APPENDIX J

MODELING TECHNICAL SUPPORT DOCUMENT (TSD)

Hutchinson County Attainment Demonstration State Implementation Plan Revision for the 2010 One-Hour Sulfur Dioxide National Ambient Air Quality Standard

2021-011-SIP-NR

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AD	Attainment Demonstration
AMS	American Meteorological Society
AERMOD	American Meteorological Society/United States Environmental Protection Agency Regulatory Model
ASOS	Automated Surface Observing System
BPIPPRM	Building Profile Input Program for PRIME
CFR	Code of Federal Regulations
DRR	Data Requirements Rule
DV	Design Value
EPA	United States Environmental Protection Agency
EPN	Emission Point Number
˚F	degrees Fahrenheit
FM	Farm to Market
FR	Federal Register
fps	feet per second
GEP	Good Engineering Practice
GHCND	Global Historical Climatology Network Daily
hr	hour
km	kilometer
lb	pound
m	meter
NAAQS	National Ambient Air Quality Standard
NCDC	National Climatic Data Center
NED	National Elevation Data
NLCD	National Land Cover Data
NSR	New Source Review
OFW	Old Fort Worth
ppb	parts per billion
Rd	Road
s	second
SE	southeast
SIP	State Implementation Plan
SO_2	sulfur dioxide

TCEQ	Texas Commission on Environmental Quality
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
v	version
WBAN	Weather-Bureau-Army-Navy

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1. INTRODUCTION

This appendix details the modeling conducted by the Texas Commission on Environmental Quality (TCEQ) for the Hutchinson County Attainment Demonstration (AD) State Implementation Plan (SIP) revision for the 2010 Sulfur Dioxide (SO_2) National Ambient Air Quality Standard (NAAQS). As part of this AD SIP revision, the TCEQ conducted air quality dispersion modeling in accordance with the United States Environmental Protection Agency's (EPA) *Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions* (EPA, 2014; SO_2 SIP guidance) and 40 *Code of Federal Regulations* (CFR) Part 51 Appendix W (EPA, 2017; Appendix W). The modeling details described in this appendix were shared with the EPA's Region 6 office during frequent discussions.

2. HUTCHINSON COUNTY NONATTAINMENT AREA OVERVIEW

The Hutchinson County nonattainment area includes a portion of Hutchinson County as indicated with the red shape in Figure 2-1: *Overview of the Hutchinson County 2010 SO_2 NAAQS Nonattainment Area*. There are eight sites housing multiple SO_2 emissions sources each in the Hutchinson County nonattainment area that are included in the AD modeling: Tokai Carbon CB LTD's Borger Carbon Black Plant site (Tokai Borger Carbon Black Plant), Orion Engineered Carbons LLC's Borger Carbon Black Plant site (Orion Borger Carbon Black Plant), Agrium US LLC's Borger Nitrogen Operations site (Agrium Borger Nitrogen Plant), IACX Rock Creek LLC's Rock Creek Gas Plant site (IACX Rock Creek Gas Plant), Borger Energy Associates LP's Blackhawk Power Plant site (Blackhawk Power Plant), Chevron Phillips Chemical LP's Borger Plant site (CP Chem Borger Plant), Solvay Specialty Polymers USA LLC's Solvay Specialty Polymers USA site (Solvay Specialty Polymers Plant), and Phillips 66 Company's Borger Refinery site (P66 Borger Refinery). A Data Requirements Rule (DRR) monitor sited to monitor SO_2 concentrations near the Tokai Borger Carbon Black Plant and Orion Borger Carbon Black Plant plants is shown as a green triangle in Figure 2-1. The National Weather Service monitor that will be used for surface meteorological data, the Borger Hutchinson County Airport station at the Hutchinson County Airport, is marked on Figure 2-1 as a purple plus-sign.

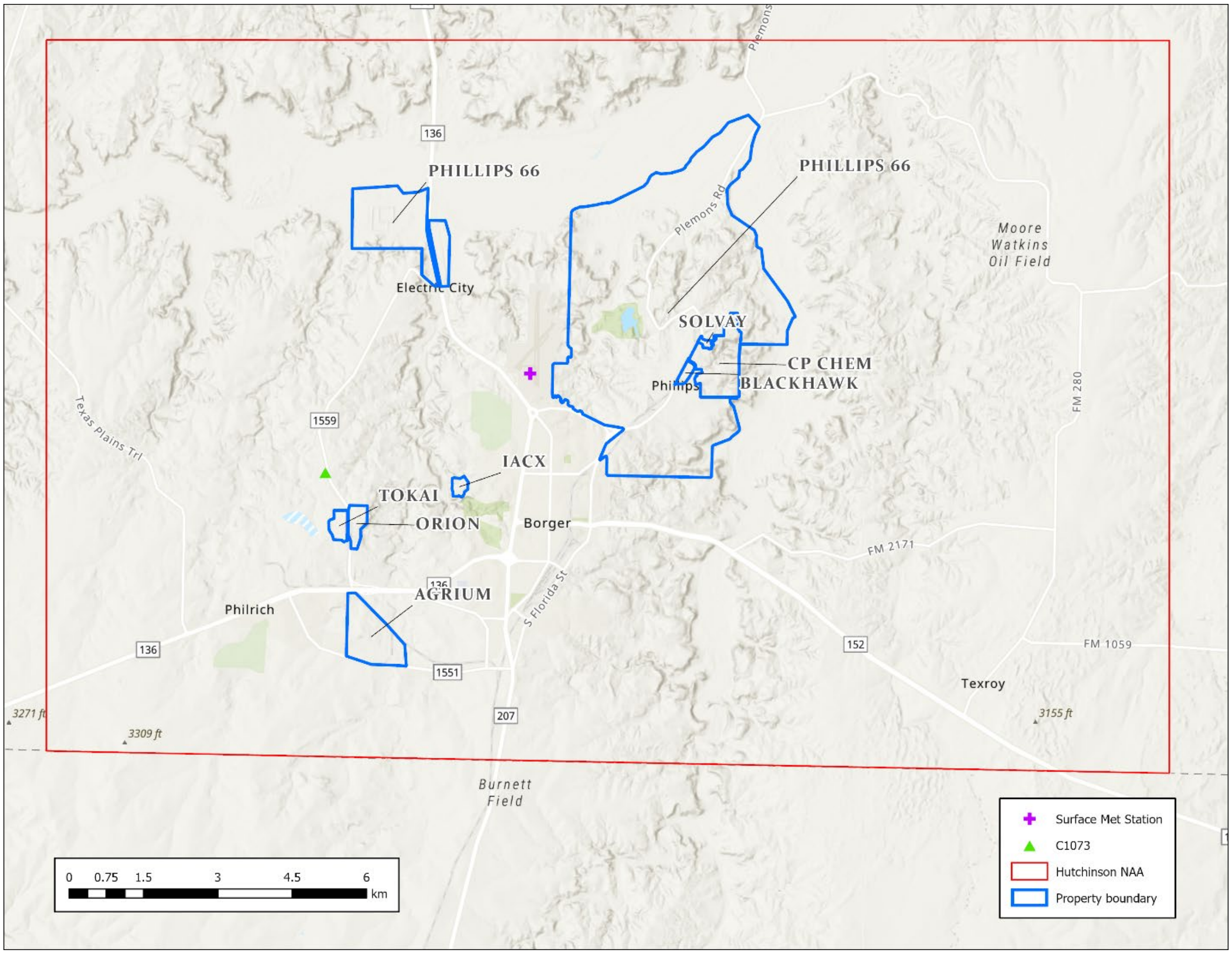

Figure 2-1: Overview of the Hutchinson County 2010 SO_2 NAAQS Nonattainment Area

3. MODEL SELECTION

As recommended in the EPA's *Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions* (EPA, 2014) and 40 *Code of Federal Regulations* (CFR) Part 51 Appendix W (EPA, 2017), the American Meteorological Society (AMS)/EPA Regulatory Model (AERMOD) version (v) 21112 have been used for this demonstration along with the following preprocessors:

- AERMET v21112 to generate meteorological data files;
- AERMINUTE v15272 to include measured one-minute wind averages;
- AERSURFACE v20060 to determine the surface characteristics for the meteorological station;
- AERMAP v18081 to gather elevation data for sources and receptors; and
- the Building Profile Input Program for PRIME (BPIPPRM) v04274 to calculate building downwash effects.

Where applicable, regulatory default parameters have been used. For a quick reference to the settings and parameters that were used in the preprocessors, refer to Section 9: *Reference Tables with Modeling Information.*

4. EMISSION SOURCES AND PARAMETERS

4.1 TOKAI BORGER CARBON BLACK PLANT

A map of the Tokai Borger Carbon Black Plant site is shown in Figure 4-1: *Tokai Borger Carbon Black Plant and Orion Borger Carbon Black Plant Sites Overview*. The modeled site boundary is visible in blue, the building locations are plotted with a red outline, and the SO_2 sources marked as pink dots. The modeled site boundary and building information were provided to the TCEQ by Tokai Borger Carbon Black Plant. The buildings were processed in BPIPPRM to calculate stack-tip downwash parameters. Elevation for the buildings and sources were determined using one-third arc-second United States Geological Survey (USGS) National Elevation Data (NED).

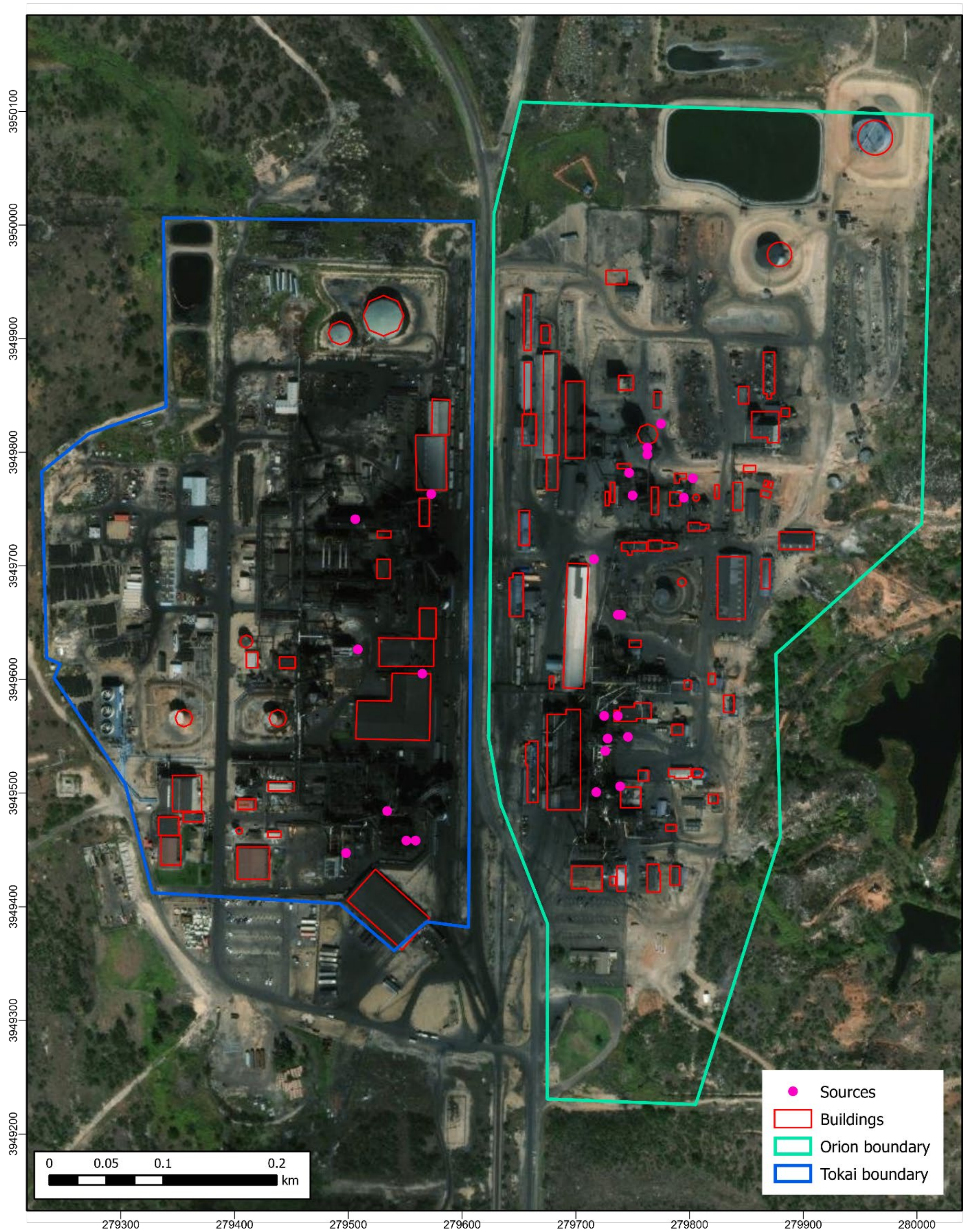

Figure 4-1: Tokai Borger Carbon Black Plant and Orion Borger Carbon Black Plant Sites Overview

4.1.1 Tokai Borger Carbon Black Plant Sources

SO_2 emissions and stack parameters for sources at Tokai Borger Carbon Black Plant are based on information provided by the company and available in permit files. Tokai Borger Carbon Black Plant sources and corresponding stack parameters that were included in the TCEQ's modeling are listed in Table 4-1: *Tokai Borger Carbon Black Plant Source Parameters*. Sources are identified in Table 4-1 by their Emission Point Number (EPN). Source location is in Universal Transverse Mercator (UTM) in meters (m), temperature (Temp.) is in degrees Fahrenheit (˚F), velocity is in meter per second (m/s), and the maximum allowable emission rate for a full load of operation mode is in pound per hour (lb/hr). Emissions provided in this section are for routine operations. Details on modeled emission rates for all operational modes are provided in Chapter 4: *Attainment Demonstration Modeling* of the accompanying SIP revision narrative.

Table 4-1: Tokai Borger Carbon Black Plant Source Parameters

EPN	Type	UTM Easting (m)	UTM Northing (m)	Height (m)	Diameter (m)	Temp. (˚F)	Velocity (m/s)	Routine Emission Rate (lb/hr)
119	Stack	279480	3949653	60.40	2.90	104.44	16.46	109.10
121	Stack	279534	3949484	60.40	2.29	426.67	13.38	441.00
122	Stack	279573	3949763	60.40	2.74	426.67	11.83	595.00
RVS	Stack	279565	3949605	17.68	0.45	165.56	1.46	0.03
RVL	Stack	279565	3949605	17.68	0.45	165.56	1.46	0.02
FLARE-1	Flare	279498	3949447	27.80	2.75	1000.00	20.00	0.00
NEWFL	Stack	279488	3949627	60.35	4.04	1000.00	20.00	0.00

4.2 ORION BORGER CARBON BLACK PLANT

A map of the Orion Borger Carbon Black Plant site is shown in Figure 4-1. The modeled site boundary is visible in green, the building locations plotted with a red outline, and the SO_2 sources marked as pink dots. The property boundary and building information was provided to the TCEQ by Orion Borger Carbon Black Plant. The buildings were processed in BPIPPRM to calculate stack-tip downwash parameters. Elevation for the buildings and sources were determined using one-third arc-second USGS NED.

4.2.1 Orion Borger Carbon Black Plant Sources

Orion Borger Carbon Black Plant sources and stack parameters used in modeling are listed in Table 4-2: *Orion Borger Carbon Black Plant Source Parameters*. Emissions provided in this section are for routine operations. Details on modeled emission rates for all operational modes are provided in Chapter 4 of the accompanying SIP revision narrative.

Table 4-2: Orion Borger Carbon Black Plant Source Parameters

EPN	Type	UTM Easting (m)	UTM Northing (m)	Height (m)	Diameter (m)	Temperature (˚F)	Velocity (m/s)	Routine Emission Rate (lb/hr)
E-100H	Stack	279775	3949825	6.10	0.36	128.33	3.53	<0.01
E-5B	Stack	279803	3949777	6.71	0.61	315.56	5.91	0.01
E-6BN	Stack	279795	3949760	29.87	2.56	216.11	21.34	144.11
E-10D	Stack	279728	3949548	7.62	0.61	315.56	10.39	0.02
E-10DF	Stack	279737	3949568	23.77	0.76	232.22	9.14	0.01
E-20D	Stack	279716	3949706	7.62	0.61	315.56	10.39	0.02
E-20DF	Stack	279737	3949657	24.99	0.76	232.22	9.14	0.01
CFL	Flare	279745	3949550	65.00	4.85	999.85	20.00	0.00
E-40D	Stack	279726	3949537	12.19	0.37	315.56	10.39	0.02
E-41DF	Stack	279739	3949506	24.38	0.76	232.22	9.14	0.01
E-50R	Stack	279763	3949798	15.24	1.52	426.67	18.29	0.69
E-51R	Stack	279763	3949804	15.24	1.52	426.67	18.29	0.69
E-53P	Stack	279747	3949782	36.58	1.52	152.22	9.14	1.37
P-60P	Stack	279750	3949762	12.19	0.20	232.22	3.05	0.21

4.3 AGRIUM BORGER NITROGEN PLANT

A map of the Agrium Borger Nitrogen Plant site is shown in Figure 4-2: *Agrium Borger Nitrogen Plant Site Overview*. The modeled site boundary is visible in blue, the building locations plotted with a red outline, and the SO_2 sources marked as pink dots. The modeled site boundary and building information were provided to the TCEQ by Agrium Borger Nitrogen Plan. The buildings were processed in BPIPPRM to calculate stack-tip downwash parameters. Elevation for the buildings and sources were determined using one-third arc-second USGS NED.

Figure 4-2: Agrium Borger Nitrogen Plant Site Overview

4.3.1 Agrium Borger Nitrogen Plant Sources

Agrium Borger Nitrogen Plant sources and stack parameters used in modeling are listed in Table 4-3: *Agrium Borger Nitrogen Plant Source Parameters*.

Table 4-3: Agrium Borger Nitrogen Plant Source Parameters

EPN	Type	UTM Easting (m)	UTM Northing (m)	Height (m)	Diameter (m)	Temperature (°F)	Velocity (m/s)	Emission Rate (lb/hr)
2	Stack	280383	3947299	32.00	3.20	125.45	25.43	9.95
E-1	Stack	280344	3947373	4.57	0.09	593.15	4.88	<0.01
E-2	Stack	280398	3947516	4.57	0.15	593.15	4.88	<0.01
H-5	Stack	280286	3947301	23.16	1.30	537.65	4.08	0.26
PKGB	Stack	280386	3947454	45.72	1.68	365.45	15.24	0.28
FL-1	Flare	280328	3947627	30.33	0.16	999.85	20.00	0.01
FL-2	Flare	280340	3947537	66.00	0.00	999.85	20.00	0.06

4.4 IACX ROCK CREEK GAS PLANT

A map of the IACX Rock Creek Gas Plant site is shown in Figure 4-3: *IACX Rock Creek Gas Plant Site Overview*. The modeled site boundary is visible in blue, the building locations plotted with a red outline, and the SO_2 sources marked as pink dots. The property boundary and building information was provided to the TCEQ by IACX Rock Creek Gas Plant. The buildings were processed in BPIPPRM to calculate stack-tip downwash parameters. Elevation for the buildings and sources were determined using one-third arc-second USGS NED.

Figure 4-3: IACX Rock Creek Gas Plant Site Overview

4.4.1 IACX Rock Creek Gas Plant Sources

IACX Rock Creek Gas Plant sources and stack parameters used in the modeling are listed in Table 4-4: *IACX Rock Creek Gas Plant Source Parameters*. The company indicated that they do not operate on reduced loads, neither 75% nor 50%.

Table 4-4: IACX Rock Creek Gas Plant Source Parameters

EPN	Type	UTM Easting (m)	UTM Northing (m)	Height (m)	Diameter (m)	Temp. (°F)	Velocity (m/s)	Routine 1 Emission Rate (lb/hr)	Routine 2 Emission Rate (lb/hr)
STK4	Stack	281773	3950369	9.14	0.31	426.67	34.75	0.03	0.03
STK5	Stack	281749	3950377	3.96	0.25	398.89	39.01	0.02	0.02
STK6A	Stack	281784	3950516	12.80	2.92	260.00	13.11	0.19	0.19
STK6B	Stack	281784	3950490	12.80	2.92	260.00	13.11	0.19	0.19
STK6C	Stack	281784	3950509	11.89	2.13	426.67	32.19	0.19	0.19
STK6D	Stack	281784	3950497	11.89	2.13	426.67	32.19	0.19	0.19
STK7	Stack	281731	3950613	10.06	1.02	440.56	13.84	0.14	0.14
STK8A	Stack	281749	3950599	4.57	0.25	398.89	32.29	0.02	0.02
HOH1	Stack	281750	3950312	6.22	0.41	329.44	7.54	0.01	0.01
HOH2	Stack	281750	3950308	6.22	0.41	329.44	7.54	0.01	0.01
HTRST K3	Stack	281879	3950424	11.89	0.61	226.67	3.81	0.01	0.01
ICIN1	Stack	281857	3950423	67.06	0.52	537.78	7.50	140.00	0.00
FLR1	Flare	281864	3950423	67.06	0.25	999.85	20.00	0.00	140.00

4.5 BLACKHAWK

A map of the Blackhawk Power Plant site is shown in Figure 4-4: *Blackhawk Power Plant, Solvay Specialty Polymers Plant, P66 Borger Refinery, and CP Chem Borger Plant Sites Overview*. The modeled site boundary is visible in black color, the building locations plotted with a red outline, and the SO_2 sources marked as pink dots. The property boundary and building information were provided to the TCEQ by Blackhawk Power Plant. The buildings were processed in BPIPPRM to calculate stack-tip downwash parameters. Elevation for the buildings and sources were determined using one-third arc-second USGS NED.

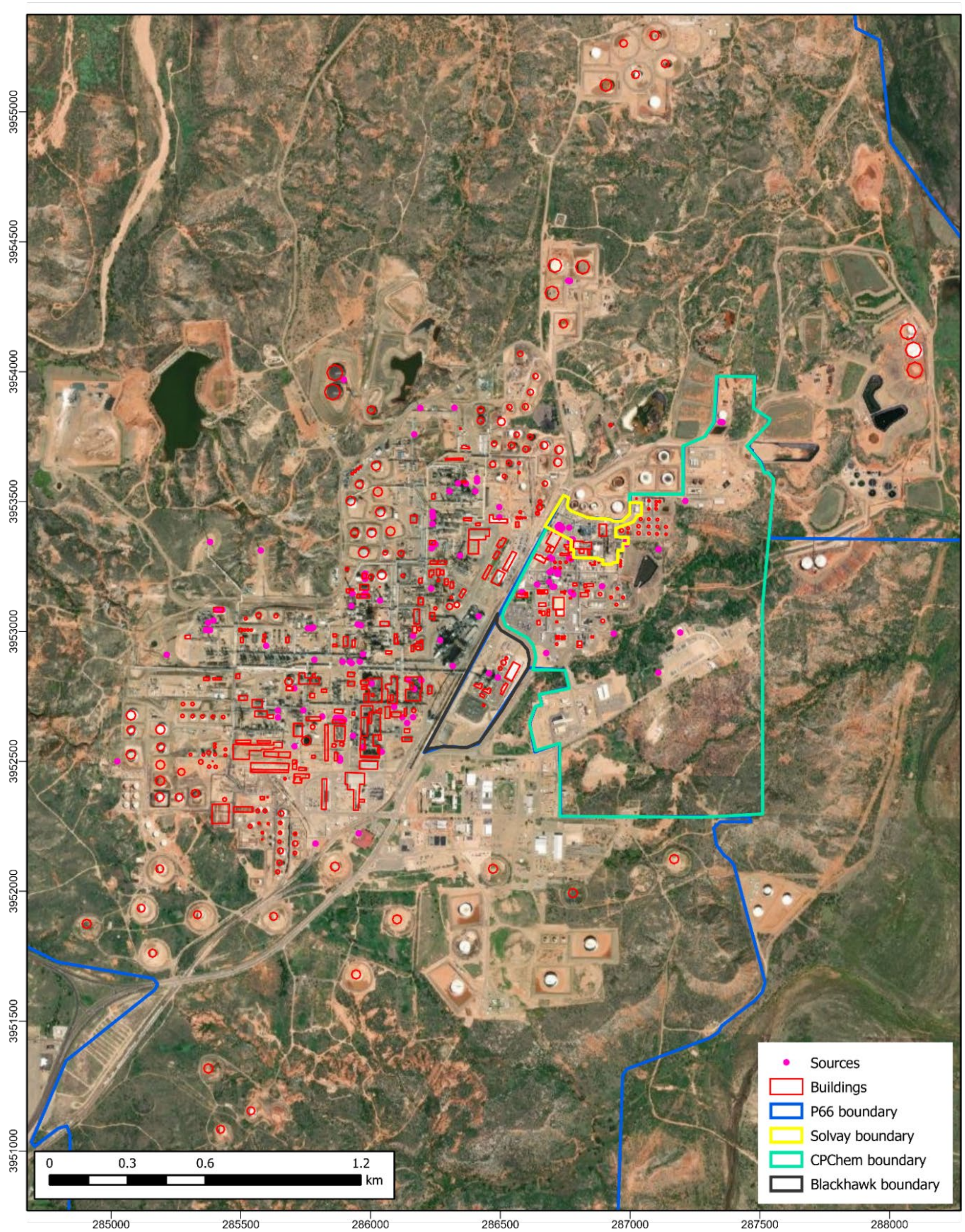

Figure 4-4: Blackhawk Power Plant, Solvay Specialty Polymers Plant, P66 Borger Refinery, CP Chem Borger Plant Sites Overview

4.5.1 Blackhawk Power Plant Sources

Sources along with stack parameters that were used in modeling are listed in Table 4-5: *Blackhawk Power Plant Source Parameters*. Emissions corresponding to a full load were provided in Chapter 4, Section 4.4: *Source Parameters and Controlled Emissions* in the AD SIP narrative.

Table 4-5: Blackhawk Power Plant Source Parameters

EPN	Type	UTM Easting (m)	UTM Northing (m)	Height (m)	Diameter (m)	Temperature (˚F)	Velocity (m/s)	Emission Rate (lb/hr)
EPN11	Stack	286456	3952838	39.62	5.49	298.89	19.81	102.00
EPN21	Stack	286490	3952823	40.00	5.00	298.89	19.81	102.00

4.6 CP CHEM BORGER PLANT

A map of the CP Chem Borger Plant site is shown in Figure 4-4. The modeled site boundary is visible in green, the building locations plotted with a red outline, and the SO_2 sources marked as pink dots. The modeled site boundary and building information were provided to the TCEQ by CP Chem Borger Plant. The buildings were processed in BPIPPRM to calculate stack-tip downwash parameters. Elevation for the buildings and sources were determined using one-third arc-second USGS NED.

4.6.1 CP Chem Borger Plant Sources

CP Chem Borger Plant sources and parameters that were used in modeling and are listed in Table 4-6: *CP Chem Borger Plant Point Source Parameters*, in Table 4-7: *CP Chem Borger Plant Area Sources,* and in Table 4-8: *CP Chem Borger Plant Polygon Source*. Table 4-9: *Coordinates of Polygon Source* lists the coordinates for the polygon source. In addition to the individual limits specified in their NSR permit, the combined emissions from flares EPN FL-1 and EPN FL-2 limited to 430 lb/hr. There are three possible operating scenarios are listed in Table 4-10: *CP Chem Borger Plant Flare Emissions and Diameters* along with emissions rates and corresponding effective diameters.

Table 4-6: CP Chem Borger Plant Point Source Parameters

EPN	Type	UTM Easting (m)	UTM Northing (m)	Height (m)	Diameter (m)	Temp. (˚F)	Velocity (m/s)	Routine Emission Rate (lb/hr)
FL-1	Flare	287110	3953316	60.96	2.21	1273	20.00	411.90
FL-2	Flare	286937	3952991	53.64	1.77	1273	20.00	75.18
ICE-NPY	Stack	287212	3953502	1.83	0.06	482.25	65.71	<0.01
ICE-SPY	Stack	287193	3952996	1.83	0.06	482.25	65.71	<0.01
M2B	Stack	286733	3953391	47.24	0.10	21.15	6.10	0.64
H_2	Stack	286892	3953174	6.71	0.61	537.75	1.83	0.00
H_3	Stack	286772	3953152	25.30	1.07	371.15	1.22	0.00

EPN	Type	UTM Easting (m)	UTM Northing (m)	Height (m)	Diameter (m)	Temp. (˚F)	Velocity (m/s)	Routine Emission Rate (lb/hr)
SP5C	Stack	286677	3952917	10.67	1.32	676.65	6.89	0.00
M2A1	Stack	286782	3953143	10.67	0.43	65.85	8.30	0.05
M2A1_ MSS	Stack	286782	3953143	10.67	0.43	65.85	8.30	0.01
ICE-03	Stack	287356	3953805	4.27	0.13	483.85	91.19	<0.01
ICE-04	Stack	287348	3953806	4.27	0.13	483.85	91.19	<0.01
ICE-05	Stack	286586	3953150	6.10	0.08	260.05	3.05	<0.01
ICE-06	Stack	286582	3953150	6.10	0.08	260.05	3.05	<0.01

Table 4-7: CP Chem Borger Plant Area Sources

EPN	UTM Easting (m)	UTM Northing (m)	Height (m)	X-Length (m)	Y-Length (m)	Axis (degrees)	Emission Rate (lb/hr)
FM2A_1	286702	3953171	6.10	27.43	21.34	0	0.98
FM2A_2	287109	3952842	3.05	19.81	7.62	66	1.00
MPU_1	286642	3953181	6.10	32.00	39.62	0	0.016
MPU_2	286688	3953191	4.57	34.14	21.95	0	<0.01
MPU_3	286708	3953172	4.57	22.25	17.68	0	<0.01

Table 4-8: CP Chem Borger Plant Polygon Source

EPN	Height (m)	Emission Rate (lb/hr)
F_MPU	6.10	0.07

Table 4-9: Coordinates of Polygon Source

UTM Easting (m)	UTM Northing (m)
286720	3953221
286723	3953221
286723	3953235
286699	3953235
286700	3953280
286773	3953279
286774	3953345
286779	3953355
286730	3953383

UTM Easting (m)	UTM Northing (m)
286739	3953398
286734	3953406
286726	3953411
286721	3953404
286729	3953399
286719	3953383
286771	3953354
286768	3953346
286765	3953284
286692	3953285
286690	3953228
286720	3953227

Table 4-10: CP Chem Borger Plant Flare Emissions and Diameters

EPN	Scenario 1 Emission Rate (lb/hr)	Scenario 1 Diameter (m)	Scenario 2 Emission Rate (lb/hr)	Scenario 2 Diameter (m)	Scenario 3 Emission Rate (lb/hr)	Scenario 3 Diameter (m)
FL-1	411.90	1.27	0.00	0.00	430.00	1.35
FL-2	75.18	1.22	430.00	1.35	0.00	0.00

4.7 SOLVAY SPECIALTY POLYMERS PLANT

A map of the Solvay Specialty Polymers Plant site is shown in Figure 4-4. The modeled site is visible in yellow, the building locations plotted with a red outline, and the SO_2 sources marked as pink dots. The property boundary and building information were provided to the TCEQ by Solvay Specialty Polymers Plant. The buildings were processed in BPIPPRM to calculate stack-tip downwash parameters. Elevation for the buildings and sources were determined using one-third arc-second USGS NED.

4.7.1 Solvay Specialty Polymers Plant Sources

Modeled sources and parameters for Solvay Specialty Polymers Plant are listed in Table 4-11: *Solvay Specialty Polymers Plant Source Parameters*.

Table 4-11: Solvay Specialty Polymers Plant Source Parameters

EPN	Type	UTM Easting (m)	UTM Northing (m)	Height (m)	Diameter (m)	Temperature (°F)	Velocity (m/s)	Emission Rate (lb/hr)
H-10	Stack	286766	3953400	45.72	1.62	355.55	8.38	1.24
H-8	Stack	286985	3953349	15.24	0.99	148.85	5.71	0.87
H-9	Stack	286986	3953337	13.41	0.99	148.85	5.71	0.87

4.8 P66 BORGER REFINERY

A map of the P66 Borger Refinery Plant site is shown in Figure 4-4. The modeled site is visible in blue, the building locations plotted with a red outline, and the SO_2 sources marked as pink dots. The modeled site boundary and building information were provided to the TCEQ by P66 Borger Refinery. The buildings were processed in BPIPPRM to calculate stack-tip downwash parameters. Elevation for the buildings and sources were determined using one-third arc-second USGS NED.

4.8.1 P66 Borger Refinery Sources

Source parameters used in the modeling of P66 Borger Refinery are listed in Table 4-12: *P66 Borger Refinery Point Source Parameters* and Table 4-13: *P66 Borger Refinery Area Sources*. The modeled emission rates for these sources are specified in Chapter 4, Section 4.4.8 of the accompanying SIP revision narrative.

Table 4-12: P66 Borger Refinery Point Source Parameters

EPN	Type	UTM Easting (m)	UTM Northing (m)	Height (m)	Diameter (m)	Temperature (˚F)	Velocity (m/s)
BLR12	Stack	285927	3952878	39.62	2.44	148.85	18.29
12E1	Stack	285866	3952666	16.31	0.31	260.05	11.53
12E2	Stack	285872	3952666	16.31	0.31	260.05	11.53
12E3	Stack	285878	3952666	16.31	0.31	260.05	11.53
12E4	Stack	285884	3952666	16.31	0.31	260.05	11.53
12E5	Stack	285889	3952666	16.31	0.31	260.05	11.53
12E6	Stack	285892	3952659	16.31	0.31	260.05	9.61
12E7	Stack	285898	3952659	16.31	0.31	260.05	9.61
7E1	Stack	285429	3953083	16.31	0.31	260.05	4.02
7E2	Stack	285425	3953083	16.31	0.31	260.05	4.02
7E3	Stack	285421	3953083	16.31	0.31	260.05	4.02
7E4	Stack	285416	3953083	16.31	0.31	260.05	4.02
7E5	Stack	285411	3953083	16.31	0.31	260.05	4.02
7E6	Stack	285406	3953083	16.31	0.31	260.05	4.02
10H1	Stack	286404	3953539	28.47	2.36	165.56	2.09
19B1/19H1	Stack	286240	3953442	30.48	1.41	165.56	3.91
19B1/19H2	Stack	286239	3953453	30.48	1.41	165.56	2.02
19H3	Stack	286238	3953414	30.51	2.26	260.00	2.86
19B2/19H4	Stack	286235	3953320	19.66	1.22	165.56	4.25
19H5	Stack	286249	3953336	15.00	0.82	343.33	3.98
19H6	Stack	286238	3953460	33.53	3.03	260.00	2.64
2H1	Stack	285373	3953033	30.48	1.44	260.00	2.98
2H2	Stack	285783	3952891	20.88	1.52	232.22	2.24

EPN	Type	UTM Easting (m)	UTM Northing (m)	Height (m)	Diameter (m)	Temperature (˚F)	Velocity (m/s)
22H1	Stack	286233	3953165	9.14	1.07	260.00	2.36
26H1	Stack	286345	3953292	21.34	1.29	196.11	5.46
28H1	Stack	286337	3953570	29.26	2.73	165.56	2.82
29H4	Stack	285971	3952912	41.15	1.60	206.11	3.67
29P1	Stack	285958	3952884	53.64	2.44	293.35	12.53
34I1	Stack	285740	3952696	60.66	1.22	453.35	4.94
36H1	Stack	286367	3953569	27.43	1.52	260.00	6.66
40H1	Stack	285963	3953024	33.83	1.05	445.00	5.81
40H3	Stack	285950	3953027	24.69	1.28	395.56	9.33
40P1	Stack	285926	3953098	53.64	2.74	237.75	14.05
4H2	Stack	285779	3953016	10.82	0.61	260.00	1.42
42H1	Stack	286043	3952536	46.02	0.82	162.78	12.64
42H2	Stack	285972	3952554	46.02	0.82	162.78	12.64
43I1	Stack	286145	3952814	45.72	1.07	176.67	18.29
50H1	Stack	286268	3952967	57.91	2.13	243.33	7.64
50HT1	Stack	286761	3954350	0.46	0.61	65.56	0.98
50HT2	Stack	286765	3954350	0.46	0.61	65.56	0.98
50HT3	Stack	286768	3954349	0.46	0.61	65.56	0.98
5H1	Stack	285758	3953012	13.35	1.07	260.00	2.27
6H1	Stack	285375	3953004	15.24	0.69	260.00	2.48
7H1-4	Stack	285395	3953042	44.81	2.06	165.56	1.05
85B2	Stack	285930	3953146	64.92	3.58	198.89	6.33
9H1	Stack	286304	3953540	25.79	2.03	165.56	2.40
93E1	Stack	285882	3952503	14.02	0.61	260.00	7.27
93E2	Stack	285882	3952512	14.02	0.61	260.00	6.46
98H1	Stack	285933	3952599	39.62	1.98	190.56	8.87
SKIDBLR	Stack	285892	3952884	23.65	2.74	144.44	14.02
66FL1	Flare	286323	3953861	42.67	4.10	999.83	20.00
66FL2	Flare	286191	3953860	42.67	4.10	999.83	20.00
66FL3	Flare	285577	3953312	60.35	4.10	999.83	20.00
66FL8	Flare	281443	3955571	9.14	0.11	999.83	20.00
66FL10	Flare	280852	3955343	10.67	1.58	999.83	20.00
66FL11	Flare	281556	3954895	9.14	1.58	999.83	20.00
66FL12	Flare	285381	3953345	60.96	4.10	999.83	20.00
66FL13	Flare	286196	3952812	76.20	0.87	999.83	20.00

EPN	Type	UTM Easting (m)	UTM Northing (m)	Height (m)	Diameter (m)	Temperature (˚F)	Velocity (m/s)
51H1	Stack	286416	3953058	57.91	2.29	198.89	9.31
4H1	Stack	285772	3953012	13.23	1.07	260.00	3.24
6H3	Stack	285381	3953005	9.39	0.99	260.00	0.43
12H1	Stack	285813	3952672	13.11	0.53	260.00	1.40
81B17	Stack	286164	3952984	19.81	1.22	160.00	34.85
41H1	Stack	286005	3952800	45.72	2.43	162.78	11.84
28-H3	Stack	286410	3953589	30.48	2.69	243.33	12.30
28-H4	Stack	286410	3953578	30.48	2.69	243.33	12.30
88-H1	Stack	286496	3953440	57.91	2.13	243.33	26.37
88-V1	Stack	286496	3953479	36.88	0.24	37.78	4.72
ENG-SD-6	Stack	286168	3953759	1.13	0.10	387.78	69.19
ENG-SD-7	Stack	286168	3953759	1.13	0.10	387.78	69.19
ENG-SD-8	Stack	286168	3953759	1.34	0.10	580.00	46.63
ENG-EB1	Stack	286164	3952670	3.05	0.10	487.39	176.61
ENG-EB2	Stack	285597	3952945	3.05	0.10	487.39	176.61
ENG-EB3	Stack	286141	3952648	3.05	0.10	487.39	176.61
ENG-EB4	Stack	285365	3953006	2.44	0.10	487.39	176.61
ENG-EB5	Stack	285643	3952696	2.44	0.10	487.39	176.61
ENG-EB6	Stack	285980	3953150	2.44	0.10	487.39	176.61
ENG-EB7	Stack	285975	3953143	2.44	0.10	487.39	176.61
ENG-EB8	Stack	286122	3952670	3.05	0.10	487.39	176.61
ENG-EB9	Stack	285643	3952669	3.05	0.10	487.39	176.61
FWP1A	Stack	285706	3952781	10.67	0.15	389.44	30.48
FWP2A	Stack	285706	3952781	10.67	0.15	389.44	30.48
FWP3A	Stack	285706	3952558	6.10	0.15	389.44	30.48
FWP4A	Stack	285979	3953223	5.49	0.15	371.11	30.48
FWP5A	Stack	285979	3953203	4.57	0.15	371.11	30.48
NHT-3	Stack	285897	3953968	1.13	0.10	526.67	89.61
53FL1	Stack	285788	3952184	12.19	2.44	760.00	7.62
40H4	Stack	286037	3953119	39.62	2.29	276.67	7.62
ENG-SC1	Stack	286091	3952710	1.23	0.13	482.00	110.95
EG-1	Stack	285954	3952222	1.52	0.12	446.11	45.80
FWBP-1	Stack	286317	3952867	1.52	0.15	348.89	68.30
CPP1	Stack	285214	3952911	0.82	0.15	454.44	13.11
CPP2	Stack	285024	3952500	0.70	0.15	454.44	13.1064

Table 4-13: P66 Borger Refinery Area Sources

EPN	UTM Easting (m)	UTM Northing (m)	Height (m)	X-Length (m)	Y-Length (m)	Axis (degrees)
F-43WHB	286168	3952778	1.53	3.05	3.05	0.00
MISC-MSS	285920	3952883	0.92	3.05	3.05	0.00
MSSFUG	285920	3952883	0.92	3.05	3.05	0.00

5. MODELING DOMAIN

The modeling domain spans the Hutchinson County 2010 SO_2 NAAQS nonattainment area to ensure that the modeled scenarios demonstrate attainment of the NAAQS throughout the entire nonattainment area. Figure 5-1: *Modeling Domain and Receptor Grid* shows the nonattainment border as a red line and black points representing modeling receptors. To sufficiently capture SO_2 concentration gradients, the receptors decrease in resolution with increased distance away from emission sources with spacing of 50 meters for the finest, innermost grid, 150 meters for the medium-resolution grid, and 450 meters for outer grids. Receptors with spacing of 50 meters are placed around Tokai Borger Carbon Black Plant, Orion Borger Carbon Black Plant, and IACX Rock Creek Gas Plant sites, including the C1073 monitor, and around the south region of the northeast P66 Borger Refinery property cluster which includes Blackhawk Power Plant, CP Chem Borger Plant, and Solvay Specialty Polymers Plant. Additional receptors with 25 meters spacing were placed along site boundaries. Receptors were removed from areas not considered ambient air. Receptor elevations were derived with AERMOD's terrain preprocessor, AERMAP, using one-third arc-second USGS NED.

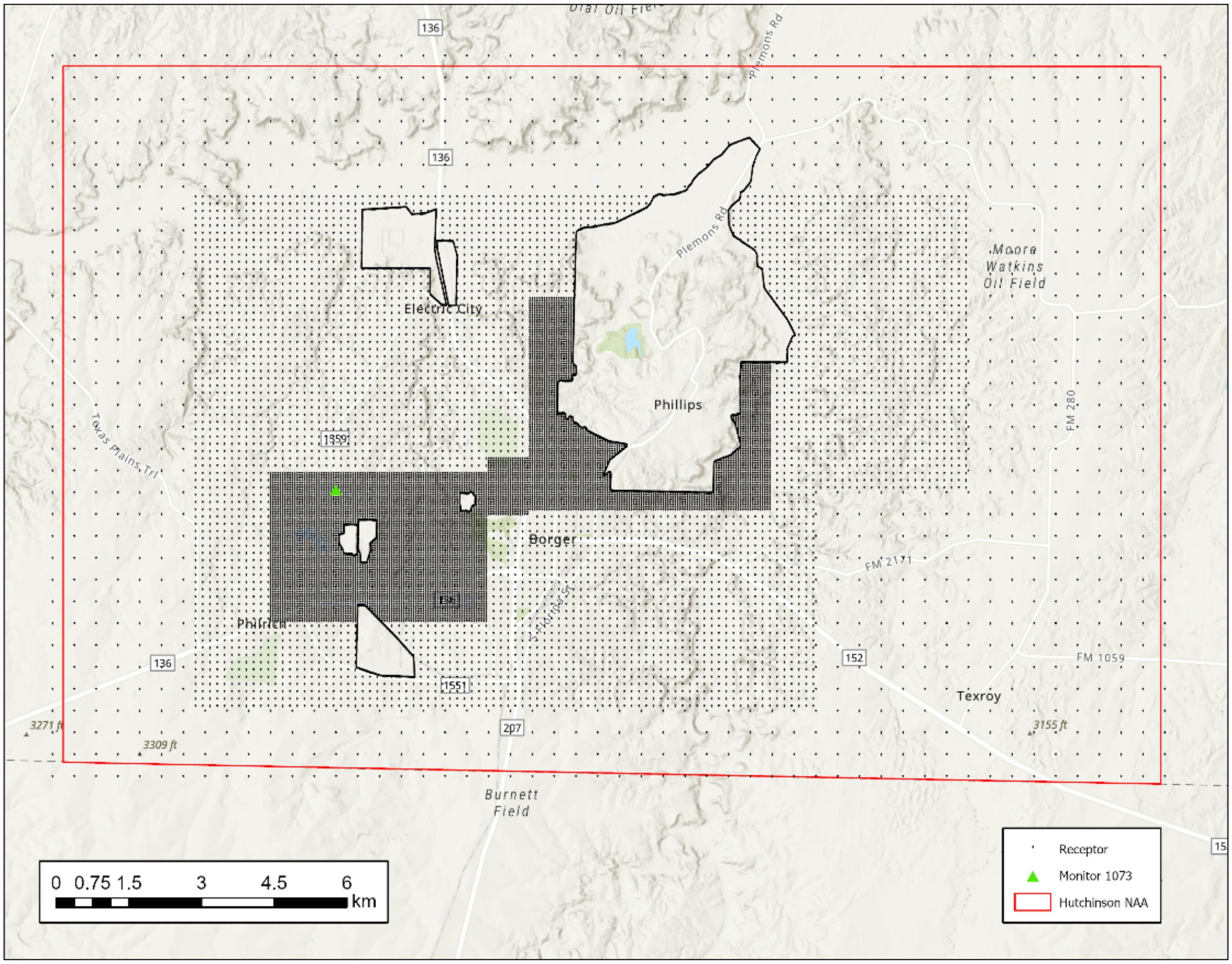

Figure 5-1: Modeling Domain and Receptor Grid

6. METEOROLOGICAL MODELING

6.1 AERMET

Following 40 CFR Part 51 Appendix W §8.4, five years of meteorological data for the years 2016 through 2020 were processed using the AERMOD preprocessors AERMET, AERMINUTE, and AERSURFACE. The closest surface station to the Tokai Borger Carbon Black Plant and Orion Borger Carbon Black Plant is the Borger Hutchinson Airport (WBAN 03024) and the upper air data[1] used are from the Amarillo Airport (WBAN 23047). Sub-hourly one-minute wind data from the surface station was included and processed with AERMINUTE using a threshold windspeed of 0.5 m/s. An hour adjustment to local time of +6 hours was used in AERMET.

Data completeness is presented for the surface station in Table 6-2: *Upper Air Data Completeness*, and for the upper air station in Table 6-2: *Upper Air Data Completeness*.

[1] https://ruc.noaa.gov/raobs/

Table 6-1: Surface Station Data Percent Completeness

Year	Temperature (%)	Wind Direction (%)	Wind Speed (%)	Acceptable
2016	99.8	96.1	99.5	Yes
2017	99.9	96.5	99.5	Yes
2018	99.7	96.7	99.7	Yes
2019	98.9	95.8	99.0	Yes
2020	99.2	96.1	99.6	Yes

Table 6-2: Upper Air Data Completeness

Year	Number of Valid Soundings	Acceptable
2016	740	Yes
2017	751	Yes
2018	738	Yes
2019	739	Yes
2020	747	Yes

6.2 AERSURFACE

AERMET takes inputs for the land surface characteristics of albedo, Bowen ratio, and surface roughness, which was derived using the AERSURFACE terrain preprocessor. For this demonstration, the TCEQ used 2016 National Land Cover Data (NLCD) in AERSURFACE, supplemented with NLCD canopy and impervious cover data for the same year. A radius of 1 km was used, as well as the maximum 12 wind sectors all classified as "airport."

6.2.1 Wetness Classification

Following the recommendations in the EPA's AERSURFACE v20060 User Guide, relative wetness classifications of dry, wet, or average have been determined based on 30 years of local precipitation data. The surface station does not have 30 years of annual precipitation data, so the percentiles have been calculated using an average of the available data between 1991-2020 from the National Climatic Data Center (NCDC)[2] for three stations in Hutchinson County including the surface station. The year was classified as wet if the annual precipitation was in the top 70th percentile (22.1 inches), dry if precipitation was in the bottom 30th percentile (18.3 inches), and average if precipitation was between those values. Table 6-3: *AERSURFACE Wetness Classifications* shows the yearly classifications, and the full 30 years of data can be found in Table 9-7: *Wetness Classification Precipitation Data*.

Table 6-3: AERSURFACE Wetness Classifications

Year	Average Precipitation (inches)	Classification
2016	19.3	Average
2017	25.4	Wet
2018	17.0	Dry
2019	25.5	Wet
2020	10.9	Dry

[2] https://www.ncdc.noaa.gov/cdo-web/search

6.2.2 Seasonal Classification

AERSURFACE determines the land surface characteristics by five seasonal classifications, which are differentiated primarily around the type of vegetation present within that season. The season descriptions and months which are assigned to each season by default are listed in Table 6-4: *AERSURFACE Seasonal Classifications*.

Table 6-4: AERSURFACE Seasonal Classifications

Seasonal Classification	Season Description from AERSURFACE v20060 User Guide	Default Months
Winter	"Late autumn after frost and harvest, or winter with no snow"	December, January, February
Spring	"Traditional spring with partial green coverage or short annuals"	March, April, May
Summer	"Midsummer with lush vegetation"	June, July, August
Autumn	"Autumn with unharvested crops"	September, October, November
Winter with continuous snow	"Winter with continuous snow on the ground"	December, January, February (if classified as continuous snow)

Per the EPA's AERSURFACE v20060 User Guide, the user can reassign months to different seasonal categories as "appropriate for the climate and conditions at the specific location." For this demonstration, the TCEQ followed a method for seasonal designations described by the Mississippi Department of Environmental Quality (Ferguson, 2017). This method uses frost-freeze occurrence data to determine the beginning and end of the winter, and monthly normal temperature to designate months into the other seasons. From the frost-freeze occurrence data, the month which contains the 50% probability fall freeze date is determined to be the beginning of winter. Likewise, the month which contains the 50% probability spring freeze date is determined to be the end of winter (a.k.a. the beginning of spring). Using the temperature data, any months with monthly normal temperatures above 70˚F are considered summer. The months between the end of winter and beginning of summer are classified as spring, and the months between the end of summer and beginning of winter are classified as autumn.

To designate months based on the above method, the TCEQ used monthly normal temperature data and frost-freeze occurrence data at the surface station from 1981 to 2010 from the NCDC.[3,4,5] As a result, September was assigned to the summer season, March and November were assigned to the winter season, and all other months were kept as their default assignment.

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[3] https://www1.ncdc.noaa.gov/pub/data/normals/1981-2010/products/station/USW00003024.normals.txt

[4] https://www1.ncdc.noaa.gov/pub/data/normals/1981-2010/supplemental/products/agricultural/ann-tmin-prbfst-t28Fp50.txt

[5] https://www1.ncdc.noaa.gov/pub/data/normals/1981-2010/supplemental/products/agricultural/ann-tmin-prblst-t28Fp50.txt

7. BACKGROUND CONCENTRATION

For SO_2 dispersion modeling, background concentrations of SO_2 are included to represent sources that are not explicitly modeled. To characterize background concentrations for attainment demonstration monitoring, the EPA recommends using data from the closest monitor upwind of the main source. There is a monitor close to the Tokai Borger Carbon Black Plant and Orion Borger Carbon Black Plant plants: the DRR monitor Borger FM 1559 monitor or Continuous Ambient Monitoring Station 1073 (C1073). However, C1073 was specifically sited to capture the impact of the Tokai Borger Carbon Black Plant and Orion Borger Carbon Black Plant emissions on nearby SO_2 concentrations, making it unsuitable to quantify background concentration. Further, previous analysis performed for the TCEQ's SO_2 nonattainment area designation modeling showed that SO_2 concentrations at C1073 are impacted by the Tokai Borger Carbon Black Plant and Orion Borger Carbon Black Plant, making C1073 unsuitable to quantify background concentration as well (TCEQ, 2020).

If there are no representative nearby monitors, the EPA recommends using a "regional site" monitor that may be located away from the source but is representative of the area. Table 7-1: *Monitors Considered for Background Concentration* shows "regional site" monitors that were considered for background concentration and their 2016 through 2020 design values (DV) in parts per billion (ppb). Only monitors with valid 2020 DVs were considered. Of the monitors considered, Midlothian Old Fort Worth (C52) monitor had the lowest variability over time making it suitable for background concentration. This monitor was chosen as the representative background monitor.

Using data from the C52, hourly and seasonally averaged background concentrations were calculated for every hour of the day, season, and year by using the second highest SO_2 or the 99th percentile SO_2 value. An R program was used to calculate both the second highest as well as the 99th percentile hourly SO_2 background concentrations. The function that calculates percentiles (quantile) in R was used with the parameter type set to 3. Both the second highest and the 99th percentile for each hour, season, and year are identical. Next, the 3-year average SO_2 hourly background concentration was calculated for each hour and season by averaging the hourly values over the three years (2018-2020). The calculated concentrations are listed in Table 7-2: *Hourly and Seasonally Varying Background Concentration.*

Table 7-1: Monitors Considered for Background Concentration

Monitor Site	Site Name	County	2016 DV (ppb)	2017 DV (ppb)	2018 DV (ppb)	2019 DV (ppb)	2020 DV (ppb)
C71	Kaufman	Kaufman	11	9	9	9	8
C52	Midlothian OFW	Ellis	6	5	6	6	6
C59	Calaveras Lake	Bexar	13	12	13	11	6
C4	Corpus Christi West	Nueces	n/a	4	4	6	6

Table 7-2: Hourly and Seasonally Varying Background Concentration

Monitor Hour	Model Hour	Winter SO_2 Concentration (ppb)	Spring SO_2 Concentration (ppb)	Summer SO_2 Concentration (ppb)	Fall SO_2 Concentration (ppb)
0	1	1.50	1.18	1.71	1.59
1	2	2.37	0.79	0.98	1.84
2	3	2.06	1.00	0.89	1.44
3	4	1.69	1.40	0.73	1.45
4	5	1.33	1.28	0.72	1.38
5	6	1.60	0.96	0.73	1.27
6	7	1.43	1.15	0.77	1.56
7	8	1.59	1.22	0.66	1.30
8	9	2.31	1.09	0.98	1.33
9	10	4.02	1.78	1.55	1.88
10	11	3.29	2.13	2.16	2.08
11	12	2.82	1.78	0.94	2.20
12	13	2.48	1.83	0.89	2.85
13	14	1.93	1.49	0.85	2.25
14	15	2.30	2.45	1.12	2.02
15	16	1.99	2.07	0.84	1.85
16	17	2.30	2.13	0.87	1.41
17	18	1.50	1.46	0.77	1.43
18	19	1.45	1.16	0.60	1.07
19	20	1.45	1.07	0.48	1.02
20	21	1.42	0.92	0.85	1.13
21	22	2.09	1.04	0.76	1.32
22	23	1.44	1.30	0.81	1.38
23	24	1.41	1.33	1.07	1.67

8. MODELING SCENARIOS

Following 40 CFR Part 51 Appendix W §8.2.2(d), any expected operating conditions which impacts the stack parameters or emission rates of the source parameters should be modeled to ensure that proposed control measures were protective of the 2010 one-hour SO_2 NAAQS of 75 ppb. Tokai Borger Carbon Black Plant, Orion Borger Carbon Black Plant, IACX Rock Creek Gas Plant, CP Chem Borger Plant and P66 Borger Refinery have different modes of operations that include emissions caps, details of which are included in Chapter 4 of the accompanying SIP revision narrative. Agrium Borger Nitrogen Plan, Blackhawk, and Solvay Specialty Polymers Plant emissions were the same in each modeled scenario. There were three sets of modeling runs, modeling scenarios with receptors placed in all ambient air areas of the nonattainment areas (Nonattainment Area Scenarios), modeling scenarios with emissions and stack parameters at lower operating loads for some sources (Load Analysis Scenarios), and modeling scenarios with receptors placed within site fence line boundaries (Site Ambient Scenarios). Final modeling scenarios were based on the control strategy and related future operating conditions for the facilities in the Hutchinson County 2010 SO_2 NAAQS nonattainment area.

8.1.1 Nonattainment Area Scenarios

Table 8-1: *Tokai Borger Carbon Black Plant Operation Scenarios and Emission Rates* provides details on three operating scenarios and associated emissions rates for EPN 119, EPN 121, EPN 122, EPN NEWFL, and EPN FLARE-1 at Tokai Borger Carbon Black Plant. The scenarios include one routine mode scenario, Ro, in which the EPN 119 is operational while the flares are off and two MSS mode scenarios, T1 and T2, during which EPN 119 is off while one of the two flares, EPN NEWFL or EPN FLARE-1, are operational in scenario T1 and T2, respectively. The scenarios were developed taking into consideration the limitation in Tokai Borger Carbon Black Plant's consent decree with the EPA that allows for flaring only when EPN 119 is in maintenance. Tokai Borger Carbon Black Plant further provided two possible future MSS scenarios contingent on the construction a new flare, EPN NEWFL, or the continued operation of an existing flare, EPN FLARE-1.

Table 8-1: Tokai Borger Carbon Black Plant Operation Scenarios and Emission Rates

EPN	Ro Emission Rates (lb/hr)	T1 Emission Rates (lb/hr)	T2 Emission Rates (lb/hr)
NEWFL	0.00	806.60	0.00
FLARE-1	0.00	0.00	420.00
119	109.10	0.00	0.00
121	441.00	272.50	250.00
122	595.00	436.00	400.00

Table 8-2: *Orion Borger Carbon Black Plant Operation Scenarios and Emission Rates* provides details on two different operating scenarios and emission rates for EPN E6BN and EPN CFL at Orion Borger Carbon Black Plant. Routine mode scenario, Ro, during which boiler EPN E6BN is operational while the flare is off and a MSS mode scenario, O, during which EPN E6BN is off while the flare is operational. The scenarios were developed taking into consideration the limitation in Orion Borger Carbon Black Plant's consent decree with the EPA that allows for flaring only when EPN E6BN is in maintenance.

Table 8-2: Orion Borger Carbon Black Plant Operation Scenarios and Emission Rates

EPN	Ro Emission Rates (lb/hr)	O Emission Rates (lb/hr)
CFL	0.00	750.05
E6BN	114.11	0.00

Table 8-3: *IACX Rock Creek Gas Plant Operation Scenarios and Emission Rates* details on two different operating scenarios and associated emission rates for EPN ICN1 and EPN FL1 at IACX Rock Creek Gas Plant. A routine model scenario, Ia, during which the incinerator, EPN ICN1, is operational while the flare, EPN FLR1, is off and another routine mode scenario, Ib, during which EPN ICN1 is off while EPN FLR1 is operational.

Table 8-3: IACX Rock Creek Gas Plant Operation Scenarios and Emission Rates

EPN	Ia Emission Rates (lb/hr)	Ib Emission Rates (lb/hr)
ICN1	140.00	0.00
FLR1	0.00	140.00

Table 8-4: *CP Chem Borger Plant Operation Scenarios* include three different scenarios and associated emissions. The scenarios account for the different operational scenarios for their flares, EPN FL-1 and EPN FL2. The scenarios include operating simultaneously at the maximum allowable emission rates specified in their NSR permit and two additional scenarios where one of the two flares is not operational. The combined emission rate for the flares is modeled in scenarios where one of the two flares is not operational.

Table 8-4: CP Chem Borger Plant Operation Scenarios and Emission Rates

EPN	CP1 Emission Rates (lb/hr)	CP3 Emission Rates (lb/hr)	CP4 Emission Rates (lb/hr)
FL-1	411.90	0.00	430.00
FL-2	75.18	430.00	00.00

Table 8-5: *P66 Borger Refinery Operation Scenarios and Emission Rates – part 1*, Table 8-6: *P66 Borger Refinery Operation Scenarios and Emission Rates – part 2,* Table 8-7: *P66 Borger Refinery Operation Scenarios and Emission Rates – part 3*, and Table 8-8: *P66 Borger Refinery Operation Scenarios and Emission Rates – part 4* provide details of the operating scenarios and the associated emission rates for the P66 Borger Refinery site. The scenarios were developed taking into consideration the emissions caps and operating modes for the site. There is one routine mode operating scenario and 26 MSS mode operating scenarios. The 26 MSS mode operating scenarios were developed taking into the emissions cap for MSS emissions (FLARE CAP MSS) from four flares, EPN 66FL1, EPN 66FL2, EPN 66FL3, and EPN 66FL12 and the restriction that the incinerators, EPN 34I1 and EPN 43I1 cannot be operated simultaneously. To ensure that under different distributions of the FLARE CAP MSS emissions of the four flares will continue to remain in attainment, the TCEQ identified 13 operating scenarios –

four scenarios where the entire cap is emitted by one of the four flares, six scenarios where the cap is split between any two of the four flares, and three scenarios where 75% of the cap is emitted by EPN 66FL12 while the remaining 25% is emitted by one of the other three flares. Each of the 13 scenarios were then modeled with either EPN 34I1 or EPN 43I1 in operation, resulting in a total of 26 MSS scenarios for the P66 Borger Refinery site.

Table 8-5: P66 Borger Refinery Operation Scenarios and Emission Rates – part 1

EPN	Ro Emission Rates (lb/hr)	Pa1 Emission Rates (lb/hr)	Pa2 Emission Rates (lb/hr)	Pa3 Emission Rates (lb/hr)	Pa12 Emission Rates (lb/hr)	Pa1_2 Emission Rates (lb/hr)	Pa3_12 Emission Rates (lb/hr)
34I1	44.82	0.00	0.00	0.00	0.00	0.00	0.00
43I1	37.00	94.00	94.00	94.00	94.00	94.00	94.00
66FL1	100.14	850.00	100.14	100.14	100.14	425.00	100.14
66FL2	100.14	0.00	850.00	0.00	0.00	425.00	0.00
66FL3	100.14	0.00	0.00	850.00	0.00	0.00	425.00
66FL12	100.14	100.14	0.00	0.00	850.00	100.14	425.00

Table 8-6: P66 Borger Refinery Operation Scenarios and Emission Rates – part 2

EPN	Pa1_3 Emission Rates (lb/hr)	Pa1_12 Emission Rates (lb/hr)	Pa2_12 Emission Rates (lb/hr)	Pa2_3 Emission Rates (lb/hr)	Pa1_12_25n75 Emission Rates (lb/hr)	Pa2_12_25n75 Emission Rates (lb/hr)
34I1	0.00	0.00	0.00	0.00	0.00	0.00
43I1	94.00	94.00	94.00	94.00	94.00	94.00
66FL1	425.00	425.00	100.14	100.14	212.5	100.14
66FL2	0.00	0.00	425.00	425.00	0.00	212.5
66FL3	425.00	100.14	0.00	425.00	100.14	0.00
66FL12	100.14	425.00	425.00	0.00	637.5	637.5

Table 8-7: P66 Borger Refinery Operation Scenarios and Emission Rates – part 3

EPN	Pa3_12_25n75 Emission Rates (lb/hr)	Pb1 Emission Rates (lb/hr)	Pb2 Emission Rates (lb/hr)	Pb3 Emission Rates (lb/hr)	Pb12 Emission Rates (lb/hr)	Pb1_2 Emission Rates (lb/hr)	Pb3_12 Emission Rates (lb/hr)
34I1	0.00	94.00	94.00	94.00	94.00	94.00	94.00
43I1	94.00	0.00	0.00	0.00	0.00	0.00	0.00
66FL1	100.14	850.00	100.14	100.14	100.14	425.00	100.14
66FL2	0.00	0.00	850.00	0.00	0.00	425.00	0.00
66FL3	212.5	0.00	0.00	850.00	0.00	0.00	425.00
66FL12	637.5	100.14	0.00	0.00	850.00	100.14	425.00

Table 8-8: P66 Borger Refinery Operation Scenarios and Emission Rates – part 4

EPN	Pb1_3 Emission Rates (lb/hr)	Pb1_12 Emission Rates (lb/hr)	Pb2_12 Emission Rates (lb/hr)	Pb2_3 Emission Rates (lb/hr)	Pb1_12_25n 75 Emission Rates (lb/hr)	Pb2_12_25n 75 Emission Rates (lb/hr)	Pb3_12_25n 75 Emission Rates (lb/hr)
34I1	94.00	94.00	94.00	94.00	94.00	94.00	94.00
43I1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
66FL1	425.00	425.00	100.14	100.14	212.5	100.14	100.14
66FL2	0.00	0.00	425.00	425.00	0.00	212.5	0.00
66FL3	425.00	100.14	0.00	425.00	100.14	0.00	212.5
66FL12	100.14	425.00	425.00	0.00	637.5	637.5	637.5

Emissions sources not specified in Table 8-1 to Table 8-8 have constant emission rates for all scenarios as specified in Chapter 4 of the accompanying SIP revision narrative.

Each site's scenarios were then combined by operation mode – routine or MSS to identify the final set of scenarios. For routine mode of operations, routine operations for Tokai Borger Carbon Black Plant, Orion Borger Carbon Black Plant, Agrium Borger Nitrogen Plan, Solvay Specialty Polymers Plant and Blackhawk Power Plant were combined with two routine IACX Rock Creek Gas Plant scenarios (Ia and Ib) and three CP Chem Borger Plant routine scenarios (CP1, CP2, and CP3) for a total of 6 (2 x 3) routine scenarios. For MSS mode of operations, routine operations for Agrium Borger Nitrogen Plan, Solvay Specialty Polymers Plant and Blackhawk, two routine IACX scenarios (Ia and Ib) and three CP Chem Borger Plant routine scenarios (CP1, CP2, and CP3) was combined with Orion Borger Carbon Black Plant MSS operation, two Tokai Borger Carbon Black Plant MSS operation scenarios (T1 and T2), and 26 P66 Borger Refinery MSS operation scenarios for a total of 312 (26 x 3 x 2 x 2) MSS scenarios. Table 8-9: *Modeling Scenarios and Maximum Modeled DV* lists scenarios modeled for the Hutchinson County AD SIP revision along with a mapping to each site's operating scenario and the maximum modeled design value.

Table 8-9: Modeling Scenarios and Maximum Modeled DV

No.	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
1	Ra	Ro	Ro	a	CP1	Ro	Ro	Ro	Ro	71.6
2	Rb	Ro	Ro	b	CP1	Ro	Ro	Ro	Ro	67.1
3	Ra_CP3	Ro	Ro	a	CP3	Ro	Ro	Ro	Ro	71.6
4	Rb_CP3	Ro	Ro	b	CP3	Ro	Ro	Ro	Ro	67.1
5	Ra_CP4	Ro	Ro	a	CP4	Ro	Ro	Ro	Ro	67.1
6	Rb_CP4	Ro	Ro	b	CP4	Ro	Ro	Ro	Ro	71.6
7	MSa_O_T1_Pa1	T1	O	a	CP1	Pa1	Ro	Ro	Ro	74.3
8	MSa_O_T1_Pa2	T1	O	a	CP1	Pa2	Ro	Ro	Ro	74.3
9	MSa_O_T1_Pa3	T1	O	a	CP1	Pa3	Ro	Ro	Ro	74.4
10	MSa_O_T1_Pa12	T1	O	a	CP1	Pa12	Ro	Ro	Ro	74.4
11	MSa_O_T1_Pa1_2	T1	O	a	CP1	Pa1_2	Ro	Ro	Ro	74.4
12	MSa_O_T1_Pa1_3	T1	O	a	CP1	Pa1_3	Ro	Ro	Ro	74.4
13	MSa_O_T1_Pa1_12	T1	O	a	CP1	Pa1_12	Ro	Ro	Ro	74.4
14	MSa_O_T1_Pa2_3	T1	O	a	CP1	Pa2_3	Ro	Ro	Ro	74.4
15	MSa_O_T1_Pa2_12	T1	O	a	CP1	Pa2_12	Ro	Ro	Ro	74.4
16	MSa_O_T1_Pa3_12	T1	O	a	CP1	Pa3_12	Ro	Ro	Ro	74.7
17	MSa_O_T1_Pa1_12_25n75	T1	O	a	CP1	Pa1_12_25n75	Ro	Ro	Ro	74.4
18	MSa_O_T1_Pa2_12_25n75	T1	O	a	CP1	Pa2_12_25n75	Ro	Ro	Ro	74.4
19	MSa_O_T1_Pa3_12_25n75	T1	O	a	CP1	Pa3_12_25n75	Ro	Ro	Ro	74.4

[6] Tokai Borger Carbon Black Plant
[7] Orion Borger Carbon Black Plant
[8] IACX Rock Creek Gas Plant
[9] CP Chem Borger Plant
[10] P66 Borger Refinery
[11] Agrium Borger Nitrogen Plant
[12] Blackhawk Power Plant
[13] Solvay Specialty Polymers Plant

No.	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
20	MSa_O_T1_Pa1_cp3	T1	O	a	CP3	Pa1	Ro	Ro	Ro	74.3
21	MSa_O_T1_Pa2_cp3	T1	O	a	CP3	Pa2	Ro	Ro	Ro	74.3
22	MSa_O_T1_Pa3_cp3	T1	O	a	CP3	Pa3	Ro	Ro	Ro	74.3
23	MSa_O_T1_Pa12_cp3	T1	O	a	CP3	Pa12	Ro	Ro	Ro	74.3
24	MSa_O_T1_Pa1_2_cp3	T1	O	a	CP3	Pa1_2	Ro	Ro	Ro	74.4
25	MSa_O_T1_Pa1_3_cp3	T1	O	a	CP3	Pa1_3	Ro	Ro	Ro	74.4
26	MSa_O_T1_Pa1_12_cp3	T1	O	a	CP3	Pa1_12	Ro	Ro	Ro	74.4
27	MSa_O_T1_Pa2_3_cp3	T1	O	a	CP3	Pa2_3	Ro	Ro	Ro	74.4
28	MSa_O_T1_Pa2_12_cp3	T1	O	a	CP3	Pa2_12	Ro	Ro	Ro	74.4
29	MSa_O_T1_Pa3_12_cp3	T1	O	a	CP3	Pa3_12	Ro	Ro	Ro	74.4
30	MSa_O_T1_Pa1_12_25n75_cp3	T1	O	a	CP3	Pa1_12_25n75	Ro	Ro	Ro	74.4
31	MSa_O_T1_Pa2_12_25n75_cp3	T1	O	a	CP3	Pa2_12_25n75	Ro	Ro	Ro	74.4
32	MSa_O_T1_Pa3_12_25n75_cp3	T1	O	a	CP3	Pa3_12_25n75	Ro	Ro	Ro	74.4
33	MSa_O_T1_Pa1_cp4	T1	O	a	CP4	Pa1	Ro	Ro	Ro	74.3
34	MSa_O_T1_Pa2_cp4	T1	O	a	CP4	Pa2	Ro	Ro	Ro	74.3
35	MSa_O_T1_Pa3_cp4	T1	O	a	CP4	Pa3	Ro	Ro	Ro	74.3
36	MSa_O_T1_Pa12_cp4	T1	O	a	CP4	Pa12	Ro	Ro	Ro	74.3
37	MSa_O_T1_Pa1_2_cp4	T1	O	a	CP4	Pa1_2	Ro	Ro	Ro	74.4
38	MSa_O_T1_Pa1_3_cp4	T1	O	a	CP4	Pa1_3	Ro	Ro	Ro	74.4
39	MSa_O_T1_Pa1_12_cp4	T1	O	a	CP4	Pa1_12	Ro	Ro	Ro	74.4
40	MSa_O_T1_Pa2_3_cp4	T1	O	a	CP4	Pa2_3	Ro	Ro	Ro	74.4
41	MSa_O_T1_Pa2_12_cp4	T1	O	a	CP4	Pa2_12	Ro	Ro	Ro	74.4
42	MSa_O_T1_Pa3_12_cp4	T1	O	a	CP4	Pa3_12	Ro	Ro	Ro	74.4
43	MSa_O_T1_Pa1_12_25n75_cp4	T1	O	a	CP4	Pa1_12_25n75	Ro	Ro	Ro	74.4
44	MSa_O_T1_Pa2_12_25n75_cp4	T1	O	a	CP4	Pa2_12_25n75	Ro	Ro	Ro	74.4
45	MSa_O_T1_Pa3_12_25n75_cp4	T1	O	a	CP4	Pa3_12_25n75	Ro	Ro	Ro	74.4
46	MSb_O_T1_Pa1	T1	O	b	CP1	Pa1	Ro	Ro	Ro	69.9

No.	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
47	MSb_O_T1_Pa2	T1	O	b	CP1	Pa2	Ro	Ro	Ro	69.9
48	MSb_O_T1_Pa3	T1	O	b	CP1	Pa3	Ro	Ro	Ro	71.4
49	MSb_O_T1_Pa12	T1	O	b	CP1	Pa12	Ro	Ro	Ro	70.8
50	MSb_O_T1_Pa1_2	T1	O	b	CP1	Pa1_2	Ro	Ro	Ro	72.9
51	MSb_O_T1_Pa1_3	T1	O	b	CP1	Pa1_3	Ro	Ro	Ro	74.2
52	MSb_O_T1_Pa1_12	T1	O	b	CP1	Pa1_12	Ro	Ro	Ro	74.0
53	MSb_O_T1_Pa2_3	T1	O	b	CP1	Pa2_3	Ro	Ro	Ro	73.8
54	MSb_O_T1_Pa2_12	T1	O	b	CP1	Pa2_12	Ro	Ro	Ro	73.6
55	MSb_O_T1_Pa3_12	T1	O	b	CP1	Pa3_12	Ro	Ro	Ro	74.7
56	MSb_O_T1_Pa1_12_25n75	T1	O	b	CP1	Pa1_12_25n75	Ro	Ro	Ro	73.7
57	MSb_O_T1_Pa2_12_25n75	T1	O	b	CP1	Pa2_12_25n75	Ro	Ro	Ro	73.3
58	MSb_O_T1_Pa3_12_25n75	T1	O	b	CP1	Pa3_12_25n75	Ro	Ro	Ro	73.9
59	MSb_O_T1_Pa1_cp3	T1	O	b	CP3	Pa1	Ro	Ro	Ro	69.9
60	MSb_O_T1_Pa2_cp3	T1	O	b	CP3	Pa2	Ro	Ro	Ro	69.9
61	MSb_O_T1_Pa3_cp3	T1	O	b	CP3	Pa3	Ro	Ro	Ro	70.0
62	MSb_O_T1_Pa12_cp3	T1	O	b	CP3	Pa12	Ro	Ro	Ro	69.9
63	MSb_O_T1_Pa1_2_cp3	T1	O	b	CP3	Pa1_2	Ro	Ro	Ro	71.5
64	MSb_O_T1_Pa1_3_cp3	T1	O	b	CP3	Pa1_3	Ro	Ro	Ro	72.6
65	MSb_O_T1_Pa1_12_cp3	T1	O	b	CP3	Pa1_12	Ro	Ro	Ro	72.3
66	MSb_O_T1_Pa2_3_cp3	T1	O	b	CP3	Pa2_3	Ro	Ro	Ro	72.2
67	MSb_O_T1_Pa2_12_cp3	T1	O	b	CP3	Pa2_12	Ro	Ro	Ro	71.9
68	MSb_O_T1_Pa3_12_cp3	T1	O	b	CP3	Pa3_12	Ro	Ro	Ro	73.7
69	MSb_O_T1_Pa1_12_25n75_cp3	T1	O	b	CP3	Pa1_12_25n75	Ro	Ro	Ro	72.2
70	MSb_O_T1_Pa2_12_25n75_cp3	T1	O	b	CP3	Pa2_12_25n75	Ro	Ro	Ro	71.8
71	MSb_O_T1_Pa3_12_25n75_cp3	T1	O	b	CP3	Pa3_12_25n75	Ro	Ro	Ro	72.9
72	MSb_O_T1_Pa1_cp4	T1	O	b	CP4	Pa1	Ro	Ro	Ro	69.9
73	MSb_O_T1_Pa2_cp4	T1	O	b	CP4	Pa2	Ro	Ro	Ro	69.9

No.	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
74	MSb_O_T1_Pa3_cp4	T1	O	b	CP4	Pa3	Ro	Ro	Ro	69.9
75	MSb_O_T1_Pa12_cp4	T1	O	b	CP4	Pa12	Ro	Ro	Ro	69.9
76	MSb_O_T1_Pa1_2_cp4	T1	O	b	CP4	Pa1_2	Ro	Ro	Ro	71.6
77	MSb_O_T1_Pa1_3_cp4	T1	O	b	CP4	Pa1_3	Ro	Ro	Ro	72.8
78	MSb_O_T1_Pa1_12_cp4	T1	O	b	CP4	Pa1_12	Ro	Ro	Ro	72.6
79	MSb_O_T1_Pa2_3_cp4	T1	O	b	CP4	Pa2_3	Ro	Ro	Ro	72.5
80	MSb_O_T1_Pa2_12_cp4	T1	O	b	CP4	Pa2_12	Ro	Ro	Ro	72.2
81	MSb_O_T1_Pa3_12_cp4	T1	O	b	CP4	Pa3_12	Ro	Ro	Ro	73.3
82	MSb_O_T1_Pa1_12_25n75_cp4	T1	O	b	CP4	Pa1_12_25n75	Ro	Ro	Ro	72.2
83	MSb_O_T1_Pa2_12_25n75_cp4	T1	O	b	CP4	Pa2_12_25n75	Ro	Ro	Ro	71.9
84	MSb_O_T1_Pa3_12_25n75_cp4	T1	O	b	CP4	Pa3_12_25n75	Ro	Ro	Ro	72.6
85	MSa_O_T1_Pb1	T1	O	a	CP1	Pb1	Ro	Ro	Ro	74.4
86	MSa_O_T1_Pb2	T1	O	a	CP1	Pb2	Ro	Ro	Ro	74.4
87	MSa_O_T1_Pb3	T1	O	a	CP1	Pb3	Ro	Ro	Ro	74.4
88	MSa_O_T1_Pb12	T1	O	a	CP1	Pb12	Ro	Ro	Ro	74.4
89	MSa_O_T1_Pb1_2	T1	O	a	CP1	Pb1_2	Ro	Ro	Ro	74.4
90	MSa_O_T1_Pb1_3	T1	O	a	CP1	Pb1_3	Ro	Ro	Ro	74.7
91	MSa_O_T1_Pb1_12	T1	O	a	CP1	Pb1_12	Ro	Ro	Ro	74.5
92	MSa_O_T1_Pb2_3	T1	O	a	CP1	Pb2_3	Ro	Ro	Ro	74.4
93	MSa_O_T1_Pb2_12	T1	O	a	CP1	Pb2_12	Ro	Ro	Ro	74.4
94	MSa_O_T1_Pb3_12	T1	O	a	CP1	Pb3_12	Ro	Ro	Ro	74.9
95	MSa_O_T1_Pb1_12_25n75	T1	O	a	CP1	Pb1_12_25n75	Ro	Ro	Ro	74.4
96	MSa_O_T1_Pb2_12_25n75	T1	O	a	CP1	Pb2_12_25n75	Ro	Ro	Ro	74.4
97	MSa_O_T1_Pb3_12_25n75	T1	O	a	CP1	Pb3_12_25n75	Ro	Ro	Ro	74.4
98	MSa_O_T1_Pb1_cp3	T1	O	a	CP3	Pb1	Ro	Ro	Ro	74.3
99	MSa_O_T1_Pb2_cp3	T1	O	a	CP3	Pb2	Ro	Ro	Ro	74.3
100	MSa_O_T1_Pb3_cp3	T1	O	a	CP3	Pb3	Ro	Ro	Ro	74.4

No.	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
101	MSa_O_T1_Pb12_cp3	T1	O	a	CP3	Pb12	Ro	Ro	Ro	74.4
102	MSa_O_T1_Pb1_2_cp3	T1	O	a	CP3	Pb1_2	Ro	Ro	Ro	74.4
103	MSa_O_T1_Pb1_3_cp3	T1	O	a	CP3	Pb1_3	Ro	Ro	Ro	74.4
104	MSa_O_T1_Pb1_12_cp3	T1	O	a	CP3	Pb1_12	Ro	Ro	Ro	74.4
105	MSa_O_T1_Pb2_3_cp3	T1	O	a	CP3	Pb2_3	Ro	Ro	Ro	74.4
106	MSa_O_T1_Pb2_12_cp3	T1	O	a	CP3	Pb2_12	Ro	Ro	Ro	74.4
107	MSa_O_T1_Pb3_12_cp3	T1	O	a	CP3	Pb3_12	Ro	Ro	Ro	74.4
108	MSa_O_T1_Pb1_12_25n75_cp3	T1	O	a	CP3	Pb1_12_25n75	Ro	Ro	Ro	74.4
109	MSa_O_T1_Pb2_12_25n75_cp3	T1	O	a	CP3	Pb2_12_25n75	Ro	Ro	Ro	74.4
110	MSa_O_T1_Pb3_12_25n75_cp3	T1	O	a	CP3	Pb3_12_25n75	Ro	Ro	Ro	74.4
111	MSa_O_T1_Pb1_cp4	T1	O	a	CP4	Pb1	Ro	Ro	Ro	74.3
112	MSa_O_T1_Pb2_cp4	T1	O	a	CP4	Pb2	Ro	Ro	Ro	74.3
113	MSa_O_T1_Pb3_cp4	T1	O	a	CP4	Pb3	Ro	Ro	Ro	74.3
114	MSa_O_T1_Pb12_cp4	T1	O	a	CP4	Pb12	Ro	Ro	Ro	74.4
115	MSa_O_T1_Pb1_2_cp4	T1	O	a	CP4	Pb1_2	Ro	Ro	Ro	74.4
116	MSa_O_T1_Pb1_3_cp4	T1	O	a	CP4	Pb1_3	Ro	Ro	Ro	74.4
117	MSa_O_T1_Pb1_12_cp4	T1	O	a	CP4	Pb1_12	Ro	Ro	Ro	74.4
118	MSa_O_T1_Pb2_3_cp4	T1	O	a	CP4	Pb2_3	Ro	Ro	Ro	74.4
119	MSa_O_T1_Pb2_12_cp4	T1	O	a	CP4	Pb2_12	Ro	Ro	Ro	74.4
120	MSa_O_T1_Pb3_12_cp4	T1	O	a	CP4	Pb3_12	Ro	Ro	Ro	74.4
121	MSa_O_T1_Pb1_12_25n75_cp4	T1	O	a	CP4	Pb1_12_25n75	Ro	Ro	Ro	74.4
122	MSa_O_T1_Pb2_12_25n75_cp4	T1	O	a	CP4	Pb2_12_25n75	Ro	Ro	Ro	74.4
123	MSa_O_T1_Pb3_12_25n75_cp4	T1	O	a	CP4	Pb3_12_25n75	Ro	Ro	Ro	74.4
124	MSb_O_T1_Pb1	T1	O	b	CP1	Pb1	Ro	Ro	Ro	69.9
125	MSb_O_T1_Pb2	T1	O	b	CP1	Pb2	Ro	Ro	Ro	69.9
126	MSb_O_T1_Pb3	T1	O	b	CP1	Pb3	Ro	Ro	Ro	71.4
127	MSb_O_T1_Pb12	T1	O	b	CP1	Pb12	Ro	Ro	Ro	70.8

No.	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
128	MSb_O_T1_Pb1_2	T1	O	b	CP1	Pb1_2	Ro	Ro	Ro	72.9
129	MSb_O_T1_Pb1_3	T1	O	b	CP1	Pb1_3	Ro	Ro	Ro	74.2
130	MSb_O_T1_Pb1_12	T1	O	b	CP1	Pb1_12	Ro	Ro	Ro	73.9
131	MSb_O_T1_Pb2_3	T1	O	b	CP1	Pb2_3	Ro	Ro	Ro	73.8
132	MSb_O_T1_Pb2_12	T1	O	b	CP1	Pb2_12	Ro	Ro	Ro	73.5
133	MSb_O_T1_Pb3_12	T1	O	b	CP1	Pb3_12	Ro	Ro	Ro	74.6
134	MSb_O_T1_Pb1_12_25n75	T1	O	b	CP1	Pb1_12_25n75	Ro	Ro	Ro	73.6
135	MSb_O_T1_Pb2_12_25n75	T1	O	b	CP1	Pb2_12_25n75	Ro	Ro	Ro	73.2
136	MSb_O_T1_Pb3_12_25n75	T1	O	b	CP1	Pb3_12_25n75	Ro	Ro	Ro	73.9
137	MSb_O_T1_Pb1_cp3	T1	O	b	CP3	Pb1	Ro	Ro	Ro	69.9
138	MSb_O_T1_Pb2_cp3	T1	O	b	CP3	Pb2	Ro	Ro	Ro	69.9
139	MSb_O_T1_Pb3_cp3	T1	O	b	CP3	Pb3	Ro	Ro	Ro	69.9
140	MSb_O_T1_Pb12_cp3	T1	O	b	CP3	Pb12	Ro	Ro	Ro	69.9
141	MSb_O_T1_Pb1_2_cp3	T1	O	b	CP3	Pb1_2	Ro	Ro	Ro	71.5
142	MSb_O_T1_Pb1_3_cp3	T1	O	b	CP3	Pb1_3	Ro	Ro	Ro	72.6
143	MSb_O_T1_Pb1_12_cp3	T1	O	b	CP3	Pb1_12	Ro	Ro	Ro	72.3
144	MSb_O_T1_Pb2_3_cp3	T1	O	b	CP3	Pb2_3	Ro	Ro	Ro	72.1
145	MSb_O_T1_Pb2_12_cp3	T1	O	b	CP3	Pb2_12	Ro	Ro	Ro	71.9
146	MSb_O_T1_Pb3_12_cp3	T1	O	b	CP3	Pb3_12	Ro	Ro	Ro	73.6
147	MSb_O_T1_Pb1_12_25n75_cp3	T1	O	b	CP3	Pb1_12_25n75	Ro	Ro	Ro	72.1
148	MSb_O_T1_Pb2_12_25n75_cp3	T1	O	b	CP3	Pb2_12_25n75	Ro	Ro	Ro	71.7
149	MSb_O_T1_Pb3_12_25n75_cp3	T1	O	b	CP3	Pb3_12_25n75	Ro	Ro	Ro	72.8
150	MSb_O_T1_Pb1_cp4	T1	O	b	CP4	Pb1	Ro	Ro	Ro	69.9
151	MSb_O_T1_Pb2_cp4	T1	O	b	CP4	Pb2	Ro	Ro	Ro	69.9
152	MSb_O_T1_Pb3_cp4	T1	O	b	CP4	Pb3	Ro	Ro	Ro	69.9
153	MSb_O_T1_Pb12_cp4	T1	O	b	CP4	Pb12	Ro	Ro	Ro	69.9
154	MSb_O_T1_Pb1_2_cp4	T1	O	b	CP4	Pb1_2	Ro	Ro	Ro	71.5

No.	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
155	MSb_O_T1_Pb1_3_cp4	T1	O	b	CP4	Pb1_3	Ro	Ro	Ro	72.8
156	MSb_O_T1_Pb1_12_cp4	T1	O	b	CP4	Pb1_12	Ro	Ro	Ro	72.6
157	MSb_O_T1_Pb2_3_cp4	T1	O	b	CP4	Pb2_3	Ro	Ro	Ro	72.4
158	MSb_O_T1_Pb2_12_cp4	T1	O	b	CP4	Pb2_12	Ro	Ro	Ro	72.1
159	MSb_O_T1_Pb3_12_cp4	T1	O	b	CP4	Pb3_12	Ro	Ro	Ro	73.3
160	MSb_O_T1_Pb1_12_25n75_cp4	T1	O	b	CP4	Pb1_12_25n75	Ro	Ro	Ro	72.2
161	MSb_O_T1_Pb2_12_25n75_cp4	T1	O	b	CP4	Pb2_12_25n75	Ro	Ro	Ro	71.8
162	MSb_O_T1_Pb3_12_25n75_cp4	T1	O	b	CP4	Pb3_12_25n75	Ro	Ro	Ro	72.5
163	MSa_O_T2_Pa1	T2	O	a	CP1	Pa1	Ro	Ro	Ro	70.4
164	MSa_O_T2_Pa2	T2	O	a	CP1	Pa2	Ro	Ro	Ro	70.4
165	MSa_O_T2_Pa3	T2	O	a	CP1	Pa3	Ro	Ro	Ro	70.4
166	MSa_O_T2_Pa12	T2	O	a	CP1	Pa12	Ro	Ro	Ro	70.4
167	MSa_O_T2_Pa1_2	T2	O	a	CP1	Pa1_2	Ro	Ro	Ro	70.7
168	MSa_O_T2_Pa1_3	T2	O	a	CP1	Pa1_3	Ro	Ro	Ro	71.8
169	MSa_O_T2_Pa1_12	T2	O	a	CP1	Pa1_12	Ro	Ro	Ro	71.5
170	MSa_O_T2_Pa2_3	T2	O	a	CP1	Pa2_3	Ro	Ro	Ro	71.4
171	MSa_O_T2_Pa2_12	T2	O	a	CP1	Pa2_12	Ro	Ro	Ro	71.1
172	MSa_O_T2_Pa3_12	T2	O	a	CP1	Pa3_12	Ro	Ro	Ro	72.3
173	MSa_O_T2_Pa1_12_25n75	T2	O	a	CP1	Pa1_12_25n75	Ro	Ro	Ro	71.2
174	MSa_O_T2_Pa2_12_25n75	T2	O	a	CP1	Pa2_12_25n75	Ro	Ro	Ro	70.8
175	MSa_O_T2_Pa3_12_25n75	T2	O	a	CP1	Pa3_12_25n75	Ro	Ro	Ro	71.5
176	MSa_O_T2_Pa1_cp3	T2	O	a	CP3	Pa1	Ro	Ro	Ro	70.4
177	MSa_O_T2_Pa2_cp3	T2	O	a	CP3	Pa2	Ro	Ro	Ro	70.4
178	MSa_O_T2_Pa3_cp3	T2	O	a	CP3	Pa3	Ro	Ro	Ro	70.4
179	MSa_O_T2_Pa12_cp3	T2	O	a	CP3	Pa12	Ro	Ro	Ro	70.4
180	MSa_O_T2_Pa1_2_cp3	T2	O	a	CP3	Pa1_2	Ro	Ro	Ro	70.4
181	MSa_O_T2_Pa1_3_cp3	T2	O	a	CP3	Pa1_3	Ro	Ro	Ro	70.5

No.	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
182	MSa_O_T2_Pa1_12_cp3	T2	O	a	CP3	Pa1_12	Ro	Ro	Ro	70.5
183	MSa_O_T2_Pa2_3_cp3	T2	O	a	CP3	Pa2_3	Ro	Ro	Ro	70.5
184	MSa_O_T2_Pa2_12_cp3	T2	O	a	CP3	Pa2_12	Ro	Ro	Ro	70.5
185	MSa_O_T2_Pa3_12_cp3	T2	O	a	CP3	Pa3_12	Ro	Ro	Ro	71.2
186	MSa_O_T2_Pa1_12_25n75_cp3	T2	O	a	CP3	Pa1_12_25n75	Ro	Ro	Ro	70.5
187	MSa_O_T2_Pa2_12_25n75_cp3	T2	O	a	CP3	Pa2_12_25n75	Ro	Ro	Ro	70.5
188	MSa_O_T2_Pa3_12_25n75_cp3	T2	O	a	CP3	Pa3_12_25n75	Ro	Ro	Ro	70.5
189	MSa_O_T2_Pa1_cp4	T2	O	a	CP4	Pa1	Ro	Ro	Ro	70.4
190	MSa_O_T2_Pa2_cp4	T2	O	a	CP4	Pa2	Ro	Ro	Ro	70.4
191	MSa_O_T2_Pa3_cp4	T2	O	a	CP4	Pa3	Ro	Ro	Ro	70.4
192	MSa_O_T2_Pa12_cp4	T2	O	a	CP4	Pa12	Ro	Ro	Ro	70.4
193	MSa_O_T2_Pa1_2_cp4	T2	O	a	CP4	Pa1_2	Ro	Ro	Ro	70.4
194	MSa_O_T2_Pa1_3_cp4	T2	O	a	CP4	Pa1_3	Ro	Ro	Ro	70.4
195	MSa_O_T2_Pa1_12_cp4	T2	O	a	CP4	Pa1_12	Ro	Ro	Ro	70.5
196	MSa_O_T2_Pa2_3_cp4	T2	O	a	CP4	Pa2_3	Ro	Ro	Ro	70.4
197	MSa_O_T2_Pa2_12_cp4	T2	O	a	CP4	Pa2_12	Ro	Ro	Ro	70.5
198	MSa_O_T2_Pa3_12_cp4	T2	O	a	CP4	Pa3_12	Ro	Ro	Ro	71
199	MSa_O_T2_Pa1_12_25n75_cp4	T2	O	a	CP4	Pa1_12_25n75	Ro	Ro	Ro	70.4
200	MSa_O_T2_Pa2_12_25n75_cp4	T2	O	a	CP4	Pa2_12_25n75	Ro	Ro	Ro	70.4
201	MSa_O_T2_Pa3_12_25n75_cp4	T2	O	a	CP4	Pa3_12_25n75	Ro	Ro	Ro	70.5
202	MSb_O_T2_Pa1	T2	O	b	CP1	Pa1	Ro	Ro	Ro	67.2
203	MSb_O_T2_Pa2	T2	O	b	CP1	Pa2	Ro	Ro	Ro	66.8
204	MSb_O_T2_Pa3	T2	O	b	CP1	Pa3	Ro	Ro	Ro	68.7
205	MSb_O_T2_Pa12	T2	O	b	CP1	Pa12	Ro	Ro	Ro	68.2
206	MSb_O_T2_Pa1_2	T2	O	b	CP1	Pa1_2	Ro	Ro	Ro	70.6
207	MSb_O_T2_Pa1_3	T2	O	b	CP1	Pa1_3	Ro	Ro	Ro	71.7
208	MSb_O_T2_Pa1_12	T2	O	b	CP1	Pa1_12	Ro	Ro	Ro	71.5

No.	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
209	MSb_O_T2_Pa2_3	T2	O	b	CP1	Pa2_3	Ro	Ro	Ro	71.4
210	MSb_O_T2_Pa2_12	T2	O	b	CP1	Pa2_12	Ro	Ro	Ro	71.1
211	MSb_O_T2_Pa3_12	T2	O	b	CP1	Pa3_12	Ro	Ro	Ro	72.3
212	MSb_O_T2_Pa1_12_25n75	T2	O	b	CP1	Pa1_12_25n75	Ro	Ro	Ro	71.2
213	MSb_O_T2_Pa2_12_25n75	T2	O	b	CP1	Pa2_12_25n75	Ro	Ro	Ro	70.8
214	MSb_O_T2_Pa3_12_25n75	T2	O	b	CP1	Pa3_12_25n75	Ro	Ro	Ro	71.5
215	MSb_O_T2_Pa1_cp3	T2	O	b	CP3	Pa1	Ro	Ro	Ro	66.4
216	MSb_O_T2_Pa2_cp3	T2	O	b	CP3	Pa2	Ro	Ro	Ro	66.4
217	MSb_O_T2_Pa3_cp3	T2	O	b	CP3	Pa3	Ro	Ro	Ro	67.4
218	MSb_O_T2_Pa12_cp3	T2	O	b	CP3	Pa12	Ro	Ro	Ro	67.1
219	MSb_O_T2_Pa1_2_cp3	T2	O	b	CP3	Pa1_2	Ro	Ro	Ro	69.2
220	MSb_O_T2_Pa1_3_cp3	T2	O	b	CP3	Pa1_3	Ro	Ro	Ro	70.1
221	MSb_O_T2_Pa1_12_cp3	T2	O	b	CP3	Pa1_12	Ro	Ro	Ro	70
222	MSb_O_T2_Pa2_3_cp3	T2	O	b	CP3	Pa2_3	Ro	Ro	Ro	69.8
223	MSb_O_T2_Pa2_12_cp3	T2	O	b	CP3	Pa2_12	Ro	Ro	Ro	69.6
224	MSb_O_T2_Pa3_12_cp3	T2	O	b	CP3	Pa3_12	Ro	Ro	Ro	71.1
225	MSb_O_T2_Pa1_12_25n75_cp3	T2	O	b	CP3	Pa1_12_25n75	Ro	Ro	Ro	69.5
226	MSb_O_T2_Pa2_12_25n75_cp3	T2	O	b	CP3	Pa2_12_25n75	Ro	Ro	Ro	69.2
227	MSb_O_T2_Pa3_12_25n75_cp3	T2	O	b	CP3	Pa3_12_25n75	Ro	Ro	Ro	70.3
228	MSb_O_T2_Pa1_cp4	T2	O	b	CP4	Pa1	Ro	Ro	Ro	66.4
229	MSb_O_T2_Pa2_cp4	T2	O	b	CP4	Pa2	Ro	Ro	Ro	66.4
230	MSb_O_T2_Pa3_cp4	T2	O	b	CP4	Pa3	Ro	Ro	Ro	67.2
231	MSb_O_T2_Pa12_cp4	T2	O	b	CP4	Pa12	Ro	Ro	Ro	66.8
232	MSb_O_T2_Pa1_2_cp4	T2	O	b	CP4	Pa1_2	Ro	Ro	Ro	69.1
233	MSb_O_T2_Pa1_3_cp4	T2	O	b	CP4	Pa1_3	Ro	Ro	Ro	70.3
234	MSb_O_T2_Pa1_12_cp4	T2	O	b	CP4	Pa1_12	Ro	Ro	Ro	70
235	MSb_O_T2_Pa2_3_cp4	T2	O	b	CP4	Pa2_3	Ro	Ro	Ro	69.9

No.	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
236	MSb_O_T2_Pa2_12_cp4	T2	O	b	CP4	Pa2_12	Ro	Ro	Ro	69.5
237	MSb_O_T2_Pa3_12_cp4	T2	O	b	CP4	Pa3_12	Ro	Ro	Ro	70.9
238	MSb_O_T2_Pa1_12_25n75_cp4	T2	O	b	CP4	Pa1_12_25n75	Ro	Ro	Ro	69.6
239	MSb_O_T2_Pa2_12_25n75_cp4	T2	O	b	CP4	Pa2_12_25n75	Ro	Ro	Ro	69.3
240	MSb_O_T2_Pa3_12_25n75_cp4	T2	O	b	CP4	Pa3_12_25n75	Ro	Ro	Ro	70.1
241	MSa_O_T2_Pb1	T2	O	a	CP1	Pb1	Ro	Ro	Ro	70.4
242	MSa_O_T2_Pb2	T2	O	a	CP1	Pb2	Ro	Ro	Ro	70.4
243	MSa_O_T2_Pb3	T2	O	a	CP1	Pb3	Ro	Ro	Ro	70.4
244	MSa_O_T2_Pb12	T2	O	a	CP1	Pb12	Ro	Ro	Ro	70.4
245	MSa_O_T2_Pb1_2	T2	O	a	CP1	Pb1_2	Ro	Ro	Ro	70.6
246	MSa_O_T2_Pb1_3	T2	O	a	CP1	Pb1_3	Ro	Ro	Ro	71.7
247	MSa_O_T2_Pb1_12	T2	O	a	CP1	Pb1_12	Ro	Ro	Ro	71.5
248	MSa_O_T2_Pb2_3	T2	O	a	CP1	Pb2_3	Ro	Ro	Ro	71.4
249	MSa_O_T2_Pb2_12	T2	O	a	CP1	Pb2_12	Ro	Ro	Ro	71.1
250	MSa_O_T2_Pb3_12	T2	O	a	CP1	Pb3_12	Ro	Ro	Ro	72.3
251	MSa_O_T2_Pb1_12_25n75	T2	O	a	CP1	Pb1_12_25n75	Ro	Ro	Ro	71.1
252	MSa_O_T2_Pb2_12_25n75	T2	O	a	CP1	Pb2_12_25n75	Ro	Ro	Ro	70.7
253	MSa_O_T2_Pb3_12_25n75	T2	O	a	CP1	Pb3_12_25n75	Ro	Ro	Ro	71.5
254	MSa_O_T2_Pb1_cp3	T2	O	a	CP3	Pb1	Ro	Ro	Ro	70.4
255	MSa_O_T2_Pb2_cp3	T2	O	a	CP3	Pb2	Ro	Ro	Ro	70.4
256	MSa_O_T2_Pb3_cp3	T2	O	a	CP3	Pb3	Ro	Ro	Ro	70.4
257	MSa_O_T2_Pb12_cp3	T2	O	a	CP3	Pb12	Ro	Ro	Ro	70.4
258	MSa_O_T2_Pb1_2_cp3	T2	O	a	CP3	Pb1_2	Ro	Ro	Ro	70.5
259	MSa_O_T2_Pb1_3_cp3	T2	O	a	CP3	Pb1_3	Ro	Ro	Ro	70.5
260	MSa_O_T2_Pb1_12_cp3	T2	O	a	CP3	Pb1_12	Ro	Ro	Ro	70.5
261	MSa_O_T2_Pb2_3_cp3	T2	O	a	CP3	Pb2_3	Ro	Ro	Ro	70.5
262	MSa_O_T2_Pb2_12_cp3	T2	O	a	CP3	Pb2_12	Ro	Ro	Ro	70.5

No.	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
263	MSa_O_T2_Pb3_12_cp3	T2	O	a	CP3	Pb3_12	Ro	Ro	Ro	71.1
264	MSa_O_T2_Pb1_12_25n75_cp3	T2	O	a	CP3	Pb1_12_25n75	Ro	Ro	Ro	70.5
265	MSa_O_T2_Pb2_12_25n75_cp3	T2	O	a	CP3	Pb2_12_25n75	Ro	Ro	Ro	70.5
266	MSa_O_T2_Pb3_12_25n75_cp3	T2	O	a	CP3	Pb3_12_25n75	Ro	Ro	Ro	70.5
267	MSa_O_T2_Pb1_cp4	T2	O	a	CP4	Pb1	Ro	Ro	Ro	70.4
268	MSa_O_T2_Pb2_cp4	T2	O	a	CP4	Pb2	Ro	Ro	Ro	70.4
269	MSa_O_T2_Pb3_cp4	T2	O	a	CP4	Pb3	Ro	Ro	Ro	70.4
270	MSa_O_T2_Pb12_cp4	T2	O	a	CP4	Pb12	Ro	Ro	Ro	70.4
271	MSa_O_T2_Pb1_2_cp4	T2	O	a	CP4	Pb1_2	Ro	Ro	Ro	70.4
272	MSa_O_T2_Pb1_3_cp4	T2	O	a	CP4	Pb1_3	Ro	Ro	Ro	70.5
273	MSa_O_T2_Pb1_12_cp4	T2	O	a	CP4	Pb1_12	Ro	Ro	Ro	70.5
274	MSa_O_T2_Pb2_3_cp4	T2	O	a	CP4	Pb2_3	Ro	Ro	Ro	70.5
275	MSa_O_T2_Pb2_12_cp4	T2	O	a	CP4	Pb2_12	Ro	Ro	Ro	70.5
276	MSa_O_T2_Pb3_12_cp4	T2	O	a	CP4	Pb3_12	Ro	Ro	Ro	70.9
277	MSa_O_T2_Pb1_12_25n75_cp4	T2	O	a	CP4	Pb1_12_25n75	Ro	Ro	Ro	70.5
278	MSa_O_T2_Pb2_12_25n75_cp4	T2	O	a	CP4	Pb2_12_25n75	Ro	Ro	Ro	70.5
279	MSa_O_T2_Pb3_12_25n75_cp4	T2	O	a	CP4	Pb3_12_25n75	Ro	Ro	Ro	70.5
280	MSb_O_T2_Pb1	T2	O	b	CP1	Pb1	Ro	Ro	Ro	67.2
281	MSb_O_T2_Pb2	T2	O	b	CP1	Pb2	Ro	Ro	Ro	66.8
282	MSb_O_T2_Pb3	T2	O	b	CP1	Pb3	Ro	Ro	Ro	68.7
283	MSb_O_T2_Pb12	T2	O	b	CP1	Pb12	Ro	Ro	Ro	68.1
284	MSb_O_T2_Pb1_2	T2	O	b	CP1	Pb1_2	Ro	Ro	Ro	70.5
285	MSb_O_T2_Pb1_3	T2	O	b	CP1	Pb1_3	Ro	Ro	Ro	71.7
286	MSb_O_T2_Pb1_12	T2	O	b	CP1	Pb1_12	Ro	Ro	Ro	71.4
287	MSb_O_T2_Pb2_3	T2	O	b	CP1	Pb2_3	Ro	Ro	Ro	71.3
288	MSb_O_T2_Pb2_12	T2	O	b	CP1	Pb2_12	Ro	Ro	Ro	71
289	MSb_O_T2_Pb3_12	T2	O	b	CP1	Pb3_12	Ro	Ro	Ro	72.2

No.	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
290	MSb_O_T2_Pb1_12_25n75	T2	O	b	CP1	Pb1_12_25n75	Ro	Ro	Ro	71.1
291	MSb_O_T2_Pb2_12_25n75	T2	O	b	CP1	Pb2_12_25n75	Ro	Ro	Ro	70.7
292	MSb_O_T2_Pb3_12_25n75	T2	O	b	CP1	Pb3_12_25n75	Ro	Ro	Ro	71.4
293	MSb_O_T2_Pb1_cp3	T2	O	b	CP3	Pb1	Ro	Ro	Ro	66.4
294	MSb_O_T2_Pb2_cp3	T2	O	b	CP3	Pb2	Ro	Ro	Ro	66.4
295	MSb_O_T2_Pb3_cp3	T2	O	b	CP3	Pb3	Ro	Ro	Ro	67.3
296	MSb_O_T2_Pb12_cp3	T2	O	b	CP3	Pb12	Ro	Ro	Ro	67
297	MSb_O_T2_Pb1_2_cp3	T2	O	b	CP3	Pb1_2	Ro	Ro	Ro	69.1
298	MSb_O_T2_Pb1_3_cp3	T2	O	b	CP3	Pb1_3	Ro	Ro	Ro	70.1
299	MSb_O_T2_Pb1_12_cp3	T2	O	b	CP3	Pb1_12	Ro	Ro	Ro	69.9
300	MSb_O_T2_Pb2_3_cp3	T2	O	b	CP3	Pb2_3	Ro	Ro	Ro	69.7
301	MSb_O_T2_Pb2_12_cp3	T2	O	b	CP3	Pb2_12	Ro	Ro	Ro	69.5
302	MSb_O_T2_Pb3_12_cp3	T2	O	b	CP3	Pb3_12	Ro	Ro	Ro	71
303	MSb_O_T2_Pb1_12_25n75_cp3	T2	O	b	CP3	Pb1_12_25n75	Ro	Ro	Ro	69.5
304	MSb_O_T2_Pb2_12_25n75_cp3	T2	O	b	CP3	Pb2_12_25n75	Ro	Ro	Ro	69.1
305	MSb_O_T2_Pb3_12_25n75_cp3	T2	O	b	CP3	Pb3_12_25n75	Ro	Ro	Ro	70.3
306	MSb_O_T2_Pb1_cp4	T2	O	b	CP4	Pb1	Ro	Ro	Ro	66.4
307	MSb_O_T2_Pb2_cp4	T2	O	b	CP4	Pb2	Ro	Ro	Ro	66.4
308	MSb_O_T2_Pb3_cp4	T2	O	b	CP4	Pb3	Ro	Ro	Ro	67.1
309	MSb_O_T2_Pb12_cp4	T2	O	b	CP4	Pb12	Ro	Ro	Ro	66.8
310	MSb_O_T2_Pb1_2_cp4	T2	O	b	CP4	Pb1_2	Ro	Ro	Ro	69
311	MSb_O_T2_Pb1_3_cp4	T2	O	b	CP4	Pb1_3	Ro	Ro	Ro	70.3
312	MSb_O_T2_Pb1_12_cp4	T2	O	b	CP4	Pb1_12	Ro	Ro	Ro	69.9
313	MSb_O_T2_Pb2_3_cp4	T2	O	b	CP4	Pb2_3	Ro	Ro	Ro	69.9
314	MSb_O_T2_Pb2_12_cp4	T2	O	b	CP4	Pb2_12	Ro	Ro	Ro	69.5
315	MSb_O_T2_Pb3_12_cp4	T2	O	b	CP4	Pb3_12	Ro	Ro	Ro	70.9
316	MSb_O_T2_Pb1_12_25n75_cp4	T2	O	b	CP4	Pb1_12_25n75	Ro	Ro	Ro	69.6

No.	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
317	MSb_O_T2_Pb2_12_25n75_cp4	T2	O	b	CP4	Pb2_12_25n75	Ro	Ro	Ro	69.2
318	MSb_O_T2_Pb3_12_25n75_cp4	T2	O	b	CP4	Pb3_12_25n75	Ro	Ro	Ro	70.1

8.1.2 Load Analysis Scenarios

Appendix W and the 2014 SO_2 SIP Guidance recommend modeling scenarios with lower operating loads since those scenarios could result in higher concentrations due to differing dispersion factors. Tokai Borger Carbon Black Plant, Orion Borger Carbon Black Plant, and IACX Rock Creek Gas Plant indicated that their sources do not operate in low load scenarios frequently. While Agrium Borger Nitrogen Plan, Solvay, Blackhawk, and CP Chem Borger Plant provided low load scenarios for some of their sources, these were sources with emissions less than 10 lbs/hr and not considered impactful, i.e., their contributions to the five-year average design value to any receptor in the nonattainment area was less than the Significant Impact Level of 3 ppb. Therefore, the TCEQ focused the load analysis scenarios on impactful sources. The TCEQ identified and modeled six low load scenarios for four emissions sources, EPN 34I1, EPN 43I1, EPN 29P1 and EPN 40P1, in the P66 Borger Refinery site. The six scenarios were developed based on the controlling routine and MSS scenarios from the Nonattainment Area Scenarios discussed in Section 8.1.1. The controlling routine and MSS scenarios are no.1, Ra, and no. 16, MSa_O_T1_Pa3_12, in Table 8-9, respectively. For the low load scenarios, the emission rates from these controlling scenarios remained the same except for sources that had lower enforceable emission rates specified for the lower load levels in Chapter 3: *Control Strategies and Required Elements* in the accompanying SIP revision. Table 8-10: *P66 Borger Refinery Stack Velocity and Emissions at 75% Load* and Table 8-11: *P66 Borger Refinery Stack Velocity and Emissions at 50% Load* provide the modeled emission rates and stack velocity, the only stack parameter that varied for lower load levels, for the four P66 Borger Refinery sources during routine and MSS operations.

Table 8-10: P66 Borger Refinery Stack Velocity and Emissions at 75% Load

EPN	Ro_75p Velocity (m/s)	Ro_75p Emission Rate (lb/hr)	Pa3_12_75p Velocity (m/s)	Pa3_12_75p Emission Rate (lb/hr)	Pb3_12_50p Velocity (m/s)	Pb3_12_50p Emission Rate (lb/hr)
29P1	9.40	155.49	9.40	140.00	9.40	140.00
34I1	3.705	44.820	NA	NA	4.94	94.00
40P1	10.54	155.49	10.54	140.00	10.54	140.00
43I1	13.72	37.000	18.29	94.00	NA	NA

Table 8-11: P66 Borger Refinery Stack Velocity and Emissions at 50% Load

EPN	Ro_50p Velocity (m/s)	Ro_50p Emission Rate (lb/hr)	Pa3_12_50p Velocity (m/s)	Pa3_12_50p Emission Rate (lb/hr)	Pb3_12_50p Velocity (m/s)	Pb3_12_50p Emission Rate (lb/hr)
29P1	6.27	155.49	6.27	130.00	6.27	130.00
34I1	2.47	44.820	NA	NA	4.94	94.00
40P1	7.03	155.49	7.03	130.00	7.03	130.00
43I1	9.15	37.00	18.29	94.00	NA	NA

Emission rates for sources at the P66 Borger Refinery site not listed in Table 8-10 and Table 8-11 remain the same as the emission rates for scenario MS_O_T1_Pa3_12 in Table 8-9.

Table 8-12: Load Analysis Scenarios and Modeled Maximum DV

No.	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
1	Ra_75p	Ro	Ro	a	CP1	Ro_75p	Ro	Ro	Ro	71.6
2	Ra_50p	Ro	Ro	a	CP1	Ro_50p	Ro	Ro	Ro	71.6
3	MSa_O_T1_Pa3_12_75p	T1	O	a	CP1	Pa3_12_75p	Ro	Ro	Ro	74.4
4	MSa_O_T1_Pb3_12_75p	T1	O	a	CP1	Pb3_12_75p	Ro	Ro	Ro	74.4
5	MSa_O_T1_Pa3_12_50p	T1	O	a	CP1	Pa3_12_50p	Ro	Ro	Ro	74.7
6	MSa_O_T1_Pb3_12_50p	T1	O	a	CP1	Pb3_12_50p	Ro	Ro	Ro	74.6

8.1.3 Site Ambient Scenarios

A site ambient run provides information on the cumulative impact of sources in the nonattainment area, other than the sources within that site, on the air quality within a site. For site ambient runs, receptors are added within site boundaries. The TCEQ conducted several site ambient scenarios for each of the eight facilities in the Hutchinson County nonattainment area. The site ambient scenarios for each site was determined based on the controlling routine mode and MSS mode scenarios conducted for the entire nonattainment area and described in Section 8.1.1: Nonattainment Area Scenarios. A total of 32 site ambient scenarios were modeled. Table 8-13: *Facility Ambient Modeling Scenarios and Maximum Modeled DV* provides a list of the site ambient scenarios modeled along with a mapping to each site's operating scenario. The table also provides the maximum modeled DV for each of the scenarios modeled. Figure 8-1: *Routine Emissions Agrium Borger Nitrogen Plant Site Ambient Scenario*, Figure 8-2: *Routine Emissions Blackhawk Power Plant Site Ambient Scenario*, Figure 8-3: *Routine Emissions CP Chem Borger Plant-Solvay Specialty Polymers Plant Site Ambient Scenario*, Figure 8-4: *Routine Emissions IACX Rock Creek Gas Plant Site Ambient Scenario*, Figure 8-5: *Routine Emissions Orion Borger Carbon Black Plant Site Ambient Scenario*, Figure 8-6: *Routine Emissions P66 Borger Refinery Site Ambient Scenario*, and Figure 8-7: *Routine Emissions Tokai Borger Carbon Black Plant Site Ambient Scenario*, shows the modeled concentrations within Agrium Borger Nitrogen Plan, Blackhawk Power Plant, CP Chem Borger Plant-Solvay Specialty Polymers Plant, IACX Rock Creek Gas Plant, Orion Borger Carbon Black Plant, and Tokai Borger Carbon Black Plant sites, respectively, when all sources in the nonattainment area are in routine mode of operations. Since CP Chem Borger Plant and Solvay Specialty Polymers Plant have a Single-Property Determination with the TCEQ, the property boundary of these two sites were included as a single property fence line in the site ambient scenarios.

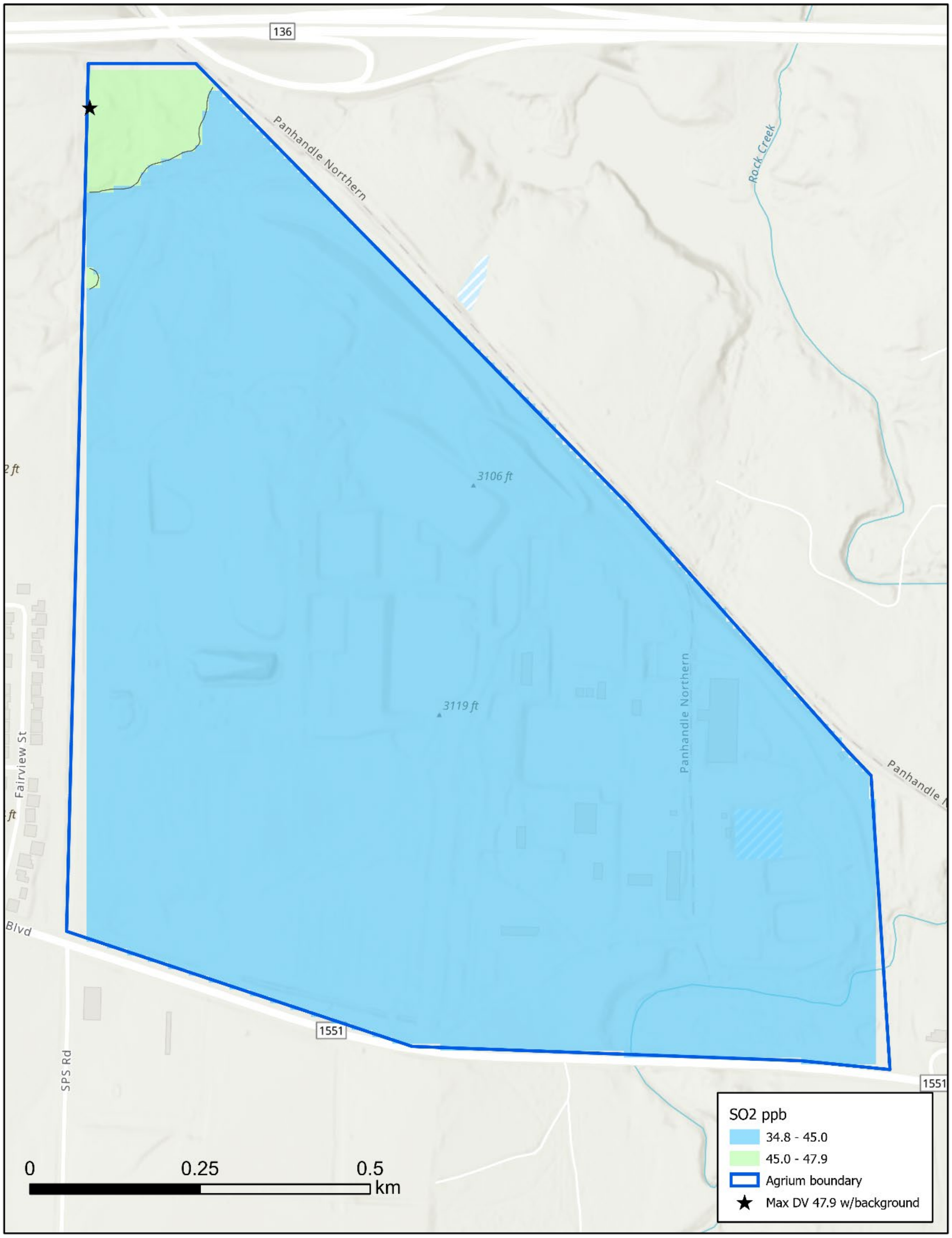

Figure 8-1: Routine Emissions Agrium Borger Nitrogen Plant Site Ambient Scenario

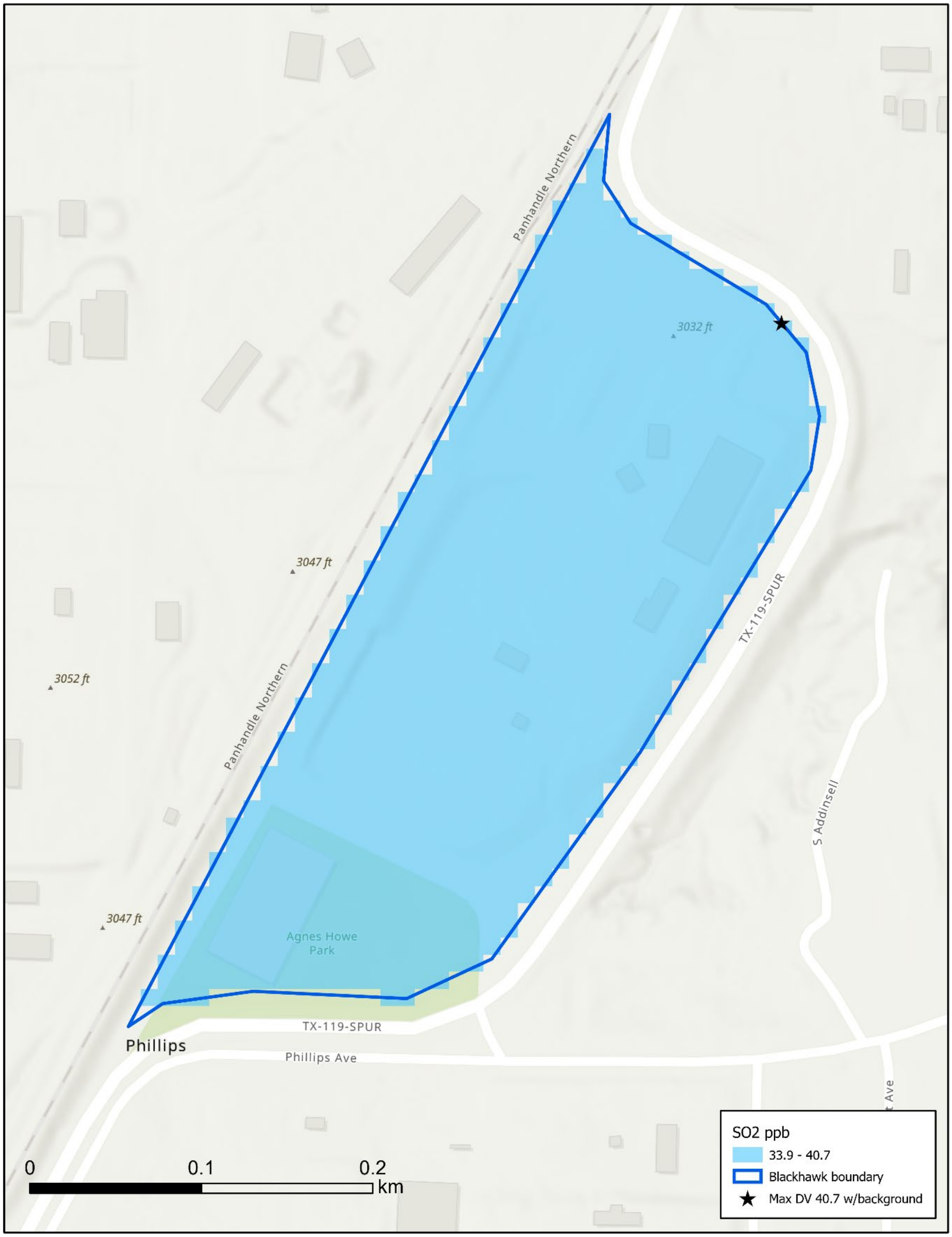

Figure 8-2: Routine Emissions Blackhawk Power Plant Site Ambient Scenario

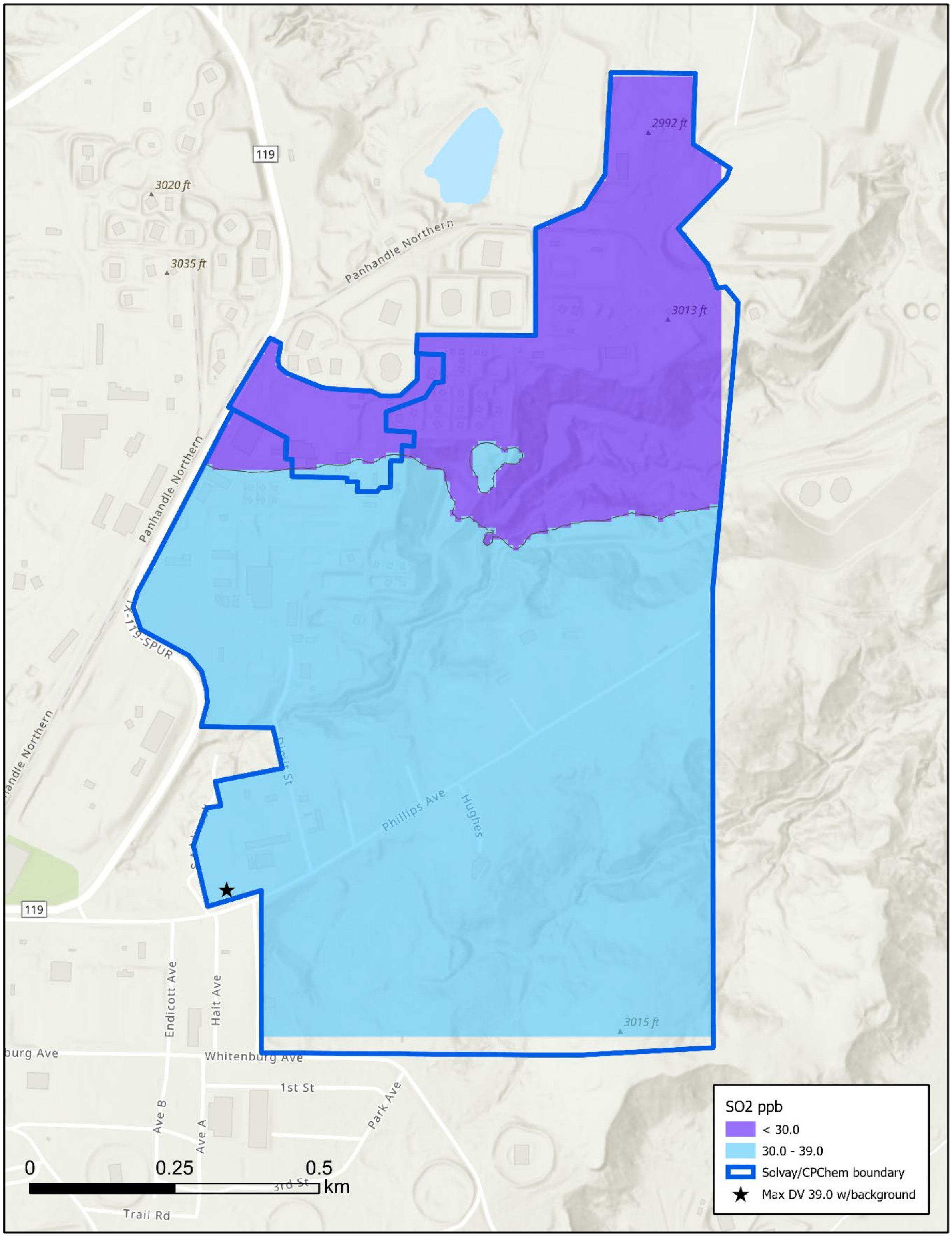

Figure 8-3: Routine Emissions CP Chem Borger Plant-Solvay Specialty Polymers Plant Site Ambient Scenario

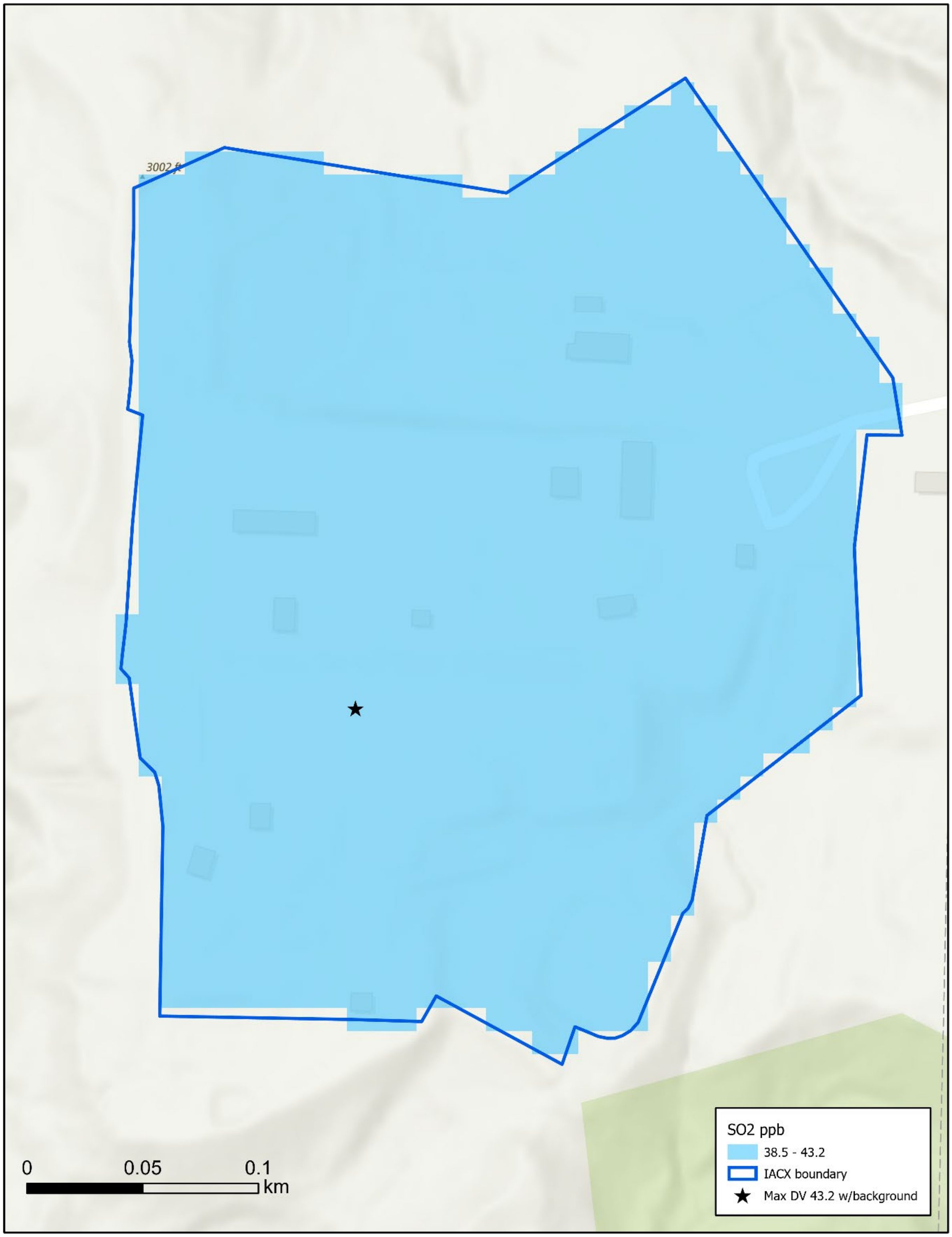

Figure 8-4: Routine Emissions IACX Rock Creek Gas Plant Site Ambient Scenario

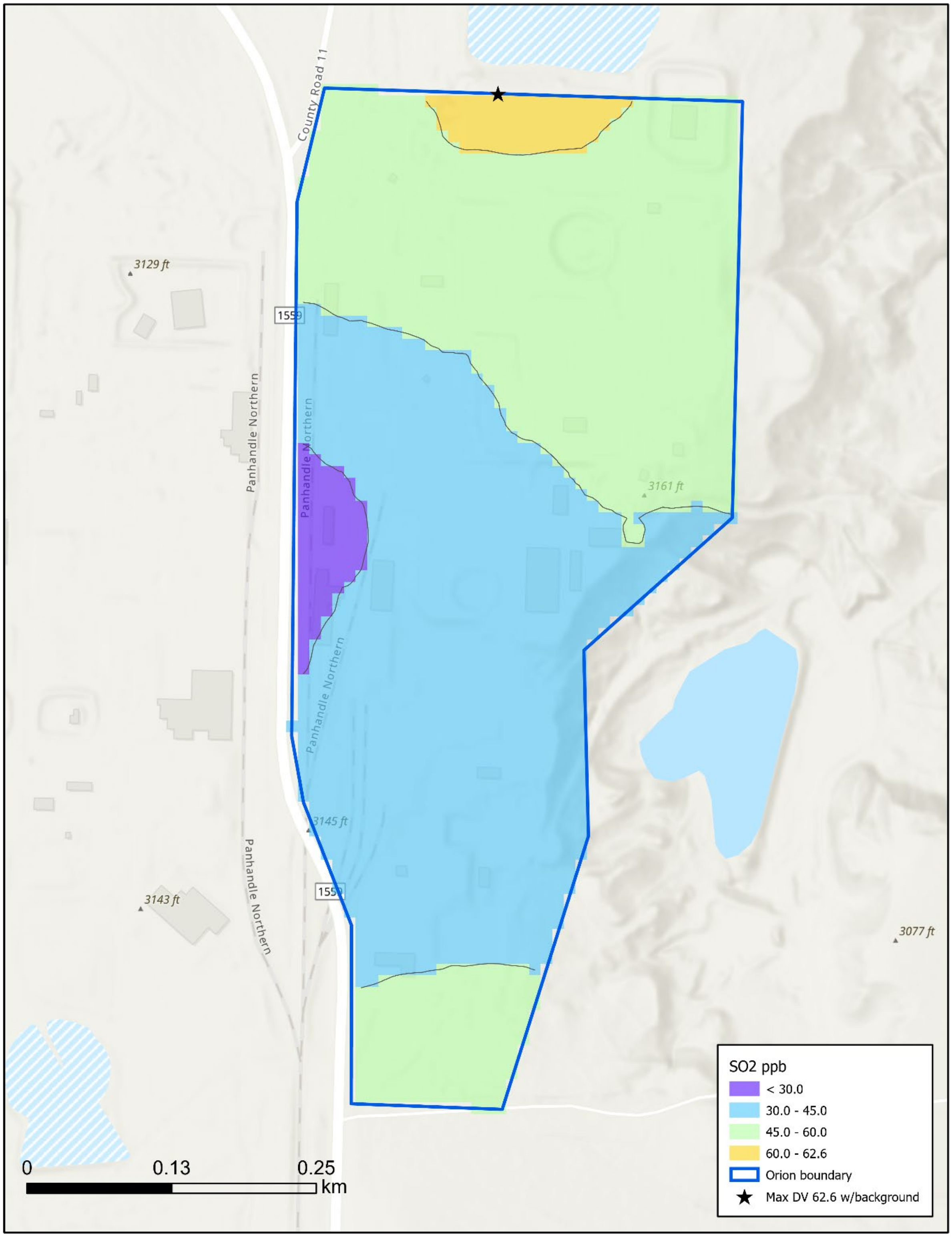

Figure 8-5: Routine Emissions Orion Borger Carbon Black Plant Site Ambient Scenario

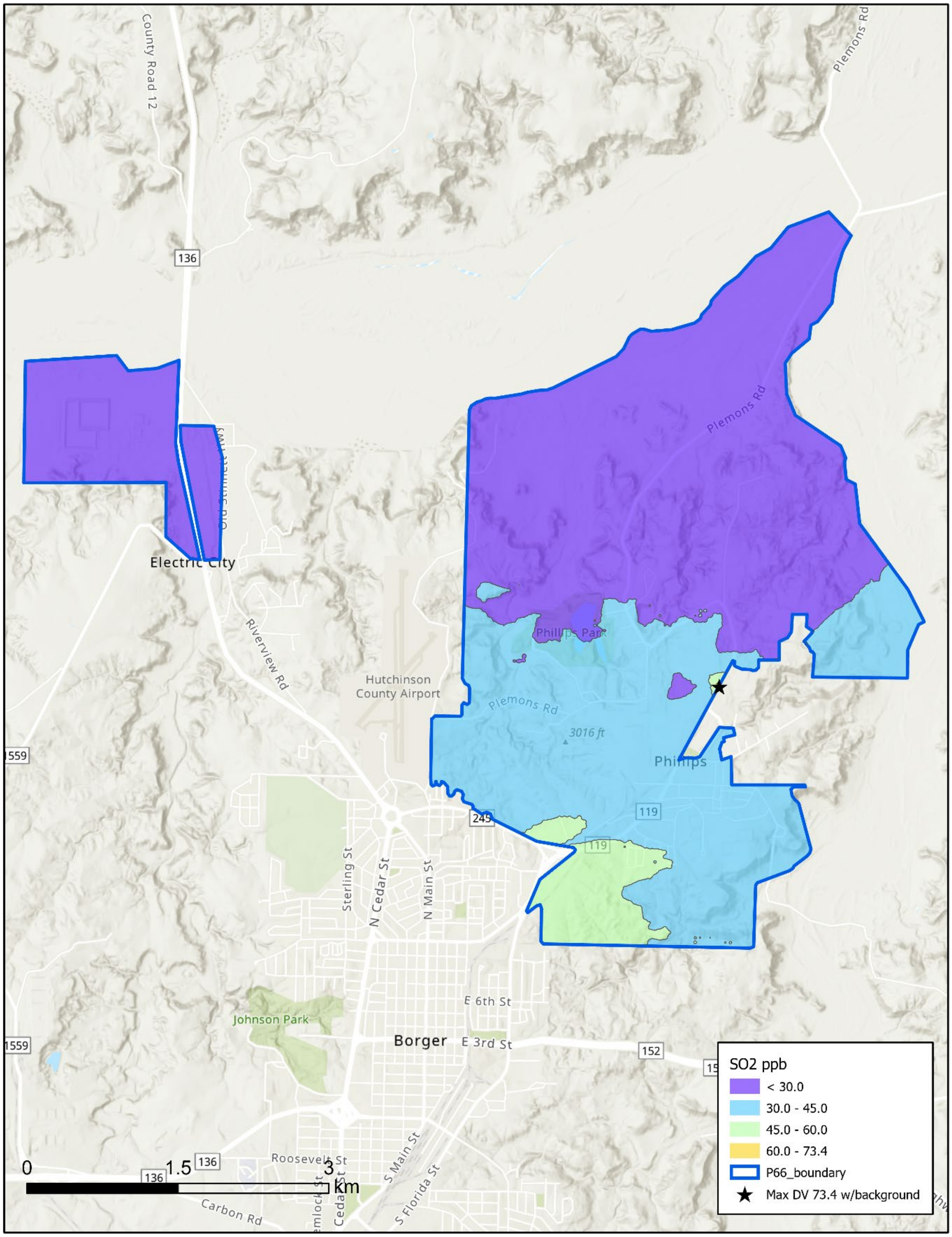

Figure 8-6: Routine Emissions P66 Borger Refinery Site Ambient Scenario

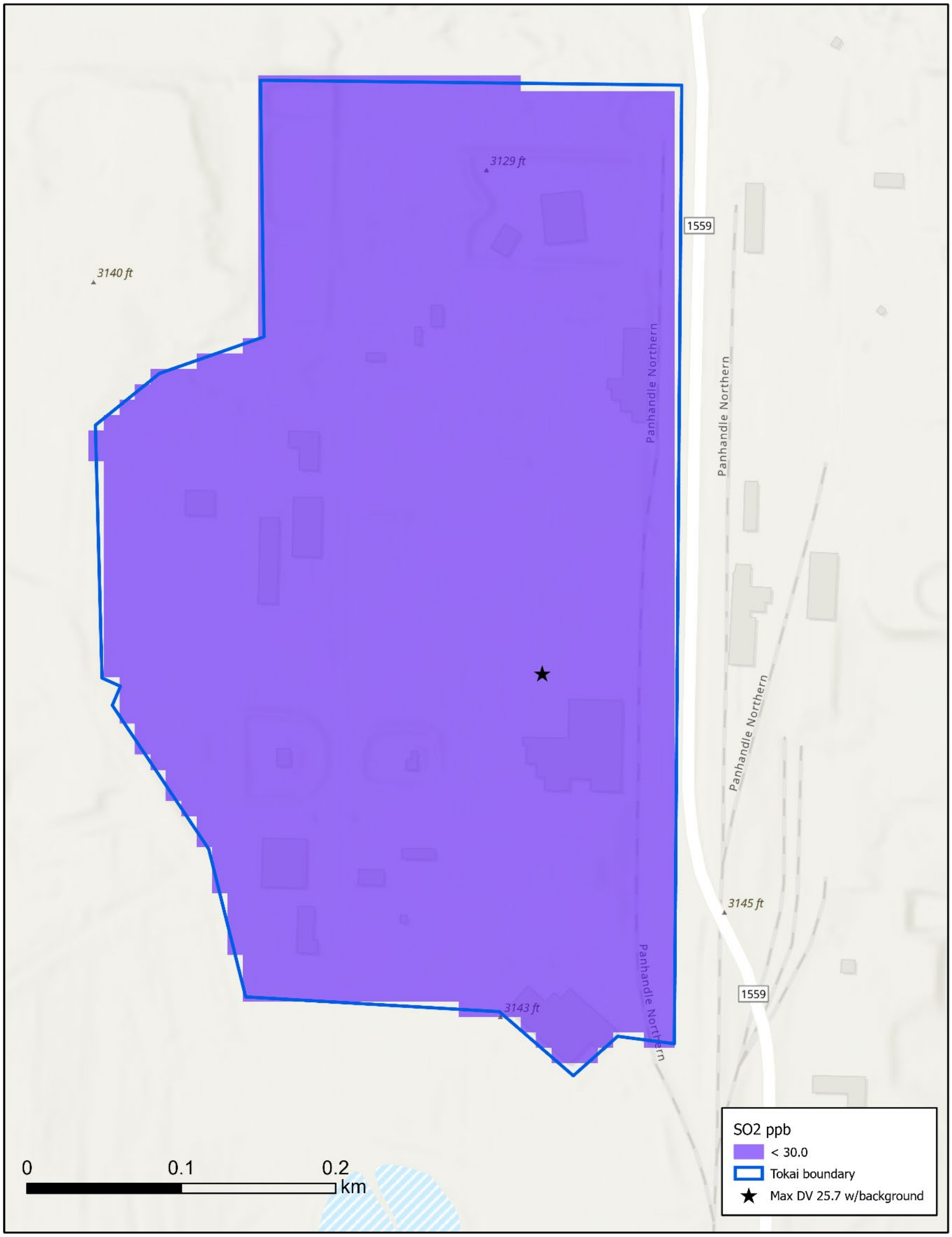

Figure 8-7: Routine Emissions Tokai Borger Carbon Black Plant Site Ambient Scenario

Table 8-13: Facility Ambient Modeling Scenarios and Maximum Modeled DV

No.	Ambient Facility	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
1	Tokai Borger Carbon Black Plant	AT_Ra	--	Ro	a	CP1	Ro	Ro	Ro	Ro	25.7
2	Tokai Borger Carbon Black Plant	AT_MSa_O_Pa3_12	--	O	a	CP1	Pa3_12	Ro	Ro	Ro	28.5
3	Orion Borger Carbon Black Plant	AO_Ra	Ro	--	a	CP1	Ro	Ro	Ro	Ro	61.3
4	Orion Borger Carbon Black Plant	AO_MSa_T1_Pa3_12	T1	--	a	CP1	Pa3_12	Ro	Ro	Ro	52.4
5	Orion Borger Carbon Black Plant	AO_MSa_T2_Pa3_12	T2	--	a	CP1	Pa3_12	Ro	Ro	Ro	54.1
6	IACX Rock Creek Gas Plant	AI_Ra	Ro	Ro	--	CP1	Ro	Ro	Ro	Ro	43.2
7	IACX Rock Creek Gas Plant	AI_MSa_O_T1_Pa3_12	T1	O	--	CP1	Pa3_12	Ro	Ro	Ro	43.2
8	IACX Rock Creek Gas Plant	AI_MSa_O_T2_Pa3_12	T2	O	--	CP1	Pa3_12	Ro	Ro	Ro	40.5
9	CP Chem Borger Plant and Solvay	ACS_Ra	Ro	Ro	a	--	--	Ro	Ro	--	39.0
10	CP Chem Borger Plant and Solvay	ACS_MSa_O_T1	T1	O	a	--	--	Ro	Ro	--	35.4

No.	Ambient Facility	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
11	CP Chem Borger Plant and Solvay	ACS_MSa_O_T2	T2	O	a	--	--	Ro	Ro	--	32.1
12	P66 Borger Refinery	AP_Ra	Ro	Ro	a	CP1	--	Ro	Ro	Ro	73.4
13	P66 Borger Refinery	AP_Ra_cp3	Ro	Ro	a	CP3	--	Ro	Ro	Ro	73.4
14	P66 Borger Refinery	AP_Ra_cp4	Ro	Ro	a	CP4	--	Ro	Ro	Ro	73.4
15	P66 Borger Refinery	AP_MSa_O_T1	T1	O	a	CP1	--	Ro	Ro	Ro	73.4
16	P66 Borger Refinery	AP_MSa_O_T1_cp3	T1	O	a	CP3	--	Ro	Ro	Ro	48.2
17	P66 Borger Refinery	AP_MSa_O_T1_cp4	T1	O	a	CP4	--	Ro	Ro	Ro	48.2
18	P66 Borger Refinery	AP_MSa_O_T2	T2	O	a	CP1	--	Ro	Ro	Ro	73.4
19	P66 Borger Refinery	AP_MSa_O_T2_cp3	T2	O	a	CP3	--	Ro	Ro	Ro	73.4
20	P66 Borger Refinery	AP_MSa_O_T2_cp4	T2	O	a	CP4	--	Ro	Ro	Ro	73.4
21	Agrium Borger Nitrogen Plan	AA_Ra	Ro	Ro	a	CP1	Ro	--	Ro	Ro	47.9
22	Agrium Borger Nitrogen Plan	AA_MSa_O_T1_Pa3_12	T1	O	a	CP1	Pa3_12	--	Ro	Ro	44.4
23	Agrium Borger Nitrogen Plan	AA_MSa_O_T2_Pa3_12	T2	O	a	CP1	Pa3_12	--	Ro	Ro	44.7
24	Blackhawk Power Plant	AB_Ra	Ro	Ro	a	CP1	--	Ro	--	Ro	38.4

No.	Ambient Facility	Scenario name	Tokai[6]	Orion[7]	IACX[8]	CP Chem[9]	P66[10]	Agrium[11]	Blackhawk[12]	Solvay[13]	Max DV (ppb)
25	Blackhawk Power Plant	AB_Ra_cp3	Ro	Ro	a	CP3	--	Ro	--	Ro	38.4
26	Blackhawk Power Plant	AB_Ra_cp4	Ro	Ro	a	CP4	--	Ro	--	Ro	38.4
27	Blackhawk Power Plant	AB_MSa_O_T1	T1	O	a	CP1	--	Ro	--	Ro	41.1
28	Blackhawk Power Plant	AB_MSa_O_T1_cp3	T1	O	a	CP3	--	Ro	--	Ro	41.1
29	Blackhawk Power Plant	AB_MSa_O_T1_cp4	T1	O	a	CP4	--	Ro	--	Ro	41.1
30	Blackhawk Power Plant	AB_MSa_O_T2	T2	O	a	CP1	--	Ro	--	Ro	57.4
31	Blackhawk Power Plant	AB_MSa_O_T2_cp3	T2	O	a	CP3	--	Ro	--	Ro	57.4
32	Blackhawk Power Plant	AB_MSa_O_T2_cp4	T2	O	a	CP4	--	Ro	--	Ro	57.4

9. REFERENCE TABLES WITH MODELING INFORMATION

Table 9-1: Model Versions Used

Module	Version
AERMOD	v21112
AERMET	v21112
AERMINUTE	v15272
AERSURFACE	v20060
AERMAP	v18081
BPIPPRM	v04274

Table 9-2: AERMET Surface Station Information

Parameter	Value
Surface Station Used	Borger Hutchinson CO AP
Latitude/Longitude	35.695, -101.395
Station ID (WBAN)	03024
Is this the ASOS station?	Yes
Hour Adjustment to Local Time	+6
Anemometer Height	10 m
Was ADJ_U* used?	Yes

Table 9-3: AERMET Upper Air Station Information

Parameter	Value
Upper Air Station Used	Amarillo
Latitude/Longitude	35.23, -101.7
Station ID (WBAN)	23047
Is this the ASOS station?	No
Hour Adjustment to Local Time	+6

Table 9-4: AERMINUTE One-Minute and Five-Minute ASOS Wind Data

Parameter	Value
Was AERMINUTE data used?	Yes
Surface Station Used	Borger Hutchinson CO AP
Latitude/Longitude	35.695, -101.395
Station ID (WBAN)	03024
Station Code	KBGD
IFW Installation Date	NA
Was the 0.5 m/s wind threshold used?	Yes

Table 9-5: AERSURFACE Settings and Parameters

Parameter	Value
Surface Station Used	Borger Hutchinson CO AP
Latitude/Longitude	35.695, -101.395
Land Use Data Used	NLCD 2016, Tree Canopy 2016, Impervious Service 2016

Parameter	Value
Was canopy data used?	Yes
Was impervious cover data used?	Yes
Datum	Albers Conical Equal Area NAD83
Radius of Surface Roughness	1 km
Number of Wind Sectors	12
Period	Monthly
Surface Moisture	2016: Average 2017: Wet 2018: Dry 2019: Wet 2020: Dry
Months with Non-Default Season Definition	March – Winter November – Winter September - Summer
Are there months of continuous snow?	No
Is this an airport site?	Yes
Was the VARYAP option used?	No
Is this an arid region?	No

Table 9-6: AERMAP Settings and Parameters

Parameter	Value
Terrain File Type & Name	Input file named Local_terrain.tif (Subset of NED file n36w102.tif from USGS)
UTM Extent of Terrain Data	SW Corner: (272269, 3943621) NE Corner: (297370, 3960771)
Anchor Latitude/Longitude	AnchorXY used, UTM Anchor Point (273269, 3944621)
Base Zone	UTM zone 14
Base Datum	NAD83

Table 9-7: Wetness Classification Precipitation Data

Year	Sanford Dam, TX (USC00418040)	Borger, TX (USC00410958)	Borger Hutchinson CO AP, TX (USW00003024)	Average Precipitation (inches)	AERSURFACE Classification
1991		28		28	
1992		28.4		28.4	
1993		22.7		22.7	
1994		18.6		18.6	
1995	18.9	21.9		20.4	
1996	20.78	23.2		22	
1997	24.72	27.5		26.1	
1998	16.72	21.2		19	
1999	20.28	22.1	19.3	20.6	
2000	16.65	23.8	19.2	19.9	
2001	13.29		15	14.2	
2002	23.82		20.6	22.2	
2003	14.68		14.8	14.7	
2004	26.93		27.9	27.4	
2005	18.23		17.7	18	
2006	16.97	22.3	16.5	18.6	
2007	19.74	21.9	18.6	20.1	
2008	18.75	20.5		19.6	
2009		20.2	16.6	18.4	
2010	22.84	20.8	16.6	20.1	
2011	8.18	9.7	8.4	8.8	
2012	17.96	16	16.1	16.7	
2013	17.04	15.1	15.2	15.8	
2014	12.52	17.8	10.8	13.7	
2015	34.32	44.5	43.1	40.7	
2016	19.45	22.5	15.8	19.3	Average
2017	24.05	26.1	26.1	25.4	Wet
2018	18.07		15.9	17	Dry
2019	27		24	25.5	Wet
2020	10.49		11.3	10.9	Dry

10. REFERENCES

United States Environmental Protection Agency (EPA), 2010. Primary National Ambient Air Quality Standard for Sulfur Dioxide; Final Rule. *Federal Register* (*FR*) 75, no. 119 35520, accessed at: https://www.govinfo.gov/content/pkg/FR-2010-06-22/pdf/2010-13947.pdf

EPA, 2012. Part 51 – Requirements for Preparation, Adoption, and Submittal of Implementation Plans. *Code of Federal Regulations (CFR)*, title 40 accessed at https://www.govinfo.gov/app/details/CFR-2012-title40-vol2/CFR-2012-title40-vol2-part51, July 1.

EPA, 2014. Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions, accessed at https://www.epa.gov/sites/production/files/2016-06/documents/20140423guidance_nonattainment_sip.pdf, April 1.

EPA, 2017. 40 CFR Part 51 Appendix W: Revisions to the Guideline on Air Quality Models: Enhancements to the AERMOD Dispersion Modeling System and Incorporation of Approaches to Address Ozone and Fine Particulate Matter. 82 FR 5182, accessed at https://www.epa.gov/sites/production/files/2020-09/documents/appw_17.pdf, January 17.

EPA, 2020. User's Guide for AERSURFACE Tool. Office of Air Quality Planning and Standards, no. EPA-454/B-20-008, accessed at https://gaftp.epa.gov/Air/aqmg/SCRAM/models/related/aersurface/aersurface_ug_v20060.pdf, February 29.

Ferguson, Bruce, 2017. MS AERMOD Ready Met Files Supporting Documentation, Mississippi Department of Environmental Quality, accessed at https://www.mdeq.ms.gov/wp-content/uploads/2018/07/MS-Met-Support-Document-2017.pdf, March 19.

Texas Commission on Environmental Quality (TCEQ), 2020. Response to the United States Environmental Protection Agency's Intended Round 4 Area Designations for the 2010 One-Hour Sulfur Dioxide Primary National Ambient Air Quality Standard for Texas, accessed at https://www.tceq.texas.gov/assets/public/implementation/air/sip/sipdocs/2020_SO2DocumentsLetters/GovAbbott_120Ltr_Response.pdf, October 16.