52	Lead	1-hr	0.01
53	Lead	1-hr	0.13

5.0 Building Wake Effects (Downwash).

Input data to Building Profile Input Program Prime (BPIP-PRM Version 04274) were provided by Exide Technologies. The building locations were validated by ADMT using aerial photography.

6.0 Meteorological Data.

Surface Station and ID: Dallas/Fort Worth, TX (Station #: 03927)

Upper Air Station and ID: Stephenville, TX (Station #: 13091)

Meteorological Dataset: 1985, 1987, 1988, 1989, 1990

Profile Base Elevation: 551 feet

The AERSURFACE analysis conducted of the area surrounding the Exide Technologies site resulted in a calculated roughness length of 0.129 meters. Since the AERSURFACE analysis used land cover data from 1992 and since the area near the site has become more developed and urbanized since 1992 based on comparing the land cover data to 2008 aerial photography, a representative roughness length for the area would be approximately 0.5 meters. For this reason, the meteorological data set used for this analysis was developed using a roughness length of 0.5 meters.

7.0 Receptor Grid.

The receptor grid used in the modeling analysis consisted of receptors with 50 meter spacing and extended approximately 1.5 kilometers (km) from the Exide Technologies site property line in all directions. An additional grid consisted of receptors with 100 m spacing and extended 3.5 km beyond the first receptor grid in all directions. Discrete receptors were used for the locations of the three existing monitoring stations and the location of a proposed monitoring station near the intersection of 1st Street and Ash Street. The purpose of the receptor grid was to determine a representative maximum ground-level concentration and the extent of ground-level concentrations at or above half of the lead NAAQS standard.

8.0 Model Used and Modeling Techniques.

AERMOD (Version 09292) was used in a refined screening mode. A new version of AERMOD was released on October 23, 2009. This version was used in the modeling analysis because it is the latest approved EPA model version. For refined screening, National Weather Service (NWS) meteorological raw input data are used with generalized surface characteristics of the application site. 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.

For this analysis, only emission sources at the Exide Technologies site were considered. The nearest source of lead emissions outside the modeling domain is approximately 20 km from the Exide Technologies site with reported 2007 lead annual emissions approximately one percent of the annual lead emissions reported by Exide Technologies. The largest nearby source of lead emissions is approximately 50 km from the Exide Technologies site with annual reported emissions approximately ten percent of the annual emissions reported by Exide Technologies. Due to the great distance to the Exide Technologies site and the small reported emission, no other sources of lead emissions would have a significant contribution near the Exide Technologies site or the modeling domain used for this analysis.

Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To:	Jim Price Air Quality Division	Date:	September 25, 2009
Thru:	Robert Opiela, P.E., Technical Specialist Technical Program Support Section Air Permits Division		
From:	Matthew Kovar, Megan Cox Air Dispersion Modeling Team Air Permits Division		

Subject: Modeling Analysis of Lead for Oxbow Calcining LLC (RN100209287)

1.0 Project Identification Information.

On November 12, 2008, the U.S. Environmental Protection Agency (EPA) finalized the new 0.15 microgram per cubic meter ($\mu g/m^3$) NAAQS for lead based on a rolling three-month average (73 *Federal Register* 66964). In general, the rule requires source-oriented ambient air lead monitoring by January 1, 2010, at sites with actual annual lead emissions of one or more tons per year. Oxbow Calcining LLC was identified as having emissions at or above this level based on the reported 2007 TCEQ Emissions Inventory and/or 2006 Toxics Release Inventory. The rule further requires that this monitoring be conducted at or near the maximum off-site ambient air lead concentration, as predicted by modeling, that results from sources with annual lead emissions of one or more tons.

The TCEQ conducted air dispersion modeling of all the lead emission sources at the site using the most current modeling parameters and associated permitted allowable emissions rates. The TCEQ will use the dispersion modeling results to determine the optimal location of any required source-oriented monitors.

ArcReader Published Map:

\\Msgiswrk\apd\MODEL PROJECTS\Lead NAAQS Analysis_2009\Lead_NAAQS_Analysis_Results.pmf

2.0 Report Summary.

The predicted maximum ground level concentration (GLCmax) is 0.016 $\mu g/m^3$ for a rolling three-month average. The location of the GLCmax is approximately 70 meters from the northwest property line. Table 1 lists the location of the predicted GLCmax. The location coordinates are in the UTM Zone 15 North, North American Datum of 1927 (NAD27) coordinate system.

Table 1. Modeling Results for Lead

Location Easting (meters)	Location Northing (meters)	Averaging Time	GLC ($\mu g/m^3$)	Standard ($\mu g/m^3$)
407000	3301300	rolling three-month	0.016	0.15

3.0 Land Use and Terrain.

A land use/land cover analysis was performed using AERSURFACE consistent with guidance given in the AERMOD Implementation Guide (March 19, 2009). The recommended input data, the National Land Cover Data 1992 archives (NLCD92), were used for this analysis.

Terrain elevations within the modeling domain were determined using AERMAP (Version 09040). The input data used for this analysis was the United States Geological Survey (USGS) National Elevation Dataset (NED) for the Port Arthur South quadrangle.

4.0 Modeling Emissions Inventory.

The modeled emission source parameters and maximum allowable emission rates were obtained from permits 45622 and 5421. The source locations were validated by ADMT using aerial photography. The emission rates represent worst case 1-hour average emission rates and may be more conservative than 24-hour or monthly average emission rates. The emission source coordinates are in the UTM Zone 15 North, North American Datum of 1927 (NAD27) coordinate system.

Table 2. On-Property Point Source Parameter Information

ID	Easting (meters)	Northing (meters)	Stack Height (meters)	Stack Temp (K)	Stack Exit Velocity (meters/sec)	Stack Diameter (meters)
KS2	406942	3300668	38.1	1366.48	14.78	3.17
WHBS3	406991	3300709	45.72	477.59	23.13	2.07
WHBS4	406935	3300796	45.72	477.59	23.13	2.07
WHBS5	406976	3300631	56.39	477.59	23.96	2.37

Table 3. On-Property Source Modeled Emission Rates

Source ID	Pollutant	Averaging Time	Emission Rates (lb/hr)
KS2	Lead	1-hr	0.13
WHBS3	Lead	1-hr	0.22
WHBS4	Lead	1-hr	0.22
WHBS5	Lead	1-hr	0.31

5.0 Building Wake Effects (Downwash).

Input data to Building Profile Input Program Prime (BPIP-PRM Version 04274) were provided by Oxbow Calcining LLC. The building locations were validated by ADMT using aerial photography.

6.0 Meteorological Data.

Surface Station and ID: Port Arthur, TX (Station #: 12917)

Upper Air Station and ID: Lake Charles, LA (Station #: 3937)

Meteorological Dataset: 1987-1991

Profile Base Elevation: 16 feet

The AERSURFACE analysis conducted of the area surrounding the Oxbow Calcining LLC site resulted in a calculated roughness length of 0.028 meters. Since the AERSURFACE analysis used land cover data from 1992 and since the area near the site has become more developed and urbanized since 1992 based on comparing the land cover data to 2004 aerial photography, a representative roughness length for the area would be approximately 0.05 meters. For this reason, the meteorological data set used for this analysis was developed using a roughness length of 0.05 meters.

7.0 Receptor Grid.

The receptor grid used in the modeling analysis consisted of receptors with 100 meter spacing and extended approximately 1.5 kilometers (km) from the Oxbow Calcining LLC site property line in all directions. The purpose of the receptor grid was to determine a representative maximum ground-level concentration and the extent of ground-level concentrations at or above half of the lead NAAQS standard.

8.0 Model Used and Modeling Techniques.

AERMOD (Version 07026) was used in a refined screening mode. For refined screening, National Weather Service (NWS) meteorological raw input data are used with generalized surface characteristics of the application site. 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.

Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To:	David Brymer Air Quality Planning Division	Date:	July 24, 2009
Thru:	Robert Opiela, P.E., Technical Specialist Technical Program Support Section Air Permits Division		
From:	Matthew Kovar, Megan Cox Air Dispersion Modeling Team Air Permits Division		

Subject: Modeling Analysis of Lead for U.S. Army (Fort Hood) (RN101612083)

1.0 Project Identification Information.

On November 12, 2008, the U.S. Environmental Protection Agency (EPA) finalized the new 0.15 microgram per cubic meter ($\mu g/m^3$) NAAQS for lead based on a rolling three-month average (73 *Federal Register* 66964). In general, the rule requires source-oriented ambient air lead monitoring by January 1, 2010, at sites with actual annual lead emissions of one or more tons per year. The U.S. Army (Fort Hood) was identified as having emissions at or above this level based on the reported 2007 TCEQ Emissions Inventory and/or 2006 Toxics Release Inventory. The rule further requires that this monitoring be conducted at or near the maximum off-site ambient air lead concentration, as predicted by modeling that results from sources with annual lead emissions of one or more tons.

The TCEQ conducted air dispersion modeling of all the lead emission sources at the site using the most current modeling parameters. The TCEQ will use the dispersion modeling results to determine the optimal location of any required source-oriented monitors.

ArcReader Published Map:

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2.0 Report Summary.

The predicted maximum ground level concentration (GLCmax) is 0.02 $\mu g/m^3$ for a rolling three-month average. The location of the GLCmax is along the southern property line. Table 1 lists the location of the predicted GLCmax. The location coordinates are in the UTM Zone 14 North, North American Datum of 1927 (NAD27) coordinate system.

Table 1. Modeling Results for Lead

Location Easting (meters)	Location Northing (meters)	Averaging Time	GLC ($\mu g/m^3$)	Standard ($\mu g/m^3$)
618000	3446900	rolling three-month	0.02	0.15

3.0 Land Use and Terrain.

A land use/land cover analysis was performed using AERSURFACE consistent with guidance given in the AERMOD Implementation Guide (March 19, 2009). The recommended input data, the National Land Cover Data 1992 archives (NLCD92), were used for this analysis.

Terrain elevations within the modeling domain were determined using AERMAP (Version 09040). The input data used for this analysis was the United States Geological Survey (USGS) National Elevation Dataset (NED) for Gatesville West, Gatesville East, Shell Mountains, North Fort Hood, Fort Hood, and Post Oak Mountains quadrangles.

4.0 Modeling Emissions Inventory.

The modeled emission source parameters and emission rates were provided by Fort Hood. The source locations were validated by ADMT. The source emission rates modeled were based on air emissions estimates reported in the Fort Hood 2007 Toxic Release Inventory (TRI). Though the emissions were reported for many firing ranges at various locations around Fort Hood, for this demonstration all of the emissions were conservatively represented to be emitted only from the firing ranges nearest the areas of public activity. From the 2007 TRI data and activity data for 2008, the firing ranges with the highest emissions were the furthest away from public locations and largest in extent. Public activities are limited to the southern and the northern ends of Fort Hood. The central areas and areas on the east and west of Fort Hood are restricted from public access. The emission rates represent worst case 1-hour average emission rates and may be more conservative than 24-hour or monthly average emission rates.

Table 2. On-Property Source Modeled Emission Rates

Source ID	Pollutant	Averaging Time	Emission Rates (lb/hr)
NFHS	Lead	1-hr	0.0056
NFHR	Lead	1-hr	0.0079

Source ID	Pollutant	Averaging Time	Emission Rates (lb/hr)
OBJID_8	Lead	1-hr	0.0105
OBJID_9	Lead	1-hr	0.0062
IHSR	Lead	1-hr	0.0306
HGQ	Lead	1-hr	0.0026
PKGL	Lead	1-hr	0.0053
BGRB	Lead	1-hr	0.0113
BGPQ	Lead	1-hr	0.0017
BGRC	Lead	1-hr	0.0255
PKAT4	Lead	1-hr	0.0054
BWPA	Lead	1-hr	0.0018
BWPB	Lead	1-hr	0.0017
HGC	Lead	1-hr	0.0025
NFHRB	Lead	1-hr	0.0128
HGDA	Lead	1-hr	0.0023
BWGL	Lead	1-hr	0.0149
PKRZ	Lead	1-hr	0.0068
PKRA	Lead	1-hr	0.0066
BWMS	Lead	1-hr	0.0411
PSR	Lead	1-hr	0.0367

5.0 Building Wake Effects (Downwash).

Building downwash is not applicable for area source modeling.

6.0 Meteorological Data.

Surface Station and ID: Waco, TX (Station #: 13959)

Upper Air Station and ID: Stephenville, TX (Station #: 13091)

Meteorological Dataset: 1985, 1987, 1988, 1989, 1990

Profile Base Elevation: 499 feet

The AERSURFACE analysis conducted of the area surrounding the U.S. Army (Fort Hood) site resulted in a calculated roughness length of 0.369 meters. Since the AERSURFACE analysis used land cover data from 1992 and since the area near the site has become more developed and urbanized since 1992 based on comparing the land cover data to 2004 aerial photography, a representative roughness length for the area would be approximately 0.5 meters. For this reason, the meteorological data set used for this analysis was developed using a roughness length of 0.5 meters.

7.0 Receptor Grid.

The two receptor grids used in the modeling analysis consisted of receptors with 100 meter spacing. The larger receptor grid was located in close proximity to the southern firing ranges and extended approximately 2 kilometers (km) from these firing ranges to the south. The smaller receptor grid was located in close proximity to the northern firing ranges and extended approximately 2 km from these firing ranges to the northeast. The purpose of the receptor grid was to determine a representative maximum ground-level concentration and the extent of ground-level concentrations at or above half of the lead NAAQS standard.

8.0 Model Used and Modeling Techniques.

AERMOD (Version 07026) was used in a refined screening mode. For refined screening, National Weather Service (NWS) meteorological raw input data are used with generalized surface characteristics of the application site. 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.