

# **June 2012 Photochemical Episode Sensitivity and Control Strategy Modeling**

## **Technical Report**

**Prepared for  
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<b>Abstract:</b> AACOG completed seven technical tasks: May 16 to June 30, 2012 base case model run, model elimination of emissions from Decker Creek unit 1, model elimination of emissions from Decker Creek Unit 2, model elimination of emissions from Decker Creek natural gas turbines, model hourly Texas Lehigh Cement Company emissions, model a “no accelerated diesel engine turnover” scenario for on-road emissions, and model accelerated non-road diesel engine turnover emission reductions. This project involved running photochemical modeling episodes based on June 2012 base case modeling platforms developed by TCEQ. For this project, AACOG used existing photochemical model input files produced by the TCEQ. Each photochemical model run used Weather Research and Forecasting (WRF) model 3.7.1 meteorological inputs, Carbon Bond 6 (CB6) chemical mechanism, and Comprehensive Air Quality Model with Extensions version 6.3 (CAMx 6.3). The greatest difference in predicted peak ozone on high ozone days at C3 and C38 was from the model elimination of emissions from Decker Creek Unit 1 run followed by the model elimination of emissions from Decker Creek Unit 2 photochemical model run.	

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## **1 Introduction**

The Capital Area Council of Governments (CAPCOG) contracted with the Alamo Area Council of Governments (AACOG) to complete seven photochemical modeling technical tasks as follows:

1. May 16 to June 30, 2012 Base Case Model Run
2. Model Elimination of Emissions from Decker Creek Unit 1
3. Model Elimination of Emissions from Decker Creek Unit 2
4. Model Elimination of Emissions from Decker Creek Natural Gas Turbines
5. Model Hourly Texas Lehigh Cement Company Emissions
6. Model a “No Accelerated Diesel Engine Turnover” Scenario for On-Road Emissions
7. Model Accelerated Non-Road Diesel Engine Turnover Emission Reductions

This project involved running photochemical modeling episodes based on June 2012 base case modeling platforms developed by TCEQ<sup>1</sup>. The monitoring stations that were analyzed included continuous air monitoring station (CAMS) 3, 38, 614, 690, 1603, 1675, and 6602. The model was run from May 16, 2012, to June 30, 2012.

### **1.1 Project Background**

The Texas Commission on Environmental Quality (TCEQ) developed a photochemical modeling episode based on the 2012 ozone season. TCEQ has continually worked to develop the overall base case photochemical modeling episodes and has periodically updated these modeling files. Most recently, TCEQ used the 2012 model for an attainment demonstration for the Houston-Galveston-Brazoria (HGB) Nonattainment Area for the 2008 Ozone National Ambient Air Quality Standards (NAAQS).

### **1.2 Photochemical Model Runs**

For this project, AACOG used existing photochemical model input files produced by the TCEQ. Details of the configuration for each modeling run used in this project are located in Appendix F. For each photochemical model run, AACOG used Comprehensive Air Quality Model with Extensions version 6.3 (CAMx 6.3). CAMx is a non-proprietary model developed by ENVIRON (now Ramboll-ENVIRON) to be used in analysis of pollutants including ozone ( $O_3$ ), particulate matter with diameters of 2.5 microns or less ( $PM_{2.5}$ ), particulate matter with diameters of 10 microns or less ( $PM_{10}$ ), air toxics, and mercury. The model “is an Eulerian photochemical dispersion model that allows for an integrated ‘one-atmosphere’ assessment of gaseous and particulate air pollution over many scales ranging from sub-urban to continental. It is designed to unify all of the technical features required of state-of-the-science air quality models into a single

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<sup>1</sup> TCEQ, April 2017. “SIP modeling files “. Available online: <ftp://amdaftp.tceq.texas.gov/pub/>. Accessed 04/14/2017. The files were those associated with “Release 2” of the 2012 base case (bc12\_12may.r6a\_r4a.2012\_wrf371\_p2ma\_i2mSNgqsfc0\_f and bc12\_12jun.r6a\_r4a.2012\_wrf371\_p2ma\_i2mSNgqsfc0\_f)

system that is computationally efficient, easy to use, and publicly available.”<sup>2</sup> AACOG used all of the same advanced CAMx settings used by TCEQ in its State Implementation Plan (SIP) modeling for other areas in Texas. CAMx 6.3 was released on April 8, 2016, and uses Carbon Bond 6 (CB6) chemistry.<sup>3</sup> While CAMx 6.3 was not the latest version of CAMx that was available at the time the modeling was initiated (version 6.40 was released on December 23, 2016), it is more consistent with the version 6.31 of CAMx that TCEQ used for its “Release 2” of the 2012 model dated December 5, 2016.<sup>4</sup>

TCEQ developed the 2012 model’s meteorological input files using the Weather Research and Forecasting (WRF) model 3.7.1. The WRF model relies on user inputs of surface and upper air meteorological data. This data may be obtained through various channels such as TCEQ monitors, National Weather Service (NWS) observations, and the National Oceanic and Atmospheric Administration (NOAA). Ambient meteorological data is also used to verify model output. Through a process called Four-Dimensional Data Assimilation (FDDA), or nudging, the predicted meteorological conditions may be manipulated to better reflect the reality seen during a particular modeling episode. The “WRF Model is a next-generation mesoscale numerical weather prediction system designed to serve both operational forecasting and atmospheric research needs. It features multiple dynamical cores, a 3-dimensional variational (3DVAR) data assimilation system, and a software architecture allowing for computational parallelism and system extensibility. WRF is suitable for a broad spectrum of applications across scales ranging from meters to thousands of kilometers.”<sup>5</sup>

CAMx and WRF models are being used to develop ozone attainment demonstrations for multiple Texas regions including Dallas and Houston. These attainment demonstrations are used to determine whether a region is expected to attain the ozone NAAQS by its attainment date. AACOG is accepting the secondary data obtained from TCEQ for this as meeting requirements for use in an attainment demonstration State Implementation Plan (SIP) revision. TCEQ is using the 2012 episode for new SIP development in Texas. TCEQ considers these inputs to be “SIP-quality” and, therefore, suitable for use in this project. CAMx advanced technical features were used to model the ozone season 2012 episode and are described in the CAMx user guide.<sup>6</sup> The advanced CAMx features include:

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<sup>2</sup> ENVIRON International Corporation, March 2016. “User’s Guide: Comprehensive Air Quality Modeling with Extensions, Version 6.30”. Novato, CA. Available online:

[http://www.camx.com/files/camxusersguide\\_v6-30.pdf](http://www.camx.com/files/camxusersguide_v6-30.pdf). Accessed 05/23/2017.

<sup>3</sup> Ramboll-ENVIRON. Release Notes for CAMx v6.30, 04/08/2016. Available online at: [http://www.camx.com/files/release\\_notes-v6-30.txt](http://www.camx.com/files/release_notes-v6-30.txt). Accessed 07/18/2017.

<sup>4</sup> <https://www.tceq.texas.gov/airquality/airmod/data/tx2012>

<sup>5</sup> ENVIRON International Corporation, March 2016. “User’s Guide: Comprehensive Air Quality Modeling with Extensions, Version 6.30”. Novato, CA. Available online:

[http://www.camx.com/files/camxusersguide\\_v6-30.pdf](http://www.camx.com/files/camxusersguide_v6-30.pdf). Accessed 05/23/2017.

<sup>6</sup> *Ibid.*

- |                                   |  |
|-----------------------------------|--|
| 1. Two-Way nested grid structure: | for the 36, 12, and 4 km grid system   |
| 2. Plume-in-grid (PiG):           | to track chemistry and dispersion of large individual point source NO <sub>x</sub> emission plumes |
| 3. Horizontal advection solver:   | Piecewise Parabolic Method (PPM) <sup>7</sup>  |
| 4. Gas Phase Chemistry Mechanism: | Carbon Bond Version 6 (CB6) <sup>8</sup>   |
| 5. Chemical Kinetics Solver:      | set to EBI <sup>9</sup>  |
| 6. Dry deposition Model           | set to Wesely <sup>10</sup>  |

“CAMx provides the option to model selected point sources with a PiG algorithm. NO<sub>x</sub> reaction chemistry is enhanced by treating these selected point source plumes as Lagrangian puffs. The GREASD PiG option in CAMx was used, which is most applicable to large NO<sub>x</sub> plumes, for all point sources that met the criteria in Table 1-1: Summary of PiG Thresholds.”<sup>11</sup>

Following TCEQ model setup, “the NO<sub>x</sub> threshold of 5.0 tpd in Texas denotes that any individual stack or co-located group of stacks with 5.0 or more tpd of NO<sub>x</sub> emissions on an episode day were tracked as a PiG source. The colocation occurs when multiple stacks are close enough together for their plumes to merge (within 200 meters of each other) and the aggregate NO<sub>x</sub> emission rate for the cluster exceeded the threshold value in Table 1-1. A new source was created with the combined NO<sub>x</sub> emission rate of the cluster, and this source was flagged for PiG treatment. The stack parameters of the new source became an average of the stack parameters of all of the sources in the cluster.”<sup>12</sup>

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<sup>7</sup> Colella, P. and P.R. Woodward, 1984. “The Piecewise Parabolic Method (PPM) for Gas-Dynamical Simulations.” *Journal of Computation Physics*. Volume 54, pp. 174-201. Available online: [http://seesar.lbl.gov/anag/publications/colella/A\\_1\\_4\\_1984.pdf](http://seesar.lbl.gov/anag/publications/colella/A_1_4_1984.pdf). Accessed: 05/30/2017.

<sup>8</sup> Yarwood, G, Whitten G. Z., Gookyoung, H, Mellberg, J. and Estes, M. 2010. “Updates to the Carbon Bond Mechanism for Version 6 (CB6)”. Presented at the 9<sup>th</sup> Annual CMAS Conference, Chapel Hill, NC, October 11-13, 2010. Available online: [http://www.cmascenter.org/conference/2010/abstracts/emery\\_updates\\_carbon\\_2010.pdf](http://www.cmascenter.org/conference/2010/abstracts/emery_updates_carbon_2010.pdf). Accessed 05/30/2017.

<sup>9</sup> Hertel O., R. Berkowicz, J. Christensen, and O. Hov (1993) “Test of two numerical schemes for use in atmospheric transport-chemistry models”, *Atmospheric Environment*, 27A, 2591- 2611. Available online: <http://www.sciencedirect.com/science/article/pii/096016869390032T>. Accessed: 05/30/2017.

<sup>10</sup> Wesely, M.L. 1989. Parameterization of Surface Resistances to Gaseous Dry Deposition in Regional-Scale Numerical Models. *Atmos. Environ.*, 23, 1293-1304. Available online: <http://www.sciencedirect.com/science/article/pii/S1352231099004677>. Accessed 05/30/2017.

<sup>11</sup> TCEQ, Dec. 16, 2016. “Appendix B: Emissions Modeling for the HGB Attainment Demonstration SIP Revision for the 2008 Eight Hour Ozone Standard”. Project Number 2016-016-SIP-NR. p. B-22. Available online: [https://www.tceq.texas.gov/assets/public/implementation/air/sip/hgb/HGB\\_2016\\_AD\\_RFP/AD\\_Adoption/HGB\\_AD\\_SIP\\_Appendix\\_B\\_Adoption.pdf](https://www.tceq.texas.gov/assets/public/implementation/air/sip/hgb/HGB_2016_AD_RFP/AD_Adoption/HGB_AD_SIP_Appendix_B_Adoption.pdf). Accessed 06/15/2017.

<sup>12</sup> TCEQ, Dec. 16, 2016. “Appendix B: Emissions Modeling for the HGB Attainment Demonstration SIP Revision for the 2008 Eight Hour Ozone Standard”. Project Number 2016-016-SIP-NR. p. B-22. Available online: [https://www.tceq.texas.gov/assets/public/implementation/air/sip/hgb/HGB\\_2016\\_AD\\_RFP/AD\\_Adoption/HGB\\_AD\\_SIP\\_Appendix\\_B\\_Adoption.pdf](https://www.tceq.texas.gov/assets/public/implementation/air/sip/hgb/HGB_2016_AD_RFP/AD_Adoption/HGB_AD_SIP_Appendix_B_Adoption.pdf). Accessed 06/15/2017.



Table 1-1: Summary of PiG Thresholds

Modeled Area	NO <sub>x</sub> Threshold (tpd)
Texas	5.0
Adjacent States (LA, AR, OK) & adjacent Mexican States	7.5
Next ring of USA and Mexican States (MS, etc.)	10.0
Next distant ring of States (AL, etc.)	15.0
Other States, Canada & Offshore	25.0

Since both the Decker Creek Power Plant and the Texas Lehigh Cement Plant had NO<sub>x</sub> emissions of 5.0 tpd or more on at least 1 day during the episode, they were flagged for PiG treatment in the modeling.

As recommended by TCEQ, the –Kieee flag was used to compile the CAMx model using Pacific Fortran complier 90. The Kieee “flag performs float and double divides in conformance with the IEEE 754 standard. This is done by replacing the usual in-line divide algorithm with a subroutine call, at the expense of performance. The default algorithm produces results that differ from the correctly rounded result by no more than 3 units in the last place.”<sup>13</sup>

For the base case model run, AACOG used the latest emission inventory data for the 2012 model available from TCEQ as of April 14, 2017. For the control strategy and sensitivity model runs, AACOG used modified input files based on CAPCOG’s targeted emissions inventory updates to selected emissions sources.<sup>14</sup> A detailed list of the files downloaded and associated dates and times are provided in Appendices C and F.

### 1.3 Quality Assurance

Quality assurance (QA) procedures used to check emissions inventory preparation and the results from the photochemical model included:

- Examination of raw data files for inconsistencies in emissions and/or locations,
- Review of message files from Emissions Preprocessor System version 3 (EPS3) and CAMx model scripts for errors and warnings,
- Verification of consistency between input and output data,
- Creation of output emissions and ozone tile plots for visual review, and
- Creation of CAMx output ozone summary files to check for consistency of values.

Special emphasis was placed on critical components, such as emissions totals by source classification codes (SCCs), spatial allocation, emissions reductions from emission inventory control packages, ozone plots, and predicted ozone values.

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<sup>13</sup> PGF90, Aug. 2003. “User Commands”. Available online: <http://www.dartmouth.edu/~rc/HPC/man/pgf90.html>. Accessed 05/23/2017.

<sup>14</sup> *Ibid*

All raw data files were checked to ensure emissions were consistent by point source stack, source type, and control factors. Any inconsistencies were noted, checked, and corrected. When running the EPS3 and CAMx job scripts, several message files are generated from each script that record data inputs, results, and errors. As part of the QA procedure, modeling staff reviewed all error messages and corrected the input data accordingly. Errors can occur in EPS3 and go unnoticed by the built-in quality assurance mechanisms; therefore, further QA methods were applied. Input and output emissions by source category were compared. If there were inconsistencies between values, input data was reviewed and any necessary corrections were made. When errors and omissions were identified, they were corrected and all documentation was updated with the corrections.

As part of the audit of the modeling files, 50% of the data used in this study was reviewed. After each section was completed, the QA/QC manager checked the data inputs into the formulas and checked all documentation on methodologies. The QA/QC manager worked closely with the project manager to update the control factors, emission estimates, and documentations. The data is reasonably consistent with other studies and the data was sufficiently complete to represent emissions and ozone production.

The following items were corrected in the photochemical modeling report as a result of the audit of the modeling data:

1. The emissions preprocessor system (EPS3) job script for modeling accelerated non-road diesel engine turnover emission reductions was accessing the incorrect emission input file. The job script was corrected and the CAMx results were updated.
2. The PiG thresholds for point sources were set incorrectly. The PiG thresholds were corrected to match SIPs developed by TCEQ before EPS3 point source and the CAMx model runs were performed.
3. For several CAMx runs, the incorrect initial ozone and emission input files were used for the first day of the modeling episode. The initial ozone and emission input files were corrected before all final CAMx runs were performed.

## 2 Emission Inventory Processing

### 2.1 EPS3 Programs

AACOG used EPS3 to adjust the base case 2012 emission inventory for six sensitivity photochemical model runs. EPS3 chemically speciates, adjusts, temporally adjusts, and spatially allocates emissions in binary format. The core EPS3 modules used to process the inventory adjustments were:

- "PREPNT The entry point for point sources; prepares the annual or seasonal point source inventory for further processing, identifies which sources are to be treated as elevated by the photochemical model.
- CNTELM Adjusts emissions levels to reflect the effects of anticipated growth or implementation of proposed controls.
- CHMSPL Assigns input hydrocarbon emissions to chemical compounds expected by the air quality model and disaggregates criteria pollutants into photochemical modeling compounds.
- TMPRL Temporally adjusts emissions from annual, seasonal, or typical season day to episodic levels; allocates emissions to the hours of the modeling episode.
- PSTPNT Screens the point source inventory and generates a stack list of elevated sources and emission inventory files to be processed by the PIGEMS module.
- PIGEMS Flags sources for Plume-in-Grid (PiG) treatment by the CAMx model, merges multiple elevated point source files, and generates a CAMx ready elevated emissions file.
- GRDEM Spatially allocates emissions based on source location, or gridded spatial surrogate indicators; generates a CAMx-ready surface emissions file.
- MRGUAM Merges multiple CAMx-ready surface emissions files into one file (e.g., merges anthropogenic and biogenic low-level emissions into the final CAMx-ready inventory of surface sources).<sup>15</sup>

EPS3 was used to process and adjust the 2012 base case photochemical model emission inventory for six scenarios. EPS3 was not used by AACOG to develop the base case run.

1. Elimination of NO<sub>x</sub> emissions from Decker Creek power plant unit 1
2. Elimination of NO<sub>x</sub> emissions from Decker Creek power plant unit 2
3. Elimination of NO<sub>x</sub> emissions from Decker Creek power plant natural gas turbines
4. Replace Texas Lehigh Cement Company average ozone season daily NO<sub>x</sub> emissions with actual hourly NO<sub>x</sub> emissions
5. Adjust the on-road NO<sub>x</sub> emissions inventory for a "no accelerated diesel engine turnover" scenario

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<sup>15</sup> ENVIRON International Corporation, September 2007. "User's Guide Emissions Processor Version 3". Novato, CA. pp. 2-1 – 2-2.

6. Adjust the non-road NO<sub>x</sub> emissions inventory to simulate accelerated diesel engine turnover emission reductions

CAPCOG developed the emissions inventory adjustments used by AACOG in this project, and produced a report documenting these adjustments.<sup>16</sup>

All emissions were spatially allocated to the 4km grid cells and vertical layers used in the June 2012 photochemical model using EPS3. An example of EPS3 script is provided in Appendix A, for processing Texas Lehigh emissions. Appendix B contains an example of an EPS3 PREPNT output message file for Texas Lehigh. A list of all EPS3 input and output files from emission inventory processing are available in Appendix C.

### **3 Photochemical Modeling Runs**

The base case CAMx simulation was developed for an elevated ozone episode that extended from May 16, 2012, to June 30, 2012, as part of TCEQ's May 1, 2012, to September 30, 2012, ozone season episode. To simulate ozone formation, transport, and dispersion, CAMx required several inputs including:

- Three-dimensional hourly meteorological fields generated by WRF;
- Land use distribution fields;
- Three-dimensional hourly emissions generated by EPS3 by pollutant (latitude, longitude, and height);
- Initial conditions (IC), top conditions (TC), and boundary conditions (BC);
- Photolysis rate inputs, including ultraviolet (UV) albedo, haze opacity, and total atmospheric ozone column fields.

#### **3.1 CAMx Configurations**

AACOG used CAMx version 6.3 to model the 2012 episode to match the current TCEQ platform being developed for Texas. The configurations used for the photochemical model runs were:

- Duration: May 16 – June 30, 2012
- Time zone: CST (central standard time)
- I/O frequency: 1 hour
- Map projection: Lambert Conformal Conic
- Nesting: 2-way fully interactive 36/12/4-km computational grids
- Chemistry mechanism: CB6
- Chemistry solver: EBI (Euler-Backward Iterative)
- Advection solver: PPM (Piecewise Parabolic Method)
- Dry deposition model: WESELY89

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<sup>16</sup> CAPCOG, 2017. "Documentation of Emissions Inputs for Task 6.3 – Sensitivity and Control Strategy Modeling". Austin, Texas.

- Plume-in-Grid model: For large NO<sub>x</sub> sources
- Probing Tools: None
- Dry deposition: On
- Wet deposition: On
- Asymmetric Convective Model 2 (ACM2) Diffusion: off
- TUV Cloud Adjustment
- Photolysis rate adjusted by cloud cover

The sampling grid was turned off during the model run because it is used solely to produce a graphical display of plume animation at the fine grid level and does not impact CAMx ozone predictions. These fine grid levels are typically less than 1 km and are smaller than the finest grid resolution, 4 km, used in this modeling application.

### **3.2 Photochemical Model Runs**

This project consisted of seven photochemical model runs listed below:

1. Base Case Model Run, May 16 to June 30, 2012
2. Model Elimination of NO<sub>x</sub> Emissions from Decker Creek Unit 1, May 16 to June 30, 2012
3. Model Elimination of NO<sub>x</sub> Emissions from Decker Creek Unit 2 , May 16 to June 30, 2012
4. Model Elimination of NO<sub>x</sub> Emissions from Decker Creek Natural Gas Turbines, May 16 to June 30, 2012
5. Model Hourly NO<sub>x</sub> Texas Lehigh Cement Company Emissions, June 1 to June 30, 2012
6. Model a “No Accelerated Diesel Engine Turnover” Scenario for On-Road NO<sub>x</sub> Emissions, May 16 to June 30, 2012
7. Model Accelerated Non-Road Diesel Engine Turnover NO<sub>x</sub> Emission Reductions, May 16 to June 30, 2012

Although most of the runs were from May 16 to June 30, 2012, the results were only analyzed for the June 1 to June 30, 2012 modeling days. The first 15 days of the run in May were used as ramp-up days because TCEQ only provided initial startup files for May 16.

For this report, AACOG calculated changes to maximum daily 8-hour ozone averages (MDA8) at each monitor for each scenario by calculating the difference in the maximum MDA8 values for each episode day in the 4 x 4 km grid cells within a 3 x 3 grid cell array around the each station analyzed. These included:

1. CAMS 3 (Austin Northwest, Travis County);
2. CAMS 38 (Audubon; Travis County);
3. CAMS 614 (Dripping Springs);
4. CAMS 690 (Lake Georgetown);
5. CAMS 1603 (Gorzycki Middle School);
6. CAMS 1675 (San Marcos); and

## 7. CAMS 6602 (Hutto).

Table 3-1 shows the average modeled MDA8 for every episode day during the June 2012 Base Case and sensitivity run. The average modeled MDA8 on all days, the average modeled MDA8 when values were > 60 ppb, and the average modeled MDA8 when values were > 70 ppbs are listed in Table 3-2. The scenario with the greatest difference in predicted MDA8 values on high ozone days at C3 and C38 was from the no Decker Power Plant Boiler 1 run followed by the Decker Power Plant no boiler 2 photochemical model run. Figure 3-1 to Figure 3-6 provides the plots for each sensitivity run on the days when the 2012 base case peak 8-hour ozone was greater than 70 ppb at any monitor.

Table 3-1: Average Peak 8-Hour Ozone for Every Model Day, 2012

CAMS	Year	Run Label	Episode days														
			1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>	13 <sup>th</sup>	14 <sup>th</sup>	15 <sup>th</sup>
C3	2012	Basecase CAPCOG	60.58	49.13	41.74	48.18	58.61	54.81	62.93	71.58	72.85	51.02	51.80	43.81	44.26	43.30	41.92
	2012	No Decker Gas Turbines	60.58	49.13	41.74	48.18	58.58	54.81	62.93	71.58	72.85	51.02	51.80	43.81	44.26	43.30	41.92
	2012	No Decker Boiler 1	60.58	49.13	41.74	48.17	58.61	54.81	62.93	71.58	72.85	51.02	51.80	43.76	44.26	43.30	41.92
	2012	No Decker Boiler 2	60.45	49.13	41.74	48.17	58.40	54.82	62.94	71.58	72.87	51.01	51.80	43.78	44.28	43.30	41.92
	2012	Texas Lehigh	60.58	49.10	41.73	48.17	58.60	54.79	62.93	71.58	72.85	50.97	51.78	43.80	44.24	43.30	41.93
	2012	On-Road	60.66	49.17	41.76	48.26	58.76	54.91	63.00	71.67	72.91	51.06	51.87	43.91	44.31	43.34	41.96
	2012	Non-Road	60.57	49.12	41.74	48.17	58.58	54.80	62.91	71.55	72.84	51.01	51.79	43.80	44.26	43.29	41.92
C38	2012	Basecase CAPCOG	64.45	49.51	43.64	51.65	61.10	56.06	56.73	62.25	76.17	51.94	52.62	45.98	45.17	45.27	44.16
	2012	No Decker Gas Turbines	64.45	49.51	43.64	51.65	60.99	56.06	56.73	62.25	76.17	51.95	52.62	45.98	45.17	45.27	44.16
	2012	No Decker Boiler 1	64.45	49.51	43.64	51.57	61.10	56.06	56.73	62.25	76.17	51.95	52.62	45.94	45.17	45.27	44.16
	2012	No Decker Boiler 2	64.36	49.51	43.64	51.60	60.83	56.06	56.72	62.25	76.16	51.94	52.62	45.96	45.17	45.27	44.16
	2012	Texas Lehigh	64.46	49.47	43.60	51.61	61.09	56.03	56.73	62.25	76.17	51.85	52.59	45.93	45.14	45.29	44.19
	2012	On-Road	64.60	49.55	43.67	51.77	61.29	56.21	56.80	62.27	76.29	51.99	52.68	46.09	45.25	45.34	44.23
	2012	Non-Road	64.42	49.50	43.63	51.63	61.05	56.03	56.70	62.25	76.14	51.93	52.61	45.96	45.16	45.26	44.15
C614	2012	Basecase CAPCOG	58.99	48.20	43.42	46.05	54.83	52.61	51.48	59.30	66.86	48.23	53.21	41.63	42.63	43.70	43.22
	2012	No Decker Gas Turbines	58.99	48.20	43.42	46.05	54.83	52.61	51.48	59.30	66.86	48.23	53.21	41.63	42.63	43.70	43.22
	2012	No Decker Boiler 1	58.99	48.20	43.42	46.05	54.82	52.61	51.48	59.30	66.86	48.23	53.21	41.57	42.63	43.70	43.22
	2012	No Decker Boiler 2	58.98	48.20	43.42	46.05	54.82	52.61	51.46	59.28	66.86	48.23	53.21	41.59	42.63	43.70	43.22
	2012	Texas Lehigh	58.97	48.20	43.42	46.05	54.70	52.61	51.48	59.30	66.81	48.23	53.21	41.62	42.63	43.70	43.22
	2012	On-Road	59.07	48.20	43.42	46.08	54.97	52.62	51.62	59.37	66.91	48.24	53.21	41.67	42.65	43.71	43.23
	2012	Non-Road	58.97	48.20	43.42	46.05	54.80	52.60	51.44	59.29	66.85	48.23	53.21	41.62	42.63	43.70	43.22
C690	2012	Basecase CAPCOG	60.70	53.96	45.75	54.02	52.49	59.01	56.04	63.07	75.18	54.73	56.53	47.63	47.63	47.42	47.19
	2012	No Decker Gas Turbines	60.70	53.92	45.75	54.02	52.42	59.01	56.04	63.07	75.18	54.66	56.43	47.63	47.63	47.42	47.19
	2012	No Decker Boiler 1	60.70	53.96	45.75	53.70	52.48	59.01	56.04	63.07	75.18	54.66	56.49	47.58	47.63	47.42	47.19
	2012	No Decker Boiler 2	60.58	53.94	45.75	53.90	52.39	58.93	56.04	63.07	74.93	54.69	56.48	47.60	47.59	47.15	47.07
	2012	Texas Lehigh	60.70	53.94	45.75	54.00	52.48	58.99	56.04	63.07	75.18	54.68	56.51	47.61	47.61	47.42	47.19
	2012	On-Road	60.79	54.04	45.80	54.16	52.63	59.19	56.10	63.08	75.29	54.80	56.66	47.76	47.76	47.52	47.29
	2012	Non-Road	60.68	53.94	45.73	53.98	52.44	58.96	56.02	63.07	75.13	54.70	56.51	47.59	47.61	47.40	47.16

CAMS	Year	Run Label	Episode days														
			16 <sup>th</sup>	17 <sup>th</sup>	18 <sup>th</sup>	19 <sup>th</sup>	20 <sup>th</sup>	21 <sup>st</sup>	22 <sup>nd</sup>	23 <sup>rd</sup>	24 <sup>th</sup>	25 <sup>th</sup>	26 <sup>th</sup>	27 <sup>th</sup>	28 <sup>th</sup>	29 <sup>th</sup>	30 <sup>th</sup>
C3	2012	Basecase CAPCOG	42.44	56.92	60.57	59.71	39.31	55.60	63.54	65.92	66.87	69.92	83.58	79.55	64.76	48.02	35.13
	2012	No Decker Gas Turbines	42.41	56.92	60.57	59.71	39.31	55.60	63.54	65.92	66.87	69.33	83.32	79.52	64.76	48.02	35.13
	2012	No Decker Boiler 1	42.44	56.92	60.57	59.71	39.31	55.60	63.54	65.35	66.55	69.89	82.96	79.22	64.77	48.02	35.10
	2012	No Decker Boiler 2	42.43	56.88	60.57	59.71	39.32	55.53	63.08	65.69	66.63	69.90	83.16	79.33	64.76	48.02	35.10
	2012	Texas Lehigh	42.44	56.93	60.58	59.71	39.31	55.60	63.54	65.94	66.87	69.93	83.57	79.54	64.75	48.01	35.13
	2012	On-Road	42.49	56.98	60.64	59.71	39.31	55.66	63.61	66.00	67.00	70.03	83.81	79.69	64.85	48.07	35.14
	2012	Non-Road	42.43	56.90	60.56	59.71	39.32	55.58	63.52	65.89	66.81	69.89	83.53	79.52	64.75	48.01	35.13
C38	2012	Basecase CAPCOG	45.25	57.24	62.86	62.20	40.56	55.43	63.21	67.21	68.51	67.67	80.66	82.59	67.87	51.27	36.96
	2012	No Decker Gas Turbines	45.12	57.24	62.86	62.20	40.56	55.43	63.21	67.21	68.51	67.67	80.47	82.39	67.87	51.27	36.96
	2012	No Decker Boiler 1	45.25	57.24	62.86	62.20	40.56	55.43	63.21	66.74	68.13	67.65	80.27	82.08	67.84	51.09	36.91
	2012	No Decker Boiler 2	45.21	57.13	62.83	62.20	40.56	55.41	63.12	67.01	68.26	67.65	80.38	82.23	67.86	51.19	36.92
	2012	Texas Lehigh	45.25	57.26	62.88	62.20	40.56	55.43	63.21	67.23	68.51	67.67	80.66	82.58	67.85	51.22	36.96
	2012	On-Road	45.33	57.32	62.96	62.20	40.59	55.50	63.30	67.32	68.67	67.74	80.88	82.78	67.99	51.36	37.00
	2012	Non-Road	45.23	57.21	62.84	62.20	40.56	55.40	63.17	67.17	68.42	67.64	80.58	82.55	67.85	51.25	36.95
C614	2012	Basecase CAPCOG	41.28	52.03	59.30	58.50	40.35	54.59	65.45	63.70	64.92	69.34	77.15	73.57	63.55	46.12	33.98
	2012	No Decker Gas Turbines	41.28	52.03	59.30	58.50	40.35	54.59	65.45	63.70	64.92	68.59	77.13	73.57	63.55	46.12	33.98
	2012	No Decker Boiler 1	41.28	52.03	59.30	58.50	40.35	54.59	65.45	63.68	64.89	69.15	76.98	73.56	63.55	46.11	33.98
	2012	No Decker Boiler 2	41.28	52.03	59.30	58.50	40.35	54.42	65.23	63.69	64.90	69.17	77.04	73.56	63.55	46.11	33.98
	2012	Texas Lehigh	41.28	52.06	59.31	58.50	40.35	54.59	65.45	63.71	64.97	69.34	77.14	73.50	63.55	46.00	33.95
	2012	On-Road	41.30	52.06	59.33	58.50	40.37	54.70	65.58	63.78	65.05	69.48	77.36	73.65	63.57	46.15	34.01
	2012	Non-Road	41.27	52.02	59.30	58.50	40.35	54.57	65.41	63.67	64.88	69.29	77.09	73.55	63.55	46.11	33.98
C690	2012	Basecase CAPCOG	44.05	56.98	62.78	62.13	39.74	52.90	57.64	62.16	60.17	68.19	70.46	77.02	68.35	50.85	35.76
	2012	No Decker Gas Turbines	44.03	56.97	62.78	62.13	39.74	52.90	57.64	62.16	60.17	68.19	70.42	76.84	68.35	50.85	35.76
	2012	No Decker Boiler 1	44.05	56.97	62.78	62.13	39.74	52.90	57.64	62.15	60.14	68.18	70.43	76.80	68.01	50.66	35.76
	2012	No Decker Boiler 2	43.94	56.87	62.72	62.13	39.69	52.90	57.63	62.13	60.15	68.18	70.45	76.84	68.20	50.74	35.76
	2012	Texas Lehigh	44.05	56.99	62.79	62.13	39.74	52.90	57.64	62.17	60.17	68.20	70.45	77.01	68.33	50.84	35.76
	2012	On-Road	44.13	57.04	62.88	62.13	39.77	52.92	57.67	62.19	60.26	68.21	70.62	77.14	68.47	50.93	35.75
	2012	Non-Road	44.02	56.94	62.76	62.13	39.74	52.90	57.63	62.13	60.10	68.19	70.42	76.98	68.33	50.83	35.77

CAMS	Year	Run Label	Episode days														
			1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>	13 <sup>th</sup>	14 <sup>th</sup>	15 <sup>th</sup>
C1603	2012	Basecase CAPCOG	60.49	48.03	41.18	45.97	55.59	52.42	62.81	69.44	70.23	49.33	50.28	41.62	42.44	43.12	41.08
	2012	No Decker Gas Turbines	60.48	48.03	41.18	45.97	55.59	52.42	62.81	69.44	70.23	49.33	50.28	41.62	42.44	43.12	41.08
	2012	No Decker Boiler 1	60.49	48.03	41.18	45.97	55.58	52.42	62.81	69.44	70.23	49.33	50.28	41.57	42.44	43.12	41.08
	2012	No Decker Boiler 2	60.48	48.03	41.18	45.97	55.55	52.42	62.78	69.42	70.23	49.32	50.28	41.58	42.44	43.12	41.07
	2012	Texas Lehigh	60.48	48.00	41.16	45.94	55.58	52.35	62.81	69.44	69.98	49.26	50.26	41.60	42.41	43.15	41.11
	2012	On-Road	60.56	48.05	41.18	46.02	55.75	52.50	62.92	69.61	70.29	49.34	50.31	41.68	42.46	43.15	41.10
	2012	Non-Road	60.47	48.03	41.18	45.97	55.55	52.40	62.80	69.38	70.22	49.32	50.28	41.62	42.44	43.11	41.07
C1675	2012	Basecase CAPCOG	56.51	46.42	40.33	43.55	49.92	49.50	53.98	78.56	64.25	45.92	48.15	37.99	38.83	41.80	39.49
	2012	No Decker Gas Turbines	56.50	46.42	40.33	43.55	49.92	49.50	53.98	78.56	64.25	45.92	48.15	37.99	38.83	41.80	39.49
	2012	No Decker Boiler 1	56.51	46.42	40.33	43.55	49.91	49.50	53.98	78.56	64.25	45.92	48.15	37.99	38.83	41.80	39.49
	2012	No Decker Boiler 2	56.50	46.42	40.33	43.55	49.91	49.50	53.90	78.52	64.25	45.92	48.15	37.99	38.83	41.80	39.49
	2012	Texas Lehigh	56.51	46.42	40.33	43.55	49.92	49.50	53.93	78.48	64.25	45.92	48.15	37.99	38.83	41.80	39.49
	2012	On-Road	56.53	46.42	40.33	43.54	49.95	49.52	54.14	78.82	64.25	45.92	48.15	37.99	38.83	41.80	39.49
	2012	Non-Road	56.50	46.42	40.33	43.55	49.91	49.50	53.96	78.49	64.24	45.92	48.15	37.99	38.83	41.80	39.49
C6602	2012	Basecase CAPCOG	58.01	49.64	42.21	46.51	49.64	52.10	55.08	63.30	68.31	49.13	50.82	40.45	40.50	41.20	41.03
	2012	No Decker Gas Turbines	58.01	49.48	42.21	46.51	49.63	52.10	55.08	63.30	68.31	49.15	50.52	40.45	40.50	41.20	41.03
	2012	No Decker Boiler 1	58.01	49.64	42.21	46.22	49.63	52.10	55.08	63.30	68.31	49.01	50.52	40.26	40.50	41.20	41.03
	2012	No Decker Boiler 2	57.95	49.50	42.20	46.34	49.59	51.89	55.08	63.30	68.30	49.05	50.69	40.33	40.31	41.16	40.90
	2012	Texas Lehigh	58.01	49.64	42.21	46.51	49.62	52.09	55.08	63.30	68.31	49.13	50.82	40.45	40.49	41.20	41.03
	2012	On-Road	58.04	49.68	42.22	46.57	49.70	52.19	55.13	63.32	68.34	49.15	50.87	40.49	40.57	41.22	41.06
	2012	Non-Road	58.00	49.64	42.21	46.50	49.61	52.09	55.06	63.30	68.30	49.12	50.81	40.44	40.48	41.19	41.03

CAMS	Year	Run Label	Episode days														
			16 <sup>th</sup>	17 <sup>th</sup>	18 <sup>th</sup>	19 <sup>th</sup>	20 <sup>th</sup>	21 <sup>st</sup>	22 <sup>nd</sup>	23 <sup>rd</sup>	24 <sup>th</sup>	25 <sup>th</sup>	26 <sup>th</sup>	27 <sup>th</sup>	28 <sup>th</sup>	29 <sup>th</sup>	30 <sup>th</sup>
C1603	2012	Basecase CAPCOG	41.86	54.43	59.66	58.91	40.15	56.35	65.30	64.64	68.29	71.24	83.38	75.53	63.09	45.63	32.44
	2012	No Decker Gas Turbines	41.86	54.43	59.66	58.91	40.15	56.35	65.30	64.64	68.29	70.61	83.26	75.53	63.09	45.63	32.44
	2012	No Decker Boiler 1	41.86	54.43	59.66	58.91	40.15	56.35	65.30	64.62	68.20	70.97	82.97	75.51	63.09	45.63	32.44
	2012	No Decker Boiler 2	41.86	54.43	59.66	58.91	40.15	56.18	65.16	64.64	68.22	71.02	83.11	75.52	63.09	45.63	32.44
	2012	Texas Lehigh	41.94	54.47	59.70	58.91	40.15	56.35	65.30	64.66	68.31	71.25	83.37	75.48	63.06	45.45	32.44
	2012	On-Road	41.89	54.47	59.71	58.91	40.16	56.44	65.41	64.73	68.43	71.38	83.64	75.63	63.14	45.67	32.45
	2012	Non-Road	41.85	54.42	59.66	58.91	40.15	56.34	65.27	64.62	68.23	71.19	83.32	75.51	63.08	45.63	32.44
C1675	2012	Basecase CAPCOG	40.49	52.61	57.79	56.99	38.94	48.06	60.97	62.88	57.81	68.03	67.94	70.32	58.69	44.58	32.31
	2012	No Decker Gas Turbines	40.49	52.61	57.79	56.99	38.94	48.06	60.97	62.88	57.81	68.03	67.94	70.32	58.69	44.58	32.31
	2012	No Decker Boiler 1	40.49	52.61	57.79	56.99	38.94	48.06	60.97	62.88	57.81	67.93	67.93	70.32	58.69	44.58	32.31
	2012	No Decker Boiler 2	40.49	52.61	57.79	56.99	38.94	48.06	60.93	62.88	57.81	67.96	67.94	70.32	58.69	44.58	32.31
	2012	Texas Lehigh	40.49	52.61	57.79	56.99	38.94	48.06	60.98	62.88	57.81	68.02	67.91	70.32	58.69	44.58	32.31
	2012	On-Road	40.49	52.62	57.80	56.99	38.94	48.08	61.02	62.88	57.83	68.16	68.02	70.33	58.69	44.59	32.32
	2012	Non-Road	40.49	52.61	57.79	56.99	38.94	48.05	60.95	62.87	57.80	67.99	67.93	70.32	58.69	44.58	32.31
C6602	2012	Basecase CAPCOG	37.76	53.93	56.94	56.07	39.47	53.83	58.86	60.04	57.78	69.29	70.95	71.95	61.33	45.88	36.02
	2012	No Decker Gas Turbines	37.76	53.93	56.94	56.07	39.47	53.83	58.86	60.04	57.78	69.29	70.91	71.96	61.33	45.88	36.02
	2012	No Decker Boiler 1	37.76	53.93	56.94	56.07	39.47	53.83	58.86	60.04	57.74	69.28	70.90	71.96	61.26	45.90	36.02
	2012	No Decker Boiler 2	37.76	53.81	56.87	56.07	39.47	53.83	58.86	60.04	57.75	69.28	70.93	71.96	61.29	45.89	36.02
	2012	Texas Lehigh	37.76	53.93	56.94	56.07	39.47	53.83	58.86	60.04	57.78	69.29	70.96	71.96	61.33	45.88	36.02
	2012	On-Road	37.77	53.96	56.97	56.07	39.48	53.84	58.88	60.05	57.81	69.30	71.07	71.99	61.37	45.91	36.03
	2012	Non-Road	37.75	53.92	56.93	56.07	39.47	53.83	58.85	60.03	57.72	69.29	70.91	71.94	61.33	45.88	36.03

Table 3-2: Average Peak Ozone for Each Run on All Days, Days > 60 ppb, and Days > 70 ppb in the Base Case, 2012

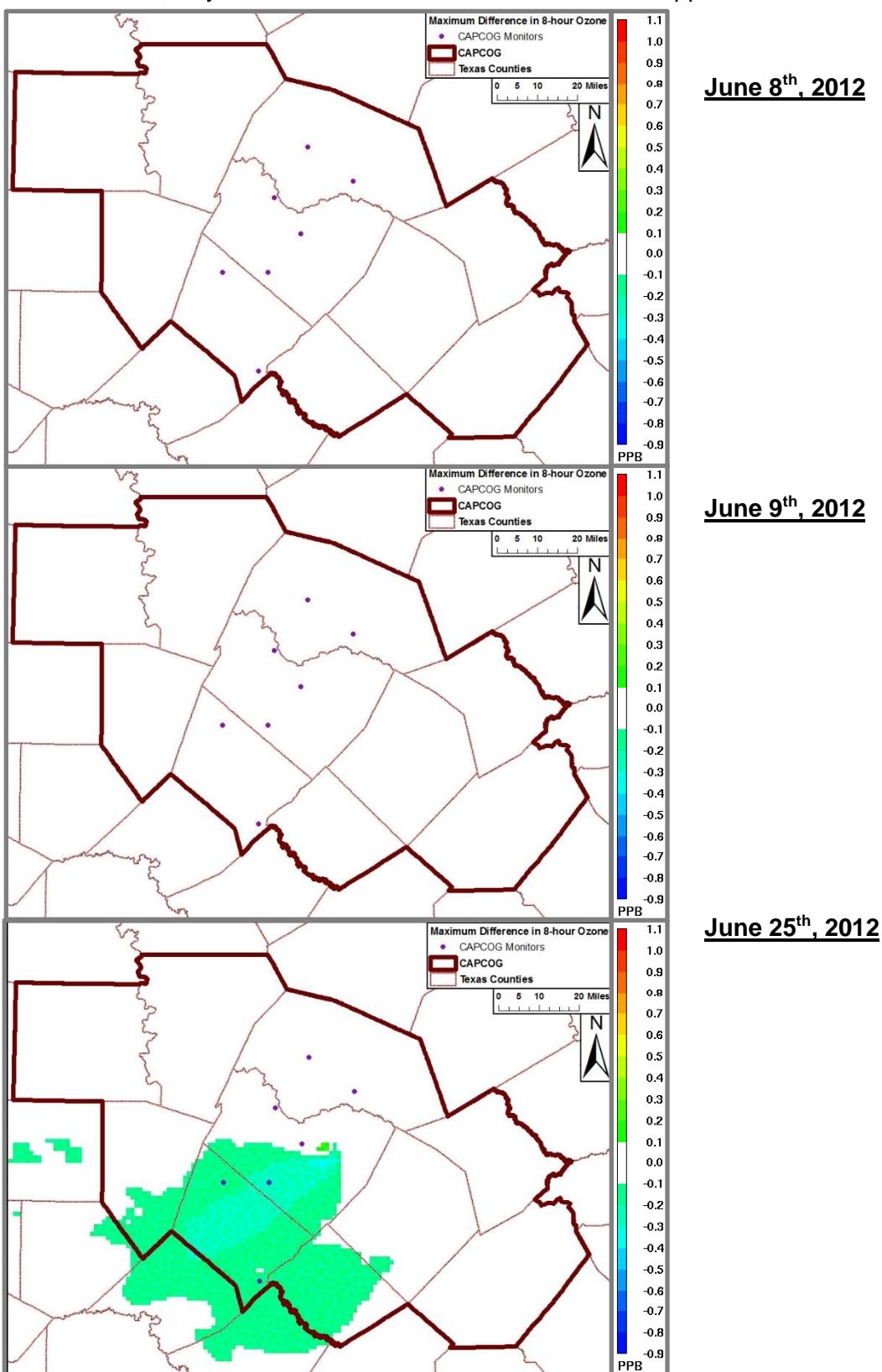
CAMS	Run Label	All Days			Days > 60 ppb			Days > 70 ppb		
		Average Peak Ozone	Difference	Standard Deviation	Average Peak Ozone	Difference	Standard Deviation	Average Peak Ozone	Difference	Standard Deviation*
C3	Basecase CAPCOG	56.28			69.07			76.89		
	No Decker Gas Turbines	56.25	-0.03	0.12	68.99	-0.08	0.18	76.82	-0.07	0.12
	No Decker Boiler 1	56.21	-0.07	0.16	68.90	-0.17	0.24	76.65	-0.24	0.30
	No Decker Boiler 2	56.21	-0.07	0.13	68.91	-0.16	0.17	76.73	-0.15	0.21
	Texas Lehigh	56.27	-0.01	0.01	69.07	0.00	0.01	76.89	0.00	0.00
	On-Road	56.35	0.07	0.05	69.17	0.10	0.05	77.02	0.13	0.08
	Non-Road	56.26	-0.02	0.01	69.04	-0.03	0.02	76.86	-0.03	0.02
C38	Basecase CAPCOG	57.21			68.21			79.81		
	No Decker Gas Turbines	57.19	-0.02	0.06	68.17	-0.04	0.08	79.68	-0.13	
	No Decker Boiler 1	57.14	-0.07	0.15	68.07	-0.14	0.21	79.51	-0.30	
	No Decker Boiler 2	57.14	-0.07	0.10	68.09	-0.13	0.13	79.59	-0.22	
	Texas Lehigh	57.19	-0.01	0.03	68.21	0.00	0.01	79.80	-0.01	
	On-Road	57.30	0.09	0.05	68.33	0.12	0.06	79.98	0.17	
	Non-Road	57.18	-0.03	0.02	68.17	-0.04	0.03	79.76	-0.05	
C614	Basecase CAPCOG	53.94			68.07			75.36		
	No Decker Gas Turbines	53.91	-0.03	0.14	67.97	-0.10	0.26	75.35	-0.01	
	No Decker Boiler 1	53.92	-0.02	0.05	68.02	-0.05	0.08	75.27	-0.09	
	No Decker Boiler 2	53.91	-0.03	0.06	68.00	-0.07	0.09	75.30	-0.05	
	Texas Lehigh	53.93	-0.01	0.04	68.06	-0.01	0.04	75.32	-0.03	
	On-Road	54.00	0.06	0.06	68.17	0.11	0.06	75.50	0.15	
	Non-Road	53.93	-0.01	0.02	68.04	-0.03	0.02	75.32	-0.03	
C690	Basecase CAPCOG	56.35			66.38			74.22		
	No Decker Gas Turbines	56.33	-0.02	0.04	66.36	-0.02	0.06	74.14	-0.07	
	No Decker Boiler 1	56.31	-0.04	0.09	66.32	-0.06	0.12	74.13	-0.08	
	No Decker Boiler 2	56.28	-0.07	0.07	66.31	-0.08	0.09	74.07	-0.15	
	Texas Lehigh	56.34	-0.01	0.01	66.38	0.00	0.01	74.21	-0.01	
	On-Road	56.43	0.08	0.05	66.46	0.08	0.05	74.35	0.13	
	Non-Road	56.33	-0.02	0.02	66.36	-0.03	0.02	74.18	-0.04	

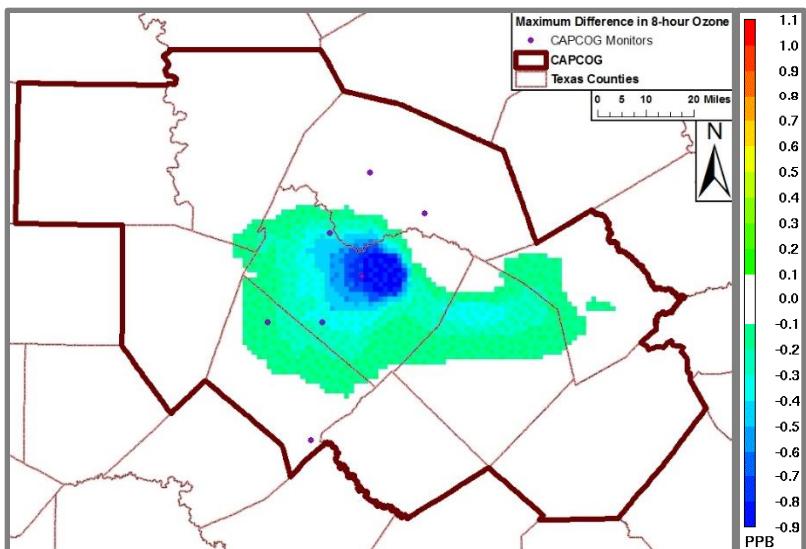
\*Standard Deviation was not calculated for averages with less than 4 values

CAMS	Run Label	All Days			Days > 60 ppb			Days > 70 ppb		
		Average Peak Ozone	Difference	Standard Deviation	Average Peak Ozone	Difference	Standard Deviation	Average Peak Ozone	Difference	Standard Deviation*
C1603	Basecase CAPCOG	55.16			68.59			75.10		
	No Decker Gas Turbines	55.14	-0.03	0.12	68.52	-0.07	0.19	74.91	-0.19	0.30
	No Decker Boiler 1	55.13	-0.03	0.09	68.51	-0.07	0.14	74.92	-0.17	0.20
	No Decker Boiler 2	55.13	-0.03	0.07	68.51	-0.07	0.10	74.97	-0.13	0.14
	Texas Lehigh	55.15	-0.02	0.06	68.56	-0.03	0.08	75.02	-0.07	0.12
	On-Road	55.23	0.07	0.06	68.70	0.12	0.06	75.24	0.14	0.09
	Non-Road	55.15	-0.02	0.02	68.55	-0.03	0.02	75.06	-0.03	0.02
C1675	Basecase CAPCOG	51.79			67.56			74.44		
	No Decker Gas Turbines	51.79	0.00	0.00	67.56	0.00	0.00	74.44	0.00	
	No Decker Boiler 1	51.78	0.00	0.02	67.55	-0.02	0.04	74.44	0.00	
	No Decker Boiler 2	51.78	-0.01	0.02	67.54	-0.02	0.03	74.42	-0.02	
	Texas Lehigh	51.78	-0.01	0.02	67.55	-0.02	0.03	74.40	-0.04	
	On-Road	51.82	0.03	0.06	67.64	0.08	0.09	74.58	0.14	
	Non-Road	51.78	-0.01	0.01	67.54	-0.02	0.02	74.41	-0.03	
C6602	Basecase CAPCOG	52.60			66.45			71.45		
	No Decker Gas Turbines	52.59	-0.02	0.06	66.45	-0.01	0.02	71.43	-0.02	
	No Decker Boiler 1	52.57	-0.04	0.08	66.44	-0.02	0.03	71.43	-0.02	
	No Decker Boiler 2	52.55	-0.05	0.06	66.44	-0.01	0.01	71.44	-0.01	
	Texas Lehigh	52.60	0.00	0.00	66.46	0.00	0.00	71.46	0.00	
	On-Road	52.64	0.03	0.03	66.49	0.04	0.04	71.53	0.08	
	Non-Road	52.59	-0.01	0.01	66.44	-0.01	0.01	71.43	-0.03	

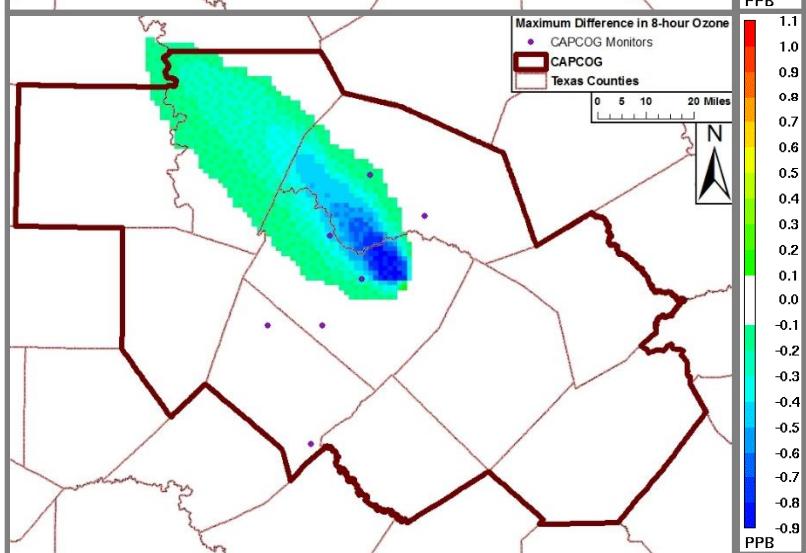
\*Standard Deviation was not calculated for averages with less than 4 values

Figure 3-1: Maximum 8-hour Ozone Difference when Decker Power Plant Boiler 1 is removed, 2012 Baseline, Days with Predicted Peak 8-hour Ozone > 70 ppb



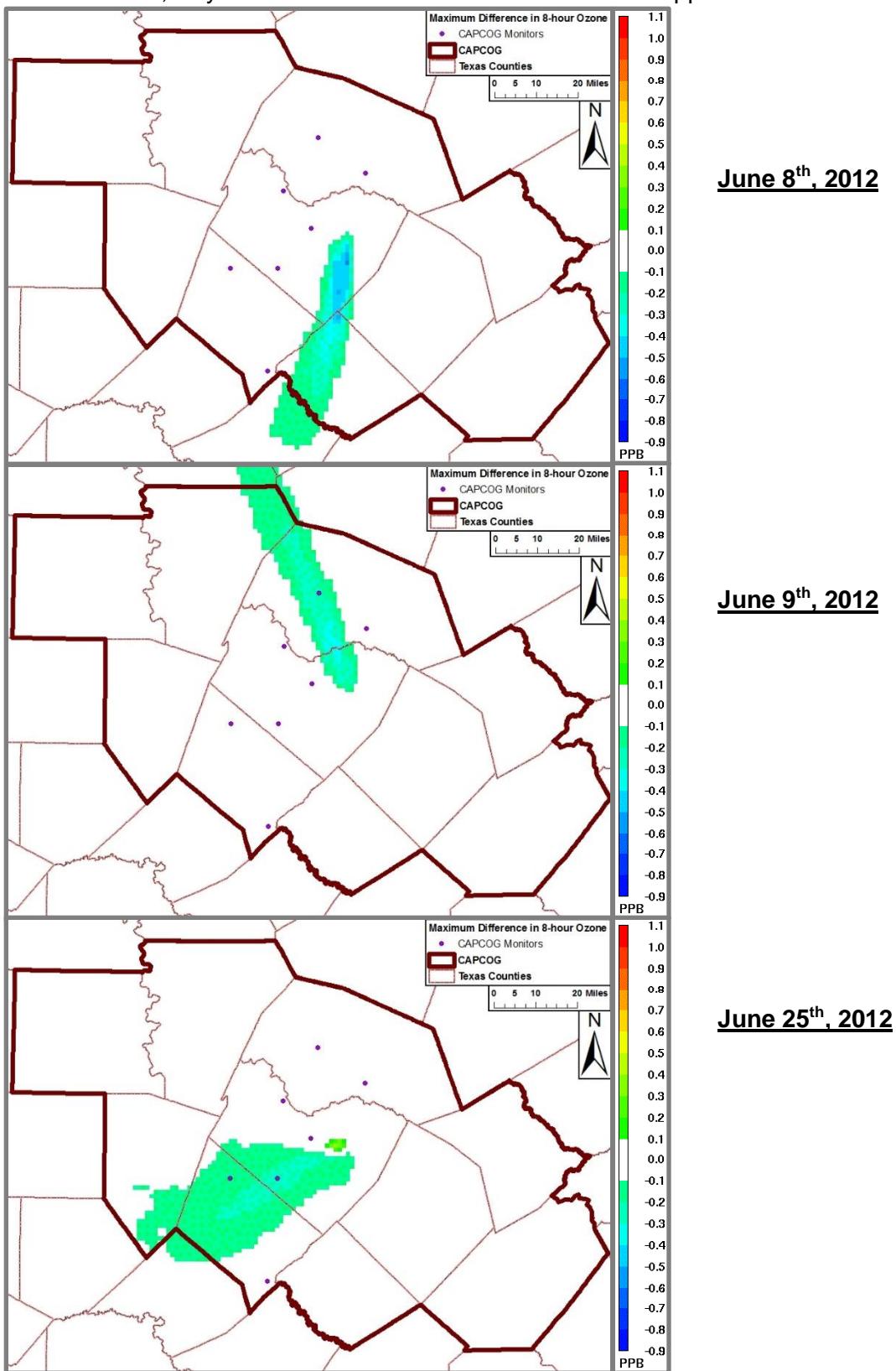


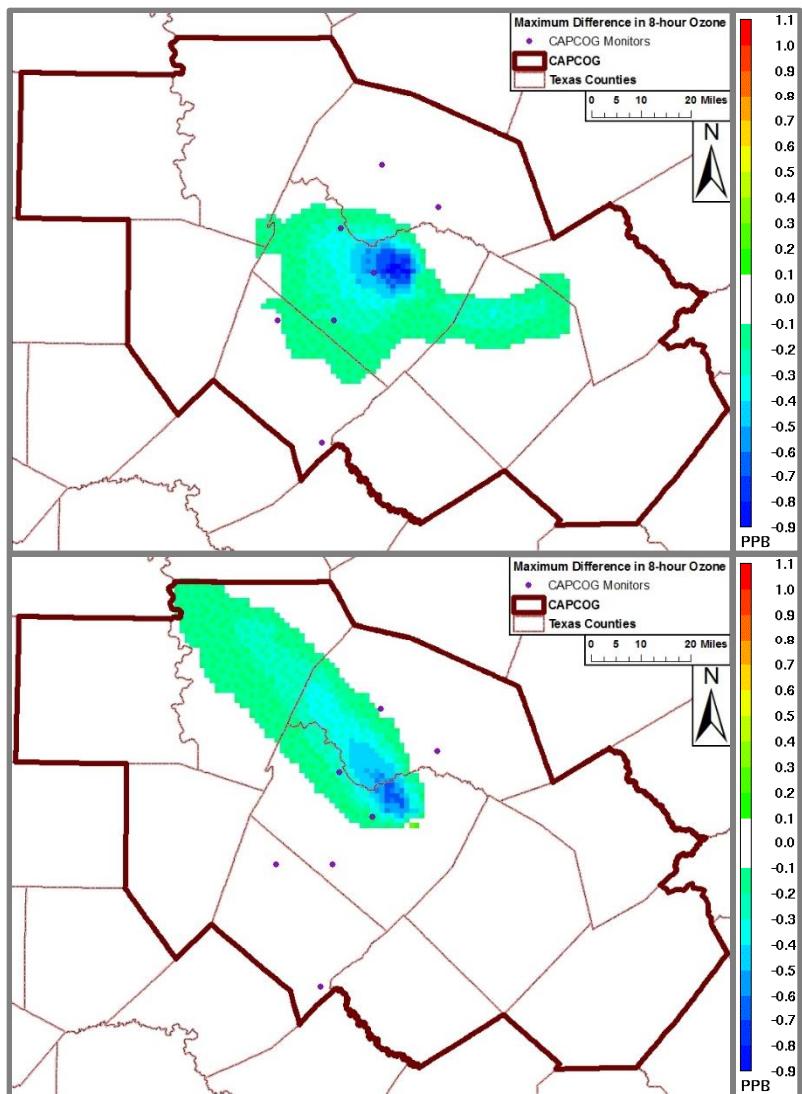
June 26<sup>th</sup>, 2012



June 27<sup>th</sup>, 2012

Figure 3-2: Maximum 8-hour Ozone Difference when Decker Power Plant Boiler 2 is removed, 2012 Baseline, Days with Predicted Peak 8-hour Ozone > 70 ppb

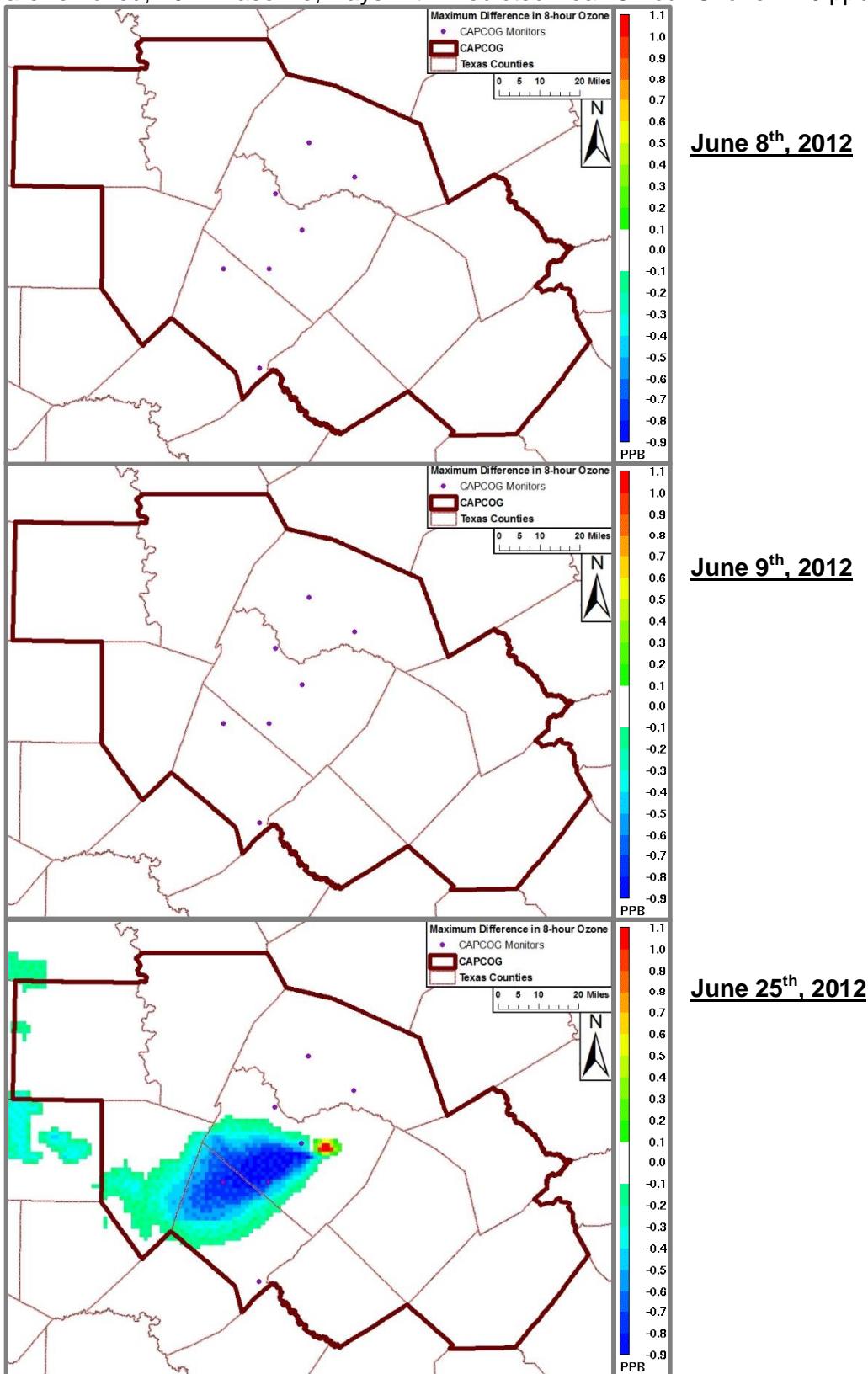


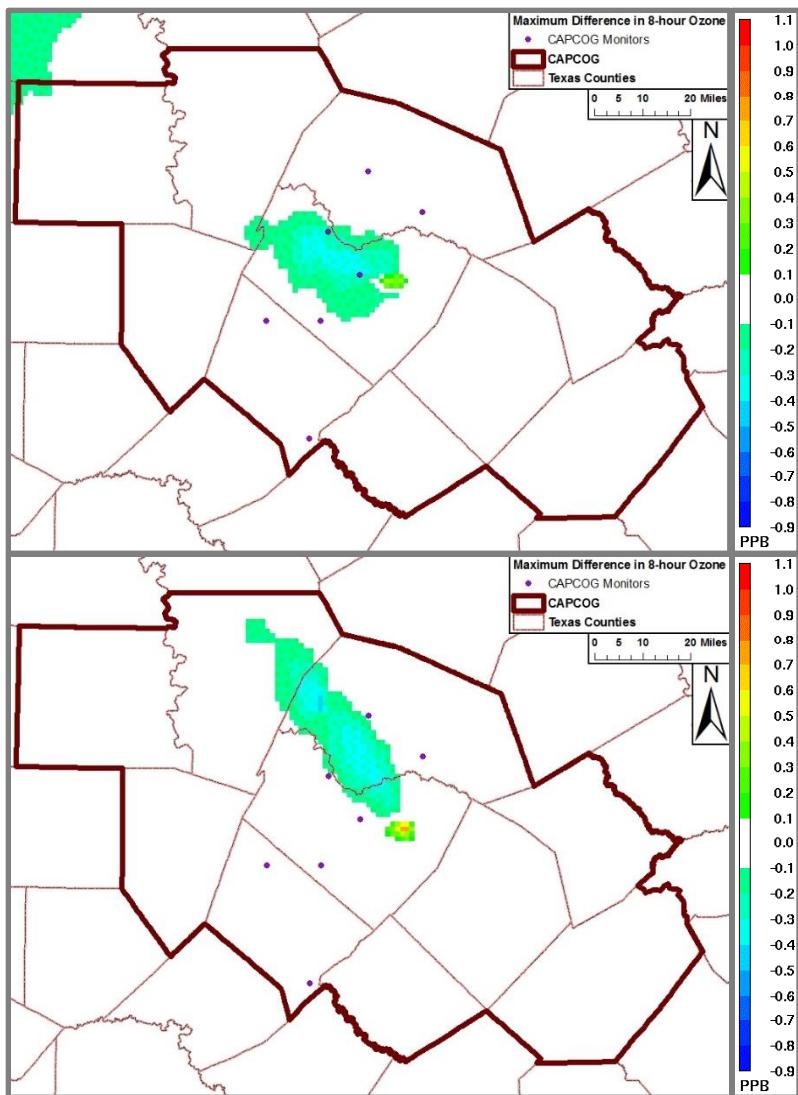


June 26<sup>th</sup>, 2012

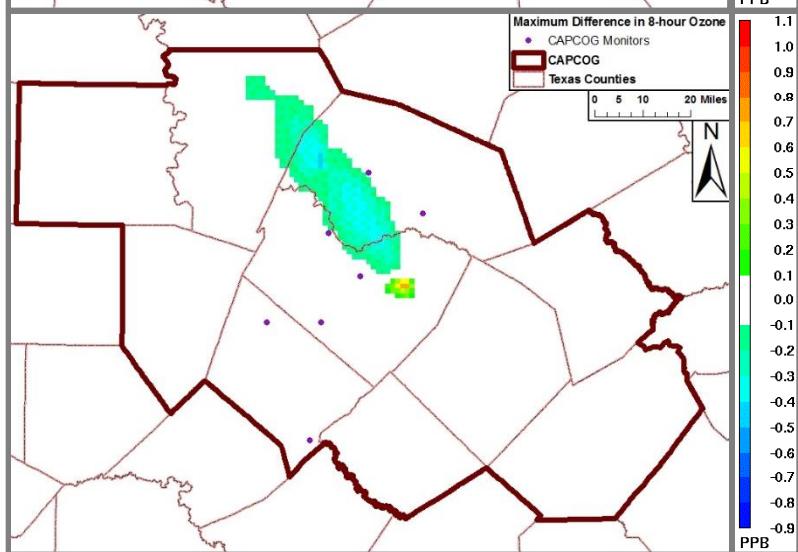
June 27<sup>th</sup>, 2012

Figure 3-3: Maximum 8-hour Ozone Difference when Decker Power Plant Natural Gas Turbines are removed, 2012 Baseline, Days with Predicted Peak 8-hour Ozone > 70 ppb



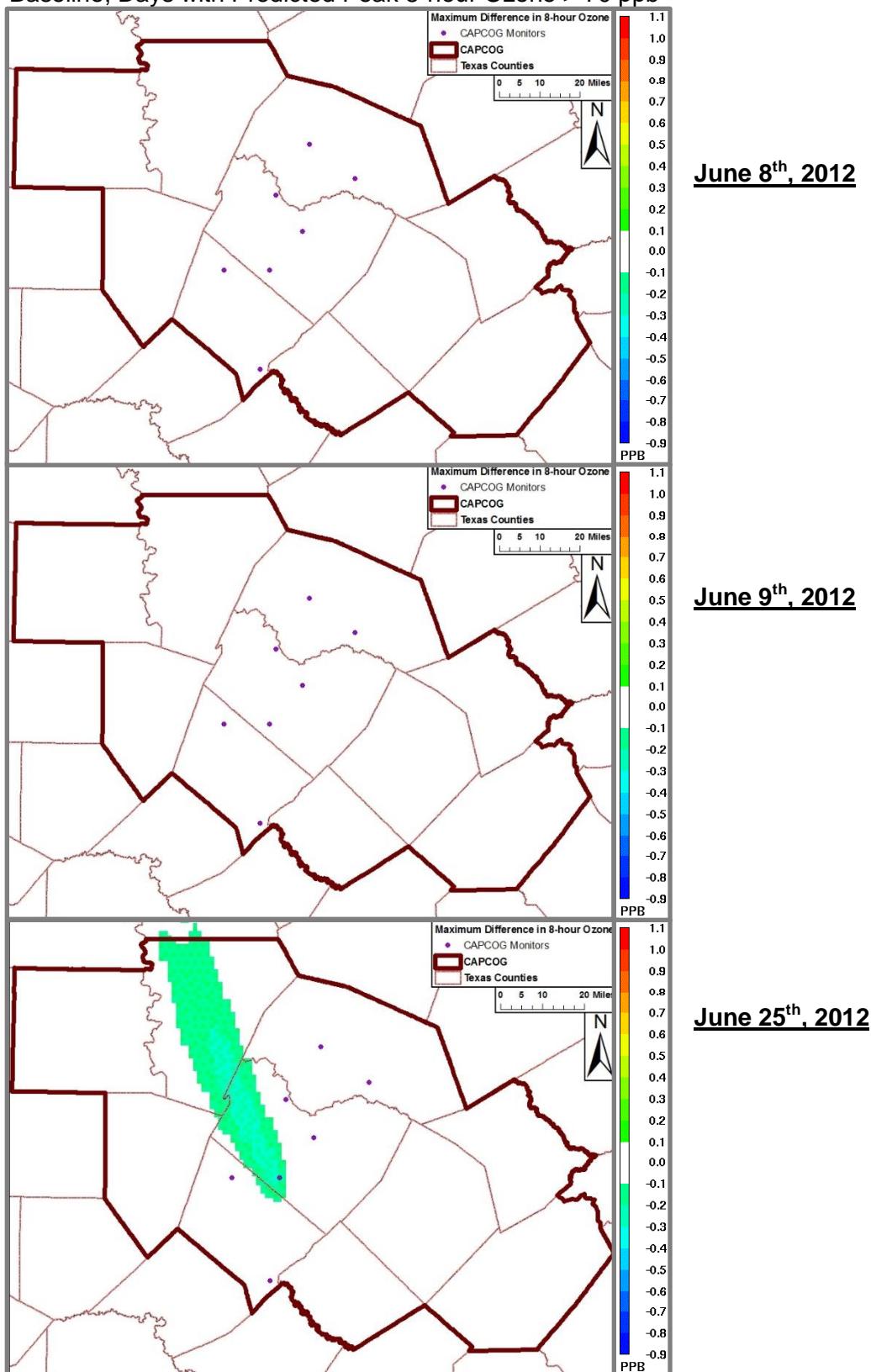


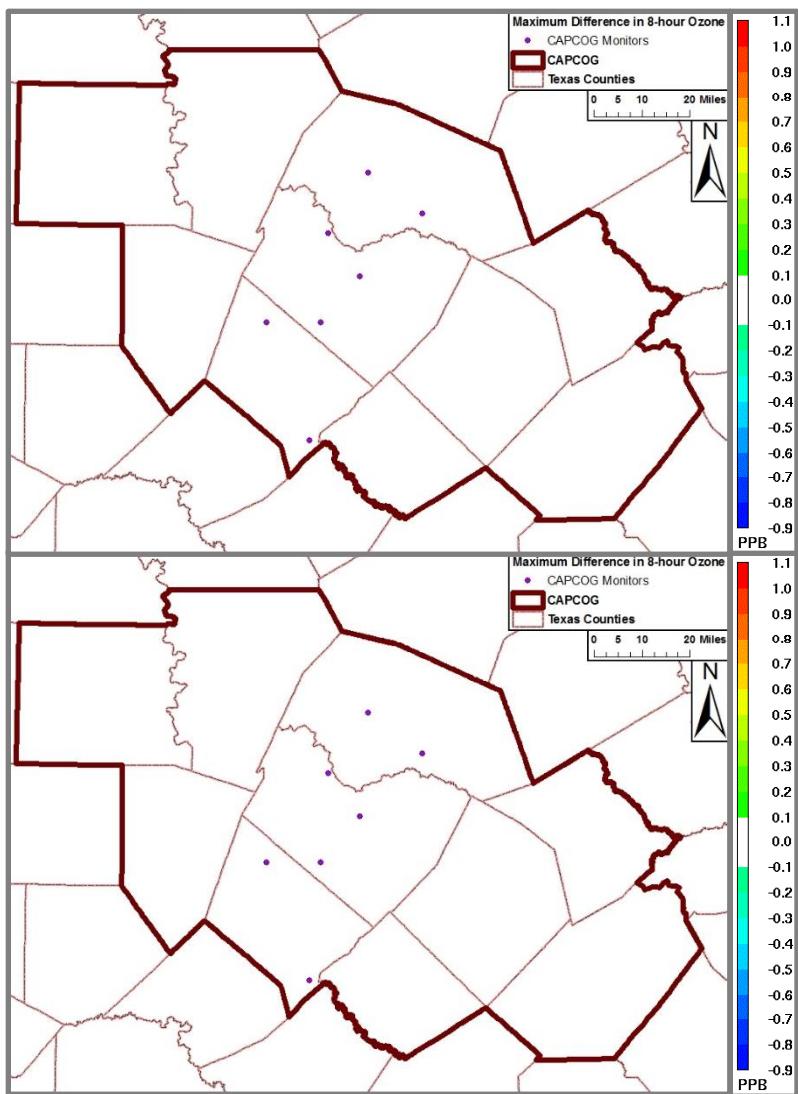
June 26<sup>th</sup>, 2012



June 27<sup>th</sup>, 2012

Figure 3-4: Maximum 8-hour Ozone Difference with Texas Lehigh Hourly Emissions, 2012 Baseline, Days with Predicted Peak 8-hour Ozone > 70 ppb





June 27<sup>th</sup>, 2012

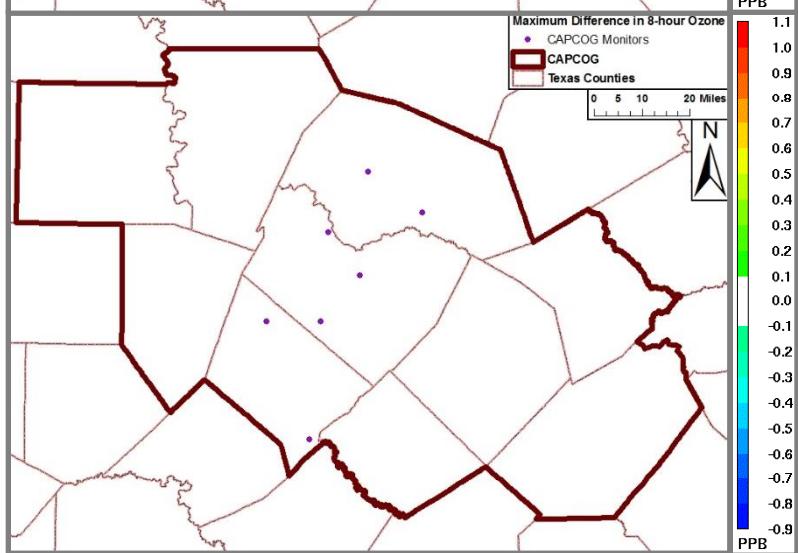
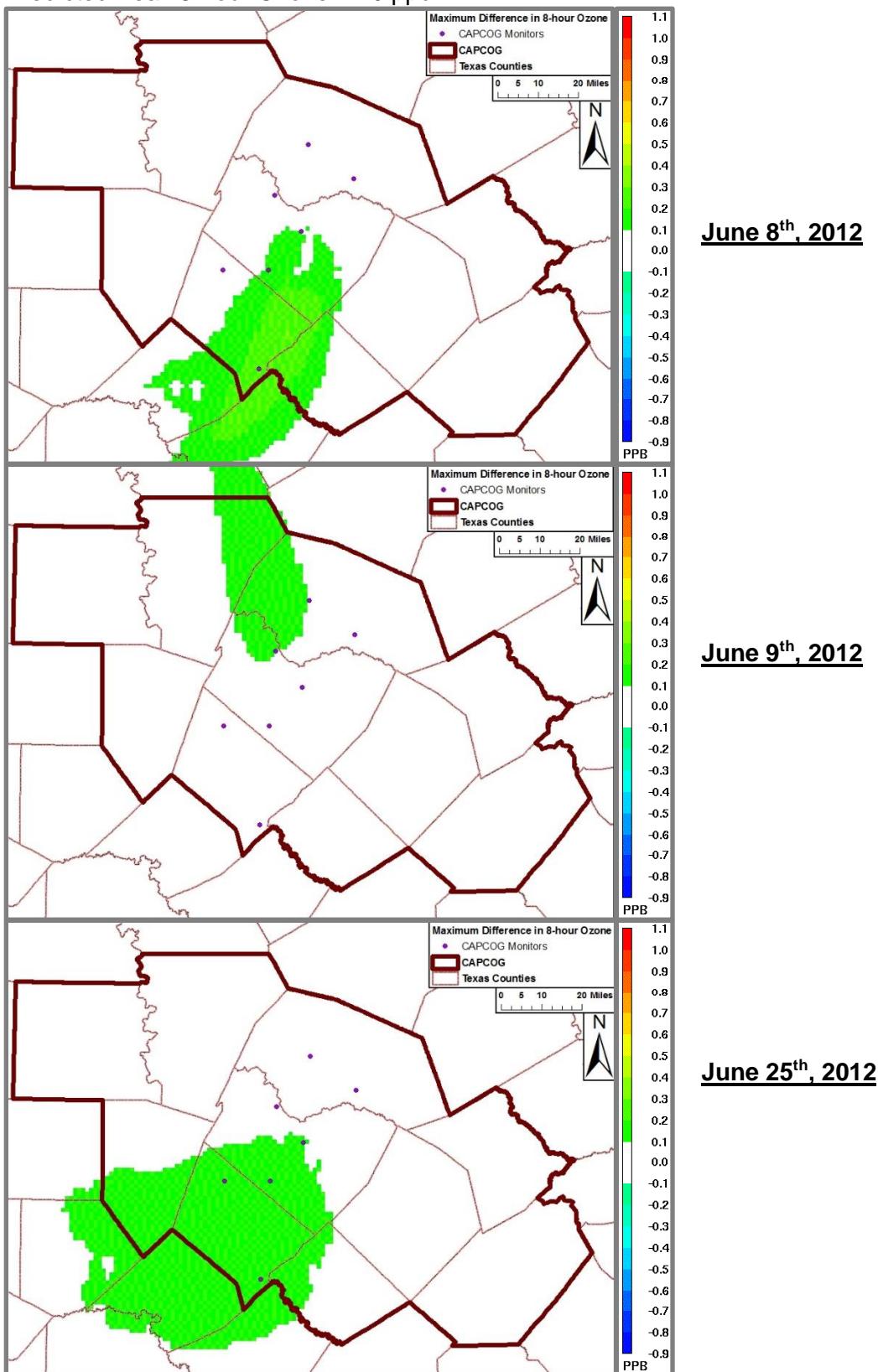
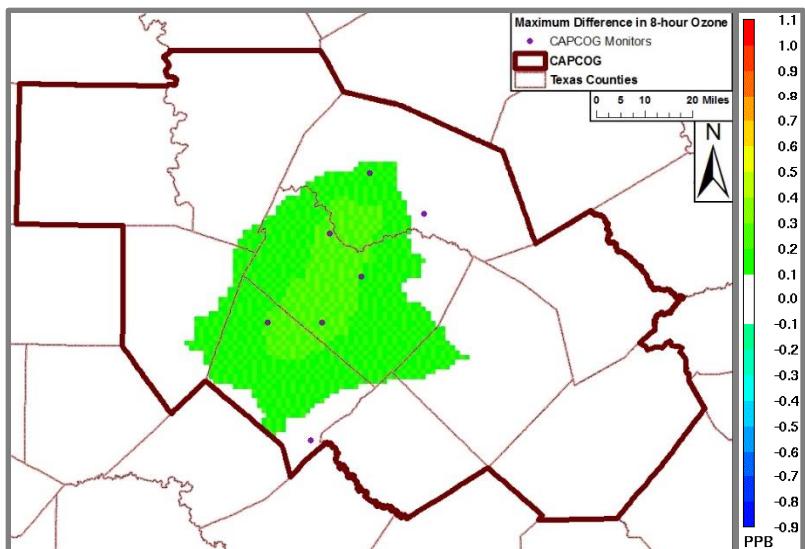
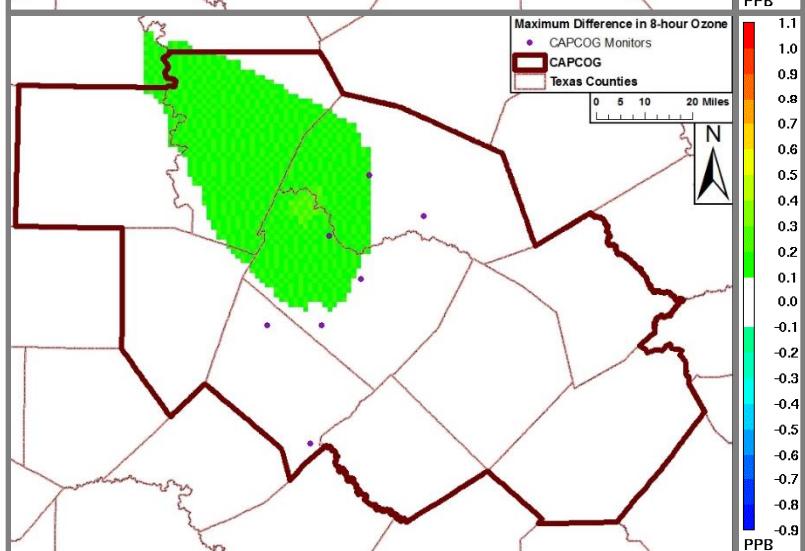


Figure 3-5: Maximum 8-hour Ozone Difference On-Road Sensitivity, 2012 Baseline, Days with Predicted Peak 8-hour Ozone > 70 ppb



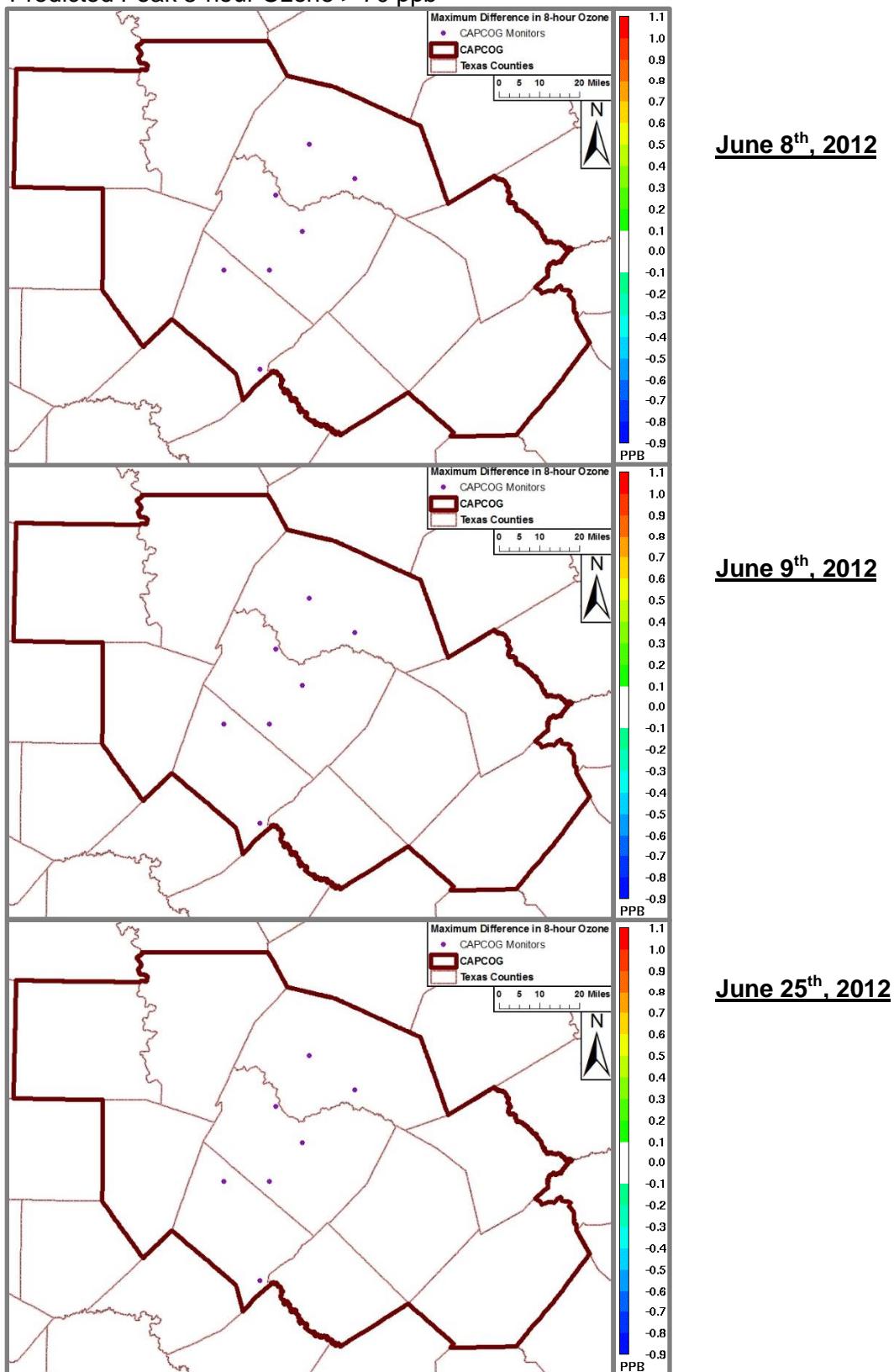


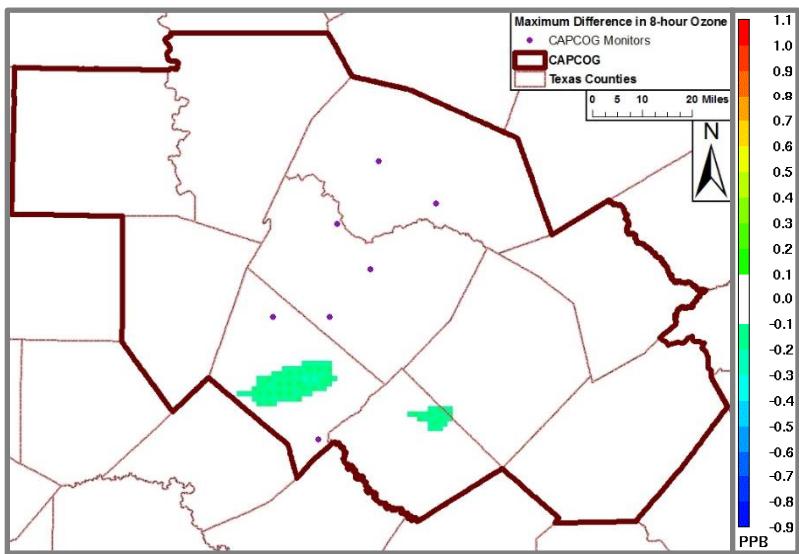
June 26<sup>th</sup>, 2012



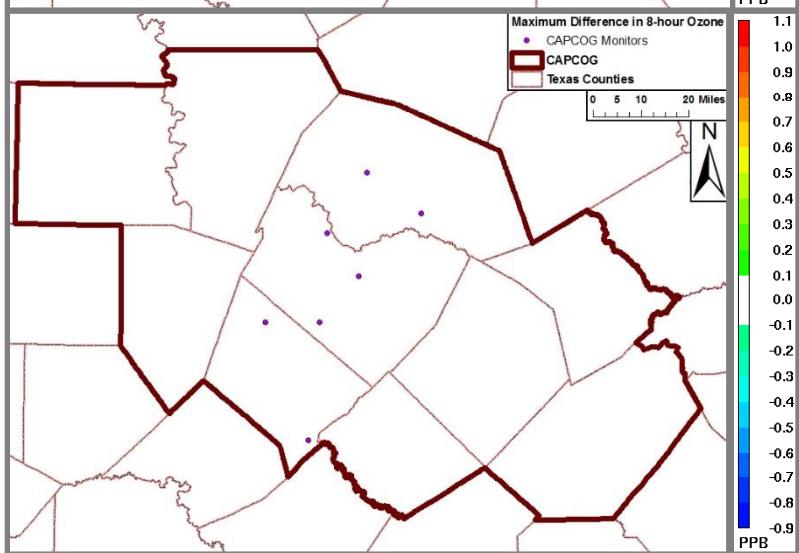
June 27<sup>th</sup>, 2012

Figure 3-6: Maximum 8-hour Ozone Difference Non-Road Sensitivity, 2012 Baseline, Days with Predicted Peak 8-hour Ozone > 70 ppb





June 26<sup>th</sup>, 2012



June 27<sup>th</sup>, 2012

## Appendix A: Example of EPS3 Processing Stream for Processing the Emission Inventory

### EPS3 script to run Texas Lehigh Emissions

```
#!/bin/csh
set EPS3_PATH = /home/eps3_v2
set yy = 12
set EI_PATH = /home/eps3_v2
foreach DAY (01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30)
# Run EPS3 PREAM module for processing texas Texas Lehigh NEGU Point NOx emissions, 2012
echo "#####
echo "prepnt : 20$yy
rm -f $EI_PATH/20$yy/msg/prepnt/msg.prepnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
rm -f $EI_PATH/20$yy/embr/embr.prepnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
rm -f $EI_PATH/20$yy/embr/stkrpt.prepnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
rm -f $EI_PATH/20$yy/errors/err.prepnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY

$EPS3_PATH/src/src19/prepnt/prepnt.distrib << IEOF
Userin File      | /home/eps3_v2/Point_EI/eps3_runstreams/userin/conus_36km/userin.cb6p.1206$DAY.conus_36km_egu_no_h_d_18co
Input AFS file   | /home/eps3_v2/Point_EI/AFS/afs.Texas.lehigh.NOx.CAPCOG.2012.prn
Output Messages  | $EI_PATH/20$yy/msg/prepnt/msg.prepnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
Output EMBR       | $EI_PATH/20$yy/embr/embr.prepnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
Stack Report     | $EI_PATH/20$yy/embr/stkrpt.prepnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
EMAR error file  | $EI_PATH/20$yy/errors/err.prepnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
IEOF

ls -l $EI_PATH/20$yy/msg/prepnt/msg.prepnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
ls -l $EI_PATH/20$yy/embr/embr.prepnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
ls -l $EI_PATH/20$yy/embr/stkrpt.prepnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
ls -l $EI_PATH/20$yy/errors/err.prepnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY

# Run EPS3 Spcems module for processing Texas Lehigh NEGU point NOx emissions, 2012
echo "#####
echo "spcems : 20$yy
rm -f $EI_PATH/20$yy/msg/chmspl/msg.spcems.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
rm -f $EI_PATH/20$yy/embr/embr.spcems.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
rm -f $EI_PATH/20$yy/errors/err.spcems.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY

$EPS3_PATH/src/src19/spcems/spcems.distrib << IEOF
Userin File      | /home/eps3_v2/Point_EI/eps3_runstreams/userin/conus_36km/userin.cb6p.1206$DAY.conus_36km_egu_no_h_d_18co
Input EMBR File  | $EI_PATH/20$yy/embr/embr.prepnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
Splits File      | /home/eps3_v2/Point_EI/EPS3_runstreams/spcems/inputs/gspro_stars_2014_v3a_w_HECT_cap_n_trade_v4.26Sep2016
ASC Profile XREF | /home/eps3_v2/Point_EI/EPS3_runstreams/spcems/inputs/gsref_stars_2014_v3a_w_HECT_cap_n_trade_v4.26Sep2016
Conversion factors | /home/eps3_v2/Point_EI/EPS3_runstreams/spcems/inputs/gscnv_stars_2014_v3a_w_HECT_cap_n_trade_v4.26Sep2016
Output Message File | $EI_PATH/20$yy/msg/chmspl/msg.spcems.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
Output EMBR File  | $EI_PATH/20$yy/embr/embr.spcems.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
Error Message File | $EI_PATH/20$yy/errors/err.spcems.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
IEOF

ls -l $EI_PATH/20$yy/msg/chmspl/msg.spcems.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
```

```

ls -l $EI_PATH/20$yy/embr/embr.spcems.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
ls -l $EI_PATH/20$yy/errors/err.spcems.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY

Run EPS3 TMPRL module for processing Texas Lehigh NEGU point NOx emissions, 2012
echo "#####
echo "tmprl : 20$yy
rm -f $EI_PATH/20$yy/msg/tmprl/msg.tmprl.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
rm -f $EI_PATH/20$yy/embr/embr.tmprl.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
rm -f $EI_PATH/20$yy/errors/err.tmprl.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY

$EPS3_PATH/src/src19/tmprl/tmprl.distrib << IEOF
Userin File      | /home/eps3_v2/Point_EI/eps3_runstreams/userin/conus_36km/userin.cb6p.1206$DAY.conus_36km_egu_no_h_d_18co
Input Point Emiss | $EI_PATH/20$yy/embr/embr.spcems.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
Temporal XREF    | /home/eps3_v2/Point_EI/EPS3_runstreams/tmprl/tmpfac/tmprl.xref.tx_osd_stars2012v1a
Temporal profiles | /home/eps3_v2/Point_EI/EPS3_runstreams/tmprl/tmpfac/tmprl.profs.tx_osd_stars2012v1a
Output message    | $EI_PATH/20$yy/msg/tmprl/msg.tmprl.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
Output EMBR       | $EI_PATH/20$yy/embr/embr.tmprl.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
Error EMAR        | $EI_PATH/20$yy/errors/err.tmprl.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
IEOF

ls -l $EI_PATH/20$yy/msg/tmprl/msg.tmprl.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
ls -l $EI_PATH/20$yy/embr/embr.tmprl.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
ls -l $EI_PATH/20$yy/errors/err.tmprl.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY

#Run EPS3 Pstpnt module for processing Texas Lehigh NEGU point NOx emissions, 2012
echo "#####
echo "Pstpnt : 20$yy
rm -f $EI_PATH/20$yy/msg/pstpnt/msg.pstpnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
rm -f $EI_PATH/20$yy/point/emiss/el_pt.pstpnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
rm -f $EI_PATH/20$yy/point/emiss/stkdef.pstpnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
rm -f $EI_PATH/20$yy/errors/emar.pstpnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY

# $EPS3_PATH/src17/pstpnt/pstpnt.distrib << IEOF
# /home/eps3/src7/pstpnt/pstpnt.aacog << IEOF
$EPS3_PATH/src/src18/pstpnt/pstpnt.distrib << IEOF
Userin File      | /home/eps3_v2/Point_EI/eps3_runstreams/userin/conus_36km/userin.cb6p.1206$DAY.conus_36km_egu_no_h_d_18co
Input EMBR File  | $EI_PATH/20$yy/embr/embr.tmprl.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
Output Messages   : $EI_PATH/20$yy/msg/pstpnt/msg.pstpnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
Output Emissions   : $EI_PATH/20$yy/point/emiss/el_pt.pstpnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
Output StackList   : $EI_PATH/20$yy/point/emiss/stkdef.pstpnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
Output SCC/stacks :
EMAR error file   : $EI_PATH/20$yy/errors/emar.pstpnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
IEOF

ls -l $EI_PATH/20$yy/msg/pstpnt/msg.pstpnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
ls -l $EI_PATH/20$yy/point/emiss/el_pt.pstpnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
ls -l $EI_PATH/20$yy/point/emiss/stkdef.pstpnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
ls -l $EI_PATH/20$yy/errors/emar.pstpnt.Texas.lehigh.NOx.CAPCOG.2012.1206$DAY
date
end

```

## Appendix B: Example of EPS3 Output Message File for Emission Inventory

EPS3 PREPNT msg file for Texas Lehigh (Note: Emissions totals are for the whole 30 day photochemical model run)

EPS3 PREPNT module v. 3.21 Jun 2014

Input Files	
USERIN file	:/home/eps3_v2/Point_EI/eps3_runstreams/userin/conus_36km/userin.cb6p.120601.conus_36km_egu_no_h_d_18co
Input AFS file	:/home/eps3_v2/Point_EI/AFS/afs.Texas.lehigh.NOx.CAPCOG.2012.prn
Output Files	
Output msg file	:/home/eps3_v2/2012/msg/prepnt/msg.prepnt.Texas.lehigh.NOx.CAPCOG.2012.120601
Output EMBR file	:/home/eps3_v2/2012/embr/embr.prepnt.Texas.lehigh.NOx.CAPCOG.2012.120601
Stack report file	:/home/eps3_v2/2012/embr/stkrpt.prepnt.Texas.lehigh.NOx.CAPCOG.2012.120601
ERROR file	:/home/eps3_v2/2012/errors/err.prepnt.Texas.lehigh.NOx.CAPCOG.2012.120601

EPS3 PREPNT module v. 3.21 Jun 2014 04/23/17 21:27:24

File note	:RPO CAMx Modeling conus_36km Fri 01 Jun 2012
Episode date (Calander)	:120601
Episode date (Julian)	:12153
Beginning hour	: 0
Ending hour	: 24
Grid origin (km)	: (-2736.000, -2088.000)
UTM zone	: 0
Grid cell width (km)	: ( 36.000, 36.000)
Number of cells	: ( 148, 112)
Number of counties	: 236
Geodesic coordinates	:NO
Process missing stack data	:YES
Plume height cutoff (m)	: 0.10
Default stack height (m)	: 3.00
Default stack diameter (m)	: 0.20
Default gas temperature (k)	: 294.00
Default exit velocity (m/s)	: 0.50

Number of input records read: 1440

Number of input records written to EMAR: 0

Number of input records skipped: 0

Number of output records written: 1440

Number of elevated output records written: 1440

Number of low level output records written: 0

Total Emissions Processed  
English Tons/Day

	NOX	VOC	CO	SO2	PM10	PM2_5	NH3
Input Emissions	206.2030	0.	0.	0.	0.	0.	0.
Output Emissions	206.2030	0.	0.	0.	0.	0.	0.
Elevated Emissions	206.2030	0.	0.	0.	0.	0.	0.
Low Level Emissions	0.	0.	0.	0.	0.	0.	0.
Outside Region	0.	0.	0.	0.	0.	0.	0.
Written to ERR file	0.	0.	0.	0.	0.	0.	0.
Total Skipped	0.	0.	0.	0.	0.	0.	0.

Criteria Pollutant Emissions by County  
English Tons/Day

County	Input NOX	Output NOX	Input VOC	Output VOC	Input CO	Output CO	Input SO2	Output SO2	Input PM10	Output PM10	Input PM2_5
48209	206.2031	206.2031	0.	0.	0.	0.	0.	0.	0.	0.	0.
Total	206.2031	206.2031	0.	0.	0.	0.	0.	0.	0.	0.	0.

Criteria Pollutant Emissions by Source Category  
English Tons/Day

Source Code	Input NOX	Output NOX	Input VOC	Output VOC	Input CO	Output CO	Input SO2	Output SO2	Input PM10	Output PM10	Input PM2_5
30500623	206.2031	206.2031	0.	0.	0.	0.	0.	0.	0.	0.	0.
Total	206.2031	206.2031	0.	0.	0.	0.	0.	0.	0.	0.	0.

Criteria Pollutant Emissions by Facility Code  
English Tons/Day

FIPS	Facility	Input NOX	Output NOX	Input VOC	Output VOC	Input CO	Output CO	Input SO2	Output SO2	Input PM10	Output PM10
48209	3	206.2031	206.2031	0.	0.	0.	0.	0.	0.	0.	0.
Total		206.2031	206.2031	0.	0.	0.	0.	0.	0.	0.	0.

## **Appendix C: EPS3 modeling Files**

All data files are available in the Archive files provided with this report.

### EPS3 Input Point Source Files

afs.48453.egu.2012.No\_Boiler\_1.Decker  
afs.48453.egu.2012.No\_Boiler\_2.Decker  
afs.48453.egu.2012.No\_gas\_turbins.Decker  
afs.Texas.lehigh.NOx.CAPCOG.2012.prn

### EPS3 Input Control Factor Files

cntlem.onroad.CAP.2012.prn  
cntlem.TexN.CAP.2012

### EPS3 Run Scripts

run.Decker.No\_Boiler\_1.amp\_01Jan\_to\_31Dec12\_episode\_all\_pols\_RPOLcp.v6.2012.job  
run.Decker.No\_Boiler\_2.amp\_01Jan\_to\_31Dec12\_episode\_all\_pols\_RPOLcp.v6.2012.job  
run.Decker.No\_gas\_turbins.amp\_01Jan\_to\_31Dec12\_episode\_all\_pols\_RPOLcp.v6.2012.job  
run.eps3.tx.onroad.mvs14\_hpms.etx\_110co\_2012\_sum.04km.job  
run.eps3\_v2.texn171\_nr08a.etx\_110co\_2012\_sum\_wkd.pream\_in.nox\_pm25\_split.2012.4km.job  
run.Texas.lehigh.NOx.CAPCOG.2012.job

## Appendix D: Example of CAMx Run Script for APCA

June 2012 Episode Texas Lehigh Run (June 2, 2012 – June 30, 2012)

```
#!/bin/csh
#
# CAMx 6.30
#
setenv OMP_NUM_THREADS 4

set BASE      = "/home/camx"
set INP       = "$BASE/input"
set EXEC     = "$BASE/camx6.3/camx9/CAMx.v6.30.noMPI.pgf"
set EMISSA   = "/home/camx/input/ei/"
#
set RUN      = "Lehigh.12"
set ICBC     = "$INP/bcic"
set MET36    = "$INP/met"
set MET12    = "$INP/met"
set MET04    = "$INP/met"
set EMISS36  = "$INP/ei"
set EMISS12  = "$INP/ei"
set EMISS04  = "$INP/ei"
set PTSRC    = "$INP/ei"
set OUTPUT   = "$BASE/outputs/$RUN"

#
mkdir $OUTPUT
mkdir $RUN
#
# --- set the dates and times ---
#
foreach f (120602.120601 120603.120602 120604.120603 120605.120604 120606.120605 120607.120606 120608.120607
120609.120608 120610.120609 120611.120610 120612.120611 120613.120612 120614.120613 120615.120614 120616.120615
120617.120616 120618.120617 120619.120618 120620.120619 120621.120620 120622.120621 120623.120622 120624.120623
120625.120624 120626.120625 120627.120626 120628.120627 120629.120628 120630.120629)
set TODAY = $f:r
set YESTERDAY = $f:e

set YEAR = 2012
set MM   = 06
```

```

set DD      = `echo $TODAY | cut -c5-6` 

# --- Create the input file (always called CAMx.in)

cat << ieof > CAMx.in

&CAMx_Control

Run_Message      = 'camx630',

!--- Model clock control ---

Time_Zone        = 6,                      ! (0=UTC,5=EST,6=CST,7=MST,8=PST)
Restart          = .true.,
Start_Date_Hour  = $YEAR,$MM,$DD,0000.0,   ! (YYYY,MM,DD,HHHH)
End_Date_Hour    = $YEAR,$MM,$DD,2400.0,   ! (YYYY,MM,DD,HHHH)

Maximum_Timestep = 15.0,                   ! minutes
Met_Input_Frequency = 60.,                 ! minutes
Ems_Input_Frequency = 60.,                 ! minutes
Output_Frequency  = 60.,                  ! minutes

!--- Map projection parameters ---

Map_Projection   = 'LAMBERT', ! (LAMBERT,POLAR,UTM,LATLON)
Longitude_Pole    = -97.0,       ! deg (west<0,south<0)
Latitude_Pole     = 40.0,        ! deg (west<0,south<0)
True_Latitude1    = 45.0,        ! deg (west<0,south<0)
True_Latitude2    = 33.0,        ! deg (west<0,south<0)

!--- Parameters for the master (first) grid ---

Number_of_Grids  = 3,
Master_SW_XCoord = -2736.0,      ! km or deg, SW corner of cell(1,1)
Master_SW_YCoord = -2088.0,      ! km or deg, SW corner of cell(1,1)
Master_Cell_XSize = 36.0,         ! km or deg
Master_Cell_YSize = 36.0,         ! km or deg
Master_Grid_Columns = 148,
Master_Grid_Rows   = 112,
Number_of_Layers   = 29,

```

```
!--- Parameters for the second grid ---
```

```
Nest_Meshing_Factor(2) = 3,          ! Relative to master grid
Nest_Beg_I_Index(2)    = 50,         ! Relative to master grid
Nest_End_I_Index(2)    = 98,         ! Relative to master grid
Nest_Beg_J_Index(2)    = 14,          ! Relative to master grid
Nest_End_J_Index(2)    = 49,          ! Relative to master grid
```

```
!--- Parameters for the third grid ---
```

```
Nest_Meshing_Factor(3) = 9,          ! Relative to master grid
Nest_Beg_I_Index(3)    = 68,         ! Relative to master grid
Nest_End_I_Index(3)    = 88,         ! Relative to master grid
Nest_Beg_J_Index(3)    = 17,          ! Relative to master grid
Nest_End_J_Index(3)    = 40,          ! Relative to master grid
```

```
!--- Model options ---
```

```
Diagnostic_Error_Check = false,      ! True = will stop after 1st timestep
Flexi_Nest            = true,        ! allow flexi-nest of input files including restart
Advection_Solver     = 'PPM',       ! (PPM,BOTT)
Chemistry_Solver      = 'EBI',       ! (EBI,IEH,LSODE)
PiG_Submodel          = 'GREASD',   ! (None,GREASD,IRON)
Probing_Tool          = 'None',      ! (None,OSAT,GOAT,APCA,PSAT,DDM,HDDM,PA,IPR,IRR,RTRAC,RTCMC)
Chemistry              = .true.,
Drydep_Model          = 'WESELY89',  ! (NONE,WESELY89,ZHANG03) (new in CAMx 5.30)
Wet_Deposition         = .true.,
ACM2_Diffusion        = .false.,
Super_Stepping         = .true.,
Gridded_Emissions     = .true.,
Point_Emissions        = .true.,
Ignore_Emission_Dates = .true.,
```

```
!--- Output specifications ---
```

```
Root_Output_Name        = '/home/camx/outputs/$RUN/camx.$RUN.20$TODAY'
Average_Output_3D       = .false.,
Output_3D_Grid(1)        = .false.,   ! Set Average_Output_3D = .false.
Output_3D_Grid(2)        = .false.,   ! if you set any of these to .true.
Output_3D_Grid(3)        = .true.,
HDF_Format_Output       = .false.,
```

```

Output_Species_Names(1) = 'O3',
!--- Input files ---

Chemistry_Parameters = '/home/camx/input/other/chemparam/CAMx6.3.chemparam.3_NONE',
Photolyis_Rates      = '/home/camx/input/other/tuv/camx620_cb6_tuv.20$TODAY.rpo_36km.2015APR28.tuv48',
Ozone_Column          = '/home/camx/input/other/o3map/camx6_o3c.20$TODAY.rpo_36km.2013MAY24',
Initial_Conditions   = '',
Boundary_Conditions   = '/home/camx/input/bcic/camx_cb6r2h_bc.20$TODAY.geoschem2015hi16B_45_291yr.rpo_36km.2012',
Top_Concentrations    = '/home/camx/input/bcic/camx_cb6r2h_tc.20$TODAY.geoschem2015hi16B_45_291yr.rpo_36km.2012',
Point_Sources          = '/home/eps3_v2/2012/point/emiss/ptsrce.PIG.cb6.lehigh.JUN.osd_2012.$TODAY',
Master_Grid_Restart   = '/home/camx/outputs/$RUN/camx.$RUN.20$YESTERDAY.inst',
Nested_Grid_Restart   = '/home/camx/outputs/$RUN/camx.$RUN.20$YESTERDAY.finst',
PiG_Restart            = '/home/camx/outputs/$RUN/camx.$RUN.20$YESTERDAY.pig'

Surface_Grid(1) = '/home/camx/input/other/landuse/camx6_landuse.rpo_36km.tceq2zhang26a.lai201206qc108ufun',
Met3D_Grid(1)       = '/home/camx/input/met/camx6_met3d.20$TODAY.2012_wrf371_p2ma_45_291yr.rpo_36km.v43',
Met2D_Grid(1)       = '/home/camx/input/met/camx6_met2d.20$TODAY.2012_wrf371_p2ma_45_291yr.rpo_36km.v43',
Vdiff_Grid(1)       = '/home/camx/input/met/camx6_kv.20$TODAY.2012_wrf371_p2ma_45_291yr.rpo_36km.v43.CMAQ.kv100',
Cloud_Grid(1)       = '/home/camx/input/met/camx6_cr.20$TODAY.2012_wrf371_p2ma_45_291yr.rpo_36km.v43',
Emiss_Grid(1)       = '/home/camx/input/ei/camx_cb6p_ei_lo.20$TODAY.tx.bl12.r4a.rpo_36km',

Surface_Grid(2) = '/home/camx/input/other/landuse/camx6_landuse.tx_12km.tceq2zhang26a.lai201206qc108ufun',
Met3D_Grid(2)       = '/home/camx/input/met/camx6_met3d.20$TODAY.2012_wrf371_p2ma_45_291yr.tx_12km.v43',
Met2D_Grid(2)       = '/home/camx/input/met/camx6_met2d.20$TODAY.2012_wrf371_p2ma_45_291yr.tx_12km.v43',
Vdiff_Grid(2)       = '/home/camx/input/met/camx6_kv.20$TODAY.2012_wrf371_p2ma_45_291yr.tx_12km.v43.CMAQ.kv100',
Cloud_Grid(2)       = '/home/camx/input/met/camx6_cr.20$TODAY.2012_wrf371_p2ma_45_291yr.tx_12km.v43',
Emiss_Grid(2)       = '/home/camx/input/ei/camx_cb6p_ei_lo.20$TODAY.tx.bl12.r4a.tx_12km',

Surface_Grid(3) = '/home/camx/input/other/landuse/camx6_landuse.tx_4km.tceq2zhang26a.lai201206qc108ufun',
Met3D_Grid(3)       = '/home/camx/input/met/camx6_met3d.20$TODAY.2012_wrf371_i2mSNgqsfco_45_291yr.tx_4km.v43',
Met2D_Grid(3)       = '/home/camx/input/met/camx6_met2d.20$TODAY.2012_wrf371_i2mSNgqsfco_45_291yr.tx_4km.v43',
Vdiff_Grid(3)       = '/home/camx/input/met/camx6_kv.20$TODAY.2012_wrf371_i2mSNgqsfco_45_291yr.tx_4km.v43.CMAQ.kv100',
Cloud_Grid(3)       = '/home/camx/input/met/camx6_cr.20$TODAY.2012_wrf371_i2mSNgqsfco_45_291yr.tx_4km.v43',
Emiss_Grid(3)       = '/home/eps3_v2/2012/merge/lo_emiss.bio.tx_4km.cb6.20$TODAY.june.2012.TCEQ.fy17.reg1.tx_4km',

&END
!-----
ieof
#

```

```
# --- Execute the model ---
#
cp -p CAMx.in $RUN/CAMx.$RUN.$TODAY.in
#/usr/bin/time $EXEC | & tee $RUN/camx.$RUN.$TODAY.out
/usr/bin/time $EXEC | & tee $RUN/camx.$RUN.$TODAY.out

@ JDATE ++
end
```

## **Appendix E: Photochemical Modeling Files**

### **June 2012 CAMx Run Files**

```
basecase.camx6.3.CAPCOG.2012.Decker.No_gas_turbins.job
basecase.camx6.3.CAPCOG.2012.Decker.No_gas_turbins.restart1.job
basecase.camx6.3.CAPCOG.2012.Decker.No_gas_turbins.restart2.job
basecase.camx6.3.CAPCOG.2012.job
basecase.camx6.3.CAPCOG.2012.lehigh.job
basecase.camx6.3.CAPCOG.2012.lehigh.restart1.job
basecase.camx6.3.CAPCOG.2012.mv.CAP.job
basecase.camx6.3.CAPCOG.2012.mv.CAP.restart1.job
basecase.camx6.3.CAPCOG.2012.mv.CAP.restart2.job
basecase.camx6.3.CAPCOG.2012.nr.CAP.job
basecase.camx6.3.CAPCOG.2012.nr.CAP.restart1.job
basecase.camx6.3.CAPCOG.2012.nr.CAP.restart2.job
basecase.camx6.3.CAPCOG.2012.restart1.job
basecase.camx6.3.CAPCOG.2012.restart2.job
basecase.camx6.3.CAPCOG.Decker.No_Boiler_1.2012.job
basecase.camx6.3.CAPCOG.Decker.No_Boiler_1.2012.restart1.job
basecase.camx6.3.CAPCOG.Decker.No_Boiler_1.2012.restart2.job
basecase.camx6.3.CAPCOG.Decker.No_Boiler_2.2012.job
basecase.camx6.3.CAPCOG.Decker.No_Boiler_2.2012.restart1.job
basecase.camx6.3.CAPCOG.Decker.No_Boiler_2.2012.restart2.job
```

### **CAMx Output Files for 2012 Base Case Model Run**

```
BC.CAPCOG.12.8hr.O3.20120601.txt
BC.CAPCOG.12.8hr.O3.20120602.txt
BC.CAPCOG.12.8hr.O3.20120603.txt
BC.CAPCOG.12.8hr.O3.20120604.txt
BC.CAPCOG.12.8hr.O3.20120605.txt
BC.CAPCOG.12.8hr.O3.20120606.txt
BC.CAPCOG.12.8hr.O3.20120607.txt
BC.CAPCOG.12.8hr.O3.20120608.txt
BC.CAPCOG.12.8hr.O3.20120609.txt
BC.CAPCOG.12.8hr.O3.20120610.txt
BC.CAPCOG.12.8hr.O3.20120611.txt
BC.CAPCOG.12.8hr.O3.20120612.txt
BC.CAPCOG.12.8hr.O3.20120613.txt
BC.CAPCOG.12.8hr.O3.20120614.txt
BC.CAPCOG.12.8hr.O3.20120615.txt
BC.CAPCOG.12.8hr.O3.20120616.txt
BC.CAPCOG.12.8hr.O3.20120617.txt
BC.CAPCOG.12.8hr.O3.20120618.txt
BC.CAPCOG.12.8hr.O3.20120619.txt
BC.CAPCOG.12.8hr.O3.20120620.txt
BC.CAPCOG.12.8hr.O3.20120621.txt
BC.CAPCOG.12.8hr.O3.20120622.txt
BC.CAPCOG.12.8hr.O3.20120623.txt
BC.CAPCOG.12.8hr.O3.20120624.txt
BC.CAPCOG.12.8hr.O3.20120625.txt
BC.CAPCOG.12.8hr.O3.20120626.txt
BC.CAPCOG.12.8hr.O3.20120627.txt
BC.CAPCOG.12.8hr.O3.20120628.txt
BC.CAPCOG.12.8hr.O3.20120629.txt
BC.CAPCOG.12.8hr.O3.20120630.txt
```

CAMx Output Files for Model Elimination of Emissions from Decker Creek Unit 1

No\_Boiler\_1.12.8hr.O3.20120601.txt  
No\_Boiler\_1.12.8hr.O3.20120602.txt  
No\_Boiler\_1.12.8hr.O3.20120603.txt  
No\_Boiler\_1.12.8hr.O3.20120604.txt  
No\_Boiler\_1.12.8hr.O3.20120605.txt  
No\_Boiler\_1.12.8hr.O3.20120606.txt  
No\_Boiler\_1.12.8hr.O3.20120607.txt  
No\_Boiler\_1.12.8hr.O3.20120608.txt  
No\_Boiler\_1.12.8hr.O3.20120609.txt  
No\_Boiler\_1.12.8hr.O3.20120610.txt  
No\_Boiler\_1.12.8hr.O3.20120611.txt  
No\_Boiler\_1.12.8hr.O3.20120612.txt  
No\_Boiler\_1.12.8hr.O3.20120613.txt  
No\_Boiler\_1.12.8hr.O3.20120614.txt  
No\_Boiler\_1.12.8hr.O3.20120615.txt  
No\_Boiler\_1.12.8hr.O3.20120616.txt  
No\_Boiler\_1.12.8hr.O3.20120617.txt  
No\_Boiler\_1.12.8hr.O3.20120618.txt  
No\_Boiler\_1.12.8hr.O3.20120619.txt  
No\_Boiler\_1.12.8hr.O3.20120620.txt  
No\_Boiler\_1.12.8hr.O3.20120621.txt  
No\_Boiler\_1.12.8hr.O3.20120622.txt  
No\_Boiler\_1.12.8hr.O3.20120623.txt  
No\_Boiler\_1.12.8hr.O3.20120624.txt  
No\_Boiler\_1.12.8hr.O3.20120625.txt  
No\_Boiler\_1.12.8hr.O3.20120626.txt  
No\_Boiler\_1.12.8hr.O3.20120627.txt  
No\_Boiler\_1.12.8hr.O3.20120628.txt  
No\_Boiler\_1.12.8hr.O3.20120629.txt  
No\_Boiler\_1.12.8hr.O3.20120630.txt

CAMx Output Files for Model Elimination of Emissions from Decker Creek Unit 2

No\_Boiler\_2.12.8hr.O3.20120601.txt  
No\_Boiler\_2.12.8hr.O3.20120602.txt  
No\_Boiler\_2.12.8hr.O3.20120603.txt  
No\_Boiler\_2.12.8hr.O3.20120604.txt  
No\_Boiler\_2.12.8hr.O3.20120605.txt  
No\_Boiler\_2.12.8hr.O3.20120606.txt  
No\_Boiler\_2.12.8hr.O3.20120607.txt  
No\_Boiler\_2.12.8hr.O3.20120608.txt  
No\_Boiler\_2.12.8hr.O3.20120609.txt  
No\_Boiler\_2.12.8hr.O3.20120610.txt  
No\_Boiler\_2.12.8hr.O3.20120611.txt  
No\_Boiler\_2.12.8hr.O3.20120612.txt  
No\_Boiler\_2.12.8hr.O3.20120613.txt  
No\_Boiler\_2.12.8hr.O3.20120614.txt  
No\_Boiler\_2.12.8hr.O3.20120615.txt  
No\_Boiler\_2.12.8hr.O3.20120616.txt  
No\_Boiler\_2.12.8hr.O3.20120617.txt  
No\_Boiler\_2.12.8hr.O3.20120618.txt  
No\_Boiler\_2.12.8hr.O3.20120619.txt  
No\_Boiler\_2.12.8hr.O3.20120620.txt  
No\_Boiler\_2.12.8hr.O3.20120621.txt  
No\_Boiler\_2.12.8hr.O3.20120622.txt

No\_Boiler\_2.12.8hr.O3.20120623.txt  
No\_Boiler\_2.12.8hr.O3.20120624.txt  
No\_Boiler\_2.12.8hr.O3.20120625.txt  
No\_Boiler\_2.12.8hr.O3.20120626.txt  
No\_Boiler\_2.12.8hr.O3.20120627.txt  
No\_Boiler\_2.12.8hr.O3.20120628.txt  
No\_Boiler\_2.12.8hr.O3.20120629.txt  
No\_Boiler\_2.12.8hr.O3.20120630.txt

CAMx Output Files for Model Elimination of Emissions from Decker Creek Natural Gas Turbines

Max.No\_gas\_turb.12.8hr.O3.20120601.txt  
Max.No\_gas\_turb.12.8hr.O3.20120602.txt  
Max.No\_gas\_turb.12.8hr.O3.20120603.txt  
Max.No\_gas\_turb.12.8hr.O3.20120604.txt  
Max.No\_gas\_turb.12.8hr.O3.20120605.txt  
Max.No\_gas\_turb.12.8hr.O3.20120606.txt  
Max.No\_gas\_turb.12.8hr.O3.20120607.txt  
Max.No\_gas\_turb.12.8hr.O3.20120608.txt  
Max.No\_gas\_turb.12.8hr.O3.20120609.txt  
Max.No\_gas\_turb.12.8hr.O3.20120610.txt  
Max.No\_gas\_turb.12.8hr.O3.20120611.txt  
Max.No\_gas\_turb.12.8hr.O3.20120612.txt  
Max.No\_gas\_turb.12.8hr.O3.20120613.txt  
Max.No\_gas\_turb.12.8hr.O3.20120614.txt  
Max.No\_gas\_turb.12.8hr.O3.20120615.txt  
Max.No\_gas\_turb.12.8hr.O3.20120616.txt  
Max.No\_gas\_turb.12.8hr.O3.20120617.txt  
Max.No\_gas\_turb.12.8hr.O3.20120618.txt  
Max.No\_gas\_turb.12.8hr.O3.20120619.txt  
Max.No\_gas\_turb.12.8hr.O3.20120620.txt  
Max.No\_gas\_turb.12.8hr.O3.20120621.txt  
Max.No\_gas\_turb.12.8hr.O3.20120622.txt  
Max.No\_gas\_turb.12.8hr.O3.20120623.txt  
Max.No\_gas\_turb.12.8hr.O3.20120624.txt  
Max.No\_gas\_turb.12.8hr.O3.20120625.txt  
Max.No\_gas\_turb.12.8hr.O3.20120626.txt  
Max.No\_gas\_turb.12.8hr.O3.20120627.txt  
Max.No\_gas\_turb.12.8hr.O3.20120628.txt  
Max.No\_gas\_turb.12.8hr.O3.20120629.txt  
Max.No\_gas\_turb.12.8hr.O3.20120630.txt

CAMx Output Files for Model Hourly Texas Lehigh Cement Company Emissions

Lehigh.12.8hr.O3.20120601.txt  
Lehigh.12.8hr.O3.20120602.txt  
Lehigh.12.8hr.O3.20120603.txt  
Lehigh.12.8hr.O3.20120604.txt  
Lehigh.12.8hr.O3.20120605.txt  
Lehigh.12.8hr.O3.20120606.txt  
Lehigh.12.8hr.O3.20120607.txt  
Lehigh.12.8hr.O3.20120608.txt  
Lehigh.12.8hr.O3.20120609.txt  
Lehigh.12.8hr.O3.20120610.txt  
Lehigh.12.8hr.O3.20120611.txt  
Lehigh.12.8hr.O3.20120612.txt  
Lehigh.12.8hr.O3.20120613.txt  
Lehigh.12.8hr.O3.20120614.txt

Lehigh.12.8hr.O3.20120615.txt  
Lehigh.12.8hr.O3.20120616.txt  
Lehigh.12.8hr.O3.20120617.txt  
Lehigh.12.8hr.O3.20120618.txt  
Lehigh.12.8hr.O3.20120619.txt  
Lehigh.12.8hr.O3.20120620.txt  
Lehigh.12.8hr.O3.20120621.txt  
Lehigh.12.8hr.O3.20120622.txt  
Lehigh.12.8hr.O3.20120623.txt  
Lehigh.12.8hr.O3.20120624.txt  
Lehigh.12.8hr.O3.20120625.txt  
Lehigh.12.8hr.O3.20120626.txt  
Lehigh.12.8hr.O3.20120627.txt  
Lehigh.12.8hr.O3.20120628.txt  
Lehigh.12.8hr.O3.20120629.txt  
Lehigh.12.8hr.O3.20120630.txt

CAMx Output Files for Model a “No Accelerated Diesel Engine Turnover” Scenario for On-Road Emissions

CAP.mv.12.8hr.O3.20120601.txt  
CAP.mv.12.8hr.O3.20120602.txt  
CAP.mv.12.8hr.O3.20120603.txt  
CAP.mv.12.8hr.O3.20120604.txt  
CAP.mv.12.8hr.O3.20120605.txt  
CAP.mv.12.8hr.O3.20120606.txt  
CAP.mv.12.8hr.O3.20120607.txt  
CAP.mv.12.8hr.O3.20120608.txt  
CAP.mv.12.8hr.O3.20120609.txt  
CAP.mv.12.8hr.O3.20120610.txt  
CAP.mv.12.8hr.O3.20120611.txt  
CAP.mv.12.8hr.O3.20120612.txt  
CAP.mv.12.8hr.O3.20120613.txt  
CAP.mv.12.8hr.O3.20120614.txt  
CAP.mv.12.8hr.O3.20120615.txt  
CAP.mv.12.8hr.O3.20120616.txt  
CAP.mv.12.8hr.O3.20120617.txt  
CAP.mv.12.8hr.O3.20120618.txt  
CAP.mv.12.8hr.O3.20120619.txt  
CAP.mv.12.8hr.O3.20120620.txt  
CAP.mv.12.8hr.O3.20120621.txt  
CAP.mv.12.8hr.O3.20120622.txt  
CAP.mv.12.8hr.O3.20120623.txt  
CAP.mv.12.8hr.O3.20120624.txt  
CAP.mv.12.8hr.O3.20120625.txt  
CAP.mv.12.8hr.O3.20120626.txt  
CAP.mv.12.8hr.O3.20120627.txt  
CAP.mv.12.8hr.O3.20120628.txt  
CAP.mv.12.8hr.O3.20120629.txt  
CAP.mv.12.8hr.O3.20120630.txt

CAMx Output Files for Model Accelerated Non-Road Diesel Engine Turnover Emission Reductions

CAP.nr.12.8hr.O3.20120601.txt  
CAP.nr.12.8hr.O3.20120602.txt  
CAP.nr.12.8hr.O3.20120603.txt  
CAP.nr.12.8hr.O3.20120604.txt  
CAP.nr.12.8hr.O3.20120605.txt  
CAP.nr.12.8hr.O3.20120606.txt

CAP.nr.12.8hr.O3.20120607.txt  
CAP.nr.12.8hr.O3.20120608.txt  
CAP.nr.12.8hr.O3.20120609.txt  
CAP.nr.12.8hr.O3.20120610.txt  
CAP.nr.12.8hr.O3.20120611.txt  
CAP.nr.12.8hr.O3.20120612.txt  
CAP.nr.12.8hr.O3.20120613.txt  
CAP.nr.12.8hr.O3.20120614.txt  
CAP.nr.12.8hr.O3.20120615.txt  
CAP.nr.12.8hr.O3.20120616.txt  
CAP.nr.12.8hr.O3.20120617.txt  
CAP.nr.12.8hr.O3.20120618.txt  
CAP.nr.12.8hr.O3.20120619.txt  
CAP.nr.12.8hr.O3.20120620.txt  
CAP.nr.12.8hr.O3.20120621.txt  
CAP.nr.12.8hr.O3.20120622.txt  
CAP.nr.12.8hr.O3.20120623.txt  
CAP.nr.12.8hr.O3.20120624.txt  
CAP.nr.12.8hr.O3.20120625.txt  
CAP.nr.12.8hr.O3.20120626.txt  
CAP.nr.12.8hr.O3.20120627.txt  
CAP.nr.12.8hr.O3.20120628.txt  
CAP.nr.12.8hr.O3.20120629.txt  
CAP.nr.12.8hr.O3.20120630.txt

## Appendix F: Run Log

Item	Base Case Model Run	Elimination of Emissions from Decker Creek Unit 1	Elimination of Emissions from Decker Creek Unit 2	Elimination of Emissions from Decker Creek Natural Gas Turbines	Hourly Texas Lehigh Cement Company Emissions	"No Accelerated Diesel Engine Turnover" Scenario for On-Road Emissions	Accelerated Non-Road Diesel Engine Turnover Emission Reductions
Run Label	BC.CAPCOG.12	No_Boiler_1.12	No_Boiler_2.12	No_Gas_turb.12	Lehigh.12	CAP.mv.CAP.12	CAP.nr.CAP.12
Analysis Dates	May 16 to June 30, 2012	June 1 to June 30, 2012	May 16 to June 30, 2012	May 16 to June 30, 2012			
Date	April 26, 2017	April 26, 2017	April 26, 2017	April 26, 2017	May 12, 2017	April 26, 2017	April 26, 2017
Performing Party	AACOG	AACOG	AACOG	AACOG	AACOG	AACOG	AACOG
Grid	RPO 36-km grid system, 12-km grid, and 4-km grid	RPO 36-km grid system, 12-km grid, and 4-km grid	RPO 36-km grid system, 12-km grid, and 4-km grid	RPO 36-km grid system, 12-km grid, and 4-km grid	RPO 36-km grid system, 12-km grid, and 4-km grid	RPO 36-km grid system, 12-km grid, and 4-km grid	RPO 36-km grid system, 12-km grid, and 4-km grid
Model	Camx6.3	Camx6.3	Camx6.3	Camx6.3	Camx6.3	Camx6.3	Camx6.3
EPS3 version	EPS3 version 2	EPS3 version 2					
Advection_Solver	PPM	PPM	PPM	PPM	PPM	PPM	PPM
Chemistry_Solver	EBI	EBI	EBI	EBI	EBI	EBI	EBI
PiG_Submodel	GREASD	GREASD	GREASD	GREASD	GREASD	GREASD	GREASD
Probing_Tool	None	None	None	None	None	None	None
Drydep_Model	WESELY89	WESELY89	WESELY89	WESELY89	WESELY89	WESELY89	WESELY89
Wet_Deposition	true	true	true	true	true	true	true
ACM2_Diffusion	false	false	false	false	false	false	false
Meteorology Download Date	1/12/2017	1/12/2017	1/12/2017	1/12/2017	1/12/2017	1/12/2017	1/12/2017
TCEQ Emission Inventory Download Date	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017
Chemistry Parameters	CAMx6.3.chemparam.2 NONE	CAMx6.3.chemparam.2 NONE	CAMx6.3.chemparam.2 NONE	CAMx6.3.chemparam.2 NONE	CAMx6.3.chemparam.2 NONE	CAMx6.3.chemparam.2 NONE	CAMx6.3.chemparam.2 NONE
Photolysis Rates	camx620_cb6_tuv.rpo_3 6km.2015APR28.tuv48	camx620_cb6_tuv.rpo_3 6km.2015APR28.tuv48	camx620_cb6_tuv.rpo_3 6km.2015APR28.tuv48	camx620_cb6_tuv.rpo_3 6km.2015APR28.tuv48	camx620_cb6_tuv.rpo_3 6km.2015APR28.tuv48	camx620_cb6_tuv.rpo_3 6km.2015APR28.tuv48	camx620_cb6_tuv.rpo_3 6km.2015APR28.tuv48
Boundary Conditions	camx_cb6r2h_bc.geosc hem2015hi16B_45_29ly r.rpo_36km.2012	camx_cb6r2h_bc.geosc hem2015hi16B_45_29ly r.rpo_36km.2012	camx_cb6r2h_bc.geosc hem2015hi16B_45_29ly r.rpo_36km.2012	camx_cb6r2h_bc.geosc hem2015hi16B_45_29ly r.rpo_36km.2012	camx_cb6r2h_bc.geosc hem2015hi16B_45_29ly r.rpo_36km.2012	camx_cb6r2h_bc.geosc hem2015hi16B_45_29ly r.rpo_36km.2012	camx_cb6r2h_bc.geosc hem2015hi16B_45_29ly r.rpo_36km.2012
Top Conditions	camx_cb6r2h_tc.geosch em2015hi16B_45_29lyr. rpo_36km.2012	camx_cb6r2h_tc.geosch em2015hi16B_45_29lyr. rpo_36km.2012	camx_cb6r2h_tc.geosch em2015hi16B_45_29lyr. rpo_36km.2012	camx_cb6r2h_tc.geosch em2015hi16B_45_29lyr. rpo_36km.2012	camx_cb6r2h_tc.geosch em2015hi16B_45_29lyr. rpo_36km.2012	camx_cb6r2h_tc.geosch em2015hi16B_45_29lyr. rpo_36km.2012	camx_cb6r2h_tc.geosch em2015hi16B_45_29lyr. rpo_36km.2012
Ozone Column	camx6_o3c.rpo_36km.2 013MAY24	camx6_o3c.rpo_36km.2 013MAY24	camx6_o3c.rpo_36km.2 013MAY24	camx6_o3c.rpo_36km.2 013MAY24	camx6_o3c.rpo_36km.2 013MAY24	camx6_o3c.rpo_36km.2 013MAY24	camx6_o3c.rpo_36km.2 013MAY24
Emiss Grid(1)	camx_cb6p_ei_lo. tx.bl12.r4a.rpo_36km	camx_cb6p_ei_lo. tx.bl12.r4a.rpo_36km	camx_cb6p_ei_lo. tx.bl12.r4a.rpo_36km	camx_cb6p_ei_lo. tx.bl12.r4a.rpo_36km	camx_cb6p_ei_lo. tx.bl12.r4a.rpo_36km	camx_cb6p_ei_lo. tx.bl12.r4a.rpo_36km	camx_cb6p_ei_lo. tx.bl12.r4a.rpo_36km

Item	Base Case Model Run	Elimination of Emissions from Decker Creek Unit 1	Elimination of Emissions from Decker Creek Unit 2	Elimination of Emissions from Decker Creek Natural Gas Turbines	Hourly Texas Lehigh Cement Company Emissions	"No Accelerated Diesel Engine Turnover" Scenario for On-Road Emissions	Accelerated Non-Road Diesel Engine Turnover Emission Reductions
Emiss Grid(2)	camx_cb6p_ei_lo.tx.b l12.r4a.tx_12km	camx_cb6p_ei_lo.tx.b l12.r4a.tx_12km	camx_cb6p_ei_lo.tx.b l12.r4a.tx_12km	camx_cb6p_ei_lo.tx.b l12.r4a.tx_12km	camx_cb6p_ei_lo.tx.b l12.r4a.tx_12km	camx_cb6p_ei_lo.tx.b l12.r4a.tx_12km	camx_cb6p_ei_lo.tx.b l12.r4a.tx_12km
Emiss Grid(3)	lo_emiss.bio.tx_4km. cb6.june.2012.TCEQ. fy17.reg1.tx_4km	lo_emiss.bio.tx_4km. cb6.june.2012.TCEQ. fy17.reg1.tx_4km	lo_emiss.bio.tx_4km. cb6.june.2012.TCEQ. fy17.reg1.tx_4km	lo_emiss.bio.tx_4km. cb6.june.2012.TCEQ. fy17.reg1.tx_4km	lo_emiss.bio.tx_4km. cb6.june.2012.TCEQ. fy17.reg1.tx_4km	lo_emiss.bio.tx_4km. cb6.june.2012.CAPC OG.mv.CAP.fy17.reg 1.tx_4km',	lo_emiss.bio.tx_4km. cb6.june.2012.CAPC OG.nr.CAP.fy17.reg1. tx_4km',
Point Sources	ptsrce.PIG.cb6.TCEQ .JUN.osd_2012	ptsrce.PIG.cb6.Decke r.No_Boiler_1.JUN.os d_2012	ptsrce.PIG.cb6.Decke r.No_Boiler_2.JUN.os d_2012	ptsrce.PIG.cb6.Decke r.No_gas_turbins.MA Y.osd_2012	ptsrce.PIG.cb6.lehigh .JUN.osd_2012	ptsrce.PIG.cb6.TCEQ .JUN.osd_2012	ptsrce.PIG.cb6.TCEQ .JUN.osd_2012
Landuse Grid(1)	camx6_landuse.rpo_ 36km.tceq2zhang26a .lai201206qc108ufun	camx6_landuse.rpo_ 36km.tceq2zhang26a .lai201206qc108ufun	camx6_landuse.rpo_ 36km.tceq2zhang26a .lai201206qc108ufun	camx6_landuse.rpo_ 36km.tceq2zhang26a .lai201206qc108ufun	camx6_landuse.rpo_ 36km.tceq2zhang26a .lai201206qc108ufun	camx6_landuse.rpo_ 36km.tceq2zhang26a .lai201206qc108ufun	camx6_landuse.rpo_ 36km.tceq2zhang26a .lai201206qc108ufun
Landuse Grid(2)	camx6_landuse.tx_12 km.tceq2zhang26a.lai 201206qc108ufun	camx6_landuse.tx_12 km.tceq2zhang26a.lai 201206qc108ufun	camx6_landuse.tx_12 km.tceq2zhang26a.lai 201206qc108ufun	camx6_landuse.tx_12 km.tceq2zhang26a.lai 201206qc108ufun	camx6_landuse.tx_12 km.tceq2zhang26a.lai 201206qc108ufun	camx6_landuse.tx_12 km.tceq2zhang26a.lai 201206qc108ufun	camx6_landuse.tx_12 km.tceq2zhang26a.lai 201206qc108ufun
Landuse Grid(3)	camx6_landuse.tx_4k m.tceq2zhang26a.lai2 01206qc108ufun	camx6_landuse.tx_4k m.tceq2zhang26a.lai2 01206qc108ufun	camx6_landuse.tx_4k m.tceq2zhang26a.lai2 01206qc108ufun	camx6_landuse.tx_4k m.tceq2zhang26a.lai2 01206qc108ufun	camx6_landuse.tx_4k m.tceq2zhang26a.lai2 01206qc108ufun	camx6_landuse.tx_4k m.tceq2zhang26a.lai2 01206qc108ufun	camx6_landuse.tx_4k m.tceq2zhang26a.lai2 01206qc108ufun
Surface Grid(1)	camx6_landuse.rpo_ 36km.tceq2zhang26a .lai201206qc108ufun	camx6_landuse.rpo_ 36km.tceq2zhang26a .lai201206qc108ufun	camx6_landuse.rpo_ 36km.tceq2zhang26a .lai201206qc108ufun	camx6_landuse.rpo_ 36km.tceq2zhang26a .lai201206qc108ufun	camx6_landuse.rpo_ 36km.tceq2zhang26a .lai201206qc108ufun	camx6_landuse.rpo_ 36km.tceq2zhang26a .lai201206qc108ufun	camx6_landuse.rpo_ 36km.tceq2zhang26a .lai201206qc108ufun
Met3D Grid(1)	camx6_met3d.2012_ wrf371_p2ma_45_29l yr.rpo_36km.v43	camx6_met3d.2012_ wrf371_p2ma_45_29l yr.rpo_36km.v43	camx6_met3d.2012_ wrf371_p2ma_45_29l yr.rpo_36km.v43	camx6_met3d.2012_ wrf371_p2ma_45_29l yr.rpo_36km.v43	camx6_met3d.2012_ wrf371_p2ma_45_29l yr.rpo_36km.v43	camx6_met3d.2012_ wrf371_p2ma_45_29l yr.rpo_36km.v43	camx6_met3d.2012_ wrf371_p2ma_45_29l yr.rpo_36km.v43
Met2D Grid(1)	camx6_met2d.2012_ wrf371_p2ma_45_29l yr.rpo_36km.v43	camx6_met2d.2012_ wrf371_p2ma_45_29l yr.rpo_36km.v43	camx6_met2d.2012_ wrf371_p2ma_45_29l yr.rpo_36km.v43	camx6_met2d.2012_ wrf371_p2ma_45_29l yr.rpo_36km.v43	camx6_met2d.2012_ wrf371_p2ma_45_29l yr.rpo_36km.v43	camx6_met2d.2012_ wrf371_p2ma_45_29l yr.rpo_36km.v43	camx6_met2d.2012_ wrf371_p2ma_45_29l yr.rpo_36km.v43
Vdiff Grid(1)	camx6_kv.2012_wrf3 71_p2ma_45_29lyr.rp o_36km.v43.CMAQ.k v100	camx6_kv.2012_wrf3 71_p2ma_45_29lyr.rp o_36km.v43.CMAQ.k v100	camx6_kv.2012_wrf3 71_p2ma_45_29lyr.rp o_36km.v43.CMAQ.k v100	camx6_kv.2012_wrf3 71_p2ma_45_29lyr.rp o_36km.v43.CMAQ.k v100	camx6_kv.2012_wrf3 71_p2ma_45_29lyr.rp o_36km.v43.CMAQ.k v100	camx6_kv.2012_wrf3 71_p2ma_45_29lyr.rp o_36km.v43.CMAQ.k v100	camx6_kv.2012_wrf3 71_p2ma_45_29lyr.rp o_36km.v43.CMAQ.k v100
Cloud Grid(1)	camx6_cr.2012_wrf3 71_p2ma_45_29lyr.rp o_36km.v43	camx6_cr.2012_wrf3 71_p2ma_45_29lyr.rp o_36km.v43	camx6_cr.2012_wrf3 71_p2ma_45_29lyr.rp o_36km.v43	camx6_cr.2012_wrf3 71_p2ma_45_29lyr.rp o_36km.v43	camx6_cr.2012_wrf3 71_p2ma_45_29lyr.rp o_36km.v43	camx6_cr.2012_wrf3 71_p2ma_45_29lyr.rp o_36km.v43	camx6_cr.2012_wrf3 71_p2ma_45_29lyr.rp o_36km.v43
Surface Grid(2)	camx6_landuse.tx_12 km.tceq2zhang26a.lai 201206qc108ufun	camx6_landuse.tx_12 km.tceq2zhang26a.lai 201206qc108ufun	camx6_landuse.tx_12 km.tceq2zhang26a.lai 201206qc108ufun	camx6_landuse.tx_12 km.tceq2zhang26a.lai 201206qc108ufun	camx6_landuse.tx_12 km.tceq2zhang26a.lai 201206qc108ufun	camx6_landuse.tx_12 km.tceq2zhang26a.lai 201206qc108ufun	camx6_landuse.tx_12 km.tceq2zhang26a.lai 201206qc108ufun

Item	Base Case Model Run	Elimination of Emissions from Decker Creek Unit 1	Elimination of Emissions from Decker Creek Unit 2	Elimination of Emissions from Decker Creek Natural Gas Turbines	Hourly Texas Lehigh Cement Company Emissions	"No Accelerated Diesel Engine Turnover" Scenario for On-Road Emissions	Accelerated Non-Road Diesel Engine Turnover Emission Reductions
Met3D Grid(2)	camx6_met3d.2012_w_rf371_p2ma_45_29lyr.tx_2km.v43'	camx6_met3d.2012_w_rf371_p2ma_45_29lyr.tx_2km.v43'	camx6_met3d.2012_w_rf371_p2ma_45_29lyr.tx_2km.v43'	camx6_met3d.2012_w_rf371_p2ma_45_29lyr.tx_2km.v43'	camx6_met3d.2012_w_rf371_p2ma_45_29lyr.tx_2km.v43'	camx6_met3d.2012_w_rf371_p2ma_45_29lyr.tx_2km.v43'	camx6_met3d.2012_w_rf371_p2ma_45_29lyr.tx_2km.v43'
Met2D Grid(2)	camx6_met2d.2012_w_rf371_p2ma_45_29lyr.tx_12km.v43	camx6_met2d.2012_w_rf371_p2ma_45_29lyr.tx_12km.v43	camx6_met2d.2012_w_rf371_p2ma_45_29lyr.tx_12km.v43	camx6_met2d.2012_w_rf371_p2ma_45_29lyr.tx_12km.v43	camx6_met2d.2012_w_rf371_p2ma_45_29lyr.tx_12km.v43	camx6_met2d.2012_w_rf371_p2ma_45_29lyr.tx_12km.v43	camx6_met2d.2012_w_rf371_p2ma_45_29lyr.tx_12km.v43
Vdiff Grid(2)	camx6_kv.2012_wrf371_p2ma_45_29lyr.tx_12km.v43.CMAQ.kv100	camx6_kv.2012_wrf371_p2ma_45_29lyr.tx_12km.v43.CMAQ.kv100	camx6_kv.2012_wrf371_p2ma_45_29lyr.tx_12km.v43.CMAQ.kv100	camx6_kv.2012_wrf371_p2ma_45_29lyr.tx_12km.v43.CMAQ.kv100	camx6_kv.2012_wrf371_p2ma_45_29lyr.tx_12km.v43.CMAQ.kv100	camx6_kv.2012_wrf371_p2ma_45_29lyr.tx_12km.v43.CMAQ.kv100	camx6_kv.2012_wrf371_p2ma_45_29lyr.tx_12km.v43.CMAQ.kv100
Cloud Grid(2)	camx6_cr.2012_wrf371_p2ma_45_29lyr.tx_12km.v43	camx6_cr.2012_wrf371_p2ma_45_29lyr.tx_12km.v43	camx6_cr.2012_wrf371_p2ma_45_29lyr.tx_12km.v43	camx6_cr.2012_wrf371_p2ma_45_29lyr.tx_12km.v43	camx6_cr.2012_wrf371_p2ma_45_29lyr.tx_12km.v43	camx6_cr.2012_wrf371_p2ma_45_29lyr.tx_12km.v43	camx6_cr.2012_wrf371_p2ma_45_29lyr.tx_12km.v43
Surface Grid(3)	camx6_landuse.tx_4km.tceq2zhang26a.lai201206qc108ufun	camx6_landuse.tx_4km.tceq2zhang26a.lai201206qc108ufun	camx6_landuse.tx_4km.tceq2zhang26a.lai201206qc108ufun	camx6_landuse.tx_4km.tceq2zhang26a.lai201206qc108ufun	camx6_landuse.tx_4km.tceq2zhang26a.lai201206qc108ufun	camx6_landuse.tx_4km.tceq2zhang26a.lai201206qc108ufun	camx6_landuse.tx_4km.tceq2zhang26a.lai201206qc108ufun
Met3D Grid(3)	camx6_met3d.2012_w_rf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_met3d.2012_w_rf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_met3d.2012_w_rf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_met3d.2012_w_rf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_met3d.2012_w_rf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_met3d.2012_w_rf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_met3d.2012_w_rf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43
Met2D Grid(3)	camx6_met2d.2012_w_rf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_met2d.2012_w_rf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_met2d.2012_w_rf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_met2d.2012_w_rf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_met2d.2012_w_rf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_met2d.2012_w_rf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_met2d.2012_w_rf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43
Vdiff Grid(3)	camx6_kv.2012_wrf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43.CMAQ.kv100	camx6_kv.2012_wrf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43.CMAQ.kv100	camx6_kv.2012_wrf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43.CMAQ.kv100	camx6_kv.2012_wrf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43.CMAQ.kv100	camx6_kv.2012_wrf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43.CMAQ.kv100	camx6_kv.2012_wrf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43.CMAQ.kv100	camx6_kv.2012_wrf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43.CMAQ.kv100
Cloud Grid(3)	camx6_cr.2012_wrf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_cr.2012_wrf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_cr.2012_wrf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_cr.2012_wrf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_cr.2012_wrf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_cr.2012_wrf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43	camx6_cr.2012_wrf371_i2mSNgqsfc0_45_29lyr.tx_4km.v43

## **Appendix G: Electronic Data Files**

max.O3.8hr.BC.CAPCOG.12

- Maximum predicted 8-hour ozone for each 4km grid cell and for each day for the 2012 Base Case Model Run

max.O3.8hr.No\_Boiler\_1.12

- Maximum predicted 8-hour ozone for each 4km grid cell and for each day for the elimination of emissions from Decker Creek Unit 1

max.O3.8hr.No\_Boiler\_2.12

- Maximum predicted 8-hour ozone for each 4km grid cell and for each day for the elimination of emissions from Decker Creek Unit 2

max.O3.8hr.No\_Gas\_turb.12

- Maximum predicted 8-hour ozone for each 4km grid cell and for each day for the elimination of emissions from Decker Creek Natural Gas Turbines

max.O3.8hr.Lehigh.12

- Maximum predicted 8-hour ozone for each 4km grid cell and for each day for the hourly Texas Lehigh Cement Company emissions

max.O3.8hr.CAP.nr.12

- Maximum predicted 8-hour ozone for each 4km grid cell and for each day for the “no accelerated diesel engine turnover” scenario for on-road emissions

max.O3.8hr.CAP.mv.12

- Maximum predicted 8-hour ozone for each 4km grid cell and for each day for the accelerated non-road diesel engine turnover emission reductions

Max\_o3.8hr.aacog.04km.summary\_CAPCOG.062017

- Calculated Peak 8-hour ozone for each day, June 1-30, 2012
- Calculated difference in peak 8-hour ozone for each day.