

APPENDIX W

DISCUSSION OF METHODOLOGY OF AIRPORT GROUND SUPPORT  
EQUIPMENT EMISSIONS INVENTORY

DALLAS/FORT WORTH ATTAINMENT DEMONSTRATION

APRIL 2000 REVISION

Note: some spreadsheets have been truncated to fit the word processor, and complete copies of the data are available from Mr. Sam Wells at (512) 239-1441 or [swells@tnrcc.state.tx.us](mailto:swells@tnrcc.state.tx.us).

# **Method to Calculate and Allocate Airport Ground Support Equipment in the Dallas Nonattainment Region**

Sam Wells

April 14, 2000

The Air Transit Association (ATA) of America conducted a survey of their ground support equipment in the four-county Dallas - Fort Worth nonattainment area. Since not all carriers are members of the ATA, the equipment totals were upscaled by 25 percent. These equipment populations were then modeled by the ATA using the NONROAD model.

Since the ATA only reported oxides of nitrogen (NO<sub>x</sub>) emission levels for all four airports which had commercial aircraft activity in the Dallas region, TNRCC staff conducted another round of NONROAD modeling to estimate carbon monoxide and volatile organic compounds (see supporting file DFW\_GSE.WPD). After calculating the tons of emissions for all pollutants, and using source category codes specific to ground support equipment, these numbers were scaled to the ATA's NO<sub>x</sub> emission estimate.

Finally, the emissions had to be geographically allocated to the four airports (DFW International, Love, Alliance, and Meacham). Using 1992 data for flight operations (landings and take-offs), approximately 85 percent of the emissions were ascribed to DFW International Airport. According to the photochemical modelers, only DFW International Airport was updated as to the new ground support emissions.

# MEMORANDUM

## ASHWORTH LEININGER GROUP

199 East Thousand Oaks Boulevard, Suite 201  
Thousand Oaks, California 91360  
Direct Tel: 805-370-1469  
Fax: 805-370-1471

To: Scott F. Belcher, Esq.

From: Ev Ashworth and Dan Godden

Date: March 13, 2000

Re: Revised ATA GSE Emission Estimate – Dallas/Fort Worth Nonattainment Area

---

This memorandum provides the revised nitrogen oxide (NOx) emission inventory for Ground Service Equipment (GSE) operations at the four major airports located within the Dallas/Fort Worth nonattainment area. Based on the emission inventory approach summarized below, our revised NOx emissions are estimated as follows:

GSE Data Set	Number of Units		NOx Emissions (TPD)	
	1996	2007	1996	2007
ATA Member Survey Only	2,472	3,705	4.3	5.4
Estimated Total Population	3,090	4,631	5.4	6.8

This revised inventory is compared to the GSE NOx emission estimate that the Texas Natural Resources Conservation Commission (TNRCC) used in the ozone modeling analyses performed to date:

- 1996 – 17.1 tons per day (tpd) total, 15.08 tpd at DFW International
- 2007 – 22.4 tpd total, 19.6 tpd at DFW International

The remainder of this memorandum provides the following:

- An explanation of why the TNRCC modeling inventory is significantly overstated (by a factor of 3 to 4);

- The technical reasons why the Nonroad Engine Vehicle Emissions Study (NEVES) results cannot be adjusted further to provide reliable GSE emission estimates in the Dallas/Forth Worth nonattainment area;
- The reasons why the Federal Aviation Administration (FAA) Emissions and Dispersion Modeling System (EDMS) cannot be used to provide reliable GSE emission estimates in the short time available; and
- A summary of how the ATA revised GSE emission estimate was prepared.

Attached to this memorandum is a spreadsheet that provides all back-up data provided by Air Transport Association (ATA) members to Ashworth Leininger Group (ALG) and upon which these revised emission estimates are based.

### **Why TNRCC GSE Emissions Data Are Significantly Overstated**

As discussed with TNRCC, DFW International, and EPA, the TNRCC proposed inventory is significantly overstated. The current GSE NO<sub>x</sub> emission estimate is scaled from “Airport Service Equipment” (i.e., GSE) emissions presented in the EPA’s 1991 Nonroad Engine and Vehicle Emission Study (NEVES), which as applied to the calculation of GSE emissions has the shortcomings detailed in the letter to Candy Garrett dated February 29, 2000.

In fact, EPA has now, in the course of developing the NONROAD model, determined that NEVES mistakenly included Terminal Tractors in the Airport Service Equipment category. In the most recent draft of the NONROAD model, EPA has changed the source classification code (SCC) for Terminal Tractors from 22xx008010 to 22xx003070 to correct this mistake. Since the NO<sub>x</sub> emissions from Terminal Tractors represented **more than 90%** of the national total for Airport Service Equipment reported by NEVES, this misrepresentation has major implications on the treatment of GSE in the SIP modeling.

### **Why NEVES Cannot Be Modified to Estimate GSE Emissions Accurately**

NEVES cannot be modified to estimate GSE emissions accurately for a number of reasons:

- **NEVES is a study and not a predictive emissions model;** therefore we cannot adjust the NEVES input variables to predict GSE emissions in 1996.
- The NEVES results should not be modified to remove Terminal Tractors, and then relied upon to scale emissions for the Dallas/Fort Worth area. True GSE (i.e., excluding Terminal Tractors) are a small component of the total nonroad engine and vehicle population database used for NEVES. Absent Terminal Tractors, NEVES estimated a national GSE population of only 12,300 units. To put this number in

perspective, the number of GSE currently in the Dallas/Fort Worth area, based on ATA member estimates, is fully ¼ of the NEVES national GSE population; all of Texas would represent roughly ½ of the NEVES national GSE population. Therefore, any attempted scaling of the NEVES report's GSE emissions based on airport operations will significantly underestimate the Dallas/Fort Worth GSE emissions.

- We cannot use NEVES to derive emissions in 2007, as its emission factors are based on 1973 test data. More importantly, NEVES doesn't reflect new diesel engines that will meet the lower NOx emission standards required under the Diesel SOP.
- Finally, we don't recommend that the NEVES report be used to determine average emissions per GSE, and then scale this value by actual populations; this will underestimate emissions. NEVES provides average annual NOx emissions for GSE (absent Terminal Tractors) that range from 1,400 to 1,850 pounds for diesel and 185 to 245 pounds for gasoline. Assuming a 50/50 mix of gas and diesel, the NEVES report would estimate that 1,065 pounds of NOx is emitted per year per GSE (using the high end of the range for both fuel types). This compares favorably to the default NONROAD model value of 1,050 pound per GSE used previously in ATA estimates of 1996 GSE emissions. However, the recently collected ATA member data shows that just 30% of the GSE fleet at the airports in the Dallas/Fort Worth nonattainment area consists of diesel engines. Thus, using the NEVES average emissions per GSE would realize an average NOx emission rate of 755 pounds/year, or about 3.1 tons/day for a GSE population of 3,000. This value is significantly lower than either the EPA or California Air Resources Board predictive models, and in our experience, 755 pounds of NOx per GSE is too low for uncontrolled engines.

### **Why EDMS Cannot Be Used to Estimate GSE Emissions**

EDMS is a predictive emissions model that assigns GSE operations to each Landing and Take Off (LTO) cycle for a type of aircraft (i.e., a Boeing 737, Lockheed L-1011, etc). EDMS then makes a series of default assumptions to derive GSE emissions, which include total activity per LTO, types and numbers of GSE assigned to an LTO, activities (in minutes) for each GSE, and fuel type. Based on these default assumptions, total GSE emissions are then estimated based on total annual LTOs by aircraft. EPA, TNRCC, FAA and ATA recognize that EDMS default assumptions will significantly underestimate emissions from GSE. Indeed, EDMS default results generated by TRNCC and ALG using the reported DFW International LTOs in 1996 result in estimated NOx emissions for GSE operations between 2 and 3 tons/day.

We understand from statements made by Mr. Darcy Zarubiak, DFW International, that URS Greiner, under direction of the airport, has modified the EDMS default assumptions. Based on these revised inputs, URS Greiner "validated" the DFW International GSE NOx estimate of 15 ton/day for 1996 that was derived from the flawed NEVES analysis. As you know, we have not

received the EDMS input files from DFW International or URS Greiner (these data were requested in early February and repeated requests have been made since that time). We cannot comment on the validity of the URS Greiner input data until we have a chance to review these data.

FAA recommends that EDMS be used with site-specific data (i.e., GSE equipment assignments and usage per LTO cycle for each aircraft type). We cannot adapt the GSE data obtained for either Dallas/Fort Worth or Southern California for use in EDMS, as these data are not associated with LTOs (which is the premise of the EDMS model). Finally, the EDMS emission factors do not account for the new diesel engines that will be manufactured to meet the Diesel SOP. These new engines will emit significantly less NOx. Thus, EDMS cannot accurately predict NOx emissions in 2007.

### **Summary of the Revised ATA GSE Emissions Inventory**

ALG applied the following approach to estimating the emissions. From the opening of the comment period for the proposed GSE electrification rule to the present, ATA has worked with its members to gather the following GSE data from the four airports in Dallas/Fort Worth:

- Population by category of GSE used in 1996
- Fuel type for each GSE
- Horsepower for each GSE
- Model year for each GSE
- Activity for each GSE
- Estimated annual growth for all operations through 2007

We obtained data from all ATA member carriers with the exception of Trans World Airlines. Data gaps were treated as follows:

**Population:** Where 1996 population data were not provided, carriers used current populations, which, as operations have increased over the past 4 years, are conservative.

**Fuel type:** Where fuel type data were not provided, we adjusted these missing data to be consistent with the ratio of gasoline:diesel:CNG that was determined by GSE category in the ATA Southern California GSE inventory (i.e., approximately 30% diesel). The default ratios in the NONROAD model were not used because they reflect a higher percentage of diesel engines than does the recent ATA member data.

Horsepower, Activity, Model Year: Where these data were not provided, we applied the average values by GSE category as determined in the ATA Southern California GSE inventory. The Southern California GSE inventory was exhaustive, and provides the most accurate usage data available. In any event, relying on the NONROAD default assumptions for these inputs will result in lower overall emissions.

Growth: Six of the ATA participants provided growth data, which when expressed as a weighted average equates to 3.75 percent per year. This growth estimate is not broken down by fuel type or airport. Over an 11 year period (1996-2007), this translates to 50% more GSE by 2007. The EPA NONROAD Model estimates national annual growth at 4.9 percent per year over that same period. ALG applied the ATA weighted average of 3.75 percent per year to derive the 2007 emissions estimate.

The data recently provided by ATA members are provided in the attached spreadsheets (with the exception of growth estimates, which is confidential business information). To generate emissions estimates, ALG used the EPA NONROAD predictive model, and substituted the average ATA values for population distributed by horsepower and fuel type, activity by fuel type, and growth. The EPA NONROAD Model emission factors and average load by fuel type were then applied to these ATA data to generate total NO<sub>x</sub> emissions. **The EPA NONROAD model was used, as it is the only model available to estimate emissions in 2007 based on current engine control requirements that apply to operations in Texas.**

Based on these data, we provide the following summaries:

Summary of GSE owned by ATA members by Airport - 1996

Dallas/Fort Worth:	1,785 Units
Love Field:	301 Units
Alliance Field	386 Units

All of the ATA members that responded to the survey indicated that they have no GSE usage at Meachem airport.

Summary of ATA Emissions Data

<b>Year</b>	<b>Number of GSE</b>	<b>NO<sub>x</sub> Emissions (Tons/Day)</b>	<b>Refined Average NO<sub>x</sub> Emissions per GSE (Pounds/Year)</b>	<b>Default Average NO<sub>x</sub> Emissions per GSE * (Pounds/Year)</b>
1996	2,472	4.33	1,279	1,050
2007	3,705	5.44	1,072	663

\*Presented in letter to Candy Garrett dated February 29, 2000

The 2007 emissions were generated by adjusting the default NONROAD model growth indicators for GSE to be consistent with the expected 3.75%/year overall growth rate.

Also shown in the table above are the per-GSE NO<sub>x</sub> emissions that were derived from the default population, activity, and growth data included in the NONROAD model. The differences between the refined results and the default results are explained as follows:

- The refined activity levels (i.e., hours per year of operation) are substantially greater than the NONROAD defaults. This increases the refined emission estimates accordingly.
- The refined populations show a substantially smaller fraction of diesel equipment than the NONROAD default. Since the 1996 gasoline NO<sub>x</sub> emission factors are generally lower than the diesel emission factors, this “fuel shift” reduces the 1996 per-GSE emissions somewhat. In 2007, the NONROAD model incorporates federal standards for new diesel engines that will soon come into play; however, the NONROAD model does not incorporate any potential future gasoline engine standards. Therefore, the overall 2007 emission factors for gasoline and diesel are comparable and the fuel shift has no effect on the per-GSE NO<sub>x</sub> emissions.

The ATA population data for DFW International, Dallas Love Field, and Alliance indicate that there are approximately 2,472 motorized GSE at these airports in 1996, not including TWA, non-ATA carriers, the airport operations, and fixed base operators. We estimate that inclusion of the operations not represented by the survey (including Meachem) could increase the GSE total by as much as 25%. This 25% value is based on a comparison between ATA member operations and all GSE operations at Los Angeles International Airport in 1995. The projected total 2007 populations and emissions, scaled from the refined NONROAD results, are summarized below.

ATA GSE NO<sub>x</sub> Emission Estimates  
for Four Major Airports in the Dallas/Fort Worth Area

<b>Year</b>	<b>Number of GSE</b>	<b>NO<sub>x</sub> Emissions (Tons/Day)</b>
1996	3,090	5.41
2007	4,631	6.80

These emissions are about 32% of the NO<sub>x</sub> emissions used in the 1996 modeling and 30% of the NO<sub>x</sub> emissions used in the 2007 modeling.

Comparing the revised 2007 NO<sub>x</sub> emissions to the 2007 emissions presented in the February 29, 2000 ATA letter to Candy Garrett, we see that the revised estimate is higher (6.8 tons per day compared to 5.5 tons per day). We feel that the revised estimate is conservative for the following reasons:

- The 1996 populations that were “grown” to provide the estimate of 2007 populations are conservative because higher current populations were used for 1996 populations when 1996 data were not available. The conservatism is compounded when the annual growth rate is applied.
- The NONROAD model does not reflect the effect of the TNRCC SIP proposal to require low emission diesel fuel. This will reduce NO<sub>x</sub> emissions from the GSE diesel engines.
- The NONROAD model does not implement the stricter NO<sub>x</sub> emission standards for large nonroad gasoline engines that TNRCC also proposes in the latest SIP. While it was not possible for us to incorporate these proposed stricter standards into the NONROAD model in the time available, we estimate that applying the California standard for nonroad gasoline engines (2.7 grams/hp-hr) to the gasoline GSE acquired after 2002, as proposed by TNRCC, would reduce the 2007 NO<sub>x</sub> emissions by approximately 0.4 to 0.45 tons per day.
- The GSE activity data are higher than is provided in the NONROAD model.

In summary, we believe that the emission estimates provided in this memo are conservative. The cumulative effect of the items listed above would likely be lower GSE NO<sub>x</sub> emissions in both 1996 and 2007.

# MEMORANDUM

## ASHWORTH LEININGER GROUP

199 East Thousand Oaks Boulevard, Suite 201  
Thousand Oaks, California 91360  
Direct Tel: 805-370-1469  
Fax: 805-370-1471

To: Scott F. Belcher, Esq.

From: Ev Ashworth and Dan Godden

Date: March 15, 2000

Re: Revised ATA GSE Emission Estimate – Dallas/Fort Worth Nonattainment Area  
Additional Supporting Information

---

This memorandum provides the additional supporting information for the revised nitrogen oxide (NOx) emission inventory for Ground Service Equipment (GSE) operations at the four major airports located within the Dallas/Fort Worth nonattainment area (NAA) as presented in our memo to you dated March 13, 2000 (ALG 2000). The supporting information is provided for the following issues:

5. How the survey of GSE operations in the Dallas/Fort Worth area was conducted and analyzed.
6. The basis for the assumption that the GSE NOx emissions from the ATA member carriers can be scaled up by 25% to account for the emissions from non-ATA carriers, fixed base operators, and airport-owned equipment.
7. The ratio of NOx emissions from GSE to NOx emissions from aircraft.

Each of these issues is discussed below.

### **1. The ATA GSE Survey Process**

ATA is the oldest and largest airline trade association in the United States. It represents more than 95% of passenger and cargo traffic carried by scheduled U.S. airlines; data gathered on ATA members can be considered representative of air operations at U.S. airports. The ATA members that responded to the survey accounted for 96 % of the departures at the four airports under consideration in 1996.

To provide a defensible estimate of GSE emissions in the Dallas/Fort Worth area, ATA requested the Environmental Directors of the member carriers to provide the following data:

- Population by category of GSE used in 1996
- Fuel type for each GSE
- Horsepower for each GSE
- Model year for each GSE
- Activity for each GSE
- Estimated annual growth for all operations through 2007

We obtained data from all major ATA member carriers, with the exception of Trans World Airlines (TWA represents less than 1 % of the scheduled departures at the four airports surveyed). The respondents included the following passenger and cargo carriers:

- Alaska Airlines
- America West Airlines
- American Airlines and American Eagle
- Continental Airlines
- Delta Airlines
- Federal Express
- Northwest Airlines
- Southwest Airlines
- United Airlines
- United Parcel Service
- US Airways

The data were provided in spreadsheet and hardcopy. The first step was to aggregate the various data sets into a master spreadsheet. After aggregating the data, ALG performed QA/QC to identify data gaps, potential errors and outliers (e.g, activity greater than 5,000 hours/year). These values were reviewed individually and the carriers were asked to verify or correct the information.

Certain data was extrapolated as follows:

**Population:** Where 1996 population data were not provided, carriers used current populations, which, because operations have increased over the past 4 years, are conservative (i.e., overstated 1996 GSE populations). Where necessary, equipment was recategorized to correspond with the ATA Southern California GSE inventory, which was a comprehensive and representative database for GSE. While this does not affect

emissions calculations directly, it determines what values are substituted for fuel type, power, age, and activity where no data were provided. The 25 categories included in that survey are:

Air Conditioner	Catering Truck	Lavatory Truck
Air Start	Deicer	Lift
Aircraft Tractor	Fork Lift	Other
Baggage Tractor	Fuel Truck	Passenger Stand
Belt Loader	Generator	Service Truck
Bobtail	Ground Power	Sweeper
Cargo Loader	Unit	Water Truck
Cargo Tractor	Hydrant Truck	
Cart	Lavatory Cart	

**Fuel type:** Where fuel type data were not provided, ALG adjusted these missing data to be consistent with the ratio of gasoline:diesel:CNG that was determined by GSE category in the ATA Southern California GSE inventory (i.e., approximately 30% diesel) and is generally consistent with the ratio obtained in this survey response. The default ratios in the NONROAD model were not used because they reflect a higher percentage of diesel engines than does the actual ATA member data. Just five units were affected by this substitution. Some carriers included electric or non-motorized GSE in their survey responses; these were deleted from the aggregate inventory because we only analyzed information associated with motorized vehicles.

**Horsepower, Activity, Model Year:** Where these data were not provided, we applied the average values by GSE category as determined in the ATA Southern California GSE inventory. The Southern California GSE inventory was exhaustive, and provides the most accurate usage data available. Less than 2% of the horsepower data were substituted, and about 13% of the activity data. We note that 3.5% of the model year data were also substituted in this manner, but the NONROAD model does not use this information in its calculations. Where individual carriers advised ALG that the Southern California data were consistent with Texas and should be used, these data were not considered missing.

**Growth:** Six of the ATA carriers representing 75% of the baseline, provided growth data for the period of 1996 to 2007. Expected annual growth rates of the respondents ranged from 0 (zero) to 11 percent per year. When weighted by population, the average growth rate was 3.75 percent per year.

**2. The scaling of ATA Member Carrier GSE emissions to account for non-ATA carriers, fixed base operators, and airport-owned equipment.**

The ATA member population of motorized GSE at DFW International, Dallas Love Field, and Alliance Airport was estimated to be 2,472 in 1996. This total did not include TWA, non-ATA carriers, airport-owned equipment, and fixed base operators. To account for these additional GSE, we increased the ATA carrier emissions by 25%. This scaling factor is based on a comparison between ATA member operations and all GSE operations at Los Angeles International Airport (LAX) in 1995. Specifically, a 1995 study (ASI 1995) estimated the total GSE population for LAX to be 2,200. ATA member population at the time was estimated to be 1800. The ratio of total GSE to ATA GSE is, therefore, 1.22:1 (22%). We used a ratio of 1.25:1 for the Dallas/Fort Worth area to add an extra measure of conservatism.

**12. The ratio of GSE NOx emissions to aircraft NOx emissions**

The DFW International Airport estimates of GSE and aircraft in 1996 and 2007 are provided in the table below (DFW 2000). These estimates indicate that GSE emissions are comparable to aircraft emissions. ATA estimates of 1996 and 2007 GSE NOx emissions for the four major airports in the Dallas/Fort Worth nonattainment area are 5.4 and 6.8 tons per day, respectively, or roughly a third of aircraft emissions.

Parameter	1996	2007
DFW GSE NOx	15.1 TPD	19.6 TPD
DFW Aircraft NOx	15.3 TPD	20.5 TPD
DFW GSE/Aircraft NOx	99%	96%
ATA's DFW NAA GSE NOx	5.4 TPD	6.8 TPD
DFW NAA Aircraft NOx	16.7 TPD	22.1 TPD
DFW NAA GSE/Aircraft NOx	32%	31%
LAX GSE/Aircraft NOx <sup>a</sup>	9% (1990)	
LAX GSE/("Total" – GSE) NOx <sup>b</sup>	19% (No Year Given)	
BWI GSE/("Total" – GSE) NOx <sup>b</sup>	25% (No Year Given)	
BOS GSE/("Total" – GSE) NOx <sup>b</sup>	20% (No Year Given)	
PHX GSE/("Total" – GSE) NOx <sup>b</sup>	16% (No Year Given)	
Hartsfield GSE NOx <sup>c,d</sup>	1.7 TPD	2.2 TPD (2003)
Hartsfield Aircraft NOx <sup>c,d</sup>	13.4 TPD	17.4 TPD (2003)
Hartsfield GSE/Aircraft NOx	13%	13%
SFO GSE NOx <sup>e</sup>	0.96 TPD (1996)	
SFO Aircraft NOx <sup>e</sup>	6.3 TPD (1996)	

SFO GSE/Aircraft NOx	15% (1996)
----------------------	------------

<sup>a</sup>From EEA 1994, Figure 2-1.

<sup>b</sup>From EEA 1997, Table 4-1.

<sup>c</sup>TSI 1999.

<sup>d</sup>TSI 1999.

<sup>e</sup>TSI 1998.

Estimates of aircraft NOx emissions in the Dallas/Fort Worth nonattainment area are also provided (DFW 2000). Based on these data, the GSE NOx emissions are about 30% of the aircraft NOx emissions. For comparison, two separate estimates of GSE NOx emissions at LAX made by Energy and Environmental Analysis are shown. One (EEA 1994) reflects the ratio of GSE NOx emissions to aircraft NOx emissions in 1990. The other (EEA 1997) reflects the ratio of GSE NOx emissions to “total” airport emissions minus GSE emissions (Note: no year is given and it is not stated in the report what sources besides aircraft and GSE are included in the airport total); this report also includes estimates from Baltimore-Washington International (BWI), Boston Logan (BOS), and Phoenix Sky Harbor (PHX) that range from 16% to 25%. Comparing the ATA’s percent estimated for the Dallas/Fort Worth area airports (~30%) to the two LAX estimates (9% to 19%) and the estimates for the other airports (16% to 25%), we see that the ATA Dallas/Fort Worth estimate of GSE NOx emissions as a fraction of aircraft emissions is likely to be conservative suggesting that actual GSE emissions would be less than the 5.4/6.8 TPD figures.

#### References:

ALG 2000. “Revised ATA GSE Emission Estimate – Dallas/Fort Worth Nonattainment Area.” Memo to Scott Belcher, Air Transport Association, from Ev Ashworth and Dan Godden, Ashworth Leininger Group, March 13, 2000.

ASI 1995. “Los Angeles International Airport Energy Study for Future Preconditioned Air, 400 Hz, and Battery Powered GSE Equipment.” Aviation Systems, Inc., August 1995.

DFW 2000. Untitled discussions of how aircraft and ground support equipment NOx emissions were developed for DFW Airport. Dallas/Fort Worth Airport, Air Modeling and Data Analysis Section, February 2000.

EEA 1994. “Air Pollution Mitigation Measures for Airports and Associated Activity.” Energy and Environmental Analysis, Inc., May 1994 (Prepared for California Air Resources Board)

Scott F. Belcher, Esq.

March 15, 2000

Page 15

EEA 1997. "Analysis of Techniques to Reduce Air Emissions at Airports." Energy and Environmental Analysis, Inc., June 1997 (Prepared for U.S. Environmental Protection Agency)

TSI 1998. "San Francisco Runway Feasibility Study." Transportation Solutions Inc., December 1998

TSI 1999. "Emissions Inventory 1996." Transportation Solutions Inc., July 1999.

TSI 1999. "Emissions Inventory 2003." Transportation Solutions Inc., July 1999

<b>GSE Category</b>	<b>Make</b>	<b>Model</b>	<b>Fuel</b>	<b>Reported Year</b>	<b>Reported Pow</b>
air conditioner	LEARS	LEAR SIEGLER	diesel	1981	160
air conditioner	Air-a-plane	5050DC	diesel	1984	Not Reported
air conditioner	AIRAPLANE	2425FD/70T	diesel	1985	Not Reported
air conditioner	AIRAPLANE	652D/110 T	diesel	1985	Not Reported
air conditioner	AIRAPLANE	652D/110 T	diesel	1985	Not Reported
air conditioner			diesel	1987	200
air conditioner			diesel	1987	200
air conditioner			diesel	1987	200
air conditioner			diesel	1987	200
air conditioner			diesel	1987	200
air conditioner			diesel	1987	200
air conditioner	Ace	804-920	diesel	1989	Not Reported
air conditioner	Ace	804-920	diesel	1989	Not Reported
air conditioner	ACE	804-920	diesel	1990	80
air conditioner	Ace	AC19	diesel	1991	170
air conditioner	Ace	AC19	diesel	1991	170
air conditioner	Ace	AC19	diesel	1992	170
air conditioner			diesel	Not Reported	Not Reported
air conditioner			diesel	Not Reported	Not Reported
air conditioner	Ace	AC19	diesel	1992	170
air conditioner	DEVTEC/NORDCO	804-920	diesel	1992	Not Reported
air conditioner	AIRAP	1520DE	diesel	1996	80
air conditioner	DEVTEC/NORDCO	300/300	diesel	1998	Not Reported
air conditioner	DEVTEC/NORDCO	300/300	diesel	1998	Not Reported
air start			diesel	1962	300
air start	Air Research	JS07	diesel	1968	Not Reported
air start			diesel	1968	300
air start			diesel	1974	300
air start	Air Research	JS07	diesel	1974	Not Reported
air start	Stewart Stevens	JS09	diesel	1980	500
air start	Stewart Stevens	JS09	diesel	1980	500
air start	S&S		diesel	1984	360
air start			diesel	1984	Not Reported
air start	S AND S	TM-AC-150	diesel	1984	Not Reported
air start			diesel	1984	Not Reported
air start	S&S		diesel	1984	360
air start			diesel	Not Reported	Not Reported
air start			diesel	Not Reported	Not Reported
air start	S AND S	TM-AC-150	diesel	1985	Not Reported
air start			diesel	Not Reported	Not Reported
air start			diesel	Not Reported	Not Reported
air start			diesel	Not Reported	Not Reported
air start	S AND S		diesel	1985	Not Reported
air start			diesel	Not Reported	Not Reported
air start			diesel	Not Reported	Not Reported
air start	S AND S	TM-AC-135	diesel	1986	Not Reported
air start	S AND S	TM-AC-150	diesel	1986	Not Reported
air start	S AND S	TM-SS-120	diesel	1986	Not Reported
air start	Stewart Stevens	JS09	diesel	1988	500

air start	Stewart Stevens	JS09	diesel	1988	500
air start	AIR-A-PLANE	SAS9000D	diesel	1989	400
air start	S AND S	TM-AC-150	diesel	1989	Not Reported
air start	S AND S	TM-SS-120	diesel	1989	Not Reported
air start	S&S		diesel	1989	360
air start	S AND S	TM-AC-150	diesel	1989	Not Reported
air start	S AND S	TM-AC-150	diesel	1991	Not Reported
air start	S AND S	TM-AC-150	diesel	1992	Not Reported
air start	S AND S	TM-AC-280	diesel	1992	Not Reported
air start	S AND S	TM-AC-150	diesel	1992	Not Reported
air start	S AND S	TM-AC-150	diesel	1992	Not Reported
air start			diesel	1994	300
air start	S&S		diesel	1994	580
air start	S AND S	TM-SS-300	diesel	1995	Not Reported
air start	Devtec	Ace 600-2250	diesel	1995	500
air start	S AND S	TM-AC-150	diesel	1997	Not Reported
air start	S AND S	TM-AC-150	diesel	1997	Not Reported
air start	S AND S	TM-AC-150	diesel	1999	Not Reported
air start	S AND S	TM-AC-150	diesel	1999	Not Reported
air start	S AND S	TM-AC-150	gasoline	2000	Not Reported
aircraft tractor	HOUGH	T300	diesel	1960	Not Reported
aircraft tractor	Detroit		diesel	1960	Not Reported
aircraft tractor	Deutz		diesel	1960	600
aircraft tractor	Detroit		diesel	1960	Not Reported
aircraft tractor	Deutz		diesel	1960	600
aircraft tractor	HOUGH	T300	diesel	1960	Not Reported
aircraft tractor	HOUGH	T300	diesel	1960	Not Reported
aircraft tractor	HOUGH	T300	diesel	1961	Not Reported
aircraft tractor	HOUGH	T300	diesel	1962	Not Reported
aircraft tractor	HOUGH	T300	diesel	1966	Not Reported
aircraft tractor	HOUGH	T300	diesel	1967	Not Reported
aircraft tractor	HOUGH	T300	diesel	1967	Not Reported
aircraft tractor	HOUGH	T300	diesel	1969	Not Reported
aircraft tractor	HOUGH	T300SL-453/2	diesel	1970	1200
aircraft tractor	HOUGH	T500	diesel	1971	Not Reported
aircraft tractor	HOUGH	T500	diesel	1972	Not Reported
aircraft tractor	HOUGH	T300	diesel	1976	Not Reported
aircraft tractor	HOUGH	T300	diesel	1976	Not Reported
aircraft tractor	Hough	TU23	diesel	1978	2300
aircraft tractor	Hough	TU23	diesel	1979	2300
aircraft tractor	Hough	TU23	diesel	1980	2300
aircraft tractor	Aero Tug	TD20	diesel	1980	Not Reported
aircraft tractor	Hough	TU23	diesel	1981	2300
aircraft tractor	S AND S	GT60	diesel	1981	Not Reported
aircraft tractor	S AND S	GT60	diesel	1981	Not Reported
aircraft tractor	S AND S	GT60	diesel	1983	Not Reported
aircraft tractor			diesel	1983	2100
aircraft tractor			diesel	1983	2100
aircraft tractor			diesel	1983	2100
aircraft tractor			diesel	1983	2100

aircraft tractor	S&S		diesel	1984	300
aircraft tractor	Detroit		diesel	Not Reported	Not Reported
aircraft tractor			diesel	Not Reported	Not Reported
aircraft tractor			diesel	Not Reported	Not Reported
aircraft tractor			diesel	Not Reported	Not Reported
aircraft tractor			diesel	Not Reported	Not Reported
aircraft tractor			diesel	Not Reported	Not Reported
aircraft tractor			diesel	Not Reported	Not Reported
aircraft tractor			diesel	Not Reported	Not Reported
aircraft tractor			diesel	Not Reported	Not Reported
aircraft tractor			diesel	Not Reported	Not Reported
aircraft tractor	Deutz		diesel	Not Reported	600
aircraft tractor			diesel	Not Reported	Not Reported
aircraft tractor	Deutz		diesel	Not Reported	600
aircraft tractor			diesel	Not Reported	Not Reported
aircraft tractor	Onan		diesel	Not Reported	800
aircraft tractor	Onan		diesel	Not Reported	800
aircraft tractor			diesel	Not Reported	Not Reported
aircraft tractor	John Deere		diesel	Not Reported	700
aircraft tractor			diesel	Not Reported	Not Reported
aircraft tractor	S AND S	GT50	diesel	1985	Not Reported
aircraft tractor	S AND S	GT50	diesel	1985	Not Reported
aircraft tractor	S AND S	GT50	diesel	1985	Not Reported
aircraft tractor	S AND S	GT50	diesel	1985	Not Reported
aircraft tractor	S & S		diesel	1985	Not Reported
aircraft tractor	S AND S	GT50	diesel	1985	Not Reported
aircraft tractor	S AND S	GT50	diesel	1985	Not Reported
aircraft tractor	Stewart Stevens	TU29	diesel	1986	2000
aircraft tractor	Stewart Stevens	TU29	diesel	1986	2000
aircraft tractor	Stewart Stevens	TU29	diesel	1986	2000
aircraft tractor	Stewart Stevens	TU29	diesel	1987	2000
aircraft tractor	Stewart Stevens	TU29	diesel	1987	2000
aircraft tractor	Stewart Stevens	TU29	diesel	1987	2000
aircraft tractor	Stewart Stevens	TU29	diesel	1988	2000
aircraft tractor	Stewart Stevens	TU29	diesel	1988	2000
aircraft tractor	Stewart Stevens	TU29	diesel	1988	2000
aircraft tractor	Stewart Stevens	TU29	diesel	1989	2000
aircraft tractor	S AND S	GT50	diesel	1989	Not Reported
aircraft tractor	S AND S	GT50	diesel	1989	Not Reported
aircraft tractor	S AND S	GT50	diesel	1989	Not Reported
aircraft tractor	Stewart Stevens	TU29	diesel	1989	2000
aircraft tractor	TUG	MC15-4	diesel	1989	Not Reported
aircraft tractor	Stewart Stevens	TU29	diesel	1989	2000
aircraft tractor	S AND S	GT50	diesel	1989	Not Reported
aircraft tractor	S AND S	GT50	diesel	1989	Not Reported
aircraft tractor	S AND S	GT50	diesel	1989	Not Reported
aircraft tractor	S AND S	GT50	diesel	1989	Not Reported
aircraft tractor	S AND S	GT50	diesel	1989	Not Reported

aircraft tractor	S AND S	GT50	diesel	1989	Not Reported
aircraft tractor	S AND S	GT50	diesel	1989	Not Reported
aircraft tractor	S AND S	GT50	diesel	1989	Not Reported
aircraft tractor	S AND S	GT50	diesel	1989	Not Reported
aircraft tractor	S AND S	GT50	diesel	1989	Not Reported
aircraft tractor	S AND S	GT50	diesel	1989	Not Reported
aircraft tractor	S AND S	GT50	diesel	1989	Not Reported
aircraft tractor	Cummins		diesel	1990	110
aircraft tractor	Stewart Stevens	TU29	diesel	1990	200
aircraft tractor	Jetline	B-300	diesel	1990	120
aircraft tractor	S AND S	GT50H	diesel	1990	Not Reported
aircraft tractor	S AND S	GT50	diesel	1990	Not Reported
aircraft tractor	Deutz		diesel	1990	60
aircraft tractor	S AND S	GT50H	diesel	1990	Not Reported
aircraft tractor	JETWAY		diesel	1990	210
aircraft tractor	Stewart Stevens	TU29	diesel	1990	200
aircraft tractor	JETLI	B300	diesel	1990	110
aircraft tractor	Stewart Stevens	TU29	diesel	1990	200
aircraft tractor	Onan		diesel	1990	80
aircraft tractor	Stewart Stevens	TU29	diesel	1991	200
aircraft tractor	Stewart Stevens	TU43	diesel	1991	80
aircraft tractor	Stewart Stevens	TU29	diesel	1991	200
aircraft tractor	Stewart Stevens	TU29	diesel	1991	200
aircraft tractor	S AND S	GT50CH	diesel	1992	Not Reported
aircraft tractor	S AND S	GT16/28	diesel	1992	Not Reported
aircraft tractor	S AND S	GT50CH	diesel	1992	Not Reported
aircraft tractor	S AND S	GT50	diesel	1992	Not Reported
aircraft tractor	S AND S	GT50CH	diesel	1992	Not Reported
aircraft tractor	CROWN	200TWR	diesel	1992	Not Reported
aircraft tractor	S AND S	GT50CH	diesel	1992	Not Reported
aircraft tractor	S AND S	GT100	diesel	1992	Not Reported
aircraft tractor	S AND S	GT50CH	diesel	1992	Not Reported
aircraft tractor	S AND S	GT50CH	diesel	1992	Not Reported
aircraft tractor	S AND S	GT90	diesel	1992	Not Reported
aircraft tractor	S AND S	GT50CH	diesel	1992	Not Reported
aircraft tractor	CROWN	200TWR	diesel	1992	Not Reported
aircraft tractor	S AND S	GT16/28	diesel	1992	Not Reported
aircraft tractor	Stewart Stevens	TU43	diesel	1993	80
aircraft tractor	S T E W A R T & STEVENSON	GT1628	diesel	1994	80
aircraft tractor	Stewart Stevens	TU43	diesel	1995	80
aircraft tractor	Stewart Stevens	TU43	diesel	1997	80
aircraft tractor	Deutz		diesel	1998	60
aircraft tractor	Stewart Stevens	TU43	diesel	1999	80
aircraft tractor	S AND S	GT50-HC	diesel	1999	Not Reported
aircraft tractor	S AND S	GT50-HC	diesel	1999	Not Reported
aircraft tractor	S AND S	GT50-HC	diesel	1999	Not Reported
aircraft tractor	S AND S	TUG	diesel	1999	Not Reported
aircraft tractor	S AND S	GT50-HC	diesel	1999	Not Reported
aircraft tractor	S AND S	GT50-HC	diesel	1999	Not Reported
aircraft tractor	Stewart Stevens	TU43	diesel	2000	80

aircraft tractor			diesel	2000	Not Reported
aircraft tractor			diesel	2000	Not Reported
aircraft tractor	S & S	TUG	diesel	2000	Not Reported
aircraft tractor	S & S	GT50-HC	diesel	2000	Not Reported
aircraft tractor	CROWN	TWR3540-20A	diesel	2000	Not Reported
aircraft tractor	Hough	TU06	gasoline	1975	199
aircraft tractor	BACKER	PPT-WWD-EE	gasoline	1992	Not Reported
aircraft tractor	BACKER	PPT-WWD-EE	gasoline	1992	Not Reported
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Stewart Stevens	TU41	diesel	1965	69
baggage tractor	Clark	TU-25	diesel	1981	90
baggage tractor	Clark	TU-25	diesel	1981	90
baggage tractor	Clark	TU-25	diesel	1981	90
baggage tractor	Clark	TU-25	diesel	1981	90
baggage tractor	Clark	TU-25	diesel	1981	90
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	CLARK	CT30	diesel	1982	Not Reported
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Clark	TU-25	diesel	1982	90
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Clark	TU-25	diesel	1982	90
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Clark	TU-25	diesel	1982	90
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Clark	TU-25	diesel	1982	90
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Tug Inc.	TU26	diesel	1982	89
baggage tractor	Tug Inc.	TU26	diesel	1982	89

baggage tractor	Tug Inc.	TU26	diesel	1982		8!
baggage tractor	Tug Inc.	TU26	diesel	1982		8!
baggage tractor	Clark	TU-25	diesel	1982		9!
baggage tractor	Tug Inc.	TU26	diesel	1982		8!
baggage tractor	Clark	TU-25	diesel	1983		9!
baggage tractor	Harlan	HTA300	diesel	1983	Not Reported	
baggage tractor	TUG	MA30	diesel	1983	Not Reported	
baggage tractor	CLARK	CT30	diesel	1983	Not Reported	
baggage tractor	TUG	MA30	diesel	1983	Not Reported	
baggage tractor	TUG	MA30	diesel	1983	Not Reported	
baggage tractor	CLARK	CT30	diesel	1983	Not Reported	
baggage tractor	TUG	MA30	diesel	1983	Not Reported	
baggage tractor	TUG	MA30	diesel	1983	Not Reported	
baggage tractor	Harlan	HTA300	diesel	1983	Not Reported	
baggage tractor	Harlan	HTA300	diesel	1983	Not Reported	
baggage tractor	TUG	MA30	diesel	1983	Not Reported	
baggage tractor	CLARK	CT30	diesel	1983	Not Reported	
baggage tractor	TUG	MA30	diesel	1983	Not Reported	
baggage tractor	Clark	TU-25	diesel	1983		9!
baggage tractor	Clark	TU-25	diesel	1983		9!
baggage tractor	CLARK	CT30	diesel	1983	Not Reported	
baggage tractor	TUG	MA30	diesel	1983	Not Reported	
baggage tractor	TUG	MA30	diesel	1983	Not Reported	
baggage tractor	CLARK	CT30	diesel	1983	Not Reported	
baggage tractor	TUG	MA30	diesel	1983	Not Reported	
baggage tractor	Clark	TU-25	diesel	1983		9!
baggage tractor	Clark	TU-25	diesel	1983		9!
baggage tractor	TUG	MA30	diesel	1983	Not Reported	
baggage tractor	TUG	MA30	diesel	1984	Not Reported	
baggage tractor	TUG	MA30	diesel	1984	Not Reported	
baggage tractor	CLARK	CT30	diesel	1984	Not Reported	
baggage tractor	Clark	TU-25	diesel	1984		9!
baggage tractor	TUG	MA30	diesel	1984	Not Reported	
baggage tractor	Clark	TU-25	diesel	1984		9!
baggage tractor	Clark	TU-25	diesel	1984		9!
baggage tractor	TUG	MA30	diesel	1984	Not Reported	
baggage tractor	Clark	TU-25	diesel	1984		9!
baggage tractor	Clark	TU-25	diesel	1984		9!
baggage tractor	CLARK	CT30	diesel	1984	Not Reported	
baggage tractor	CLARK	CT30	diesel	1984	Not Reported	
baggage tractor	TUG	MA30	diesel	1984	Not Reported	
baggage tractor	Clark	TU-25	diesel	1985		9!
baggage tractor	Clark	TU-25	diesel	1985		9!
baggage tractor	Clark	TU-25	diesel	1985		9!
baggage tractor	TUG	MA30	diesel	1985	Not Reported	
baggage tractor	HARLAN	HTAD-50	diesel	1985		7!
baggage tractor	Clark	TU-25	diesel	1985		9!
baggage tractor	Clark	TU-25	diesel	1986		9!
baggage tractor	CLARK	30D/50D	diesel	Not Reported		7!
baggage tractor	CLARK	30D/50D	diesel	Not Reported		7!



























belt loader	COCHRAN	600	gasoline	1967	Not Reported
belt loader	COCHRAN	600	gasoline	1967	Not Reported
belt loader	COCHRAN	600	gasoline	1968	Not Reported
belt loader	COCHRAN	600	gasoline	1969	Not Reported
belt loader	COCHRAN	600	gasoline	1970	Not Reported
belt loader	COCHRAN	600	gasoline	1971	Not Reported
belt loader	COCHRAN	600	gasoline	1971	Not Reported
belt loader	COCHRAN	600	gasoline	1971	Not Reported
belt loader	COCHRAN	600	gasoline	1971	Not Reported
belt loader	COCHRAN	600	gasoline	1973	Not Reported
belt loader	COCHRAN	600	gasoline	1973	Not Reported
belt loader	COCHRAN	600	gasoline	1973	Not Reported
belt loader	COCHRAN	600	gasoline	1973	Not Reported
belt loader	WOLLARD		gasoline	1974	9!
belt loader	Wollard	BC13	gasoline	1976	9!
belt loader	Wollard	BC13	gasoline	1976	9!
belt loader	COCHRAN	600	gasoline	1976	Not Reported
belt loader	Wollard	BC13	gasoline	1976	9!
belt loader	Wollard	BC13	gasoline	1976	9!
belt loader	COCHRAN	600	gasoline	1976	Not Reported
belt loader	COCHRAN	600	gasoline	1976	Not Reported
belt loader	Wollard	BC13	gasoline	1976	9!
belt loader	Wollard	BC13	gasoline	1976	9!
belt loader	Wollard	BC13	gasoline	1976	9!
belt loader	Wollard	BC13	gasoline	1976	9!
belt loader	Wollard	BC13	gasoline	1976	9!
belt loader	LANTI	600U	gasoline	1977	6!
belt loader	COCHRAN	600	gasoline	1978	Not Reported
belt loader	COCHRAN	600	gasoline	1978	Not Reported
belt loader	COCHRAN	600	gasoline	1978	Not Reported
belt loader	Wollard	TC885	gasoline	1978	Not Reported
belt loader	LANTI	600U	gasoline	1979	6!
belt loader	COCHRAN	660	gasoline	1979	Not Reported
belt loader	COCHRAN	660	gasoline	1979	Not Reported
belt loader	COCHRAN	660	gasoline	1979	Not Reported
belt loader	Wollard	TC885	gasoline	1980	Not Reported
belt loader	Wollard	TC885	gasoline	1980	Not Reported
belt loader	NORDCO	2181	gasoline	1980	Not Reported
belt loader	Wollard	BC13	gasoline	1982	9!
belt loader	Wollard	BC13	gasoline	1982	9!
belt loader	Wollard	BC13	gasoline	1982	9!
belt loader	Wollard	BC13	gasoline	1982	9!
belt loader	Wollard	BC13	gasoline	1982	9!
belt loader	Wollard	BC13	gasoline	1982	9!
belt loader	Wollard	BC13	gasoline	1982	9!
belt loader	Wollard	BC13	gasoline	1982	9!
belt loader	Wollard	BC13	gasoline	1982	9!
belt loader	LANTIS		gasoline	1984	9!
belt loader	LANTIS		gasoline	1984	9!









cargo loader			diesel	Not Reported	Not Reported
cargo loader			diesel	Not Reported	Not Reported
cargo loader			diesel	Not Reported	Not Reported
cargo loader			diesel	Not Reported	Not Reported
cargo loader			diesel	Not Reported	Not Reported
cargo loader			diesel	Not Reported	Not Reported
cargo loader			diesel	Not Reported	Not Reported
cargo loader	FMC	COMMANDER	diesel	1990	Not Reported
cargo loader	FMC	COMMANDER	diesel	1990	Not Reported
cargo loader	FMC	COMMANDER	diesel	1990	Not Reported
cargo loader	FMC	COMMANDER	diesel	1990	Not Reported
cargo loader	FMC	COMMANDER	diesel	1990	Not Reported
cargo loader	FMC	COMMANDER	diesel	1990	Not Reported
cargo loader	FMC	COMMANDER	diesel	1990	Not Reported
cargo loader	FMC	COMMANDER	diesel	1990	Not Reported
cargo loader	FMC	COMMANDER	diesel	1990	Not Reported
cargo loader	FMC	COMMANDER	diesel	1990	Not Reported
cargo loader	FMC	COMMANDER	diesel	1990	Not Reported
cargo loader	FMC	COMMANDER	diesel	1990	Not Reported
cargo loader	FMC	COMMANDER	diesel	1990	Not Reported
cargo loader	FMC	COMMANDER	diesel	1990	Not Reported
cargo loader	LANTIS		diesel	1994	160
cargo loader	LANTIS		diesel	1996	160
cargo loader			diesel	2000	Not Reported
cargo loader	FMC		gasoline	1974	130
cargo loader	LANTIS		gasoline	1985	200
cargo loader	LANTIS		gasoline	1987	300
cargo loader	LANTIS		gasoline	1993	900
cargo loader	FMC		gasoline	1994	900
cargo loader	LANTIS		gasoline	1994	900
cargo loader	FMC		gasoline	1994	900
cargo loader	FMC		gasoline	1994	900
cargo loader	FMC		gasoline	1994	900
cargo loader	FMC		gasoline	1994	900
cargo loader	FMC	Commander 15 Widebody	gasoline	2000	Not Reported
cargo loader	FMC	Commander 15 Widebody	gasoline	2000	Not Reported
cargo loader	FMC	Commander 15 Widebody	gasoline	2000	Not Reported
cargo loader	FMC	Commander 15 Widebody	gasoline	2000	Not Reported
cargo tractor	Eagle/Ford	F350/CT	gasoline	1982	Not Reported
cargo tractor	TUG		gasoline	1984	900
cargo tractor	TUG		gasoline	1984	900
cargo tractor	TUG		gasoline	1984	900
cargo tractor	TUG		gasoline	1986	900
cargo tractor	Eagle/Ford	F350/CT	gasoline	1987	Not Reported









cart			gasoline	1985	Not Reported
cart			gasoline	Not Reported	Not Reported
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	1988	Not Reported
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	Not Reported	Not Reported
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	1988	Not Reported
cart	EZ-90		gasoline	1988	Not Reported
cart	EZ-90		gasoline	Not Reported	?
cart	EZ-90		gasoline	Not Reported	?
cart			gasoline	Not Reported	Not Reported
cart			gasoline	Not Reported	Not Reported
cart			gasoline	1988	Not Reported
cart	EZ-90		gasoline	Not Reported	?
cart			gasoline	1990	Not Reported
cart			gasoline	1990	Not Reported
cart			gasoline	1991	Not Reported
cart			gasoline	1992	Not Reported
cart			gasoline	1992	Not Reported
cart			gasoline	1992	Not Reported
cart			gasoline	1992	Not Reported
cart			gasoline	1992	Not Reported
cart			gasoline	1992	Not Reported
cart			gasoline	1992	Not Reported
cart	TAYLOR-DUNN	G1-50	gasoline	1997	Not Reported
cart			gasoline	2000	Not Reported
catering truck	Ford	TR53	gasoline	1978	220
catering truck	Olson		gasoline	1980	120
catering truck	Ford	TR53	gasoline	1981	220
catering truck	Ford	TR82	gasoline	1985	180
catering truck	Ford	TR82	gasoline	1985	180
catering truck	Ford	TR82	gasoline	1985	180
catering truck	Ford	TR82	gasoline	1985	180
catering truck	Ford	TR82	gasoline	1985	180
catering truck	Ford	TR82	gasoline	1988	180
catering truck	Ford	TR82	gasoline	1988	180
catering truck	Ford	TR82	gasoline	1988	180

catering truck	HI-WAY	F700/A5820	gasoline	1989	Not Reported
catering truck	Ford	TR86	gasoline	1989	18:
catering truck	HI-WAY	F700/A5820	gasoline	1989	Not Reported
catering truck	Ford	TR86	gasoline	1989	18:
catering truck	HI-WAY	F700/A5816	gasoline	1989	Not Reported
catering truck	FORD	HIWAY	gasoline	1992	Not Reported
catering truck	FORD	F700	gasoline	1997	Not Reported
catering truck	HI-WAY	A58-16CS	gasoline	2000	Not Reported
catering truck	HI-WAY	A58-16CS	gasoline	2000	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	Not Reported	Not Reported
deicer			diesel	1989	17:
deicer			diesel	1989	17:
deicer	PREMIER	MT3512	diesel	1996	3:
deicer	PREMIER	MT3512	diesel	1996	17:
deicer	Ford	TR62 rear	gasoline	1976	10:
deicer	Ford	TR62 rear	gasoline	1976	10:
deicer	Ford	TR62	gasoline	1976	19:
deicer	Ford	TR62 rear	gasoline	1976	10:
deicer	Ford	TR62	gasoline	1976	19:
deicer	Ford	TR62 rear	gasoline	1976	10:
deicer	Ford	TR62	gasoline	1976	19:
deicer	Ford	TR62	gasoline	1976	19:
deicer	FMC	IM1800-Type 2	gasoline	Not Reported	Not Reported
deicer			gasoline	Not Reported	Not Reported
deicer	SMALL	SMALL RIDER	gasoline	Not Reported	1:
deicer	TRUMP	JB-GPM	gasoline	Not Reported	10:
deicer			gasoline	Not Reported	Not Reported
deicer	FMC	36-2H1000/336-H1000	gasoline	Not Reported	10:
deicer	TRUMP		gasoline	1987	9:
deicer	FORD/TRUMP	DD1000	gasoline	1987	Not Reported
deicer	Ford	TR62 rear	gasoline	1988	10:
deicer	Ford	TR62	gasoline	1988	19:
deicer	Ford	TR62	gasoline	1988	19:
deicer	Ford	TR62	gasoline	1988	19:
deicer	Ford	TR62 rear	gasoline	1988	10:
deicer	Ford	TR62	gasoline	1988	19:
deicer	Ford	TR62	gasoline	1988	19:







fork lift	TOYOTA	2FBE15	gasoline	1991	Not Reported
fork lift	TOYOTA	42-5FD25	gasoline	1992	Not Reported
fork lift	TOYOTA	02-5FD25	gasoline	1992	Not Reported
fork lift	TOYOTA	02-5FD25	gasoline	1992	Not Reported
fork lift			gasoline	1992	6:
fork lift	TOYOTA	02-5FD25	gasoline	1992	Not Reported
fork lift	TOYOTA	02-5FD35 D	gasoline	1992	Not Reported
fork lift	TOYOTA	4S-SFG25	gasoline	1992	Not Reported
fork lift			gasoline	1992	6:
fork lift			gasoline	1992	6:
fork lift			gasoline	1992	6:
fork lift	TOYOTA	42-5FG25	gasoline	1992	Not Reported
fork lift	RAYMOND	152-OPC30T	gasoline	1993	Not Reported
fork lift	CARDINAL		gasoline	1994	8:
fork lift			gasoline	2000	Not Reported
fork lift			LPG/CNG	Not Reported	Not Reported
fork lift	ALLMAND		LPG/CNG	1985	4:
fork lift			LPG/CNG	Not Reported	Not Reported
fork lift			LPG/CNG	Not Reported	Not Reported
fork lift	CATERPILLAR	T50C,T50E	LPG/CNG	1985	Not Reported
fork lift			LPG/CNG	1988	14:
fork lift			LPG/CNG	1988	14:
fork lift			LPG/CNG	1988	14:
fork lift	CATERPILLAR	V50D	LPG/CNG	1992	Not Reported
fork lift	CATERPILLAR	V50D	LPG/CNG	1992	Not Reported
fork lift	CATERPILLAR	T40D	LPG/CNG	1992	Not Reported
fork lift	CATERPILLAR	VC60D	LPG/CNG	1992	Not Reported
fork lift	CATERPILLAR	T40D	LPG/CNG	1992	Not Reported
fork lift	CATERPILLAR	T40D	LPG/CNG	1992	Not Reported
fork lift	CATERPILLAR	T40D	LPG/CNG	1992	Not Reported
fork lift	CATERPILLAR	VC60D	LPG/CNG	1992	Not Reported
fork lift	CATERPILLAR	VC60D	LPG/CNG	1992	Not Reported
fork lift	CATERPILLAR	VC60D	LPG/CNG	1992	Not Reported
fork lift	CATERPILLAR	T40D	LPG/CNG	1992	Not Reported
fork lift	CATERPILLAR	VC60D	LPG/CNG	1992	Not Reported
fork lift	CATERPILLAR	GP25	LPG/CNG	1996	Not Reported
fuel truck	CHEVY		diesel	1976	21:
fuel truck			diesel	Not Reported	Not Reported
fuel truck			diesel	Not Reported	Not Reported
fuel truck			diesel	Not Reported	Not Reported
fuel truck			gasoline	1970	9:
fuel truck			gasoline	1971	20:
fuel truck	Ford	TR77	gasoline	1978	18:
fuel truck	Ford	TR77	gasoline	1978	18:
fuel truck	Ford	TR77	gasoline	1985	18:
generator			diesel	1962	20:
generator	Stewart Stevens	GE09	diesel	1970	20:
generator	LISTER C	FRAME 280	diesel	1971	Not Reported
generator			diesel	Not Reported	Not Reported
generator			diesel	Not Reported	Not Reported



generator	TRILECTRON	90T400	diesel	1999	Not Reported
generator			diesel	2000	Not Reported
generator			diesel	2000	Not Reported
ground power unit Hobart		60G20S	diesel	1980	Not Reported
ground power unit			diesel	1983	200
ground power unit			diesel	1983	200
ground power unit			diesel	1983	200
ground power unit			diesel	1983	200
ground power unit			diesel	1983	200
ground power unit HOBART			diesel	1984	160
ground power unit S&S			diesel	1984	160
ground power unit HOBART			diesel	1984	160
ground power unit Hobart		90G20P	diesel	1985	120
ground power unit HOBART		90D20P	diesel	1988	180
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	100
ground power unit			diesel	Not Reported	Not Reported
ground power unit HOBART		90D20P	diesel	1989	180
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit S&S			diesel	1989	150
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit			diesel	Not Reported	Not Reported
ground power unit S&S			diesel	1991	150

lavatory cart			gasoline	1985	10
lavatory cart			gasoline	1989	10
lavatory cart			gasoline	1991	4
lavatory cart			gasoline	1991	10
lavatory cart			gasoline	1991	10
lavatory cart			gasoline	1991	10
lavatory cart			gasoline	1991	10
lavatory cart			gasoline	1992	Not Reported
lavatory cart	STINAR	SLC742AC	gasoline	1994	Not Reported
lavatory cart			gasoline	Not Reported	Not Reported
lavatory truck	Wollard/Ford	TLS770	gasoline	1980	Not Reported
lavatory truck	STINAR	SLS350	gasoline	1984	Not Reported
lavatory truck			gasoline	1985	Not Reported
lavatory truck	STINAR	OST350	gasoline	1986	Not Reported
lavatory truck	STINAR	OST-350	gasoline	1986	Not Reported
lavatory truck	STINAR	SLS350	gasoline	1988	Not Reported
lavatory truck	STINAR	SLS350	gasoline	1989	Not Reported
lavatory truck	STINAR	SLS350	gasoline	1990	Not Reported
lavatory truck	STINAR	SLS350	gasoline	1990	Not Reported
lavatory truck	STINAR	SLS350	gasoline	1990	Not Reported
lavatory truck	STINAR	SLS350	gasoline	1990	Not Reported
lavatory truck	STINAR	SLS350	gasoline	1990	Not Reported
lavatory truck	Ford	TR64	gasoline	1991	12!
lavatory truck	STINAR	SLS350	gasoline	1991	Not Reported
lavatory truck	Ford	TR64	gasoline	1991	12!
lavatory truck	STINAR	SLS350	gasoline	1991	Not Reported
lavatory truck	Ford	TR64	gasoline	1991	12!
lavatory truck	STINAR	SLS350	gasoline	1991	Not Reported
lavatory truck	Ford	TR64	gasoline	1991	12!
lavatory truck	Ford	TR64	gasoline	1991	12!
lavatory truck	STINAR	SLS350	gasoline	1992	Not Reported
lavatory truck	STINAR	SLS350	gasoline	1996	Not Reported
lavatory truck	WOLLARD	TLS-770	gasoline	1997	Not Reported
lavatory truck	WOLLARD/HOBART	TLS-770	gasoline	1997	Not Reported
lavatory truck	WOLLARD	TLS-770	gasoline	1997	Not Reported
lavatory truck	WOLLARD/HOBART	TLS-770	gasoline	1997	Not Reported
lavatory truck	WOLLARD	TLS-770	gasoline	1997	Not Reported
lavatory truck	WOLLARD	TLS-770	gasoline	1997	Not Reported
lavatory truck	WOLLARD	TLS-770	gasoline	1997	Not Reported
lavatory truck	WOLLARD	TLS-770	gasoline	1997	Not Reported
lavatory truck	WOLLARD	TLS-770	gasoline	1997	Not Reported
lavatory truck	WOLLARD/HOBART	TLS-770	gasoline	1997	Not Reported
lavatory truck	DEVTEC/NORDCO		gasoline	1998	Not Reported
lavatory truck	DEVTEC/NORDCO		gasoline	1998	Not Reported
lavatory truck	DEVTEC/NORDCO		gasoline	1998	Not Reported
lavatory truck	DEVTEC/NORDCO		gasoline	1998	Not Reported
lavatory truck	DEVTEC/NORDCO		gasoline	1998	Not Reported
lavatory truck	DEVTEC/NORDCO	LOW PROFILE LAV TRUCK	gasoline	1999	Not Reported
lavatory truck	DEVTEC/NORDCO	LOW PROFILE LAV TRUCK	gasoline	1999	Not Reported

lavatory truck	DEVTEC/NORDCO	LOW PROFILE LAV TRUCK	gasoline	1999	Not Reported
lavatory truck			gasoline	2000	Not Reported
lavatory truck			F350 gasoline	2000	Not Reported
lift			diesel	Not Reported	Not Reported
lift			diesel	Not Reported	Not Reported
lift	Ford	TR87	diesel	1989	58
lift	Ford	TR87	diesel	1989	58
lift	Ford	TR87	diesel	1989	58
lift	Ford	TR87	diesel	1990	58
lift	Ford	TR87	diesel	1990	58
lift	WOLLARD	TML-704	diesel	1990	58
lift	Grove		diesel	1990	210
lift	Ford	TR87	diesel	1990	58
lift	Ford	TR92	diesel	1991	178
lift	Ford	TR92	diesel	1991	178
lift	Ford	TR92	diesel	1991	178
lift	SELMA	27AS	gasoline	1970	Not Reported
lift	SELMA	31AS	gasoline	1970	Not Reported
lift	FULTON	40-45A	gasoline	1973	Not Reported
lift	AMERICAN	201	gasoline	1974	Not Reported
lift	AMERICAN	201	gasoline	1974	Not Reported
lift			gasoline	1977	208
lift	FULTON	UNKNOWN	gasoline	1984	Not Reported
lift	MARK IND	SRT31G	gasoline	1984	Not Reported
lift	MARK IND	SRT31G	gasoline	1984	Not Reported
lift	MITE-E-LIFT	SP19-15	gasoline	1985	Not Reported
lift	LIFT-A-LOFT	SP19-15	gasoline	1985	Not Reported
lift	LIFT-A-LOFT	SP19-15	gasoline	1985	Not Reported
lift	LIFT-A-LOFT	SP19-15	gasoline	1985	Not Reported
lift	MITE-E-LIFT	SP19-15	gasoline	1985	Not Reported
lift	Ford	TR76	gasoline	1986	108
lift	NORDCO	6008	gasoline	1986	Not Reported
lift			gasoline	Not Reported	Not Reported
lift			gasoline	Not Reported	Not Reported
lift	Ford	TR76	gasoline	1986	108
lift	NORDCO	5008-60	gasoline	1986	Not Reported
lift	Ford	TR76	gasoline	1986	108
lift	NORDCO	6008	gasoline	1986	Not Reported
lift			gasoline	Not Reported	Not Reported
lift	CALAVAR	43	gasoline	1987	Not Reported
lift	Ford	TR76	gasoline	1988	108
lift	Ford	TR81	gasoline	1988	180
lift	Ford	TR76	gasoline	1988	108
lift	Ford	TR76	gasoline	1988	108
lift	Ford	TR81	gasoline	1988	180
lift	Ford	TR69	gasoline	1989	180
lift	Ford	TR69	gasoline	1989	180
lift	Ford	TR81	gasoline	1989	180
lift	Ford	TR69	gasoline	1989	180
lift	Ford	TR69	gasoline	1990	180

lift	GENIE	V18/32	gasoline	1990	Not Reported
lift	WASP		gasoline	1990	160
lift	Ford	TR69	gasoline	1990	180
lift	AMER-LIF	SL-A27	gasoline	1992	Not Reported
lift	WOLLARD	TML704	gasoline	1992	Not Reported
lift	WORKFORC	XLT2400	gasoline	1992	Not Reported
lift	LIFT-A-LOFT	SP19-15	gasoline	1992	Not Reported
lift	HOBART	TML704	gasoline	1992	Not Reported
lift	AMER-LIF	2032	gasoline	1992	Not Reported
lift	SNORKEL	ATB-60	gasoline	1992	Not Reported
lift	WOLLARD	TML704	gasoline	1992	Not Reported
lift	WOLLARD	TML704	gasoline	1992	Not Reported
lift	HOBART	TML704	gasoline	1992	Not Reported
lift	LIFT-A-LOFT	SP19-15	gasoline	1992	Not Reported
lift	AMER-LIF	20-46	gasoline	1992	Not Reported
lift	AMER-LIF	SL-A27	gasoline	1992	Not Reported
lift	LIFT-A-LOFT	MCL300-4	gasoline	1992	Not Reported
lift	AMER-LIF	20-46	gasoline	1992	Not Reported
lift	SKYJACK	3220	gasoline	1992	Not Reported
lift	SNORKEL	ATB-60	gasoline	1992	Not Reported
lift	WOLLARD	TML704	gasoline	1992	Not Reported
lift	LIFT-A-LOFT	SP19-15	gasoline	1992	Not Reported
lift	HOBART	TML704	gasoline	1992	Not Reported
lift	LIFT-A-LOFT	SP19-15	gasoline	1992	Not Reported
lift	SNORKLELIFT		gasoline	1994	90
lift	HIGHWAY		gasoline	1994	50
lift	LIFT-A-LOFT		gasoline	1997	Not Reported
lift	LIFT-A-LOFT		gasoline	1997	Not Reported
lift	LIFT-A-LOFT	SPW24-7.5	gasoline	1998	Not Reported
lift	LIFT-A-LOFT	SPW24-7.5	gasoline	1998	Not Reported
lift	LIFT-A-LOFT	24 FT SCISSOR	gasoline	1998	Not Reported
lift	LIFT-A-LOFT	SPW24-7.5	gasoline	1998	Not Reported
lift	LIFT-A-LOFT	SPW24-7.5	gasoline	1998	Not Reported
lift			gasoline	1999	Not Reported
lift	INTERNATIONAL	ECG-4-85 85 FT	gasoline	1999	Not Reported
		A E R I A L			
		PLATFORM			
lift			gasoline	2000	Not Reported
lift			gasoline	2000	Not Reported
lift			gasoline	2000	Not Reported
lift			gasoline	2000	Not Reported
lift			gasoline	2000	Not Reported
lift			gasoline	2000	Not Reported
lift			gasoline	2000	Not Reported
lift			gasoline	2000	Not Reported
lift			LPG/CNG	1969	130
other			diesel	1981	100
other			diesel	1983	170
other			diesel	1983	170
other			diesel	Not Reported	Not Reported





other	FORD	CLUG WAGON	gasoline	1990	Not Reported
other	FORD		gasoline	1990	Not Reported
other	FORD	E250	gasoline	1990	Not Reported
other	FORD	EXPLORER	gasoline	1991	Not Reported
other	ONAN	12DJC L188	gasoline	1991	Not Reported
other	FORD	E150	gasoline	1991	Not Reported
other	FORD	EXPLORER	gasoline	1991	Not Reported
other			gasoline	1991	20!
other	FORD	EXPLORER	gasoline	1991	Not Reported
other	FORD	EXPLORER	gasoline	1991	Not Reported
other	TENNANT	1480	gasoline	1992	Not Reported
other			gasoline	1992	Not Reported
other	FORD	CLUB WAGON	gasoline	1992	Not Reported
other	TENNANT	1480	gasoline	1992	Not Reported
other	FORD	EXPLORER	gasoline	1992	Not Reported
other	TENNANT	1480	gasoline	1992	Not Reported
other			gasoline	1992	20!
other	TENNANT	480EE	gasoline	1992	Not Reported
other	TENNANT	1480	gasoline	1992	Not Reported
other	FORD	EXPLORER	gasoline	1992	Not Reported
other	FORD	CLUB WAGON	gasoline	1992	Not Reported
other	FORD	E350	gasoline	1992	Not Reported
other	TENNANT	1480	gasoline	1992	Not Reported
other			gasoline	1992	Not Reported
other	GM	C6H042	gasoline	1992	Not Reported
other	FORD	E350	gasoline	1992	Not Reported
other	FORD	EXPLORER	gasoline	1992	Not Reported
other	HI-WAY	E2020	gasoline	1992	Not Reported
other	TENNANT	1480	gasoline	1992	Not Reported
other			gasoline	1993	20!
other	FORD	CLUG WAGON	gasoline	1993	Not Reported
other	FORD	EXPLORER	gasoline	1993	Not Reported
other	FORD	EXPLORER	gasoline	1993	Not Reported
other	FORD	EXPLORER	gasoline	1993	Not Reported
other	FORD	CLUG WAGON	gasoline	1993	Not Reported
other	FORD	AEROSTAR	gasoline	1993	Not Reported
other	FORD	EXPLORER	gasoline	1993	Not Reported
other			gasoline	1994	20!
other	FORD	E350	gasoline	1994	Not Reported
other	FORD	E350	gasoline	1995	Not Reported
Other	FORD		gasoline	1995	8!
other	FORD	E350	gasoline	1995	Not Reported
Other	FORD		gasoline	1995	9!
Other	FORD		gasoline	1995	9!
other			gasoline	1996	20!
other	FORD	ECONOLINE	gasoline	1996	Not Reported
other			gasoline	1996	19!
other	FORD	CLUB VAN	gasoline	1996	16!
other	DODGE/CHRYSLER/PL YMOOUTH	CARAVAN	gasoline	1996	Not Reported
other	GRACO	231133	gasoline	1996	Not Reported

other			gasoline	1997	199
other	DODGE/CHRYSLER/PL DODGE CARAVAN		gasoline	1997	Not Reported
	YMOOUTH				
other	FORD	E150	gasoline	1997	Not Reported
other			gasoline	1998	Not Reported
other	E-Z-GO		gasoline	1999	Not Reported
other	Ford		gasoline	1999	12%
other	Ford		gasoline	1999	22%
other	E-Z-GO		gasoline	1999	Not Reported
other			gasoline	1999	Not Reported
other	Ford		gasoline	1999	12%
other	E-Z-GO		gasoline	1999	Not Reported
other	Ford		gasoline	1999	22%
other	E-Z-GO		gasoline	1999	Not Reported
other	E-Z-GO		gasoline	1999	Not Reported
other	E-Z-GO		gasoline	1999	Not Reported
other	E-Z-GO	WORKHORSE	gasoline	1999	Not Reported
other	FORD	E150 CARGOVAN	gasoline	1999	Not Reported
other	E-Z-GO		gasoline	1999	Not Reported
other	Ford		gasoline	1999	12%
other	Ford		gasoline	1999	22%
other	E-Z-GO		gasoline	1999	Not Reported
other	Ford		gasoline	1999	12%
other	Ford		gasoline	1999	22%
other	FORD	E150 CARGOVAN	gasoline	1999	Not Reported
other	Ford		gasoline	1999	22%
other			gasoline	1999	Not Reported
other	Ford		gasoline	1999	12%
other	E-Z-GO		gasoline	1999	Not Reported
other	Ford		gasoline	1999	12%
other	Ford		gasoline	1999	22%
other	Ford		gasoline	1999	12%
other	Ford		gasoline	1999	12%
other	E-Z-GO		gasoline	1999	Not Reported
other	Ford		gasoline	1999	22%
other	DODGE/CHRYSLER/PL TRANSITVAN		gasoline	1999	Not Reported
	YMOOUTH				
other	E-Z-GO		gasoline	1999	Not Reported
other	E-Z-GO		gasoline	1999	Not Reported
other	Ford		gasoline	1999	22%
other	E-Z-GO		gasoline	1999	Not Reported
other	Ford		gasoline	1999	12%
other	E-Z-GO		gasoline	1999	Not Reported
other	E-Z-GO		gasoline	1999	Not Reported
other	Ford		gasoline	1999	22%
other	Ford		gasoline	1999	12%
other			gasoline	2000	Not Reported
other			gasoline	2000	Not Reported
other			gasoline	2000	Not Reported
passenger stand		MS09	diesel	1989	5%
passenger stand		MS09	diesel	1989	5%

passenger stand			MS09 diesel	1991	58
passenger stand	WOLLARD		gasoline	1985	Not Reported
passenger stand	Wollard	MLPH307	gasoline	1985	Not Reported
passenger stand	WOLLARD	MLPH-309	gasoline	1987	Not Reported
passenger stand	WOLLARD	MLPH-309	gasoline	1988	Not Reported
passenger stand	WOLLARD	MLPH-309	gasoline	1988	Not Reported
passenger stand	WOLLARD	TLPH252SMT	gasoline	1989	Not Reported
passenger stand	FORD	F350	gasoline	1989	Not Reported
passenger stand			MS03 gasoline	1989	200
passenger stand			MS03 gasoline	1991	200
passenger stand	WOLLARD	TLPH252SMT	gasoline	1991	Not Reported
passenger stand	WOLLARD	TLPH252SMT	gasoline	1992	Not Reported
passenger stand			gasoline	2000	Not Reported
passenger stand	CHARLATTE		gasoline	2000	Not Reported
service truck	Detroit		diesel	1982	100
service truck	Detroit	F600	diesel	Not Reported	100
service truck			diesel	Not Reported	Not Reported
service truck	Cummins		diesel	Not Reported	100
service truck			diesel	Not Reported	Not Reported
service truck			diesel	Not Reported	Not Reported
service truck			diesel	Not Reported	Not Reported
service truck			diesel	Not Reported	Not Reported
service truck			diesel	Not Reported	Not Reported
service truck			diesel	Not Reported	Not Reported
service truck	FORD	F800	diesel	1985	Not Reported
service truck	FORD	F800	diesel	1985	Not Reported
service truck	FORD	F800	diesel	1985	Not Reported
service truck	Cummins		diesel	1986	100
service truck	Cummins		diesel	1986	100
service truck	Ford	F700	diesel	1989	170
service truck	FORD	F800	diesel	1989	Not Reported
service truck	Mitsubishi		diesel	1992	150
service truck	Mitsubishi		diesel	1992	150
service truck	Ford	F700	diesel	1993	170
service truck			diesel	2000	Not Reported
service truck			diesel	2000	Not Reported
service truck			diesel	2000	Not Reported
service truck			diesel	2000	Not Reported
service truck			diesel	2000	Not Reported
service truck			diesel	2000	Not Reported
service truck	TRUMP	F700	gasoline	1971	Not Reported
service truck	TAYLOR-DUNN	1248-B	gasoline	1976	Not Reported
service truck	FORD	F150	gasoline	1976	Not Reported
service truck	GM	CE60	gasoline	1979	Not Reported
service truck	CHEVY		gasoline	1980	90
service truck	YAMAHA	G1A	gasoline	1981	Not Reported
service truck	FORD		gasoline	1982	90
service truck	CHEVY		gasoline	1982	90

service truck	FORD	RANGER	gasoline	1982	Not Reported
service truck	FORD		gasoline	1982	9!
service truck	FORD		gasoline	1982	9!
service truck	PARGO	952	gasoline	1983	Not Reported
service truck	PARGO	952	gasoline	1983	Not Reported
service truck	GM	CC20903	gasoline	1983	Not Reported
service truck	PARGO	952	gasoline	1983	Not Reported
service truck	PARGO	952	gasoline	1983	Not Reported
service truck			gasoline	1983	Not Reported
service truck	PARGO	952	gasoline	1983	Not Reported
service truck	GM	UNK	gasoline	1984	Not Reported
service truck	FORD		gasoline	Not Reported	9!
service truck	FORD		gasoline	Not Reported	9!
service truck	FORD		gasoline	Not Reported	9!
service truck	FORD		gasoline	Not Reported	9!
service truck	FORD	F350	gasoline	1985	Not Reported
service truck	PARGO	P4-04	gasoline	1985	Not Reported
service truck	FORD	F800	gasoline	1985	Not Reported
service truck	NORDCO	5008-60	gasoline	1986	Not Reported
service truck	GM	SILVERADO	gasoline	1986	Not Reported
service truck	FORD	RANGER	gasoline	1986	Not Reported
service truck	CLUB CAR	CARRYALL 2	gasoline	1986	Not Reported
service truck	FORD	RANGER	gasoline	1986	Not Reported
service truck	CLUB CAR	CARRYALL 2	gasoline	1986	Not Reported
service truck	FORD	RANGER	gasoline	1986	Not Reported
service truck	CUSHMAN	898335-871	gasoline	1987	Not Reported
service truck	MOORE	F700	gasoline	1987	Not Reported
service truck			gasoline	1987	Not Reported
service truck	CUSHMAN	898335-871	gasoline	1987	Not Reported
service truck	CUSHMAN	898335-871	gasoline	1987	Not Reported
service truck	GM	CS10603	gasoline	1988	Not Reported
service truck	YAMAHA	G1-AM	gasoline	1988	Not Reported
service truck	FORD	RANGER	gasoline	1988	Not Reported
service truck	GM	30	gasoline	1988	Not Reported
service truck	GM	1500	gasoline	1988	Not Reported
service truck	FORD	F150	gasoline	1989	Not Reported
service truck	GM	700R4	gasoline	1989	Not Reported
service truck	HI-WAY	F700/A5816	gasoline	1989	Not Reported
service truck	FORD	F150	gasoline	1989	Not Reported
service truck	GMC	TC20903PK	gasoline	1989	130
service truck	HI-WAY	F700/A5820	gasoline	1989	Not Reported
service truck	FORD	RANGER	gasoline	1989	Not Reported
service truck	HI-WAY	F700/A5820	gasoline	1989	Not Reported
service truck	FORD		gasoline	1989	9!
service truck	FORD	F250	gasoline	1989	Not Reported
service truck	FORD	F250	gasoline	1989	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	FORD	RANGER	gasoline	1990	Not Reported
service truck	TAYLOR-DUNN	R6-80	gasoline	1990	Not Reported

service truck	FORD	F350	gasoline	1990	Not Reported
service truck	FORD	RANGER	gasoline	1990	Not Reported
service truck	FORD	RANGER	gasoline	1990	Not Reported
service truck	FORD	RANGER	gasoline	1990	Not Reported
service truck	FORD	F150	gasoline	1990	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	FORD	F150	gasoline	1990	Not Reported
service truck	TAYLOR-DUNN	R6-80	gasoline	1990	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	FD/HIWAY	F700	gasoline	1990	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	FORD	F700	gasoline	1990	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1990	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	FORD	RANGER	gasoline	1990	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	TAYLOR-DUNN	R6-80	gasoline	1990	Not Reported
service truck	FORD	RANGER	gasoline	1990	Not Reported
service truck	FORD	F350	gasoline	1990	Not Reported
service truck	E-Z-GO	XI875P	gasoline	1991	Not Reported
service truck	E-Z-GO	XI875P	gasoline	1991	Not Reported
service truck	E-Z-GO	GXI-804	gasoline	1991	Not Reported
service truck	FORD	F150	gasoline	1991	Not Reported
service truck	E-Z-GO	XI875P	gasoline	1991	Not Reported
service truck	FORD	RANGER	gasoline	1991	Not Reported
service truck	FORD	RANGER	gasoline	1991	Not Reported
service truck	FORD	RANGER	gasoline	1991	Not Reported
service truck	FORD	F150	gasoline	1991	Not Reported
service truck	TAYLOR-DUNN	R6-80	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	GM	1500	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	R6-80	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	E-Z-GO	GXI-804	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	R6-80	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	E-Z-GO	GXI-804	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	FORD	MH20X30	gasoline	1992	Not Reported

service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	FORD	RANGER	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	R6-80	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	E-Z-GO	GXI-804	gasoline	1992	Not Reported
service truck	E-Z-GO	GXI-804	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	R6-80	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	GM	1500	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	R6-80	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	GM	C6H042	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	FORD	F350	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	HI-WAY	D29-16	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	R6-80	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	GM	2500	gasoline	1992	Not Reported
service truck	E-Z-GO	GXI-804	gasoline	1992	Not Reported
service truck	GM	S10	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	R6-80	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	R6-80	gasoline	1992	Not Reported
service truck	TAYLOR-DUNN	B6-10	gasoline	1992	Not Reported
service truck	FORD	F150	gasoline	1993	Not Reported
service truck	FORD	RANGER	gasoline	1993	Not Reported
service truck	FORD	F150	gasoline	1993	Not Reported
service truck	FORD	RANGER	gasoline	1993	Not Reported
service truck	FORD	F150	gasoline	1993	Not Reported
service truck	FORD	RANGER	gasoline	1993	Not Reported
service truck	FORD	F150	gasoline	1993	Not Reported
service truck	FORD	R10 XLT	gasoline	1994	Not Reported
service truck	FORD	F250	gasoline	1994	Not Reported
service truck	FORD	F250	gasoline	1994	Not Reported
service truck	FORD	R10	gasoline	1994	Not Reported
service truck	FORD	RANGER	gasoline	1994	Not Reported

service truck	GMC		gasoline	1994	9/
service truck	GMC		gasoline	1994	9/
service truck	FORD	RANGER	gasoline	1994	Not Reported
service truck	GMC		gasoline	1994	9/
service truck	FORD	F350	gasoline	1995	Not Reported
service truck	FORD	F350	gasoline	1995	Not Reported
service truck	FORD	RANGER	gasoline	1995	Not Reported
service truck	FORD		gasoline	1995	9/
service truck	FORD	RANGER	gasoline	1995	Not Reported
service truck	FORD	RANGER	gasoline	1995	Not Reported
service truck	E-Z-GO	GXI-804D	gasoline	1995	Not Reported
service truck	FORD	F250	gasoline	1995	Not Reported
service truck			APV-1 gasoline	1996	Not Reported
service truck	E-Z-GO	GXI-804D	gasoline	1996	Not Reported
service truck			gasoline	1996	Not Reported
service truck	E-Z-GO	GXI804D	gasoline	1996	Not Reported
service truck	FORD	F350	gasoline	1996	Not Reported
service truck	LIFT-A-LOFT	APV-1	gasoline	1996	Not Reported
service truck	FORD	F350	gasoline	1996	Not Reported
service truck	E-Z-GO	GXI-804D	gasoline	1996	Not Reported
service truck	FORD	F250	gasoline	1996	Not Reported
service truck	E-Z-GO	GXI-804D	gasoline	1996	Not Reported
service truck	E-Z-GO	GXI-804D	gasoline	1996	Not Reported
service truck	E-Z-GO	GXI-804D	gasoline	1996	Not Reported
service truck	FORD	F250	gasoline	1996	Not Reported
service truck	E-Z-GO	GXI804D	gasoline	1996	Not Reported
service truck	FORD	F350	gasoline	1996	Not Reported
service truck	E-Z-GO	GXI804D	gasoline	1996	Not Reported
service truck	E-Z-GO	GXI-804D	gasoline	1996	Not Reported
service truck	FORD	F250	gasoline	1997	Not Reported
service truck	FORD	RANGER	gasoline	1997	Not Reported
service truck	FORD	RANGER	gasoline	1997	Not Reported
service truck	FORD	F350	gasoline	1997	Not Reported
service truck	FORD	RANGER	gasoline	1997	Not Reported
service truck	LIFT-A-LOFT		gasoline	1997	Not Reported
service truck	FORD	RANGER	gasoline	1997	Not Reported
service truck	FORD	RANGER	gasoline	1998	Not Reported
service truck			gasoline	1998	Not Reported
service truck	FORD	RANGER	gasoline	1998	Not Reported
service truck	FORD	RANGER	gasoline	1998	Not Reported
service truck	FORD	RANGER	gasoline	1998	Not Reported
service truck	FORD	RANGER	gasoline	1998	Not Reported
service truck	FORD	RANGER	gasoline	1998	Not Reported
service truck	FORD	RANGER	gasoline	1999	Not Reported
service truck	FORD	F150	gasoline	1999	Not Reported
service truck	FORD	F350 QUICK TURN	gasoline	1999	Not Reported
service truck	FORD	RANGER	gasoline	1999	Not Reported
service truck	FORD	F150	gasoline	1999	Not Reported
service truck	FORD	F150	gasoline	1999	Not Reported
service truck	FORD	F350 QUICK TURN	gasoline	1999	Not Reported

service truck	FORD	F150	gasoline	1999	Not Reported
service truck			gasoline	1999	Not Reported
service truck			gasoline	1999	Not Reported
service truck	FORD	RANGER	gasoline	1999	Not Reported
service truck	FORD	F350 QUICK TURN	gasoline	1999	Not Reported
service truck			gasoline	1999	Not Reported
service truck		150 PPM	gasoline	2000	Not Reported
service truck			gasoline	2000	Not Reported
service truck			gasoline	2000	Not Reported
service truck			gasoline	2000	Not Reported
service truck		OST-350	gasoline	2000	Not Reported
service truck			gasoline	2000	Not Reported
service truck			gasoline	2000	Not Reported
service truck			gasoline	2000	Not Reported
service truck	GM	C10	LPG/CNG	1984	Not Reported
sweeper			diesel	Not Reported	Not Reported
sweeper			diesel	Not Reported	Not Reported
sweeper			diesel	Not Reported	Not Reported
sweeper			diesel	Not Reported	Not Reported
sweeper			diesel	Not Reported	Not Reported
sweeper			gasoline	Not Reported	Not Reported
sweeper			gasoline	Not Reported	Not Reported
sweeper	TENNANT	TENN 285	gasoline	1992	Not Reported
sweeper	TENNANT	TENN 285	gasoline	1992	Not Reported
sweeper			gasoline	2000	Not Reported
sweeper			gasoline	2000	Not Reported
water truck			diesel	Not Reported	Not Reported
water truck	Nordco/Ford	2199	gasoline	1979	Not Reported
water truck	Wollard/Ford	TWS402	gasoline	1980	Not Reported

# Amended Airport Emissions for the DFW Area

Sam Wells, Peter Ogbeide, Bill Gill  
23-Mar-00

## Step 1. Defining proportion of 4 commercial airports for GSE

1992-1993 LTO data

	Aircraft Operations	
Meacham	425	0.000703
Love	87855	0.145326
DFW	515385	0.852526
Alliance	874	0.001446
	604539	1

## Step 2. Sam's Default GSE Runs (for SCCs and CO)

	1996		
	Fuel VOC	NOX	CO
2265008005	gasoline 3.84	2.23	122.21
2267008005	LPG 0.00	0.06	0.22
2270008005	diesel 0.46	2.34	1.72
		4.30	4.63
			124.15

	2007		
	Fuel VOC	NOX	CO
2265008005	gasoline 3.94	2.36	125.91
2267008005	LPG 0.00	0.10	0.36
2270008005	diesel 0.41	2.46	1.10
		4.35	4.92
			127.37

## Step 3. ATA Inventory and Adjustment Factors

Total Emissions		VOC	NOX	CO
	1996	n/a	5.4	n/a
	2007	n/a	6.8	n/a
Adjustment Factor				
	1996	n/a	1.166307	n/a
	2007	n/a	1.382114	n/a

Step 4. Compute new airport GSE numbers

1996				
	Fuel	VOC	NOX	CO
2265008005	gasoline	4.48	2.60	142.53
2267008005	LPG	0.00	0.07	0.26
2270008005	diesel	0.54	2.73	2.01
			5.02	5.40
				144.80

2007				
	Fuel	VOC	NOX	CO
2265008005	gasoline	5.45	3.26	174.02
2267008005	LPG	0.00	0.14	0.50
2270008005	diesel	0.57	3.40	1.52
			6.01	6.80
				176.04

Step 5. Allocate to specific airports

A. Meacham

1996				
	Fuel	VOC	NOX	CO
2265008005	gasoline	0.00	0.00	0.10
2267008005	LPG	0.00	0.00	0.00
2270008005	diesel	0.00	0.00	0.00
			0.00	0.00
				0.10

2007				
	Fuel	VOC	NOX	CO
2265008005	gasoline	0.00	0.00	0.12
2267008005	LPG	0.00	0.00	0.00
2270008005	diesel	0.00	0.00	0.00
			0.00	0.00
				0.12

B. Love

1996				
	Fuel	VOC	NOX	CO
2265008005	gasoline	0.65	0.38	20.67
2267008005	LPG	0.00	0.01	0.04
2270008005	diesel	0.08	0.40	0.29
			0.73	0.78
				21.00

2007				
	Fuel	VOC	NOX	CO
2265008005	gasoline	0.79	0.47	25.23
2267008005	LPG	0.00	0.02	0.07
2270008005	diesel	0.08	0.49	0.22
			0.87	0.99
				25.53

**C. DFW International**

<b>1996</b>			
	<b>Fuel VOC</b>	<b>NOX</b>	<b>CO</b>
2265008005	gasoline 3.82	2.22	121.58
2267008005	LPG 0.00	0.06	0.22
2270008005	diesel 0.46	2.33	1.71
		4.28	4.61
			123.51

<b>2007</b>			
	<b>Fuel VOC</b>	<b>NOX</b>	<b>CO</b>
2265008005	gasoline 4.65	2.78	148.44
2267008005	LPG 0.00	0.12	0.42
2270008005	diesel 0.48	2.90	1.30
		5.13	5.80
			150.16

*D. Alliance*

<b>1996</b>			
	<b>Fuel VOC</b>	<b>NOX</b>	<b>CO</b>
2265008005	gasoline 0.00	0.00	0.14
2267008005	LPG 0.00	0.00	0.00
2270008005	diesel 0.00	0.00	0.00
		0.01	0.01
			0.14

<b>2007</b>			
	<b>Fuel VOC</b>	<b>NOX</b>	<b>CO</b>
2265008005	gasoline 0.01	0.00	0.17
2267008005	LPG 0.00	0.00	0.00
2270008005	diesel 0.00	0.00	0.00
		0.01	0.01
			0.18

*Step 6. Q/A - check 2007 total*

<b>VOC</b>	<b>NOX</b>	<b>CO</b>
6.01	6.80	175.99

*Step 7. Add shuttle bus EI to DFW International Airport*

	<b>VOC-TPY</b>	<b>NOX-TPY</b>	<b>CO-TYP</b>
223007033	rental shuttle 99.80	494.45	n/a
223007033	parking shuttle 27.70	137.20	n/a
223007033	employee bus 19.70	97.60	n/a
		147.20	729.25
			n/a
		<b>TPD</b>	<b>TPD</b>
223007033	total, TPD 0.40	2.00	1.34

# NONROAD INPUT FILE

Written by Nonroad interface at 3/16/2000 9:15:15 AM

This is the options file for the NONROAD program.

The data is sperated into "packets" bases on common information. Each packet is specified by an identifier and a terminator. Any notes or descriptions can be placed between the data packets.

---

## PERIOD PACKET

This is the packet that defines the period for which emissions are to be estimated. The order of the records matter. The selection of certain parameters will cause some of the record that follow to be ignored. The order of the records is as follows:

- 1 - Char 10 - Period type for this simulation.  
Valid responses are: ANNUAL, SEASONAL, and MONTHLY
- 2 - Char 10 - Type of inventory produced.  
Valid responses are: TYPICAL DAY and PERIOD TOTAL
- 3 - Integer - year of episode (4 digit year)
- 4 - Char 10 - Month of episode (use complete name of month)
- 5 - Char 10 - Type of day  
Valid responses are: WEEKDAY and WEEKEND

---

/PERIOD/

Period type : Seasonal  
Summation type : Typical day  
Year of episode : 1996  
Season of year : Summer  
Month of year :  
Weekday or weekend : Weekday  
/END/

---

## OPTIONS PACKET

This is the packet that defines some of the user options that drive the model. Most parameters are used to make episode specific emission factor adjustments. The order of the records is fixed. The order is as follows.

- 1 - Char 80 - First title on reports
- 2 - Char 80 - Second title on reports
- 3 - Real 10 - Fuel RVP of gasoline for this simulation
- 4 - Real 10 - Oxygen weight percent of gasoline for simulation
- 5 - Real 10 - Percent sulfur for gasoline
- 6 - Real 10 - Percent sulfur for diesel
- 7 - Real 10 - Percent sulfur for LPG/CNG
- 8 - Real 10 - Minimum daily temperature (deg. F)
- 9 - Real 10 - maximum daily temperature (deg. F)
- 10 - Real 10 - Representative average daily temperature (deg. F)
- 11 - Char 10 - Flag to determine if region is high altitude  
Valid responses are: HIGH and LOW
- 12 - Char 10 - Flag to determine if RFG adjustments are made  
Valid responses are: YES and NO

-----  
/OPTIONS/

Title 1 : GSE for DFW NAA  
Title 2 : Tx Total Used for DFW  
Fuel RVP for gas : 6.8  
Oxygen Weight % : 1.0  
Gas sulfur % : 0.034  
Diesel sulfur % : 0.330  
CNG/LPG sulfur % : 0.003  
Minimum temper. (F): 76  
Maximum temper. (F): 102  
Average temper. (F): 93  
Altitude of region : LOW  
/END/

-----  
**REGION PACKET**

This is the packet that defines the region for which emissions are to be estimated.

The first record tells the type of region and

allocation to perform.

Valid responses are:

US TOTAL - emissions are for entire USA without state  
breakout.

50STATE - emissions are for all 50 states  
and Washington D.C., by state.

STATE - emissions are for a select group of states  
and are state-level estimates

COUNTY - emissions are for a select group of counties  
and are county level estimates. If necessary,  
allocation from state to county will be performed.

SUBCOUNTY - emissions are for the specified sub counties  
and are subcounty level estimates. If necessary,  
county to subcounty allocation will be performed.

The remaining records define the regions to be included.  
The type of data which must be specified depends on the  
region level.

US TOTAL - Nothing needs to be specified. The FIPS  
code 00000 is used automatically.

50STATE - Nothing needs to be specified. The FIPS  
code 00000 is used automatically.

STATE - state FIPS codes

COUNTY - state or county FIPS codes. State FIPS  
code means include all counties in the  
state.

SUBCOUNTY - county FIPS code and subregion code.

-----  
/REGION/

Region Level : STATE

Texas : 48000

/END/

or use -  
Region Level : STATE  
Michigan : 26000

---

### SOURCE CATEGORY PACKET

This packet is used to tell the model which source categories are to be processed. It is optional. If used, only those source categories list will appear in the output data file. If the packet is not found, the model will process all source categories in the population files.

---

All Equipment - just put semicolon at start of packet name line  
or use the following SCC list -

:2260000000  
:2265000000  
:2267000000  
:2268000000  
:2270000000  
:2282000000  
:2285000000

Diesel Only -

:2270000000  
:2282020000  
:2285002015

Spark Ignition Only -

:2260000000  
:2265000000  
:2267000000  
:2268000000  
:2282005010  
:2282005015  
:2282010005  
:2285004015

---

This is the packet that lists the names of output files and some of the input data files read by the model. If a drive:\path\ is not given, the location of the NONROAD.EXE file itself is assumed. You will probably

want to change the names of the Output and Message files to match that of the OPTion file, e.g., MICH-97.OPT, MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.

-----  
/RUNFILES/  
ALLOC XREF : c:\nonroad\data\allocate\allocate.xrf  
ACTIVITY : c:\nonroad\data\activity\gse.dat  
TECHNOLOGY : c:\nonroad\data\tech\tech.dat  
SEASONALITY : c:\nonroad\data\season\season.dat  
REGIONS : c:\nonroad\data\season\season.dat  
MESSAGE : c:\nonroad\outputs\template.msg  
OUTPUT DATA : c:\nonroad\outputs\gse96.out  
EPS2 AMS :  
/END/

EPS2 AMS : c:\nonroad\outputs\eps1993.out

-----  
This is the packet that defines the equipment population files read by the model.

-----  
/POP FILES/  
Population File : c:\nonroad\data\pop\tx\_gse1.pop  
/END/

POPULATION FILE : c:\nonroad\data\POP\MI.POP

-----  
This is the packet that defines the growth files read by the model.

-----  
/GROWTH FILES/  
National defaults :C:\nonroad\data\growth\nation.grw  
/END/

-----  
This is the packet that defines the spatial allocation files read by the model.

-----  
/ALLOC FILES/  
RV Park employees :c:\nonroad\data\allocate\tx\_rvprk.alo  
Golf Course estab. :c:\nonroad\data\allocate\tx\_golf.alo

Air Transportation :c:\nonroad\data\allocate\tx\_airtr.alo  
Contruccion empl. :c:\nonroad\data\allocate\tx\_const.alo  
Havested Cropland :c:\nonroad\data\allocate\tx\_farms.alo  
Wholesale establis.:c:\nonroad\data\allocate\tx\_holsl.alo  
Family housing :c:\nonroad\data\allocate\tx\_house.alo  
Logging empl. :c:\nonroad\data\allocate\tx\_loggn.alo  
Landscape empl. :c:\nonroad\data\allocate\tx\_lscap.alo  
Metal mining empl. :c:\nonroad\data\allocate\tx\_metal.alo  
Manufacturing empl.:c:\nonroad\data\allocate\tx\_mnfg.alo  
Oil & Gas employees:c:\nonroad\data\allocate\tx\_oil.alo  
Census population :c:\nonroad\data\allocate\tx\_pop.alo  
Surface water area :c:\nonroad\data\allocate\tx\_water.alo  
/END/

-----  
This is the packet that defines the emssions factors  
files read by the model.  
-----

/EMFAC FILES/

THC exhaust :c:\nonroad\data\emsfac\exhthc.emf  
CO exhaust :c:\nonroad\data\emsfac\exhco.emf  
NOX exhaust :c:\nonroad\data\emsfac\exhnox.emf  
PM exhaust :c:\nonroad\data\emsfac\exhpm.emf  
BSFC :c:\nonroad\data\emsfac\bsfc.emf  
Crankcase :c:\nonroad\data\emsfac\crank.emf  
Spillage :c:\nonroad\data\emsfac\spillage.emf  
Diurnal :c:\nonroad\data\emsfac\diurnal.emf  
/END/

-----  
This is the packet that defines the deterioration factors  
files read by the model.  
-----

/DETERIORATE FILES/

THC exhaust :c:\nonroad\data\detfac\exhthc.det  
CO exhaust :c:\nonroad\data\detfac\exhco.det  
NOX exhaust :c:\nonroad\data\detfac\exhnox.det  
PM exhaust :c:\nonroad\data\detfac\exhpm.det  
/END/

Optional Packets - Add initial slash "/" to activate

/STAGE II/

Control Factor : 0

/END/

Enter percent control: 95 = 95% control = 0.05 x uncontrolled

Default should be zero control.

/MODELYEAR OUT/

by-model-year out : C:\nonroad\outputs\template.bmy

/END/

SI REPORT/

SI report file-CSV :C:\NONROAD\OUTPUTS\NRPOLLUT.CSV

/END/

/SOURCE CATEGORY/

:2260008000

:2265008000

:2267008000

:2268008000

:2270008000

/END/

