APPENDIX 9

DEVELOPMENT OF ANNUAL EMISSIONS INVENTORIES AND ACTIVITY DATA FOR AIRPORTS IN THE 12-COUNTY DALLAS-FORT WORTH AREA AND DEVELOPMENT OF STATEWIDE ANNUAL EMISSIONS INVENTORIES AND ACTIVITY DATA FOR AIRPORTS

Development of Annual Emissions Inventories and Activity Data for Airports in the 12-County Dallas-Fort Worth Area

Collin	Hunt
Dallas	Johnson
Denton	Kaufman
Ellis	Parker
Henderson	Rockwall
Hood	Tarrant

North Central Texas Aircraft Emissions Inventory
August 2011

North Central Texas
Council of Governments
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What is NCTCOG?

The North Central Texas Council of Governments is a voluntary association of cities, counties, school districts, and special districts which was established in January 1966 to assist local governments in **planning** for common needs, **cooperating** for mutual benefit, and **coordinating** for sound regional development.

It serves a 16-county metropolitan region centered around the two urban centers of Dallas and Fort Worth. Currently the Council has **240 members**, including 16 counties, 170 cities, 24 independent school districts, and 30 special districts. The area of the region is approximately **12,800 square miles**, which is larger than nine states, and the population of the region is over **6.5 million**, which is larger than 38 states.

NCTCOG's structure is relatively simple; each member government appoints a voting representative from the governing body. These voting representatives make up the **General Assembly** which annually elects a 15-member Executive Board. The **Executive Board** is supported by policy development, technical advisory, and study committees, as well as a professional staff of 315.

NCTCOG's offices are located in Arlington in the Centerpoint Two Building at 616 Six Flags Drive (approximately one-half mile south of the main entrance to Six Flags Over Texas).

North Central Texas Council of Governments
P. O. Box 5888
Arlington, Texas 76005-5888
(817) 640-3300

NCTCOG's Department of Transportation

Since 1974 NCTCOG has served as the Metropolitan Planning Organization (MPO) for transportation for the Dallas-Fort Worth area. NCTCOG's Department of Transportation is responsible for the regional planning process for all modes of transportation. The department provides technical support and staff assistance to the Regional Transportation Council and its technical committees, which compose the MPO policy-making structure. In addition, the department provides technical assistance to the local governments of North Central Texas in planning, coordinating, and implementing transportation decisions.

Prepared in cooperation with the Texas Department of Transportation and the U. S. Department of Transportation, Federal Highway Administration, and Federal Transit Administration.

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ABSTRACT

TITLE:	Development of Annual Emissions Inventories and Activity Data for Airports in the 12-County Dallas-Fort Worth Area
DATE:	August 2011
AUTHORS:	Chris Klaus Senior Program Manager Madhusudhan Venugopal, P.E. Principal Transportation Planner Syeda Haque Transportation Planner
SUBJECT:	Annual Airport Emissions Inventory
SOURCES OF COPIES:	Transportation Department North Central Texas Council of Governments PO Box 5888 Arlington, Texas 76005-5888 (817)695-9240
NUMBER OF PAGES:	38
ABSTRACT:	The North Central Texas Council of Governments conducted an emission inventory for airports in the North central Texas Counties. In this analysis, airport emissions and activity data were estimated for the 12 -county Metropolitan Statistical Area that encompasses Collin, Dallas, Denton, Ellis, Henderson, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties for 1996, 2000, 2002, 2008, 2011, 2014, 2017, 2020, 2023, 2026, and 2029 analysis years. This estimate will assist the Texas Commission on Environmental Quality in the State Implementation Plan development and other airport related inquiries which require annual emissions inventory estimates of criteria pollutants, criteria precursor pollutants, and hazardous air pollutants.

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Michael Morris, P.E.	Director of Transportation
Dan Kessler	Assistant Director of Transportation
Vickie Alexander	Administrative Program Supervisor
Christopher Klaus	Senior Program Manager
Madhusudhan Venugopal, P.E.	Principal Transportation Planner
Arash Mirzaei, P.E.	Transportation System Modeling Manager
Michael Branum	Transportation Planner II
Michael Mallonee	Principal Transportation Planner
Behruz Paschai, PhD. , P.E.	Senior Transportation System Modeler
Kathleen Yu	Senior Transportation System Modeler
Cecilia Howard	Administrative Assistant II
Peter Ogbeide	TCEQ, Project Manager
Elaine Karnes	Director, Environmental Services, Southwest Airlines Co.
Sam Peacock	City of Dallas, Environmental Manager
Kris Russell	DFWIA, Senior Environmental Analyst

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LIST OF EXHIBITS

GLOSSARY OF ABBREVIATIONS

APU	-	Auxiliary Power Units
ATADS	-	Air Traffic Activity System
CA	-	Commercial Airline
CAAA	-	Clean Air Act Amendments
CO	-	Carbon Monoxide
CO_2	-	Carbon Dioxide
DAL	-	Dallas Love Field International Airport
DFW	-	Dallas-Fort Worth
DFWIA	-	Dallas/Fort Worth International Airport
EDMS	-	Emission and Dispersion Modeling Systems
EPA	-	Environmental Protection Agency
FAA	-	Federal Aviation Administration
GISDK	-	Geographic Information System Developer Kit
GSE	-	Ground Support Equipment
HAPS	-	Hazardous Air Pollutants
ICAO	-	International Civil Aviation Organization
LTO	-	Landing and Takeoff
MPA	-	Metropolitan Planning Area
MPO	-	Metropolitan Planning Organization
MSA	-	Metropolitan Statistical Area
NAAQS	-	National Ambient Air Quality Standards
NCT	-	North Central Texas
NCTCOG	-	North Central Texas Council of Governments
NEI	-	National Emission Inventory
NFW	-	Fort Worth NAS JRB
NMHC	-	Non-Methane Hydrocarbons
NO_X	-	Nitrogen Oxides
NPIAS	-	National Plan of Integrated Airport Systems
Pb	-	Lead
$PM_{2.5}$	-	Particulate Matter, 2.5 microns
PM_{10}	-	Particulate Matter, 10 microns
QA	-	Quality Assurance
QAPP	-	Quality Assurance Project Plan
SIP	-	State Implementation Plan
SO_X	-	Sulfur Oxides
TAF	-	Terminal Area Forecast
TCEQ	-	Texas Commission on Environmental Quality
THC	-	Total Hydrocarbons
TOG	-	Total Organic Compounds
TxDOT	-	Texas Department of Transportation
USAF	-	United States Air Force
VOC	-	Volatile Organic Compounds

EXECUTIVE SUMMARY

This task required the North Central Texas Council of Governments (NCTCOG) to develop annual emissions inventory and activity data for airports for 1996, 2000, 2002, 2008, 2011, 2014, 2017, 2020, 2023, 2026, and 2029 analysis years. This inventory was developed for the 12-County Metropolitan Statistical Area (MSA) that covers Collin, Dallas, Denton, Ellis, Henderson, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties. The inventory will be used to support State Implementation Plan (SIP) development and other airport related inquiries which require annual emissions inventory estimates of criteria pollutants, criteria precursor pollutants, and hazardous air pollutants (HAPs).

There are 344 facilities in this 12-county MSA area that provide aviation services to the region. Among these, 282 facilities had no reported activities and 62 facilities with reported activities which were grouped into three categories for data collection and modeling purposes. Among the 62 facilities, Dallas Love Field International Airport (DAL) and Dallas/Fort Worth International Airport (DFWIA) are major commercial facilities with significant activities, Fort Worth NAS JRB (NFW) is a military base, 27 facilities were identified as significant airports with annual operations of more than 18,000 along with airports identified in the National Plan of Integrated Airport Systems (NPIAS) system, and the remaining 32 airports were grouped as other and had less than 18,000 annual operations reported.

The U.S. Federal Aviation Administration (FAA)'s Emission and Dispersion Modeling System (EDMS) was utilized to model the emission inventory for all 62 airports for all analysis years. EDMS requires aircraft-specific activity data such as the make, model, and engine of the aircraft. This information is readily available for medium and large commercial airports and air carriers, but is not available for air taxis, general aviation, or military aircraft. To estimate emissions from these sources, the methodology documented in the Environmental Protection Agency (EPA)'s National Emission Inventory (NEI) was used. Lead emissions from the aircraft were estimated following EPA's "Calculating Piston-Engine Aircraft Airport Inventories for Lead for the 2008 National Emissions Inventory" methodology.

Activity data required for emission estimation was gathered for all modeled facilities where data was easily available. The major airports were contacted for detailed aircraft activity data and other EDMS model input parameters. Data gaps, where appropriate, were filled using most closely related data that was available.

A data collection survey was conducted by NCTCOG's Aviation Team to collect most up to date information on the aircraft activity, fleet mix, ground support equipment (GSE), and auxiliary power unit (APU) inventory from the rest of the facilities. Compiled data was reviewed and identified data gaps were analyzed and filled in by experts from the aviation team.

Once the input data was quality checked, the EDMS model was populated and emission estimation from aircraft activity utilizing default GSE and APU assignment for all analysis years were produced. The uncontrolled results for major pollutants are summarized in Exhibit 1.

EXHIBIT 1

Emissions Without Controls (tons per year)

Pollutant	1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
CO	24,314	24,120	24,600	17,381	13,880	13,363	13,147	13,492	14,050	14,774	15,641
THC	1,485.40	1,474.80	1,496.95	1,082.75	998.25	1,045.18	1,111.21	1,181.24	1,229.47	1,278.04	1,328.56
NMHC	2,083.80	2,049.46	2,064.55	1,411.50	1,241.31	1,258.89	1,306.30	1,373.85	1,424.49	1,478.87	1,537.30
VOC	2,088.44	2,052.69	2,066.87	1,409.36	1,236.97	1,252.73	1,298.52	1,365.03	1,415.11	1,469.06	1,527.12
NOX	6,191.76	6,014.07	5,751.04	4,496.11	4,005.51	4,166.80	4,351.85	4,645.36	4,998.59	5,391.51	5,827.58
SO x	684.82	679.04	661.93	491.46	434.16	466.89	503.54	547.13	590.23	636.62	687.91
PM10	214.81	181.37	167.06	122.71	105.92	105.62	105.83	107.06	106.56	105.90	104.88
PM2.5	211.93	179.47	165.41	121.90	105.33	105.11	105.39	106.67	106.18	105.51	104.48
Lead	4.67	4.95	4.91	4.74	4.29	4.42	4.56	4.70	4.84	4.98	5.13
TOG	2,154.21	2,117.79	2,132.96	1,452.25	1,269.36	1,281.89	1,325.47	1,391.58	1,441.98	1,496.65	1,555.66

A set of control strategies was identified from the reported survey that provided percentage conversion of GSE and APU to electric. The base emissions were post processed to reflect emission credits from the GSE and APU electric conversions. Post processed results reflecting controls are shown in Exhibit 2. Detailed emissions inventories of all other pollutants including HAPs for controlled and uncontrolled scenarios are organized in Appendix D.

EXHIBIT 2

Emissions After Implementing Controls (tons per year)

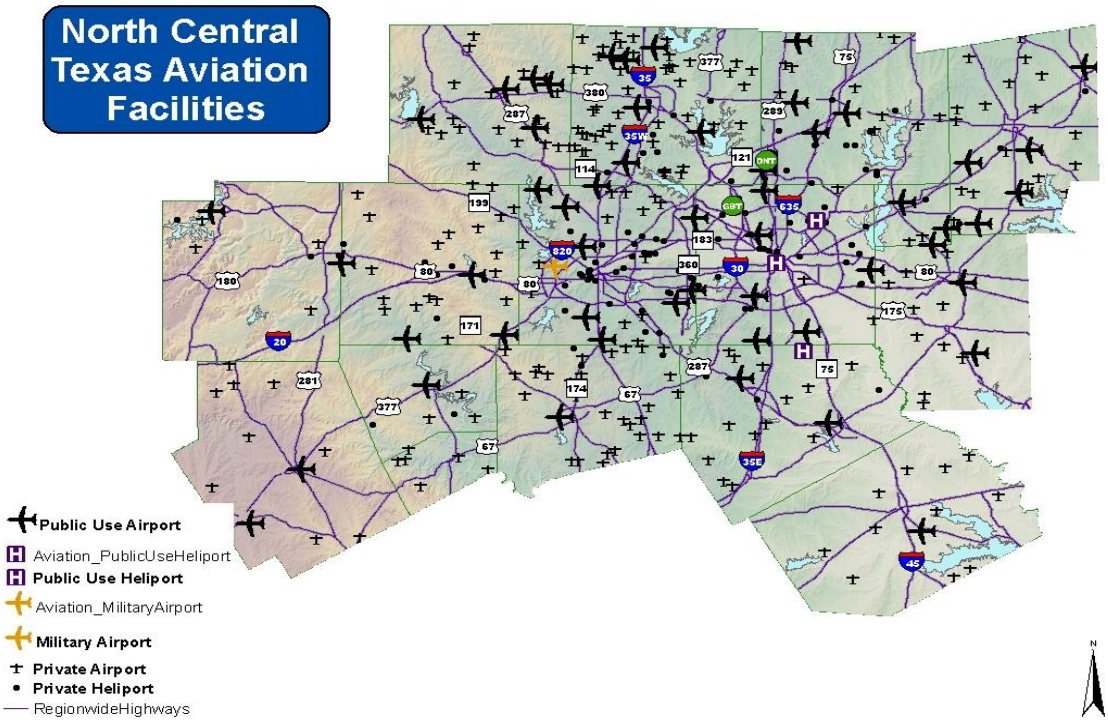
Pollutant	1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
CO	24,250	24,056	24,545	15,412	12,616	12,428	12,482	12,920	13,516	14,244	15,095
THC	1,485.40	1,474.80	1,496.95	1,068.98	987.04	1,033.65	1,099.29	1,167.53	1,215.41	1,263.66	1,313.90
NMHC	2,081.48	2,047.23	2,062.61	1,337.50	1,192.48	1,220.58	1,275.98	1,344.90	1,396.37	1,450.48	1,508.04
VOC	2,086.03	2,050.37	2,064.85	1,333.03	1,186.70	1,213.42	1,267.53	1,335.55	1,386.51	1,440.18	1,497.35
NOX	6,183.47	6,006.30	5,744.39	4,204.85	3,799.91	3,991.09	4,198.64	4,488.38	4,838.87	5,223.54	5,647.81
SO x	684.32	678.54	661.50	469.39	417.41	449.23	484.76	525.09	566.56	611.21	660.63
PM10	214.37	181.10	166.86	95.83	84.32	84.06	84.15	82.63	81.33	79.69	77.55
PM2.5	211.51	179.20	165.22	95.26	83.90	83.70	83.84	82.36	81.07	79.43	77.29
Lead	4.67	4.95	4.91	4.74	4.29	4.42	4.56	4.70	4.84	4.98	5.13
TOG	2,151.55	2,115.22	2,130.73	1,369.63	1,215.24	1,239.96	1,292.84	1,360.85	1,412.27	1,466.69	1,524.76

CHAPTER 1: INTRODUCTION

Aviation is a vital transportation element that is critical in sustaining the region's economic growth and development, and North Central Texas (NCT) is home to an astounding number of airports and aviation employers. There are 13 airports within NCT that have an air traffic control tower. In 2009, the region's towered reliever airports conducted over 875,000 operations (Source: FAA ATADS). According to FAA, in 2009 Dallas Fort Worth International Airport (DFWIA) was ranked as the third busiest airport in the United States with 636,000 operations. Within NCT, an approximate 15,696 square mile area, there are over 400 aviation facilities, 57 of which are public-use. Of these public-use airports, approximately 21 are located within 30 nautical miles of Dallas-Fort Worth (DFW). Within the NCT 12-county MSA area, there are 344 facilities providing aviation related services as airport, heliport or glide ports. Exhibit 1.1 below shows all the facilities within the region.

EXHIBIT 1.1

Locations of Aviation Facilities Within the 12-County Modeling Area



This report documents the methodology and results of aircraft emission inventory for all facilities in the NCT area. The emission inventory analysis period includes 1996, 2000, 2002, 2008, 2011, 2014, 2017, 2020, 2023, 2026, and 2029. Chapter 1 of this report discusses the DFW region, emission sources, and the scope of the study.

Chapter 2 documents procedures utilized to develop airport activities and the grouping criteria utilized for modeling purposes , development of survey to gather airport specific information , estimates in terms of aircraft landings and take offs (LTO's) and the development of backcast and forecast factors.

Chapter 3 documents the parameters and inputs used to develop emissions inventories for airports by utilizing U.S. Federal Aviation Administration (FAA)'s Emission and Dispersion Modeling System (EDMS). This chapter documents regionally specific calculations, procedures, and adjustments to better reflect regional emissions emitted. The calculations and procedures include LTO distribution to estimate Fleet Mix, and APU and GSE assignments and adjustments. Also application of Lead emission factors to estimate emissions from aircrafts utilizing leaded aviation fuels which are not part of EDMS model output.

Chapter 4 documents the 12-county MSA area airport emission calculation procedure. Chapter 5 summarizes emissions of all pollutants by county and analysis years. The appendix contains supplemental information and electronic data that supports the airport emissions inventory.

1.1 Background

The Clean Air Act Amendments of 1990 (CAAA) requires the EPA to set National Ambient Air Quality Standards (NAAQS) for widespread pollutants considered harmful to public health and the environment. EPA has set NAAQS for six principal pollutants; Ozone, Particulate Matter, Carbon Monoxide, Sulfur Dioxide, Nitrogen Oxides, and Lead.

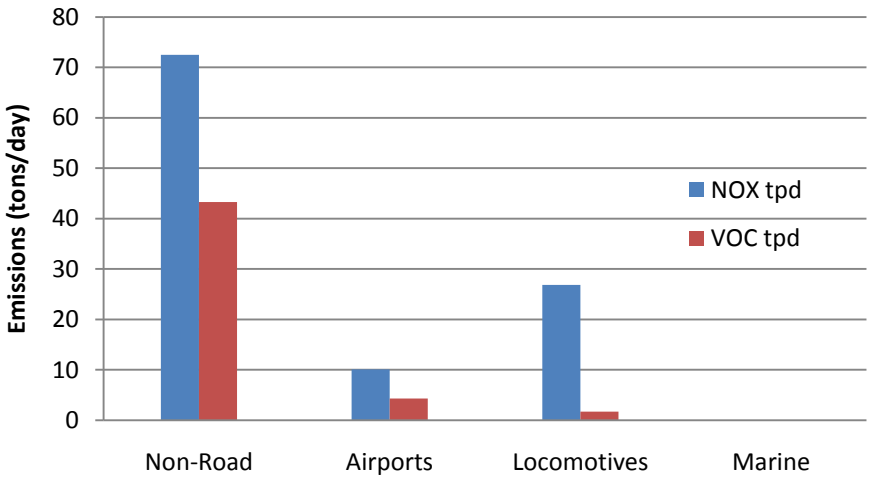
With the signing of the CAAA into law, the four counties of Collin, Dallas, Denton, and Tarrant County in the DFW region were designated as nonattainment under the 1-hour NAAQS for the pollutant ozone. The law also requires the EPA to periodically review the NAAQS to ensure that they provide adequate health and environmental protection and to update these standards as necessary. Upon completion of a scientific review of the 1-hour NAAQS, EPA determined that the 1-hour NAAQS was insufficient to protect human health. As a result, EPA developed the 1997 8-hour NAAQS to place greater emphasis on prolonged exposure to pollutants.

In April 2004, EPA announced that Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties comprise the new DFW nine-county nonattainment area for the pollutant ozone under the new stricter 1997 8-hour NAAQS. With an effective designation date of June 15, 2004, for the 8-hour NAAQS, these nine counties received a "Moderate" ozone classification. That gave the NCT region until June 15, 2010, to reach attainment or face a reclassification to "serious". As a result of not reaching attainment by June 2010, the DFW region was classified as serious with the new attainment date of June 2013.

TCEQ, the State's environmental agency, is required under the CAAA to determine how best to meet the CAAA goals through developing a SIP to achieve the NAAQS. The SIP is an air quality plan that contains a collection of regulations and measures to reduce emissions from stationary, area and mobile (on- and non-road) sources, and demonstrate attainment of the air quality standards. Exhibit 1.2 shows the aircraft emissions accounted in the 2013 reclassification State Implementation Plan (SIP)

EXHIBIT 1.2

2013 Attainment Demonstration SIP Emissions Contribution by Source



Source: TCEQ

1.2 Purpose and Scope of the Study

The project required the North Central Texas Council of Governments (NCTCOG) to develop annual activity and emissions inventory for airports for the years 1996, 2000, 2002, 2008, 2011, 2014, 2017, 2020, 2023, 2026 and 2029. This inventory will be developed for 12-County Metropolitan Statistical Area (MSA) that covers Collin, Dallas, Denton, Rockwall, Tarrant, Ellis, Johnson, Kaufman, Parker, Henderson, Hood and Hunt Counties. The inventories developed will be used to support State Implementation Plan (SIP) and other airport related inquiries which require annual emissions inventory estimates of criteria pollutants, criteria precursor pollutants, and hazardous air pollutants (HAPs).

NCTCOG serves as the Metropolitan Planning Organization (MPO) for transportation sector in the DFW area and is responsible for developing and maintaining emission inventories for the region. NCTCOG has worked with all the airports in the region and has developed a process that is now available to facilitate regional aviation planning. It hosts a variety of information about regional aviation facilities and is available for public and airport use. A variety of data has been collected through a collaborative effort with airports which will be useful in developing a comprehensive emissions inventory for airport.

1.3 Emission Sources

Research has identified that majority of the airport emissions are from aircraft operations. These processes include aircraft engines, auxiliary power units, and ground support equipment. This section discusses source categories considered for this study.

Aircrafts

Aviation industry has advanced tremendously in recent decades and aircrafts are extensively used for public, private, and military purposes. They are also a significant source of NOx, VOC, and CO emissions. Aircraft operations are generally grouped into the following categories as shown in Exhibit 1.3

EXIBIT 1.3

Airport Grouping

Aircraft Type	Properties
Commercial Air Carriers	Transport passengers, freight, or both Larger Aircrafts, Frequent Operations
Air Taxis	Air taxis carry passengers, freight, or both Smaller Aircrafts, Limited Operations
General Aviation	Recreational and personal transportation Smaller Aircrafts, Limited Operations
Military	Transport personnel, freight, or both Wide range of aircrafts with varying sizes

Emissions from aircraft are associated with a landing and takeoff (LTO) cycle. The cycle begins when the aircraft approaches the airport on its descent from cruising altitude, lands, and taxis to the gate. It continues as the aircraft taxis back out to the runway for subsequent takeoff and climbout as it heads back up to cruising altitude. The description of five specific operating modes in a LTO cycle is shown in Exhibit 1.4 and 1.5:

EXHIBIT 1.4

Landing and Takeoff Cycle

Operations	Description
Approach	The airborne segment of an aircraft's arrival extending from the start of the flight profile (or the mixing height, whichever is lower) to touchdown on the runway.
Taxi In	The landing ground roll segment (from touchdown to the runway exit) of an arriving aircraft, including reverse thrust, and the taxiing from the runway exit to a gate.
Startup	Aircraft main engine startup occurs at the gate. This methodology is only applied to aircraft with ICAO certified engines. All other aircraft will not have startup emissions. Aircraft main engine startup produces only THC, VOC, NMHC, and TOG emissions. A detailed speciated organic gases profile does not exist for main engine startup emissions.
Taxi Out	The taxiing from the gate to a runway end.
Takeoff	The portion from the start of the ground roll on the runway, through wheels off, and the airborne portion of the ascent up to cutback during which the aircraft operates at maximum thrust.
Climb Out	The portion from engine cutback to the end of the flight profile (or the mixing height, whichever is lower).

Source: EDMS User Manual

The LTO cycle is one of the essential inputs for calculating aircraft emissions. During each mode of operation, an aircraft engine operates at a specific power setting and fuel consumption rate for a given aircraft type. Emissions from aircrafts generally vary with the engine and fuel type. Exhibit 1.6 shows the emission for different pollutants per LTO cycle for different aircraft types. Exhibit 1.7 shows the emission by source type for all analysis years.

EXHIBIT 1.5

International Civil Aviation Organization (ICAO) LTO cycle

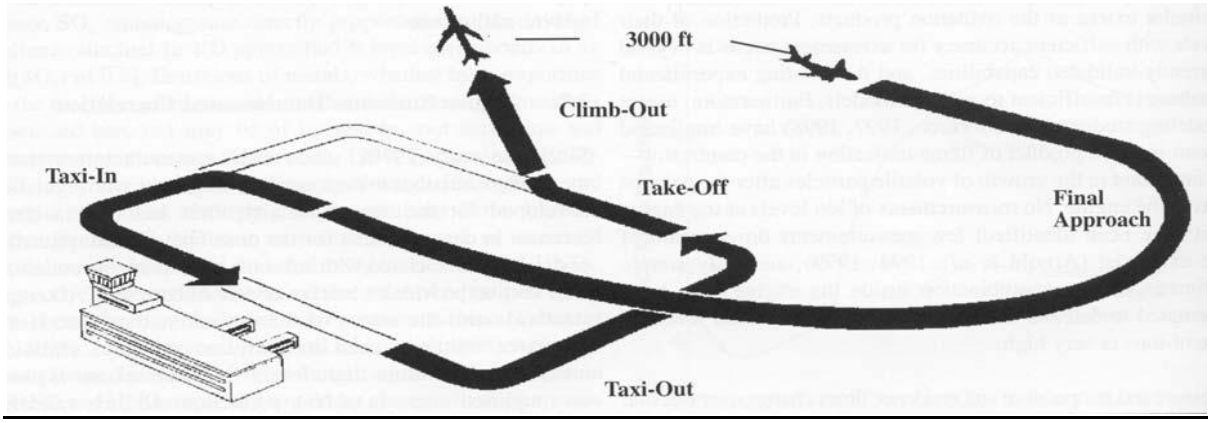
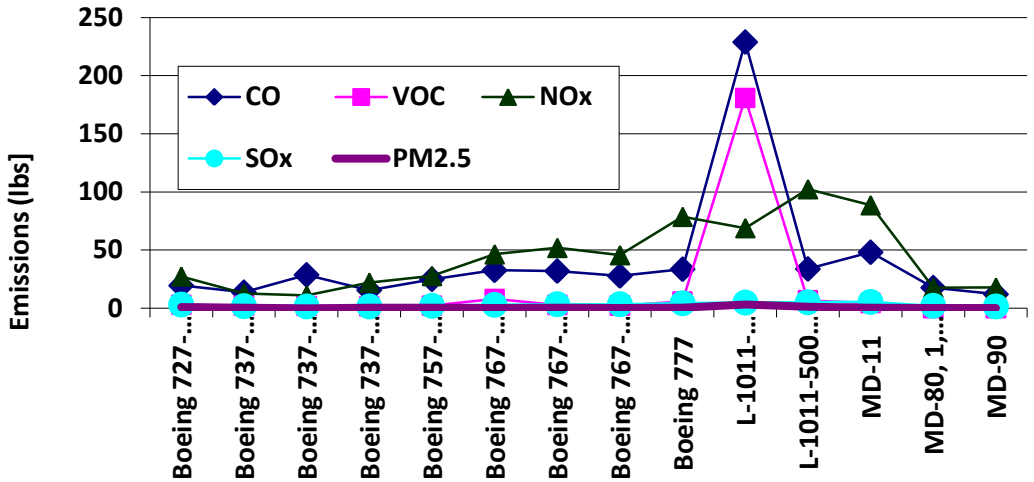


EXHIBIT 1.6

Emissions per LTO



Ground Support Equipment and Auxiliary Power Units

Other sources of emissions from the airport considered for this analysis include Ground Support Equipment (GSE) and Auxiliary Power Units (APU). When large aircraft are on the ground with their engines shut down, they need power and preconditioned air to maintain the aircraft's operability. If a ground-based power and air source is unavailable, an auxiliary power unit (APU), which is part of the aircraft, is operated. These units are essentially small jet engines, which generate electricity and compressed air. Detailed information about GSE and APU are discussed in Chapter 3.

EXHIBIT 1.7

Emissions by Source Type

Emission Source	Pollutant	1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
AIRCRAFT	CO	13,312	13,270	13,844	11,371	10,170	10,724	11,390	12,137	12,827	13,576	14,411
APU	CO	329	327	329	302	244	250	259	268	274	279	283
GSE	CO	10,672	10,522	10,427	5,708	3,467	2,389	1,499	1,086	949	919	947
AIRCRAFT	THC	1,469	1,458	1,481	1,066	985	1,031	1,097	1,166	1,214	1,262	1,313
APU	THC	17	17	16	16	13	14	14	15	15	16	16
GSE	THC	0	0	0	0	0	0	0	0	0	0	0
AIRCRAFT	NMHC	1,665	1,653	1,676	1,201	1,110	1,162	1,237	1,316	1,370	1,425	1,482
APU	NMHC	19	19	19	19	16	16	17	17	18	18	19
GSE	NMHC	400	378	370	192	116	81	53	40	36	36	37
AIRCRAFT	VOC	1,652	1,640	1,663	1,190	1,100	1,153	1,227	1,305	1,359	1,414	1,470
APU	VOC	19	19	19	19	15	16	16	17	18	18	18
GSE	VOC	417	393	385	200	121	84	55	42	38	37	39
AIRCRAFT	NOX	4,495	4,450	4,228	3,687	3,477	3,757	4,038	4,379	4,747	5,138	5,564
APU	NOX	167	166	162	127	112	120	129	139	151	163	176
GSE	NOX	1,530	1,399	1,361	682	417	290	185	127	101	90	88
AIRCRAFT	SO x	561	556	539	452	408	440	475	517	558	602	651
APU	SO x	26	25	25	22	19	20	21	22	24	26	27
GSE	SO x	99	98	98	18	8	7	8	8	9	9	10
AIRCRAFT	PM10	99	98	93	76	70	71	73	75	75	73	71
APU	PM10	27	27	26	25	22	22	23	25	26	27	28
GSE	PM10	88	56	47	21	15	12	9	7	6	6	6
AIRCRAFT	PM2.5	99	98	93	76	70	71	73	75	75	73	71
APU	PM2.5	27	27	26	25	22	22	23	25	26	27	28
GSE	PM2.5	86	54	46	20	14	11	9	7	6	5	6
AIRCRAFT	Lead(Pb)	4.67	4.95	4.91	4.74	4.29	4.42	4.56	4.70	4.84	4.98	5.13
APU	Lead(Pb)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GSE	Lead(Pb)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AIRCRAFT	TOG	1,677	1,665	1,690	1,213	1,121	1,174	1,249	1,328	1,383	1,438	1,495
APU	TOG	19	19	19	19	16	16	17	17	18	18	19
GSE	TOG	458	433	424	221	133	92	60	46	41	40	42

CHAPTER 2: AIRPORT ACTIVITY

This Chapter describes the procedures used to develop activity estimates in terms of vehicle landings and take offs (LTOs). The LTO refers to the number of aircraft that land and then takeoff. LTOs are typically equal to the number of total aircraft operations (the sum of all arrivals and departures) divided by 2. Most aircraft go through a similar sequence during a complete operating cycle. Helicopters may combine certain modes such as takeoff and climbout. During each mode of operation, the aircraft engines operate at a fairly standard power setting for a given aircraft category. Emissions for one complete cycle for a given aircraft can be calculated by knowing emission factors for specific aircraft engines at those power settings. Then, if the activity of all aircraft in the modeling zone can be determined for the inventory period, the total emissions can be calculated.

2.1 Airports Modeled

Within the 12-county North Central Texas Metropolitan Statistical Area (MSA), there are 344 facilities identified under various ownership types. Exhibit 2.1 shows total number of facilities with their ownership types. Among these 344 facilities, 62 facilities had reported activities, data collection and modeling effort were focused on these 62 facilities. In order to simplify modeling efforts, these 62 airports are grouped into 3 categories which are shown in the Exhibit 2.2. Lists of facilities within the NCT MSA area is provided in the Appendix A.

EXHIBIT 2.1

Facility Type by Ownership Type

Facility Type	Ownership Type	Number of Facility
AIRPORT	MUNICIPAL	1
AIRPORT	PRIVATE	189
AIRPORT	PUBLIC	26
GLIDERPORT	PRIVATE	1
HELIPORT	PRIVATE	105
HELIPORT	PUBLIC	17
STOLPORT	PRIVATE	2
ULTRALIGHT	PRIVATE	3
TOTAL FACILITY		344

EXHIBIT 2.2

Airport Modeling Groups

Airport Group Names	Description	Number of Facilities
Major Airports	Major commercial Airports	2
NIPIAS and Significant	Airports identified as NPIAS along with airports reported annual LTOs over 18,000.	28
Other Airports	Airports not identified as NPIAS and with reported annual LTOs less than 18,000.	32

A list of facilities within each group is provided in Appendix A.

2.2 Data Collection

The historic and forecasted activity data for major airports was collected from the specific airports. Historic and forecasted activity data for other facilities were collected from the Federal Aviation Administration (FAA)'s 2010 Terminal Area Forecast (TAF). A data collection survey was sent to all facilities in the region for gathering specific inputs along with activity data required for the airport modeling. The collected data was analyzed against the TAF data. Exhibit 2.3 shows an example survey form employed for this study. In this survey process, detailed information on LTO's was obtained for all major airports and limited survey results were obtained for other airports. Our aviation team expertise was utilized to deduce LTO's distribution. Detailed information on ground support equipment (GSE)and auxiliary power units (APU) were not obtained for this study due to time and resource required to gather the data. However other required information required to estimate GSE and APU's emissions and emission credits were collected.

EXHIBIT 2.3

Sample Survey Form

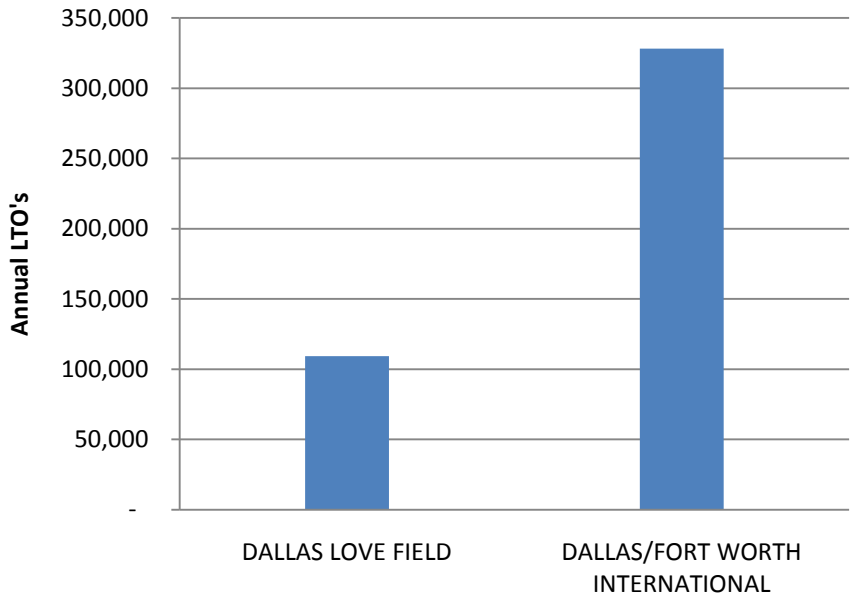
	Analysis Years	1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
Operations												
Operations	Annual Operations											
	Annual LTOs	0	0	0	0	0	0	0	0	0	0	0
	Operation Source	Information requested from Airport Staff										
Fleet Mix												
Fleet Mix	Fleet Mix (LTOs by Aircraft Type)	Requested (please attach)	Requested (please attach)	Requested (please attach)	Requested (please attach)	Requested (please attach)	Requested (please attach)	Requested (please attach)	Requested (please attach)	Requested (please attach)	Requested (please attach)	Requested (please attach)
	Source/Comments	Information requested. Please see tab "Example-fleet mix" for example.				Employ 2010 fleet mix and forecasted operations; incorporating airport staff recommendations and future fleet change assumption where applicable or available.						
Performance (Taxi-Time)												
Taxi Time	Taxi-In (Minutes)											
	Taxi-Out (Minutes)											
	Comments	EDMS default, unless airport specific data is provided.										
GSE												
GSE	Total GSE Units											
	% of Electric Vehicle											
	% Alternative Fuel Vehicle (AFV)											
	Comments	If airport specific data unavailable, aircraft specific EDMS default will be employed for baseline emission. Emission credits from AFV/electric will be post processed.										
APU												
APU	APU Units											
	APU Operating Time / LTO (minutes)											
	% of Electric											
	% Alternative Fuel											
	Comments	If airport specific data unavailable, aircraft specific EDMS default will be employed for baseline emission. Emission credits from AFV/electric will be post processed.										

Major Airports

Major airports which include Dallas/Fort Worth International Airport (DFWIA) and Dallas Love Field (DAL) were contacted to gather these input parameters. Actual input parameter work sheets sent to each major airport are attached in Appendix B. Exhibit 2.4 shows 2008 annual LTOs for the major airports.

EXHIBIT 2.4

2008 Annual LTOs for Major Airports

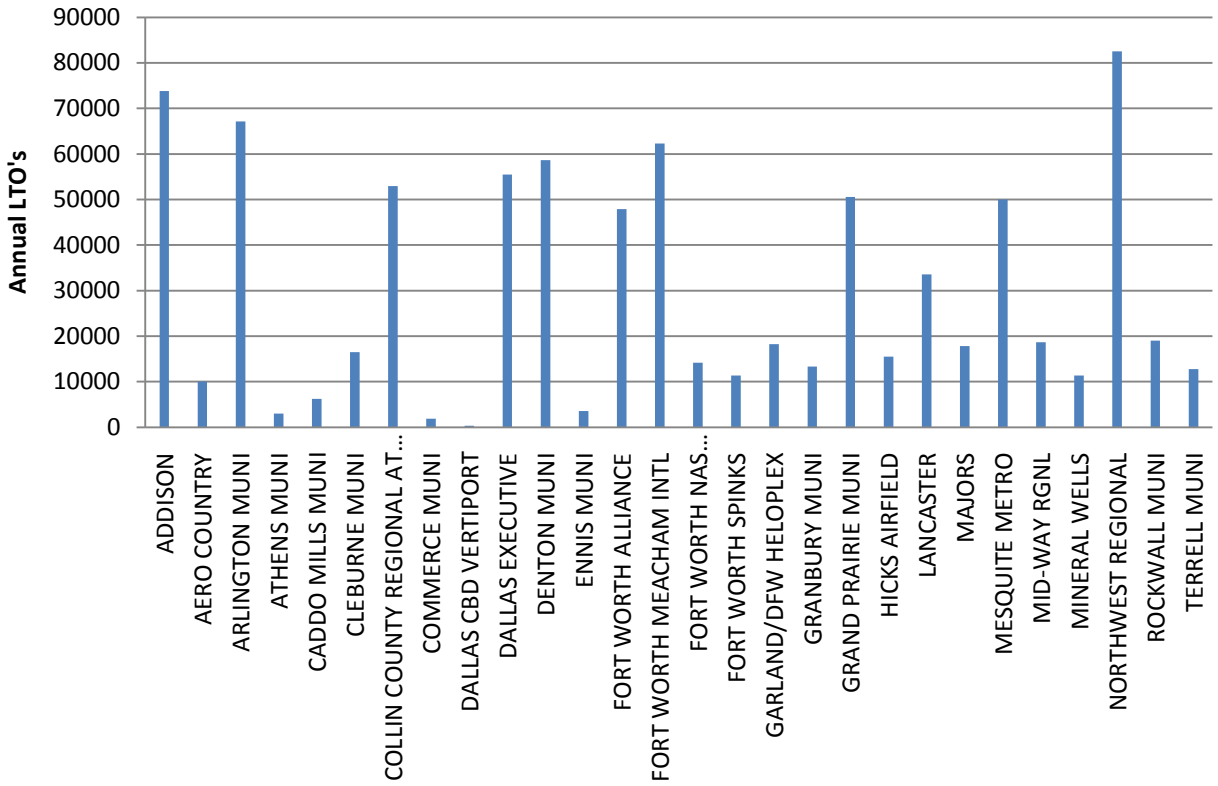


NPIAS and Significant Airports

A data collection survey was sent out to all other facilities for their inputs for the modeling parameters and fleet distribution. The North Central Texas Council of Governments (NCTCOG) Aviation Team conducted a data collection survey to collect most up to date data on the aircraft activity, fleet mix distribution, GSE and APU inventory from rest of the facilities. Compiled data was reviewed and data gaps identified were discussed and where possible was filled in by the experts from aviation team. Exhibit 2.5 shows 2008 annual LTOs for the NPIAS and significant airports.

EXHIBIT 2.5

2008 Annual LTOs for NPIAS and Significant Airports

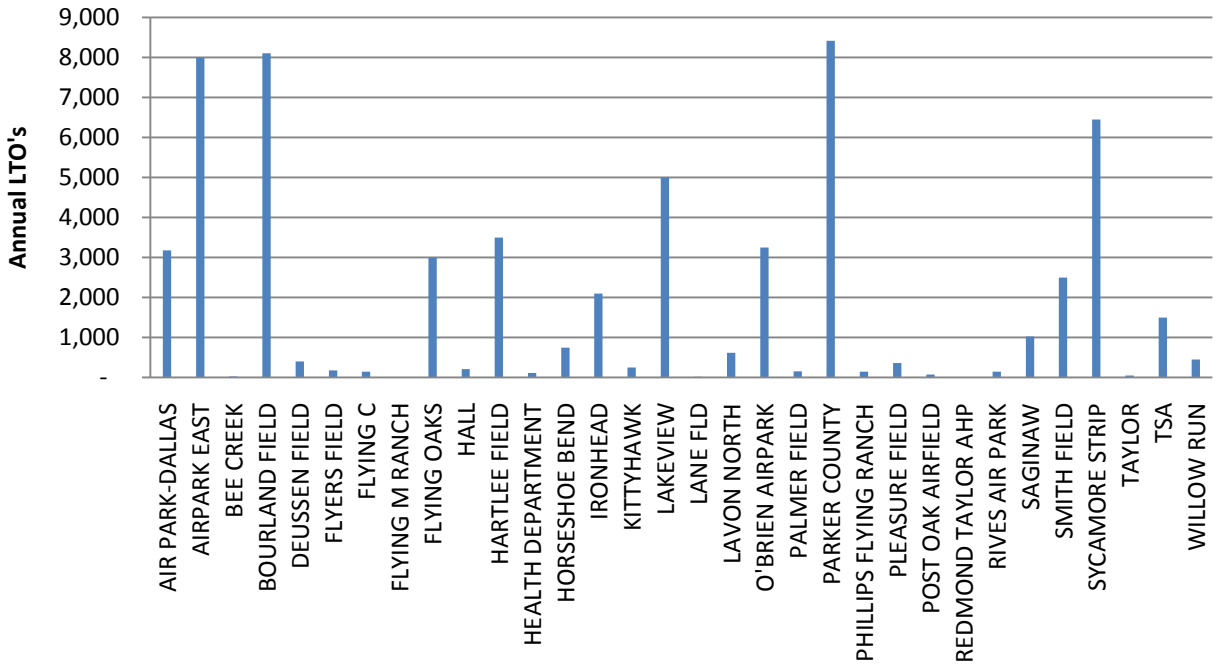


Other Airports

Similar to National Plan of Integrated Airport Systems (NPIAS) and significant airports, a collection survey was sent to all other facilities for their inputs for the modeling parameters and fleet distribution. NCTCOG's Aviation Team conducted a data collection survey to collect most up to date data on the aircraft activity, fleet mix distribution, GSE and APU inventory from rest of the facilities. Compiled data was reviewed and data gaps identified were discussed and where possible was filled in by the experts from aviation team. Exhibit 2.6 shows 2008 annual LTOs for the other airports.

EXHIBIT 2.6

2008 Annual LTOs for Other Airports



2.3 Backcast & Forecast Factors

After collecting historic and forecasted operations data for all 344 airports, for all analysis years, a backcast and forecast factors were estimated for all analysis years based on 2008 operations.

Forecast/ Backcast factor = [operations of each analysis year]/ [operations of 2008]

The forecast /back ast factors are organized in Appendix B.

CHAPTER 3: EDMS INPUT PARAMETERS

After gathering the annual land and takeoff (LTO)'s for all airports and in order to estimate emissions, LTO's must be assigned to specific aircraft and engine types. This chapter describes techniques and data sources for determining the critical variables in the inventory calculations. Emission and Dispersion Modeling system (EDMS) version 5.1.3 was used to estimate the emissions for all airports in the region. The model was developed by the Federal Aviation Administration (FAA) in cooperation with the United States Air Force (USAF).

3.1 EDMS Inputs

When an emission inventory is being created for a particular area, the fleet make-up, aircraft activity, and times-in-mode need to be specific to that area. Engine emission indexes, on the other hand, depend on the engine design and are available as options to select in the EDMS model. In this study following factors used in creating an inventory were collected for individual airports where available.

1. Weather Data
2. Fleet-Mix and Engine Assignments
3. Taxi-in and Taxi-out times
4. GSE and APU Assignment
5. Control strategies in place and future plans

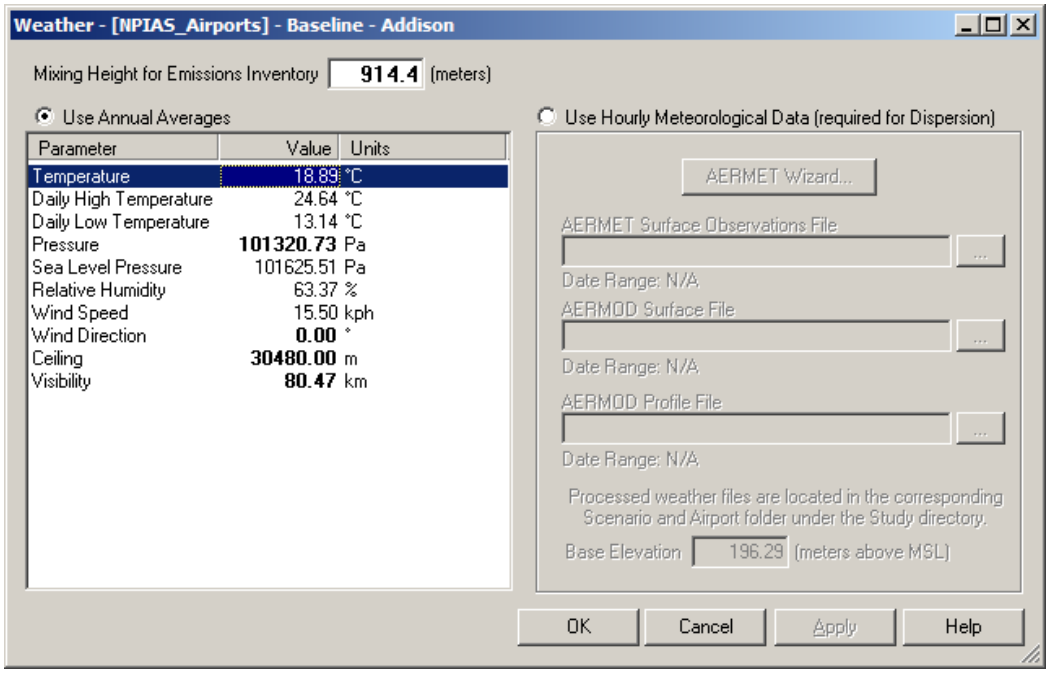
Weather Data

The EDMS default meteorological data setting which is specific to each scenario-airport combination was employed for this study. Annual average weather values were used for all airports in the region. The following weather parameters are used by EDMS. Detailed information on individual weather parameters can be found in the EDMS manual. Exhibit 3.1 shows the Addison airport weather data used for this study

1. Mixing Height
2. Temperature (ambient, daily high, daily low)
3. Relative humidity
4. Wind direction
5. Wind speed
6. Sea level pressure
7. Cloud ceiling height
8. Horizontal visibility

EXHIBIT 3.1

Addison Airport Weather Data



Fleet-Mix and Engine Assignments

For a single LTO cycle, aircraft emissions vary considerably depending on the category of aircraft and the resulting typical flight profile. Aircraft activity for individual facility is a critical modeling element for this analysis. But obtaining site specific fleet mix was not possible for all the facilities. Thus, emphasis was provided on gathering total operations of facilities where LTO's by individual aircraft type was not available. Even for the airports where LTO's were available by aircraft type, some aircrafts types reported could not be matched with aircraft types available in the EDMS model. These EDMS unidentifiable aircrafts were matched with closely related available aircraft types. Finally some that could not be matched in any manner were excluded from the study but their LTO's were redistributed to the identified aircrafts. Appendix B contains fleet mix distribution collected and utilized for emission modeling.

The aircraft engines are the source of emissions of the key pollutants that result from fuel combustion. Emission rates vary depending on the fuel consumption rate and engine specific design factors. EDMS treats each aircraft as a combination of a specific aircraft type and engine type. For each aircraft type

there may be several different engine types available for use and emission factors may vary from engine to engine. Consequently, different aircraft may generate identical emissions because they are equipped with identical engines, or older aircraft may be outfitted with technologically newer engines and generate fewer emissions. Where applicable most common or the most widely used engine available in the EDMS options (Exhibit 3.2) for that particular aircraft type was utilized in this study. For an aircraft if the reported engine type was not available as an option in EDMS model, it was reallocated to the engines data that was available. Exhibit 3.3 shows the data sources of the fleet mix.

EXHIBIT 3.2

EDMS Aircraft and Engine Combination Window

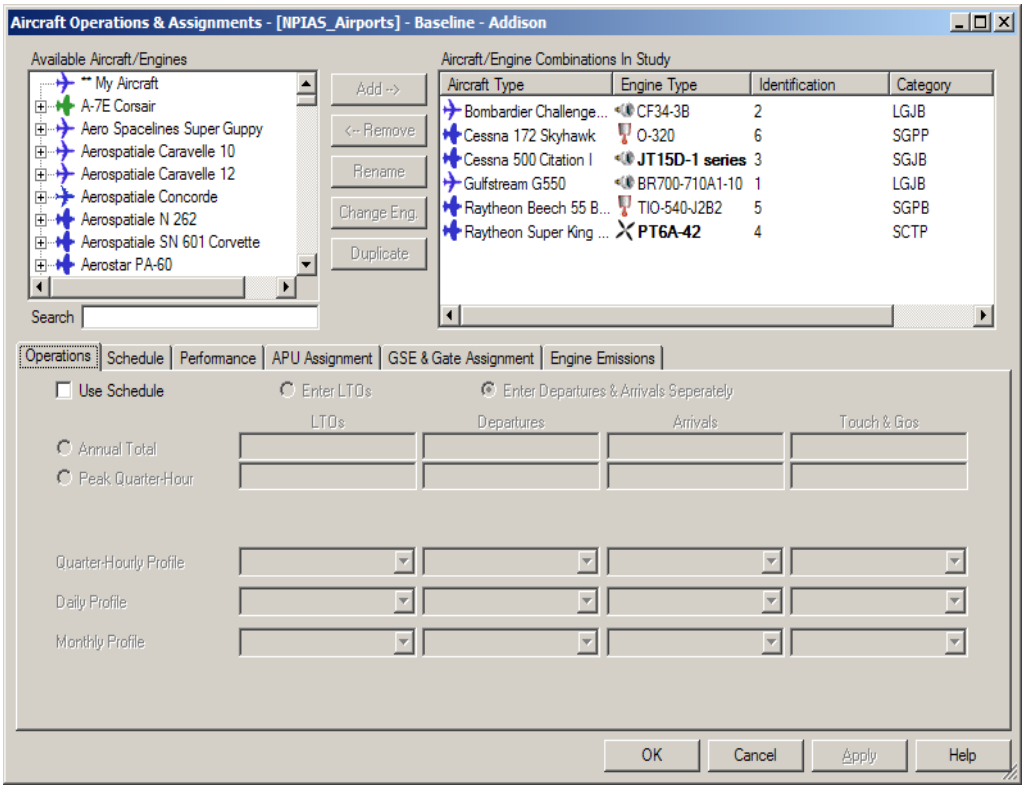


EXHIBIT 3.3

LTO's by Aircraft Data Identification

Airport Name	Fleet Mix Source
Major Airports	Airport Staff
NPIAS and Significant Airports	Airports and Aviation Team
Other Airports	Aviation Team

Dallas/Fort Worth International Airport (DFWIA) staff provided fleet mix and aircraft activity with engine combination for each aircraft type for modeled analysis 2009 through 2030. For analysis years between 1996 and 2007, previously collected 2002 fleet activity was utilized to model activity. For analysis year 2008 previously collected 2008 fleet activity along with 2009 fleet mix was employed. DAL airport staff provided flight count information for year 2002, 2010 and 2012. 2002 was utilized for historic years and 2012 was utilized to distribute future year fleet distribution.

Military airbase, NFW airport provided fleet mix distribution for year 2010. Fleet mix distribution for all analysis years were based on 2010 sample fleet mix. For all other airports in the region, survey results along with aviation team expertise were utilized to identify fleet mix. Total LTO were distributed according to this fleet mix. Exhibit 3.4 shows the most common aircraft for each category was recommended by the aviation team for modeling purposes. See Appendix B for detailed modeled fleet mix utilized for all airports.

EXHIBIT 3.4

Recommended Aircrafts Type

Aircraft Category	Aircraft Type
Jet (Heavy)	Gulfstream V (550)
Jet (Midsize)	Challenger 605
Jet (Light)	Cessna Citation 500/501
Turbo - Prop	Beechcraft King Air 200
Multi -Engine (Piston)	Beech Baron 55/58
Singe Engine (Piston)*	Cessna 172 Skyhawk at airports. For Heliports (T57 and 49T) use Robinson R44.

Taxi-in and Taxi-out Times

Taxi/idle time, whether from the runway to the gate (taxi/idle-in) or from the gate to the runway (taxi/idle-out), depends on the size and layout of the airport, the amount of traffic or congestion on the ground, and airport-specific operational procedures. Taxi/idle time is the most variable of the LTO modes. Taxi/idle time can vary significantly for each airport throughout the day, as aircraft activity changes, and seasonally, as general travel activity increases and decreases. In this study airport specific taxi-time were employed to estimate emissions for all modeled airports. Exhibit 3.5 shows the EDMS window to input taxi-in and taxi-out durations. All other parameters such as Takeoff, Climbout, Approach, and Landing Roll are automatically selected when user selects the aircraft and engine combination. Exhibit 3.6 shows taxi-time used for modeling major airports. A detailed list of taxi-times for all reports can be found in Appendix B

EXHIBIT 3.5

EDMS Taxi-in and Taxi-out Times

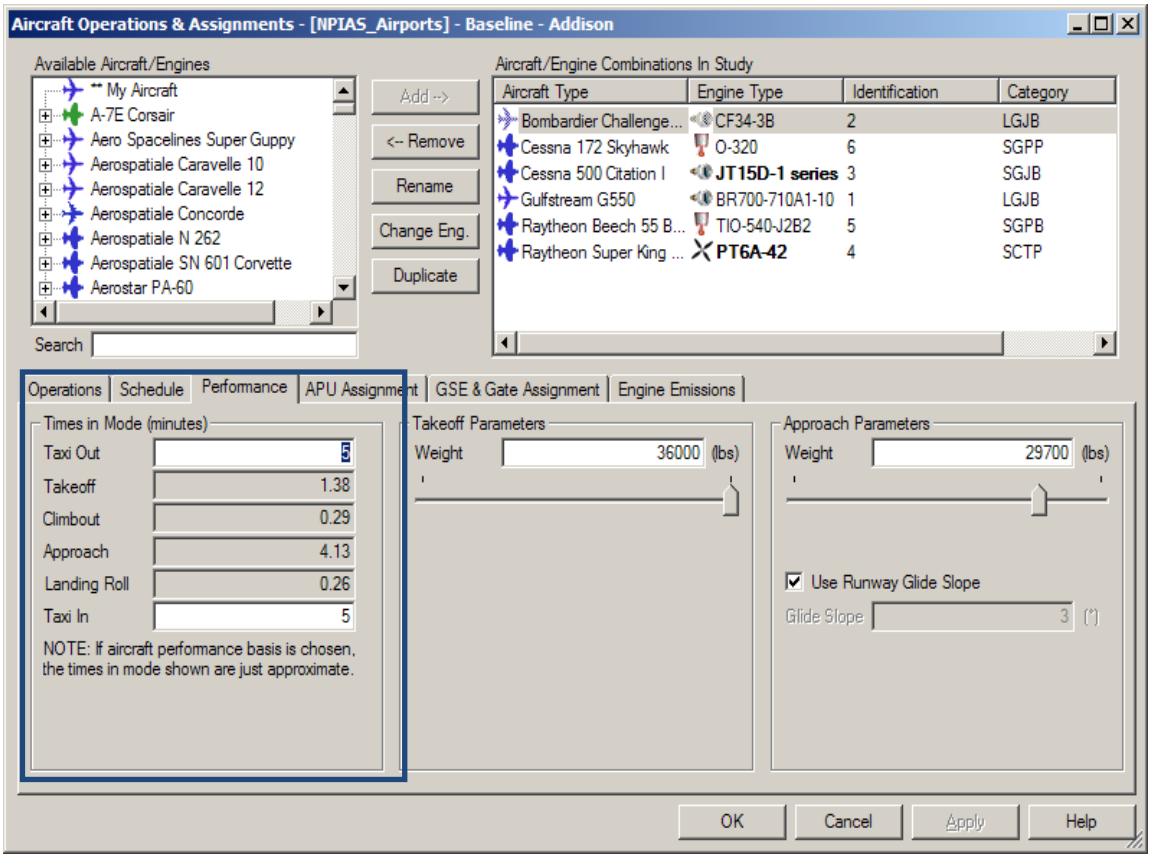


EXHIBIT 3.6

EDMS Taxi-in and Taxi-out Times of Major Airports

YEAR		1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
DFWIA	TAXI-IN (Minutes/LTO)	15.4	15.4	15.4	15.4	15.3	16.1	17.0	17.9	18.7	19.5	20.5
	TAXI-OUT (Minutes/LTO)	9.6	9.6	9.6	9.6	9.7	10.1	10.7	11.4	11.9	12.5	13.1
DAL	TAXI-IN (Minutes/LTO)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	TAXI-OUT (Minutes/LTO)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Auxiliary Power Units and Ground Support Equipment Assignment

When large aircrafts are on the ground with their engines shut down, they need power and preconditioned air to maintain the aircraft's operability. If a ground-based power and air source is unavailable, an auxiliary power unit (APU), which is part of the aircraft, is operated. These units are essentially small jet engines, which generate electricity and compressed air. They burn jet fuel and generate exhaust emissions like larger engines. In use, APUs essentially runs at full throttle. For this study EDMS defaults APU's were employed for all the airports. Exhibit 3.7 shows the EDMS window where APU is assigned for aircraft types.

Ground support equipment (GSE) comprises vehicles or engines needed to support the aircraft while at the terminal or initiating takeoff. Prior to aircraft departure, GSE are present to load baggage, food and fuel. When an aircraft departs from a gate, a tug may be used to push or tow the aircraft away from the gate and to the taxiway. Exhibit 3.8 shows the EDMS window where GSE is assigned for aircraft types .
Aircraft require a mix of ground support equipment that includes the following:

- External air conditioners
- Compressors to help with engine starts
- Aircraft tractors or tugs
- Baggage tractors
- Belt loaders
- Cabin service trucks
- Catering trucks
- Lavatory trucks
- Water supply trucks
- External generators
- Hydrant fueling trucks

EXHIBIT 3.7

EDMS Auxiliary Power Units Assignment

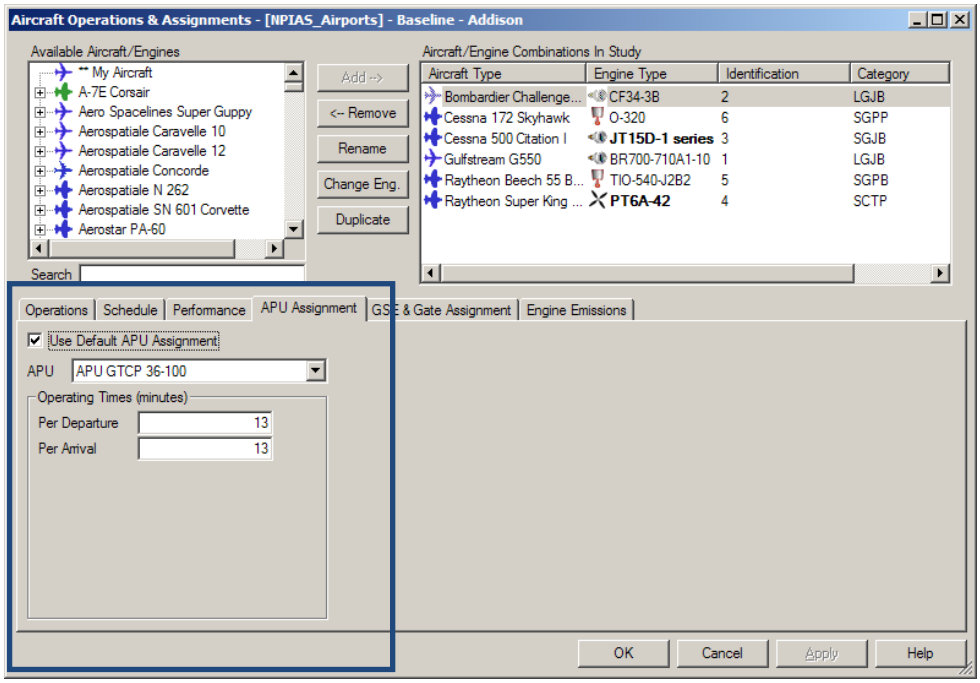
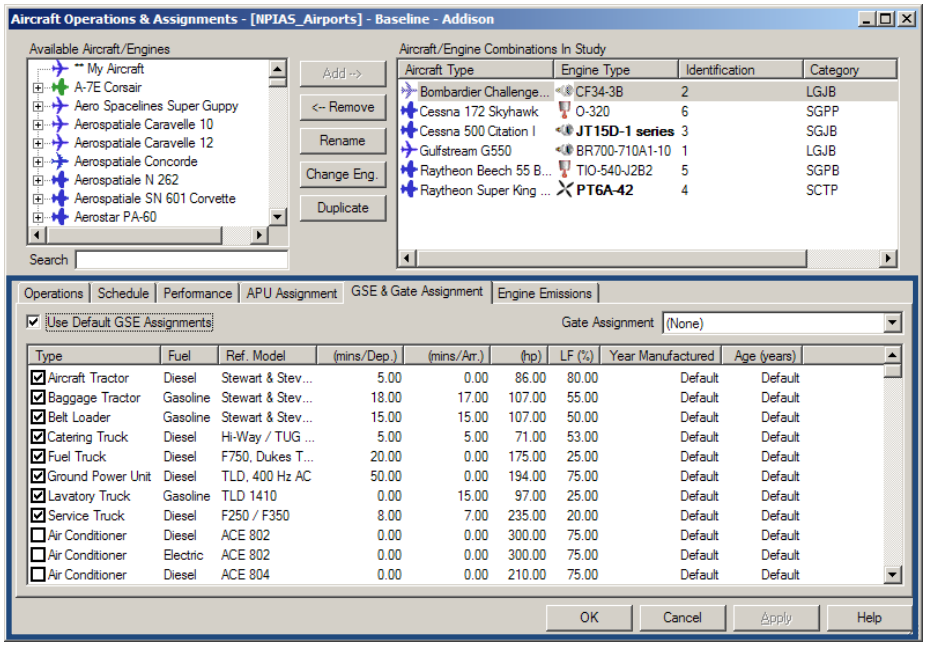


EXHIBIT 3.8

EDMS Ground Support Equipments



Control strategies in place and future plans

A set of control strategies was identified from the reported survey which included percentage conversion of GSE and APU to electric. The base emissions were post processed to reflect such emission credits from the GSE and APU electric conversions. These following control strategies were considered for airports. See Appendix B for airport specific percentage of APU and GSE conversion assignment.

CHAPTER 4: EMISSION MODELING

Airports emission inventories for all the airports in the North Central Texas Area were developed using the Federal Aviation Administration (FAA)'s Emission and Dispersion Modeling System (EDMS) model. This model is designed to estimate air quality impacts of airport emission sources, particularly aviation sources. In this study emissions from following sources were calculated by:

- Aircraft
- Auxiliary power units
- Ground support equipment

4.1 Aircraft Methodology

The Environmental Protection Agency (EPA) and FAA's EDMS model was utilized to develop the Dallas-Fort Worth Area Airport Emission Inventory.

EDMS uses the following equation to estimate aircraft emissions:

$$E_{il} = \Sigma\, T_k \times NE_{jl} \times (FF_{jlk} / 1000) \times (EI_{ilk}) \times LTO_{jl}$$

Where:

E_{il} = Emission of pollutant i in pounds produced by the aircraft make j and model l

T_k = Operating time in mode k (min)

NE_{jl} = Number of engines associated with aircraft make j and model l;

FF_j = Fuel flow for individual engine used on aircraft make type j and model l operating in mode (lbs/min);

EI_{ij} = Emission index for pollutant i for each engine associated with aircraft make j and model l operating in mode k (lbs of pollutant /1,000 lbs of fuel)

i = Pollutant (i.e, HC, CO, NOx SO2)

j = Aircraft make (e.g. Boeing, McDonald Douglas, Airbus)

l = Aircraft model (e.g., B-737 300 series)

k = Mode (approach, taxi, climbout)

Similarly, emissions from auxiliary power units are estimated using the following equation:

$$E_{ij} = T \times (FF_j/1{,}000) \times (EI_{ij})$$

Where:

E_{ij} = Emission of pollutant i in pounds produced by the auxiliary power unit installed on aircraft type j for one LTO cycle

T = Operating time per LTO cycle (min)

FF_j = Fuel flow for each auxiliary power unit used on aircraft type j (lbs/min)

EI_{ij} = Emission index for pollutant i for each auxiliary power unit used on aircraft type j (lbs of pollutant /1,000 lbs of fuel)

i = Pollutant (i.e, HC, CO, NOx SO2)

j = Aircraft type (e.g., B-737, MD-11)

EDMS calculates emissions of the following pollutants:

1. **CO2** (carbon dioxide) for aircraft only,
2. **CO** (carbon monoxide),
3. **THC** (total hydrocarbons) for aircraft and APUs only,
4. **NMHC** (non-methane hydrocarbons),
5. **VOC** (volatile organic compounds),
6. **TOG** (total organic compounds),
7. **NOx** (nitrogen oxides),
8. **SOx** (sulfur oxides),
9. **PM10** (particulate matter, 10 microns)
10. **PM2.5** (particulate matter, 2.5 microns), and
11. 394 **Speciated Organic Gases**
    a. 45 Hazardous Air Pollutants (HAPs)
    b. 349 non-toxic compounds

Lead Emission Estimation

Since lead emissions were not part of the EDMS model output, Lead (Pb) emissions from aircrafts and helicopters were calculated using EPA's "Calculating Piston-Engine Aircraft Airport Inventories for Lead for the 2008 National Emissions Inventory" methodologies.

LTO PB (tons) = (Piston Engine LTO) x (Avgas Pb g/LTO) (1- Pb retention) /(907,181 g/ton)

EPA's study suggests that about five percent of lead from the fuel is retained in the engine and engine oil. Thus, the emitted fraction is 0.95. The concentration of lead in avgas is 2.12 g/gal. This concentration was multiplied by the weighted average fuel usage rate for four types of Robinson helicopter engines to produce an overall average emission factor of 6.6 grams of lead per LTO of piston-engine powered helicopter. Similarly, lead content of 2.12g/gal of avgas were multiplied by the weighted average fuel usage rate of various types of piston engines to produce an overall average value of 7.34 grams of lead per LTO. Exhibit 4.1 shows the emission factors utilized to calculate the lead emissions.

EXHIBIT 4.1

EPA Recommended Lead Emission Factors

Engine Type	Lead Emission Factor (Grams/LTO)	Lead Emission Factor with Retention factor 5% (Grams/LTO)	Lead Emission Factor with Retention (kg/LTO)	Lead Emission Factor with Retention (Tons/LTO)
Piston Engine Helicopter	6.60	6.27	**6.27E-03**	**6.9E-06**
Piston Engine Aircrafts	7.34	6.97	**6.97E-03**	**7.7 E-06**

Simplified Equation:

Emissions (KG) = LTO x EF_R (kg/LTO)

Where,

EF_R = Lead emission factors with 5% retention factored in.

Since these lead emission factors are applicable to LTO and not specific to any mode, for simplifying calculations and ease reporting, emissions factors were applied to the Take-off mode, for aircrafts with piston engines only.

4.2 Ground Support Equipment Methodology

Ground Support Equipment (GSE) emission factors used by EDMS are derived from EPA's NONROAD2005 model and are based on the following variables: fuel, brake horsepower and load factor. In addition, a deterioration factor is applied based on the age of the engine. GSE emission factors are given in grams per horsepower-hour. EDMS allows users to select the EPA-derived national fleet average age for a particular vehicle type, or to specify the exact age of an individual piece of equipment.

$$E_{gse} = \sum_{i=1}^{n} [(ZHF_i) \cdot (Power_i) \cdot (LF_i) \cdot (Activity_i) \cdot (DF_i)]$$

Where:

E_{gse} = Emission estimate for ground support equipment

N = Number of units in the fleet

ZHF = Zero-hour emission factor for equipment category i (g/bhp-hr)

Power = Rated power for equipment i (break horsepower)

LF = Load factor for equipment i (% of maximum power)

Activity = Activity for equipment i (hours per year of use)

DF = Deterioration factor for equipment i (factor >1.00 expressing increased emissions due to aging)

i = Specific equipment type (e.g., baggage tractor, belt loader, catering truck, lavatory truck, water service truck, and fuel hydrant truck)

4.3 Auxiliary Power Units Methodology

Emission reductions associated with the use of gates equipped with electricity and preconditioned air was also quantified. The use of these gates reduces the amount of time auxiliary power units (APUs) are operating during an LTO cycle by percent identified by the airport personnel. APU emission estimates for aircraft operations were obtained directly from the EDMS model. The uncontrolled APU emission estimates from EDMS were reduced by a percentage to reflect the use of electricity and preconditioned air.

CHAPTER 5: EMISSION RESULTS

Emission estimates from the analysis are organized by counties for major air pollutants in Exhibit 5.1. Appendix D contains aggregated summary tables and emission tables for the entire analysis in two access databases.

EXHIBIT 5.1

Emissions of Major Pollutants by County without Controls

2011 Airport Emission Inventory without Controls 12 County MSA Totals Tons per Year											
CO											
Analysis Years	1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
COLLIN	622	621	972	648	470	461	455	458	469	483	498
DALLAS	4,697	4,698	5,064	4,385	2,931	2,924	2,992	3,107	3,189	3,295	3,415
DENTON	1,603	1,601	1,368	1,464	1,622	1,651	1,685	1,729	1,780	1,836	1,894
ELLIS	100	100	129	228	224	221	218	217	216	216	216
HENDERSON	19	19	20	25	25	25	25	25	25	25	25
HOOD	35	35	52	114	113	111	111	110	110	110	110
HUNT	98	98	155	199	195	191	189	187	187	187	187
JOHNSON	125	125	125	132	131	132	133	135	138	142	146
KAUFMAN	118	118	156	141	132	124	117	114	112	112	111
PARKER	234	234	234	232	229	227	224	223	222	222	222
ROCKWALL	213	213	213	211	210	209	208	207	207	207	207
TARRANT	16,449	16,259	16,113	9,603	7,600	7,089	6,792	6,981	7,394	7,941	8,611
TOTAL	24,314	24,120	24,600	17,381	13,880	13,363	13,147	13,492	14,050	14,774	15,641

2011 Airport Emission Inventory without Controls 12 County MSA Totals Tons per Year											
	THC										
Analysis Years	1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
COLLIN	21.46	21.46	35.21	24.89	18.28	18.95	19.65	20.37	21.13	21.91	22.73
DALLAS	178.48	178.94	193.23	192.15	169.85	181.59	199.70	217.11	225.36	233.98	242.94
DENTON	31.25	31.25	25.97	28.88	33.17	34.26	35.38	36.55	37.77	39.02	40.32
ELLIS	1.85	1.85	2.44	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61
HENDERSON	0.20	0.20	0.21	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
HOOD	0.60	0.60	0.91	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
HUNT	1.54	1.54	2.76	3.78	3.78	3.78	3.78	3.78	3.78	3.78	3.78
JOHNSON	2.07	2.07	2.07	2.29	2.33	2.39	2.46	2.53	2.60	2.67	2.75
KAUFMAN	3.56	3.56	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
PARKER	4.89	4.89	4.89	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95
ROCKWALL	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59
TARRANT	1,235.92	1,224.85	1,220.85	810.52	750.61	783.97	829.99	880.65	918.60	956.44	995.80
TOTAL	1,485.40	1,474.80	1,496.95	1,082.75	998.25	1,045.18	1,111.21	1,181.24	1,229.47	1,278.04	1,328.56

	NMHC										
Analysis Years	1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
COLLIN	29.56	29.29	48.55	31.69	22.12	22.10	22.21	22.67	23.37	24.18	25.05
DALLAS	264.15	262.19	282.63	258.07	204.02	212.46	229.06	246.56	254.82	264.07	273.99
DENTON	34.66	34.27	27.73	29.99	33.97	34.32	34.82	35.68	36.76	37.94	39.20
ELLIS	1.91	1.89	2.57	4.88	4.74	4.63	4.54	4.50	4.48	4.47	4.47
HENDERSON	0.19	0.18	0.19	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
HOOD	0.63	0.62	0.94	2.00	1.95	1.91	1.88	1.87	1.86	1.86	1.86
HUNT	1.69	1.66	3.14	4.10	3.96	3.84	3.76	3.72	3.71	3.70	3.70
JOHNSON	2.75	2.71	2.70	2.75	2.67	2.64	2.62	2.65	2.71	2.77	2.85
KAUFMAN	5.11	5.06	6.90	6.34	6.02	5.75	5.53	5.42	5.38	5.36	5.35
PARKER	5.33	5.28	5.27	5.16	5.05	4.96	4.87	4.83	4.81	4.81	4.80
ROCKWALL	3.53	3.49	3.47	3.39	3.34	3.30	3.26	3.25	3.24	3.24	3.24
TARRANT	1,734.28	1,702.82	1,680.46	1,062.90	953.22	962.76	993.50	1,042.47	1,083.12	1,126.24	1,172.55
TOTAL	2,083.80	2,049.46	2,064.55	1,411.50	1,241.31	1,258.89	1,306.30	1,373.85	1,424.49	1,478.87	1,537.30

2011 Airport Emission Inventory without Controls 12 County MSA Totals Tons per Year											
VOC											
Analysis Years	1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
COLLIN	29.51	29.22	48.47	31.52	21.94	21.88	21.96	22.39	23.08	23.87	24.74
DALLAS	264.85	262.70	283.14	257.64	202.66	210.79	227.08	244.33	252.47	261.61	271.43
DENTON	33.98	33.56	27.10	29.26	33.13	33.41	33.86	34.68	35.72	36.86	38.08
ELLIS	1.86	1.84	2.50	4.77	4.63	4.51	4.41	4.37	4.35	4.34	4.34
HENDERSON	0.18	0.17	0.19	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
HOOD	0.62	0.61	0.91	1.94	1.89	1.85	1.82	1.80	1.80	1.79	1.79
HUNT	1.65	1.63	3.09	4.01	3.86	3.74	3.65	3.62	3.60	3.60	3.60
JOHNSON	2.73	2.69	2.68	2.72	2.63	2.59	2.57	2.60	2.65	2.72	2.79
KAUFMAN	5.11	5.05	6.89	6.31	5.99	5.70	5.47	5.36	5.31	5.29	5.28
PARKER	5.22	5.17	5.15	5.03	4.92	4.83	4.74	4.69	4.68	4.67	4.66
ROCKWALL	3.42	3.37	3.36	3.27	3.22	3.17	3.14	3.12	3.12	3.12	3.12
TARRANT	1,739.30	1,706.68	1,683.40	1,062.66	951.88	960.03	989.59	1,037.84	1,078.12	1,120.96	1,167.05
TOTAL	2,088.44	2,052.69	2,066.87	1,409.36	1,236.97	1,252.73	1,298.52	1,365.03	1,415.11	1,469.06	1,527.12

NOX											
Analysis Years	1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
COLLIN	31.67	29.80	49.00	25.74	15.22	12.71	10.58	9.56	9.34	9.47	9.75
DALLAS	618.31	603.81	651.00	609.07	216.09	210.82	215.73	225.24	228.93	235.34	243.25
DENTON	32.18	29.96	22.59	20.01	19.93	16.80	14.47	13.51	13.38	13.63	14.05
ELLIS	1.40	1.30	2.10	4.35	3.71	3.14	2.73	2.53	2.45	2.42	2.41
HENDERSON	0.18	0.16	0.17	0.17	0.14	0.12	0.11	0.10	0.10	0.10	0.10
HOOD	0.53	0.49	0.72	1.18	0.95	0.74	0.60	0.53	0.50	0.50	0.49
HUNT	3.11	2.99	6.44	8.00	7.41	6.92	6.59	6.44	6.39	6.36	6.36
JOHNSON	4.70	4.44	4.35	3.84	3.37	2.97	2.67	2.55	2.54	2.58	2.64
KAUFMAN	6.36	5.98	8.06	6.08	5.00	4.01	3.20	2.78	2.61	2.54	2.52
PARKER	4.12	3.86	3.78	2.93	2.40	1.95	1.62	1.46	1.40	1.37	1.36
ROCKWALL	2.47	2.25	2.19	1.60	1.25	0.96	0.76	0.68	0.65	0.64	0.64
TARRANT	5,486.75	5,329.02	5,000.63	3,813.13	3,730.05	3,905.68	4,092.80	4,379.98	4,730.30	5,116.54	5,544.01
TOTAL	6,191.76	6,014.07	5,751.04	4,496.11	4,005.51	4,166.80	4,351.85	4,645.36	4,998.59	5,391.51	5,827.58

2011 Airport Emission Inventory without Controls 12 County MSA Totals Tons per Year											
SO x											
Analysis Years	**1996**	**2000**	**2002**	**2008**	**2011**	**2014**	**2017**	**2020**	**2023**	**2026**	**2029**
COLLIN	3.66	3.66	6.09	3.08	2.09	2.16	2.23	2.31	2.40	2.49	2.58
DALLAS	83.39	83.72	91.29	77.82	28.28	30.12	33.19	36.16	37.55	39.00	40.51
DENTON	4.79	4.80	3.86	3.08	3.38	3.49	3.60	3.72	3.84	3.98	4.11
ELLIS	0.24	0.24	0.36	0.60	0.56	0.56	0.55	0.55	0.55	0.55	0.55
HENDERSON	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
HOOD	0.08	0.08	0.13	0.19	0.17	0.17	0.17	0.17	0.17	0.17	0.17
HUNT	0.41	0.41	0.84	0.97	0.93	0.93	0.93	0.93	0.93	0.93	0.93
JOHNSON	0.56	0.56	0.56	0.45	0.43	0.44	0.45	0.46	0.47	0.49	0.50
KAUFMAN	0.70	0.70	0.96	0.68	0.64	0.63	0.63	0.63	0.63	0.63	0.63
PARKER	0.63	0.63	0.63	0.46	0.43	0.42	0.42	0.42	0.42	0.42	0.42
ROCKWALL	0.46	0.46	0.46	0.30	0.28	0.28	0.27	0.27	0.27	0.27	0.27
TARRANT	589.84	583.72	556.71	403.82	396.95	427.67	461.07	501.47	542.96	587.66	637.20
TOTAL	684.82	679.04	661.93	491.46	434.16	466.89	503.54	547.13	590.23	636.62	687.91

PM10											
Analysis Years	**1996**	**2000**	**2002**	**2008**	**2011**	**2014**	**2017**	**2020**	**2023**	**2026**	**2029**
COLLIN	1.67	1.24	1.93	1.06	0.72	0.68	0.64	0.60	0.61	0.63	0.65
DALLAS	24.40	19.75	20.04	18.22	7.56	7.70	8.04	8.40	8.57	8.81	9.12
DENTON	2.05	1.26	0.83	0.67	0.75	0.70	0.63	0.59	0.59	0.61	0.63
ELLIS	0.10	0.05	0.07	0.14	0.13	0.12	0.11	0.10	0.10	0.09	0.09
HENDERSON	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HOOD	0.04	0.02	0.02	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01
HUNT	0.15	0.09	0.18	0.21	0.20	0.19	0.18	0.18	0.17	0.17	0.17
JOHNSON	0.25	0.16	0.15	0.12	0.11	0.11	0.10	0.09	0.09	0.09	0.10
KAUFMAN	0.32	0.24	0.30	0.24	0.23	0.20	0.18	0.16	0.16	0.16	0.16
PARKER	0.28	0.16	0.13	0.09	0.08	0.08	0.07	0.06	0.06	0.06	0.06
ROCKWALL	0.20	0.09	0.07	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01
TARRANT	185.33	158.30	143.34	101.89	96.09	95.82	95.86	96.85	96.19	95.26	93.89
TOTAL	214.81	181.37	167.06	122.71	105.92	105.62	105.83	107.06	106.56	105.90	104.88

2011 Airport Emission Inventory without Controls 12 County MSA Totals Tons per Year											
PM2.5											
Analysis Years	1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
COLLIN	1.63	1.22	1.89	1.05	0.71	0.67	0.63	0.59	0.60	0.62	0.64
DALLAS	23.99	19.48	19.78	18.06	7.48	7.62	7.97	8.34	8.51	8.75	9.06
DENTON	2.00	1.23	0.81	0.66	0.74	0.69	0.62	0.58	0.59	0.60	0.62
ELLIS	0.10	0.05	0.07	0.14	0.13	0.12	0.11	0.10	0.09	0.09	0.09
HENDERSON	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HOOD	0.03	0.02	0.02	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01
HUNT	0.15	0.09	0.18	0.21	0.19	0.19	0.18	0.17	0.17	0.17	0.17
JOHNSON	0.24	0.16	0.14	0.12	0.11	0.11	0.10	0.09	0.09	0.09	0.09
KAUFMAN	0.32	0.23	0.30	0.23	0.22	0.20	0.18	0.16	0.16	0.16	0.16
PARKER	0.28	0.16	0.13	0.09	0.08	0.07	0.07	0.06	0.06	0.06	0.06
ROCKWALL	0.19	0.09	0.06	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.00
TARRANT	182.99	156.74	142.02	101.29	95.62	95.41	95.51	96.54	95.88	94.95	93.56
TOTAL	211.93	179.47	165.41	121.90	105.33	105.11	105.39	106.67	106.18	105.51	104.48

Lead (Pb)											
Analysis Years	1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
COLLIN	0.28	0.40	0.39	0.31	0.25	0.26	0.26	0.27	0.28	0.29	0.30
DALLAS	1.14	1.21	1.24	1.30	1.07	1.12	1.18	1.23	1.28	1.33	1.38
DENTON	1.13	1.01	1.06	1.07	1.17	1.21	1.24	1.28	1.32	1.36	1.40
ELLIS	0.09	0.11	0.18	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
HENDERSON	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
HOOD	0.03	0.04	0.04	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
HUNT	0.09	0.14	0.14	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
JOHNSON	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.12	0.13	0.13
KAUFMAN	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
PARKER	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
ROCKWALL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
TARRANT	1.34	1.46	1.28	1.00	0.73	0.77	0.80	0.84	0.88	0.92	0.97
TOTAL	4.67	4.95	4.91	4.74	4.29	4.42	4.56	4.70	4.84	4.98	5.13

2011 Airport Emission Inventory without Controls 12 County MSA Totals Tons per Year											
TOG											
Analysis Years	1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
COLLIN	31.17	30.87	51.08	33.15	23.08	22.96	23.00	23.42	24.13	24.95	25.85
DALLAS	277.61	275.45	296.90	268.95	210.06	217.92	234.15	251.52	259.78	269.13	279.20
DENTON	37.80	37.37	30.34	32.67	36.87	37.19	37.70	38.60	39.75	41.02	42.37
ELLIS	2.10	2.08	2.82	5.31	5.15	5.02	4.92	4.87	4.85	4.84	4.84
HENDERSON	0.21	0.20	0.22	0.27	0.27	0.27	0.26	0.26	0.26	0.26	0.26
HOOD	0.70	0.69	1.04	2.21	2.15	2.11	2.07	2.06	2.05	2.05	2.05
HUNT	1.85	1.83	3.43	4.45	4.29	4.16	4.06	4.02	4.00	4.00	4.00
JOHNSON	2.97	2.92	2.91	2.95	2.86	2.81	2.78	2.81	2.87	2.94	3.02
KAUFMAN	5.42	5.36	7.30	6.66	6.30	5.99	5.73	5.60	5.55	5.53	5.52
PARKER	5.80	5.74	5.73	5.60	5.47	5.37	5.27	5.22	5.20	5.19	5.19
ROCKWALL	3.94	3.89	3.87	3.78	3.72	3.67	3.63	3.62	3.61	3.61	3.61
TARRANT	1,784.64	1,751.38	1,727.32	1,086.25	969.13	974.42	1,001.90	1,049.57	1,089.92	1,133.12	1,179.76
TOTAL	2,154.21	2,117.79	2,132.96	1,452.25	1,269.36	1,281.89	1,325.47	1,391.58	1,441.98	1,496.65	1,555.66

EXHIBIT 5.2

Emissions of Major Pollutants by County with Controls

2011 Airport Emission Inventory With Controls in Place 12 County MSA Totals Tons per Year											
CO											
Analysis Years	1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
COLLIN	622	621	972	648	470	461	455	458	469	483	498
DALLAS	4,633	4,634	5,008	3,923	2,777	2,805	2,898	3,029	3,119	3,226	3,344
DENTON	1,603	1,601	1,368	1,464	1,622	1,651	1,685	1,729	1,780	1,836	1,894
ELLIS	100	100	129	228	224	221	218	217	216	216	216
HENDERSON	19	19	20	25	25	25	25	25	25	25	25
HOOD	35	35	52	114	113	111	111	110	110	110	110
HUNT	98	98	155	199	195	191	189	187	187	187	187
JOHNSON	125	125	125	132	131	132	133	135	138	142	146
KAUFMAN	118	118	156	141	132	124	117	114	112	112	111
PARKER	234	234	234	232	229	227	224	223	222	222	222
ROCKWALL	213	213	213	211	210	209	208	207	207	207	207
TARRANT	16,449	16,259	16,113	8,095	6,490	6,273	6,221	6,486	6,930	7,480	8,136
TOTAL	24,250	24,056	24,545	15,412	12,616	12,428	12,482	12,920	13,516	14,244	15,095

2011 Airport Emission Inventory With Controls in Place 12 County MSA Totals Tons per Year											
THC											
Analysis Years	**1996**	**2000**	**2002**	**2008**	**2011**	**2014**	**2017**	**2020**	**2023**	**2026**	**2029**
COLLIN	21.46	21.46	35.21	24.89	18.28	18.95	19.65	20.37	21.13	21.91	22.73
DALLAS	178.48	178.94	193.23	189.01	169.27	180.96	198.98	216.30	224.53	233.11	242.04
DENTON	31.25	31.25	25.97	28.88	33.17	34.26	35.38	36.55	37.77	39.02	40.32
ELLIS	1.85	1.85	2.44	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61
HENDERSON	0.20	0.20	0.21	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
HOOD	0.60	0.60	0.91	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
HUNT	1.54	1.54	2.76	3.78	3.78	3.78	3.78	3.78	3.78	3.78	3.78
JOHNSON	2.07	2.07	2.07	2.29	2.33	2.39	2.46	2.53	2.60	2.67	2.75
KAUFMAN	3.56	3.56	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
PARKER	4.89	4.89	4.89	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95
ROCKWALL	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59
TARRANT	1,235.92	1,224.85	1,220.85	799.89	739.97	773.07	818.79	867.74	905.37	942.92	982.03
TOTAL	1,485	1,475	1,497	1,069	987	1,034	1,099	1,168	1,215	1,264	1,314

NMHC											
Analysis Years	**1996**	**2000**	**2002**	**2008**	**2011**	**2014**	**2017**	**2020**	**2023**	**2026**	**2029**
COLLIN	29.56	29.29	48.55	31.69	22.12	22.10	22.21	22.67	23.37	24.18	25.05
DALLAS	261.84	259.96	280.69	241.10	198.63	208.24	225.62	243.59	252.09	261.36	271.16
DENTON	34.66	34.27	27.73	29.99	33.97	34.32	34.82	35.68	36.76	37.94	39.20
ELLIS	1.91	1.89	2.57	4.88	4.74	4.63	4.54	4.50	4.48	4.47	4.47
HENDERSON	0.19	0.18	0.19	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
HOOD	0.63	0.62	0.94	2.00	1.95	1.91	1.88	1.87	1.86	1.86	1.86
HUNT	1.69	1.66	3.14	4.10	3.96	3.84	3.76	3.72	3.71	3.70	3.70
JOHNSON	2.75	2.71	2.70	2.75	2.67	2.64	2.62	2.65	2.71	2.77	2.85
KAUFMAN	5.11	5.06	6.90	6.34	6.02	5.75	5.53	5.42	5.38	5.36	5.35
PARKER	5.33	5.28	5.27	5.16	5.05	4.96	4.87	4.83	4.81	4.81	4.80
ROCKWALL	3.53	3.49	3.47	3.39	3.34	3.30	3.26	3.25	3.24	3.24	3.24
TARRANT	1,734.28	1,702.82	1,680.46	1,005.87	909.79	928.68	966.64	1,016.49	1,057.73	1,100.56	1,146.12
TOTAL	2,081.48	2,047.23	2,062.61	1,337.50	1,192.48	1,220.58	1,275.98	1,344.90	1,396.37	1,450.48	1,508.04

2011 Airport Emission Inventory With Controls in Place 12 County MSA Totals Tons per Year											
VOC											
Analysis Years	**1996**	**2000**	**2002**	**2008**	**2011**	**2014**	**2017**	**2020**	**2023**	**2026**	**2029**
COLLIN	29.51	29.22	48.47	31.52	21.94	21.88	21.96	22.39	23.08	23.87	24.74
DALLAS	262.44	260.38	281.12	240.14	197.07	206.43	223.53	241.28	249.66	258.82	268.52
DENTON	33.98	33.56	27.10	29.26	33.13	33.41	33.86	34.68	35.72	36.86	38.08
ELLIS	1.86	1.84	2.50	4.77	4.63	4.51	4.41	4.37	4.35	4.34	4.34
HENDERSON	0.18	0.17	0.19	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
HOOD	0.62	0.61	0.91	1.94	1.89	1.85	1.82	1.80	1.80	1.79	1.79
HUNT	1.65	1.63	3.09	4.01	3.86	3.74	3.65	3.62	3.60	3.60	3.60
JOHNSON	2.73	2.69	2.68	2.72	2.63	2.59	2.57	2.60	2.65	2.72	2.79
KAUFMAN	5.11	5.05	6.89	6.31	5.99	5.70	5.47	5.36	5.31	5.29	5.28
PARKER	5.22	5.17	5.15	5.03	4.92	4.83	4.74	4.69	4.68	4.67	4.66
ROCKWALL	3.42	3.37	3.36	3.27	3.22	3.17	3.14	3.12	3.12	3.12	3.12
TARRANT	1,739.30	1,706.68	1,683.40	1,003.83	907.20	925.09	962.16	1,011.42	1,052.32	1,094.88	1,140.19
TOTAL	2,086	2,050	2,065	1,333	1,187	1,213	1,268	1,336	1,387	1,440	1,497

NOX											
Analysis Years	**1996**	**2000**	**2002**	**2008**	**2011**	**2014**	**2017**	**2020**	**2023**	**2026**	**2029**
COLLIN	31.67	29.80	49.00	25.74	15.22	12.71	10.58	9.56	9.34	9.47	9.75
DALLAS	610.02	596.04	644.36	549.91	195.94	194.64	202.22	213.60	218.48	225.24	233.03
DENTON	32.18	29.96	22.59	20.01	19.93	16.80	14.47	13.51	13.38	13.63	14.05
ELLIS	1.40	1.30	2.10	4.35	3.71	3.14	2.73	2.53	2.45	2.42	2.41
HENDERSON	0.18	0.16	0.17	0.17	0.14	0.12	0.11	0.10	0.10	0.10	0.10
HOOD	0.53	0.49	0.72	1.18	0.95	0.74	0.60	0.53	0.50	0.50	0.49
HUNT	3.11	2.99	6.44	8.00	7.41	6.92	6.59	6.44	6.39	6.36	6.36
JOHNSON	4.70	4.44	4.35	3.84	3.37	2.97	2.67	2.55	2.54	2.58	2.64
KAUFMAN	6.36	5.98	8.06	6.08	5.00	4.01	3.20	2.78	2.61	2.54	2.52
PARKER	4.12	3.86	3.78	2.93	2.40	1.95	1.62	1.46	1.40	1.37	1.36
ROCKWALL	2.47	2.25	2.19	1.60	1.25	0.96	0.76	0.68	0.65	0.64	0.64
TARRANT	5,487	5,329	5,001	3,581	3,545	3,746	3,953	4,235	4,581	4,959	5,374
TOTAL	6,183	6,006	5,744	4,205	3,800	3,991	4,199	4,488	4,839	5,224	5,648

2011 Airport Emission Inventory With Controls in Place 12 County MSA Totals Tons per Year											
SOx											
Analysis Years	**1996**	**2000**	**2002**	**2008**	**2011**	**2014**	**2017**	**2020**	**2023**	**2026**	**2029**
COLLIN	3.66	3.66	6.09	3.08	2.09	2.16	2.23	2.31	2.40	2.49	2.58
DALLAS	82.90	83.23	90.85	73.39	27.22	28.99	31.90	34.72	36.05	37.43	38.85
DENTON	4.79	4.80	3.86	3.08	3.38	3.49	3.60	3.72	3.84	3.98	4.11
ELLIS	0.24	0.24	0.36	0.60	0.56	0.56	0.55	0.55	0.55	0.55	0.55
HENDERSON	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
HOOD	0.08	0.08	0.13	0.19	0.17	0.17	0.17	0.17	0.17	0.17	0.17
HUNT	0.41	0.41	0.84	0.97	0.93	0.93	0.93	0.93	0.93	0.93	0.93
JOHNSON	0.56	0.56	0.56	0.45	0.43	0.44	0.45	0.46	0.47	0.49	0.50
KAUFMAN	0.70	0.70	0.96	0.68	0.64	0.63	0.63	0.63	0.63	0.63	0.63
PARKER	0.63	0.63	0.63	0.46	0.43	0.42	0.42	0.42	0.42	0.42	0.42
ROCKWALL	0.46	0.46	0.46	0.30	0.28	0.28	0.27	0.27	0.27	0.27	0.27
TARRANT	589.84	583.72	556.71	386.17	381.26	411.14	443.58	480.87	520.78	563.82	611.57
TOTAL	684.32	678.54	661.50	469.39	417.41	449.23	484.76	525.09	566.56	611.21	660.63

PM10											
Analysis Years	**1996**	**2000**	**2002**	**2008**	**2011**	**2014**	**2017**	**2020**	**2023**	**2026**	**2029**
COLLIN	1.67	1.24	1.93	1.06	0.72	0.68	0.64	0.60	0.61	0.63	0.65
DALLAS	23.97	19.47	19.84	12.59	6.19	6.30	6.56	6.86	7.02	7.23	7.47
DENTON	2.05	1.26	0.83	0.67	0.75	0.70	0.63	0.59	0.59	0.61	0.63
ELLIS	0.10	0.05	0.07	0.14	0.13	0.12	0.11	0.10	0.10	0.09	0.09
HENDERSON	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HOOD	0.04	0.02	0.02	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01
HUNT	0.15	0.09	0.18	0.21	0.20	0.19	0.18	0.18	0.17	0.17	0.17
JOHNSON	0.25	0.16	0.15	0.12	0.11	0.11	0.10	0.09	0.09	0.09	0.10
KAUFMAN	0.32	0.24	0.30	0.24	0.23	0.20	0.18	0.16	0.16	0.16	0.16
PARKER	0.28	0.16	0.13	0.09	0.08	0.08	0.07	0.06	0.06	0.06	0.06
ROCKWALL	0.20	0.09	0.07	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01
TARRANT	185.33	158.30	143.34	80.65	75.87	75.65	75.66	73.97	72.51	70.63	68.20
TOTAL	214.37	181.10	166.86	95.83	84.32	84.06	84.15	82.63	81.33	79.69	77.55

2011 Airport Emission Inventory With Controls in Place 12 County MSA Totals Tons per Year											
PM2.5											
Analysis Years	**1996**	**2000**	**2002**	**2008**	**2011**	**2014**	**2017**	**2020**	**2023**	**2026**	**2029**
COLLIN	1.63	1.22	1.89	1.05	0.71	0.67	0.63	0.59	0.60	0.62	0.64
DALLAS	23.57	19.21	19.59	12.47	6.13	6.25	6.52	6.82	6.98	7.19	7.44
DENTON	2.00	1.23	0.81	0.66	0.74	0.69	0.62	0.58	0.59	0.60	0.62
ELLIS	0.10	0.05	0.07	0.14	0.13	0.12	0.11	0.10	0.09	0.09	0.09
HENDERSON	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HOOD	0.03	0.02	0.02	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01
HUNT	0.15	0.09	0.18	0.21	0.19	0.19	0.18	0.17	0.17	0.17	0.17
JOHNSON	0.24	0.16	0.14	0.12	0.11	0.11	0.10	0.09	0.09	0.09	0.09
KAUFMAN	0.32	0.23	0.30	0.23	0.22	0.20	0.18	0.16	0.16	0.16	0.16
PARKER	0.28	0.16	0.13	0.09	0.08	0.07	0.07	0.06	0.06	0.06	0.06
ROCKWALL	0.19	0.09	0.06	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.00
TARRANT	182.99	156.74	142.02	80.24	75.54	75.37	75.42	73.76	72.31	70.43	67.99
TOTAL	211.51	179.20	165.22	95.26	83.90	83.70	83.84	82.36	81.07	79.43	77.29

Lead (Pb)											
Analysis Years	**1996**	**2000**	**2002**	**2008**	**2011**	**2014**	**2017**	**2020**	**2023**	**2026**	**2029**
COLLIN	0.28	0.40	0.39	0.31	0.25	0.26	0.26	0.27	0.28	0.29	0.30
DALLAS	1.14	1.21	1.24	1.30	1.07	1.12	1.18	1.23	1.28	1.33	1.38
DENTON	1.13	1.01	1.06	1.07	1.17	1.21	1.24	1.28	1.32	1.36	1.40
ELLIS	0.09	0.11	0.18	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
HENDERSON	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
HOOD	0.03	0.04	0.04	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
HUNT	0.09	0.14	0.14	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
JOHNSON	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.12	0.13	0.13
KAUFMAN	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
PARKER	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
ROCKWALL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
TARRANT	1.34	1.46	1.28	1.00	0.73	0.77	0.80	0.84	0.88	0.92	0.97
TOTAL	4.67	4.95	4.91	4.74	4.29	4.42	4.56	4.70	4.84	4.98	5.13

2011 Airport Emission Inventory With Controls in Place 12 County MSA Totals Tons per Year											
TOG											
Analysis Years	1996	2000	2002	2008	2011	2014	2017	2020	2023	2026	2029
COLLIN	31.17	30.87	51.08	33.15	23.08	22.96	23.00	23.42	24.13	24.95	25.85
DALLAS	274.96	272.88	294.67	249.97	203.96	213.19	230.33	248.27	256.81	266.18	276.13
DENTON	37.80	37.37	30.34	32.67	36.87	37.19	37.70	38.60	39.75	41.02	42.37
ELLIS	2.10	2.08	2.82	5.31	5.15	5.02	4.92	4.87	4.85	4.84	4.84
HENDERSON	0.21	0.20	0.22	0.27	0.27	0.27	0.26	0.26	0.26	0.26	0.26
HOOD	0.70	0.69	1.04	2.21	2.15	2.11	2.07	2.06	2.05	2.05	2.05
HUNT	1.85	1.83	3.43	4.45	4.29	4.16	4.06	4.02	4.00	4.00	4.00
JOHNSON	2.97	2.92	2.91	2.95	2.86	2.81	2.78	2.81	2.87	2.94	3.02
KAUFMAN	5.42	5.36	7.30	6.66	6.30	5.99	5.73	5.60	5.55	5.53	5.52
PARKER	5.80	5.74	5.73	5.60	5.47	5.37	5.27	5.22	5.20	5.19	5.19
ROCKWALL	3.94	3.89	3.87	3.78	3.72	3.67	3.63	3.62	3.61	3.61	3.61
TARRANT	1,784.64	1,751.38	1,727.32	1,022.61	921.12	937.23	973.09	1,022.10	1,063.18	1,106.12	1,151.93
TOTAL	2,152	2,115	2,131	1,370	1,215	1,240	1,293	1,361	1,412	1,467	1,525

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APPENDICES

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ERG NO. 0292.00.006.002

DEVELOPMENT OF STATEWIDE ANNUAL EMISSIONS INVENTORY AND ACTIVITY DATA FOR AIRPORTS

FINAL REPORT

TCEQ Contract No. 582-11-99776
Work Order No. 582-11-99776-FY11-06

Prepared for:

Texas Commission on Environmental Quality
Air Quality Division

Prepared by:

Eastern Research Group, Inc.

July 15, 2011

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Prepared for:

Peter Ogbeide
Texas Commission on Environmental Quality
Air Quality Division
Bldg. E, Room 361S
Austin, TX

Prepared by:

Eastern Research Group, Inc.
1600 Perimeter Park Drive
Suite 200
Morrisville, North Carolina 27560

July 15, 2011

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Executive Summary

The purpose of this study is to develop statewide annual emission inventories for Texas airport activities for the calendar years 1996, 2000, 2002, 2011, 2014, 2017, 2020, 2023, 2026, 2029, and the base year 2008. These annual inventories will include all counties in the state of Texas with the exception of those in the Dallas-Fort Worth (DFW) Metropolitan Planning Organization's planning area. Those counties include Collin, Dallas, Denton, Ellis, Henderson, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, and Tarrant counties. Emissions will be developed for all criteria pollutants and hazardous air pollutants (HAPs) where appropriate data are available. Lead emissions will also be developed for air taxis and general aviation activities associated with piston aircraft using aviation gasoline.

The emissions associated with airport activities include:

- Commercial aviation (SCC: 2275020000)
- Air taxis
  - Piston driven (SCC: 2275060011)
  - Turbine driven (SCC: 2275060012)
- General aviation
  - Piston driven (SCC: 2275050011)
  - Turbine driven (SCC: 2275050012)
- Military (SCC: 2275001000)
- Auxiliary Power Units (SCC: 2275070000)
- Ground Support Equipment
  - CNG-fueled (SCC: 2268008005)
  - Diesel-fueled (SCC: 2270008005)
  - Gasoline-fueled (SCC: 2265008005)
  - LPG-fueled (SCC: 2267008005).

In order to estimate baseline emissions from these sources, publically available 2008 activity data was compiled and supplemented with 2008 activity data provided by local airports. Two approaches were used to estimate emissions from the compiled activity data. If the activity data had aircraft specific data, the Federal Aviation Administration's (FAA) Emissions Dispersion Modeling System (EDMS) was employed. If such detailed data were not available, then ERG applied a more general approach for different aircraft types (i.e., air taxis, general aviation, and military aircraft) using available generic emission estimating procedures. Once the base year of 2008 was established, the inventory was backcasted and forecasted based on FAA's Terminal Area Forecast (TAF) data.

In 2008, general aviation aircraft outfitted with piston engines account for 50% of the total aircraft activities. General aviation aircraft outfitted with jet engines, commercial aircraft, military aircraft, air taxi aircraft outfitted with piston engines, and air taxi aircraft outfitted with jet engines account for 21%, 6.7%, 3.5%, 3.1%, and 1.2% of the total aircraft activities, respectively. Auxiliary power units and ground support equipment contribute 6.7% and 7.8% to the total aircraft activities, respectively. Harris County has the highest activity. The airports located in Harris County account for 19% of all Texas activity in scope for this project.

The backcasted and forecasted activity and emissions show a general decline from 1996 to 2011, and a general increase from 2011 to 2029. From 1996 to the base year, 2008, the backcasted emissions decreased by 86%; and from the base year to 2029 the projected emissions increased by 19%.

1. INTRODUCTION

1.1 Purpose and Objectives

The purpose of this study was to develop a statewide annual emission inventory for Texas airport activities for the calendar years 1996, 2000, 2002, 2011, 2014, 2017, 2020, 2023, 2026, 2029, and the base year 2008. These annual inventories include all counties in the state of Texas with the exception of those in the Dallas-Fort Worth (DFW) Metropolitan Planning Organization's planning area. Those counties include Collin, Dallas, Denton, Ellis, Henderson, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, and Tarrant counties. Emissions were developed for all criteria pollutants and hazardous air pollutants (HAPs) where appropriate data are available. Lead emissions were also developed for air taxis and general aviation activities associated with piston aircraft using aviation gasoline.

In order to develop the comprehensive inventories for the aircraft source category, the following objectives were met:

- Compile 2008 activity data from available national data,
- Create backcasting and forecasting scale factors,
- Confirm activity data and scale factors with airports, if possible,
- Calculate 2008 emission estimates using Emissions and Dispersion Modeling System 5.1.3 (EDMS) and generic emission factors,
- Calculate activity data and estimate emissions for all other years using backcasting and forecasting factors,
- Summarize activity and emissions data, and
- Format activity and emissions data into XML.

The methods used for this study comply with EPA guidance on developing aircraft emission inventories as stated in the Quality Assurance Project Plan for the Development of a Commercial Aircraft Hazardous Air Pollutants Emission Inventory Methodology1. It should be noted that the engine specific factors used in the model were derived from testing data used to certify the engines and as such these factors account for U.S. and international emission standards. The inventories will be used to support the State Implementation Plan (SIP) and other airport related inquires.

1.2 Report Organization

Section 1 of this report includes general information and background about this project. Section 2 identifies the national and local activity data sources included in this study. This section describes how each activity data source is employed in terms of compiling

the 2008 base year activity dataset. This section also documents any assumptions or manipulations made to each data source to facilitate the compilation of the base year activity dataset.

Section 3 summarizes the emission estimation methodology and the results of the 2008 emissions inventory. Summary emissions tables are provided on a statewide and county level basis for the criteria pollutants.

Section 4 summarizes the projection methodology utilized to develop the airport activities and estimate annual emissions for the calendar years 1996, 2000, 2002, 2011, 2014, 2017, 2020, 2023, 2026, and 2029. Summary emissions tables are provided on a statewide basis for the criteria pollutants.

In order to examine the hazardous air pollutant emissions due to airport activities, see the MSAccess database submitted with this report.

1.3 Background

This report covers airport activities as a point source. The aircraft source category includes all aircraft types used for public, private, and military purposes. Aircraft tend to emit significant amounts of nitrogen oxides (NOx), volatile organic compounds (VOC), and carbon monoxide (CO); as well as smaller amounts of sulfur dioxide (SO2), and particulate matter (PM). Following are the four typical aircraft types and their Source Classification Codes (SCC) present in the inventory:

Commercial aviation (SCC: 2275020000)

- Air taxis
  - — Piston driven (SCC: 2275060011)
  - — Turbine driven (SCC: 2275060012)
- General aviation
  - — Piston driven (SCC: 2275050011)
  - — Turbine driven (SCC: 2275050012)
- Military (SCC: 2275001000)

Commercial aircraft transport passengers, freight, or both. Commercial aircraft tend to be larger aircraft that are driven with jet engines. Air taxis (AT) are usually smaller (less than 60 passenger) aircraft that operate on a limited basis compared to commercial carriers. General aviation (GA) includes most other aircraft used for recreational flying and personal transportation. Aircraft that support business travel, usually on an unscheduled basis, are included in the GA category.

The national AT and GA fleet includes both jet and propeller-driven aircraft. Most of the AT and GA fleet are made up of piston (or propeller) driven aircraft, though smaller business jets can also be found in these categories. The piston driven aircraft tend to have higher VOC, PM, and CO emissions and lower NOx emissions than larger jet-powered aircraft. According to a 2005 FAA GA and AT Activity Survey, 72% of all GA and AT activity are powered by propeller-driven aircraft and 28% are jet (or turbine) driven.2 EPA has used this estimate as a national-scale default value in recently published studies investigating lead emissions from aviation sources.3

Military aircraft cover a wide range of aircraft types such as training aircraft, fighter jets, helicopters, and jet- and propeller-driven cargo planes of varying sizes. Because of a lack of information concerning the make-up of the military aircraft fleet, EPA has assumed that most military aircraft are jet-powered.

Aircraft emissions are associated with an aircraft's landing and takeoff (LTO) cycle. The cycle begins when the aircraft approaches the airport on its descent from cruising altitude, then lands and taxis to the gate, where it idles during passenger deplaning. The cycle continues as the aircraft starts up, idles during passenger boarding, taxis back onto the runway, takes off, and ascends (or climbs out) to cruising altitude. Thus, the six specific operating modes in an LTO illustrated in Figure 1 1 are the following:

- Approach
- Taxi/idle-in
- Startup
- Taxi/idle-out
- Takeoff
- Climb out.

The LTO cycle provides a basis for calculating aircraft emissions. During each mode of operation, an aircraft engine operates at a specific power setting and fuel consumption rate for a given aircraft make and model. Emissions for one complete cycle are calculated using emission factors for each operating mode, for each specific aircraft engine, combined with the typical period of time the aircraft is in the operating mode.

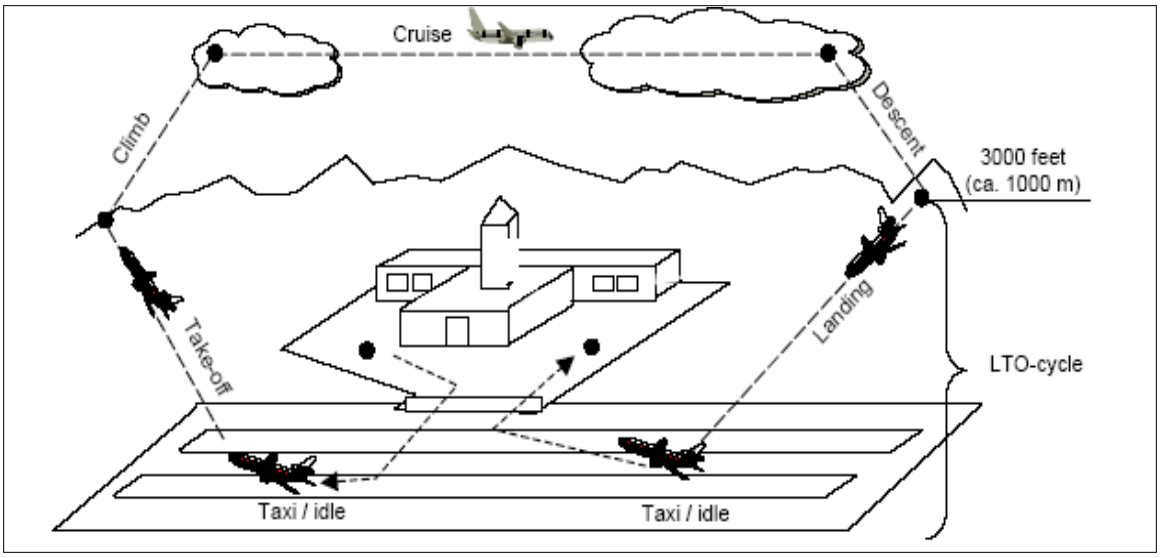

Figure 1-1. Landing and Take Off Cycle

2. DATA SOURCES OF TEXAS AIRPORT ACTIVITIES INVENTORIED

2.1 National Data Sources of Texas Airport Activities

To estimate emissions from aircraft operating in Texas, ERG used the activity data compiled by EPA intended for use in the 2008 National Emissions Inventory (NEI). Activity data were compiled from the following sources:

- Bureau of Transportation Statistics (BTS) T-100 segment dataset,4
- Federal Aviation Administration (FAA) Terminal Area Forecast (TAF) dataset, and 5
- FAA Airport Master Record (5010) dataset.6

The compiled data are adjusted for duplicates associated with the three datasets and supplemented with local data as discussed further in Section 2.2. This section discusses each data source investigated for this project, summarizing the publically available data and noting any limitations or data gaps.

2.1.1 T-100 Dataset

The T-100 data is an activity dataset that includes information provided by domestic and international commercial aircraft. This dataset had the most specific data of the three datasets. The T-100 data included airport, aircraft make and model, and LTO data. The engine information was incorporated into the dataset from the FAA's Emissions and Dispersion Modeling System 5.1.3 (EDMS) default engine list. The aircraft categories were assigned to each aircraft with the assumption that T-100 only includes commercial and air taxis. Aircrafts were assigned the aircraft category, air taxi (AT), if the number of seats on the aircraft were less than or equal to 60, otherwise the aircraft was assigned the aircraft category, commercial (AC). Appendix A summarizes the T-100 data.

2.1.2 TAF Dataset

The TAF dataset is an FAA dataset derived from a variety of sources such as reported traffic at FAA towered facilities, data reported directly by airports, and FAA-derived estimates from historical information. This dataset includes airport, aircraft categories, and operations data.

The aircraft categories included commercial (AC), air taxi (AT), military (MIL), and general aviation (GA). As mentioned in Section 1.3, it can be assumed that 72% of all GA and AT activity are powered by aircraft with piston engines and 28% are powered by aircraft with jet (or turbine) engines. The aircraft categories from AT and GA were

broken out into piston and jet engines. This breakout is important because piston engines have different emission factors than jet engines.

For consistency between the other two datasets, the TAF operations data were converted into landing and take-off cycles (LTOs). There was overlap between the TAF dataset and T-100 dataset. The T-100 activity had a higher priority than the TAF dataset because it had greater detail; consequently the duplicate data were removed from the TAF dataset.

2.1.3 5010 dataset

The 5010 data is EPA-compiled data from the airport 5010 master plan data and estimated activity levels based on statistical techniques described in greater detail in the EPA aviation lead report from December 20103. The 5010 data were provided to the states via the EPA's National Emissions Inventory (NEI). This data includes airport, aircraft categories, and LTO data.

The aircraft categories include commercial (AC), air taxi (AT), military (MIL), and general aviation (GA). As mentioned in Section 1.3, it can be assumed that 72% of all GA and AT activity are powered by aircraft with piston engines and 28% are powered by aircraft with jet (or turbine) engines. The aircraft categories from AT and GA were broken out into piston and jet engines. This breakout is important because piston engines have a different emission factors than jet engines. There was overlap between the 5010 data and the TAF dataset. The duplicate activity was removed from the 5010 data.

2.2 Local Activity Data and Control Strategies for Medium and Large Airports

2.2.1 Contacting Airports

The medium to large airports based on estimated activity levels were contacted in order to validate the compiled 2008 FAA activity data, and to identify and characterize control strategies used or planned at each airport. Thirty-nine candidate airports were identified that had 19,000 LTO cycles or more. These candidate airports accounted for 32% of the activity in Texas, not including the DFW Metropolitan Planning Organization's planning area. In addition to these 39 candidate airports, TCEQ provided activity from 17 additional airports. There was overlap between the candidate airports and the list of airports that TCEQ provided information for; therefore, only 35 candidate airports needed to be contacted directly by ERG.

Each airport was contacted by telephone and asked to do the following:

- Review/update the FAA's 2008 national landing & take-off data, and

- List emission control strategies (i.e. gate electrification, auxiliary power units, etc.) from 1996 to 2029, when they were implemented, and the expected emission reduction.

Each airport that agreed to participate received an email with the compiled data attached for review. Table 2 1 summarizes the airports that ERG contacted and their responses. 95% of the airports contacted agreed to review the data and were sent the compiled data via email. 55% of the airports that agreed to participate responded. 73% of the airports that responded agreed with the FAA data, while 27% of the airports that responded provided their own data. Only 36% of the airports that responded provided information on emission control strategies.

Table 2-1. Summary of Responses from Large to Medium Airports Contacted

State Facility Identifier	Facility Name	Contact Name	Phone Number	Email Address	Contacted	Sent Data to Review	Reviewed Data	Provided Data
ABI	ABILENE RGNL	Don Green	325-676-6367	don.green@abilenetx.com	Yes.	Yes.	Yes.	Agreed with FAA data. Provided emission control strategies.
RKP	ARANSAS CO	Gene Johnson	361-790-0141	manager@krkp.com	Yes.	Yes.	Yes.	Agreed with FAA data. Provided emission control strategies.
AUS	AUSTIN-BERGSTROM INTL	Kane Carpenter/ Stephen Dick	512-530-6621	kane.carpenter@ci.austin.tx.us/ stephen.dick@ci.austin.tx.us	Yes.	Yes.	Yes.	Provided 2008 data.
LBX	BRAZORIA COUNTY	Jeff Bilyeu	979-849-5755	amym@brazoria-county.com	Yes.	Yes.	Yes.	Provided 2008 data.
DWH	DAVID WAYNE HOOKS MEMORIAL	Roger Schmidt	281-376-5436		Left message.			
TPL	DRAUGHON-MILLER CENTRAL TEXAS RGNL	Sharon Rostovich	254-298-5350		Left message.			
GGG	EAST TEXAS RGNL	Rick Davis	903-643-3031		Left message.			
CLL	EASTERWOOD FIELD	John Happ	979-845-5103		Yes.	Yes.		

State Facility Identifier	Facility Name	Contact Name	Phone Number	Email Address	Contacted	Sent Data to Review	Reviewed Data	Provided Data
ELP	EL PASO INTL	Rick Venegas	915-599-6238	rick.venegas@elpasotexas.gov	Yes.	Yes.		
EFD	ELLINGTON FIELD	Carlos Ortiz	281-233-1842		Left message.			
IAH	GEORGE BUSH INTERCONTINENTAL/ HOUSTON	Carlos Ortiz	281-233-1842		Left message.			
GTU	GEORGETOWN MUNI	Travis Mclain	512-930-3666	travis.mclain@georgetown.org	Yes.	Yes.	Yes.	Provided 2008 data. Provided emission control strategies.
TA90	GREEN ACRES	Ranson Fullinwider	409-931-1311		Invalid phone number.			
AXH	HOUSTON-SOUTHWEST	Len Franklin	281-431-2583		Yes.	Yes.	Yes.	Agreed with FAA data. Provided emission control strategies.
T41	LA PORTE MUNI	David Mitch	281-471-9650		Left message.			
LRD	LAREDO INTL	Jose Flores	956-795-2000		Left message.			
CXO	LONE STAR EXECUTIVE	Scott Smith	936-539-7811		Left message.			

State Facility Identifier	Facility Name	Contact Name	Phone Number	Email Address	Contacted	Sent Data to Review	Reviewed Data	Provided Data
LBB	LUBBOCK PRESTON SMITH INTL	James Loomis	806-775-3126		Left message.			
MFE	MC ALLEN MILLER INTL	Kristi Salinas	956-681-1527	ktsalinas@mcallen.net	Yes.	Yes.	Yes.	Agreed with FAA data.
MAF	MIDLAND INTL	Marv Esterly	432-560-2200 x 3001	mesterly@midlandtexas.gov	Yes.	Yes.		
GYI (Formerly F39)	NORTH TEXAS RGNL/PERRIN FIELD	Mike Shahan	903-786-2904	airport@co.grayson.tx.us	Yes.	Yes.	Yes.	Agreed with FAA data.
ODO	ODESSA-SCHLEMEYER FIELD	John Landgraf	432-332-5058		Left message.			
LVJ	PEARLAND RGNL	Andy Rivera/ Wayne Messinger	281-482-7551	clover3@flash.net	Yes.	Yes.		
AMA	RICK HUSBAND AMARILLO INTL	Patrick Rhodes	806-335-1671	patrick.rhodes@amarillo.gov	Yes.	Yes.	Yes.	Agreed with FAA data.
SJT	SAN ANGELO RGNL/MATHIS FIELD	Linda Clifton	325-659-6409	linda.clifton@sanangelotexas.us	Yes.	Yes.		
HYI	SAN MARCOS MUNI	Steven Alexander	512-216-6039	salexander@texasaviationpartners.com	Yes.	Yes.	Yes.	Agreed with FAA data.
GLS	SCHOLES INTL AT GALVESTON	Hud Hopkins	409-741-4609	manager@houstonairport.com	Yes.	Yes.		
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Sarah Johnson	940-855-3623		Yes.	Yes.		
SGR	SUGAR LAND RGNL	Phillip Savko	281-275-2100	psavko@sugarlandtx.gov	Yes.	Yes.		

State Facility Identifier	Facility Name	Contact Name	Phone Number	Email Address	Contacted	Sent Data to Review	Reviewed Data	Provided Data
TYR	TYLER POUNDS RGNL	Cheryl Mcinnis	903-531-2343		Yes.	Yes.		
HRL	VALLEY INTL	Bryan Wren		bryan@flythevalley.com	Yes.	Yes.	Yes.	Agreed with FAA data. Removed DC-9/8 at the end of 2010, but could return.
VCT	VICTORIA RGNL	Larry Blackwell	361-578-2704		Left message.			
EYQ	WEISER AIR PARK	Cecil Weiser	281-469-8227		Yes.			Was not interested in reviewing data.
IWS	WEST HOUSTON	Woody Lesikar	281-492-2130		Left message.			
HOU	WILLIAM P HOBBY	Carlos Ortiz	281-233-1842		Left message.			

2.2.2 Summary of Local Data Received

As noted in the previous section, 55% of the airports responded with comments about the FAA's 2008 activity data and/or information on emission control strategies. 73% of those airports agreed with the FAA data, while 27% of those airports provided their own data. Only 36% airports provided information on emission control strategies.

The three airports that provided their own 2008 activity data were Georgetown Municipal Airport, Austin-Bergstrom International Airport, and Brazoria County Airport. Georgetown Municipal provided a total annual LTO count and a breakout of the LTOs by aircraft category for 2008 (Table 2 2).

Table 2-2. 2008 Activity for Georgetown Municipal Airport

Aircraft Category	Percentage of Annual LTOs	Annual LTOs
General Aviation	98.32%	73,670
Military	1.22%	914
Air Taxi	0.46%	345
	Total	74,929

Austin-Bergstrom provided aircraft-engine specific LTO data for 2008 (Table 2 3). Austin-Bergstrom also provided information on taxi times. Based on field observations, the taxi-in time was three minutes and the taxi-out time was six minutes.

Table2-3. 2008 Activity for Austin-Bergstrom International Airport

Aircraft	Annual LTOs
Aerostar PA-60	82
Agusta A-109	9
Airbus A300	511
Airbus A310	12
Airbus A318	364
Airbus A319	1,424
Airbus A320	849
Airbus A321	2
ATR 72-200 (use PW124B)	3
Aviat Husky A1B	842
BAE 146-	1
Bell 206 Jetranger	368
Boeing 717-200 (DC9)	3
Boeing 727-200	14
Boeing 737-200	94

Aircraft	Annual LTOs
Boeing 737-300	9,934
Boeing 737-400	35
Boeing 737-500	3,139
Boeing 737-600	1
Boeing 737-700	9,693
Boeing 737-800	1,441
Boeing 737-900	558
Boeing 737-900-ER	2
Boeing 747-200	1
Boeing 747-400	5
Boeing 757-200	51
Boeing 757-200	14
Boeing 757-300	27
Boeing 767-200	16
Boeing 767-300	3
Boeing 767-300	1
Boeing 767-400	1
Boeing DC-10-10	408
Boeing DC-9-10	3
Boeing DC-9-30	2
Boeing DC-9-50	2
Boeing DC-9-50	21
Boeing MD-10	213
Boeing MD-11	9
Boeing MD-81	237
Boeing MD-82	7,263
Boeing MD-83	2,351
Boeing MD-87	22
Boeing MD-88	988
Boeing Stearman PT-17	31
Bombardier Challenger 300	513
Bombardier Challenger 601	774
Bombardier CRJ-100	1
Bombardier CRJ-100	12
Bombardier CRJ-200	1,002
Bombardier CRJ-700	2,677
Bombardier CRJ-900	6,472
Bombardier Global Express 500	196
Bombardier Learjet 24	3
Bombardier Learjet 25	173

Aircraft	Annual LTOs
Bombardier Learjet 31	337
Bombardier Learjet 35	383
Bombardier Learjet 40	303
Bombardier Learjet 45	762
Bombardier Learjet 55	145
Bombardier Learjet 60	802
CASA C-101 Aviojet	3
Cesnna 206	768
Cessna 150 Series	371
Cessna 172 Skyhawk	1,661
Cessna 172 Skyhawk - use 0-320	85
Cessna 182	1,258
Cessna 208 Caravan	1,928
Cessna 210 Centurion	1,185
Cessna 310	445
Cessna 337 Skymaster	26
Cessna 340	397
Cessna 402	850
Cessna 414	459
Cessna 421 Golden Eagle	360
Cessna 425 Conquest I	235
Cessna 441 Conquest II	164
Cessna 500 Citation I	286
Cessna 501 Citation ISP	334
Cessna 525 CitationJet	2,046
Cessna 550 Citation II	927
Cessna 551 Citation IIPS	48
Cessna 552 T-47A	17
Cessna 560 Citation V	3,341
Cessna 650 Citation III	564
Cessna 680 Citation Sovereign	601
Cessna 750 Citation X	1,216
Cirrus SR20	196
Cirrus SR22	2,412
Dassault Falcon 10 / 100	99
Dassault Falcon 20	198
Dassault Falcon 2000 /-EX	553
Dassault Falcon 50	1,258
Dassault Falcon 900	589
DeHavilland DHC-2 Mk III Beaver	11

Aircraft	Annual LTOs
DeHavilland DHC-6-200	3
DeHavilland DHC-8-100	3
DeHavilland DHC-8-200	40
DeHavilland DHC-8-300	11
Dornier 328 Jet	34
EADS Socata TBM-700	65
EADS Socata TBM-850	26
Embraer ERJ135	154
Embraer ERJ145	728
Embraer ERJ145-	28
Embraer ERJ145-XR	117
Embraer ERJ170	854
Embraer ERJ190	2,154
Fairchild SA-226-TC Metro II	44
Fairchild SA-227-AC Metro III	212
Fairchild SA-227-AT	9
Falcon 7X	6
Gulfstream G150	170
Gulfstream G200	510
Gulfstream I	23
Gulfstream II	6
Gulfstream IV-SP	1,304
Hawker HS-125 Series 700	34
Hughes 500D	17
Israel IAI-1124 Westwind I	298
Israel IAI-1125 Astra	162
Lockheed C-130 Hercules	37
Lockheed L-1329 Jetstar I / II	26
Mitsubishi MU-2	363
Mitsubishi MU-300 Diamond	125
Piaggio P.180 Avanti	507
Pilatus PC-12	666
Pilatus PC-6 Porter	3
Pilatus PC-6 Porter	45
Piper PA-23 Apache	26
Piper PA-24 Comanche	550
Piper PA-27 Aztec	14
Piper PA-28 Cherokee	918
Piper PA-28 Cherokee - use IO-360	142
Piper PA-30 Twin Comanche	445

Aircraft	Annual LTOs
Piper PA-31 Navajo	646
Piper PA-31T Cheyenne	62
Piper PA-32 Cherokee Six	340
Piper PA-34 Seneca	258
Piper PA-42 Cheyenne Series	74
Piper PA46-TP Meridian	470
Rans S7S	527
Raytheon Beech 18	3
Raytheon Beech 1900-C	14
Raytheon Beech 55 Baron	425
Raytheon Beech 60 Duke	40
Raytheon Beech 99	9
Raytheon Beech Baron 58	1,440
Raytheon Beech Bonanza 36	1,165
Raytheon Beechjet 400	1,014
Raytheon Hawker 1000	34
Raytheon Hawker 4000	9
Raytheon Hawker 800	1,686
Raytheon King Air 100	196
Raytheon King Air 90	1,559
Raytheon Premier I	456
Raytheon Super King Air 200	2,610
Raytheon Super King Air 300	1,403
Robinson R22	43
Robinson R44	9
Rockwell Commander 500	1,386
Rockwell Commander 680	20
Rockwell Commander 690	193
Rockwell commander 980/1000	102
Rockwell Sabreliner 65	232
Rockwell Sabreliner 80	3
Ryan Navion B	31
SAAB 340	3
SAAB 340B	3
Shorts 330	1
Shorts 360	248
T-38 Talon	94
Total	108,176

Brazoria County Airport provided 2008 annual operations data by aircraft type or SCC. For consistency, the operations data were converted into LTOs (Table 2 4).

Table 2-4. 2008 Activity for Brazoria County Airport

SCC	SCC Description	Annual LTOs
2275001000	Military Aircraft, Total	500
2275020000	Commercial Aircraft, Total: All Types	260
2275050011	General Aviation, Piston	10,300
2275050012	General Aviation, Turbine	26,486
2275060011	Air Taxi, Piston	405
2275060012	Air Taxi, Turbine	1,040
	Total	38,991

The four airports that provided information on emission control strategies were Houston-Southwest Airport, Aransas County Airport, Abilene Regional Airport, and Georgetown Municipal Airport. Houston-Southwest will be building a number of new hangars in the future, and installing electric gates in 2012. Aransas County had electronic gates installed in 2002, and auxiliary power generators installed in 2006/2007. The auxiliary power generators were used in case of emergency, when power is not available. Abilene Regional had two auxiliary power units (APUs) installed in 2002, but were unaware the associated emission reductions. Georgetown Municipal had electrical gates installed in 1999.

In addition to the 2008 activity data and emission control strategy information collected, TCEQ also provided local data for 17 additional airports. Table 2 5 lists each airport and the type of information provided.

Table 2-5. Local Airport data collected from TCEQ

Airport	Information Type
Boerne Stage Field	Specific/Generic Activity for 2002 GA
Bulverde	Specific Activity
Castroville Muni	Specific/Generic Activity for 2002 GA
Corpus Christi International Airport	General Activity
Devine	Specific Activity
GILLESPIE COUNTY	Specific Activity for GA 2008/A single day of Activity (Arrivals)
HONDO MUNI (HDO)	Specific/Generic Activity for 2002 GA/Specific Operations for 2003
HUBER AIRPARK CIVIC CLUB LLC	Specific Activity for GA 2008/EDMS Emission Data, no activity
KARNES COUNTY	Specific/Generic Activity for GA (assume 08)

Airport	Information Type
KERRVILLE MUNI/LOUIS SCHREINER FIELD (ERV)	A single day of Activity (Arrivals and Departures)/Specific Operations
Kestrel Airpark	Specific/Generic Activity for 2002 GA
NEW BRAUNFELS MUNI	Specific Activity (No engine) 2007/2008/Specific Activity for GA 2008
PLEASANTON MUNI	Specific Activity for GA 2008
SAN ANTONIO INTL	Specific Activity for Turbo/Jet/Military/Piston 2008 & Specific Emissions for GSE 2008
SAN GERONIMO AIRPARK	Specific Activity for GA 2008
STINSON MUNI	Specific Activity for GA 2002/2003
TWIN-OAKS	Specific Activity for GA 2008

The provided local data were incorporated into the compiled dataset for 2008. These data were used as the 2008 baseline activity data for this study. Where local 2002/2003 data were provided by TCEQ, the data represent 2002. The TAF factors were used to adjust the data to 2008. The compiled 2008 baseline dataset was then backcasted to 1996, 2000, and 2002 and forecasted to 2011, 2014, 2017, 2020, 2023, 2026, and 2029 using scale factors developed from the 2010 version of the TAF dataset.

3. SUMMARY OF 2008 BASE YEAR EMISSIONS

3.1 Emission Estimation Methodology

To develop the most accurate aircraft emission inventory possible, two different approaches were required. If aircraft-specific data were available, ERG used the FAA's Emissions and Dispersion Modeling System (EDMS) model in conjunction with detailed aircraft activity data from T-100 (Texas T-100 data are provided in Appendix A). If such detailed data were not available, then ERG applied a more general approach for different aircraft types (i.e., air taxis, general aviation, and military aircraft) using available generic emission estimating procedures. Using these two complementary approaches provided the most accurate emission estimates for the larger commercial jets, which tend to be the most significant aircraft emission source, while still providing estimates for smaller aircraft.

3.1.1 Emissions and Dispersion Modeling System

There are a total of 1,620 airports in Texas outside of the Dallas-Fort Worth (DFW) Metropolitan Planning Organization's planning area; 34 are large airports for which detailed aircraft activity data were available. To estimate 2008 emissions for these large airports, ERG used the T-100 segment data (summarized in Appendix A) in conjunction with the FAA EDMS model – version 5.12. The remaining 1,586 were estimated using a generic approach relying upon EPA emission factors as described in Section 3.1.2.

EDMS is an emission estimating tool developed by the FAA. EDMS is capable of estimating criteria and HAP emissions from a variety of stationary and mobile sources. Stationary sources include fuel storage tanks, power and heat generation, surface coating, degreasing, and incineration. Mobile sources include aircraft, auxiliary power units (APUs), ground support equipment (GSE), road traffic (including shuttle bus services), and vehicle emissions from parking areas.

For the 2008 base year emissions inventory, the EDMS analysis was limited to aircraft, APU, and GSE emissions. Note that emissions from APU and GSE are reported separately to the NEI and have their own SCC codes. The APU SCC code is 2275070000, and the GSE SCC codes are 2265008005, 2267008005, 2268008005, and 2270008005 for GSE fueled by gasoline, LPG, CNG, and diesel, respectively.

EDMS allows users to customize time-in-mode and mixing height to provide greater precision of aircraft emissions. Time-in-mode is synonymous with the LTO cycle discussed above. For each large airport, ERG developed airport specific taxing and idling times and mixing height to adjust time-in-mode for approach and climb out modes. Taxing and idling times were collected from on-time performance reports

submitted to BTS by certificated air carriers.7 Upper-air weather observations were collected by the National Climatic Data Center and published by the EPA Support Center for Regulatory Air Models.8 ERG identified the closest weather service station to each large airport. The mixing height provides a vertical cutoff for EDMS modeling of aircraft emissions.

For each individual aircraft make and model (e.g., Boeing 747-200 series), EPA has assigned an engine type and code, which can be linked to the engines in EDMS. EDMS incorporates the latest aircraft engine emission factors from the International Civil Aviation Organization Engine Exhaust Emissions Data Bank.9

EDMS uses the following equation to estimate aircraft emissions:

$$Eil = \sum Tk \times NEjl \times (FFjlk / 1000) \times (EIjlk) \times LTO\ jl$$

Where:

Eil	=	Emission of pollutant i in pounds produced by the aircraft make j and model l
Tk	=	Operating time in mode k (min)
NEjl	=	Number of engines associated with aircraft make j and model l
FFjlk	=	Fuel flow for individual engine used on aircraft make type j and model l operating in mode k(lbs/min)
EIilk	=	Emission index for pollutant i for each engine associated with aircraft make j and model l operating in mode k(lbs of pollutant /1,000 lbs of fuel)
i	=	Pollutant (i.e., HC, VOC, CO, NOx SO2)
j	=	Aircraft make (e.g. Boeing, McDonald Douglas, Airbus)
l	=	Aircraft model (e.g., B-737 300 series)
k	=	Mode (approach, taxi, climbout).

Auxiliary power units (APUs) are most often on-board generators that provide electrical power to the aircraft while its main engines are shut down. The APU is, in effect, a small jet engine and the calculations for the emissions generated by it are similar to that of an aircraft engine operating in one optimal power setting only. APU emissions are generated per LTO cycle.

Emissions from APUs were estimated using the following equation:

$$Eij = T \times (FFj/1{,}000) \times (EIij)$$

Where:

Eij	=	Emission of pollutant i in pounds produced by the auxiliary power unit installed on aircraft type j for one LTO cycle
T	=	Operating time per LTO cycle (min)
FFj	=	Fuel flow for each auxiliary power unit used on aircraft type j (lbs/min)
EIij	=	Emission index for pollutant i for each auxiliary power unit used on aircraft type j (lbs of pollutant /1,000 lbs of fuel)
i	=	Pollutant (i.e., VOC, HC, CO, NOx SO2)
j	=	Aircraft type (e.g., B-737, MD-11)

Upon arrival at a gate, aircraft are met by GSE to unload baggage and service the lavatory and cabin. Prior to aircraft departure, GSE are present to load baggage, food, and fuel. When an aircraft departs from a gate, a tug may be used to push or tow the aircraft away from the gate and to the taxiway. GSE emission factors used by EDMS were derived from EPA's NONROAD2005 model and are based on the following variables: fuel, brake horsepower, and load factor.

GSE emissions were estimated by applying activity data to an appropriate emission factor as noted in the following equation:

$$EE = A \times EF \times (1\text{-}CE/100)$$

Where:

EE	=	Emission estimate (tons per year)
A	=	Annual activity level
EF	=	Emission factor (tons/activity)
CE	=	Anticipated emission reduction (percentage)

GSE activity level (minutes per arrival, minutes per departure) is assigned based on the type of service. For example, a fuel truck servicing a large commercial aircraft has a different operating time than the same fuel truck servicing a smaller aircraft.

EDMS provides emission estimates for NOx, HC, VOC, CO, SO2, PM10, PM2.5, and HAPs.

3.1.2 Generic Emission Estimating Procedures

EDMS can provide emission estimates if the aircraft make and model are known. Often this is not the case for air taxis, general aviation, and military aircraft activity in the TAF

and 5010 datasets. For the remaining 1,586 smaller airports operating in Texas within the project's area of interest, ERG used the generic approach that relies upon representative criteria emission factors provided by EPA. The following equation was used:

$$Eixj = LTOi \times FRpro\text{-}i \times EFij$$

Where:

Eixj	=	Emission estimate for aircraft type i equipped with engine type x and pollutant j (lbs/year)
LTOi	=	Annual count of LTO cycles for aircraft type i
FRx	=	Fraction of LTOs equipped with engine type x
EFij	=	Generic emission factor for aircraft type i equipped with engine type x and pollutant j (lbs/LTO)
i	=	Aircraft type (i.e., air taxi, general aviation, and military)
x	=	Engine type (i.e., jet or turboprop, and piston engine)
j	=	Criteria pollutant j

Critical to the calculation is the application of representative emission factors that account for the different aircraft in the national fleet. Table 3 1 lists the generic emission factors for criteria pollutants by aircraft type.10 U.S. EPA OTAQ staff have recently review the generic criteria emission factors used for this Texas inventory and recommended the use of new VOC/HC conversion factors (1.15)11; this correction was made to the files used for this project.

As discussed above, EPA has assumed that 72% of all GA and AT activity is piston-driven and 28% is jet-driven, and that commercial and military aircraft are jet-driven. For this emissions inventory, ERG has used EPA's engine fleet assumptions to be consistent with data submittals provided by other states.

Table 3-1. Emission Factors for Aircraft Types (pounds per LTO)

	Pollutant					
Aircraft Type	**VOC**	**NOX**	**CO**	**SO2**	**PM10**	**PM2.5**
Commercial	5.87	18.6	22.4	1.78	1.08	1.05
Air Taxi (jet)	1.01	0.78	3.61	0.16	0.60	0.078
Air Taxi (propeller)	0.000085	0.16	28.1	0.015	0.60	0.078
General Aviation (jet)	0.55	0.32	9.58	0.074	0.24	0.031
General Aviation (propeller)	0.000075	0.065	12.0	0.010	0.24	0.031
Military	0.00068	0.16	28.1	0.015	0.60	0.078

3.2 Summary of Texas Airport Emissions

The results of implementing the emission estimation methodology for the base year 2008 are present in Table 3-2 on a statewide basis and Table 3-3 on a county-level basis for the top ten counties with the highest activity.

General aviation aircraft outfitted with piston engines account for 50% of the total aircraft activities. General aviation aircraft outfitted with jet engines, commercial aircraft, military aircraft, air taxi aircraft outfitted with piston engines, and air taxi aircraft outfitted with jet engines account for 21%, 6.7%, 3.5%, 3.1%, and 1.2% of the total aircraft activities, respectively. Auxiliary power units and ground support equipment contribute 6.7% and 7.8% to the total aircraft activities, respectively.

General aviation aircraft outfitted with piston engines also contributed to the highest percentage of carbon monoxide emissions (50%); while air taxi aircraft outfitted with jet engines contributed the least (0.48%). Commercial aircraft contributed to the highest percentage of nitrogen oxide emissions (78%); while air taxi aircraft outfitted with piston engines contributed the least (0.13%). Commercial aircraft contributed to the highest percentage of particulate matter 10 emissions (53%) and particulate matter 2.5 emissions (30%); while air taxi aircraft outfitted with jet engines contributed the least (0.85% and 0.66%, respectively). Commercial aircraft contributed the most to sulfur dioxide emissions (77%); while air taxi aircraft outfitted with piston engines contributed the least (0.25%). Commercial aircraft also contributed the highest percentage of volatile organic compound emissions (41%); while military aircraft contributed the least (0.35%).

Table 3-2. Statewide Summary of TX Base year Activity and Emissions Data for the Criteria Pollutants

Aircraft/Equipment Type	Activity (LTO)	Annual Emissions (tons/yr)					
		CO	NOx	PM10	PM2.5	SOx	VOC
Air Taxi (piston)	246,680	1,485	7.78	17	2.22	1.61	13
Air Taxi (jet)	97,887	229	51	7.19	1.33	10	78
Commercial	536,288	4,097	4,559	60	60	493	649
General Aviation (piston)	3,976,106	23,775	128	450	59	21	18
General Aviation (jet)	1,685,933	8,049	314	186	28	69	608
Military	278,372	3,887	49	83	11	3.94	5.55
Auxiliary Power Unit	536,326	232	131	24	24	23	18
Ground Support Equipment (CNG)	8,127	76	7.91	0.21	0.20	0.22	2.58
Ground Support Equipment (diesel)	497,443	4,670	484	13	12	13	158

Aircraft/Equipment Type	Activity (LTO)	Annual Emissions (tons/yr)					
		CO	NOx	PM10	PM2.5	SOx	VOC
Ground Support Equipment (gasoline)	104,623	982	102	2.74	2.63	2.81	33
Ground Support Equipment (LPG)	10,277	96	10	0.27	0.26	0.28	3.27
Total	7,978,063	47,578	5,843	844	201	638	1,586

42% of all airport activity in this project comes from the top 10 counties. These airports account for 42% of the carbon monoxide emissions, 86% of the nitrogen oxide emissions, 33% of the particulate matter 10 emissions, 57% of the particulate 2.5 emissions, 82% of the sulfur dioxide emissions, and 70% of the volatile organic compound emissions.

The airports located in the most active county, Harris County, account for 19% of all Texas activity in scope for this project. These airports account for 20% of the carbon monoxide emissions, 58% of the nitrogen oxide emissions, 15% of the particulate matter 10 emissions, 33% of the particulate matter 2.5 emissions, 53% of the sulfur dioxide emissions, and 35% of the volatile organic compound emissions.

Table 3-3. Summary of TX Base year Activity and Emissions Data for the Criteria Pollutants for the Top Ten Counties

County	FIPS	Activity (LTO)	Annual Emissions (tons/yr)					
			CO	NOx	PM10	PM2.5	SOx	VOC
Harris	48201	1,524,252	9,352.92	3,376.61	128.53	65.91	338.06	550.93
Bexar	48029	626,018	3,107.90	567.48	30.00	13.96	60.20	215.51
Travis	48453	365,919	2,074.17	647.43	18.20	13.85	71.45	199.09
Brazoria	48039	149,536	835.08	18.12	18.21	2.56	3.16	17.65
Fort Bend	48157	138,791	803.48	9.78	16.98	2.21	1.96	10.73
El Paso	48141	132,602	919.92	266.56	13.82	6.12	27.93	44.93
Nueces	48355	116,210	902.49	56.90	17.78	3.30	7.00	14.97
Williamson	48491	114,585	653.91	7.90	13.68	1.78	1.59	8.74
Bell	48027	113,988	689.18	73.62	15.05	4.52	8.24	25.65
Medina	48325	108,655	550.10	11.49	8.26	1.11	2.49	20.42
Total		3,390,556	19,889	5,036	281	115	522	1,109

4. EMISSION PROJECTIONS

This section of the report summarizes activities related to development of the forecast and backcast emission estimates. ERG developed backcast and forecast uncontrolled emission estimates by applying the scale factors developed from the FAA's Terminal Area Forecast (TAF) data to the 2008 baseline emissions inventory. ERG also developed controlled emission estimates accounting for the control strategies identified by local airport staff.

Control strategy information was collected because airports are looking for alternatives to diminish emissions. Many have developed control strategies to include reducing the usage of APUs through the utilization of alternatives sources to provide ground power, heating, and air conditioning. These alternatives include mobile units, terminal based, bridge based, or ramp based. For example for power, there are various ground power units (GPU) options or power can be drawn from the terminal and converted to 400Hz to match the aircraft systems. For heating and air conditioning, mobile pre-conditioned air (PCA) units, terminal based glycol and water systems, pit based air handling units (AHU) or electrical PCAs are all options. Each of these alternatives is associated with different emission control efficiencies and different capital and operating costs. Some require extensive investments in infrastructure such as upgrading connections to the local electrical grid, changes in HVAC capacity and configuration within a terminal, or constructing pit systems for aircraft that load and unload passengers and cargo on the ramp. APU alternatives will vary based on what is appropriate for different airports with different climatic conditions, infrastructure context, and aircraft fleet.

4.1 Projections Methodology

4.1.1 Backcast and Forecast Emission Estimates – Uncontrolled

ERG developed backcast and forecast uncontrolled emission estimates by applying the scale factors developed from the FAA's Terminal Area Forecast (TAF) data to the 2008 baseline emissions inventory.

The TAF scale factors were produced using annual data from the 2010 version of the TAF dataset. The scale factors were based on the 2008 base year, by airport and aircraft category. The aircraft categories include air carrier (AC), air taxi (AT), commercial (COM), and general aviation (GA). The scale factors were calculated using the TAF activity data for all Texas airport-aircraft category combinations in the TAF dataset where the activity was greater than 0 for both the base year and the projection year. For the Texas airport-aircraft category combinations not in the TAF dataset and the airport-aircraft category combinations where the activity was 0 for either the base year and/or the projection year, an average scale factor by aircraft category was used. The average

scale factors were calculated using the total annual activity by aircraft category for the towered Texas airports.

The TAF scale factors were applied to the 2008 baseline emissions by facility and aircraft category using the following equation.

$$Ep = E08 \times TSF$$

Where:

Ep	=	Projected Emissions
E08	=	2008 Baseline Emissions
TSF	=	TAF Scaling Factor

The uncontrolled backcast and forecast criteria emission estimates are summarized in Appendix C by year and aircraft type and in Table 4 1 by year.

4.1.2 Backcast and Forecast Emission Estimates – Controlled

The controlled emission estimates were developed by applying the control strategies listed for each airport that provided additional emission control information to the uncontrolled backcast and forecast emission inventories.

The airports that provided information on emission control strategies were Houston-Southwest Airport, Aransas County Airport, Abilene Regional Airport, Georgetown Municipal Airport, and Austin-Bergstrom International Airport. Houston-Southwest will be building a number of new hangars in the future and installing electric gates in 2012. Aransas County had electronic gates installed in 2002 and auxiliary power generators installed in 2006/2007. The auxiliary power generators were used in case of emergency, when power is not available. Abilene Regional had two auxiliary power units (APUs) installed in 2002 but lacked data on the associated emission reductions. Georgetown Municipal had electrical gates installed in 1999. Austin-Bergstrom provided information on taxi times. Based on field observations, the taxi in time was three minutes, and the taxi out time was six minutes. This is less than the default taxi-in and taxi-out times used for the other airports which were seven and nine minutes, respectively. These default values were also used for the EPA's National Emission Inventory and the EPA's Historical Assessment Inventory.

Table 4-1. Summary of Emission Control Strategies Identified by Local Airport Staff

State Facility Identifier	Facility Name	County	FIPS	Control Strategy	Year Installed	APU Emission Reductions
ABI	ABILENE RGNL	Taylor	48441	APU	2002	-
RKP	ARANSAS CO	Aransas	48007	Electric Gates	2002	90%
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Shorter Taxi Times	-	-
GTU	GEORGETOWN MUNI	Williamson	48491	Electric Gates	1999	90%
AXH	HOUSTON-SOUTHWEST	Fort Bend	48157	Electric Gates	2012	90%

The identified controls listed in Table 4-1 are the addition of APUs, the shorter taxi times, and the addition of electric gates. As previously mentioned the emission reductions associated with the addition of APUs at Abilene Regional Airport is unknown and therefore cannot be quantified. The shorter taxi times at Austin-Bergstrom International Airport were integrated into the calculation of the 2008 baseline inventory. A comparison between taxi times provided by Austin and the default taxi times is out of scope for this project, therefore the emission reductions associated with a shorter taxi time was not calculated. The emission reductions associated with the addition of electric gates at Aransas County Airport, Georgetown Municipal Airport, and Houston-Southwest Airport is 90% for emissions linked with APU usage. In order to calculate the controlled emissions, the emission reductions associated with the addition of electric gates are applied to the uncontrolled emissions. Unfortunately, once the control data were linked to the emissions inventory, no reductions were found. APU emissions data are only available for aircraft specific data that are run through EDMS. The airports that gave control data only provided generic aircraft data that were not run through EDMS. Therefore, there are no APU emissions to reduce. Hence, the controlled emission inventory is the same as the uncontrolled emission inventory (Appendix C and Table 4-1).

4.2 Summary of Texas Airport Emissions Projected

The results of implementing the emissions projection methodology are presented in Table 4 2 on a statewide basis. Table 4-2 summarizes to projected statewide activity and criteria emissions by year. The backcasted emissions show a decline from 1996 to the base year, 2008. The projected emissions from the base year through 2029 are expected increase. From 1996 to the base year, the backcasted emissions decreased by 86%, and from the base year to 2029 the projected emissions increased by 19%. It is important to note that although the projected emissions illustrate a general increase, there is a slight decrease in emissions from the base year to 2011 (6% decrease).

Table 4-2. TX Backcast and Forecast Activity and Emissions Data for the Criteria Pollutants Summarized by Year

Projected Year	Projected LTO	Annual Emissions (tons/yr)					
		CO	NOx	PM10	PM2.5	SOx	VOC
1996	14,808,897	66,529	6,723	936	227	764	2,471
2000	9,493,806	55,890	6,881	1,000	235	753	1,847
2002	9,615,872	55,051	5,717	976	214	638	1,726
2008*	7,978,063	47,581	5,844	844	201	638	1,586
2011	7,512,210	45,502	5,991	798	200	662	1,554
2014	7,796,744	47,150	6,373	823	209	702	1,636
2017	8,099,370	48,902	6,786	850	218	744	1,724
2020	8,420,766	50,763	7,232	879	229	790	1,819
2023	8,763,378	52,747	7,720	909	240	840	1,921
2026	9,128,831	54,865	8,251	940	252	895	2,032
2029	9,518,969	57,126	8,831	974	265	954	2,151
*Base year used for projections.							

5. REFERENCES

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Appendix A. T-100 Data used in EDMS Model

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
ABI	ABILENE RGNL	Taylor	48441	ATR 72-200	ATR72-2	PW127	PW127	3
ABI	ABILENE RGNL	Taylor	48441	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	2
ABI	ABILENE RGNL	Taylor	48441	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	5
ABI	ABILENE RGNL	Taylor	48441	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	1
ABI	ABILENE RGNL	Taylor	48441	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	24
ABI	ABILENE RGNL	Taylor	48441	Boeing MD-82	MD82	JT8D-217C	4PW070	50
ABI	ABILENE RGNL	Taylor	48441	Boeing MD-90	MD90	V2525-D5	1IA002	1
ABI	ABILENE RGNL	Taylor	48441	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	8
ABI	ABILENE RGNL	Taylor	48441	Cessna 208 Caravan	CNA208	PT6A-114A	P6114A	702
ABI	ABILENE RGNL	Taylor	48441	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	16
ABI	ABILENE RGNL	Taylor	48441	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	407
ABI	ABILENE RGNL	Taylor	48441	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	1300
ABI	ABILENE RGNL	Taylor	48441	Embraer ERJ190	ERJ190	CF34-10E	XCF10E	1
ABI	ABILENE RGNL	Taylor	48441	Fokker F27 Friendship	F27	RDa.7	RDA7	1
ABI	ABILENE RGNL	Taylor	48441	Raytheon Beech 18	BEECH18	R-1820	R1820	1
ABI	ABILENE RGNL	Taylor	48441	Saab 340-B	SAAB340-B	CT7-9B	CT79B	1435
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Airbus A300F4-600 Series	A300F4-6	PW4158	1PW048	442
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Airbus A310-200 Series	A310-2	CF6-80A3	1GE013	6

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Airbus A318-100 Series	A318-1	CFM56-5B8/P	7CM048	218
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Airbus A319-100 Series	A319-1	CFM56-5B6/P	3CM028	1469
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Airbus A320-200 Series	A320-2	V2527-A5	1IA003	287
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing 727-200 Series	B727-2	JT8D-15	1PW009	53
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	35
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	10501
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	8
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing 737-500 Series	B737-5	CFM56-3C-1	1CM007	3247
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	7873
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	1808
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing 737-900 Series	B737-9	CFM56-7B24	3CM032	649
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing 757-200 Series	B757-2	PW2037	4PW072	34
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing 757-300 Series	B757-3	PW2043	PW2043	65
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing 767-200 ER	B767-2ER	CF6-80A2	1GE012	553
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing 767-300 ER	B767-3ER	PW4060	1PW043	1
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing 767-400	B767-4	CF6-80C2B8FA	3GE058	1

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing DC-10-10 Series	DC10-1	CF6-6D	1GE001	108
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing DC-10-30 Series	DC10-3	CF6-50C2	3GE074	500
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing DC-8 Series 70	DC8-7	CFM56-2B	CF562B	5
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	7
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing DC-9-30 Series	DC9-3	JT8D-7 series	1PW005	67
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing DC-9-40 Series	DC9-4	JT8D-11	1PW008	0
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing MD-11	MD11	CF6-80C2D1F	2GE049	4
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing MD-82	MD82	JT8D-217C	4PW070	10209
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Boeing MD-90	MD90	V2525-D5	1IA002	28
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Bombardier CRJ-100	CRJ1	CF34-3A1	1GE035	239
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	1651
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	3691
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Bombardier CRJ-900	CRJ9	CF34-8C5	6GE092	3652
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Cessna 208 Caravan	CNA208	PT6A-114A	P6114A	1368
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Cessna 650 Citation III	CNA650	TFE731-3	1AS002	1
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Cessna 750 Citation X	CNA750	AE3007C	6AL022	1
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Convair CV-580	CV580	501D22A	501D22	1
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Dassault Falcon 10	FAL10	TAY Mk620-15	1RR020	1

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Dornier 328-100 Series	DO328-1	PW119B	PW119B	1
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	3
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	242
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	4024
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Embraer ERJ170	ERJ170	CF34-8E5	6GE094	850
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Embraer ERJ175	ERJ175	CF34-8E5	6GE094	194
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Embraer ERJ190	ERJ190	CF34-10E	XCF10E	2169
AUS	AUSTIN-BERGSTROM INTL	Travis	48453	Gulfstream G500	GULF5	BR700-710A1-10	4BR008	2
SWW	AVENGER FIELD	Nolan	48353	Convair CV-580	CV580	501D22A	501D22	1
BIF	BIGGS AAF (FORT BLISS)	El Paso	48141	Antonov 124 Ruslan	AN124	D-36	1ZM001	4
BIF	BIGGS AAF (FORT BLISS)	El Paso	48141	Boeing 727-200 Series	B727-2	JT8D-15	1PW009	2
BIF	BIGGS AAF (FORT BLISS)	El Paso	48141	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	16
BIF	BIGGS AAF (FORT BLISS)	El Paso	48141	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	4
BIF	BIGGS AAF (FORT BLISS)	El Paso	48141	Boeing 757-200 Series	B757-2	PW2037	4PW072	1
BIF	BIGGS AAF (FORT BLISS)	El Paso	48141	Boeing 767-300 ER	B767-3ER	PW4060	1PW043	3
BIF	BIGGS AAF (FORT BLISS)	El Paso	48141	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	4
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	Cameron	48061	Boeing 727-100 Series	B727-1	JT8D-7 series	1PW005	5
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	Cameron	48061	Boeing 727-200 Series	B727-2	JT8D-15	1PW009	7
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	Cameron	48061	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	5
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	Cameron	48061	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	2

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	Cameron	48061	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	3
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	Cameron	48061	Boeing DC-8 Series 60	DC8-6	JT3D-7 series	1PW003	3
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	Cameron	48061	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	22
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	Cameron	48061	Boeing DC-9-30 Series	DC9-3	JT8D-7 series	1PW005	11
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	Cameron	48061	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	805
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	Cameron	48061	Convair CV-580	CV580	501D22A	501D22	19
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	Cameron	48061	Dassault Falcon 10	FAL10	TAY Mk620-15	1RR020	4
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	Cameron	48061	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	173
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	Cameron	48061	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	1255
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	Cameron	48061	Embraer ERJ170	ERJ170	CF34-8E5	6GE094	1
BWD	BROWNWOOD RGNL	Brown	48049	Cessna 208 Caravan	CNA208	PT6A-114A	P6114A	263
CRP	CORPUS CHRISTI INTL	Nueces	48355	Airbus A319-100 Series	A319-1	CFM56-5B6/P	3CM028	1
CRP	CORPUS CHRISTI INTL	Nueces	48355	Boeing 727-100 Series	B727-1	JT8D-7 series	1PW005	1
CRP	CORPUS CHRISTI INTL	Nueces	48355	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	1007
CRP	CORPUS CHRISTI INTL	Nueces	48355	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	5
CRP	CORPUS CHRISTI INTL	Nueces	48355	Boeing 737-500 Series	B737-5	CFM56-3C-1	1CM007	453

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
CRP	CORPUS CHRISTI INTL	Nueces	48355	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	465
CRP	CORPUS CHRISTI INTL	Nueces	48355	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	22
CRP	CORPUS CHRISTI INTL	Nueces	48355	Boeing 737-900 Series	B737-9	CFM56-7B24	3CM032	4
CRP	CORPUS CHRISTI INTL	Nueces	48355	Boeing MD-82	MD82	JT8D-217C	4PW070	13
CRP	CORPUS CHRISTI INTL	Nueces	48355	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	2787
CRP	CORPUS CHRISTI INTL	Nueces	48355	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	1
CRP	CORPUS CHRISTI INTL	Nueces	48355	Convair CV-580	CV580	501D22A	501D22	1
CRP	CORPUS CHRISTI INTL	Nueces	48355	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	33
CRP	CORPUS CHRISTI INTL	Nueces	48355	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	985
CRP	CORPUS CHRISTI INTL	Nueces	48355	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	2325
DHT	DALHART MUNI	Hartley	48205	Cessna 550 Citation II	CNA550	JT15D-4 series	1PW036	1
DRT	DEL RIO INTL	Val Verde	48465	Boeing 727-100 Series	B727-1	JT8D-7 series	1PW005	1
DRT	DEL RIO INTL	Val Verde	48465	Boeing 727-200 Series	B727-2	JT8D-15	1PW009	1
DRT	DEL RIO INTL	Val Verde	48465	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	6
DRT	DEL RIO INTL	Val Verde	48465	Boeing DC-9-30 Series	DC9-3	JT8D-7 series	1PW005	1
DRT	DEL RIO INTL	Val Verde	48465	Cessna 208 Caravan	CNA208	PT6A-114A	P6114A	501
DRT	DEL RIO INTL	Val Verde	48465	Convair CV-580	CV580	501D22A	501D22	5
DRT	DEL RIO INTL	Val Verde	48465	Dassault Falcon 10	FAL10	TAY Mk620-15	1RR020	2
DRT	DEL RIO INTL	Val Verde	48465	Saab 340-B	SAAB340-B	CT7-9B	CT79B	907

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
DYS	DYESS AFB	Taylor	48441	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	1
DYS	DYESS AFB	Taylor	48441	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	1
GGG	EAST TEXAS RGNL	Gregg	48183	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	1
GGG	EAST TEXAS RGNL	Gregg	48183	Boeing 757-300 Series	B757-3	PW2043	PW2043	1
GGG	EAST TEXAS RGNL	Gregg	48183	Boeing DC-9-30 Series	DC9-3	JT8D-7 series	1PW005	2
GGG	EAST TEXAS RGNL	Gregg	48183	Boeing MD-82	MD82	JT8D-217C	4PW070	10
GGG	EAST TEXAS RGNL	Gregg	48183	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	3
GGG	EAST TEXAS RGNL	Gregg	48183	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	2
GGG	EAST TEXAS RGNL	Gregg	48183	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	7
GGG	EAST TEXAS RGNL	Gregg	48183	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	232
GGG	EAST TEXAS RGNL	Gregg	48183	Saab 340-B	SAAB340-B	CT7-9B	CT79B	707
CLL	EASTERWOOD FIELD	Brazos	48041	Airbus A320-200 Series	A320-2	V2527-A5	1IA003	2
CLL	EASTERWOOD FIELD	Brazos	48041	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	3
CLL	EASTERWOOD FIELD	Brazos	48041	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	4
CLL	EASTERWOOD FIELD	Brazos	48041	Boeing 737-500 Series	B737-5	CFM56-3C-1	1CM007	2
CLL	EASTERWOOD FIELD	Brazos	48041	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	2
CLL	EASTERWOOD FIELD	Brazos	48041	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	2
CLL	EASTERWOOD FIELD	Brazos	48041	Boeing 757-200 Series	B757-2	PW2037	4PW072	7

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
CLL	EASTERWOOD FIELD	Brazos	48041	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	15
CLL	EASTERWOOD FIELD	Brazos	48041	Boeing DC-9-30 Series	DC9-3	JT8D-7 series	1PW005	3
CLL	EASTERWOOD FIELD	Brazos	48041	Boeing MD-82	MD82	JT8D-217C	4PW070	1
CLL	EASTERWOOD FIELD	Brazos	48041	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	19
CLL	EASTERWOOD FIELD	Brazos	48041	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	2
CLL	EASTERWOOD FIELD	Brazos	48041	Cessna 208 Caravan	CNA208	PT6A-114A	P6114A	200
CLL	EASTERWOOD FIELD	Brazos	48041	Dornier 328-100 Series	DO328-1	PW119B	PW119B	3
CLL	EASTERWOOD FIELD	Brazos	48041	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	66
CLL	EASTERWOOD FIELD	Brazos	48041	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	17
CLL	EASTERWOOD FIELD	Brazos	48041	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	623
CLL	EASTERWOOD FIELD	Brazos	48041	Saab 340-B	SAAB340-B	CT7-9B	CT79B	2953
ELP	EL PASO INTL	El Paso	48141	Airbus A300F4-600 Series	A300F4-6	PW4158	1PW048	363
ELP	EL PASO INTL	El Paso	48141	Airbus A310-200 Series	A310-2	CF6-80A3	1GE013	8
ELP	EL PASO INTL	El Paso	48141	Airbus A319-100 Series	A319-1	CFM56-5B6/P	3CM028	45
ELP	EL PASO INTL	El Paso	48141	Airbus A320-200 Series	A320-2	V2527-A5	1IA003	6
ELP	EL PASO INTL	El Paso	48141	Airbus A321-100 Series	A321-1	V2530-A5	1IA005	1
ELP	EL PASO INTL	El Paso	48141	Boeing 727-100 Series	B727-1	JT8D-7 series	1PW005	3
ELP	EL PASO INTL	El Paso	48141	Boeing 727-200 Series	B727-2	JT8D-15	1PW009	457

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
ELP	EL PASO INTL	El Paso	48141	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	2
ELP	EL PASO INTL	El Paso	48141	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	6369
ELP	EL PASO INTL	El Paso	48141	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	20
ELP	EL PASO INTL	El Paso	48141	Boeing 737-500 Series	B737-5	CFM56-3C-1	1CM007	1734
ELP	EL PASO INTL	El Paso	48141	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	5206
ELP	EL PASO INTL	El Paso	48141	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	91
ELP	EL PASO INTL	El Paso	48141	Boeing 737-900 Series	B737-9	CFM56-7B24	3CM032	1
ELP	EL PASO INTL	El Paso	48141	Boeing 747-100 Series	B747-1	JT9D-7A	1PW021	1
ELP	EL PASO INTL	El Paso	48141	Boeing 747-200 Series	B747-2	CF6-50E2	3GE077	2
ELP	EL PASO INTL	El Paso	48141	Boeing 757-200 Series	B757-2	PW2037	4PW072	19
ELP	EL PASO INTL	El Paso	48141	Boeing 757-300 Series	B757-3	PW2043	PW2043	1
ELP	EL PASO INTL	El Paso	48141	Boeing 767-200 ER	B767-2ER	CF6-80A2	1GE012	1
ELP	EL PASO INTL	El Paso	48141	Boeing 767-300 ER	B767-3ER	PW4060	1PW043	1
ELP	EL PASO INTL	El Paso	48141	Boeing DC-10-10 Series	DC10-1	CF6-6D	1GE001	38
ELP	EL PASO INTL	El Paso	48141	Boeing DC-10-30 Series	DC10-3	CF6-50C2	3GE074	510
ELP	EL PASO INTL	El Paso	48141	Boeing DC-8 Series 60	DC8-6	JT3D-7 series	1PW003	1

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
ELP	EL PASO INTL	El Paso	48141	Boeing DC-8 Series 70	DC8-7	CFM56-2B	CF562B	2
ELP	EL PASO INTL	El Paso	48141	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	111
ELP	EL PASO INTL	El Paso	48141	Boeing DC-9-30 Series	DC9-3	JT8D-7 series	1PW005	43
ELP	EL PASO INTL	El Paso	48141	Boeing MD-11	MD11	CF6-80C2D1F	2GE049	3
ELP	EL PASO INTL	El Paso	48141	Boeing MD-82	MD82	JT8D-217C	4PW070	4020
ELP	EL PASO INTL	El Paso	48141	Boeing MD-90	MD90	V2525-D5	1IA002	21
ELP	EL PASO INTL	El Paso	48141	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	2388
ELP	EL PASO INTL	El Paso	48141	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	2
ELP	EL PASO INTL	El Paso	48141	Bombardier CRJ-900	CRJ9	CF34-8C5	6GE092	827
ELP	EL PASO INTL	El Paso	48141	Bombardier de Havilland Dash 8 Q400	DHC8Q-4	PW150A	PW150A	688
ELP	EL PASO INTL	El Paso	48141	Cessna 208 Caravan	CNA208	PT6A-114A	P6114A	249
ELP	EL PASO INTL	El Paso	48141	Cessna 750 Citation X	CNA750	AE3007C	6AL022	2
ELP	EL PASO INTL	El Paso	48141	Convair CV-580	CV580	501D22A	501D22	53
ELP	EL PASO INTL	El Paso	48141	Dassault Falcon 10	FAL10	TAY Mk620-15	1RR020	54
ELP	EL PASO INTL	El Paso	48141	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	8
ELP	EL PASO INTL	El Paso	48141	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	51
ELP	EL PASO INTL	El Paso	48141	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	883
ELP	EL PASO INTL	El Paso	48141	Embraer ERJ170	ERJ170	CF34-8E5	6GE094	185
EFD	ELLINGTON FIELD	Harris	48201	Airbus A320-200 Series	A320-2	V2527-A5	1IA003	2

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
EFD	ELLINGTON FIELD	Harris	48201	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	3
EFD	ELLINGTON FIELD	Harris	48201	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	4
EFD	ELLINGTON FIELD	Harris	48201	Boeing 737-500 Series	B737-5	CFM56-3C-1	1CM007	1
EFD	ELLINGTON FIELD	Harris	48201	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	1
EFD	ELLINGTON FIELD	Harris	48201	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	4
EFD	ELLINGTON FIELD	Harris	48201	Boeing 757-200 Series	B757-2	PW2037	4PW072	7
EFD	ELLINGTON FIELD	Harris	48201	Boeing 757-300 Series	B757-3	PW2043	PW2043	1
EFD	ELLINGTON FIELD	Harris	48201	Boeing 767-200 ER	B767-2ER	CF6-80A2	1GE012	1
EFD	ELLINGTON FIELD	Harris	48201	Boeing 767-300 ER	B767-3ER	PW4060	1PW043	5
EFD	ELLINGTON FIELD	Harris	48201	Boeing 777-200 Series	B777-2	PW4077	2PW061	1
EFD	ELLINGTON FIELD	Harris	48201	Boeing MD-82	MD82	JT8D-217C	4PW070	1
EFD	ELLINGTON FIELD	Harris	48201	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	2
EFD	ELLINGTON FIELD	Harris	48201	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	24
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Airbus A300B4-100 Series	A300B4-1	CF6-50C2	3GE074	5
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Airbus A300F4-600 Series	A300F4-6	PW4158	1PW048	552
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Airbus A310-200 Series	A310-2	CF6-80A3	1GE013	315
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Airbus A318-100 Series	A318-1	CFM56-5B8/P	7CM048	336

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Airbus A319-100 Series	A319-1	CFM56-5B6/P	3CM028	2571
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Airbus A320-200 Series	A320-2	V2527-A5	1IA003	1281
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Airbus A321-100 Series	A321-1	V2530-A5	1IA005	3
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Airbus A330-200 Series	A330-2	PW4168A	7PW082	1
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Airbus A340-200 Series	A340-2	CFM56-5C2	1CM010	103
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Antonov 12 Cub	AN12	T56 series I	T56-1	7
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Antonov 124 Ruslan	AN124	D-36	1ZM001	10
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 727-100 Series	B727-1	JT8D-7 series	1PW005	3
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 727-200 Series	B727-2	JT8D-15	1PW009	166
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	27
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	19016
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	409
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 737-500 Series	B737-5	CFM56-3C-1	1CM007	17870
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	14197
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	35813
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 737-900 Series	B737-9	CFM56-7B24	3CM032	10249

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 747-100 Series	B747-1	JT9D-7A	1PW021	702
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 747-200 Series	B747-2	CF6-50E2	3GE077	777
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 747-400 Series	B747-4	PW4056	1PW042	789
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 757-200 Series	B757-2	PW2037	4PW072	3927
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 757-300 Series	B757-3	PW2043	PW2043	5280
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 767-200 ER	B767-2ER	CF6-80A2	1GE012	1574
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 767-300 ER	B767-3ER	PW4060	1PW043	158
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 767-400	B767-4	CF6-80C2B8FA	3GE058	1746
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 777-200 Series	B777-2	PW4077	2PW061	2155
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing 777-300 ER	B777-3ER	GE90-115B	7GE099	162
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing DC-10-10 Series	DC10-1	CF6-6D	1GE001	326
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing DC-10-30 Series	DC10-3	CF6-50C2	3GE074	77
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing DC-10-40 Series	DC10-4	JT9D-59A	1PW033	1
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing DC-8 Series 60	DC8-6	JT3D-7 series	1PW003	2
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing DC-8 Series 70	DC8-7	CFM56-2B	CF562B	262
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	31

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing DC-9-30 Series	DC9-3	JT8D-7 series	1PW005	75
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing DC-9-40 Series	DC9-4	JT8D-11	1PW008	2
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing DC-9-50 Series	DC9-5	JT8D-17	1PW013	5
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing MD-11	MD11	CF6-80C2D1F	2GE049	197
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing MD-82	MD82	JT8D-217C	4PW070	4056
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Boeing MD-90	MD90	V2525-D5	1IA002	79
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Bombardier CRJ-100	CRJ1	CF34-3A1	1GE035	638
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	22034
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	2862
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Bombardier CRJ-900	CRJ9	CF34-8C5	6GE092	5223
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Cessna 208 Caravan	CNA208	PT6A-114A	P6114A	192
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Cessna 650 Citation III	CNA650	TFE731-3	1AS002	1
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Convair CV-580	CV580	501D22A	501D22	4
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Dassault Falcon 10	FAL10	TAY Mk620-15	1RR020	3
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	11959
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	1

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	88794
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Embraer ERJ170	ERJ170	CF34-8E5	6GE094	1424
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Embraer ERJ175	ERJ175	CF34-8E5	6GE094	1721
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Embraer ERJ190	ERJ190	CF34-10E	XCF10E	673
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Fokker F27 Friendship	F27	RDa.7	RDA7	1
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Raytheon Beech 18	BEECH18	R-1820	R1820	1
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	Harris	48201	Saab 340-B	SAAB340-B	CT7-9B	CT79B	16533
SKF	LACKLAND AFB (KELLY FLD ANNEX)	Bexar	48029	Antonov 124 Ruslan	AN124	D-36	1ZM001	1
SKF	LACKLAND AFB (KELLY FLD ANNEX)	Bexar	48029	Boeing 747-200 Series	B747-2	CF6-50E2	3GE077	1
SKF	LACKLAND AFB (KELLY FLD ANNEX)	Bexar	48029	Boeing 747-400 Series	B747-4	PW4056	1PW042	2
SKF	LACKLAND AFB (KELLY FLD ANNEX)	Bexar	48029	Boeing 767-300 ER	B767-3ER	PW4060	1PW043	1
SKF	LACKLAND AFB (KELLY FLD ANNEX)	Bexar	48029	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	1
LJN	Lake Jackson, TX: Brazoria County	Brazoria	48039	Airbus A319-100 Series	A319-1	CFM56-5B6/P	3CM028	162
LJN	Lake Jackson, TX: Brazoria County	Brazoria	48039	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	44
LJN	Lake Jackson, TX: Brazoria County	Brazoria	48039	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	16
LRD	LAREDO INTL	Webb	48479	Airbus A300F4-600 Series	A300F4-6	PW4158	1PW048	3

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
LRD	LAREDO INTL	Webb	48479	Airbus A310-200 Series	A310-2	CF6-80A3	1GE013	6
LRD	LAREDO INTL	Webb	48479	Boeing 727-100 Series	B727-1	JT8D-7 series	1PW005	20
LRD	LAREDO INTL	Webb	48479	Boeing 727-200 Series	B727-2	JT8D-15	1PW009	25
LRD	LAREDO INTL	Webb	48479	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	1
LRD	LAREDO INTL	Webb	48479	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	5
LRD	LAREDO INTL	Webb	48479	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	46
LRD	LAREDO INTL	Webb	48479	Boeing 757-200 Series	B757-2	PW2037	4PW072	331
LRD	LAREDO INTL	Webb	48479	Boeing DC-8 Series 60	DC8-6	JT3D-7 series	1PW003	9
LRD	LAREDO INTL	Webb	48479	Boeing DC-8 Series 70	DC8-7	CFM56-2B	CF562B	198
LRD	LAREDO INTL	Webb	48479	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	233
LRD	LAREDO INTL	Webb	48479	Boeing DC-9-30 Series	DC9-3	JT8D-7 series	1PW005	262
LRD	LAREDO INTL	Webb	48479	Boeing DC-9-40 Series	DC9-4	JT8D-11	1PW008	68
LRD	LAREDO INTL	Webb	48479	Boeing MD-82	MD82	JT8D-217C	4PW070	116
LRD	LAREDO INTL	Webb	48479	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	538
LRD	LAREDO INTL	Webb	48479	Cessna 550 Citation II	CNA550	JT15D-4 series	1PW036	1
LRD	LAREDO INTL	Webb	48479	Convair CV-580	CV580	501D22A	501D22	62
LRD	LAREDO INTL	Webb	48479	Dassault Falcon 10	FAL10	TAY Mk620-15	1RR020	86

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
LRD	LAREDO INTL	Webb	48479	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	439
LRD	LAREDO INTL	Webb	48479	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	275
LRD	LAREDO INTL	Webb	48479	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	1290
LRD	LAREDO INTL	Webb	48479	Saab 340-B	SAAB340-B	CT7-9B	CT79B	86
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Airbus A300F4-600 Series	A300F4-6	PW4158	1PW048	57
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Airbus A310-200 Series	A310-2	CF6-80A3	1GE013	138
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	ATR 72-200	ATR72-2	PW127	PW127	195
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Boeing 727-200 Series	B727-2	JT8D-15	1PW009	6
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	5
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	2353
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	4
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Boeing 737-500 Series	B737-5	CFM56-3C-1	1CM007	844
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	1278
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	13
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Boeing 757-200 Series	B757-2	PW2037	4PW072	8
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Boeing 767-300 ER	B767-3ER	PW4060	1PW043	1
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	2
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Boeing DC-9-30 Series	DC9-3	JT8D-7 series	1PW005	9

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Boeing DC-9-40 Series	DC9-4	JT8D-11	1PW008	497
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Boeing MD-82	MD82	JT8D-217C	4PW070	32
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	893
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	1222
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Bombardier CRJ-900	CRJ9	CF34-8C5	6GE092	2
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Cessna 208 Caravan	CNA208	PT6A-114A	P6114A	1568
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Dassault Falcon 10	FAL10	TAY Mk620-15	1RR020	1
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Dornier 328-100 Series	DO328-1	PW119B	PW119B	4
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	27
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	268
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	2232
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Fokker F27 Friendship	F27	RDa.7	RDA7	397
LBB	LUBBOCK PRESTON SMITH INTL	Lubbock	48303	Raytheon Beech 18	BEECH18	R-1820	R1820	402
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Airbus A320-200 Series	A320-2	V2527-A5	1IA003	1
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Boeing 727-100 Series	B727-1	JT8D-7 series	1PW005	2
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Boeing 727-200 Series	B727-2	JT8D-15	1PW009	1
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	1
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	544

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Boeing 737-500 Series	B737-5	CFM56-3C-1	1CM007	727
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	168
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	196
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Boeing 737-900 Series	B737-9	CFM56-7B24	3CM032	14
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Boeing 757-200 Series	B757-2	PW2037	4PW072	1
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Boeing 757-300 Series	B757-3	PW2043	PW2043	1
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	11
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Boeing DC-9-30 Series	DC9-3	JT8D-7 series	1PW005	3
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Boeing MD-82	MD82	JT8D-217C	4PW070	1674
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	128
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Convair CV-580	CV580	501D22A	501D22	3
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Dassault Falcon 10	FAL10	TAY Mk620-15	1RR020	9
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	20
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	1017
MFE	MC ALLEN MILLER INTL	Hidalgo	48215	Embraer ERJ190	ERJ190	CF34-10E	XCF10E	1
MAF	MIDLAND INTL	Midland	48329	ATR 72-200	ATR72-2	PW127	PW127	284
MAF	MIDLAND INTL	Midland	48329	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	2205
MAF	MIDLAND INTL	Midland	48329	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	6
MAF	MIDLAND INTL	Midland	48329	Boeing 737-500 Series	B737-5	CFM56-3C-1	1CM007	588

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
MAF	MIDLAND INTL	Midland	48329	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	1074
MAF	MIDLAND INTL	Midland	48329	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	17
MAF	MIDLAND INTL	Midland	48329	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	1
MAF	MIDLAND INTL	Midland	48329	Boeing MD-82	MD82	JT8D-217C	4PW070	19
MAF	MIDLAND INTL	Midland	48329	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	863
MAF	MIDLAND INTL	Midland	48329	Cessna 208 Caravan	CNA208	PT6A-114A	P6114A	196
MAF	MIDLAND INTL	Midland	48329	Cessna 750 Citation X	CNA750	AE3007C	6AL022	2
MAF	MIDLAND INTL	Midland	48329	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	68
MAF	MIDLAND INTL	Midland	48329	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	240
MAF	MIDLAND INTL	Midland	48329	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	2624
MAF	MIDLAND INTL	Midland	48329	Fokker F27 Friendship	F27	RDa.7	RDA7	204
MAF	MIDLAND INTL	Midland	48329	Raytheon Beech 18	BEECH18	R-1820	R1820	204
MAF	MIDLAND INTL	Midland	48329	Saab 340-B	SAAB340-B	CT7-9B	CT79B	1
PIL	PORT ISABEL-CAMERON COUNTY	Cameron	48061	Boeing 727-100 Series	B727-1	JT8D-7 series	1PW005	16
PIL	PORT ISABEL-CAMERON COUNTY	Cameron	48061	Convair CV-580	CV580	501D22A	501D22	53
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Airbus A320-200 Series	A320-2	V2527-A5	1IA003	1
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Airbus A321-100 Series	A321-1	V2530-A5	1IA005	1
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	ATR 72-200	ATR72-2	PW127	PW127	167
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Boeing 727-200 Series	B727-2	JT8D-15	1PW009	1

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	1964
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	4
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Boeing 737-500 Series	B737-5	CFM56-3C-1	1CM007	460
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	1695
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	23
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Boeing 757-200 Series	B757-2	PW2037	4PW072	2
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Boeing 757-300 Series	B757-3	PW2043	PW2043	1
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Boeing DC-9-30 Series	DC9-3	JT8D-7 series	1PW005	3
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Boeing DC-9-40 Series	DC9-4	JT8D-11	1PW008	1
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Boeing MD-82	MD82	JT8D-217C	4PW070	16
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	810
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	1014
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Dassault Falcon 10	FAL10	TAY Mk620-15	1RR020	1
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	134
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	67
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	2098
AMA	RICK HUSBAND AMARILLO INTL	Potter	48375	Embraer ERJ170	ERJ170	CF34-8E5	6GE094	1
GRK	ROBERT GRAY AAF	Bell	48027	Antonov 124 Ruslan	AN124	D-36	1ZM001	3
GRK	ROBERT GRAY AAF	Bell	48027	ATR 72-200	ATR72-2	PW127	PW127	797

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
GRK	ROBERT GRAY AAF	Bell	48027	Boeing 727-200 Series	B727-2	JT8D-15	1PW009	2
GRK	ROBERT GRAY AAF	Bell	48027	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	27
GRK	ROBERT GRAY AAF	Bell	48027	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	5
GRK	ROBERT GRAY AAF	Bell	48027	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	34
GRK	ROBERT GRAY AAF	Bell	48027	Boeing 747-200 Series	B747-2	CF6-50E2	3GE077	3
GRK	ROBERT GRAY AAF	Bell	48027	Boeing 757-200 Series	B757-2	PW2037	4PW072	4
GRK	ROBERT GRAY AAF	Bell	48027	Boeing 767-300 ER	B767-3ER	PW4060	1PW043	7
GRK	ROBERT GRAY AAF	Bell	48027	Boeing MD-82	MD82	JT8D-217C	4PW070	11
GRK	ROBERT GRAY AAF	Bell	48027	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	636
GRK	ROBERT GRAY AAF	Bell	48027	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	874
GRK	ROBERT GRAY AAF	Bell	48027	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	447
GRK	ROBERT GRAY AAF	Bell	48027	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	310
GRK	ROBERT GRAY AAF	Bell	48027	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	1389
GRK	ROBERT GRAY AAF	Bell	48027	Saab 340-B	SAAB340-B	CT7-9B	CT79B	1791
SJT	SAN ANGELO RGNL/MATHIS FIELD	Tom Green	48451	ATR 72-200	ATR72-2	PW127	PW127	293
SJT	SAN ANGELO RGNL/MATHIS FIELD	Tom Green	48451	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	5
SJT	SAN ANGELO RGNL/MATHIS FIELD	Tom Green	48451	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	10
SJT	SAN ANGELO RGNL/MATHIS FIELD	Tom Green	48451	Boeing DC-10-30 Series	DC10-3	CF6-50C2	3GE074	2

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
SJT	SAN ANGELO RGNL/MATHIS FIELD	Tom Green	48451	Boeing MD-82	MD82	JT8D-217C	4PW070	10
SJT	SAN ANGELO RGNL/MATHIS FIELD	Tom Green	48451	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	2
SJT	SAN ANGELO RGNL/MATHIS FIELD	Tom Green	48451	Cessna 208 Caravan	CNA208	PT6A-114A	P6114A	457
SJT	SAN ANGELO RGNL/MATHIS FIELD	Tom Green	48451	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	6
SJT	SAN ANGELO RGNL/MATHIS FIELD	Tom Green	48451	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	322
SJT	SAN ANGELO RGNL/MATHIS FIELD	Tom Green	48451	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	590
SJT	SAN ANGELO RGNL/MATHIS FIELD	Tom Green	48451	Saab 340-B	SAAB340-B	CT7-9B	CT79B	911
SAT	SAN ANTONIO INTL	Bexar	48029	Airbus A300F4-600 Series	A300F4-6	PW4158	1PW048	414
SAT	SAN ANTONIO INTL	Bexar	48029	Airbus A310-200 Series	A310-2	CF6-80A3	1GE013	4
SAT	SAN ANTONIO INTL	Bexar	48029	Airbus A318-100 Series	A318-1	CFM56-5B8/P	7CM048	511
SAT	SAN ANTONIO INTL	Bexar	48029	Airbus A319-100 Series	A319-1	CFM56-5B6/P	3CM028	2713
SAT	SAN ANTONIO INTL	Bexar	48029	Airbus A320-200 Series	A320-2	V2527-A5	1IA003	866
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 727-200 Series	B727-2	JT8D-15	1PW009	951
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	14
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	8284
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	60

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 737-500 Series	B737-5	CFM56-3C-1	1CM007	2787
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	10360
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	1565
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 737-900 Series	B737-9	CFM56-7B24	3CM032	353
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 747-200 Series	B747-2	CF6-50E2	3GE077	1
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 747-400 Series	B747-4	PW4056	1PW042	1
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 757-200 Series	B757-2	PW2037	4PW072	1317
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 757-300 Series	B757-3	PW2043	PW2043	130
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 767-200 ER	B767-2ER	CF6-80A2	1GE012	1
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 767-300 ER	B767-3ER	PW4060	1PW043	5
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 767-400	B767-4	CF6-80C2B8FA	3GE058	1
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing 777-200 Series	B777-2	PW4077	2PW061	1
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing DC-10-10 Series	DC10-1	CF6-6D	1GE001	108
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing DC-10-30 Series	DC10-3	CF6-50C2	3GE074	511
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing DC-8 Series 70	DC8-7	CFM56-2B	CF562B	127
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	5

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing DC-9-30 Series	DC9-3	JT8D-7 series	1PW005	307
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing DC-9-40 Series	DC9-4	JT8D-11	1PW008	22
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing DC-9-50 Series	DC9-5	JT8D-17	1PW013	708
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing MD-11	MD11	CF6-80C2D1F	2GE049	6
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing MD-82	MD82	JT8D-217C	4PW070	8368
SAT	SAN ANTONIO INTL	Bexar	48029	Boeing MD-90	MD90	V2525-D5	1IA002	2
SAT	SAN ANTONIO INTL	Bexar	48029	Bombardier Challenger 604	CL604	CF34-3B	5GE084	1
SAT	SAN ANTONIO INTL	Bexar	48029	Bombardier CRJ-100	CRJ1	CF34-3A1	1GE035	433
SAT	SAN ANTONIO INTL	Bexar	48029	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	1195
SAT	SAN ANTONIO INTL	Bexar	48029	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	4475
SAT	SAN ANTONIO INTL	Bexar	48029	Bombardier CRJ-900	CRJ9	CF34-8C5	6GE092	1863
SAT	SAN ANTONIO INTL	Bexar	48029	Cessna 208 Caravan	CNA208	PT6A-114A	P6114A	454
SAT	SAN ANTONIO INTL	Bexar	48029	Convair CV-580	CV580	501D22A	501D22	6
SAT	SAN ANTONIO INTL	Bexar	48029	Dassault Falcon 10	FAL10	TAY Mk620-15	1RR020	6
SAT	SAN ANTONIO INTL	Bexar	48029	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	11
SAT	SAN ANTONIO INTL	Bexar	48029	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	188
SAT	SAN ANTONIO INTL	Bexar	48029	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	3350
SAT	SAN ANTONIO INTL	Bexar	48029	Embraer ERJ170	ERJ170	CF34-8E5	6GE094	215
SAT	SAN ANTONIO INTL	Bexar	48029	Embraer ERJ175	ERJ175	CF34-8E5	6GE094	876
SAT	SAN ANTONIO INTL	Bexar	48029	Saab 340-B	SAAB340-B	CT7-9B	CT79B	103

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Wichita	48485	ATR 72-200	ATR72-2	PW127	PW127	245
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Wichita	48485	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	1
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Wichita	48485	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	13
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Wichita	48485	Boeing MD-82	MD82	JT8D-217C	4PW070	48
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Wichita	48485	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	10
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Wichita	48485	Bombardier CRJ-900	CRJ9	CF34-8C5	6GE092	1
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Wichita	48485	Dassault Falcon 10	FAL10	TAY Mk620-15	1RR020	1
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Wichita	48485	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	11
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Wichita	48485	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	31
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Wichita	48485	Embraer ERJ170	ERJ170	CF34-8E5	6GE094	2
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Wichita	48485	Saab 340-B	SAAB340-B	CT7-9B	CT79B	1758
BPT	SOUTHEAST TEXAS RGNL	Jefferson	48245	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	1
BPT	SOUTHEAST TEXAS RGNL	Jefferson	48245	Boeing 737-500 Series	B737-5	CFM56-3C-1	1CM007	3
BPT	SOUTHEAST TEXAS RGNL	Jefferson	48245	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	1
BPT	SOUTHEAST TEXAS RGNL	Jefferson	48245	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	3
BPT	SOUTHEAST TEXAS RGNL	Jefferson	48245	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	7
BPT	SOUTHEAST TEXAS RGNL	Jefferson	48245	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	69
BPT	SOUTHEAST TEXAS RGNL	Jefferson	48245	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	237
BPT	SOUTHEAST TEXAS RGNL	Jefferson	48245	Saab 340-B	SAAB340-B	CT7-9B	CT79B	1325

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
SGR	SUGAR LAND RGNL	Fort Bend	48157	Cessna 750 Citation X	CNA750	AE3007C	6AL022	1
TYR	TYLER POUNDS RGNL	Smith	48423	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	1
TYR	TYLER POUNDS RGNL	Smith	48423	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	2
TYR	TYLER POUNDS RGNL	Smith	48423	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	3
TYR	TYLER POUNDS RGNL	Smith	48423	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	3
TYR	TYLER POUNDS RGNL	Smith	48423	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	65
TYR	TYLER POUNDS RGNL	Smith	48423	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	326
TYR	TYLER POUNDS RGNL	Smith	48423	Saab 340-B	SAAB340-B	CT7-9B	CT79B	2995
HRL	VALLEY INTL	Cameron	48061	Airbus A300F4-600 Series	A300F4-6	PW4158	1PW048	11
HRL	VALLEY INTL	Cameron	48061	Airbus A310-200 Series	A310-2	CF6-80A3	1GE013	253
HRL	VALLEY INTL	Cameron	48061	Boeing 727-100 Series	B727-1	JT8D-7 series	1PW005	1
HRL	VALLEY INTL	Cameron	48061	Boeing 727-200 Series	B727-2	JT8D-15	1PW009	390
HRL	VALLEY INTL	Cameron	48061	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	2187
HRL	VALLEY INTL	Cameron	48061	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	16
HRL	VALLEY INTL	Cameron	48061	Boeing 737-500 Series	B737-5	CFM56-3C-1	1CM007	810
HRL	VALLEY INTL	Cameron	48061	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	875
HRL	VALLEY INTL	Cameron	48061	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	245

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
HRL	VALLEY INTL	Cameron	48061	Boeing 757-200 Series	B757-2	PW2037	4PW072	260
HRL	VALLEY INTL	Cameron	48061	Boeing 767-200 ER	B767-2ER	CF6-80A2	1GE012	296
HRL	VALLEY INTL	Cameron	48061	Boeing DC-8 Series 60	DC8-6	JT3D-7 series	1PW003	1
HRL	VALLEY INTL	Cameron	48061	Boeing DC-8 Series 70	DC8-7	CFM56-2B	CF562B	24
HRL	VALLEY INTL	Cameron	48061	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	4
HRL	VALLEY INTL	Cameron	48061	Boeing DC-9-30 Series	DC9-3	JT8D-7 series	1PW005	4
HRL	VALLEY INTL	Cameron	48061	Boeing DC-9-40 Series	DC9-4	JT8D-11	1PW008	1
HRL	VALLEY INTL	Cameron	48061	Boeing MD-82	MD82	JT8D-217C	4PW070	24
HRL	VALLEY INTL	Cameron	48061	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	1156
HRL	VALLEY INTL	Cameron	48061	Cessna 208 Caravan	CNA208	PT6A-114A	P6114A	1
HRL	VALLEY INTL	Cameron	48061	Convair CV-580	CV580	501D22A	501D22	5
HRL	VALLEY INTL	Cameron	48061	Dassault Falcon 10	FAL10	TAY Mk620-15	1RR020	4
HRL	VALLEY INTL	Cameron	48061	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	9
HRL	VALLEY INTL	Cameron	48061	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	550
HRL	VALLEY INTL	Cameron	48061	Raytheon Beech 18	BEECH18	R-1820	R1820	1
VCT	VICTORIA RGNL	Victoria	48469	Convair CV-580	CV580	501D22A	501D22	1
VCT	VICTORIA RGNL	Victoria	48469	Saab 340-B	SAAB340-B	CT7-9B	CT79B	701
ACT	WACO RGNL	McLennan	48309	Airbus A319-100 Series	A319-1	CFM56-5B6/P	3CM028	1

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
ACT	WACO RGNL	McLennan	48309	Airbus A320-200 Series	A320-2	V2527-A5	1IA003	1
ACT	WACO RGNL	McLennan	48309	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	3
ACT	WACO RGNL	McLennan	48309	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	1
ACT	WACO RGNL	McLennan	48309	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	1
ACT	WACO RGNL	McLennan	48309	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	3
ACT	WACO RGNL	McLennan	48309	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	17
ACT	WACO RGNL	McLennan	48309	Boeing 757-200 Series	B757-2	PW2037	4PW072	1
ACT	WACO RGNL	McLennan	48309	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	2
ACT	WACO RGNL	McLennan	48309	Boeing MD-82	MD82	JT8D-217C	4PW070	8
ACT	WACO RGNL	McLennan	48309	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	1
ACT	WACO RGNL	McLennan	48309	Cessna 650 Citation III	CNA650	TFE731-3	1AS002	1
ACT	WACO RGNL	McLennan	48309	Dassault Falcon 10	FAL10	TAY Mk620-15	1RR020	1
ACT	WACO RGNL	McLennan	48309	Dornier 328-100 Series	DO328-1	PW119B	PW119B	1
ACT	WACO RGNL	McLennan	48309	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	5
ACT	WACO RGNL	McLennan	48309	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	35
ACT	WACO RGNL	McLennan	48309	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	391
ACT	WACO RGNL	McLennan	48309	Saab 340-B	SAAB340-B	CT7-9B	CT79B	2746
HOU	WILLIAM P HOBBY	Harris	48201	Airbus A319-100 Series	A319-1	CFM56-5B6/P	3CM028	15

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
HOU	WILLIAM P HOBBY	Harris	48201	Airbus A320-200 Series	A320-2	V2527-A5	1IA003	112
HOU	WILLIAM P HOBBY	Harris	48201	Boeing 727-200 Series	B727-2	JT8D-15	1PW009	17
HOU	WILLIAM P HOBBY	Harris	48201	Boeing 737-100 Series	B737-1	JT8D-17	1PW012	18
HOU	WILLIAM P HOBBY	Harris	48201	Boeing 737-300 Series	B737-3	CFM56-3-B1	1CM004	20231
HOU	WILLIAM P HOBBY	Harris	48201	Boeing 737-400 Series	B737-4	CFM56-3B-2	1CM005	27
HOU	WILLIAM P HOBBY	Harris	48201	Boeing 737-500 Series	B737-5	CFM56-3C-1	1CM007	5610
HOU	WILLIAM P HOBBY	Harris	48201	Boeing 737-700 Series	B737-7	CFM56-7B22	3CM031	21834
HOU	WILLIAM P HOBBY	Harris	48201	Boeing 737-800 Series	B737-8	CFM56-7B26	3CM033	39
HOU	WILLIAM P HOBBY	Harris	48201	Boeing 747-400 Series	B747-4	PW4056	1PW042	1
HOU	WILLIAM P HOBBY	Harris	48201	Boeing 757-200 Series	B757-2	PW2037	4PW072	22
HOU	WILLIAM P HOBBY	Harris	48201	Boeing 767-200 ER	B767-2ER	CF6-80A2	1GE012	1
HOU	WILLIAM P HOBBY	Harris	48201	Boeing DC-9-20 Series	DC9-2	JT8D-11	1PW008	4
HOU	WILLIAM P HOBBY	Harris	48201	Boeing DC-9-50 Series	DC9-5	JT8D-17	1PW013	1736
HOU	WILLIAM P HOBBY	Harris	48201	Boeing MD-82	MD82	JT8D-217C	4PW070	312
HOU	WILLIAM P HOBBY	Harris	48201	Bombardier CRJ-200	CRJ2	CF34-3B	5GE084	43
HOU	WILLIAM P HOBBY	Harris	48201	Bombardier CRJ-700	CRJ7	CF34-8C1	5GE083	117

Airport Code ID	Facility Name	County	FIPS	Aircraft Description	Aircraft Code	Engine Description	Engine Code	Activity (LTO)
HOU	WILLIAM P HOBBY	Harris	48201	Bombardier CRJ-900	CRJ9	CF34-8C5	6GE092	1292
HOU	WILLIAM P HOBBY	Harris	48201	Cessna 750 Citation X	CNA750	AE3007C	6AL022	2
HOU	WILLIAM P HOBBY	Harris	48201	Convair CV-580	CV580	501D22A	501D22	7
HOU	WILLIAM P HOBBY	Harris	48201	Embraer ERJ135	ERJ135	AE3007A1/3	6AL013	2
HOU	WILLIAM P HOBBY	Harris	48201	Embraer ERJ140	ERJ140	AE3007A1E	6AL020	114
HOU	WILLIAM P HOBBY	Harris	48201	Embraer ERJ145	ERJ145	AE3007A1E	6AL020	2244
HOU	WILLIAM P HOBBY	Harris	48201	Embraer ERJ170	ERJ170	CF34-8E5	6GE094	631
HOU	WILLIAM P HOBBY	Harris	48201	Embraer ERJ190	ERJ190	CF34-10E	XCF10E	804
HOU	WILLIAM P HOBBY	Harris	48201	Gulfstream G500	GULF5	BR700-710A1-10	4BR008	4
HOU	WILLIAM P HOBBY	Harris	48201	Saab 340-B	SAAB340-B	CT7-9B	CT79B	1

Appendix B. Communication Log -- Comprehensive log of communication between ERG and each airport.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
IAH	GEORGE BUSH INTERCONTINENTAL/ HOUSTON	Carlos Ortiz	281-233-1842	Peter Ogbeide (TCEQ)		Janet Mangum	Called--3/29/2011--1:40 pm		Left voicemail.
IAH	GEORGE BUSH INTERCONTINENTAL/ HOUSTON	Carlos Ortiz	281-233-1842	Peter Ogbeide (TCEQ)		Jennifer Marik	Called--4/25/2011--2:23 pm		Left voicemail.
HOU	WILLIAM P HOBBY	Carlos Ortiz	281-233-1842	Peter Ogbeide (TCEQ)		Janet Mangum	Called--3/29/2011--1:40 pm		Left voicemail.
HOU	WILLIAM P HOBBY	Carlos Ortiz	281-233-1842	Peter Ogbeide (TCEQ)		Jennifer Marik	Called--4/25/2011--2:23 pm		Left voicemail.
AUS	AUSTIN-BERGSTROM INTL	Unknown			airportinfo@ci.austin.tx.us	Jennifer Marik	emailed--3/29/2011--3:39 pm	Unknown	
AUS	AUSTIN-BERGSTROM INTL	Jim Smith/Airport Manager	512-530-2242			Jennifer Marik	Called--3/30/2011--12:34 pm	Jim Smith	Left voicemail.
AUS	AUSTIN-BERGSTROM INTL	Kane Carpenter	512-530-6621	Peter Ogbeide (TCEQ)	kane.carpenter@ci.austin.tx.us	Jennifer Marik/ Roger Chang	Called--4/4/2011--3:09 pm	Kane Carpenter	Agreed to review.
AUS	AUSTIN-BERGSTROM INTL	Kane Carpenter/ Stephen Dick	512-530-6621	Peter Ogbeide (TCEQ)	kane.carpenter@ci.austin.tx.us / stephen.dick@ci.austin.tx.us	Jennifer Marik/ Roger Chang	emailed--4/4/2011--3:54 pm	Kane Carpenter	Emailed 2008 FAA data for review.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
AUS	AUSTIN-BERGSTROM INTL	Kane Carpenter/ Stephen Dick	512-530-6621	Peter Ogbeide (TCEQ)	kane.carpenter@ci.austin.tx.us / stephen.dick@ci.austin.tx.us	Jennifer Marik/ Roger Chang	email returned--4/4/2011--4:40 pm	Kane Carpenter	Will provide 2009 data, adjusted for 2008.
AUS	AUSTIN-BERGSTROM INTL	Kane Carpenter/ Stephen Dick	512-530-6621	Peter Ogbeide (TCEQ)	kane.carpenter@ci.austin.tx.us / stephen.dick@ci.austin.tx.us	Jennifer Marik/ Roger Chang	email returned--4/8/2011--3:28 pm	Stephen Dick	Provided aircraft specific data, and taxi times.
AUS	AUSTIN-BERGSTROM INTL	Kane Carpenter/ Stephen Dick	512-530-6621	Peter Ogbeide (TCEQ)	kane.carpenter@ci.austin.tx.us / stephen.dick@ci.austin.tx.us	Jennifer Marik	emailed--4/12/2011--1:16 pm	Stephen Dick	Ask for engine data.
AUS	AUSTIN-BERGSTROM INTL	Kane Carpenter/ Stephen Dick	512-530-6621	Peter Ogbeide (TCEQ)	kane.carpenter@ci.austin.tx.us / stephen.dick@ci.austin.tx.us	Jennifer Marik	email returned--4/12/2011--3:13 pm	Stephen Dick	Provided engine data.
DWH	DAVID WAYNE HOOKS MEMORIAL	Roger Schmidt	281-376-5436	Peter Ogbeide (TCEQ)		Janet Mangum	Called--3/29/2011--1:45 pm		Left voicemail.
DWH	DAVID WAYNE HOOKS MEMORIAL	Roger Schmidt	281-376-5436	Peter Ogbeide (TCEQ)		Jennifer Marik	Called--4/25/2011--3:06 pm		Left voicemail.
EFD	ELLINGTON FIELD	Carlos Ortiz	281-233-1842	Peter Ogbeide (TCEQ)		Janet Mangum	Called--3/29/2011--1:40 pm		Left voicemail.
EFD	ELLINGTON FIELD	Carlos Ortiz	281-233-1842	Peter Ogbeide (TCEQ)		Jennifer Marik	Called--4/25/2011--2:23 pm		Left voicemail.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
HYI	SAN MARCOS MUNI	~~Scott Gallagher/ Airport Manager~~	~~512-393-8160~~			Jennifer Marik	Called--3/30/2011--1:11 pm	Scott Gallagher	New number: 512-216-6039
HYI	SAN MARCOS MUNI	Steven Alexander/Airport Manager	512-216-6039	Jennifer Marik (ERG)		Jennifer Marik	Called--3/30/2011--1:12 pm	Cassidy	Left message with Cassidy. (new manager: Steven Alexander)
HYI	SAN MARCOS MUNI	Steven Alexander/Airport Manager	512-216-6039	Jennifer Marik (ERG)		Jennifer Marik	Call returned--3/30/2011--6:00 pm	Steven Alexander	Left voicemail.
HYI	SAN MARCOS MUNI	Steven Alexander/Airport Manager	512-216-6039	Jennifer Marik (ERG)		Jennifer Marik	Called--3/31/2011--10:57 am	Cassidy	Left message with Cassidy.
HYI	SAN MARCOS MUNI	Steven Alexander/Airport Manager	512-216-6039	Jennifer Marik (ERG)		Jennifer Marik	Call returned--3/31/2011--2:06 pm	Steven Alexander	Agreed to review.
HYI	SAN MARCOS MUNI	Steven Alexander/Airport Manager	512-216-6039	Jennifer Marik (ERG)	salexander@texasaviationpartners.com	Jennifer Marik	emailed--3/31/2011--2:10 pm	Steven Alexander	Emailed 2008 FAA data for review.
HYI	SAN MARCOS MUNI	Steven Alexander/Airport Manager	512-216-6039	Jennifer Marik (ERG)	salexander@texasaviationpartners.com	Jennifer Marik	email returned--4/6/2011--9:20 am	Steven Alexander	Agreed with 2008 FAA data.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Monica Morris/Airport Manager	940-855-3623			Jennifer Marik	Called--3/30/2011--12:53	Monica Morris	Rang for an extended period of time, and beeped (not sure if it was an answering machine).
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Sarah Johnson/Airport Manager	940-855-3623	Janet Mangum (ERG)	sarah.johnson@wichitafallstx.gov	Janet Mangum	Called--4/6/2011--1:18 pm	Sarah Johnson	Spoke with Sharon--Monica Morris is replaced by Sarah Johnson.
SPS	SHEPPARD AFB/WICHITA FALLS MUNI	Sarah Johnson/Airport Manager	940-855-3623	Janet Mangum (ERG)	sarah.johnson@wichitafallstx.gov	Janet Mangum	emailed--4/6/2011--1:35 pm	Sarah Johnson	Emailed 2008 FAA data for review.
IWS	WEST HOUSTON	Woody Lesikar	281-492-2130	Peter Ogbeide (TCEQ)		Janet Mangum	Called--3/29/2011--1:47 pm		Left voicemail.
IWS	WEST HOUSTON	Woody Lesikar	281-492-2130	Peter Ogbeide (TCEQ)		Jennifer Marik	Called--4/25/2011--3:07 pm		Left voicemail.
ELP	EL PASO INTL	~~Patrick Abeln/Airport Manager~~	~~915-780-4749~~			Jennifer Marik	Called--3/30/2011--12:53	Rick Venegas	Transferred 4 times. Rick agreed to review data.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
ELP	EL PASO INTL	Rick Venegas/Environmental Plannter	915-599-6238	Jennifer Marik (ERG)	rick.venegas@elpasotexas.gov	Jennifer Marik	emailed--3/30/2011--1:03 pm	Rick Venegas	Emailed 2008 FAA data for review.
ELP	EL PASO INTL	Rick Venegas/Environmental Plannter	915-599-6238	Jennifer Marik (ERG)	rick.venegas@elpasotexas.gov	Jennifer Marik	email returned--3/31/2011--10:32 pm	Rick Venegas	Confirmed receipt of email.
GGG	EAST TEXAS RGNL	Virginia Hall/Airport Manager	903-643-3031			Jennifer Marik	Called--3/30/2011--1:37 pm	Rick Davis/Airport Director	Left voicemail.
GGG	EAST TEXAS RGNL	Rick Davis/Airport Director	903-643-3031			Jennifer Marik	Called--4/25/2011--3:10 pm	Rick Davis/Airport Director	Left voicemail.
SJT	SAN ANGELO RGNL/MATHIS FIELD	Luis Elguezabal/Airport Manager	325-659-6409			Jennifer Marik	Called--3/30/2011--1:40 pm	Linda Clifton	Agreed to review. Note operations total for 2008=85,373
SJT	SAN ANGELO RGNL/MATHIS FIELD	Linda Clifton	325-659-6409	Jennifer Marik (ERG)	linda.clifton@sanangelotexas.us	Jennifer Marik	emailed--3/30/2011--1:47 pm	Linda Clifton	Emailed 2008 FAA data for review.
ABI	ABILENE RGNL	Don Green/Airport Manager	325-676-6367	Jennifer Marik (ERG)		Jennifer Marik	Called--3/31/2011--11:04 am	Don Green	Left voicemail.
ABI	ABILENE RGNL	Don Green/Airport Manager	325-676-6367	Jennifer Marik (ERG)		Jennifer Marik	Call returned--3/31/2011--1:13 pm	Don Green	Agreed to review.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
ABI	ABILENE RGNL	Don Green/Airport Manager	325-676-6367	Jennifer Marik (ERG)	don.green@abilenetx.com	Jennifer Marik	emailed--3/31/2011--1:29 pm	Don Green	Emailed 2008 FAA data for review.
LVJ	PEARLAND RGNL	Andy Rivera	281-482-7551	Peter Ogbeide (TCEQ)	clover3@flash.net	Janet Mangum	Called--3/29/2011--1:49 pm	Wayne Messinger	Emailed 2008 FAA data for review to: clover3@flash.net (Rivera) & ginevan4@gmail.net (Messinger)
MAF	MIDLAND INTL	Marv Esterly/Airport Manager	432-560-2200 x 3001	Jennifer Marik (ERG)		Jennifer Marik	Called--3/31/2011--12:10 pm	Marv Esterly	Agreed to review.
MAF	MIDLAND INTL	Marv Esterly/Airport Manager	432-560-2200 x 3001	Jennifer Marik (ERG)	mesterly@midlandtexas.gov	Jennifer Marik	emailed--3/31/2011--12:17 pm	Marv Esterly	Emailed 2008 FAA data for review.
AMA	RICK HUSBAND AMARILLO INTL	~~Scott Carr/Airport Manager~~	806-335-1671			Jennifer Marik	Called--3/31/2011--12:24 pm	Patrick Rhodes/Airport Manager	Left voicemail.
AMA	RICK HUSBAND AMARILLO INTL	Patrick Rhodes/Airport Manager	806-335-1671			Jennifer Marik	Called--4/25/2011--3:15 pm	Patrick Rhodes/Airport Manager	Left voicemail.
AMA	RICK HUSBAND AMARILLO INTL	Patrick Rhodes/Airport Manager	806-335-1671			Jennifer Marik	Call returned--4/25/2011--5:05 pm	Patrick Rhodes/Airport Manager	Left voicemail.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
AMA	RICK HUSBAND AMARILLO INTL	Patrick Rhodes/Airport Manager	806-335-1671	Jennifer Marik (ERG)		Jennifer Marik	Called--4/26/2011--12:14 pm	Patrick Rhodes/Airport Manager	Agreed to review data.
AMA	RICK HUSBAND AMARILLO INTL	Patrick Rhodes/Airport Manager	806-335-1671	Jennifer Marik (ERG)	patrick.rhodes@amarillo.gov	Jennifer Marik	emailed--4/26/2011--12:17 pm	Patrick Rhodes/Airport Manager	Emailed 2008 FAA data for review.
RKP	ARANSAS CO	Gene Johnson/Airport Manager	361-790-0141	Jennifer Marik (ERG)		Jennifer Marik	Called--3/31/2011--12:30 pm	Gene Johnson	Agreed to review. Warned that the "records" they have are based on speculation.
RKP	ARANSAS CO	Gene Johnson/Airport Manager	361-790-0141	Jennifer Marik (ERG)	manager@krkp.com	Jennifer Marik	emailed--3/31/2011--12:34 pm	Gene Johnson	Emailed 2008 FAA data for review.
RKP	ARANSAS CO	Gene Johnson/Airport Manager	361-790-0141	Jennifer Marik (ERG)	manager@krkp.com	Jennifer Marik	email returned--3/31/2011--12:59 pm	Gene Johnson	Confirmed that ERG can use FAA data, and sent a few notes on emission control strategies.
CXO	LONE STAR EXECUTIVE	Scott Smith	936-539-7811	Peter Ogbeide (TCEQ)		Janet Mangum	Called--3/29/2011--2:29 pm	Scott Smith	Left voicemail.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
CXO	LONE STAR EXECUTIVE	Scott Smith	936-539-7811	Peter Ogbeide (TCEQ)		Jennifer Marik	Called--4/25/2011--3:20 pm	Scott Smith	Left voicemail.
SGR	SUGAR LAND RGNL	Phillip W. Savko	281-275-2100	Peter Ogbeide (TCEQ)		Janet Mangum	Called--3/29/2011--2:33 pm	Kimbler Johnson	Left message
SGR	SUGAR LAND RGNL	Phillip W. Savko	281-275-2100	Peter Ogbeide (TCEQ)		Jennifer Marik	Called--4/25/2011--3:22 pm		Need to call back next day at 12 pm (11am).
SGR	SUGAR LAND RGNL	Phillip W. Savko	281-275-2100	Peter Ogbeide (TCEQ)		Jennifer Marik	Called--4/26/2011--12:10 pm		Left message with receptionist.
SGR	SUGAR LAND RGNL	Phillip W. Savko	281-275-2100	Peter Ogbeide (TCEQ)	psavko@sugarlandtx.gov	Jennifer Marik	Call returned--4/28/2011--2:57 pm	Phillip Savko	Agreed to review.
SGR	SUGAR LAND RGNL	Phillip W. Savko	281-275-2100	Peter Ogbeide (TCEQ)	psavko@sugarlandtx.gov	Jennifer Marik	emailed--4/28/2011--3:08 pm	Phillip Savko	Emailed 2008 FAA data for review.
T41	LA PORTE MUNI	Steve Gillett	281-471-9650	Peter Ogbeide (TCEQ)		Janet Mangum	Called--3/29/2011--2:36 pm	Shonda	Left message for David Mich, replacement for Gillett
T41	LA PORTE MUNI	David Mich	281-471-9650			Jennifer Marik	Called--4/25/2011--3:28 pm		Left voicemail.
LBB	LUBBOCK PRESTON SMITH INTL	James Loomis/Airport Manager	806-775-3126			Jennifer Marik	Called--3/31/2011--12:45 pm	James Loomis	Left voicemail.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
LBB	LUBBOCK PRESTON SMITH INTL	James Loomis/Airport Manager	806-775-3126			Jennifer Marik	Called--4/25/2011--3:30 pm	James Loomis	Left voicemail.
TA90	GREEN ACRES	Ranson Fullinwider	409-931-1311	Peter Ogbeide (TCEQ)		Janet Mangum	Called--3/29/2011--2:38 pm		Invalid number.
TA90	GREEN ACRES	Ranson Fullinwider	409-931-1311	Peter Ogbeide (TCEQ)		Jennifer Marik	Called--4/4/2011--2:29 pm		Invalid number. Error Message: "You're call cannot be completed as dialed"
GTU	GEORGETOWN MUNI	Travis Mclain/Airport Manager	512-930-3666			Jennifer Marik	Called--3/31/2011--12:50 pm	Unknown	Left voicemail.
GTU	GEORGETOWN MUNI	Travis Mclain/Airport Manager	512-930-3666/ 512-818-0418 (cell)			Jennifer Marik	Call returned--3/31/2011--5:58 pm	Travis Mclain	Left voicemail.
GTU	GEORGETOWN MUNI	Travis Mclain/Airport Manager	512-930-3666/ 512-818-0418 (cell)			Jennifer Marik	Call returned--4/1/2011--9:15 am	Travis Mclain	Left voicemail.
GTU	GEORGETOWN MUNI	Travis Mclain/Airport Manager	512-930-3666/ 512-818-0418 (cell)			Jennifer Marik	Called--4/4/2011--10:09	Travis Mclain	Agreed to review.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
GTU	GEORGETOWN MUNI	Travis Mclain/Airport Manager	512-930-3666/ 512-818-0418 (cell)		travis.mclain@georgetown.org	Jennifer Marik	emailed--4/4/2011--10:15 am	Travis Mclain	Emailed 2008 FAA data to review.
GTU	GEORGETOWN MUNI	Travis Mclain/Airport Manager	512-930-3666/ 512-818-0418 (cell)	Jennifer Marik (ERG)	travis.mclain@georgetown.org	Jennifer Marik	email returned--4/4/2011--10:24 am	Travis Mclain	Confirmed receipt of email.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
GTU	GEORGETOWN MUNI	Travis Mclain/Airport Manager	512-930-3666/ 512-818-0418 (cell)	Jennifer Marik (ERG)	travis.mclain@georgetown.org	Jennifer Marik	email returned--4/5/2011--9:50 am	Travis Mclain	Response: The total number of operations at GTU for the calendar year 2008 was 74,929. Approximately 98.32% were general aviation, 1.22% were military, and 0.46% were air taxi. As for emission control strategies, the three entrance gates are electrical.
GLS	SCHOLES INTL AT GALVESTON	Hud Hopkins	409-741-4609	Peter Ogbeide (TCEQ)		Janet Mangum	Called--3/29/2011--2:40 pm	George Smith	Left message.
GLS	SCHOLES INTL AT GALVESTON	Hud Hopkins	409-741-4609	Peter Ogbeide (TCEQ)		Jennifer Marik	Call returned--3/30/2011--10:37 am	Hud Hopkins	Agreed to review data

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
GLS	SCHOLES INTL AT GALVESTON	Hud Hopkins	409-741-4609	Peter Ogbeide (TCEQ)	manager@houstonairport.com	Jennifer Marik	emailed--3/30/2011--10:44 am	Hud Hopkins	Emailed 2008 FAA data for review.
GLS	SCHOLES INTL AT GALVESTON	Hud Hopkins	409-741-4609	Peter Ogbeide (TCEQ)	manager@houstonairport.com	Jennifer Marik	email returned--3/30/2011--12:38 pm	Hud Hopkins	Confirmed receipt of email.
LBX	BRAZORIA COUNTY	Jeff Bilyeu	979-849-5755	Peter Ogbeide (TCEQ)		Janet Mangum	Called--3/29/2011--2:42 pm	Amy Moyle	Left message with Amy Moyle. Mr. Bilyeu out of office until Thursday or Friday.
LBX	BRAZORIA COUNTY	Jeff Bilyeu	979-849-5755	Peter Ogbeide (TCEQ)		Jennifer Marik	Called--4/25/2011--3:35 pm	Amy Moyle	Sent email to Jeff Bilyeu via Amy Moyle (amym@brazoria-county.com).
LBX	BRAZORIA COUNTY	Jeff Bilyeu	979-849-5755	Peter Ogbeide (TCEQ)		Jennifer Marik	Call returned--4/27/2011--12:00 pm	Jeff Bilyeu	Agreed to send document with generic 2008 emissions and possible forecast information.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
LBX	BRAZORIA COUNTY	Jeff Bilyeu	979-849-5755	Peter Ogbeide (TCEQ)		Jennifer Marik	email returned--4/27/2011--12:33 pm	Amy Moyle	Sent via email Texas Gulf Coast Regional Airport Forecast - Airport Master Plan (Exhibit 2G).
MFE	MC ALLEN MILLER INTL	~~Philip Brown/Airport Manager~~	~~956-682-9101~~			Jennifer Marik	Called--3/31/2011--1:24 pm	Eric, then transferred to Philip Brown's Secretary	Left voicemail.
MFE	MC ALLEN MILLER INTL	Kristi Salinas/Properties & Compliance Manager	956-681-1527	Jennifer Marik (ERG)		Jennifer Marik	Call returned--3/31/2011--4:49 pm	Kristi Salinas	Left voicemail.
MFE	MC ALLEN MILLER INTL	Kristi Salinas/Properties & Compliance Manager	956-681-1527	Jennifer Marik (ERG)		Jennifer Marik	Called--4/4/2011--1:30 pm	Kristi Salinas	Left voicemail.
MFE	MC ALLEN MILLER INTL	Kristi Salinas/Properties & Compliance Manager	956-681-1527	Jennifer Marik (ERG)	ktsalinas@mcallen.net	Jennifer Marik	Call returned--4/4/2011--2:37 pm	Kristi Salinas	Agreed to review.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
MFE	MC ALLEN MILLER INTL	Kristi Salinas/Properties & Compliance Manager	956-681-1527	Jennifer Marik (ERG)	ktsalinas@mcallen.net	Jennifer Marik	emailed--4/4/2011--2:39 pm	Kristi Salinas	Emailed 2008 FAA data for review.
MFE	MC ALLEN MILLER INTL	Kristi Salinas/Properties & Compliance Manager	956-681-1527	Jennifer Marik (ERG)	ktsalinas@mcallen.net	Jennifer Marik	email returned--4/5/2011--11:44 am	Kristi Salinas	Response: No changes to the data, and no information on emission control strategies.
TPL	DRAUGHON-MILLER CENTRAL TEXAS RGNL	Sharon Rostovich/Airport Manager	254-298-5350	Jennifer Marik (ERG)		Jennifer Marik	Called--3/31/2011--1:40 pm	Sharon Rostovich	Left voicemail.
TPL	DRAUGHON-MILLER CENTRAL TEXAS RGNL	Sharon Rostovich/Airport Manager	254-298-5350	Jennifer Marik (ERG)		Jennifer Marik	Called--4/25/2011--3:37 pm	Sharon Rostovich	Left voicemail.
LRD	LAREDO INTL	Jose Flores/Airport Manager	956-795-2000			Jennifer Marik	Called--3/31/2011--2:30 pm	Jose Flores' secretary	Left message with secretary.
LRD	LAREDO INTL	Jose Flores/Airport Manager	956-795-2000			Jennifer Marik	Call returned--4/1/2011--4:35 pm	Jose Flores	Left voicemail.
LRD	LAREDO INTL	Jose Flores/Airport Manager	956-795-2000			Jennifer Marik	Called--4/4/2011--1:33 pm	Jose Flores	Left voicemail.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
TYR	TYLER POUNDS RGNL	Davis Dickson/Airport Manager	903-531-2343			Jennifer Marik	Called--3/31/2011--2:40 pm	Linda	Mr. Dickson is out of town this week, directed to www.tylerairport.com. Did not have data needed, will need to call back on Monday.
TYR	TYLER POUNDS RGNL	Davis Dickson/Airport Manager	903-531-2343			Jennifer Marik	Called--4/11/2011--1:00 pm	Cheryl Mcinnis	Agreed to review.
TYR	TYLER POUNDS RGNL	Cheryl Mcinnis	903-531-2343	Jennifer Marik (ERG)	cmcinnis@tylertexas.com	Jennifer Marik	emailed--4/11/2011--1:04 pm	Cheryl Mcinnis	Emailed FAA 2008 data for review.
HRL	VALLEY INTL	~~Michael Browning/Airport Manager~~	~~956-430-8605~~			Jennifer Marik	Called--3/31/2011--3:10 pm	Secretary	Directed to Bryan Wren/Assistant Director of Aviation (bryan@flythevalley.com)

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
HRL	VALLEY INTL	Bryan Wren		Jennifer Marik (ERG)	bryan@flythevalley.com	Jennifer Marik	emailed--3/31/2011--3:15 pm	Bryan Wren	Emailed Bryan Wren/Assistant Director of Aviation to see if he would be interested in reviewing the 2008 FAA Data
HRL	VALLEY INTL	Bryan Wren		Jennifer Marik (ERG)	bryan@flythevalley.com	Jennifer Marik	emailed returned--3/31/2011--5:40 pm	Bryan Wren	Agreed to review data.
HRL	VALLEY INTL	Bryan Wren		Jennifer Marik (ERG)	bryan@flythevalley.com	Jennifer Marik	emailed--4/4/2011--9:14 am	Bryan Wren	Emailed 2008 FAA data for review.
CLL	EASTERWOOD FIELD	John Happ/Airport Manager	979-845-5103			Jennifer Marik	Called--3/31/2011--3:25 pm	John Happ	Agreed to review.
CLL	EASTERWOOD FIELD	John Happ/Airport Manager	979-845-5103	Jennifer Marik (ERG)	jhapp@tamu.edu	Jennifer Marik	emailed--3/31/2011--3:29 pm	John Happ	Emailed 2008 FAA data for review.
F39 (GYI)	NORTH TEXAS RGNL/PERRIN FIELD	Mike Shahan/Airport Manager	903-786-2904			Jennifer Marik	Called--3/31/2011--3:36 pm	Secretary	Left message with secretary.
F39 (GYI)	NORTH TEXAS RGNL/PERRIN FIELD	Mike Shahan/Airport Manager	903-786-2904	Jennifer Marik (ERG)	airport@co.grayson.tx.us	Jennifer Marik	Call returned--4/4/2011--10:58 am	Mike Shahan	Agreed to review.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
F39 (GYI)	NORTH TEXAS RGNL/PERRIN FIELD	Mike Shahan/Airport Manager	903-786-2904	Jennifer Marik (ERG)	airport@co.grayson.tx.us	Jennifer Marik	emailed--4/4/2011--11:00 am	Mike Shahan	Emailed 2008 FAA data for review.
F39 (GYI)	NORTH TEXAS RGNL/PERRIN FIELD	Mike Shahan/Airport Manager	903-786-2904	Jennifer Marik (ERG)	airport@co.grayson.tx.us	Jennifer Marik	email returned--4/4/2011--11:59 am	Mike Shahan	Agreed with 2008 FAA data. Correct Identifier is GYI.
ODO	ODESSA-SCHLEMEYER FIELD	~~Fred Crawford/Airport Manager~~	~~432-498-4041~~			Jennifer Marik	Called--3/31/2011--3:40	Unknown	New manager: John Landgraf (432-332-5058)
ODO	ODESSA-SCHLEMEYER FIELD	John Landgraf/Airport Manager	432-332-5058			Jennifer Marik	Called--3/31/2011--3:42	Secretary	Left message with secretary.
AXH	HOUSTON-SOUTHWEST	Len Franklin	281-431-2581	Peter Ogbeide (TCEQ)		Janet Mangum	Called--3/29/2011--2:42 pm	Damien	Left message.
AXH	HOUSTON-SOUTHWEST	Len Franklin	281-431-2582	Peter Ogbeide (TCEQ)		Jennifer Marik	Call returned--3/29/2011--4:09 pm	Len Franklin	Agreed to review data.
AXH	HOUSTON-SOUTHWEST	Len Franklin	281-431-2583	Peter Ogbeide (TCEQ)	manager@houstonairport.com	Jennifer Marik	emailed--3/29/2011--4:09 pm	Len Franklin	Emailed 2008 FAA data for review.
VCT	VICTORIA RGNL	Larry Blackwell/Airport Manager	361-578-2704			Jennifer Marik	Called--4/4/2011--1:35 pm	Unknown	Message extension did not work.

Airport Code ID	Facility Name	Contact Name	Number	Contact Source	Email Address	ERG Contact Name	Date/Time Contacted	Airport Contact Name	Response
VCT	VICTORIA RGNL	Larry Blackwell/Airport Manager	361-578-2704			Jennifer Marik	Called--4/4/2011--2:06 pm	Unknown	Could not get a hold of anyone, and message was unclear.
VCT	VICTORIA RGNL	Larry Blackwell/Airport Manager	361-578-2704			Janet Mangum	Called--4/5/2011--1:13 pm	Unknown	Left voicemail.
EYQ	WEISER AIR PARK	Cecil Weiser	281-469-3009	Peter Ogbeide (TCEQ)		Janet Mangum	Called--3/29/2011--2:42 pm		Invalid number.
EYQ	WEISER AIR PARK	Cecil Weiser	281-469-8227	Peter Ogbeide (TCEQ)		Jennifer Marik	Called--4/4/2011--1:52 pm	Cecil Weiser	Was not interested in reviewing data.

Appendix C. TX Backcast and Forecast Activity and Emissions Data for the Criteria Pollutants Summarized by Year and Aircraft Type

Aircraft Type	Projected Year	Projected LTO	Annual Emissions (tons/year)					
			CO	NOx	PM10	PM2_5	SOx	VOC
Air Taxi (piston)	1996	5,412,986	13,321	75	14	3	23	242
Air Taxi (piston)	2000	175,684	1,223	6	16	2	1	9
Air Taxi (piston)	2002	711,395	2,630	14	19	3	4	33
Air Taxi (piston)	2008*	246,680	1,485	8	17	2	2	13
Air Taxi (piston)	2011	136,273	1,034	6	15	2	1	6
Air Taxi (piston)	2014	138,924	1,070	6	16	2	1	6
Air Taxi (piston)	2017	141,761	1,108	6	16	2	1	7
Air Taxi (piston)	2020	144,758	1,149	6	17	2	1	7
Air Taxi (piston)	2023	147,931	1,192	6	17	2	1	7
Air Taxi (piston)	2026	151,293	1,237	7	18	2	1	7
Air Taxi (piston)	2029	154,854	1,286	7	19	2	1	8
Air Taxi (jet)	1996	686,598	2,371	345	11	7	50	544
Air Taxi (jet)	2000	111,883	227	60	7	1	13	88
Air Taxi (jet)	2002	149,721	423	76	9	2	14	118
Air Taxi (jet)	2008*	97,887	229	51	7	1	10	78
Air Taxi (jet)	2011	71,511	156	39	6	1	8	55
Air Taxi (jet)	2014	74,557	162	40	7	1	9	57
Air Taxi (jet)	2017	77,911	168	42	7	1	9	60
Air Taxi (jet)	2020	81,450	175	44	7	1	9	63
Air Taxi (jet)	2023	85,215	183	47	7	1	10	66
Air Taxi (jet)	2026	89,220	191	49	8	1	10	69
Air Taxi (jet)	2029	93,481	199	51	8	1	11	72
Commercial	1996	600,472	4,533	4,876	65	65	534	710
Commercial	2000	639,348	4,830	5,320	69	68	578	755
Commercial	2002	519,298	3,929	4,289	56	56	467	614
Commercial	2008*	536,288	4,097	4,559	60	60	493	649
Commercial	2011	644,536	4,553	4,716	63	63	526	710
Commercial	2014	680,657	4,822	5,033	67	67	560	753
Commercial	2017	719,747	5,114	5,376	71	71	596	799
Commercial	2020	762,111	5,429	5,748	75	75	635	850
Commercial	2023	808,361	5,773	6,154	80	80	678	905
Commercial	2026	858,870	6,149	6,597	85	85	725	965
Commercial	2029	914,047	6,558	7,082	91	91	776	1,031
General Aviation (piston)	1996	4,516,046	27,053	146	521	68	23	13
General Aviation (piston)	2000	4,826,123	28,898	157	553	72	25	16
General Aviation (piston)	2002	4,765,011	28,523	154	543	71	25	18
General Aviation (piston)	2008*	3,976,106	23,776	129	450	59	21	18
General Aviation (piston)	2011	3,450,617	20,646	111	390	51	18	16

Aircraft Type	Projected Year	Projected LTO	Annual Emissions (tons/year)					
			CO	NOx	PM10	PM2_5	SOx	VOC
General Aviation (piston)	2014	3,565,729	21,333	115	403	52	19	17
General Aviation (piston)	2017	3,686,500	22,053	119	416	54	19	18
General Aviation (piston)	2020	3,812,966	22,808	123	430	56	20	19
General Aviation (piston)	2023	3,945,469	23,598	127	445	58	21	20
General Aviation (piston)	2026	4,084,318	24,426	132	460	60	21	21
General Aviation (piston)	2029	4,229,881	25,294	137	476	62	22	22
General Aviation (jet)	1996	2,076,253	9,659	394	220	33	85	714
General Aviation (jet)	2000	2,059,759	9,839	372	231	34	83	710
General Aviation (jet)	2002	2,055,110	9,797	375	228	34	83	721
General Aviation (jet)	2008*	1,685,933	8,049	314	186	28	69	608
General Aviation (jet)	2011	1,472,035	7,036	275	163	24	60	527
General Aviation (jet)	2014	1,523,617	7,283	286	168	25	62	548
General Aviation (jet)	2017	1,577,796	7,542	296	174	26	65	571
General Aviation (jet)	2020	1,634,671	7,814	308	180	27	67	594
General Aviation (jet)	2023	1,694,406	8,099	320	187	28	70	619
General Aviation (jet)	2026	1,757,159	8,399	333	193	29	73	645
General Aviation (jet)	2029	1,823,128	8,715	346	200	31	75	673
Military	1996	208,833	2,900	78	61	8	6	11
Military	2000	263,972	3,671	91	77	10	7	12
Military	2002	280,762	3,906	99	82	11	7	14
Military	2008*	278,372	3,887	49	83	11	4	6
Military	2011	390,293	5,460	61	116	15	5	6
Military	2014	390,339	5,460	61	116	15	5	6
Military	2017	390,389	5,461	61	116	15	5	6
Military	2020	390,443	5,461	61	116	15	5	6
Military	2023	390,502	5,461	61	116	15	5	6
Military	2026	390,565	5,461	61	116	15	5	6
Military	2029	390,634	5,461	61	116	15	5	6
Auxiliary Power Unit	1996	606,892	255	144	27	27	26	20
Auxiliary Power Unit	2000	666,689	273	156	29	29	28	21
Auxiliary Power Unit	2002	521,157	222	125	24	24	22	17
Auxiliary Power Unit	2008*	536,326	232	131	24	24	23	18
Auxiliary Power Unit	2011	642,735	246	143	27	27	26	20
Auxiliary Power Unit	2014	678,764	261	152	29	29	28	21
Auxiliary Power Unit	2017	717,836	277	162	31	31	29	22
Auxiliary Power Unit	2020	760,132	295	173	32	32	31	24
Auxiliary Power Unit	2023	806,279	314	185	35	35	33	25
Auxiliary Power Unit	2026	856,640	335	198	37	37	35	27
Auxiliary Power Unit	2029	911,621	357	212	39	39	38	28
Ground Support Equipment (CNG)	1996	9,180	84	9	0.23	0.22	0.24	3

Aircraft Type	Projected Year	Projected LTO	Annual Emissions (tons/year)					
			CO	NOx	PM10	PM2_5	SOx	VOC
Ground Support Equipment (CNG)	2000	9,829	91	9	0.25	0.24	0.26	3
Ground Support Equipment (CNG)	2002	8,035	74	8	0.21	0.20	0.21	2
Ground Support Equipment (CNG)	2008*	8,127	76	8	0.21	0.20	0.22	3
Ground Support Equipment (CNG)	2011	9,224	83	8	0.22	0.21	0.23	3
Ground Support Equipment (CNG)	2014	9,747	89	9	0.23	0.22	0.25	3
Ground Support Equipment (CNG)	2017	10,314	94	9	0.25	0.24	0.26	3
Ground Support Equipment (CNG)	2020	10,927	100	10	0.26	0.25	0.28	3
Ground Support Equipment (CNG)	2023	11,595	106	11	0.28	0.27	0.30	4
Ground Support Equipment (CNG)	2026	12,323	114	11	0.30	0.29	0.32	4
Ground Support Equipment (CNG)	2029	13,116	121	12	0.32	0.31	0.34	4
Ground Support Equipment (diesel)	1996	561,858	5,159	533	14	14	15	175
Ground Support Equipment (diesel)	2000	601,569	5,555	577	16	15	16	188
Ground Support Equipment (diesel)	2002	491,790	4,506	468	13	12	13	153
Ground Support Equipment (diesel)	2008*	497,443	4,670	484	13	13	13	158
Ground Support Equipment (diesel)	2011	564,578	5,107	513	13	13	14	172
Ground Support Equipment (diesel)	2014	596,604	5,418	545	14	14	15	182
Ground Support Equipment (diesel)	2017	631,297	5,755	580	15	15	16	194
Ground Support Equipment (diesel)	2020	668,821	6,119	617	16	15	17	206
Ground Support Equipment (diesel)	2023	709,694	6,516	658	17	17	18	219
Ground Support Equipment (diesel)	2026	754,230	6,948	702	18	18	19	234
Ground Support Equipment (diesel)	2029	802,778	7,420	750	20	19	21	250
Ground Support Equipment (gasoline)	1996	118,171	1,085	112	3	3	3	37

Aircraft Type	Projected Year	Projected LTO	Annual Emissions (tons/year)					
			CO	NOx	PM10	PM2_5	SOx	VOC
Ground Support Equipment (gasoline)	2000	126,523	1,168	121	3	3	3	40
Ground Support Equipment (gasoline)	2002	103,434	948	98	3	3	3	32
Ground Support Equipment (gasoline)	2008*	104,623	982	102	3	3	3	33
Ground Support Equipment (gasoline)	2011	118,743	1,074	108	3	3	3	36
Ground Support Equipment (gasoline)	2014	125,479	1,140	115	3	3	3	38
Ground Support Equipment (gasoline)	2017	132,775	1,210	122	3	3	3	41
Ground Support Equipment (gasoline)	2020	140,667	1,287	130	3	3	4	43
Ground Support Equipment (gasoline)	2023	149,264	1,370	138	4	3	4	46
Ground Support Equipment (gasoline)	2026	158,631	1,461	148	4	4	4	49
Ground Support Equipment (gasoline)	2029	168,842	1,561	158	4	4	4	53
Ground Support Equipment (LPG)	1996	11,608	107	11	0.30	0.28	0.30	4
Ground Support Equipment (LPG)	2000	12,429	115	12	0.32	0.31	0.33	4
Ground Support Equipment (LPG)	2002	10,161	93	10	0.26	0.25	0.27	3
Ground Support Equipment (LPG)	2008*	10,277	96	10	0.27	0.26	0.28	3
Ground Support Equipment (LPG)	2011	11,664	106	11	0.28	0.26	0.29	4
Ground Support Equipment (LPG)	2014	12,326	112	11	0.29	0.28	0.31	4
Ground Support Equipment (LPG)	2017	13,043	119	12	0.31	0.30	0.33	4
Ground Support Equipment (LPG)	2020	13,818	126	13	0.33	0.32	0.35	4
Ground Support Equipment (LPG)	2023	14,663	135	14	0.36	0.34	0.38	5
Ground Support Equipment (LPG)	2026	15,583	144	15	0.38	0.37	0.40	5
Ground Support Equipment (LPG)	2029	16,586	153	16	0.41	0.39	0.43	5
*Base year used for projections.								