

APPENDIX M

MEMO, RESULTS FOR REGIONAL MODELING WITH 1993,
1995, AND 1996 EPISODES, 2/23/00

REGIONAL STRATEGY

APRIL 2000 REVISION

Texas Natural Resource Conservation Commission

INTEROFFICE MEMORANDUM

To: Jim Thomas, P.E., Director
Technical Analysis Division

Date: February 23, 2000

Thru: Candy Garrett, Manager
Air Modeling & Data Analysis Section
Technical Analysis Division

From: Cyril Durrenberger, P.E.
Air Modeling & Data Analysis Section
Technical Analysis Division

Subject: Results for Regional Modeling with 1993, 1995, and 1996 Episodes

This is to provide additional information to the memo on this same subject dated June 2, 1999. The University of Texas has performed regional scale photochemical modeling with the 1993, 1995, and 1996 episodes. The 1993 episode was used for the Houston/Galveston (HG) nonattainment area State Implementation Plan (SIP), and the 1995 and 1996 episodes were used for modeling in the Dallas/Fort Worth (DFW) nonattainment area SIP. All results are based on a future base 2007 emissions inventory. For the 1993 episode, the emissions were projected to 2007 directly from the base 1993 emissions inventory. For the 1995 and 1996 episodes, the future base 2007 emissions inventory was projected to 2007 with emissions from the projections to 2007 developed for the 1993 episode and day specific temperatures and day of the week information.

Texas Clean Gas is to be marketed between June 1 and October 1 of each year. The Reid Vapor Pressure (RVP) will be limited to 7.8 pounds per square inch (psi), and the sulfur content in gasoline will be limited to an average of 150 parts per million (ppm). The impact of these controls on the 2007 base inventory was calculated with the Complex Model and MOBILE5 model. These calculations were based on the fuel supplied to each area of the state. Phase I reformulated gasoline is marketed in the HG and DFW areas. For other areas, it was assumed that the RVP for gasoline was 9 psi and the sulfur content was 330 ppm. In the HG and DFW areas, no additional reductions were modeled. In all other areas of the state, the reduction for mobile source emissions was 14.3 percent for volatile organic compounds and 5 percent for nitrogen oxides.

The reductions to 1-hour and 8-hour ozone averages in the near nonattainment areas were reported in the June 2, 1999 memo. This analysis is limited to the Beaumont/Port Arthur (BPA), DFW, and HG nonattainment areas. This analysis is based on the three counties in the BPA nonattainment area, the four counties in the DFW nonattainment area, and the eight counties in the HG nonattainment area. It should be noted that there will be no emission reductions due to Texas Clean Gas in the DFW and HG nonattainment areas because cleaner-burning gasoline is currently in use.

For each area and each episode, the day and value of the maximum 1-hour and 8-hour concentrations for the base 2007 modeling are reported in Table 1. Also reported are the corresponding maximum concentrations after Texas Clean Gas was applied to the emissions inventory. For the BPA area, the maximum 1-hour and 8-hour concentrations were decreased by 1 ppb on all days. In the DFW area, the maximum 1-hour concentrations were decreased by 1 ppb in all cases. The reductions did not decrease the maximum concentrations above 1 ppb in the HG area.

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For each grid cell modeled, the maximum difference between the results obtained with base 2007 emissions and the result with the application of Texas Clean Gas were determined. These were illustrated in a series of ozone concentration isopleth maps for each day modeled. For each day modeled, Table 2 contains a list of the largest maximum difference in 1-hour concentrations in the modeling domain and the largest maximum difference over each of the three nonattainment areas. Table 3 is the corresponding values for 8-hour concentrations. In the BPA area for five of the 11 days modeled, the largest maximum 1-hour difference was between 1 ppb and 2 ppb. For the DFW area, the largest maximum 1-hour difference was between 1 ppb and 2 ppb on eight of the 11 days modeled. In the HG area, the largest maximum 1-hour difference was between 1 ppb and 2 ppb on six of the 11 days modeled. The corresponding differences for 8-hour concentrations were similar.

Detailed information on this modeling may be found in the report prepared by the University of Texas entitled "Impacts of Regional Control Strategies on Air Quality in Eastern and Central Texas, Volumes 1 and 2."

Table 1. Maximum Ozone Concentrations in ppb

BPA Area

Episode	Day	1-hour Base 2007 ppb	1-hour Clean Gas ppb	8-hour Base 2007 ppb	8-hour Clean Gas ppb
September 1993	September 10, 1993	184	183	165	164
June 1995	June, 22, 1995	201	200	185	184
July 1996	July 4, 1996	162	161	150	149

DFW Area

Episode	Day	1-hour Base 2007 ppb	1-hour Clean Gas ppb	8-hour Base 2007 ppb	8-hour Clean Gas ppb
September 1993	September 7 1993	146	145	131	131
June 1995	June, 22, 1995	133	132	121	120
July 1996	July 3 1996	143	142	122	122

HG Area

Episode	Day	1-hour Base 2007 ppb	1-hour Clean Gas ppb	8-hour Base 2007 ppb	8-hour Clean Gas ppb
September 1993	September 10, 1993	209	209	194	194

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June 1995	June, 22, 1995	206	206	178	178
July 1996	July 4, 1996	160	161	139	139

Table 2. Maximum Difference in 1-hour Ozone Concentrations

Day	Maximum Difference ppb	Difference BPA Area ppb	Difference DFW Area ppb	Difference HG Area ppb
September 7, 1993	2.8	<1.0	1.0 to 2.0	1.0 to 2.0
September 8, 1993	3.6	1.0 to 2.0	1.0 to 2.0	1.0 to 2.0
September 9, 1993	3.6	<1.0	1.0 to 2.0	1.0 to 2.0
September 10, 1993	3.2	1.0 to 2.0	<1.0	1.0 to 2.0
September 11, 1993	1.8	<1.0	<1.0	<1.0
June 20, 1995	1.8	<1.0	<1.0	<1.0
June 21, 1995	1.8	<1.0	1.0 to 2.0	1.0 to 2.0
June 22, 1995	2.8	1.0 to 2.0	1.0 to 2.0	1.0 to 2.0
July 2, 1996	2.2	<1.0	1.0 to 2.0	<1.0
July 3, 1996	2.7	1.0 to 2.0	1.0 to 2.0	<1.0
July 4, 1996	1.5	1.0 to 2.0	1.0 to 2.0	<1.0

Table 3. Maximum Difference in 8-hour Ozone Concentrations

Day	Maximum Difference ppb	Difference BPA Area ppb	Difference DFW Area ppb	Difference HG Area ppb
September 7, 1993	2.3	<1.0	1.0 to 2.0	1.0 to 2.0
September 8, 1993	2.9	<1.0	1.0 to 2.0	1.0 to 2.0
September 9, 1993	3.0	<1.0	<1.0	1.0 to 2.0
September 10, 1993	2.6	1.0 to 2.0	<1.0	1.0 to 2.0
September 11, 1993	1.6	<1.0	<1.0	<1.0
June 20, 1995	1.6	<1.0	<1.0	<1.0

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June 21, 1995	1.7	<1.0	<1.0	1.0 to 2.0
June 22, 1995	2.6	1.0 to 2.0	1.0 to 2.0	1.0 to 2.0
July 2, 1996	1.8	<1.0	<1.0	<1.0
July 3, 1996	2.4	<1.0	1.0 to 2.0	<1.0
July 4, 1996	1.5	<1.0	1.0 to 2.0	<1.0

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