

US EPA ARCHIVE DOCUMENT



## OFFICE OF THE GOVERNOR

RICK PERRY  
GOVERNOR

February 29, 2012

Al Armendariz, Ph.D.  
Regional Administrator  
U.S. Environmental Protection Agency (EPA), Region 6  
1445 Ross Avenue, Suite 1200  
Dallas, Texas 75202-2133

Dear Dr. Armendariz:

I'm writing in response to your December 9, 2011, proposal to modify the state's recommendation for designation of areas in Texas with regard to the 2008 National Ambient Air Quality Standard (NAAQS) for eight-hour ozone of 0.075 parts per million. I respectfully request that you not enact the planned designation of Hood, Matagorda, and Wise counties as ozone nonattainment areas.

The enclosed analysis performed by the Texas Commission on Environmental Quality (TCEQ), submitted pursuant to Section 107(d)(1)(B) of the Federal Clean Air Act, demonstrates there is insufficient scientific justification for EPA's proposed modification of the state's recommendation for these three counties. These counties do not measure nonattainment at a federal regulatory monitor, nor do they significantly contribute to elevated ozone measurements at any violating monitors in the adjacent counties. In fact, EPA has always designated Hood, Matagorda, and Wise counties as attainment/unclassifiable for ozone.

TCEQ's analysis indicates that significant reductions in nitrogen oxide (NO<sub>x</sub>) emissions have occurred in Hood, Matagorda, and Wise counties in the past eight years. Current permitting and rule requirements, combined with technological advancements in industrial equipment, are anticipated to continue this downward trend in NO<sub>x</sub> emissions without the need for the imposition of further rules and programs on citizens and businesses in the three counties. A nonattainment designation for these three counties will undoubtedly stifle economic growth while providing little, if any, environmental benefit.

We have worked hard in Texas to strike a balance between meaningful environmental regulation and economic growth, and designating these counties as nonattainment is not a decision that should be taken lightly, especially during these tough economic times. I thank you for your

Al Armendariz, Ph.D.

February 29, 2012

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consideration of this issue. If you have any questions or need additional information, please feel free to contact TCEQ Chairman Bryan Shaw at (512) 239-5510.

Sincerely,

*RICK PERRY*

Rick Perry  
Governor

RP:jhp

Enclosures

cc: Bryan W. Shaw, Ph.D.

Bryan W. Shaw, Ph.D., *Chairman*  
Buddy Garcia, *Commissioner*  
Carlos Rubinstein, *Commissioner*  
Mark R. Vickery, P.G., *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

February 10, 2012

The Honorable Rick Perry  
Governor of Texas  
State Capitol  
P. O. Box 12428  
Austin, TX 78711-2428

Dear Governor Perry:

In a December 9, 2011 letter, the United States Environmental Protection Agency (EPA) said it intends to expand the Dallas-Fort Worth (DFW) and Houston-Galveston-Brazoria (HGB) ozone nonattainment areas. This plan is inconsistent with the Texas nonattainment designation recommendation you submitted to the EPA in October 2011. I recommend you ask the EPA to reverse this plan, because there is insufficient scientific justification for the EPA's proposed expansion of these two ozone nonattainment areas. Enclosed for your consideration is a comprehensive technical analysis that supports the Texas position as well as a draft transmittal letter for your signature. State responses to the EPA are due no later than February 29, 2012.

The federal air quality standard at issue is the EPA's 2008 National Ambient Air Quality Standard for eight-hour ozone of 0.075 parts per million. The EPA has said it intends to finalize 2008 eight-hour ozone nonattainment area designations by May 31, 2012. Section 107(d)(1)(B) of the Federal Clean Air Act provides states the opportunity to demonstrate why the EPA's modifications to state nonattainment area recommendations are not appropriate. The technical analysis provided here is an expansion of the response already submitted to the EPA on this matter on January 19, 2012, by the Texas Commission on Environmental Quality during a brief EPA public comment period announced in the *Federal Register* on December 20, 2011, over the holidays.

The counties at issue are Hood and Wise Counties in the DFW area and Matagorda County in the HGB area. These three counties neither measure nonattainment at a federal regulatory ozone monitor for the years in question, 2008 through 2010, nor do they significantly contribute to elevated ozone measurements at violating ozone monitors in adjacent counties. In addition, these three counties have always been designated by the EPA as attainment/unclassified for the federal ozone standards.

Thank you for your support in this matter. If I can be of any assistance in submitting a Texas response by the February 29 due date, please contact me at (512) 239-5510.

Sincerely,

A handwritten signature in black ink that reads "Bryan W. Shaw".

Bryan W. Shaw, Ph.D.  
Chairman

Enclosures

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US EPA ARCHIVE DOCUMENT

Bryan W. Shaw, Ph.D., *Chairman*  
Buddy Garcia, *Commissioner*  
Carlos Rubinstein, *Commissioner*  
Mark R. Vickery, P.G., *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

January 11, 2012

U.S. Environmental Protection Agency  
Mail Code 6102T  
1200 Pennsylvania Avenue, N.W.  
Washington, D.C. 20460

Attn: Docket ID No. EPA-HQ-OAR-2008-0476

Re: United States Environmental Protection Agency (EPA)  
Responses to State and Tribal 2008 Ozone Designation Recommendations: Notice  
of Availability and Public Comment Period

Dear Sir or Madam:

The Texas Commission on Environmental Quality (TCEQ) provides the following comments on EPA's response to the Texas recommendation for 2008 ozone nonattainment designations. The availability of a public comment period was published in the December 20, 2011, *Federal Register* (76 FR 78872). The EPA's timing of the 30-day comment period during the holiday season severely restricted the TCEQ's ability to provide thorough comments within the stipulated time period.

In short, the TCEQ believes that the EPA should reverse its plan to expand Texas nonattainment areas in Houston and Dallas because there is no scientific justification for the proposed expansion. The counties in question neither measure nonattainment at a federal regulatory monitor nor do they significantly transport ozone precursors to violating monitors.

**Background.** For its 2012 implementation of the 2008 ozone standard, the EPA said in a December 9, 2011, letter sent to the governor that it would expand the Houston-Galveston-Brazoria (HGB) and Dallas-Fort Worth (DFW) ozone nonattainment areas. These areas were established in 2004 to implement the 1997 ozone standard. In particular, the EPA said it intends to add: Matagorda County to the HGB eight-county nonattainment area, and Hood and Wise Counties to the DFW nine-county nonattainment area. (The governor had recommended that the HGB area remain eight counties and the DFW area remain nine counties.)

The EPA relied significantly on meteorology (weather/transport patterns) to justify the inclusion of the three counties as nonattainment. The TCEQ believes that the use of the National Oceanic and Atmospheric Administration Single Particle Lagrangian Integrated Trajectory Model (HYSPLIT) was unsoundly applied as corroborative support for expanding the HGB and DFW nonattainment areas. HYSPLIT cannot provide evidence directly linking emissions from one area to ozone formation in another area. Furthermore, HYSPLIT does not have the ability to calculate pollutant concentrations, the types of pollutants added along the transport path from

different areas, pollutant dispersal rates along the transport path, or ozone formation rates that may result from different pollutant interactions. The EPA also relied on emissions inventory data. However, the EPA did not use the most current emissions inventory data submitted by the state. Emissions inventory discrepancies are discussed below.

**Matagorda County.** The EPA stated that Matagorda County should be designated nonattainment because of high emissions and a wind pattern that indicates emissions could at times impact violating monitors. The TCEQ disagrees with this analysis because emissions are in fact substantially lower than those cited by the EPA and because TCEQ's technical analysis shows that very few wind trajectories that travel through Matagorda County impact violating monitors. Furthermore, Matagorda County does not have a federal regulatory ozone monitor, does not significantly contribute mobile- or area-source emissions to the HGB nonattainment area, and is outside the jurisdictional boundary of the Houston area's Metropolitan Planning Organization. Matagorda County's 2010 population, which has declined by 3% between 2000 and 2010, is approximately 37,000 residents compared to the HGB nonattainment area population of approximately 6 million residents.

- Regarding **emissions**, the EPA December 9 letter cited high emissions that included non-road source emissions calculated from EPA-derived surrogates. However, in May 2010, the TCEQ submitted locally obtained non-road emissions data from commercial marine vessels and locomotives to the EPA for the Periodic Emissions Inventory that result in 2,928 tons per year *fewer* nitrogen oxides (NO<sub>x</sub>) emissions. This correction is a 42% reduction from the total emissions of 7007 tons per year cited by the EPA.
- Regarding **wind patterns**, the EPA cited back trajectory analysis that shows "at times" emissions from Matagorda County could impact violating monitors in the HGB area. However, a review conducted by TCEQ technical experts created back trajectories for five years, i.e., 2006 through 2010, for days measuring greater than 76 parts per billion at the Manvel Croix, Texas City, and Wallisville monitors shows that at most only 1.8% of the trajectory endpoints actually traverse Matagorda County. On the few days when Matagorda County was upwind of a violating monitor, the back trajectories routinely crossed counties with far greater emissions. Again, a back trajectory traversing Matagorda County does not necessarily mean that emissions from Matagorda County have a significant impact on ozone formation.

**Hood County.** The EPA stated that Hood County should be designated nonattainment because of considerable growth in emissions from oil and gas development, a wind pattern that indicates emissions could at times impact violating monitors, and a high population growth. Although the most recent census data indicate that there has been some population growth in Hood County, the TCEQ disagrees with this analysis because emissions are in fact substantially lower than those cited by the EPA and because TCEQ's technical analysis shows very few wind trajectories that may impact violating monitors. Furthermore, Hood County's design value for 2008 through 2010 measures 75 parts per billion, i.e., attainment of the 2008 ozone standard.



- Regarding growth in emissions from **oil and gas development**, the emissions cited by the EPA did not include the TCEQ revision to oil and gas sector pneumatic emissions submitted October 2011 to the EPA for the Periodic Emissions Inventory, which results in 808 tons per year *fewer* volatile organic compound (VOC) emissions than those cited by the EPA.
- Regarding **wind patterns and proximity of emissions to a violating monitor**, the EPA cited back trajectory analysis that shows at times emissions from Hood County could impact a violating monitor. However, TCEQ's technical experts indicate that at most 2.55% of the trajectory endpoints from Hood County impact violating monitors. The TCEQ's analysis of the days with the highest ozone concentration do not indicate that Hood County emissions routinely impact DFW monitors.

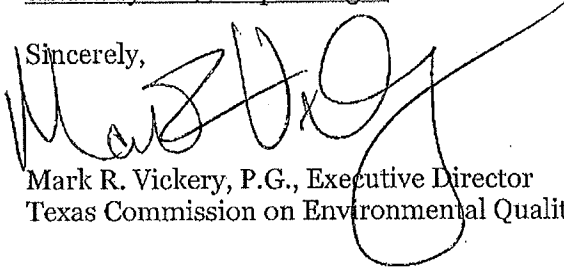
**Wise County.** The EPA stated that Wise County should be designated nonattainment because of its proximity to violating monitors, growth in emissions from Barnett Shale gas production, a wind pattern that indicates emissions could at times impact violating monitors, and growth in population. Although Wise County is located near some violating monitors and the most recent census data indicate that there has been some population growth in Wise County, the TCEQ disagrees with this analysis because emissions are in fact substantially lower than those cited by the EPA and because Texas technical analysis shows that few wind trajectories would impact violating monitors. Furthermore, Wise County does not have a federal regulatory ozone monitor and is primarily a rural county with a low population density.

- Regarding growth in emissions from **Barnett Shale gas production**, the emissions cited by the EPA did not include the TCEQ revision to oil and gas sector pneumatic emissions submitted October 2011 to the EPA for the Periodic Emissions Inventory, which results in 6,048 tons per year *fewer* VOC emissions than those cited by the EPA.
- Regarding **wind patterns and proximity of emissions to a violating monitor**, the EPA cited back trajectory analysis that shows at times emissions from Wise County could impact a violating monitor. However, TCEQ's technical experts indicate that at most 2.87% of the trajectory endpoints from Wise County impact violating monitors.

**Conclusion.** In conclusion, EPA has not provided an adequate justification for the expansion of the HGB and DFW nonattainment areas for implementation of the 2008 ozone standard. Furthermore, the TCEQ believes there would be no justification for the associated imposition of rules and programs on citizens and businesses in these counties associated with such a nonattainment designation. Given the lack of evidence in all cases, it appears EPA cherry-picked data for the sole purpose of adding these counties to nonattainment areas. Therefore, the TCEQ specifically requests that the EPA reverse its plan to designate Hood, Matagorda, and Wise Counties as nonattainment counties.

The TCEQ appreciates the opportunity to provide these comments and expects that the State of Texas will respond further by the February 29, 2012, deadline specified in the EPA December 9, 2011, letter. If you have any questions concerning these comments, please contact Mr. David Brymer, Director, Air Quality Division, Chief Engineer's Office, 512-239-1735, or at [david.brymer@tceq.texas.gov](mailto:david.brymer@tceq.texas.gov).

Sincerely,

A handwritten signature in black ink, appearing to read 'Mark R. Vickery', is written over the typed name and title.

Mark R. Vickery, P.G., Executive Director  
Texas Commission on Environmental Quality



**Technical Analysis Support Documentation by the  
Texas Commission on Environmental Quality (TCEQ)  
Regarding U.S. Environmental Protection Agency (EPA) Responses to  
State and Tribal 2008 Ozone Designation Recommendations**

**Evaluation of the EPA's Factor 2: Emissions and Emissions-Related Data**

The EPA is proposing that Matagorda County should be designated nonattainment because of the amount of emissions and their belief that these emissions may, at times, impact violating ozone monitors in Brazoria and Harris Counties. The TCEQ analysis of current emission data indicates emissions in Matagorda County are in fact substantially lower than those cited by the EPA. The EPA's December 9, 2011, letter cited emissions that included non-road source emissions calculated from EPA-derived surrogates. However, in May 2010, the TCEQ submitted locally obtained non-road emissions data from commercial marine vessels and locomotives to the EPA for the Periodic Emissions Inventory that result in 2,928 tons per year *fewer* nitrogen oxides (NO<sub>x</sub>) emissions in Matagorda County. This correction is a 42% reduction from the total NO<sub>x</sub> emissions of 7,007 tons per year cited by the EPA.

The EPA's technical support document stated that population and urban growth patterns were also considered in their evaluation of emissions related data. Matagorda County's 2010 population, which has declined by 3% between 2000 and 2010, is approximately 37,000 residents compared to the Houston-Galveston-Brazoria (HGB) nonattainment area population of approximately 6 million residents. The EPA's analysis also points out that Matagorda County only has 343 million vehicle miles travelled (VMT) compared with an area-wide VMT of 56, 878 million miles. In fact, Matagorda County is the only county in the area with a decrease in VMT, i.e., 1%, between the 2002 to 2008 time period reviewed by the EPA. The EPA's technical support document states that "Total VMT is an important metric as an indicator of potential contribution to ground level ozone concentrations."

The EPA is proposing that Hood County should be designated nonattainment in part due to considerable growth in emissions from oil and gas development. However, the emissions cited by the EPA did not include the TCEQ revision to oil and gas sector pneumatic emissions submitted October 2011 to the EPA for the Periodic Emissions Inventory, which results in 808 tons per year *fewer* volatile organic compound (VOC) emissions in Hood County than those cited by the EPA.

The EPA is proposing that Wise County should be designated nonattainment in part due to considerable growth in emissions from Barnett Shale gas production. However, the emissions cited by the EPA did not include the TCEQ revision to oil and gas sector pneumatic emissions submitted October 2011 to the EPA for the Periodic Emissions Inventory, which results in 6,048 tons per year *fewer* VOC emissions in Wise County than those cited by the EPA.

Wise County's 2010 population is 59,127 residents compared to the Dallas-Fort Worth (DFW) nonattainment area population of approximately 6.2 million. The Wise County's 2008 VMT was 969 million miles compared with an area-wide VMT of 61,900 million miles.

**Emissions from Oil and Gas Development**

Non-combustion sources account for approximately 99% of 2008 oil and gas area source VOC emissions in Hood, Matagorda, and Wise Counties. VOC emissions from non-combustion emission sources in the oil and gas industry are generally alkanes and would not be expected to significantly contribute to ozone formation due to their low reactivity. The EPA's technical analysis has not demonstrated that these VOC emissions have had a significant impact on area ozone formation. The EPA should carefully analyze the chemical composition of VOC emissions for each county and

accurately assess the potential of these compounds to form ozone based on reactivity rather than basing designations on total VOC emissions.

The majority of oil and natural gas VOC emissions are flash gas emissions. Flash gas emissions occur when oil or condensed natural gas hydrocarbon liquids are reduced to atmospheric pressure after extraction. The majority of the heavier alkanes and related components are primarily present in this hydrocarbon liquid, which is either oil or natural gas condensate. The TCEQ has sampled flash gas emissions from storage tanks located at natural gas and oil wells at approximately 70 sites statewide. None of the lab analyses for these sites reported detectable quantities of highly reactive volatile organic compounds as defined by 30 Texas Administrative Code (TAC) Chapter 115. Similarly, the EPA SPECIATE software's emissions profile for oil and gas production activities does not contain these compounds. Therefore, the TCEQ would not expect these emissions to significantly contribute to ozone formation in these counties based upon currently available data.

Since the 2002 periodic inventory year, Matagorda County condensate and gas production peaked in 2008 and has declined to levels below 2002 production levels. Matagorda County's 2010 production levels for gas and condensate represent a nine-year low in production (2002 through 2010). Compared to 2008 peak levels, 2010 gas production declined by 36% and 2010 condensate production declined by 43%. VOC area source emission estimates from oil and gas production have declined accordingly, 40% from 2008 to 2010.

Since 2008 represents an atypical, outlier year for both gas and condensate production, and since 2010 VOC emissions from oil and gas production have declined below both 2005 and 2008 emissions estimates, the outlier 2008 data should not be used either to evaluate the impact of VOC emissions from oil and gas operations in Matagorda County or to potentially designate the county as nonattainment for ozone. See Table 1 for more detail.

**Table 1: Matagorda County Gas, Condensate, and Oil Production**

Year	Total Gas (mscf)	% of 2008 Gas Production	Condensate (bbl)	% of 2008 Condensate Production	Oil (bbl)	% of 2008 Oil Production
2002	38,927,717	84%	827,816	77%	1,245,863	358%
2003	32,391,351	70%	625,618	59%	1,325,355	381%
2004	27,651,406	59%	666,500	62%	619,565	178%
2005	31,538,651	68%	665,156	62%	527,521	152%
2006	40,879,756	88%	773,314	72%	451,840	130%
2007	37,004,320	80%	843,957	79%	374,064	108%
2008	46,514,207	100%	1,069,248	100%	347,868	100%
2009	40,723,331	88%	751,811	70%	331,112	95%
2010	29,736,754	64%	606,220	57%	400,786	115%

Source: Texas Railroad Commission, January 13, 2012

**Supplemental Analysis on the EPA's Factor 2: Emissions and Emissions Related Data**

Industrial emissions sources located in Hood, Wise, and Matagorda Counties are currently subject to several state rules, which are listed below, limiting the ozone precursor emissions of VOC and NO<sub>x</sub> as a means to control ozone pollution. Many emissions sources in Hood, Wise, and Matagorda Counties are

also subject to rules that were adopted as part of the state implementation plan (SIP) to meet federal air quality standards. Many of these state rules specify emission limits and operating parameters for a variety of processes. In addition, certain sources located in these counties are required to obtain a site-specific permit authorization that includes best available control technology (BACT) requirements and the applicability of any state and federal rules.

NO<sub>x</sub> emissions from major industrial sources have dramatically decreased in Hood, Matagorda, and Wise counties by 80%, 52%, and 25% respectively in the past eight years (Table 2). This reduction in NO<sub>x</sub> emissions has occurred while these counties have been classified as attainment and demonstrates that reclassification of these counties to nonattainment is not warranted to continue these emission reductions. Permitting and rule requirements combined with technological advancements in industrial equipment are anticipated to continue this downward trend in NO<sub>x</sub> emissions from major industrial sources in Hood, Matagorda, and Wise counties.

**Table 2: Percent Change in Point Source NO<sub>x</sub> Emissions in Tons Per Year (tpy)**

County	2002 NO <sub>x</sub> tpy	2010 NO <sub>x</sub> tpy	Percent Change from 2002 To 2010
Hood	5,964	1,178	-80%
Matagorda	2,044	972	-52%
Wise	2,895	2,163	-25%

The specific state rules and general permitting requirements applicable to Hood, Wise, and Matagorda Counties and other attainment areas are listed below.

**Current State Rules Applicable in Hood and Wise Counties**

The following state rules were adopted to reduce VOC emissions:

- Low Emission Fuels (Gasoline Volatility) – these rules establish volatility requirements for gasoline and diesel fuels intended to power engines (30 TAC Chapter 114, Subchapter H, Division 1).
- Loading and Unloading of VOC – these rules control VOC emissions and by establishing control, inspection, testing, and monitoring requirements for general VOC loading, disposal of transported vapors, gasoline terminals, gasoline bulk plants, and marine terminals (Chapter 115, Subchapter C, Division 1).
- Filling of Gasoline Storage Vessels (Stage I) for Motor Vehicle Fuel Dispensing Facilities – these rules establish control requirements for the transfer of gasoline at a vehicle dispensing facility (Chapter 115, Subchapter C, Division 2).
- Control of VOC Leaks from Transport Vessels – these rules provide the inspection, testing, and recordkeeping requirements for tank-trucks that will be filled with gasoline or non-gasoline VOC with a certain vapor pressure (Chapter 115, Subchapter C, Division 3).

The following state rules were adopted to reduce NO<sub>x</sub> emissions:

- Nitric Acid Manufacturing – these rules apply to production units of any nitric acid production unit and establish emission specifications during manufacturing (30 TAC Chapter 117, Subchapter F, Division 3).
- Small Boilers, Process Heaters, and Water Heaters – these rules establish emission specifications for boilers, heaters, and water heaters operating under a specific capacity threshold (Chapter 117, Subchapter E, Division 3).

- East and Central Texas Utilities (Hood County only) – these rules apply to units used to generate electric energy for compensation including utility electric power boilers, stationary gas turbines, and duct burners used in turbine exhaust ducts (Chapter 117, Subchapter E, Division 1).
- Low Emission Fuels (Low Emission Diesel) – these rules establish aromatic hydrocarbon and cetane number requirements for diesel fuels intended to power engines (Chapter 114, Subchapter H, Division 2).
- Diesel Emission Reduction Incentive Program for On-Road and Non-Road Vehicles (Hood County) – these rules offer grant opportunities for on-road and non-road diesels to reduce diesel emissions (Chapter 114, Subchapter K, Division 3).

### **Current State Rules Applicable in Matagorda County**

The following state rules were adopted to reduce VOC emissions:

- Low Emission Fuels (Gasoline Volatility) – these rules establish volatility requirements for gasoline and diesel fuels intended to power engines (Chapter 114, Subchapter H, Division 1).
- Storage of VOC – these rules establish control requirements for VOC storage tanks and condensate storage tanks (Chapter 115, Subchapter B, Division 1).
- Vent Gas Control – these rules establish control requirements for emissions of VOC from process vents (Chapter 115, Subchapter B, Division 2).
- Water Separation – these rules provide control requirements for VOC water separators (Chapter 115, Subchapter B, Division 3).
- Loading and Unloading of VOC – these rules establish control requirements for general VOC loading, disposal of transported vapors, gasoline terminals, gasoline bulk plants, and marine terminals (Chapter 115, Subchapter C, Division 1).
- Filling of Gasoline Storage Vessels (Stage I) for Motor Vehicle Fuel Dispensing Facilities – these rules establish control requirements for the transfer of gasoline at a vehicle dispensing facility (Chapter 115, Subchapter C, Division 2).
- Control of VOC Leaks from Transport Vessels – these rules establish the inspection, testing, and recordkeeping requirements for tank-trucks to be filled with gasoline or non-gasoline VOC with a certain vapor pressure (Chapter 115, Subchapter C, Division 3).

The following state rules were adopted to reduce NO<sub>x</sub> emissions:

- Nitric Acid Manufacturing – these rules apply to production units of any nitric acid production unit and establish emission specifications during manufacturing (Chapter 117, Subchapter F, Division 3).
- Small Boilers, Process Heaters, and Water Heaters – these rules establish emission specifications and control requirements for boilers, heaters, and waterheaters operating under a specific capacity threshold (Chapter 117, Subchapter E, Division 3).
- Low Emission Fuels (Low Emission Diesel) – these rules establish aromatic hydrocarbon and cetane number requirements for diesel fuels intended to power engines (Chapter 114, Subchapter H, Division 2).

### **General New Source Review (NSR) Permit Requirements for an Attainment Area**

- Public notice requirements.
- Federal requirements in 40 Code of Federal Regulations (CFR) Subparts 60, 61, and 63, where applicable, are integrated into permit conditions.



- BACT evaluation and determination, which include good housekeeping practices.
- Health impacts review, which requires a VOC speciation determination and can include modeling.

### **Other General Permitting Requirements for an Attainment Area**

- Prevention of Significant Deterioration (PSD) applicability determination (PSD is an extensive and complicated process that is not common).
- Title V permits are required for major sources and other certain sources.
- Standard permits are available for certain industrial classification sources and establish BACT for each of those industries.
- Oil and Gas Handling and Production Facilities Permit by Rule (PBR) (Chapter 106, Subsection O, §106.352) was updated in 2011 and applies in the Barnett Shale, which includes Wise and Hood Counties.

## **Evaluation of the EPA's Factor 3: Meteorology (weather/transport patterns) for the DFW Area**

### **Current Understanding of Ozone Formation in the DFW Area**

Ozone formation in the DFW area, as in most areas, depends largely on interaction of three factors: local emissions of ozone precursors, ozone-conducive meteorology, and existing or transported background ozone and precursors. The Dallas-Fort Worth-Arlington area is the fourth largest metropolitan area in the United States, home to nearly 6.5 million residents as of 2009 (United States Census Bureau, 2010), which contribute to the DFW's emission inventories in various ways. Substantial amounts of precursor compounds, chiefly NO<sub>x</sub> and VOC, are emitted by three major source categories: mobile sources, point sources, and area sources.

Mobile sources include cars, trucks, planes, locomotives, and construction equipment. Point sources include most industrial equipment, such as cement kilns; boilers; process heaters; gas, diesel, and dual-fuel fired stationary engines; stationary gas turbines; duct burners used in turbine exhaust ducts; lime, brick, and ceramic kilns; metallurgical heat treat and reheat furnaces; lead smelting; reverberatory and blast furnaces; incinerators; glass, fiberglass, and mineral wool processing facilities; natural gas-fired heaters, dryers and ovens; and electricity generation facilities. The DFW area hosts all of the above equipment.

Higher background ozone concentrations in the DFW area are usually observed when winds originate from the south and southeast, while lower concentrations are observed when winds originate from the north and west. Background and transport appear at this time to play a secondary, though not inconsequential, role in DFW ozone photochemistry, at least when compared to local sources. However, these sources may contribute a greater fraction of the total in the future as local emissions reductions are implemented.

Meteorology also affects other key processes, such as chemical reaction rates (Banta, et al., 2005). High ozone concentrations are observed most frequently in the DFW area on days lacking strong synoptic, or large-scale, pressure gradients. When synoptic (large-scale) weather systems move through the region, ozone and precursor emissions tend to be diluted and carried out of the city, rather than concentrated in still, stagnating air, to be heated, reacted, and turned into ozone. Days dominated by strong synoptic weather systems tend to experience low ozone levels (Banta, et al., 2005).

Absent dominant synoptic weather systems, smaller-scale local wind patterns govern ozone formation. As precursor emissions are advected across the region, they mix with other local emissions, as well as compounds transported into the region, to generate elevated concentrations of ozone. On days with light winds, precursors generated in the morning, along with those remaining from the previous day, accumulate and then react during the warmest and sunniest portion of the day. Ozone rich air masses

typically begin to form in the center and south of the city. Later in the afternoon, southeasterly breezes can advect, or horizontally transport, the pool of high ozone over the city toward the west and northwest.

To summarize, the DFW area typically experiences high ozone on days that are warm, sunny, winds either from the east or southeast, or slow wind speeds. This means that Hood and Wise Counties are usually downwind of the DFW urban plume and unlikely to contribute to high ozone values at the analyzed ozone monitors. Given the DFW area's large population, automobile fleet, and variety of industry, the area produces enough emissions to result in a high ozone day when meteorological conditions are favorable.

### **Analysis of EPA's Modeling for Hood and Wise Counties**

The EPA proposed nonattainment designation for Hood and Wise Counties based on their belief that the emissions from these counties contribute to observed violations in the area. This section describes why the tools used by the EPA are not capable of nor appropriate for providing such as determination and that these counties do not significantly contribute to the highest ozone levels.

The EPA evaluated available meteorological data to help determine how meteorological conditions, such as weather, transport patterns, and stagnation conditions, would affect the fate and transport precursor emissions contributing to ozone formation. The EPA used the National Oceanic and Atmospheric Administration Hybrid Single Particle Lagrangian Integrated Trajectory (NOAA HYSPLIT) Model as its primary modeling tool.

This HYSPLIT analysis is simple in nature and is only capable of giving a qualitative examination of areas that may influence design value at key ozone monitoring sites. The HYSPLIT model, which creates back trajectories, is not capable of directly linking ozone or pollutants in one area to another. Hourly endpoints are the hourly estimates of air parcel location from HYSPLIT that compose a back trajectory. The whole back trajectory is the mean-path of an air parcel over space and time. The model uses meteorological data to estimate hourly positions of wind parcels in space and time. Because the analyses show large numbers of back trajectories converging on a single fixed point, the model introduces a built-in bias, which tends to give higher endpoint counts in areas near the receptor sites, such as an ozone monitor.

The EPA's argument depends highly on the path a trajectory took before reaching a receptor ozone monitor. Simply looking at back trajectories when the daily maximum ozone is greater than 75 parts per billion (ppb) will not establish that these trajectories increase ozone levels at any single ozone monitor.

To improve upon EPA's back trajectory analysis, the TCEQ analyzed back trajectories developed by the EPA to better understand the effects of upwind regions that may affect ozone monitors in the DFW area.

The TCEQ created HYSPLIT 24-hour back trajectories during 2006 through 2010. The HYSPLIT trajectories coincide with days when maximum daily eight-hour ozone was greater than 75 ppb in the DFW area. These trajectories are at 800 meters in height, well within the mixing layer during the day, but not too low that the trajectories touch ground level, thereby invalidating the trajectory. This analysis better highlights the true extent of trajectories passing through Wise and Hood Counties. The analysis used three DFW ozone monitors, namely Eagle Mountain (Mtn.) Lake, Keller and Parker ozone monitoring sites. The EPA used a starting height of 100 meters, which often left trajectories touching ground level and can result in erroneous back trajectories over time.

The back trajectory hourly endpoints generated from HYSPLIT were plotted on a map. The back trajectory hourly endpoints that appeared over Hood and Wise County were counted. One set of back trajectories and hourly endpoints were plotted for ozone design value sensitive monitors such as the Parker, Eagle Mtn. Lake and Keller ozone monitors. A lower frequency of endpoints indicates less

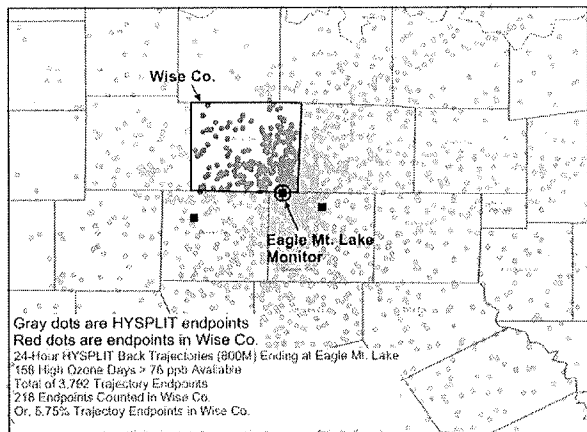
probability that an air parcel transported ozone from Hood or Wise County to an ozone monitor. There were 3,792 endpoints generated using the HYSPLIT model.

Results from TCEQ's trajectory analysis show 5.75% percentage of hourly endpoints in Wise County are associated to trajectories ending at Eagle Mtn. Lake (Figure 1). A smaller percentage of hourly endpoints in Hood County at 1.03% were attached to trajectories ending at Eagle Mtn. Lake (Figure 2). Because Eagle Mtn. Lake is close to Wise County one should expect to see higher endpoint counts for Wise County. Furthermore, a closer examination of these hourly endpoints and their associated trajectories shows that some trajectories meander into other counties before terminating at Eagle Mtn. Lake. A cursory count of endpoints shows the majority of endpoints are within Tarrant County, Eagle Mtn. Lake's residing county. This is an update of the analysis noted in the TCEQ's January 11, 2012, response to comment letter that stated at most only 2.87% of the trajectory endpoints actually traverse Wise County.

The number of hourly endpoints leading to the Parker County ozone monitor is 3.90% for Wise County (Figure 3) and 2.27% for Hood County (Figure 4). The 2010 design value setting monitor for the DFW area is Keller. The hourly endpoint count for Keller is 2.77% for Wise County (Figure 5) and 0.69% for Hood County (Figure 6). The TCEQ noted in its January 11, 2012, response to comment letter that at most only 2.55% of the trajectory endpoints actually traverse Hood County. This slight revision is the result of further review of trajectory data.

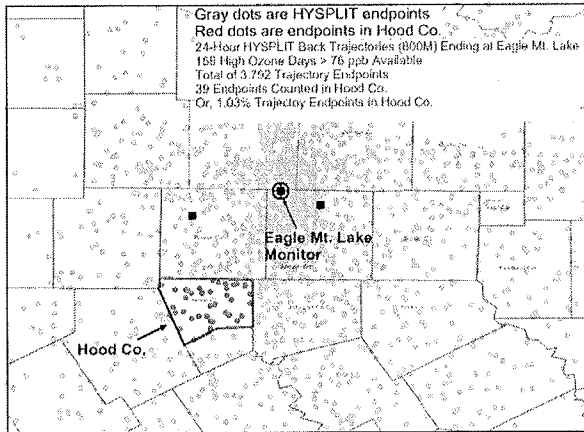
This back trajectory analysis indicates that wind seldom passes over either Wise or Hood County before reaching ozone monitors on high ozone days. These analyzes and this tool, however, do not indicate if Hood or Wise County emissions significantly contribute to ozone formation at these ozone monitors.

**Figure 1: The map shows trajectory endpoints (in red) in Wise County for receptor monitor Eagle Mtn. Lake (5.75%).**

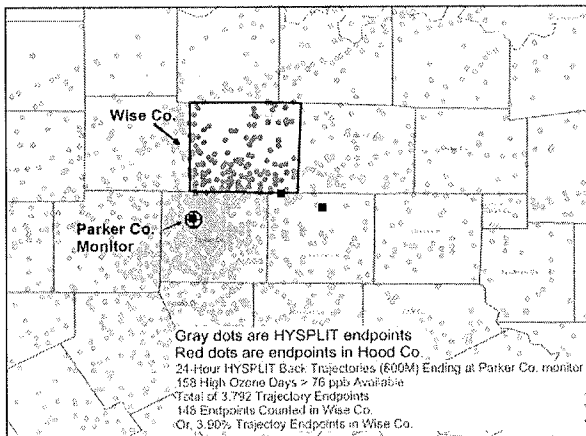




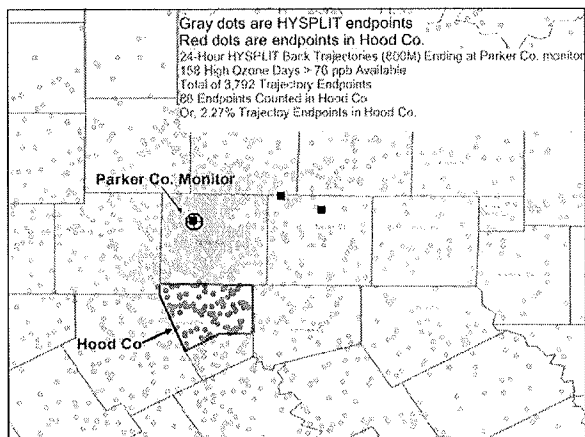
**Figure 2: The map shows trajectory endpoints (in red) in Hood County for receptor monitor Eagle Mtn. Lake (1.03%).**



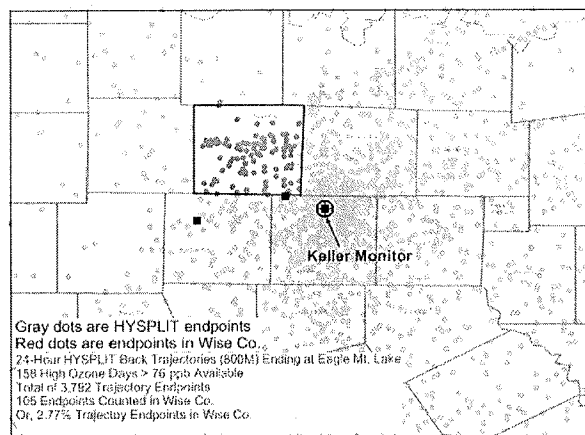
**Figure 3: The map shows trajectory endpoints (in red) in Wise County for receptor monitor Parker County (3.90%).**



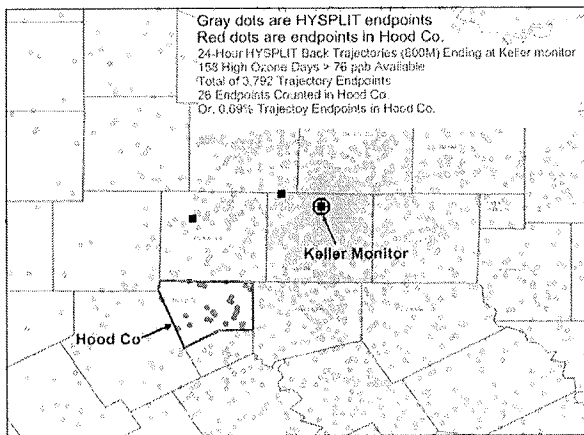
**Figure 4: The map shows trajectory endpoints (in red) in Hood County for receptor monitor Parker County (2.27%).**



**Figure 5: The map shows trajectory endpoints (in red) in Wise County for receptor monitor Keller (2.77%).**



**Figure 6: The map shows trajectory endpoints (in red) in Hood Counties for receptor monitor Keller (0.69%).**



### **Supplemental Analysis on Factors 2: Emissions and Emissions Related Data and 3: Meteorology (weather/transport patterns) for the DFW Area**

The TCEQ utilized an additional modeling tool, Comprehensive Air quality Model with extensions (CAMx) Anthropogenic Precursor Culpability Assessment (APCA), as complementary information to the meteorology and emissions factors. APCA is a modeling tool that can be used to keep track of the origin of the NO<sub>x</sub> and VOC precursors creating the ozone at specified locations during a model run. The ozone can then be apportioned to specific user-defined sources groups and regions. The TCEQ used APCA to determine the eight-hour ozone contribution from Hood and Wise Counties to specific ozone monitors in the DFW area for 2006 and 2012. These APCA runs used the same June 2006 episode model setup (meteorology, emissions, CAMx version, etc.) as the Dallas-Fort Worth Attainment Demonstrations SIP Revision for the 1997 Eight-Hour Ozone Standard Nonattainment Area adopted December 7, 2011 (2011 DFW AD SIP Revision). The June 2006 episode was shown to be representative of typical ozone-conducive conditions in the DFW area, including impacts from local and non-DFW source areas via wind directions from the east, southeast, and south. Details on the June 2006 episode can be found in the episode selection of the DFW modeling protocol at [http://www.tceq.texas.gov/assets/public/implementation/air/sip/dfw/ad\\_2011/AppE\\_Protocol\\_ado.p df#page=37](http://www.tceq.texas.gov/assets/public/implementation/air/sip/dfw/ad_2011/AppE_Protocol_ado.p df#page=37).

The TCEQ did not use the updated oil and gas sector pneumatic emissions submitted October 2011 to the EPA for the Periodic Emissions Inventory in this modeling and source apportionment analysis, therefore, the VOC emissions from this source category are likely overestimated in the modeling.

Figure 7, Figure 8, and Figure 9 display the 2012 contributions to the Keller, Eagle Mtn. Lake, and Weatherford (Parker County) ozone monitors from Hood County, Wise County, the initial and boundary conditions (IC/BC), and all other areas of the modeled domain, including DFW (DFW+Other). The modeled June 2006 episode is shown. Throughout most of the episode the DFW+Other and the IC/BC source regions dominate the contributions to total predicted ozone.

Figure 7: 2012 Future Case Keller Eight-Hour Ozone APCA Results

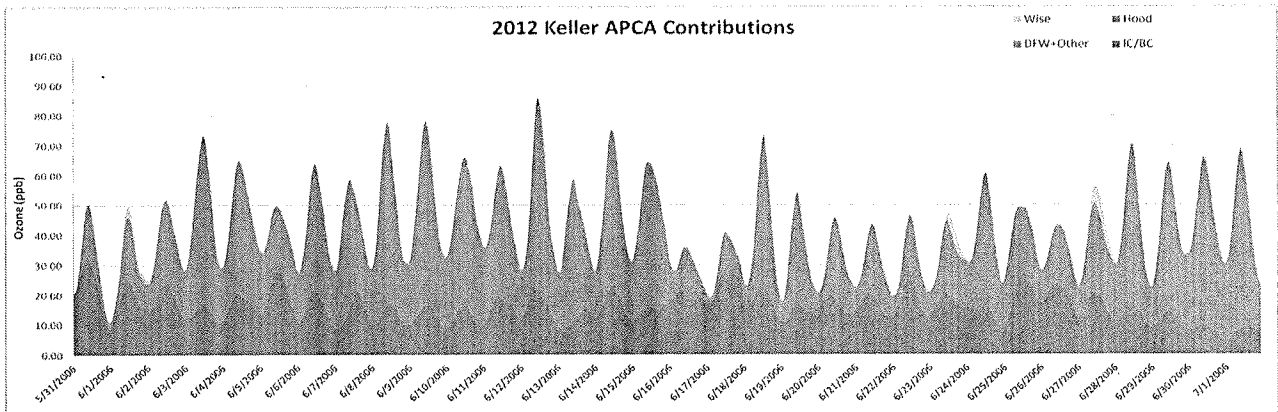


Figure 8: 2012 Future Case Eagle Mtn. Lake Eight-Hour Ozone APCA Results

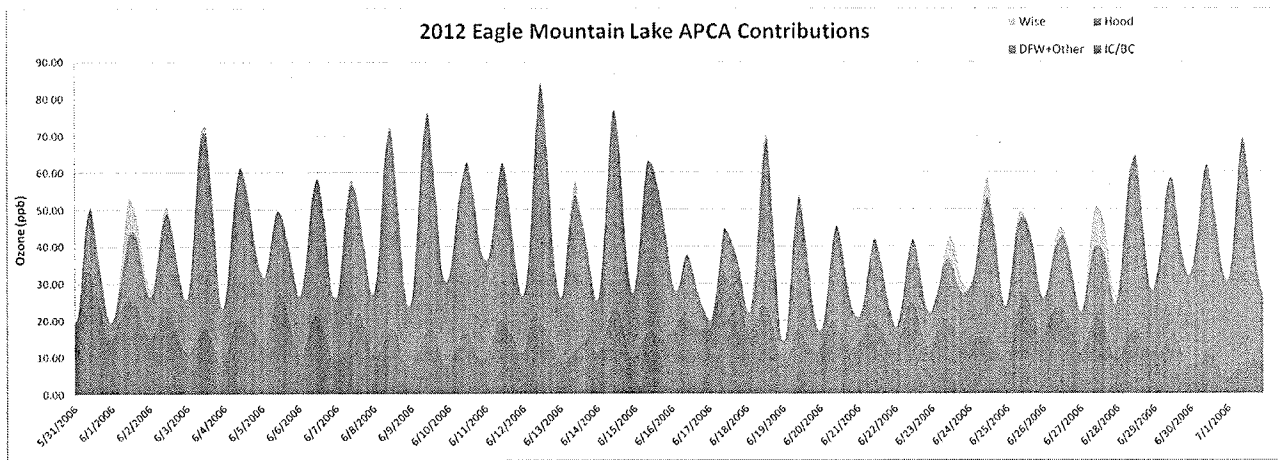


Figure 9: 2012 Future Case Weatherford (Parker County) Eight-Hour Ozone APCA Results

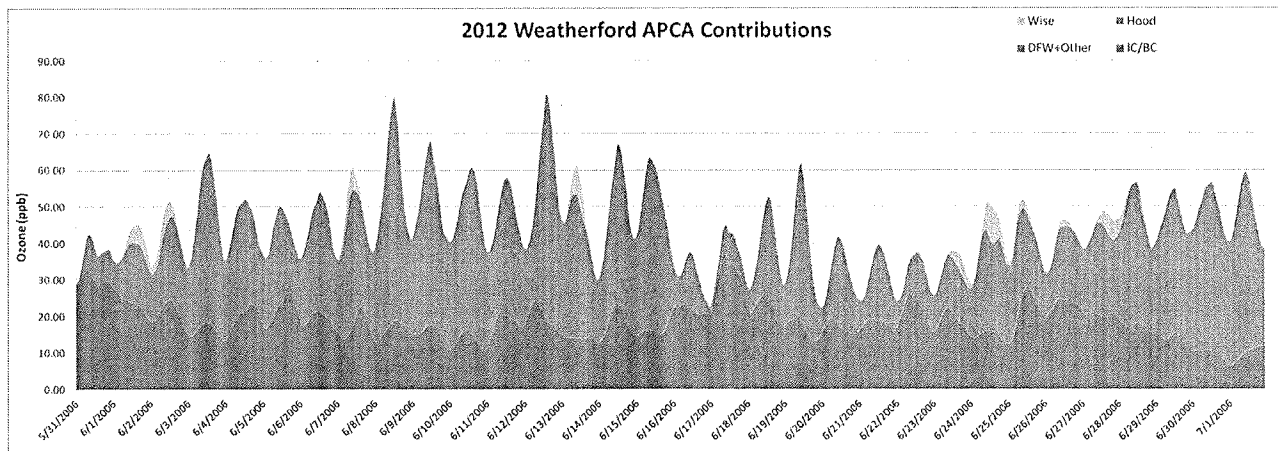
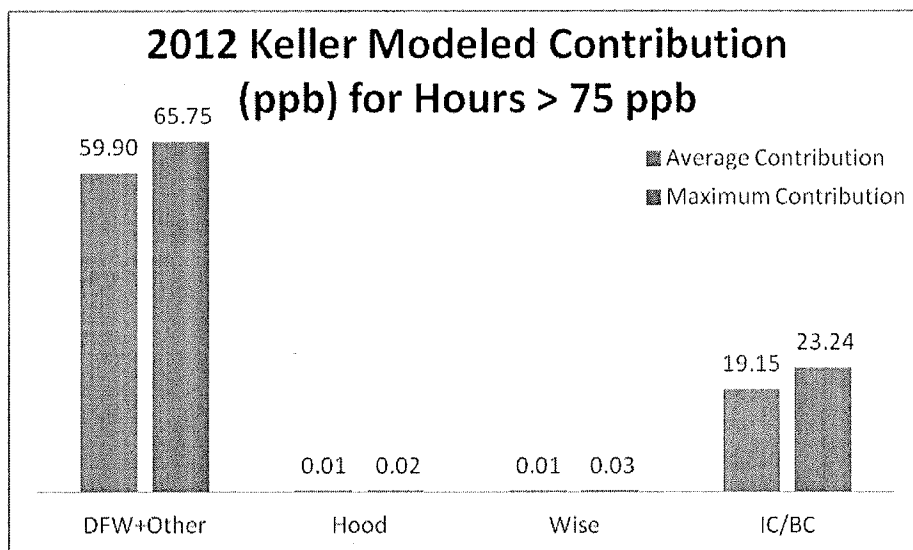




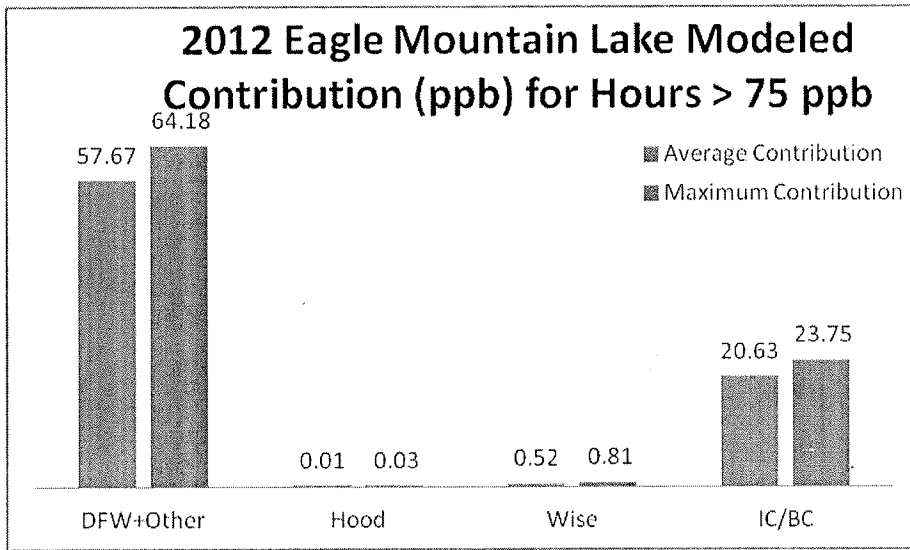
Figure 10, Figure 11, and Figure 12 show the average and maximum contributions from Hood and Wise Counties to the Keller, Eagle Mtn. Lake, and Weatherford (Parker County) ozone monitors in 2012. The IC/BC and all other areas of the modeled domain, including DFW+Other, are also represented. The blue bars exhibit the average contribution for eight-hour ozone periods greater than or equal to 75 ppb, while the red bars exhibit the maximum contribution during the eight-hour ozone periods greater than or equal to 75 ppb at that ozone monitor. The maxima from Hood, Wise, DFW+Other, and IC/BC source areas could have occurred on different days or eight-hour periods and thus, the sum of the maxima does not correspond to the modeled design value or any specific maximum daily eight-hour concentration.

The average modeled contributions of ozone from Hood County emissions to the three ozone monitors were less than 0.1 ppb. The average modeled contributions of ozone from Wise County emissions were less than 0.01 at the Keller monitor. At the Eagle Mtn. Lake and Weatherford (Parker County) ozone monitors, the average modeled contributions of ozone from Wise County emissions were less than 0.7 ppb.

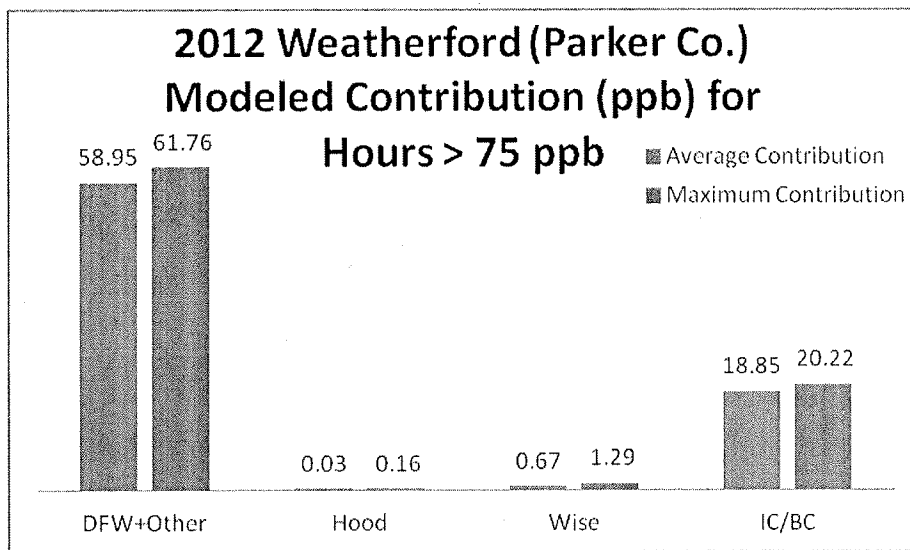
**Figure 10: 2012 Modeled Ozone Contributions at Keller**



**Figure 11: 2012 Modeled Ozone Contributions at Eagle Mtn. Lake**



**Figure 12: 2012 Modeled Ozone Contributions at Weatherford (Parker County)**



Another benefit of the APCA tool is that it determines how NO<sub>x</sub> and/or VOC emissions create ozone from each of the defined source categories and regions. At the Weatherford (Parker County) ozone monitor NO<sub>x</sub> emissions from Hood and Wise Counties created 97-99% of the contributed ozone from these counties, while VOC emissions were only responsible for 1-3% of the contributed ozone from these counties. The availability of biogenic VOC emissions, generally more reactive than local anthropogenic VOC emissions, most likely influences the importance of anthropogenic NO<sub>x</sub> emissions.

Using the APCA results, contributions from Hood and Wise Counties to the 2012 future design values at the Keller, Eagle Mtn. Lake, and Weatherford (Parker County) ozone monitors were calculated as shown in Table 3. The fractions of the relative response factors from Hood and Wise Counties were

multiplied against the observed baseline design value to determine the contribution. As with the 2011 DFW AD SIP Revision, this methodology followed the EPA modeling guidance for calculating a future design value.

**Table 3: Modeled Ozone Contributions to the 2012 Future Design Value**

Source Region	Eagle Mtn. Lake Future Contribution	Keller Future Contribution	Weatherford (Parker County) Future Contribution
Hood County	0.08%	0.01%	1.25%
Wise County	0.53%	0.01%	1.25%
DFW+Other	76.52%	78.04%	73.11%
IC/BC	22.86%	21.93%	24.37%
APCA DV <sub>F</sub>	100.0%	100.0%	100.0%

Note: The APCA DV<sub>F</sub> total may not equal the sum of the source region contributions due to rounding.

As with the APCA results shown in Table 3, the contributions from Hood and Wise Counties to the 2012 Keller future design value (DV<sub>F</sub>) are very small. At the Eagle Mtn. Lake and Weatherford (Parker County) ozone monitors, the contributions are larger since those ozone monitors are closer to Hood and Wise Counties. The contributions are less than one ppb, which indicates the majority of the 2012 design value comes from the DFW area and other areas of the modeling domain.

**Evaluation of the EPA’s Factor 3: Meteorology (weather/transport patterns) for the Houston-Galveston-Brazoria (HGB) Area**  
**Current Understanding of Ozone Formation in the HGB Area**

Ozone formation in the HGB area is generally associated with relatively clear skies, light winds, abundant sunshine, and temperatures above 80 to 85 degrees Fahrenheit. Typically, these meteorological conditions are associated with high pressure areas that migrate across the United States during the summer season. And just as important, precursor compounds to ozone need to be present for ozone formation. Houston has all these factors including the presence of millions of people, the presence of numerous NO<sub>x</sub> and VOC emissions sources, and meteorological conditions favorable to the formation of ozone from those emissions.

The processes that create emissions in the Houston area typically are continuous, in large amounts, and present every day. Therefore, meteorological patterns are the controlling force that either dilute and carry pollution out of the city (Banta, et al., 2005) or concentrate pollution causing high ozone events. This concentration of pollution or emissions typically is the result of the land-sea breeze flow reversals and a shoreline convergence zone, which combine to form a rotational wind pattern that often re-circulates emissions over ozone precursor sources, amplifying ozone formation dynamics (Banta, et al., 2005; Nielson-Gammon et al., 2005b).

Research on the meteorology of the HGB area has found that the highest background ozone transported into the HGB area predominately originates from the north and northeast (Nielson-Gammon et al., 2005a). Similarly, a transport study that links measured ozone with a wind direction found that winds originating from the south tend to have the lowest ozone concentrations (Sullivan, 2009). The higher background concentrations are associated with winds that originate from the northeast, east or “short” trajectories that represent stagnation. Trajectories from the southwest are not generally associated with high background ozone levels being transported into the HGB nonattainment area.



More fundamentally, Houston has a large population and emissions that are present on any given day. Meteorological patterns of recirculation are the driving force that determines whether ozone transport is a significant factor in ozone development. High background levels of ozone come from the east and northeast, not from the southwest where Matagorda County lies.

To summarize, the EPA has shown no significant or statistical basis to expect that wind flow from Matagorda County adversely impacts the HGB nonattainment area. Moreover, the TCEQ's own analysis has shown just how insignificant any potential contribution from Matagorda County really is.

### **Analysis of EPA's Modeling for Matagorda County**

The EPA evaluated available meteorological data to help determine how meteorological conditions, such as weather, transport patterns, and stagnation conditions, would affect the fate and transport precursor emissions contributing to ozone formation. The EPA used the NOAA HYSPLIT Model as its primary modeling tool.

The TCEQ performed its own analysis using HYSPLIT and concluded that the EPA's conclusions regarding potential transport from Matagorda County is unsupported. The key tool the EPA used to derive its transport argument is the HYSPLIT model. The back trajectory tool simply calculates air parcel's mean-path movement in space and time. Both the TCEQ and EPA agree that only a few trajectories traverse Matagorda County before reaching the ozone monitors in the HGB area. The distinction between the EPA and TCEQ position is that the EPA fails to show on a scientific or statistical basis that such a small number of trajectories could adversely affect the ozone design values at these ozone monitoring sites in particular and the HGB nonattainment area in general. The EPA does not present any scientific or statistical evidence to support its claim of adverse impact from transport nor does the EPA quantify the number of trajectories passing over Matagorda County and how many would be required to cause a noticeable or significant effect. The EPA also lacks any corroborating evidence, such as an ozone monitor in Matagorda County to show that those trajectories in question actually contain ozone – or at the very least sufficient ozone to adversely impact the HGB nonattainment area. This cannot be sufficient to lead the EPA to conclude that transport through Matagorda adversely affects the HGB nonattainment area.

Following EPA's back trajectory analysis, the TCEQ analyzed back trajectories to show the frequency that Matagorda County was upwind of the ozone monitors in the HGB area.

HYSPLIT 24-hour back trajectories were created for 2006 through 2010. These trajectories are at 800 meters in height, well within the mixing layer during the day, but not too low that the trajectories touch ground level, thereby invalidating the trajectory. The EPA's use of 100 meter height trajectories is technically faulty. Furthermore these HYSPLIT trajectories coincide with days when maximum daily eight-hour ozone was greater than 75 ppb in the HGB area. The TCEQ's analysis used trajectories terminating at three HGB ozone monitoring sites, namely Manvel Croix, Texas City, and Wallisville Road. Please note that the Wallisville ozone monitor is not a regulatory monitor and it was used in the TCEQ's analysis only because it was used by the EPA in their modeling. There were 4,224 hourly endpoints generated using the HYSPLIT model. This analysis was conducted to highlight the true extent of the number of trajectories passing through Matagorda County.

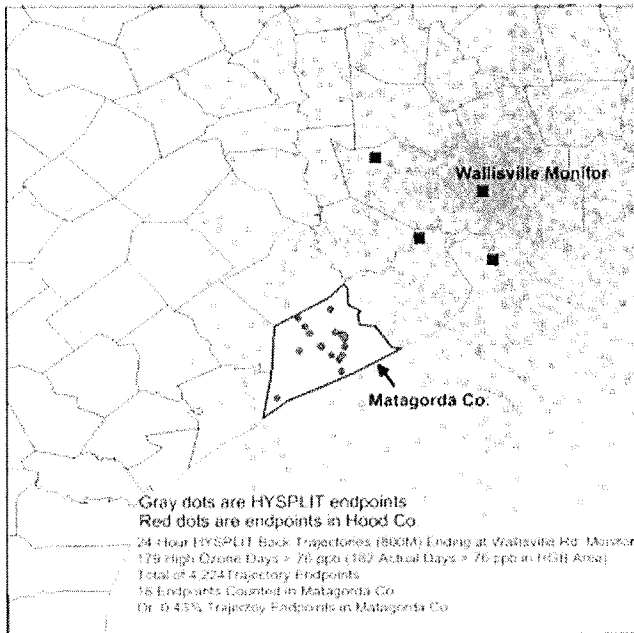
To assess the EPA's HYSPLIT analysis, the TCEQ delineated Matagorda County and then overlaid the trajectories. A back trajectory is the mean-path of an air parcel over space and time. Back trajectories are composed of hourly points that track a trajectory's path on an hourly basis. The Manvel Croix, Wallisville, and Texas City ozone monitors had hourly endpoints that fell in Matagorda County and were counted. A lower frequency of endpoints indicates a lower probability that an air parcel transported ozone from Matagorda County to an ozone monitor.

This analysis is simple in nature and is only intended to give a qualitative indication of areas that may have been upwind of design value setting monitors. An important distinction of the HYSPLIT model, which creates the back trajectories, is that it is not intended to directly link ozone or pollutants in one

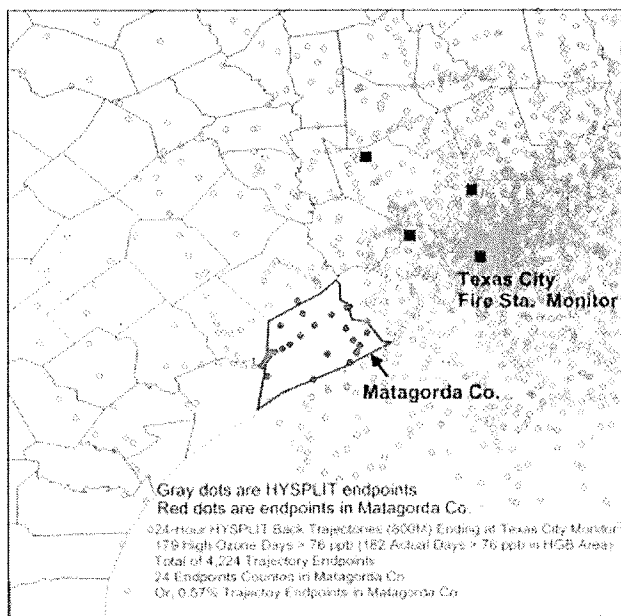
area to another. The model simply uses meteorological data to estimate hourly positions of wind parcels in space and time.

Results for the Wallisville ozone monitor show that very few hourly endpoints were contained in Matagorda County, i.e., 0.43% (Figure 13). The Texas City ozone monitor shows similar results with 0.57% (Figure 14), the Northwest Harris ozone monitor resulted in 0.92% (Figure 15), and the Manvel Croix ozone monitor resulted in 1.9% of hourly endpoints in Matagorda County (Figure 16). The TCEQ noted in its January 11, 2012, response to comment letter that at most only 1.8% of the trajectory endpoints actually traverse Matagorda County. This slight revision is the result of further review of trajectory data. Therefore, Matagorda County emissions would rarely have an opportunity to impact ozone monitors because they are seldom upwind of the ozone monitors during periods of elevated ozone. In addition, there are other emission sources between Matagorda County and the ozone monitors. Note that locally produced ozone can have the greatest impact at the ozone monitor, especially in an area such as Houston, which has a large automobile fleet, is densely populated, and is highly industrialized.

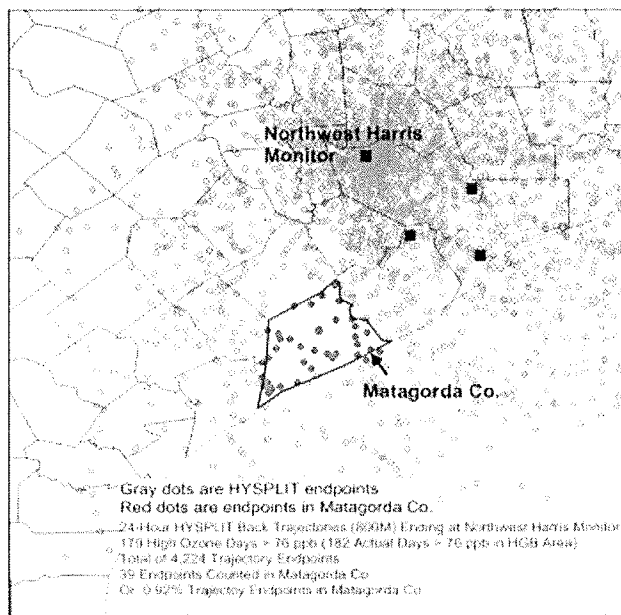
**Figure 13: Map shows hourly trajectory endpoints (in red) in Matagorda County for the Wallisville ozone monitor (0.43%).**



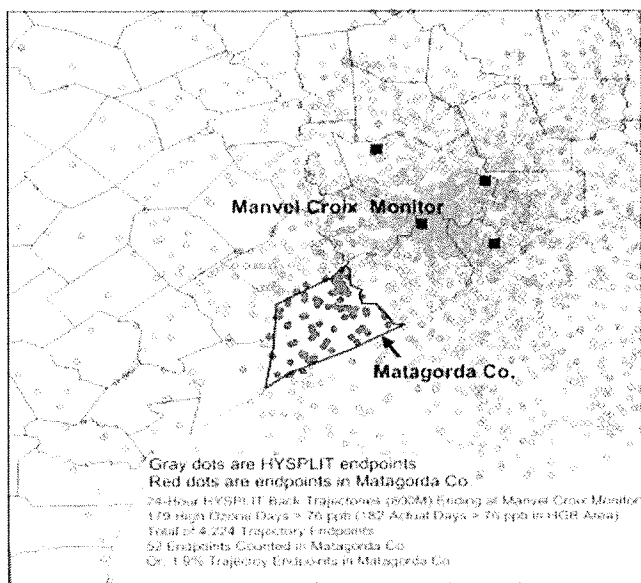
**Figure 14: Map shows hourly trajectory endpoints (in red) in Matagorda County for the Texas City ozone monitor (0.57%).**



**Figure 15: Map shows hourly trajectory endpoints (in red) in Matagorda County for the Northwest Harris ozone monitor (0.92%).**



**Figure 16: Map shows hourly trajectory endpoints (in red) in Matagorda County for the Manvel Croix ozone monitor (1.9%).**



Given that the trajectory count is not large at Matagorda County and the EPA does not present additional evidence to support the transport of pollutants or ozone, there is not enough evidence to suggest that Matagorda County adversely affects ozone design values in the HGB area.

**Supplemental Analysis on Factors 2: Emissions and Emissions Related Data and 3: Meteorology (weather/transport patterns) for the HGB Area**

The EPA used the NOAA HYSPLIT as its primary modeling tool. The TCEQ utilized an additional modeling tool, APCA, as complementary information on the meteorology and emissions factors. APCA is a modeling tool that can be used to keep track of the origin of the NO<sub>x</sub> and VOC precursors creating the ozone at specified locations during a model run. The ozone can then be apportioned to specific user-defined sources groups and regions. The TCEQ used APCA to determine the eight-hour ozone contribution from Matagorda County to specific ozone monitors in the HGB area for 2006 and 2018, although 2006 data will be the focus of this document since 2018 is several years future. These APCA runs used the same episodes and model setup (meteorology, emissions, CAMx version, etc.) as the Houston-Galveston-Brazoria Attainment Demonstration State Implementation Plan Revision for the 1997 Eight-Hour Ozone Standard adopted March 10, 2010 (2010 HGB AD SIP Revision).

Figures 17 and 18 display the 2005 and 2006 contributions of ozone from Matagorda County emissions to the Manvel Croix ozone monitor and Figures 19 and 20 to the Wallisville ozone monitor, respectively. Also shown are the IC/BC and all other areas of the modeled domain, including HGB+Other. Separate charts are provided for the collective 2005 and 2006 episodes. Throughout all episodes, the HGB+Other and the IC/BC source regions dominate the contributions to total predicted ozone. In fact, it is difficult to see any contribution of ozone from Matagorda County emissions at all. Charts were also developed for the Northwest Harris County ozone monitor (Figures 21 and 22) and the Texas City ozone monitor (Figures 23 and 24), but contributions of ozone from Matagorda County emissions were even less notable.



Figure 17: 2005 Baseline Manvel Croix Eight-Hour Ozone APCA Results

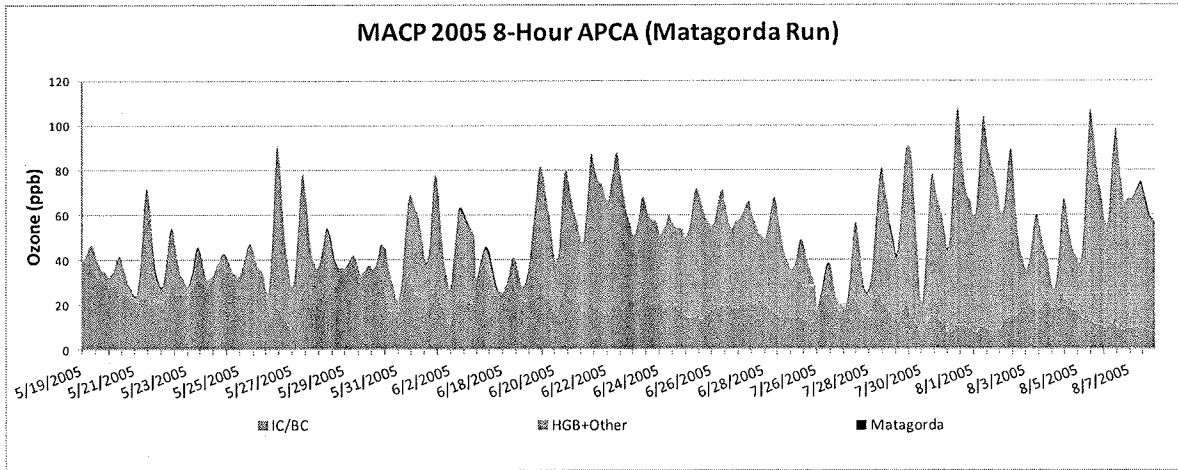


Figure 18: 2006 Baseline Manvel Croix Eight-Hour Ozone APCA Results

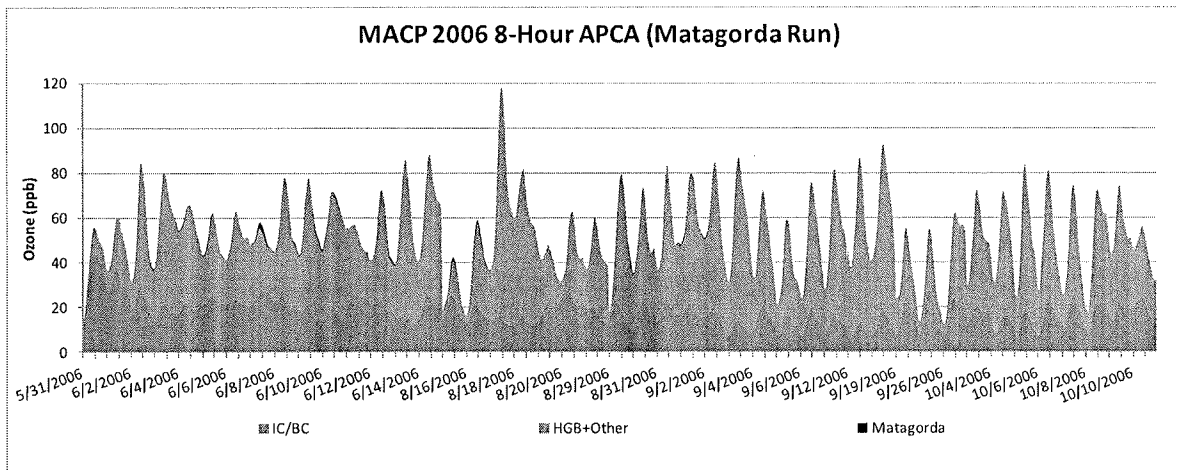


Figure 19: 2005 Baseline Wallisville Eight-Hour Ozone APCA Results

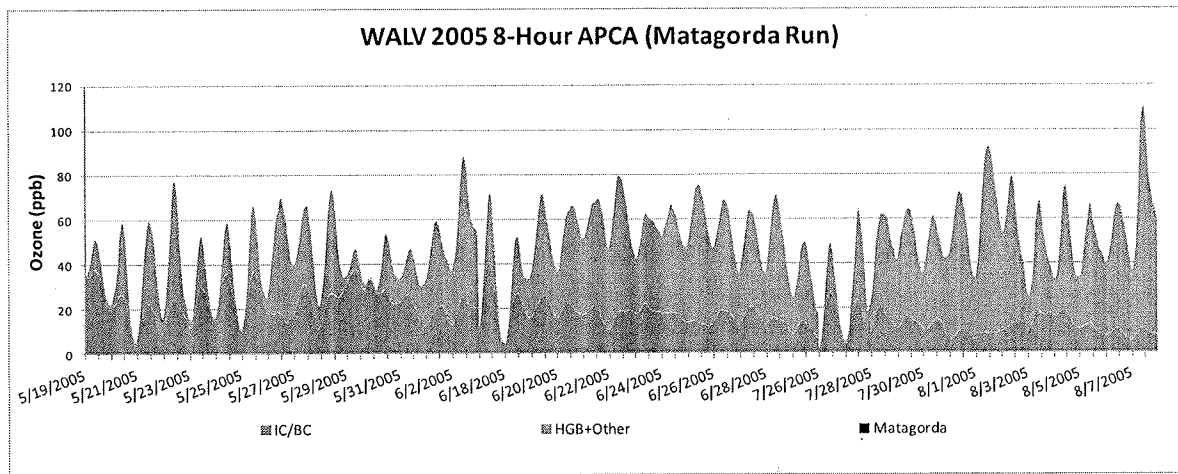


Figure 20: 2006 Baseline Wallisville Eight-Hour Ozone APCA Results

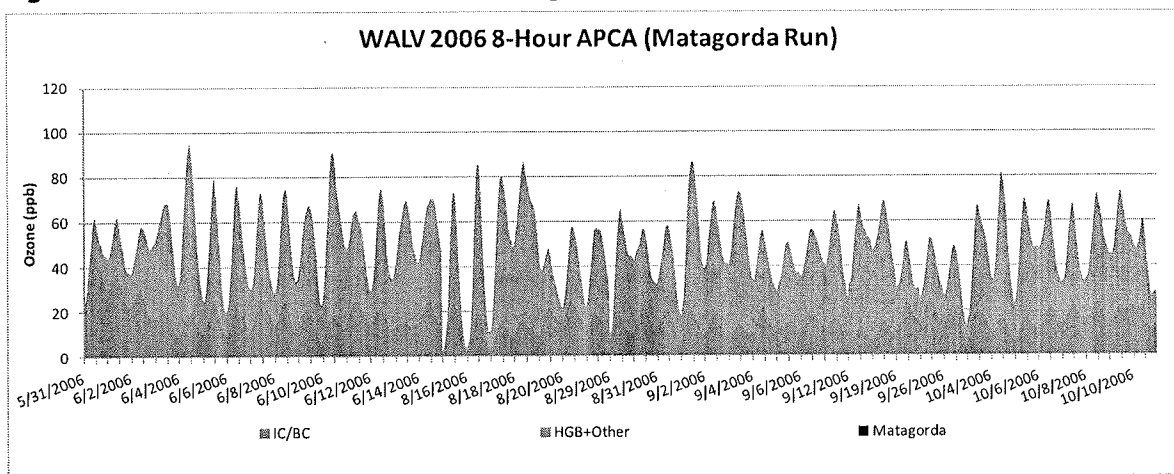


Figure 21: 2005 Baseline Northwest Harris County Eight-Hour Ozone APCA Results

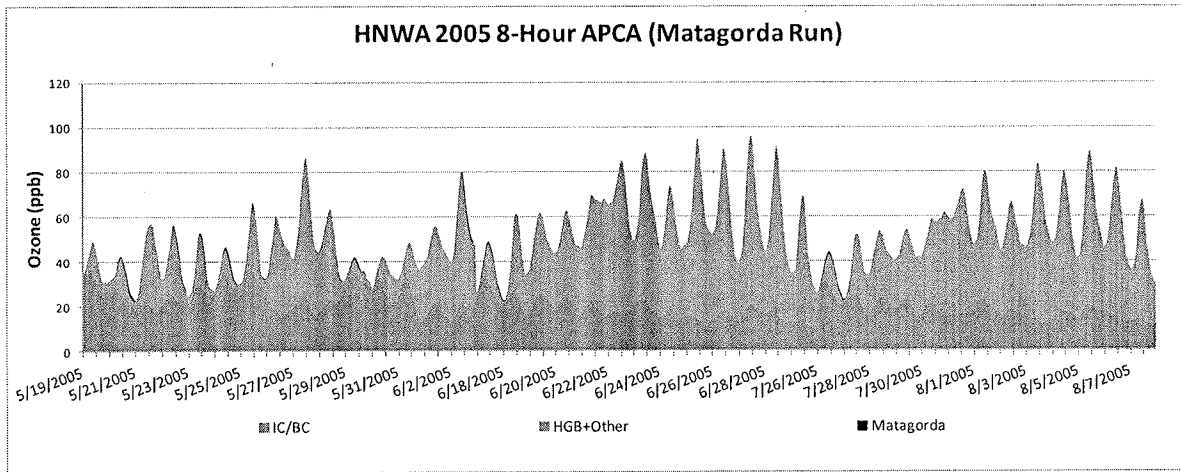
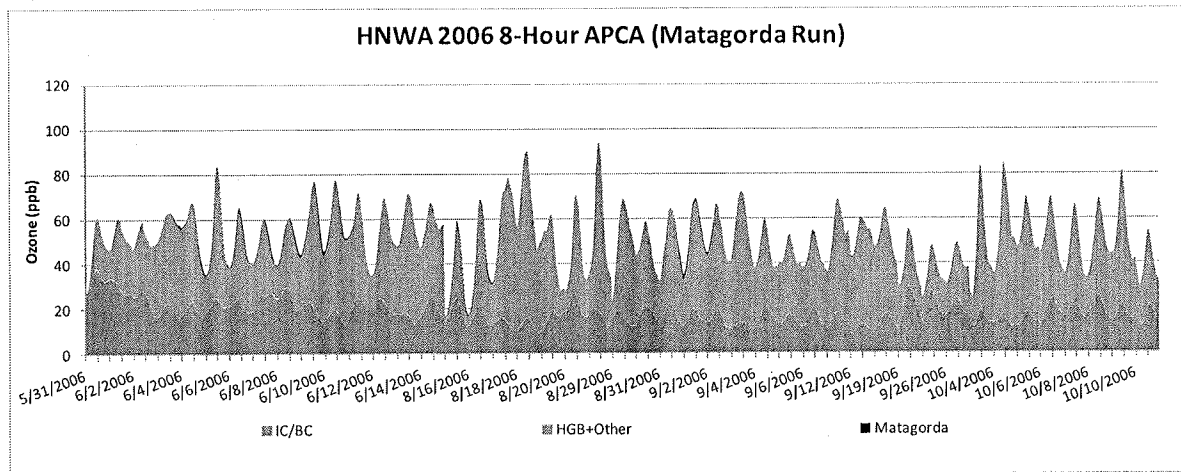
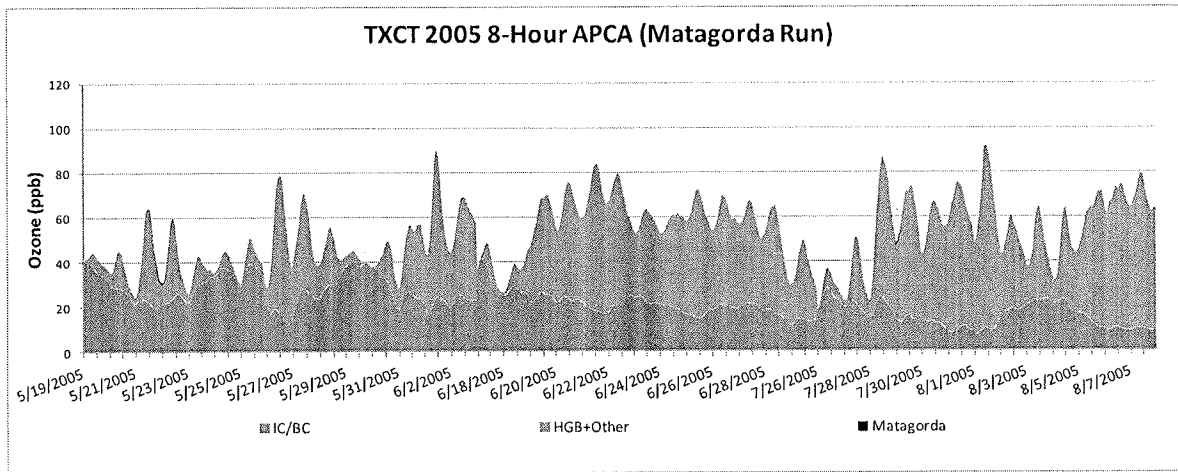


Figure 22: 2006 Baseline Northwest Harris County Eight-Hour Ozone APCA Results

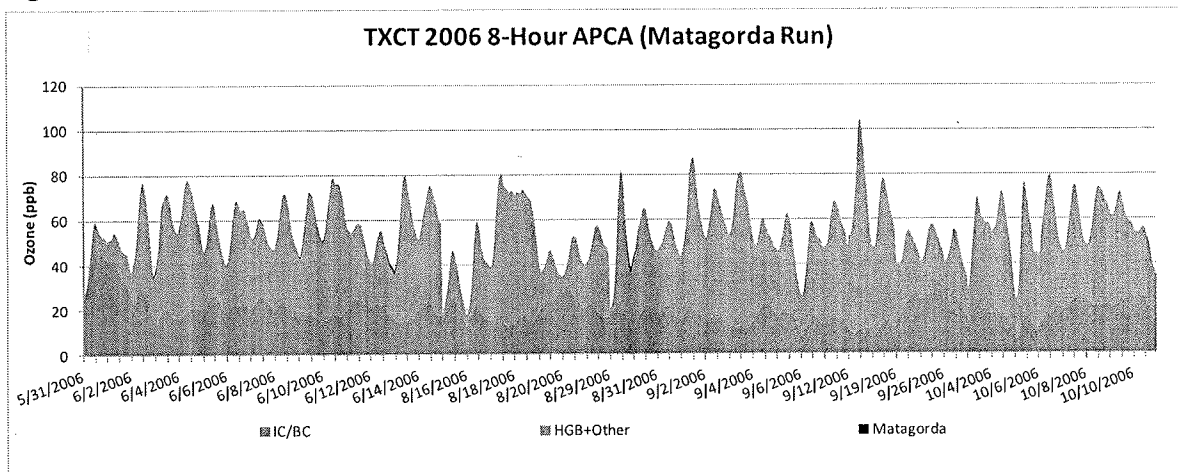




**Figure 23: 2005 Baseline Texas City Eight-Hour Ozone APCA Results**



**Figure 24: 2006 Baseline Texas City Eight-Hour Ozone APCA Results**



Figures 25 through 32 show the average and maximum contributions of ozone from Matagorda County emissions to the Manvel Croix, Wallisville, Northwest Harris County, and Texas City ozone monitors in 2005 and 2006. The IC/BC and all other areas of the modeled domain, including HGB+Other, are also represented. The blue bars exhibit the average contribution of ozone for eight-hour ozone periods greater than or equal to 75 ppb, while the red bars exhibit the maximum contribution of ozone during the eight-hour ozone periods greater than or equal to 75 ppb at that ozone monitor. The maxima from Matagorda, HGB+Other, and IC/BC source areas could have occurred on different days or eight-hour periods and thus, the sum of the maxima does not correspond to the modeled design value or any specific maximum daily eight-hour concentration.

Of all the ozone monitoring sites evaluated, the Wallisville ozone monitor shows the largest average contribution of ozone from emission source categories in Matagorda County, although the contribution is small (0.18 ppb). The Northwest Harris County ozone monitor had a modeled average contribution of 0.11 ppb from Matagorda County emissions.

Figure 25: 2005 Modeled Ozone Contributions at Manvel Croix

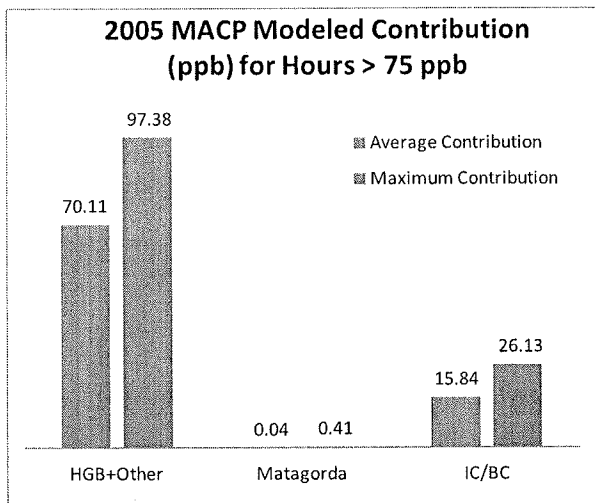


Figure 26: 2006 Modeled Ozone Contributions at Manvel Croix

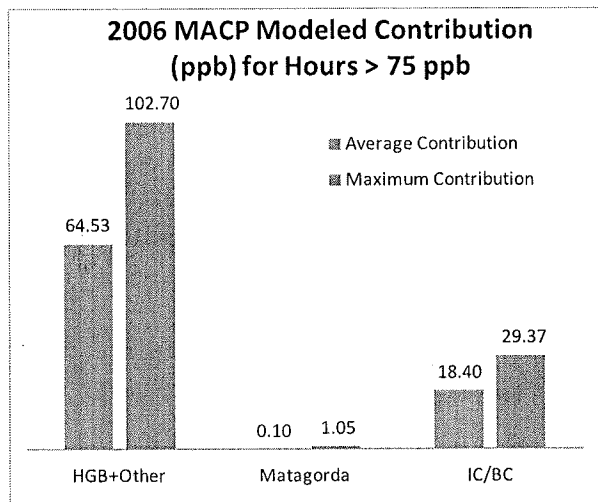


Figure 27: 2005 Modeled Ozone Contributions at Wallisville

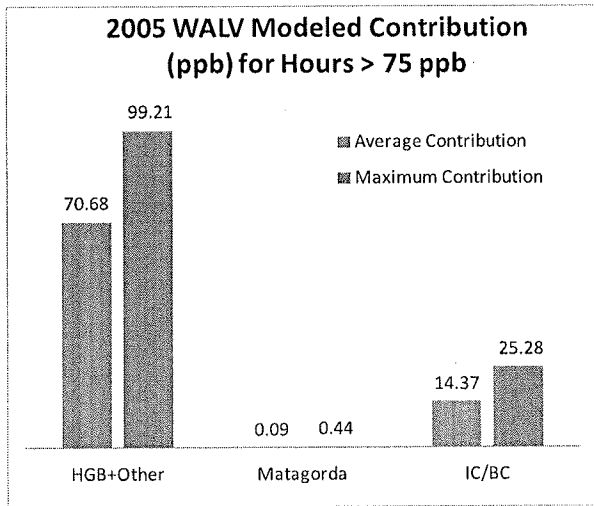


Figure 28: 2006 Modeled Ozone Contributions at Wallisville

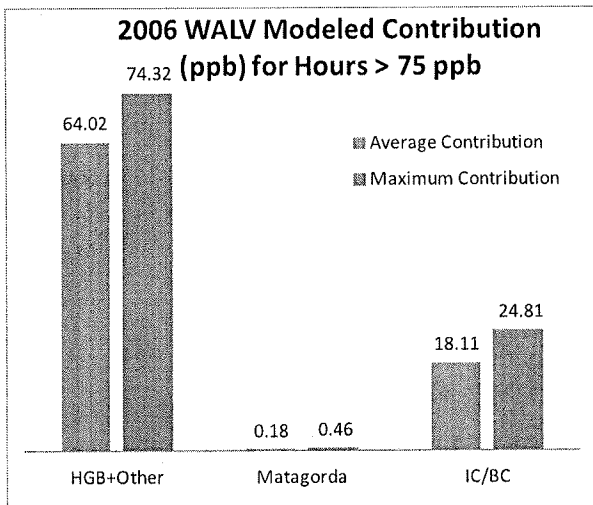


Figure 29: 2005 and 2006 Modeled Ozone Contributions at Northwest Harris County

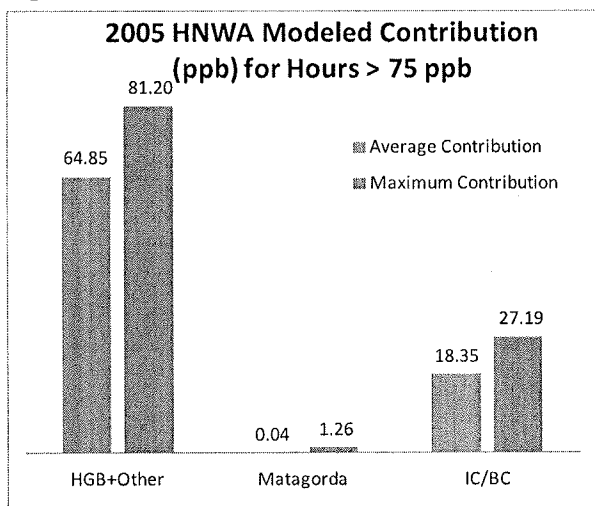
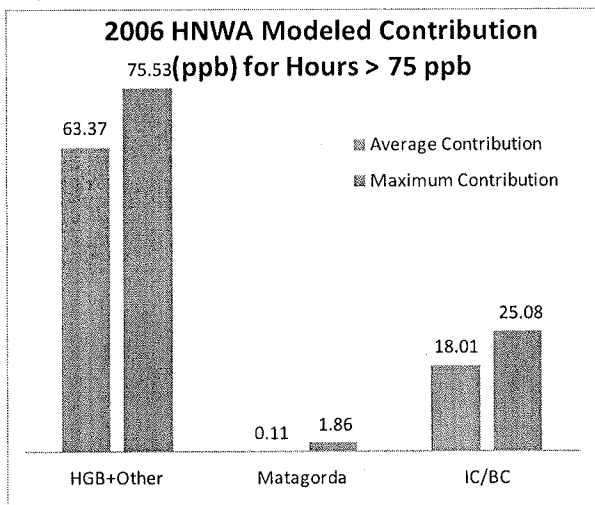
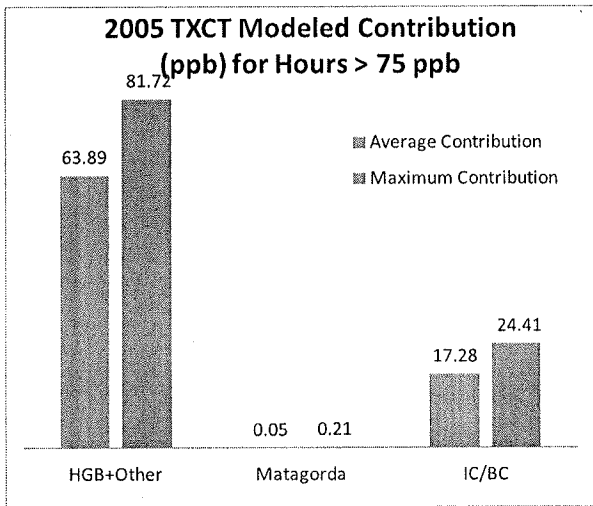


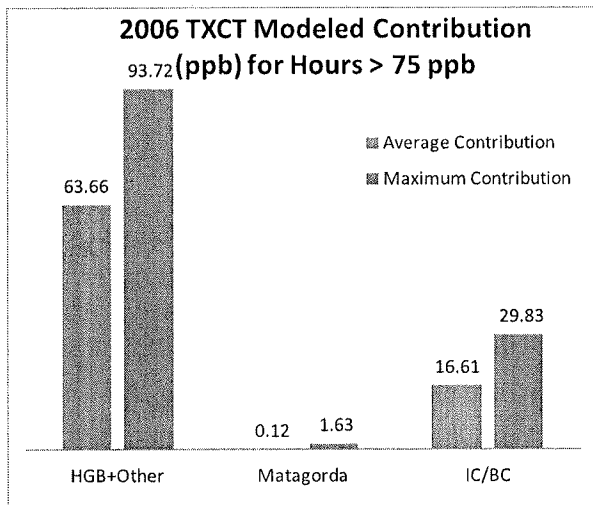
Figure 30: 2005 and 2006 Modeled Ozone Contributions at Northwest Harris County



**Figure 31: 2005 Modeled Ozone Contributions at Texas City**



**Figure 32: 2006 Modeled Ozone Contributions at Texas City**



Using the APCA results, contributions from Matagorda County to the 2018 future design values at the Manvel Croix, Northwest Harris County, Texas City, and Wallisville ozone monitors were calculated as shown in Table 4. The fractions of the relative response factors from Matagorda County were multiplied against the observed baseline design value to determine the contribution. As with the 2010 AD HGB SIP Revision, this methodology followed the EPA modeling guidance for calculating a future design value.

**Table 4: Modeled Ozone Contributions to the 2018 Future Design Value**

<b>Source Region</b>	<b>Manvel Croix</b>	<b>Wallisville</b>	<b>NW Harris County</b>	<b>Texas City</b>
<b>Matagorda County</b>	0.07%	0.23%	0.09%	0.06%
<b>HGB+Other</b>	79.04%	80.51%	79.41%	81.24%
<b>IC/BC</b>	20.88%	19.26%	20.50%	18.70%
<b>APCA DV<sub>F</sub></b>	100.00%	100.00%	100.00%	100.00%

Note: The APCA DV<sub>F</sub> total may not equal the sum of the source region contributions due to rounding.

As with the APCA results shown in Figures 25 through 32, the contributions from Matagorda County to the 2018 design values are very small. Of the ozone monitoring sites evaluated, the Wallisville ozone monitor receives the largest contribution of ozone from Matagorda County emissions, although even it is exceedingly small (0.20 ppb). All of the contributions of ozone from Matagorda County emissions at these modeled monitoring sites are significantly less than 1 ppb, which indicates the majority of the 2018 design value comes from the non-Matagorda County areas of the modeling domain. Based on these results, the likelihood of ozone and ozone precursors from Matagorda County significantly impacting the HGB ozone design values is too small to warrant including Matagorda County in the HGB nonattainment area.