

APPENDIX L
MAINTENANCE FOR GROWTH

Appendix L

Table of Contents	Page
Introduction.....	L-6
Emissions Trend Analysis.....	L-6
Data Compiled for Analysis.....	L-6
Data Variation between Emission Inventories.....	L-7
Non Road Sources.....	L-7
Agriculture Equipment.....	L-7
Recreational Boating.....	L-7
Residential Equipment.....	L-7
Airport/Military Sources.....	L-7
Brooks Air Force Base.....	L-7
Camp Bullis and Fort Sam Houston.....	L-7
Lackland AFB and Randolph AFB.....	L-8
Small Airports.....	L-8
New Braunfels Municipal and St. Geronimo Airport.....	L-8
Area Sources.....	L-8
Asphalt Paving.....	L-8
Agriculture Fertilizer.....	L-8
Biogenic Sources.....	L-8
Forecasting Methodologies.....	L-9
Non-Road Emissions.....	L-9
Locomotives.....	L-9
Non-Road Equipment Usage at Toyota.....	L-10
Tier 3 Non-Road Equipment.....	L-12
Airport/Military Emissions.....	L-12
Area Source Emissions.....	L-13
Projecting Emissions with the EGAS Model.....	L-13
Control Measures in 2007 and 2012.....	L-14
Degreasing Emissions.....	L-14
On-Board Refueling Vapor Recovery (ORVR).....	L-15
Stage I Vapor Recovery Systems.....	L-16
Regulation V Rules Affecting Area Source.....	L-20
Emissions Projection with Population Estimates.....	L-20
Rate of Progress Control Factors.....	L-20
Biogenic Source Emissions.....	L-22
Point Source Emissions.....	L-22
Tessman Road Landfill Gas Power Station.....	L-22
Guadalupe County Power Plants.....	L-23
Toyota Manufacturing Plant.....	L-23
Electric Generating Units (EGU) and Non-electric Generating Units (NEGU).....	L-24
City Public Service.....	L-24

Appendix L

Table of Contents (cont'd)	Page
Legislative Actions.....	L-24
Senate Bill 7.....	L-25
Senate Bill 766.....	L-25
On Road Source Emissions.....	L-25
Trend Analysis.....	L-25
Conclusion.....	L-26
Area Sources.....	L-27
Point Sources.....	L-27
On Road Sources.....	L-27
Non Road Sources.....	L-27

Appendix L

List of Tables	Page
Table L-1	EPA Emission Factors Used in Calculating Locomotive Emissions L-10
Table L-2.	Locomotive Emissions 1999, 2007, and 2012 in the San Antonio EAC Region L-10
Table L-3	2007 Ton per Day Toyota Plant Non Road Emissions, Bexar County..... L-11
Table L-4	2012 Ton per Day Toyota Plant Non Road Emissions, Bexar County..... L-12
Table L-5	Airport/Military Emissions for the San Antonio EAC Region..... L-13
Table L-6	Degreasing Emissions with and without Chapter 106 Reductions L-15
Table L-7	2007 ORVR Reductions for the SAER by Modeling Episode Days..... L-16
Table L-8	Comparison of Average Weekday VOC tons/day Emissions From Vehicle Refueling (SCC 2501060100)..... L-16
Table L-9	2007 Emissions from Tanker Unloading in San Antonio EAC Region..... L-18
Table L-10	2012 Emissions from Tanker Unloading in San Antonio EAC Region..... L-19
Table L-11	Emission Reduction Due to Stage I Implementation in the 95-County Region..... L-19
Table L-12	Stage I Emission Reductions (>125,000 gal/mo) for the SAER Counties, 2007..... L-20
Table L-13	Stage I Emission Reductions (>125,000 gal/mo) for the SAER Counties, 2012..... L-20
Table L-14	Rate of Progress Control Factors..... L-21
Table L-15	2007 Bexar County Area Source Emissions impacted by ROP... L-21
Table L-16	2007 & 2012 ROP Emission Reductions..... L-22
Table L-17	Biogenic Emissions for the San Antonio EAC Region..... L-22
Table L-18	Projected 2012 Emissions for the Natural Gas Power Plant in Guadalupe County..... L-23
Table L-19	Point Source Emissions from Toyota Plant, Bexar County, 2007 & 2012..... L-23
Table L-20	Non-CPS EGU and NEGU Emissions for 2007 and 2012..... L-24
Table L-21	Projected CPS Emissions from 2007 to 2012..... L-24
Table L-22	Historic Anthropogenic Emission Trend within the San Antonio Early Action Compact Region L-29

Appendix L

List of Figures	Page
Figure L-1 Stage I Vapor Recovery System.....	L-17
Figure L-2 Dual Point Top Filling System.....	L-17
Figure L-3 Dual Point Bottom Filling System.....	L-18
Figure L-4 Coaxial System.....	L-18
Figure L-5 Trend Line Analysis of VOC and NO _x Emissions in the SAER, 1996, 1999, 2007, 2012.....	L-26

INTRODUCTION

Due to the rapid economic growth and expansion of residential areas that San Antonio area is experiencing, updates of emission sources must be considered and their impacts on regional air quality must be determined. As motorists from new residential areas commute to new businesses, new travel patterns emerge. The Early Action Compact mandates that the impacts of new travel patterns as well as new emission sources be continually measured to insure the region's maintenance of the 8-hour NAAQS beyond the 2007 attainment date. Therefore, emissions were projected to 2012 to demonstrate the San Antonio EAC Region's (SAER) maintenance of the 8-hour NAAQS five years beyond the 2007 attainment date.

Emission projections were done in accordance with EPA guidance and by utilizing various models. A vast array of data was put into different models to project the expected conditions, such as growth of population, distribution of residential areas, and increased numbers of vehicles and equipment.

One of the deliverables required under the Early Action Compact protocol is an analysis of emissions inventory trends. Specifically, the protocol states "emissions inventories will be compared and analyzed for trends in emission sources over time." The original deliverable, an Emissions Trend Analysis utilizing National Emissions Trends (NET) Emissions Inventories (EIs), was completed and submitted to the Texas Commission on Environmental Quality and the US Environmental Protection Agency by the due date of September 30, 2003. The entirety of this earlier report is incorporated into the present appendix, and has been expanded to meet the further analysis required for a comprehensive Maintenance for Growth report, completing an analysis to 2012.

EMISSIONS TREND ANALYSIS

The preceding sections describe the methodologies and data employed in developing the trend analysis for the SAER. The descriptions will provide insight in the development of the 1999, 2007, and 2012 EIs.

Data Compiled for Analysis

Data from NET emissions inventories and projected NET emissions inventories were used in the development of air quality trends within the San Antonio EAC Region. Volatile organic compounds (VOC), oxides of nitrogen (NO_x), and carbon monoxide (CO) emissions are the three main pollutants that are measured in the emission inventories. These emissions are presented in the following categories: Non-road source, airport/military, area source, point source, biogenic source, and on-road source.

The inventories utilized are as follows:

- 1996 Emission Inventory for the AACOG Region
 - 1999 Emission Inventory for the AACOG Region
 - 2007 Projected Emission Inventory for the AACOG Region - Attainment Year
 - 2012 Projected Emission Inventory for the AACOG Region - 5 Yr. Past Attainment
- } Part of the NET EI

These emission inventories were developed by employing various methodologies, some of which were recommended from local, state, or federal levels. The inventories provide data on many regional pollution sources, their emissions amounts, and their emission

rates. By understanding these varied sources of ozone pollution, planners, political leaders, and concerned citizens can work together and find ways to better manage them. Thus, the emission inventory, as a means of record keeping, proves to be an important tool for the air quality planning and management process.

AACOG had compiled a 1994 Emissions Inventory, which is not incorporated in the trend analysis and deemed unusable for comparison purposes. One reason involves the differences in the methodologies used to calculate emissions. Also, some emissions were categorized differently in the 1994 EI.

Data Variation between Emission Inventories

The 1996 and 1999 emissions inventories were developed and produced by AACOG staff. When developing the 1999 EI, several sources were re-categorized and/or expanded in an effort to express emissions more clearly as compared to the 1996 EI. In addition, some methodologies were improved or replaced to produce more accurate results. The following categories underwent changes from the 1996 EI to the 1999 EI.

Non-Road Sources

The differences between each subcategory in the 1996 and 1999 EI's are described in greater detail in the following paragraphs.

Agricultural Equipment

Different from the 1996 Emission Inventory, agricultural equipment types were subdivided into 2 groups for the 1999 EI: tractors and combines. A number of new small polluters were added also, including: sprayers, hydro-power units, balers, agricultural mowers, tillers, swatters, other agricultural equipment, and irrigation sets. These new polluters were subdivided according to their fuel and engine type: 2-stroke, 4-stroke, LPG, CNG, and diesel.

Recreational Boating

The methodology, which had caused unrealistic results in the 1996 EI, was updated for 1999 by using the non-road model in place of population data. The 1999 methodology was based on the EPA's non-road emissions inventory model.

Residential Equipment

This category was renamed as the "Lawn & Garden Equipment" and was divided into "Residential" and "Commercial" categories in the 1999 EI to provide more detailed emission data. In the 1996 EI, the residential and commercial use were not identified separately, rather they were combined into the total emission estimates.

Airport/Military Sources

Several alterations were done to the methodology of calculating airport and military emissions for the 1999 EI as compared to the 1996 EI.

Small Airports

The airport category was added to various counties for small airports. This includes the Horizon Airport and Twin Oaks Airport were new additions for Bexar County in the 1999 EI, accounting for 0.0024 tons/day VOC and 0.0004 tons/day NOx. Also, The New Braunfels Municipal Airport and San Geronimo Airport were added to Guadalupe County in the 1999 EI, accounting for .0086 tons/day VOC and .0014 tons/day NOx.

Brooks AFB

Several categories were added in regards to the “area source” emissions within Brooks AFB. These categories included: aboveground storage tanks, degreasing and solvent cleaning, surface coating, and underground storage tanks. Mobile source emissions were added to non-road emissions.

Lackland AFB and Randolph AFB

Many emission categories were removed from the 1996 EI while new categories were added to the 1999 EI. This reorganization did not significantly affect the amount of emissions for these bases.

Area Sources

There were minimal changes to the methodologies used for calculating area source emissions totals.

Asphalt Paving

The 1996 EI only accounted for one type of asphalt, cutback asphalt, for the AACOG region. The 1999 EI contained emission estimates for emulsified and cutback asphalt. Two methods were used for calculations of emissions for the 1999 EI. One formula multiplied the density of the used asphalt with the diluent volume percentage and the cure rate. The other method of calculation involved the multiplication of a volume based emission factor (lbs VOC/barrel of asphalt) to calculate emissions. The emission factor varied depending on whether the asphalt was cutback or emulsified.

Agricultural Fertilizer

The methodology for the 1999 EI differed than the methodology employed in the 1996 EI. In the 1999 EI, updated formulas were utilized to account for side-planting and side-dressing application of fertilizer. Ozone season duration was adjusted to include April and October (from 154 days/year in 1996, to 214 days/year in 1999).

Biogenic Sources

In the 1996 EI, PCBeis version 2.3 model was run by the AACOG staff to obtain biogenic emission total, however, this method did not produce estimations for NO_x emissions. In the development of the 1999 EI, AACOG utilized emissions totals developed by The University of Texas in Austin (UT), which was generated with the GloBeis, version 2.2, model. The 1999 Emissions Inventory had both VOC and NO_x emissions totals from biogenic source.

The base case used in projections of 2007 and 2012 emission data came from the 1999 Emissions Inventory, which is the most recent emission inventory. Several different methods were employed in the development of these two projections and are described in the following sections.

FORECASTING METHODOLOGIES

The 2007 projection was developed to produce the 2007 EI, which is described in detail in Appendix F, Future Year Modeling Emission Inventory Development. The 2007 emissions were projected using EPA approved methodologies and are described under their respective categories below. The methodologies for the forecast of 2012 emission sources are the same as methods employed for projecting 2007 emission estimates with some exceptions.

For the 2012 projections, various federal, state, and local regulatory measures are expected to be fully implemented, whereas for the 2007 projections, some strategies were considered to be in the beginning and middle stages of implementation and did not have a substantial effect on emissions. Also, additional sources may have come into existence after 2007. These exceptions have been taken into account when estimating future emissions.

The population figures used to estimate some emission categories in 2012 were developed using a straight-line extrapolation from 2010 and 2020 population forecasts obtained from the Texas Water Development Board (TWDB) report, "Population Projections by County for 2000-2050" (TWDB, 2000).

Non Road Emissions

The 2007 and 2012 projected non-road emissions were developed using the EPA's NONROAD 2000 model. Federal programs including: Standards for Compression-ignition Vehicles and Equipment, Standards for Spark-ignition Off-road Vehicles and Equipment, Tier III Heavy-duty Diesel Equipment, Locomotive Standards, Recreational Marine Standards, and Lawn and Garden Equipment were accounted for. Detailed descriptions of these federally mandated programs are in Appendix F - 2007 Emission Inventory Development. The non-road emissions totals were calculated by using the following equation:

$$\frac{\text{Base Case Year Non Road Model Emissions}}{\text{Projection Year Non Road Model Emissions}} = \frac{\text{Base Case Emission Inventory}}{\text{Projection Year Emission Inventory}}$$

Several sources had other methodology for calculating emissions because factors are not available in the NONROAD model. In the non-road category, locomotives were calculated to reflect a larger population of engines that were compliant with Tier 2 and 3 standards in 2007 and 2012. Also, equipment populations were increased to account for additional equipment used at the Toyota Manufacturing Plant during Phase I operations in 2007. Phase II operations are expected to double the size of the plant in 2009. The non-road equipment emissions from the Toyota Plant were doubled to account for Phase I and II operations in 2012. Some of the diesel engines in non-road equipment will be Tier 3 compliant in 2007 and majority of diesel engines in 2012 are expected to be of Tier 3. These details are explained below.

Locomotives

The Environmental Protection Agency established emission standards for locomotive engines applied by the date of manufacture. (USEPA, 1997) Since locomotive engines manufactured in 2005 are subjected to Tier 2 standards, the locomotive population in 2007 will consist of new and older engines. For the 2012 emission projection, locomotive emissions were calculated to reflect full Tier 2 implementation since the majority of locomotives are expected to have the newer engines adhering to the EPA requirement.

To calculate the projected locomotive emissions for 2007 and 2012, the 1999 base case emissions were multiplied by an emission factor that takes into account the stringent controls. Based on a reduction factor provided by the EPA, 2007 Hydrocarbons (HC)¹

¹ HC emissions can be converted to VOC emissions by multiplying by 1.05

emissions are projected nearly 10% less than emissions in 1999. HC emissions in 2012 are calculated to be 17% less than 1999. NOx emissions in 2007 are projected to be approximately 36% less than 1999 NOx emissions. NOx emissions in 2012 are expected to be 43% less than the 1999 locomotive emissions.

Table L-1 lists the emission reductions used to calculate the new locomotive emissions with the implementation of Tier 2. Table L-2 details the locomotive emissions in 1999, 2007, and 2012.

Table L-1. EPA Emission Factors Used in Calculating Locomotive Emissions

Year	HC		CO		NOx	
	g/bhp-hr	% reduction	G/bhp-hr	% reduction	g/bhp-hr	% reduction
1999	0.52	0.0	1.32	0.0	13.3	0.0
2007	0.47	9.6	1.32	0.0	8.51	36.0
2012	0.43	17.3	1.32	0.0	7.62	42.7

Table L-2. Locomotive Emissions 1999, 2007, and 2012 in the San Antonio EAC Region

County	1999		2007		2012	
	VOC	NOx	VOC	NOx	VOC	NOx
Bexar	0.13	2.99	0.12	1.91	0.11	1.71
Comal	0.04	0.82	0.03	0.53	0.03	0.47
Guadalupe	0.10	2.26	0.09	1.44	0.08	1.29
Wilson	0.00	0.00	0.00	0.00	0.00	0.00

Non-Road Equipment Usage at Toyota

Aside from the emissions emitted by the new Toyota plant, emissions will also be produced by non-road equipment usage at the plant. Table L-3 provides the projected emissions of the different equipment types that will be used as part of the manufacturing plant's operations in 2007 and table L-4 lists the 2012 emission estimates. These equipment emissions are based on 2,000 employees for Phase 1 in 2007 and 4,000 employees for Phase 2. A further description of the methodology to calculate these emissions is provided in Appendix F: 2007 EI Develop.

Table L-3. 2007 Ton per Day Toyota Plant Non Road Emissions, Bexar County

SCC*	Equipment Description	Est. Equip. Pop.	VOC (t/d)	NOx (t/d)
2265003020	2-str Sweepers/Scrubbers	0.4	0.000017	0.000001
2267003020	4-str Aerial Lifts	4	0.000822	0.000315
2268003020	4-str Forklifts	2.3	0.002539	0.001134
2265003010	4-str Other General Ind. Equip.	9.8	0.001020	0.000203
2267003010	4-str Other Material Handling Equip.	0.2	0.000065	0.000025
2270003020	4-str Sweepers/Scrubbers	2.3	0.000599	0.000237
2270003010	4-str Terminal Tractors	0.7	0.000301	0.000135
2267003070	CNG Forklifts	4.6	0.000008	0.005978
2260003040	CNG Other General Ind. Equip.	0	0.000000	0.000000
2268003070	CNG Sweepers/Scrubbers	0	0.000000	0.000000
2265003040	CNG Terminal Tractors	0	0.000000	0.000000
2267003040	Dsl Aerial Lifts	4.1	0.000239	0.001159
2268003040	Dsl Forklifts	12.7	0.001344	0.013099
2265003050	Dsl Other General Ind. Equip.	8.3	0.000618	0.007399
2267003050	Dsl Other Material Handling Equip.	0.6	0.000072	0.000431
2270003040	Dsl Sweepers/Scrubbers	4.2	0.000826	0.006187
2265003030	LPG Forklifts	39.6	0.000001	0.001034
2260003030	LPG Aerial Lifts	2.1	0.000107	0.083179
2268003030	LPG Other General Ind. Equip.	0.2	0.000000	0.00022
2270003030	LPG Other Material Handling Equip.	0.1	0.000000	0.000055
2267003030	LPG Sweepers/Scrubbers	0.7	0.000001	0.00074
2265003070	LPG Terminal Tractors	0.1	0.000001	0.000466
TOTAL		97	0.008580	0.121997

* Source Classification Code

Table L-4. 2012 Ton per Day Toyota Plant Non Road Emissions, Bexar County

SCC*	Equipment Description	Est. Equip. Pop.	VOC (t/d)	NOx (t/d)
2265003020	4-Str Forklifts	4.6	0.005078	0.002268
2267003020	LPG – Forklifts	79.2	0.000214	0.166358
2268003020	CNG – Forklifts	9.2	0.000016	0.005978
2270003020	Dsl – Forklifts	25.4	0.002688	0.026198
2265003010	4-Str Aerial Lifts	8.0	0.001644	0.000630
2267003010	LPG- Aerial Lifts	4.2	0.000002	0.002068
2270003010	Dsl – Aerial Lifts	8.2	0.000478	0.002318
2260003030	2-Str Sweepers/Scrubbers	0.8	0.000034	0.000002
2265003030	4-Str Sweepers/Scrubbers	4.6	0.001198	0.000474
2267003030	LPG- Sweepers/Scrubbers	1.4	0.000002	0.001480
2268003030	CNG- Sweepers/Scrubbers	0.0	0.000000	0.000000
2270003030	Dsl – Sweepers/Scrubbers	8.4	0.001652	0.012374
2265003070	4-Str Terminal Tractors	1.4	0.000602	0.000270
2267003070	LPG- Terminal Tractors	0.2	0.000002	0.000932
2268003070	CNG- Terminal Tractors	0.0	0.000000	0.000000
2260003040	2-Str Other General Industrial Eqp	0.0	0.000000	0.000000
2265003040	4-Str Other General Industrial Eqp	19.6	0.002040	0.000406
2267003040	LPG- Other General Industrial Eqp	0.4	0.000000	0.000440
2268003040	CNG- Other General Industrial Eqp	0.0	0.000000	0.000000
2270003040	Dsl – Other General Industrial Eqp	16.6	0.001236	0.014798
2265003050	4-Str Other Material Handling Eqp	0.4	0.000130	0.000025
2267003050	LPG- Other Material Handling Eqp	0.2	0.000000	0.000110
2270003050	Dsl – Other Material Handling Eqp	1.2	0.000144	0.000862
TOTAL	-	194	0.017160	0.243998

*Source Classification Code

Tier 3 Non- Road Equipment

Beginning in the year 2006, Tier 3 standards will start to be phased in for new non-road diesel equipment of 50 horsepower or greater. By 2008, it is required that all new equipment will be Tier 3 compliant. (USEPA, 1998) The non-road equipment in 2007 will reflect phasing in of Tier 3 standards while the non-road equipment in 2012 will have full implementation of Tier 3 standards. These reductions are accounted for when the projections are being developed in the NONROAD model.

Airport/Military Emissions

Airport and military emission data cannot be projected due to the uncertainty of future of airport and military bases in the region. Political influence or unusual circumstances, such as wartime situation, may increase emissions levels. In times of peace or poor economy, the military may cut back causing a decrease in emissions. Thus, emissions for this category will remain the same for 2012 as those in 1999. Also, improvements in equipment standards are expected to reduce emissions. Table L-5 details the airport/military emissions. For projection purposes, these emissions were incorporated into the non-road category when developing the non-road 2007 and 2012 projections.

Table L-5. Airport/Military Emissions for the San Antonio EAC Region

County	1996		1999		2007		2012	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
Bexar	2.7	6.8	3.0	9.9	3.0	9.9	3.0	9.9
Comal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Guadalupe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wilson	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2.7	6.8	3.0	9.9	3.0	9.9	3.0	9.9

Construction could occur at the San Antonio International Airport involving the tearing down of one terminal and the construction of two new terminals. The emissions from this activity is not expected to be more than 150% of the current airport emissions, which is 0.6 tons per day of VOC and 1.8 tons of NOx per day. It is important to note that the emissions generated will not put the SAER over its emission budget since they will not be significant. The possibility also exists that the construction may not take place for security purposes and public concerns for terrorist activity. Airport equipment would most likely be subject to emission controls in the future, therefore airport emissions most likely be reduced even if an additional terminal is constructed.

Area Source Emissions

The 2007 and 2012 area source categories were projected using two different methodologies. For some categories, the Economic Growth Analysis System (E-GAS) 4.0 was used to project the area source emission to 2007 and 2012. For the categories that are based on population emissions factors, growth in population was used. The U.S. Environmental Protection Agency endorses the use of E-GAS when emission source growth estimates are not available by facility survey or other local source. E-GAS generates surrogate growth indicators via a three-tiered modeling system. The first tier includes available national economic forecasts that are used to drive the regional economic models of the second tier. The third tier estimates fuel consumption, physical output, and VMT based on the second tier's regional economic forecasts. (Pechan, 2001)

Projecting Emissions with the EGAS Model

The Economic Growth Analysis System (EGAS) was developed by the EPA to provide "credible growth factors" for projecting future emissions. (Pechan, 2001) The following sections will describe the methodology employed to develop the emission estimates as well as any state or federal regulation that would be applicable to the source category.

EGAS Version 4.0 was used to obtain growth factors for some area sources by Source Classification Codes (SCCs). These growth factors are ratios of the projection years' (2012) activity level to the 1996 activity level; 1996 being the base case. (Pechan, 2001)

Data selected to run EGAS Version 4.0:
 W5 Attainment portion of Texas: 12 AACOG counties

Years desired for growth factors: 1999 & 2012
 Output Format: SCC form

Output files from EGAS Version 4.0:

- Ind_fuel.scc: SCCs 2102004000 - 2102007000
- Com_fuel.scc: SCCs 2103004000 - 2103007000
- Res_fuel.scc: SCCs 2104001000 - 2104008001
- Other.scc: SCCs 2810001000 - 2810015000
- Phy.scc: Contains all other Area Sources not listed above

The EGAS model outputs three emission growth factors.

To figure out the emissions for the projection year, the output growth factor for that year is multiplied by the emission for 1996. For example, if the output growth factor for 2012 is 1.2323 for SCC xxxxxxxxxx, and the VOC emission in 1996 was 2.0000 tons/yr. for SCC xxxxxxxxxx, then the projected 2012 VOC emission for that SCC equals 2.4646 tons/yr.

$$\begin{array}{rclcl}
 \text{2012 VOC} & & & & \\
 \text{Emissions} & = & 1.2323 & \times & 2.0000 \text{ tons/yr.} \\
 \text{(tons/yr.)} & & \text{(EGAS Growth} & & \text{(1996 Emissions)} \\
 & & \text{Factor for 2012)} & & \\
 \\
 = & & 2.4646 \text{ tons/yr.} & &
 \end{array}$$

However, the 1999 AACOG NET EI was the most recent inventory and, thus, was used as the base case in the development of the 2012 EI for AACOG. The 2012 growth factors were adjusted based on the factor for 1996 (which is always 1.0000), 1999, and 2012 to reflect 1999 as the base Emission Inventory. Therefore, the 2012 projected emissions were figured as follows:

$$\begin{array}{rclcl}
 \text{2012 VOC} & & & & \\
 \text{Emissions} & = & y.yyyy \text{ (Adjusted} & \times & z.zzzz \text{ tons/yr.} \\
 \text{(tons/yr.)} & & \text{EGAS} & & \text{(1999 Emissions)} \\
 & & \text{Growth Factor 1999} & & \\
 & & \text{to 2012)} & &
 \end{array}$$

Control Measures in 2007 and 2012

Some emission sources within the area source category required additional calculations to account for federal and /or state regulations that would reduce VOC and/or NOx emissions. The following sections describe the emission source and its regulation.

Degreasing Emissions

The 1999 base case and its 2007 projection did account for emission reductions from degreasing units due to TAC Chapter 106. Chapter 106 affects degreasing units throughout Texas as specified in Control of Air Pollution From Volatile Organic Compounds §115.412-415. These reductions were applied to the growth of emissions between 1999 to 2007 and 1999 to 2012. Chapter 115 requires a 85% reduction of VOC emissions. Therefore, the difference in emissions from 1999 to 2007 and 1999 to 2012 are reduced by 85% and then subtracted from the original 2007 and 2012 emissions. Table L-6 lists the degreasing emissions before and after Chapter 106 was accounted for.

Table L-6. Degreasing Emissions with and without Chapter 106 Reductions

County	2007 VOC (ton/day)		2012 VOC (ton/day)	
	w/o Ch.106	w/ Ch. 106	w/o Ch.106	w/ Ch. 106
Bexar	14.027	9.745	16.468	10.111
Comal	0.849	0.590	0.997	0.612
Guadalupe	0.014	0.010	0.016	0.010
Wilson	0.200	0.139	0.235	0.144

On-Board Refueling Vapor Recovery (ORVR)

The concept of ORVR requires a system within an automobile that captures vapors that accumulate in the fuel tank, as well as fuel vapors generated during refueling. ORVR system is installed on the vehicle ("onboard") as compared to external methods (known as Stage II vapor recovery) and efficiently collects the vapors before they can escape into the atmosphere. Current ORVR technologies generally consist of Activated Carbon Canisters (ACC) which absorb the hydrocarbons (HCs) contained in the vapors forced out of the vehicle while refueling is occurring.

In the past, vapor recovery systems that addressed this problem have been termed Stage II vapor recovery systems, with Balance and Vacuum Assist being the major forms of Stage II systems. With the introduction of ORVR, the vapors do not leave the internal system of the vehicle. Starting in 2000, all 2000 and later model vehicles will have ORVR systems. Light duty trucks will have ORVR phased in over a six-year period, beginning with 2001 models. The EPA expects ORVR vehicles to be in wide spread use by 2010. Thus, emission benefits from this control would be increasingly evident in 2012 than in 2007. (USEPA, 2003) The schedule for implementation of ORVR is:

- Automobiles: 40% of 1998, 80% of 1999, and 100% of 2000 and beyond models will be equipped with ORVR.
- "Light Duty Trucks" and similar vehicles: 40% of 2001, 80% of 2002, and 100% of 2003 and beyond models will be equipped with ORVR.
- "Medium Duty Trucks" and similar vehicles: 40% of 2004, 80% of 2005, and 100% of 2006 and beyond models will be equipped with ORVR.
- Heavy Duty Trucks and other Vehicles: At this time, it is not required in these vehicles (Synergetic, 2004)

To estimate the effect of ORVR, the NO CLEAN AIR ACT command was used in the MOBILE6 command file to model vehicle emissions as if the Federal Clean Air Act Amendments of 1990 had not been implemented. The MOBILE6 by default assumes that the Clean Air Act (CAA) Amendments of 1990 did occur and includes a number of vehicle and fuel requirements mandated by the 1990 Clean Air Act Amendments in its forecasts and analyses of future year. These include Tier1, low emissions vehicle (LEV),

and Tier2 tailpipe exhaust emission standards, and new evaporative emission test procedure requirements.

For the study of effects of the absence of CAA, we ran two 2007 base year with and without the effects of CAA and calculated the differences in the amounts of VOC for 4 counties in the SAER and for each days of the week. The amounts of VOC for 2007 for each modeled day and for each county in our study area were higher by approximately 60% when the CAA requirements in MOBIE6 were disabled. This reduction percentage was reflected in the emission inventory to account for the presence of the effects of CAA in the year 2007. The reductions were applied to the Vehicle Refueling category (SCC 2501060100).

The following table lists the reduction/adjustment values for VOC emissions for each county in San Antonio region.

Table L-7. 2007 ORVR Reductions for the SAER by Modeling Episode Days

Episode Day	Bexar		Comal		Guadalupe		Wilson	
	Percent Reduction	Tons per Day						
Sept. 13	62.3%	7.26	62.7%	0.39	60.3%	0.41	59.7%	0.15
Sept. 14	62.3%	7.26	62.7%	0.39	60.3%	0.41	59.7%	0.15
Sept. 15	62.3%	7.26	62.7%	0.39	60.3%	0.41	59.7%	0.15
Sept. 16	62.3%	7.26	62.7%	0.39	60.3%	0.41	59.7%	0.15
Sept. 17	63.7%	7.42	63.5%	0.39	61.5%	0.42	60.7%	0.15
Sept. 18	64.3%	4.80	64.4%	0.26	62.0%	0.27	61.6%	0.10
Sept. 19	64.0%	2.43	63.7%	0.13	61.4%	0.14	61.1%	0.05
Sept. 20	62.3%	7.26	62.7%	0.39	60.3%	0.41	59.7%	0.15

The table below details the emission reductions predicted for 2007 and 2012. As listed in the table, an emission reduction of approximately 50% for each county in the San Antonio EAC region is anticipated between 2007 and 2012. (USEPA, 2004)

Table L-8. Comparison of Average Weekday VOC tons/day Emissions from Vehicle Refueling (SCC 2501060100)

County	2007	2012	Difference
Bexar	4.36	2.13	48.7%
Comal	0.23	0.12	48.2%
Guadalupe	0.27	0.13	49.5%
Wilson	0.10	0.05	48.8%

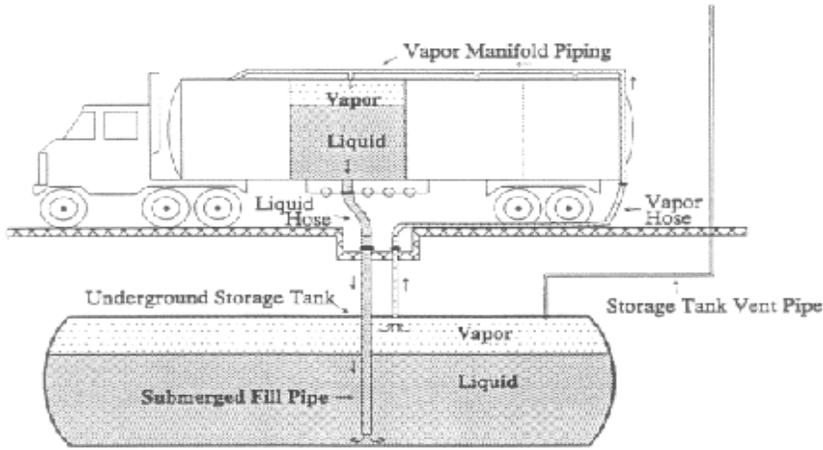
Stage I Vapor Recovery Systems

As a tank of volatile fuel such as gasoline is gradually emptied, the empty space will be occupied by vapors of the fuel, or by a mixture of air and vapors, if an inlet air vent is provided. When a tanker truck delivers fuel to a gas station, the new fuel entering the underground tank forces accumulated gasoline vapors out of the tank into the air.

Stage I vapor recovery systems are designed to control the escape of these vapors, and can achieve a 98% reduction in hydrocarbon emissions once they are put into use. The vapors are captured by a vapor return hose, which is connected to the storage tank and

the gasoline delivery truck. Once captured, the vapors are stored in a vapor cargo department in the gasoline delivery trucks and transported to the refinery for recovery or incineration. Figure L-1 illustrates a typical stage one recovery system.

Figure L-1. Stage I Vapor Recovery System



(A) Loading of Service Station Underground Storage Tank With Vapor Balance System (Stage I Controls).

There are two types of Stage I vapor recovery systems, the dual point system and the coaxial system. The dual point system has two parts, a drop tube and a vapor recovery tube equipped with a spring-loaded valve. The valve prevents vapors from escaping. Dual point systems also consist of two separate tank openings, one for delivery of the product and the other for the release of vapors. The following figures illustrate a top filling dual point system, and a bottom filling dual point system.

Figure L-2. Dual Point Top Filling System

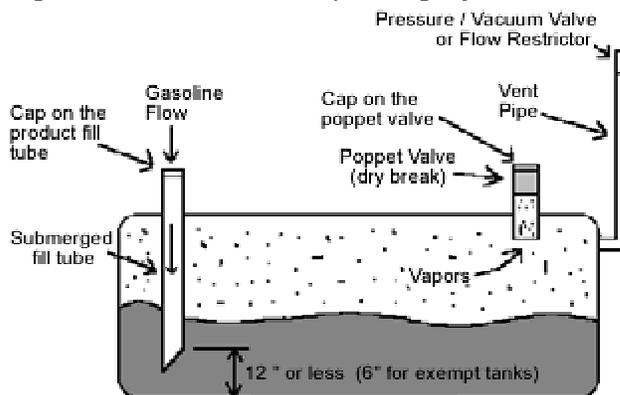
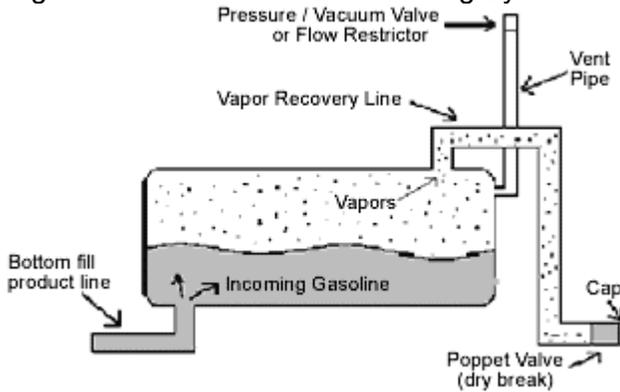
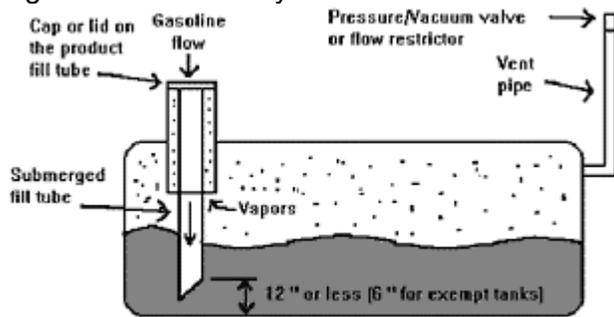


Figure L-3. Dual Point Bottom Filling System



The coaxial system is comprised of a tube within a tube. A coaxial spring allows the drop tube to depress during the filling of the tank and then retract upon disconnection of the fill hose to create a tight seal. This tight seal prevents vapors from escaping. The coaxial system only has one tank opening. The opening usually has a four-inch diameter product fill tube inserted into the tank opening. Gasoline flows through the inner tube and the vapors are displaced through the space in between the inner and outer tubes. The following figure provides an illustration of the coaxial system.

Figure L-4. Coaxial System



Coaxial tubes installed after June 30, 1994, need to be popped.

Currently, Stage I systems are required in the San Antonio EAC Region for facilities that dispense 125,000 or more gallons/month of gasoline are required by Control of Air Pollution From Volatile Organic Compounds §115.229. The effectiveness of the Stage I vapor recovery system strategy was approximated by calculating the current release of hydrocarbon emissions due to tank unloading for the San Antonio EAC Region. These emissions would be eliminated if all of the gasoline stations in the region were required to have Stage I vapor recovery system. Table L-9 lists the 2007 emissions and table L-10 lists the 2012 emissions from the tanker unloading category in the SAER counties.

Table L-9. 2007 Emissions from Tanker Unloading in San Antonio EAC Region (AACOG, 2001)

County	VOC tons/day
Bexar	8.81
Comal	0.47
Guadalupe	0.52
Wilson	0.19
Total SA MSA	9.99

Table L-10. 2012 Emissions from Tanker Unloading in San Antonio EAC Region

County	VOC tons/day
Bexar	9.08
Comal	0.48
Guadalupe	0.53
Wilson	0.19
Total SA MSA	10.28

The effectiveness of the Stage I vapor recovery system strategy was measured by calculating the current release of hydrocarbon emissions due to tanker truck unloading for the San Antonio EAC Region. Of the 9.99 tons/day for 2007 and the 10.28 tons/day VOC emissions presented in tables L-8 and L-9 respectively, seventy percent of those emissions totals was included in the 2007 and 2012 EIs. This adjustment was performed based on data analysis in a TCEQ study for 95 counties east of I-35 (TCEQ 1999). The results of this study are displayed in table L-11.

Table L-11. Emission Reduction Due to Stage I Implementation in the 95-county Region

Gasoline Throughput Gallons/Month	Number of Gas Stations	% of Total Stations	VOC Reductions Tons/Year	% of Total VOC Reductions
Less than 10,000	1,607	18.6	0	0.0
10,000 – 25,000	2,436	28.3	1,210	11.8
25,000 – 50,000	2,287	26.5	2,480	24.1
50,000 – 125,000	1,599	18.6	3,510	34.1
Greater than 125,000	691	8.0	3,090	30.0
Total	8,620	100.0	10,290	100.0

Source: Texas Commission on Environmental Quality, (TCEQ 1999)

As displayed in tables L-12 and L-13, use of Stage I technology by facilities that have 125,000+ gallons per month throughput can reduce VOC emissions by 30%. Removing this amount of reduction from the total projected amount of VOC emissions in the SAER from tanker truck unloading results in reducing the 2007 projected emissions to 7.0 tons per day and 2012 projected estimates to 7.19 tons per day.

The following table indicates the exact reduction/adjustment values for VOC emissions for each county in San Antonio region.

Table L-12. Stage I Emission Reductions (>125,000 gal) for the SAER Counties, 2007

County	Percent Reduction	Tons per Day Reduction
Bexar	30%	2.64
Comal	30%	0.14
Guadalupe	30%	0.15
Wilson	30%	0.06
Total	-	2.99

Table L-13. Stage I Emission Reductions (>125,000 gal) for the SAER Counties, 2012

County	Percent Reduction	Tons per Day Reduction
Bexar	30%	2.72
Comal	30%	0.14
Guadalupe	30%	0.16
Wilson	30%	0.06
Total	-	3.08

Regulation V Rules Affecting Area Source

The only category affected by the Regulation V Rules in the AACOG 2012 Projected Emissions Inventory is Factory Finished Wood, under the subtitle of Surface Coatings. This category has a 99% Rule Effectiveness (RE), thus emissions are reduced by 99%. This gives Factory Finished Wood, SCC 2401015000, a control factor of 0.01. (Mark, 2001)

Emissions Projections with Population Estimates

The EGAS model supplied growth factors were used to project of all area source emissions except Architectural Surface Coatings, SCC: 2401001000, and Consumer/Commercial Solvents which include:
 SCC: 2465100000 - Personal Care Products
 SCC: 2465200000 - Household Products
 SCC: 2465400000 - Automotive After-market Products
 SCC: 2440020000 - Adhesives and Sealants
 SCC: 2465600000 - FIFRA Regulated Products
 SCC: 2460520000 - Coatings and related products
 SCC: 2460900000 - Miscellaneous Products

Instead, the emissions from these emission categories were projected using population estimates. Some of the categories also had emission control factors applied to reflect future controls that would reduce product emissions, such as Rate of Progress factors for Consumer /Commercial Solvents.

Rate of Progress Control Factors

In addition to projection factors, Rate of Progress (ROP) control factors were also used on several categories, as directed by TCEQ (Environ, 2001). Table L-14 shows applicable ROP control factors for the AACOG 2007 and 2012 emission inventories. These control factors account for the amount of emission reductions due to use of improved techniques and/or implementation of new regulations.

Table L-14. Rate of Progress Control Factors

Category	SCC	Control Factor
Leaking Underground Storage Tanks	2660000000	0.0
Architectural Coatings	2401001000	0.8
Traffic Markings	2401008000	0.8
High-Performance Maintenance	2401100000	0.8
Other Specific Purpose Coatings	2401200000	0.8
All Solvent Types	2465000000	0.8
Personal Care Solvents	2465100000	0.8
Household Solvents	2465200000	0.8
TSDF's	2640000000	0.07
Automotive Aftermarket Coatings	2465400000	0.8
Adhesives & Sealants	2465600000	0.8

To forecast the amount of emission for each area source category, the emission amount for each category in 1999 EI was enlarged by the given 2007 and a 2012 projection factors. The results were then factored by the ROP factors to account for improvements in applications techniques and changes in regulations. To give a demonstration of this procedure, the following table, which is prepared for the 2007 Bexar County, is presented in this appendix. The last column in this table indicates the net amount of change between before and after application of ROP factors.

Table L-15. 2007 Bexar County Area Source Emissions impacted by ROP

Emission Inventory Category	Uncontrolled 2007 Tons/Day	Controlled 2007 Tons/Day	Reduction Tons/Day
Architectural Coatings	9.73	7.78	1.95
Traffic Markings	0.02	0.02	0.00
High-Performance Maintenance	3.14	2.51	0.63
Other Spec. Purpose Coatings	2.41	1.93	0.48
Personal Care Solvents	3.84	3.07	0.77
Household Solvents	2.54	2.03	0.51
Automotive Solvents	1.64	1.31	0.33
Leaking Underground Tanks	0.19	0.00	0.19

The above procedure was repeated for each county in the SAER region. A summary of the results of these factoring is shown in the table L-16. The values in this table are in fact the reduction amounts that are resulted after the application of ROP factors.

Table L-16. 2007 & 2012 ROP Emission Reductions

Emission Inventory Category	Bexar County		Comal County		Guadalupe County		Wilson County	
	2007	2012	2007	2012	2007	2012	2007	2012
Leaking Underground Storage Tanks	0.194	0.215	0.004	0.005	0.030	0.034	0.003	0.003
Architectural Coatings	1.946	1.916	0.109	0.122	0.120	0.122	0.045	0.043
Traffic Markings	0.004	0.004	0.001	0.001	0.001	0.002	0.000	0.000
High-Performance Maintenance	0.628	0.714	0.033	0.038	0.037	0.042	0.013	0.015
Other Specified Purpose Coatings	0.482	0.500	0.026	0.027	0.028	0.029	0.010	0.011
Personal Care Solvents	0.767	0.850	0.045	0.054	0.047	0.054	0.018	0.019
Household Solvents	0.508	0.563	0.030	0.036	0.031	0.036	0.012	0.013
Automotive Solvents	0.328	0.364	0.019	0.023	0.020	0.023	0.008	0.008
Total	4.856	5.126	0.266	0.304	0.316	0.341	0.109	0.112

Biogenic Source Emissions

Biogenic data for the 2007 and 2012 projected emission inventory remained unchanged from the 1999 base case emissions in accordance with EPA recommendations. Table L-17 details the biogenic emissions for the SAER.

Table L-17. Biogenic Emissions for the San Antonio EAC Region

County	1996		1999		2007		2012	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
Bexar	60.1	5.0	60.1	5.0	60.1	5.0	60.1	5.0
Comal	56.5	1.5	56.5	1.5	56.5	1.5	56.5	1.5
Guadalupe	83.6	7.5	83.6	7.5	83.6	7.5	83.6	7.5
Wilson	62.8	6.5	62.8	6.5	62.8	6.5	62.8	6.5
Total	263.0	20.6	263.0	20.6	263.0	20.6	263.0	20.6

Point Source Emissions

Point source emissions were gathered from a variety of sources. City Public Service (CPS) provided the 2007 and 2012 emission figures for the CPS power plants. Also accounted for were the new Tessman Road Landfill Gas Power Station, Guadalupe Power Plants, and Toyota Manufacturing plant. The emission estimates for these additional sources are detailed in the following tables.

Tessman Road Landfill Gas Power Station

The proposed Tessman Road power station is located in Bexar County near Converse, TX. The station will feature six Deutz TBG 620 V16 engines, producing electricity from

methane and other landfill gases. This plant will emit 0.179 ton of NOx and 0.049 ton of VOC in both 2007 and 2012.

Guadalupe County Power Plants

Two natural gas powered electrical generating facilities are slated for completion and operation prior to 2007. Table L-18 details the projected emissions from the point source for 2007 and 2012.

Table L-18. Projected 2007 and 2012 Emissions for the Natural Gas Power Plant in Guadalupe County

Facility ID	SIC	Stack ID	Stack Height (Meters)	Projected Emissions (tons/day)	
				NOx	VOC
Guadalupe Power Partners 1000	4911	100	39.6	0.948	0.060
		300	39.6	0.948	0.060
		400	39.6	0.948	0.060
		500	39.6	0.948	0.060
Rio Nogales Power Projects LP 1001	4911	100	39.6	1.249	0.064
		200	39.6	1.249	0.064
		300	39.6	1.249	0.064

Toyota Manufacturing Plant

Toyota Motor Manufacturer North America (TMMNA) is currently negotiating the building of an auto-production assembly plant in south Bexar County. Toyota provided emissions estimates of the anticipated pollutants produced by this plant at the start of production and are described in the following paragraphs. Table L-19 lists the emission estimates for 2007 and 2012.

The plant is to be built in 2 phases.

Phase 1: Phase 1 operation has a Start of Production (SOP) date of 2006. Emissions for 2007 are projected at 5.00 tons/day of VOC and 0.34 tons/day of NOx.

Phase 2: Phase 2 operation has a SOP date of 2008-2010. Emissions estimates in 2012 include both phases of production. Phase 1 and 2 combined is projected to emit 10.00 tons/day of VOC and 0.68 tons/day of NOx.

VOC emissions will be mainly from painting cleaning, sealers, adhesives, & natural gas combustion. NOx emissions will be mainly from natural gas boilers, space heaters, miscellaneous process heating.

Table L-19. Point Source Emissions from Toyota Plant, Bexar County 2007 & 2012

Year & Phase	VOC (tpd)	NOx (tpd)
2007 Emissions, Phase 1	5.00	0.34
2012 Emissions, Phase 1 and 2	10.00	0.68

Electric Generating Units (EGU) and Non-electric Generating Units (NEGU)

TCEQ provided AACOG with electric generating unit (EGU) and non-electric generating unit (NEGU) files for 2007. These emissions were left unchanged 2012. (Thomas, 2003), (TCEQ, 2003). The emission estimates are from the 2007 TEXAQS 2000 projection, which was used in the photochemical model. The estimates do not reflect growth or additional controls between 2007 and 2012. These files, used in the Houston SIP, were updated with local data when available. Table L-20 lists NEGU, non-CPS EGU point, and minor point source emissions source emissions.

Table L-20. Non-CPS EGU and NEGU emissions for 2007 and 2012

County	1999		2007		2012	
	NOx	VOC	NOx	VOC	NOx	VOC
Bexar	16.86	4.55	17.89	5.99	17.89	5.99
Comal	12.16	0.34	13.77	0.52	13.77	0.52
Guadalupe	0.51	0.45	8.07	1.10	8.07	1.10
Wilson	0.00	0.07	0.00	0.07	0.00	0.07

City Public Service

City Public Service provided projected emissions for 2007 and 2012 for the CPS power plants in the area. (Fulton, 2003) The emissions reflect average ozone season days in September. These emissions include a new coal fired power plant scheduled to go on-line in 2009. Table L-21 gives the predicted weekday emissions per power plant for 2007 and 2012.

Table L-21. Projected CPS Emissions from 2007 to 2012

CPS Plant	2007		2012	
	VOC	NOx	VOC	NOx
CPS - O.W. Sommers (OWS) - Total	0.27	6.28	0.00	0.00
CPS - J.T. Deely (JTD) - Total	0.34	15.62	0.67	10.03
CPS - J.K. Spruce (JKS) - Total	0.05	10.85	0.15	12.89
CPs - V.H. Braunig (VHB) - Total	0.05	1.04	0.09	0.00
CPS - A.Von Rosenberg Unit 1 (VHB 4A)	0.07	1.05	0.14	1.32
TOTAL	0.78	34.84	1.01	24.24

Legislative Actions

In 1999, the Texas Legislature passed two laws governing emissions for point sources in Texas. The 2012 emission inventory from City Public Service accounts for Senate Bill 7, which limits NO_x emissions from grand-fathered electric generating facilities in central and eastern Texas and Senate Bill 766, which increases emissions fees on grand-fathered non-electric generating facilities. (TCEQ, 2004)

Senate Bill 7

The electric utility deregulation bill requires reductions in emissions levels of nitrogen oxides and sulfur dioxide from grandfathered electric utility units. The NO_x rate, in pounds of NO_x per MM Btu (lbs. NO_x/MM Btu) is specified by SB 7 and is based on the

location of the EGF. This applies only to grand-fathered EGFs and is blank for permitted EGFs.

Senate Bill 766

Senate Bill 766 has two major parts. The first part redefines the current permitting hierarchy according to the significance of emissions into De Minimis, Exemptions, Permits by Rule, Standard Permits and regular permits. The second part created three new types of permits: Voluntary Emission Reduction Permit (VERP), Multiplant Permit, and Grandfather Utility Permit. Senate Bill 7 provides additional guidance to the TCEQ regarding the issuance of Grandfathered Utility Permits and allowances as stipulated in General Air Quality Rules §101.333.

On Road Source Emissions

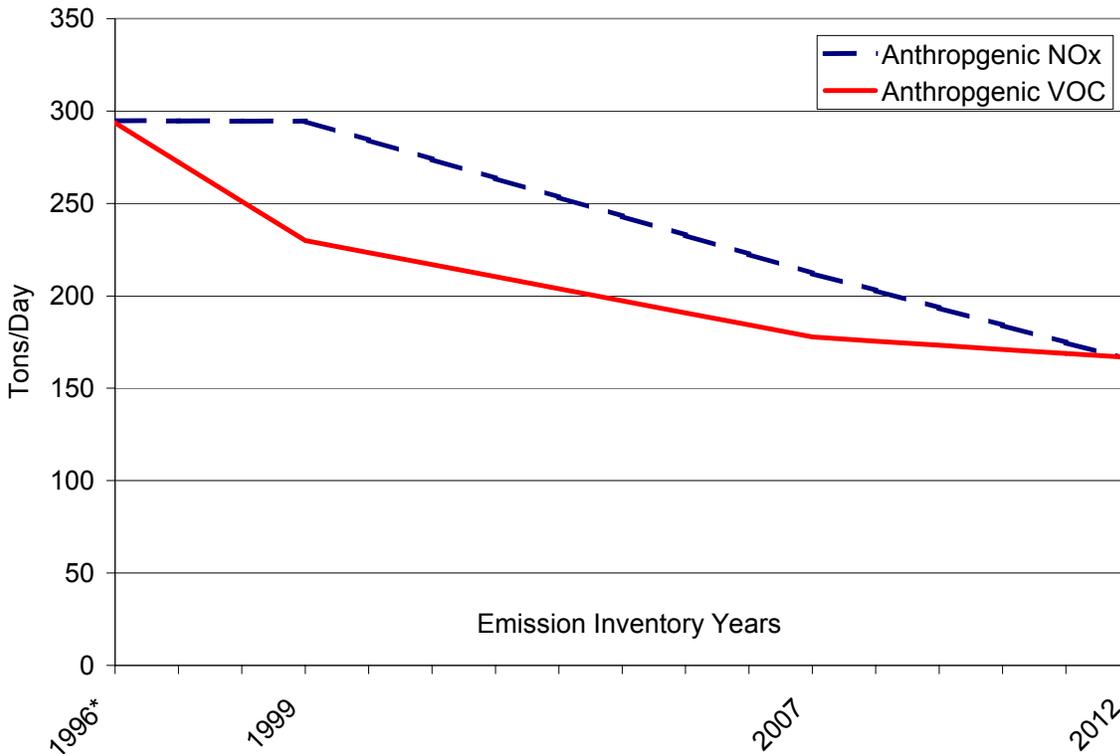
On road emissions were provided by the Texas Transportation Institute (TTI). The emissions are average weekday emissions with no adjustments and are from the modeling inventory.

The emission estimates in 1996 includes the 1995 on road estimates updated with MOBILE6, version 2. There were no Mobile6 emission estimates for 1996 so the closest year was used.

TREND ANALYSIS

As mentioned in previous sections, due to the federal, state, and local emission control policies, the downward trend of emissions will be sustained until the year 2012, despite predicted growth in population size and economic activities. The following figure, which was generated based on the available and forecasted data, depicts this trend. The anthropogenic emissions are caused by human's activities and are separated from those occurring naturally.

Figure L-5. Trend Line Analysis of VOC and NOx Emissions in the SAER, 1996, 1999, 2007, 2012



*note 1996 estimates included using version two of the 1995 Mobile6 inventory

As indicated in figure L-5, the tonnage of VOC and NOx emissions is projected to decrease from 1996 to 2012. Between 1999 and 2007, an overall reduction of 28% of NOx emissions and 23% reduction in VOC emissions are predicted. Between 2007 and 2012, additional reductions of 22% in NOx emissions and 7% in VOC emissions can be expected. The reductions are as a result of control strategies enforced by the USEPA and TCEQ and provides improved air quality in the future of the San Antonio EAC region.

Table L-23 details and compares emission totals for the four EAC counties in all emission source categories. These estimates are slight different then the photochemical modeling inventory because the model is based on day specific inventories. The inventory used in the Trend Line analysis is for and average ozone season day. Also, certain emission categories may be affected by seasonal adjustments. For example, there are no fertilizer emissions in the model, while these tables do include fertilizer emissions. Fertilizer is not applied during September in the SAER.

The total emissions in the SAER indicate a decrease in emissions for VOCs in area sources, NOx emissions in point sources, and both ozone precursor emissions in mobile sources and non-road sources. These observable trends of increasing emissions in some sources and the decreasing of emissions in other sources counterbalance each other and indicate that the SAER is projected to remain in attainment in 2012. The

following subsections describe the individual emission source categories and their emission trends.

Area Sources

Area source emissions in 2012 are lower than 1999 area source emissions. This is indicative of the effects federal and state measures have on the San Antonio's regional air quality. However, trends within individual counties in the SAER demonstrate peculiar activity.

For Bexar, Comal, and Guadalupe counties, area source VOC emissions decrease from 1999 to 2007 but then increase from 2007 to 2012. In 2007, larger decreases of VOC emissions from state and federal strategy implementation are anticipated than the total projected VOC increase due to population and source growth. In 2012, larger increases in VOC emissions than strategy induced VOC reduction is expected.

Originally, the projected 2007 VOC emission estimate for Bexar County was 83.4 tons per day. After taking into account state and federal regulations such as Stage I vapor recovery at stations that throughput 125,000 gallons/month, onboard refueling vapor recovery, and state mandated degreasing controls, total VOC emissions for Bexar County is 69.2 tons per day.

For 2012, area VOC emissions are projected to increase 7 tons. Therefore, before taking into account additional emission reductions due to strategy implementation in 2012, 2012, area sources were projected at 76.2 tons per day (69.2 tons + 7 tons). An emission reduction of 4.8 tons per day due to implemented control measures was then applied thus reducing emissions to 71.4 tons per day (76.2 tons - 4.8 tons).

The same occurrences can be noted in Comal and Guadalupe area source emissions. The reductions were not large enough to offset the projected increases in 2012. Emissions in Wilson County reflected no activity and remained constant.

Point Sources

In Bexar County, point source VOC emissions are expected to nearly triple from 1999 to 2012 due to emergence of additional point sources within the county, such as the Toyota Manufacturing Plant and the Tessman Landfill Gas Power Plant. NOx emissions, however, decrease from 1999 to 2012, which would be reflective of updated emission controls on local point sources. VOC emissions remained constant in Comal County while NOx emissions slightly increased. Guadalupe County VOC and NOx emissions increased due to the development of a new power plant within the county. Wilson County VOC emissions increased slightly but their NOx emissions did not significantly change.

On Road Sources

Both VOC and NOx emissions decrease from 1999 to 2012 in all SAER counties.

Non Road Sources

Reductions in VOC and NOx emissions can be noted in all SAER counties. These reductions can be attributed to improved emission control technologies as required by various federal standards. These emissions also reflect airport and military emissions in the SAER.

The resulting emission estimates displayed on table L-22 indicate that the San Antonio EAC Region is projected to maintain the 8-hour ozone NAAQS five years beyond the 2007 attainment date. It is important to note that these emission estimates do not reflect the additional emission reduction resulting from the implementation of the locally selected clean air measures submitted as part of San Antonio's Clean Air Plan.

Table L-22. Anthropogenic Emission Trend within the San Antonio Early Action Compact Region

San Antonio Early Action Compact Region		Tons per Day Emission									
		1996		1999		2007		2012			
		VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx		
Area Sources	Bexar	78.3	2.4	73.4	4.7	69.2	5.0	71.4	5.2		
	Comal	4.4	0.1	3.7	0.3	3.4	0.5	3.6	0.5		
	Guadalupe	6.1	0.3	5.4	0.9	5.2	1.7	5.4	1.8		
	Wilson	2.6	0.4	2.7	0.9	2.7	1.8	2.7	2.0		
	Total	91.4	3.3	85.2	6.8	80.5	9.0	83.1	9.5		
Point Sources	Bexar	7.0	64.3	6.3	83.9	11.8	53.2	17.0	43.0		
	Comal	0.4	8.2	0.5	12.2	0.5	13.8	0.5	13.8		
	Guadalupe	0.4	0.3	0.5	0.5	1.1	8.1	1.1	8.1		
	Wilson	0.0	0.0	0.01	0.004	0.1	0.004	0.1	0.004		
On Road Sources	Total	7.8	72.8	7.3	96.6	13.5	75.1	18.7	64.9		
	Bexar	106.6	122.39	82.1	121.87	45.5	69.1	33.7	41.4		
	Comal	6.8	10.4	6.2	11.7	3.9	7.1	3	4.3		
	Guadalupe	6.6	10	5.6	10.5	3.4	6.5	2.6	3.9		
	Wilson	1.9	1.9	1.6	1.9	1	1.3	0.8	0.8		
Non Road Sources	Total	121.9	144.69	95.5	145.97	53.8	84	40.1	50.4		
	Bexar	54.3	55.2	36.3	36.4	25.6	36.3	21.0	32.9		
	Comal	9.8	3.5	3.4	2.6	2.1	3.4	1.8	3.3		
	Guadalupe	4.3	4.4	4.1	2.3	1.7	3.3	1.4	3.3		
	Wilson	1.4	4.1	1.0	0.7	0.6	1.0	0.5	0.9		
Total	69.9	67.2	45.7	42.0	30.0	44.0	24.7	40.4			

CONCLUSION

Developing the 2012 projections for various emission sources required the use of various methods and models. Emissions for sources such as non-road and on road source needed to reflect the implementation of various control measures aimed at reducing ozone precursors. When developing the Maintenance Year Emission Inventory, incorporating projected emissions from future sources such as the automobile manufacturing plants or new power plants is important. Taking into account these variables enables air quality planners to confidently develop air quality plans aimed at reducing emissions.

The Clean Air Plan for the SAER is directed to achieve the 8-hour standard by December 2007. Maintaining the 8-hour standard five years beyond the attainment date will be achieved through an annual review of growth as required in the EAC protocol.

As discussed in the Executive Summary, the Maintenance for Growth analysis performed by AACOG has several stages or components.

- **Current Analysis:** This Maintenance for Growth analysis is an updated and expanded Trend Analysis, first published September 30, 2003 as an EAC milestone. This appendix analyzes the emissions inventories from 1996 and 1999 and projects emissions to 2007 and 2012. These future year projections encompass all relevant changes affecting future emissions, including revised or new federal, state, and local rules and any new practices that would result in changes to future year emissions inventories. As a separate document, the Trend Analysis itself is updated once more, and is due as an updated milestone / deliverable in the EAC by September 30, 2005.
- **Continuing Planning Process:** The assumptions underlying this analysis will be reviewed annually throughout the term of the EAC (through 2007). Changes in assumptions will be incorporated annually into an updated Maintenance for Growth analysis and reported as a component of the Semi-Annual Updates. The current analysis will next be updated and reported in the December 2004 Semi-Annual Update.
- **New Strategy Requirements:** In the event the annual analysis of emission trends and control strategies fails to maintain attainment standards, appropriate planning and implementation of additional clean air measures will result.

Current Analysis

The bulk of this Appendix is devoted to the Current Analysis outlined above, according to which our present projections suggest continued attainment of the 8-hour average ozone NAAQS through 2012. This is based on the most-currently available data as of March 2004.

Continuing Planning Process

Various stages of planning and verification must be performed on a continual basis to ensure timely emission reductions for the region to maintain air quality standards. The impacts of new point source related emissions, economic and population growth, and the implementation of new control strategies are evaluated during the air quality modeling process. Analyzing their effect on ambient ozone levels will be essential in ensuring the maintenance of attainment.

AACOG staff will analyze air quality and related data and perform necessary modeling updates and modeling assumption verification annually. In the event that updated emission inventories, updates in any photochemical model inputs, or corrections to

earlier modeling assumptions are created and available, the modeling scenarios used to demonstrate attainment for the SAER will be brought up to date. Modeling updates will be performed in accordance with state and federal guidelines.

Ongoing Updates

Gathering, updating, and verifying data is part of an ongoing process between the Texas Commission on Environmental Quality, the US Environmental Protection Agency, and the Alamo Area Council of Governments. The updating and verification process will continue to occur in the context of the Joint Near Nonattainment Area meetings held by air quality planning technical staff representing TCEQ, and the San Antonio, Victoria, Corpus Christi, Austin and the Tyler-Longview areas, or other appropriate venue (technical meetings with TCEQ and / or EPA, etc.). Joint Near Nonattainment Area meetings are held at least as often as every three months. They were established as a forum for discussion of new technology, new program and planning requirements under state programs, progress on and cooperation in attainment of air quality goals, as well as discussion of updates to modeling input and modeling technique. AACOG frequently attends other technical modeling meetings hosted by the TCEQ, EPA and other agencies, which provides greater opportunity for information update exchanges. In addition, AACOG staff attends regularly scheduled monthly technical meetings of the local San Antonio / Bexar County Metropolitan Planning Organization (MPO), allowing AACOG staff the most recent transportation planning information. AACOG provides all air quality analysis for the local MPO transportation projects. All local transportation planning updates to the modeling inputs will be incorporated as they occur, and their impacts analyzed.

Reporting of modeling updates and modeling assumption verification will be reported in the Semi-Annual Reports written by the AACOG. These reports are due on an ongoing six-month cycle ending December 31 and June 30 of each year of the Early Action Compact, ending December 31, 2007. These reports will specifically address, at a minimum,

- all relevant actual new point sources;
- impacts from potential new source growth; and
- future transportation patterns and their impact on air quality in a manner that is consistent with the most current adopted Long Term Transportation Plan and most current trend and projections of local motor vehicle emissions.

Throughout the continuing planning process, the air quality impact on the region's ozone levels imposed by transportation patterns will be evaluated and assessed by technical staff of various local, regional, state, and federal offices. The ongoing technical collaboration between AACOG and the local MPO is the central conduit such that updated transportation planning becomes integrated in air quality planning. These cooperative relations will assist in maintaining the 8-hour ozone standard by the technical assistance provided by each agency and in the event additional planning is necessary.

New Strategy Requirements

The annual reviews of growth, including the updates and the continuing planning processes reported in the Semi-Annual Updates will provide air quality planners the insight necessary to ensure attainment of the 8-hour standard up to 2012. The extensive clean air strategy modeling performed by AACOG staff will facilitate the

planning if the continuous review process indicates additional measures should be considered.

If at any time the review of growth demonstrates that adopted control measures are inadequate to address growth in emissions, additional measures will be added to the plan. If additional control measures for 2007 attainment are suggested as being necessary through a review of growth, they will be verified using the current attainment demonstration photochemical model and adopted according to the public review process overseen by the Air Improvement Resources Committee. If additional control measures for 2012 attainment are suggested as being necessary through a review of growth, AACOG staff will work with the TCEQ and EPA to analyze control strategies based on then-currently available photochemical models. Appropriate control strategies will be adopted according to the public review process overseen by the Air Improvement Resources Committee.

References:

Texas Water Development Board (TWDB), 2000. "Population Projections 1990-2050: Most likely Scenario." Austin, TX. Available online: <http://www.twdb.state.tx.us/data/popwaterdemand/countypopulation.htm>.

United States Environmental Protection Agency (USEPA), 1997. "Emission Factors for Locomotives." Ann Arbor, MI. Available online: <http://www.epa.gov/otaq/regs/nonroad/locomotv/frm/42097051.pdf>

United States Environmental Protection Agency (USEPA), 1998. "Regulatory Announcement: New Emission Standards for Non Road Diesel Engines." Ann Arbor, MI. Available online: <http://www.epa.gov/otaq/regs/nonroad/equip-hd/frm1998/f98034.htm>

Pechan, 2001. EGAS 4.0 Reference Manual. Durham, NC. Available online: http://www.epa.gov/ttn/chief/emch/projection/egas40/ref_man_4.pdf

Control of Air Pollution From Volatile Organic Compounds, 30 T.A.C. §115.412-415 (1999). Available online: http://www.tnrcc.state.tx.us/oprd/rules/pdflib/115_ind.pdf

Synergetic Technologies, Inc. Available online: http://www.stationwatch.com/swfaq/orvr_faq.htm#FAQ001 Last accessed: March 21, 2004.

U.S. Environmental Protection Agency, February 2004. "Commonly Asked Questions About ORVR." Available online: <http://www.epa.gov/otaq/regs/ld-hwy/onboard/orvrq-a.txt> Accessed November 2003.

Control of Air Pollution From Volatile Organic Compounds, 30 T.A.C. §115.221-229 (1999). Available online: <http://www.tnrcc.state.tx.us/oprd/rules/pdflib/115c.pdf>

Mack, Eddie, August 2001. "Regulations Affecting Area Sources in 1999." Last revised 8/28/01.

Environ International Corporation, 2001. "Future-Year Ozone Modeling of the Austin, Texas Region: Draft Final Report." Novato, Ca.

Thomas, Ron, May 2003. Email: "Re: DFW 1999 Files - TNRCC processing of Texas hourly egu.0913_2099 point sources for 2007." Austin, TX. Available: <ftp://ftp.tceq.state.tx.us/pub/OEPAA/TAD/Modeling/HGAQSE/Modeling/EI>

Texas Commission on Environmental Quality (TCEQ), 2003. "TNRCC processing of Texas NonEGU point sources for 2007." Austin, TX. Available: <ftp://ftp.tceq.state.tx.us/pub/OEPAA/TAD/Modeling/HGAQSE/Modeling>

Fulton, Joe, April 2003. "1999, 2007, 2012 CPS power plant emissions." San Antonio, TX.

Texas Commission on Environmental Quality (TCEQ), February 2004. "Permitting Grandfathered Facilities." Austin, TX. Available online: <http://www.tnrcc.state.tx.us/grandfathered/background>

Texas Commission on Environmental Quality (TCEQ), 1999. "Chapter 115 - Control of Air Pollution From Volatile Organic Compounds, Rule Log No. 98028-115-AI."

General Air Quality Rules, 30 T.A.C. §101.333 (1999). Available online:
<http://www.tnrcc.state.tx.us/oprd/rules/pdflib/101h.pdf>