Appendix F

Excerpts from Connecticut's 2005 Draft Periodic Emission Inventory (PEI) for Ozone and Carbon Monoxide

- **Mobile Source: Aircraft Emissions (2005 PEI Section 3.4 excerpt)**
- **Mobile Source: Locomotive Emissions (2005 PEI Section 3.6 excerpt)**
- **Area Source: Residential, Commercial and Industrial Fuel Use (2005 PEI Section 4.5 excerpt)**

3.4 AIRCRAFT

Aircraft emissions were calculated using diverse databases along with other sources of information. 2005 CT DOT activity reports and Federal Aviation Administration (FAA) activity reports from the largest airports (those with FAA control towers) were considered where possible. However, Connecticut survey data collected using the form shown in Attachment F-1 generally provided aircraft specific LTOs and were considered to be of higher quality than other data sources. The airports in Connecticut having control towers are as follows.

- Bradley International Airport
- Danbury Municipal Airport
- Groton-New London Airport
- Hartford-Brainard Airport
- Igor I. Sikorsky Memorial Airport
- Tweed-New Haven Airport
- Waterbury-Oxford Airport

Table 3.4-1 provides a comparison between the Federal Aviation Administration's Terminal Area Forecast (TAF) Data and available survey data. The Terminal Area Forecast System is the official forecast of aviation activity at FAA facilities, which includes historical data (years 2004 and earlier) and future forecasts for the active airports in the National Plan of Integrated Airport System (NPIAS). This includes FAA towered airports, federally contracted towered airports, non-federal towered airports, and many non-towered airports. Airports that provided survey responses that had significantly different activity than reported in TAF were contacted to confirm appropriate LTO counts were used in the emissions estimates.

The Bureau used the FAA's Emission and Dispersion Modeling System (EDMS) version 4.5 software package to estimate emissions. In many cases the EDMS assigned a default engine to each type of aircraft, and each engine carried default emission factors. For exact survey response aircraft matches, the EDMS defaults were used. In other cases, research was required to assign the appropriate engine to the survey response. It is important to note that the engine assignment and not the specific aircraft model that defines the emission factors for each operating mode, multi-engine aircraft generate pollution at a proportional rate to the number of engines.

Because of the correlation between temperature and pollution production, an effort was made to seasonally adjust the LTOs at each airport. Annual, summer (Ozone season) and winter (CO season) aircraft specific LTO data were obtained from survey results. This enabled the Bureau to calculate seasonal emissions directly for these airports. Connecticut Department of Transportation inputs were obtained for airports that did not supply seasonal LTO information. Seasonal adjustments were calculated for hospital and non-hospital helicopters and for fixed wing aircraft. Non-hospital helicopters and aircraft had increased activity during the summer and lowest activity in the winter, while hospital helicopter LTOs approximated uniform activity year round.

The emission rates for aircraft vary at different stages (or modes) of each LTO cycle. The four LTO modes are Taxi/Idle-out/in, Takeoff, Climb out, and Approach. Each mode occurs for a fixed length of time depending on the category of aircraft (i.e., jumbo jet, helicopter, turboprop, etc.). The emission estimates used default time-in-mode values provided by the EDMS model. The EPA default assignment of 26 minutes for Taxi/Idle-out/in was applied to all airports, including Bradley International Airport.

Table 3.4-2A and 3.4-2B show how the aircraft make and model survey results reported to DEP were matched to the EDMS aircraft/engine model assignments. Table 3.4-2A shows a consolidation of survey responses into a single common aircraft make model, while Table 3.4-2B shows composite emission factors of pounds of pollutant per LTO. Table 3.4-2B also shows the reported survey LTO count for the stated aircraft makes and models. LTO's were apportioned when more than one EDMS aircraft/engine model combination was assigned to the survey aircraft make and model. Individual surveys and web-based sources, such as www.en.wikipedia.org ,www.risingup.com and www.airliners.net, were used and EDMS aircraft/engine emission estimates were reviewed to ensure reasonable assignments for the subject survey data.

When available, the default EDMS engine for the aircraft was used for the survey response. Otherwise, a weighted assignment of engines was used. A good example showing this situation is the aircraft model "ERJ-135" model survey response, which was applied equally to ten engine types having similar but not identical emission factors listed for the EDMS 4.5 "Embraer ERJ 135/140" aircraft.

Reviewing the table for more extreme examples, it is possible to assess a range of emission factors assigned to the survey results. Looking at the links to the EDMS options available for the survey response of "Beechjet" in the Table 3.4-2 of the 2002 Periodic Emissions Inventory Document, it was possible to see that both the Beechjet 400 and the Beechjet 400A are two engine airplanes assigned an EDMS engine model of "JT15D-5 (A & B)" with identical emission factors. Given that both options provide identical results, the percentage of LTOs assigned to each model would have no impact on calculated emissions, therefore in the processing of 2005 data the entries were combined to a single "Beechjet 400" listing. Consolidation of these similar survey responses are shown in Table 3.4-2A. The consolidation of numerous survey response aircraft make and models into a reduced set of aircraft make and models served to limit the size of Table 3.4-2B and to clarify interpretation of some of the inputs. For example the "Christian Eagle" was interpreted to be the "Christen Eagle" as the existence of a "Christian Eagle" could not be demonstrated. In contrast to airplane makes and models having the same emissions, a single aircraft could use many different engines having very different emission factors. The survey response of "C-135" presents an example of a single aircraft having a large range of emission factors. The survey response of "C-135" presents the largest range of emission factors for linked EDMS airplane makes and models due in part to it being a four-engine airplane. The minimum CO emission factor for "C-135" is 46.451 lb CO/ LTO for the "CFM56-2A SERIES" engine, while the maximum CO emission factor for "C-135" is 281.75 lb CO/ LTO for the "TF33-P-100" engine. In this "C-135" case, the percent applied for each link has an impact to calculated emissions. 6% was applied to the largest emission factor, while the balance of the percent applied to various emission factors that were lower than the maximum emission factor yielding a composite emission factor of 143.86 lb CO / LTO for "C-135". Clearly, the emission factor could vary from 46.451 lb CO/ LTO to 281.75 lb CO/ LTO depending upon the engines used on the "C-135" performing the LTOs. This largest range of emission factors was selected to illustrate the widest possible difference in emission factors for the purpose of illustrating how the use of different engines on an airplane can influence the emission factor. This difference is extreme as the next widest range of emission factors was less than half the range of this "C-135" example. The two examples presented above illustrate that different EDMS assignments choices available for airplanes may or may not impact emission factors linked to a survey response. Table 3.4-2B shows the range of emission factors linked to aircraft make and model groups extracted from survey responses. Table 3.4-2A is not limited to showing aircraft survey responses having similar emissions. Some consolidations in Table 3.4-2A combine engines having different emission factors that were derived on a similar percentage population weighting system, the "Robinson R-22 Helicopter" would serve as such an example, while other entries serve to clarify the interpretation of the survey input based on EDMS 4.5 or information obtained from web searches.

Table 3.4-2B also shows that the emission factor varies with engine model and number of engines on the airplane. When the number of engines cannot explain a difference in the presented emission factors for an engine model, it is usually due to the aircraft having different time-in-mode values. This is most pronounced when the same engine is used on helicopters and fixed wing aircraft.

Survey inputs that indicated an aircraft or aircraft engine combination that were not included in EDMS 4.5 were either added as a user defined aircraft or matched to a best available EDMS 4.5 entry or weighted combination EDMS 4.5 entries. User Defined aircraft can be identified in Table 3.4-2B as starting with two asterisks (i.e. **). **LifeStar (BK-117), **Robinson R-44, **Sikorsky S76, and **UH-1H Helicopter were User Defined aircraft added to the standard EDMS 4.5 aircraft options. The number of engine(s) and the associated engine are listed in Table 3.4-2B for these user defined aircraft.

Emissions were calculated using a methodology consistent with the 1992 Procedures for Emission Inventory Preparation Document[4]. The EDMS program returned emission estimates for each mode of operation. Internally, EDMS Mode 1 corresponds to approach, Mode 2 corresponds to climb out, Mode 3 corresponds to takeoff, and Mode 4 corresponds to idle. The emissions for each mode were combined to obtain a composite emission factor for each LTO, which when multiplied by the number of LTOs for a given period yields emission results for that period. The LTO seasonal adjustments and unit conversions were factored in the following equation.

$$E_{ij} = LTO_j \; x \; TIM_{jk} \; x \; FF_{jk} \; / \; 1000 \; x \; EI_{ijk} \; x \; Ne_j \; / \; P \; / \; CF$$

Where:

E_{ij}	=	Total emissions of pollutant i, in pounds per day or tons per year, produced by aircraft type j for all LTO cycles
LTO_j	=	Annual Landing and Take-Off Cycles for aircraft type j. (If summer or winter emissions were sought, seasonal LTO Cycles for aircraft type j were used when known or seasonal LTO Cycles for aircraft type j were calculated from seasonal adjustment factors when not directly available from survey data.)
TIM_{jk}	=	Time in mode for mode k, in minutes, for aircraft type j

FF_{jk}	=	Fuel flow for mode k, in pounds of fuel per minute, for each engine used on aircraft type j.
EI_{ijk}	=	Emission index for pollutant i, in pounds of pollutant per thousand pounds of fuel, in mode k for aircraft type j
1000	=	1000 pounds of fuel per thousand pounds of fuel conversion factor to balance the units of the equation (i.e. FF_{jk} is in units of pounds of fuel per minute and E_{ijk} is in units of pounds of pollutant per thousand pounds of fuel, dividing by 1000 lbs/thousand pounds of fuel balances the units of the equation).
Ne_j	=	Number of engines used on aircraft type j
P	=	Period which is 1 year if calculating annual emissions or is the number of days in Ozone or CO season if calculating a daily emission rate.
CF	=	Conversion factor for balancing units when annual emissions are calculated, which is 2000 for annual calculations and 1 for seasonal calculations. The units for the equation are pounds per day for seasonal input, but are not tons per year for annual input. Consequently, it is necessary to divide by 2000 pounds per ton to obtain the desired annual units of tons per year.

A sample calculation for CO emissions from Gulfstream II aircraft LTOs at Igor I. Sikorsky Memorial Airport in Fairfield County during the ozone season in 2005 was selected as an example, since it is powered by two engines (engine model is a Rolls Royce series SPEY MK511-8), which was included in Table 5-4 of the procedures document. This calculation cannot be matched to an output in Table 3.4-3, since Igor I. Sikorsky Memorial Airport has numerous other aircraft traffic. However, a discussion and information comparing the 1992 Procedures Document and EDMS emission results is presented to illustrate how the EMDS methodology is consistent with the 1992 Procedures.

TIM_{jk} for a Gulfstream II jet can be obtained from Commercial Carrier Jumbo, long and medium range jet row of the 1992 Procedures for Emission Inventory Preparation Document[4] Table 5-1 or via EDMS table AIR_CAT row XCJX and is also shown on the Engine Emissions Tab of the EDMS Aircraft Operations & Assignments Form). The Parameters needed to calculate emissions were obtained from the 1992 Procedures Document and EDMS and presented below. This exercise confirmed consistency between EDMS and the 1992 Procedures Document for the SPEY MK511-8 aircraft engine.

Mode	EDMS 4.2 Mode Number	Time in Mode (Min)	1992 Procedures Document Fuel Flow (lb/min)	EDMS 4.2 Fuel Flow converted from metric units from EDMS Table ENG_EI	1992 Procedures Document CO Emission Rate (lb/1000 lb)	EDMS 4.2 CO Emission Rate From Table ENG_EI
Takeoff	3	0.7	117.86 lb/min	117.86 lb/min	0.12	0.12
Climb out	2	2.2	96.03 lb/min	96.03 lb/min	0.63	0.63
Approach	1	4.0	36.77 lb/min	36.77 lb/min	2.65	2.65
Idle	4	26	16.80 lb/min	16.80 lb/min	31.77	31.77

A sample calculation for CO emissions from Gulfstream II LTOs at Igor I. Sikorsky Memorial Airport in Fairfield County during the ozone season in 2005 follows.

E_{ij} =	500 x	[(	0.7	x 117.86	/1000	x	0.12	x	2)	takeoff
		+ (	2.2	x 96.03	/1000	x	0.63	x	2)	climb out
		+ (	4.0	x 36.77	/1000	x	2.65	x	2)	approach
		+ (	26	x 16.80	/1000	x	31.77	x	2)] /91	taxi/idle

E_{ij} = 500 x [28.820] / 91 All modes combined

$$E_{ij} = 158.35 \frac{lbs}{day} CO$$

Table 3.4-2B presents EDMS composite LTO emission factors. The EDMS composite LTO CO emission factor for the Gulfstream II is 28.814 lb per LTO, which compares well with the 28.820 lb per LTO composite emission factor calculated above for all modes combined. EDMS was developed after 1992 and contains more engines and aircraft that contained in the 1992 Procedures Document.

TABLE 3.4-1

Comparison of TAF Database Airports Activity versus Survey Data

(Sorted by TAF Database Activity in Descending Order)

FAA Location ID	Airport Name	TAF 2005 LTO Estimate	2005 Survey Response
BDL	Bradley INTL Airport	78,580	78,985
HFD	Hartford Brainard	54,981	45,500
DXR	Danbury Municipal Airport	39,183	36,596
BDR	Igor Sikorsky Memorial	34,741	33,712
HVN	Tweed-New Haven	34,029	34,157
GON	Groton New London	31,004	28,942
4B8	Robertson Field	29,600	29,550
OXC	Waterbury Oxford	28,145	27,823
IJD	Windham	15,345	9,025
SNC (1)	Chester	10,400	2,410
5B3	Danielson	10,232	12,170
MMK	Meriden Markham Municipal	9,014	10,024
22B (2)	Mountain Meadow Airstrip	6,530	18
4B9	Simsbury	4,726	5,795
N04	Griswold	1,568	9,914

(1) Chester Airport was previously designated 3B9 but is now designated SNC.

(2) Mountain Meadows Airport closed prior to 2005 and was not contained in 2005 FAA listings or web based references other than the TAF database. Mountain Meadows was not licensed for activity in 2005 and is no longer open to aircraft other than helicopters.

TABLE 3.4-2A

Grouping Modifications Made to 2005 Aircraft Survey Responses

(Sorted by Modified Aircraft Make Model Name in Ascending Order)

Modified Aircraft Make Model Listed in Table 3.4-2	Survey Response Aircraft Make Model before Modification (Note that only modified names are listed)
Adam Jets	Jets Adam Jet
Aeronca 7AC	Aeronca Champ
	Mononca 7AC
AH1 Helicopter	Helicopter AH1
Avanti Jets	Jets Avanti
Aviat A1 Husky	Aviat A1A
	Aviat Aircraft Inc Husky A-1A
	Aviat Aircraft Inc Husky A-1B
B-727-200	B-727-200A
	B-727-200C
	B-727-200H
	B-727-2SH
	B-737-200
Beech B19 Sport	BEECHCRAFT BB19 MUSKETEER SPORT (1P)
Beech Bonanza	Beech 35
	Beech A-36
	Beech A36 IO-520
	Beech BE-33A
	Beech BE35 Bonanza
	Beech Bonanza 35
	Beech Bonanza U35A
	Beech C-33A IO-520
	Beech F33A
	Beech V-35B
	BEECHCRAFT B36T BONANZA (1T)
	BEECHCRAFT BE33 DEBONAIR/BONANZA (1P)
	BEECHCRAFT BE35 BONANZA (1P)
	BEECHCRAFT BE36 BONANZA (1P)
	Beechcraft Bonanza
	Bonanza’s
Beech King Air 100	BE-99
	Beech King Air 100 (PT6A-28)
	BEECHCRAFT BE10 KING AIR (2T)
	BEECHCRAFT BE99 AIRLINER (2T)
	BEECHCRAFT BE9L KING AIR (2T)
	BEECHCRAFT BE9T KING AIR (2T)
	Beechcraft Kingair F-90
Beech King Air 200	Beech King Air 200 (PT6A-41)

TABLE 3.4-2A

Grouping Modifications Made to 2005 Aircraft Survey Responses

(Sorted by Modified Aircraft Make Model Name in Ascending Order)

Modified Aircraft Make Model Listed in Table 3.4-2	Survey Response Aircraft Make Model before Modification (Note that only modified names are listed)
Beech King Air 300	Beech King Air 300 (PT6A-60, -60A, -60AG)
	BEECHCRAFT BE30 SUPER KING AIR (2T+)
Beech King Air 350	BEECHCRAFT B350 SUPER KING AIR (2T+)
Beech King Air B200	Beech B200 King Air
	BEECHCRAFT BE20 SUPER KING AIR (2T+)
Beech Queen Air	BEECHCRAFT BE65 QUEEN AIR (2P)
	BEECHCRAFT BE70 QUEEN AIR (2P)
	BEECHCRAFT BE80 QUEEN AIR (2P)
	BEECHCRAFT BE88 QUEEN AIR (2P)
Beechcraft 18	BEECHCRAFT BE18 TWIN BEECH (2P)
	Beechcraft D 18
Beechcraft 1900	Beech 1900
	BEECHCRAFT B190 1900 (2T)
Beechcraft Baron	Barons
	BE-58
	Beech B-55
	Beech Baron
	Beech Baron BE55
	Beech BE55
	Beech E_55
	BEECHCRAFT BE55 BARON (2P)
	BEECHCRAFT BE56 TURBO BARON (2P)
	BEECHCRAFT BE58 BARON (2P)
Beechcraft T-6 Texan	BEECHCRAFT T6 0 (1P)
	T-6
Beechjet 400	BEECHCRAFT BE40 BEECHJET (2J+)
	Beechjet
	Beechjet 400 (JT15D-5 (A & B))
Bell 206 Helicopter	Bell 206 (250B17B)
	Bell 206 B III
	Bell 407 Helicopter
	Bell Jet Ranger (Rolls-Royce C-20 Engine)
	Helicopter Bell 206
	HELO
	Jet Ranger Helicopter
	Single Engine Turbine Helicopter / Bell Jet Ranger
Bellanca Citabria	Bellanca 17-30
Bellanca Jets	Jets Bellanca

TABLE 3.4-2A

Grouping Modifications Made to 2005 Aircraft Survey Responses

(Sorted by Modified Aircraft Make Model Name in Ascending Order)

Modified Aircraft Make Model Listed in Table 3.4-2	Survey Response Aircraft Make Model before Modification (Note that only modified names are listed)
Bombardier Global Express	Bombardier Global Ex
C 130 Military Jets	Jets C 130 Military
Cessna 150	Cessna 140A. Cessna 150 or O-200 equivalent
	Cessna 150 (O-200)
	Cessna 150H
	Cessna 150K
	Cessna C-150
	CESSNA C150 150 (1P)
	Cessna Cessna 150
	Piper Cub, Cessna 150 and other 80-125HP engines
Cessna 152	Cessna 152 O-235
	CESSNA C152 152 (1P)
	Cessna Cessna 152
Cessna 170	Cessna 170A
	Cessna 170B
	Cessna 170B 80C
	Cessna 170B 88C
	CESSNA C170 170 (1P)
	Cessna Cessna 170B
Cessna 172	C172
	Cessna C-172
	Cessna Cessna 172
Cessna 172 Skyhawk (IO-320)	Cessna 172 or Piper PA-28 (IO-320-D1AD)
	Cessna 172 Skyhawk (IO-320-D1AD)
	Cessna 172 Skyhawk or Piper PA-28 (IO-320)
Cessna 172 Skyhawk (IO-360-B)	Cessna 172 RG IO-320
	CESSNA C72R CUTLAS (1P)
Cessna 172 Skyhawk (O-320)	CESSNA 172 - 150 HP LYCOMING
	Cessna 172 H
	Cessna 172 R&P O-320
	Cessna 172, Grumman AA-5b, Piper Cherokee 140 or O-320 Eng Equivalent
	Cessna 172B
	Cessna 172I
	Cessna 172M
	Cessna Cessna 172B
Cessna 180	Cessna 180B OBF

TABLE 3.4-2A

Grouping Modifications Made to 2005 Aircraft Survey Responses

(Sorted by Modified Aircraft Make Model Name in Ascending Order)

Modified Aircraft Make Model Listed in Table 3.4-2	Survey Response Aircraft Make Model before Modification (Note that only modified names are listed)
	Cessna 185
	CESSNA C180 SKYWAGON (1P)
	CESSNA C185 SKYWAGON (1P)
Cessna 182	Cessna 182, Lancair, RV 8 and Bonanza 200-300 HP Engines
	Cessna 182-J
	Cessna 182Q
	Cessna 182RG
	CESSNA C82R SKYLANE (1P)
	Cessna Skylane
CESSNA 188	CESSNA C188 WAGON (1P)
Cessna 195	Cessna C-195
CESSNA 205	CESSNA C205 205 (1P)
Cessna 206 Skywagon	C206
	CESSNA C206 SKYWAGON/STATION AIR (1P)
CESSNA 207	CESSNA C207 SKYWAGON/STATION AIR (1P)
Cessna 208 Caravan	C-208B
	Cesna Caravan
	CESSNA C208 CARAVAN/CARGOMASTER (1T)
	Cessna Caravan
Cessna 210	CESSNA C210 CENTURIAN (1P)
	Cessna Centurion 11 210
CESSNA 310	CESSNA C310 310 (2P)
CESSNA 335	CESSNA C335 335 (2P)
CESSNA 340	CESSNA C340 340 (2P)
CESSNA 404	CESSNA C404 TITAN (2P)
Cessna 414	Cessna 414 TISO-520
	CESSNA C414 CHANCELLOR (2P)
CESSNA 425 CORSAIR	CESSNA C425 CORSAIR/CONQUEST (2T)
CESSNA C441 CONQUEST	CESSNA C441 CONQUEST (2T)
CESSNA SKYMASTER	CESSNA C336 SKYMASTER (2P)
	CESSNA C337 SKYMASTER (2P)
Cessna T337	Cessna T337 (IO-360-B)
CH-46 Helicopter	Helicopter CH46
CH-47 Helicopter	Helicopter CH-47
Challenger Jets	Jets Challenger
Cherokee six	Piper Saratoga

TABLE 3.4-2A

Grouping Modifications Made to 2005 Aircraft Survey Responses

(Sorted by Modified Aircraft Make Model Name in Ascending Order)

Modified Aircraft Make Model Listed in Table 3.4-2	Survey Response Aircraft Make Model before Modification (Note that only modified names are listed)
	PIPER P32R LANCE / SARATOGA (1P)
	Piper Saratoga T10-540
	Single Engine naturally aspirated similar to Piper Saratoga
Cherokee six or TIO-540 Eq	Cessna 172, Cherokee six , TIO-540-J2B2 Eq.
	Cherokee six (IO-520/IO-540)
	Cherokee Six, Comanche, Mooney M20R or TIO-540-J2B2 Eng Eq.
	Piper PA32R
	Piper Cherokee 6
	PIPER P32T TURBO LANCE (1P)
	PIPER PA32 CHEROKEE SIX / SARATOGA (1P)
Christen Eagle	Christian Eagle
Christen Eagle II	Experimental Christian Eagle II
Cirrus SR20	CIRRUS SR20 SR-20 (1P)
Cirrus SR22	CIRRUS SR22 SR-22 (1P)
Citation Jets (Various)	Jets Citation (Various)
Comanche	Comanche (IO-520/IO-540)
	Piper PA 24-250
	Piper PA-24 Commanche
	PIPER PA24 COMANCHE (1P)
CRJ 701	CRJ-701
Dash 7 / Global Express / etc. Jets	Jets Dash 7 / Global Express / etc.
DHC2 Beaver	BEAVER DHC-2 - 450 HP PRATT&WHITNEY
	DHC-2 Bealer 450 Hp
Dornier Jets	Jets Dornier
Embraer Jets (various)	Jets Embraer (various)
ERJ-170	ERJ 170
Falcon 10	Jets Falcon 10
Falcon 20	FA20
Falcon 50	Falcon 50 (3 engine)
Grumman AA 5-A	Grumman AA 5-A
Grumman AA 5-B	Grumman AA 5-B
Gulfstream II	Gulf Stream G II
Gulfstream III	Gulf Stream G III
Gulfstream IV	Gulf Stream G IV
	Gulf Stream GIV

TABLE 3.4-2A

Grouping Modifications Made to 2005 Aircraft Survey Responses

(Sorted by Modified Aircraft Make Model Name in Ascending Order)

Modified Aircraft Make Model Listed in Table 3.4-2	Survey Response Aircraft Make Model before Modification (Note that only modified names are listed)
Gulfstream IV-V	Gulfstream GIV-V
Gulfstream Jets (Various)	Jets Gulfstream (Various)
Gulfstream V	Gulf Stream G V
H-60 Black Hawk	H-60
	Helicopter UH-60
	Helicopter Various Experimental
	UH-60A
	UH-60D
H-65 Helicopter	Helicopter H-65
Hawker 700 or Falcon 50 like Jets	Jet Aircraft like Hawker 700 or Falcon 50
Hawker Jets	Jets Hawker
Hughes Helicopter 500C	Hugh's Helicopter 500C
Husky Jets	Jets Husky
IO-360-B Eng. Eq.	Beech C-23, Sundowner, Cessna 172 Skyhawk, Mooney M20, Piper Cherokee 180 or IO-360-B Eng. Eq.
	Piper Archer
	Piper Archer II
	Piper 180
	Piper 181
	Piper 200R
	Piper Archer
	Piper Cherokee 180
Lear Jets (Various)	Jets Lear (Various)
Learjet 35	LR-35
Learjet 35/36	LR-35/36
Learjet 35A	LR-35A
Learjet 35B	LR-35B
Learjet 60	LR-60
LifeStar	American Eurocopter BK-117
	BK117 Eurocopter
	BK-117 Helicopter
	Life Star Helicopter
	Lifestar Helicopter
	MBB BK-117
Maule	Cessna Maule
	Maule 180-210-225

TABLE 3.4-2A

Grouping Modifications Made to 2005 Aircraft Survey Responses

(Sorted by Modified Aircraft Make Model Name in Ascending Order)

Modified Aircraft Make Model Listed in Table 3.4-2	Survey Response Aircraft Make Model before Modification (Note that only modified names are listed)
	Maule MT-7-235
	Maule MTA
Maule Jets	Jets Maul
Mooney M-20	Mooney M20
	Mooney M-20C
	Mooney Single Engine
Mooney w Textron Engine	Textron Mooney
Not Listed	Hot Air Ballon Take-offs
Navajo (Twin Engine TIO-540-J2B2)	Navajo (IO-520/IO-540)
	Navajo (twin TIO-540-J2B2)
O-320 Eng Eq.	Cessna 172 Skyhawk, Grumman AA-5b, Piper Cherokee 140 or O-320 Eng Eq.
	Piper PA 140 Cherokee
	Piper PA140 Cherokee
	Piper Cherokee 140
P-337P Skymaster (Twin Engine TSIO-360C)	P-337P Skymaster (TSIO-360C)
Pilatus Jets	Jets Pilatus
Piper Aztec	Aztec (TIO-540-J2B2)
	Piper Aztech
	PIPER PA27 AZTEC (2P)
Piper Cheyenne	PIPER PAY1 CHEYENNE 1 (2T)
	Twin Engine Turbine Piper Cheyenne
Piper Cub	Piper J-5A Cub
	Piper J3-Cub
	Piper Cubs
	Piper J-3
	Piper J3 Cub
	Piper J-3 Cub
	PIPER PA-11 - 85 HP CONTINENTAL
	PIPER PA11 CUB SPECIAL (1P)
	Piper PA12
	PIPER PA12 SUPER CRUISER (1P)
Piper PA 28-140	Piper PA 28-140
Piper PA 28-161	Piper PA 28-161
Piper PA-18 Supercub	PA-18 Supercub 180 Hp
	PIPER PA18 SUPER CUB (1P)
	PIPER PA-18-180 - 180 HP LYCOMING

TABLE 3.4-2A

Grouping Modifications Made to 2005 Aircraft Survey Responses

(Sorted by Modified Aircraft Make Model Name in Ascending Order)

Modified Aircraft Make Model Listed in Table 3.4-2	Survey Response Aircraft Make Model before Modification (Note that only modified names are listed)
Piper PA-25 Pawnee	Piper PA25
	PIPER PA25 PAWNEE (1P)
Piper PA-31T Cheyenne	PA-31T Cheyenne
	PA-31T Cheyenne (PT6A-28)
Piper PA-42 Cheyenne	PA-42 Cheyenne (PT6A-41)
PIPER PA46 MALIBU	PIPER PA46 NMALIBU / MIRAGE (1P)
Piper Seneca	Piper PA-34-200
	Piper Seneca
	PIPER PA34 SENECA (2P)
Piper Warrior	Piper Warrior IO-320
	Piper Warrior PA-28
Pit Special Jets	Jets Pit Special
Robinson R-22 Helicopter	Helicopter Robinson R22
	R-22 (Helicopter)
	Robinson R22
	Robinson R-22
	Robinson R22 (IO-320-D1AD)
	Robinson R22 (IO-360-B)
	Robinson R22 (O-320)
	Robinson R22 / Sikorski S52
Robinson R-22-R44 Helicopter	Robinson Helicopter R22-R44
Robinson R-44 Helicopter	Helicopter R44
	Robinson Helicopter R-44 Clipper II
	Robinson R-44
SAAB 340	SF340
Saberliner 75A	Jets Sabreliner
	Saberliner
SH-33 Helicopter	Helicopter SH-33
Sikorsky S-76 Helicopter	Helicopter Sikorsky SK 76
	Other at JSD Heliport
	S-76
	S76 Helicopter
	Sikorski S-76C+
	Sikorsky 76B (S-76B)
	Sikorsky S76
	Sikorsky S-76
	Sikorsky S76 (PT6B-36A)

TABLE 3.4-2A

Grouping Modifications Made to 2005 Aircraft Survey Responses

(Sorted by Modified Aircraft Make Model Name in Ascending Order)

Modified Aircraft Make Model Listed in Table 3.4-2	Survey Response Aircraft Make Model before Modification (Note that only modified names are listed)
	Sikorsky S76 C+
	Sikorsky S76 Helicopter
	Sikorsky S76B
	Sikorsky S-76B N61CP/N22CP Sikorsky S-92
	Sikorsky S-76C+
Sikorsky S-92 Helicopter	S-92
	Sikorsky S-92
Socata TBM 700	Jets TBM
	TBM
Stinson Voyager	Stinson
	Stinson Vorage
Taylor Craft	Tailor craft
	Tcraft
Twin Comanche	PIPER PA30 TWIN COMANCHEE (2P)
	Twin Comanche (IO-320-D1AD)
UH-1 Helicopter	Helicopter UH-1
	Hughie Helicopter
UH-1H Helicopter	UH-1H
Ultralights	Assorted Ultralights
	Ultra Lights
	Ultralight
	Ultralights, Mixed
	Ultralites
West Wind	Jets West Wind

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
328JET	1012	100	Dornier 328JET	PW306B	2	1.257	12.54	6.57
330 Shorts	14	100	Shorts 330	PT6A-45R	2	3.968	0.683	1.19
500 Citation (JT15D-1A & 1B)	53	100	500 Citation	JT15D-1A & 1B	2	21.87	8.598	0.573
550 Citation (JT15D-4 (B,C,D))	94	100	550 Citation	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
552 Citation (JT15D-4 (B,C,D))	63	100	552 Citation	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
A-10A Thunderbolt II	1433	100	A-10A Thunderbolt II	TF34-GE-100-100A	2	36.442	8.841	1.455
A-300	753	50	A300-600	CF6-80C2A5F	2	27.139	2.116	56.416
		10	A300-B4	CF6-80C2A5 (revised)	2	61.597	14.33	56.13
		10	A300-B4	JT9D-59A	2	87.964	22.00	54.586
		10	A300-B4-605R	CF6-80C2A5	2	28.065	2.469	55.711
		5	A300-600F	CF6-80E1A4 Low Emis	2	24.67	1.742	66.249
		5	A300B	CF6-80C2A5	2	28.065	2.469	55.711
		5	A300-B4-100	CF6-50C2	2	30.269	3.792	52.404
		5	A300-B4-200	CF6-50C2	2	30.269	3.792	52.404
A-300-600	557	100	A300-600	CF6-80C2A5F	2	27.139	2.116	56.416
A-300B4	277	90	A300-B4	CF6-80C2A5	2	28.065	2.469	55.711
		5	A300-600	CF6-80C2A5F	2	27.139	2.116	56.416
		5	A300-B4	JT9D-59A	2	87.964	22.00	54.586
A-310	394	100	A310	CF6-80A3	2	32.628	8.003	52.36
A319	2696	100	A319	CFM56-5B6/P	2	19.93	4.365	18.651
A319/A320	1	50	A319	CFM56-5B6/P	2	19.93	4.365	18.651
		50	A320	V2527-A5	2	12.17	0.154	23.722
A320	2587	100	A320	V2527-A5	2	12.17	0.154	23.722
A321	888	100	A321	CFM56-5B3/P	2	16.667	3.417	36.861
A5355F1 / Eurocopter	34	100	**Sikorsky S76	PT6A-36	2	0.705	0.044	1.036
Adam Jets	140	100	500 Citation	JT15D-1A & 1B	2	21.87	8.598	0.573
Aeronca	90	60	Cessna 150	O-200	1	9.193	0.265	0.022

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
		15	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044
		15	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		10	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
Aeronca 7AC	202	100	Cessna 150	O-200	1	9.193	0.265	0.022
Aeronca 7EC	91	100	Cessna 150	O-200	1	9.193	0.265	0.022
Aeronca Chief	50	100	Cessna 150	O-200	1	9.193	0.265	0.022
Aerospatial 320-B	500	100	ATR42	PW120	2	5.004	0	3.285
Agusta SPA/A109E	1	100	Galaxy (IAI) G200	PW306A	2	1.257	11.70	3.086
AH1 Helicopter	70	25	AH-1J Cobra	T400-CP-400	2	0.573	0.044	1.742
		25	AH-1S Cobra	T53-L-11D	2	4.74	5.445	1.301
		25	AH-1S Cobra	T53-L-13	2	4.74	6.349	1.301
		25	AH-1W Super Cobra	T700-GE-401 -401C	2	4.365	0.243	2.006
All(Mostly Single Engine)	1500	40	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		25	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044
		20	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		13	Cessna 150	O-200	1	9.193	0.265	0.022
		2	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
American Champion Aircraft 8K CAB	155	60	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		20	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		20	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044
Avanti Jets	70	100	500 Citation	JT15D-1A & 1B	2	21.87	8.598	0.573
Aviat A1 Husky	191	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
B-727	18	34	B727-100	JT8D-9A	3	21.429	5.159	23.082
B-727	18	33	B727-100C	TAY 651 (Transply)	3	44.577	5.004	19.775
		33	B727-200	JT8D-15	3	19.533	3.086	27.403
B-727-200	964	80	B727-200	JT8D-15	3	19.533	3.086	27.403
		10	B727-200F	JT8D-15	3	19.533	3.086	27.403
		5	B727-200RE	JT8D-217C	3	28.065	0	27.888

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
		5	B727-200RF	JT8D-217C	3	28.065	0	27.888
B-737-300	5293	100	B737-300	CFM56-3-B1	2	28.748	2.006	15.873
B-737-400	919	100	B737-400	CFM56-3B-2	2	26.411	1.609	18.563
B-737-500	769	100	B737-500	CFM56-3C-1	2	24.67	1.367	21.208
B-737-700	5287	100	B737-700	CFM56-7B22	2	17.637	2.094	20.084
B-737-800	1235	100	B737-800	CFM56-7B26	2	15.587	1.742	27.095
B-757	5332	35	B757-200	PW2037	2	24.67	2.293	35.803
		35	B757-200F	RB211-535E4	2	17.791	0.529	51.632
		5	B757-300	PW2040	2	23.038	2.072	44.048
		5	B757-300	PW2043	2	22.664	1.962	47.774
		5	B757-300	RB211-535E4 PHASE 5	2	27.007	0.419	33.025
		5	B757-300	RB211-535E4B	2	25.618	0.243	39.375
		5	B757-300	RB211-535E4B old com	2	16.909	0.419	65.235
		5	B757-300	RB211-535E4B PHASE5	2	25.618	0.243	39.375
B-757-200PF	917	100	B757-200F	RB211-535E4	2	17.791	0.529	51.632
B-767	240	18	B767-200ER	CF6-80A2	2	32.628	8.003	52.36
		18	B767-300	CF6-80A2	2	32.628	8.003	52.36
		18	B767-300ER	PW4060	2	31.879	2.866	62.17
		18	B767-300F	CF6-80C2B7F	2	27.183	2.359	54.763
		18	B767-400ER	CF6-80C2B8FA	2	27.271	2.359	54.675
		5	B767-200	CF6-80C2A5 (revised)	2	61.597	14.33	56.13
		5	B767-200	CF6-80E1A4 Low Emis	2	24.67	1.742	66.249
B767-200	151	35	B767-200ER	CF6-80A2	2	32.628	8.003	52.36
		20	B767-200	CF6-80E1A4 Low Emis	2	24.67	1.742	66.249
		15	B767-200	CF6-80CB42	2	62.567	14.90	49.45
		15	B767-200	CF6-80C2A5 (revised)	2	61.597	14.33	56.13
		15	B767-200	CF6-80E1A3	2	59.437	16.60	84.9
B-767-300	171	34	B767-300	CF6-80A2	2	32.628	8.003	52.36

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
		33	B767-300ER	PW4060	2	31.879	2.866	62.17
		33	B767-300F	CF6-80C2B7F	2	27.183	2.359	54.763
B-767-300E	45	100	B767-300ER	PW4060	2	31.879	2.866	62.17
Beech A36 Turbine	156	100	Beech King Air 100	PT6A-28	2	1.852	0.132	0.838
Beech B19 Sport	161	100	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
Beech Bonanza	6434	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Beech King Air	4273	20	Beech King Air 100	PT6A-28	2	1.852	0.132	0.838
		20	Beech King Air 200	PT6A-41	2	16.336	14.81	0.772
		20	Beech King Air 300	PT6A-60, -60A, -60AG	2	9.48	1.455	0.948
		20	Beech King Air 350	PT6A-60, -60A, -60AG	2	9.48	1.455	0.948
		10	Beech King Air 90	PT6A-28	2	1.852	0.132	0.838
		10	Beech King Air B200	PT6A-41	2	16.336	14.81	0.772
Beech King Air 100	658	100	Beech King Air 100	PT6A-28	2	1.852	0.132	0.838
Beech King Air 200	293	100	Beech King Air 200	PT6A-41	2	16.336	14.81	0.772
Beech King Air 300	363	100	Beech King Air 300	PT6A-60, -60A, -60AG	2	9.48	1.455	0.948
Beech King Air 350	70	100	Beech King Air 350	PT6A-60, -60A, -60AG	2	9.48	1.455	0.948
Beech King Air B200	215	100	Beech King Air B200	PT6A-41	2	16.336	14.81	0.772
Beech Queen Air	1570	100	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
Beech Sundowner, Cessna 172, Mooney, or IO-360-B E	3982	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
Beechcraft 18	144	100	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
Beechcraft 1900	2740	75	BH-1900	PT6A-67D	2	13.228	4.343	1.146
		25	BH-1900C	PT6A-65B	2	11.067	3.571	1.014
Beechcraft Baron	6457	100	Navajo	TIO-540-J2B2	2	106.99	2.271	0.022
BEECHCRAFT BE17 TRAVELER/STAGGER WING (1P)	70	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
BEECHCRAFT BE23 MUSKETEER/SUNDOWNER (1P)	70	50	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
		50	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
BEECHCRAFT BE24 MUSKETEER SUPER/SIERRA (1P)	70	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
BEECHCRAFT BE60 DUKE (2P)	70	100	Navajo	TIO-540-J2B2	2	106.99	2.271	0.022
BEECHCRAFT BE76 DUCHESS (2P)	70	100	Cessna T337	IO-360-B	2	24.317	0.485	0.11
BEECHCRAFT BE77 SKIPPER (1P)	70	75	Cessna 150	O-200	1	9.193	0.265	0.022
		25	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
BEECHCRAFT BE95 TRAVEL AIR (2P)	70	100	Cessna T337	IO-360-B	2	24.317	0.485	0.11
Beechcraft Sundowner	91	100	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
BEECHCRAFT T34P MENTOR (1P)	70	75	Cessna 150	O-200	1	9.193	0.265	0.022
		25	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
BEECHCRAFT T34T TURBOMENTOR (1T)	70	100	Equator P-550 Turbo	PT6A-27	1	0.926	0.066	0.441
Beechcraft T-6 Texan	70	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Beechjet 400	727	100	Beechjet 400	JT15D-5 (A & B)	2	25.375	26.14	0.926
Bell 206 Helicopter	5141	100	Bell 206	250B17B	1	1.367	0.198	0.198
Bellanca Citabria	141	34	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		33	Cessna 150	O-200	1	9.193	0.265	0.022
		33	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
Bellanca Jets	70	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Boeing A75N1	91	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Bombardier Challenger 300	265	20	CL600	CF34-3B	2	16.094	1.676	2.491
		20	CL600S	ALF 502L-2	2	15.212	2.315	2.513
		20	CL601-3A	CF34-3A	2	14.617	1.433	2.601
		20	CL601-3R	CF34-3A	2	14.617	1.433	2.601
		20	CL604	CF34-3B	2	16.094	1.676	2.491
Bombardier Challenger 600	265	20	CL600	CF34-3B	2	16.094	1.676	2.491
		20	CL600S	ALF 502L-2	2	15.212	2.315	2.513

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
		20	CL601-3A	CF34-3A	2	14.617	1.433	2.601
		20	CL601-3R	CF34-3A	2	14.617	1.433	2.601
		20	CL604	CF34-3B	2	16.094	1.676	2.491
Bombardier Global Express	2942	100	Bombardier Global Ex	BR700-710A2-20	2	18.695	0.75	12.28
C 130 Military Jets	70	17	C-130 HERCULES	T56 series I	4	10.296	1.698	15.961
		17	C-130 HERCULES	T56-A-15	4	7.981	3.858	20.04
		17	C-130 HERCULES	T56 series III	4	12.037	1.962	19.246
		17	C-130 HERCULES	501D22A	4	49.097	21.82	11.045
		16	C-130 HERCULES	T56-A-9	4	9.414	3.616	15.587
		16	C-130 HERCULES	T56-A-16	4	32.893	22.46	10.428
C Citation (JT15D-4 (B,C,D))	53	100	C Citation	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
C-135	14	7	C-135	TF33-P-5&9	4	195.19	199.8	29.035
		7	C-135	J57-P-22	4	128.52	116.1	26.455
		7	C-135	F108-CF-100	4	60.892	2.072	31.262
		7	C-135	F103-GE-100 & 101	4	192.33	75.88	139.37
		6	C-135B	TF33-P-7	4	274.78	270.9	27.007
		6	C-135B	F108-CF-100	4	60.892	2.072	31.262
		6	C-135B	TF33-P-100	4	281.75	282.8	26.125
		6	C-135B	TF33-P-102&102A	4	194.22	198.2	25
		6	C-135B	TF33-P-3/103	4	156.88	160.0	22.95
		6	C-135B	TF33-P3/5/7	4	144.91	155.7	28.351
		6	C-135B	TF33-P-5&9	4	195.19	199.8	29.035
		6	C-135FR	TF33-P-5&9	4	195.19	199.8	29.035
		6	C-135FR	F108-CF-100	4	60.892	2.072	31.262
		6	C-135FR	CFM56-2B-1	4	58.952	3.704	38.118
		6	C-135FR	CFM56-2A SERIES	4	46.451	2.381	44.577
		6	C-135FR	CFM56-2B	4	54.52	3.329	38.537
C-150-172-182 Piper 53 PA 28 Stearman PT17	750	30	Cessna 150	O-200	1	9.193	0.265	0.022

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
Maule F								
		25	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
		15	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044
		15	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		15	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
C-17	10	34	C-17A	PW2041	4	54.609	5.732	110.69
		33	C-17A	F117-PW-100	4	48.436	5.467	103.92
		33	C-17A	PW2040	4	46.562	4.189	97.488
Canadair Challenger	500	97	CL600	CF34-3B	2	16.094	1.676	2.491
		2	CL600S	ALF 502L-2	2	15.212	2.315	2.513
		1	CL600	ALF 502L-2	2	15.212	2.315	2.513
Canadair CL-600/CRT-200	1200	97	CL600	CF34-3B	2	16.094	1.676	2.491
		2	CL600S	ALF 502L-2	2	15.212	2.315	2.513
		1	CL600	ALF 502L-2	2	15.212	2.315	2.513
Cessna 140	20	100	Cessna 150	O-200	1	9.193	0.265	0.022
Cessna 150	12835	100	Cessna 150	O-200	1	9.193	0.265	0.022
Cessna 152	3821	75	Cessna 150	O-200	1	9.193	0.265	0.022
		25	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
Cessna 170	819	100	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
Cessna 172	17432	34	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		33	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044
		33	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
Cessna 172 Skyhawk (IO-320)	4087	100	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044
Cessna 172 Skyhawk (IO-360-B)	6474	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
Cessna 172 Skyhawk (O-320)	25961	100	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
Cessna 172, Piper Warrior and other 150-180HP Lyco	3650	34	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		33	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		33	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
Cessna 180	975	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Cessna 182	7713	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
CESSNA 188	140	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Cessna 192Q 9HA	10	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Cessna 195	90	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
CESSNA 205	70	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Cessna 206 Skywagon	150	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
CESSNA 207	140	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Cessna 208 Caravan	4297	100	Cessna 208 Caravan	PT6A-114	1	0.992	0.066	0.419
Cessna 210	785	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
CESSNA 310	70	100	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
CESSNA 335	70	100	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
CESSNA 340	70	100	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
CESSNA 404	70	100	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
Cessna 414	670	100	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
Cessna 421 GTISO-520	1900	100	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
CESSNA 425 CORSAIR	70	20	King Air B200	PT6A-41	2	16.336	14.81	0.772
		20	PA-31T Cheyenne	PT6A-28	2	1.852	0.132	0.838
		20	PA-42 Cheyenne	PT6A-41	2	16.38	14.83	0.794
		20	Shorts 360	PT6A-65AR	2	10.318	3.064	1.323
		20	Shorts 360	PT6A-65R	2	10.428	3.131	1.257
Cessna 550	1000	100	550 Citation	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
CESSNA C172 SKYHAWK/CUTLASS (1P)	280	50	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		25	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044
		25	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
CESSNA C175 SKYLARK (1P)	140	100	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
CESSNA C177 CARDINAL (1P)	140	100	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
Cessna C-177RG	90	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
CESSNA C402 UTILILINER/BUSINESSLINER (2P)	70	100	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
CESSNA C421 GOLDEN EAGLE (2P)	70	100	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
CESSNA C441 CONQUEST	70	100	Cessna 441 Conquest2	TPE331-8	2	2.094	0.154	1.301
CESSNA C77R CARDINAL (1P)	140	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
Cessna Citation	265	26	551 Citation	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
		25	552 Citation	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
		25	552 Citation	JT15D-5 (A & B)	2	25.375	26.14	0.926
		6	Citation Sovereign	PW308C	2	13.36	1.94	2.888
		6	Citation Ultra	JT15D-5C	2	25.243	20.01	0.816
		6	Citation VII	TFE731-3	2	9.083	1.764	1.742
		6	CITATION X	AE3007C (Type 1)	2	7.077	1.389	2.161
Cessna Citation - Bravo	265	100	Citation Bravo	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
Cessna Citation 500	1000	100	500 Citation	JT15D-1A & 1B	2	21.87	8.598	0.573
Cessna Citation CJ#	265	100	CITATION X	AE3007C (Type 1)	2	7.077	1.389	2.161
Cessna Citation Excel	1265	100	Citation Sovereign	PW308C	2	13.36	1.94	2.888
Cessna Citation V-X	500	100	560 Citation V	JT15D-5 (A & B)	2	25.375	26.14	0.926
Cessna Citation XL	265	50	560 Citation V	JT15D-5 (A & B)	2	25.375	26.14	0.926
		50	CITATION X	AE3007C (Type 1)	2	7.077	1.389	2.161
Cessna Skyhawk 172/182	6000	50	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		50	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
CESSNA SKYMASTER	70	100	P-337P Skymaster	TSIO-360C	2	35.384	1.631	0.132
Cessna T337	1957	100	Cessna T337	IO-360-B	2	24.317	0.485	0.11
Cessna's 150-152-172-175-182-195	1000	20	Cessna 150	O-200	1	9.193	0.265	0.022
		20	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		20	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044
		20	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		20	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
Cessna's 180-206-210-Caravans	350	75	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
		25	Cessna 208 Caravan	PT6A-114	1	0.992	0.066	0.419
CH-46 Helicopter	70	100	H-46E SEA KNIGHT	T58-GE-16	2	13.073	3.329	1.698
CH-47 Helicopter	561	80	H-53J Pave Low	T64-GE-100	2	12.963	4.519	4.806
		20	AH-1S Cobra	T53-L-13	2	4.74	6.349	1.301
CH-47D	22	80	H-53J Pave Low	T64-GE-100	2	12.963	4.519	4.806
		20	AH-1S Cobra	T53-L-13	2	4.74	6.349	1.301
Challenger Jets	70	20	CL600	CF34-3B	2	16.094	1.676	2.491
		20	CL600S	ALF 502L-2	2	15.212	2.315	2.513
		20	CL601-3A	CF34-3A	2	14.617	1.433	2.601
		20	CL601-3R	CF34-3A	2	14.617	1.433	2.601
		20	CL604	CF34-3B	2	16.094	1.676	2.491
Challengers, Citations	324	50	CITATION X	AE3007C (Type 1)	2	7.077	1.389	2.161
		25	Citation VII	TFE731-3	2	9.083	1.764	1.742
		25	S550 Citation	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
Cherokee six	1317	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Cherokee six or TIO-540 Eq	2406	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Chinock C-47D	184	93	H-53D Sea Stallion	T64-GE-413	2	7.54	2.734	7.165
		7	H-60 Black Hawk	T700-GE-700	2	4.63	4.277	2.227
Chinook Helicopter	4	80	H-53J Pave Low	T64-GE-100	2	12.963	4.519	4.806
		20	AH-1S Cobra	T53-L-13	2	4.74	6.349	1.301
Chipmunk	1	100	Cessna 150	O-200	1	9.193	0.265	0.022
Christen Eagle	50	50	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		50	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
Christen Eagle II	90	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
Cirrus SR20	140	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
Cirrus SR22	231	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
CITATION I (JT15D-1A & 1B)	132	100	CITATION I	JT15D-1A & 1B	2	21.87	8.598	0.573

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
Citation Jets (Various)	841	5	500 Citation	JT15D-1A & 1B	2	21.87	8.598	0.573
		5	550 Citation	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
		5	551 Citation	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
		5	552 Citation	JT15D-5 (A & B)	2	25.375	26.14	0.926
		5	552 Citation	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
		5	560 Citation V	JT15D-5 (A & B)	2	25.375	26.14	0.926
		5	C Citation	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
		5	Citation Bravo	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
		5	CITATION I	JT15D-1A & 1B	2	21.87	8.598	0.573
		5	CITATION I SP	JT15D-1A & 1B	2	21.87	8.598	0.573
		5	CITATION II	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
		5	CITATION II SP	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
		5	CITATION SII	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
		5	Citation Sovereign	PW308C	2	13.36	1.94	2.888
		5	Citation Ultra	JT15D-5C	2	25.243	20.01	0.816
		5	Citation Ultra	JT15D-5 (A & B)	2	25.375	26.14	0.926
		4	CITATION T-47A	JT15D-4 (B,C,D)	2	20.172	8.4	1.455
		4	CITATION V	JT15D-5 (A & B)	2	25.375	26.14	0.926
		4	Citation VII	TFE731-3	2	9.083	1.764	1.742
		4	CITATION X	AE3007C (Type 1)	2	7.077	1.389	2.161
		4	S550 Citation	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
Citation SII JT-15-D	700	100	CITATION SII	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
CITATION V (JT15D-5 (A & B))	63	100	CITATION V	JT15D-5 (A & B)	2	25.375	26.14	0.926
Comanche	2054	100	Comanche	TIO-540-J2B2	1	53.484	1.124	0.022
CRJ 200	3278	100	REG'L JET 200	CF34-3B	2	16.226	1.698	4.762
CRJ 701	785	100	Bombardier CRJ700	CF34-8C1	2	12.522	0.066	9.348
Dash 7 / Global Express / etc. Jets	1402	50	Bombardier Global Ex	BR700-710A2-20	2	18.695	0.75	12.28
		50	Dash 7	PT6A-50	4	5.908	0.794	2.91

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
Dash 8	867	25	Dash 8-100	PW120A	2	5.004	0	3.131
		25	Dash 8-200	PW123D	2	3.461	0	4.762
		25	Dash 8-300	PW123	2	3.439	0	5.115
		25	Dash 8-400	PW123	2	3.439	0	5.115
Dassault Falcon 200	500	50	Falcon 20	CF700-2D	2	66.624	7.694	0.816
		50	Falcon 2000EX	PW308C	2	13.36	1.94	2.888
Dassault Falcon 50, 200, 900, 2000	250	25	Falcon 100	TFE731-2	2	10.384	3.66	1.279
		25	Falcon 20	CF700-2D	2	66.624	7.694	0.816
		25	Falcon 2000EX	PW308C	2	13.36	1.94	2.888
		25	Falcon 50	TFE731-3	3	13.603	2.646	2.579
DC10-10	14	75	DC10-10	CF6-6K	3	102.47	42.15	76.787
		10	DC10-10F	CF6-6D	3	102.47	42.15	76.787
		5	DC10-10C	CF6-6K2	3	99.649	40.65	83.004
		5	DC10-10C	CF6-6K	3	102.47	42.15	76.787
		5	DC10-10C	CF6-6D	3	102.47	42.15	76.787
DC10-30	7	74	DC10-30	CF6-50C2	3	45.393	5.732	78.595
		2	DC10-30C	CF6-50C2	3	45.393	5.732	78.595
		2	DC10-30C	CF6-50C2 non-LEFN	3	142.79	55.86	94.226
		2	DC10-30C	CF6-50C2R	3	45.525	5.666	73.524
		2	DC10-30C	CF6-50C2R non-LEFN	3	142.74	57.91	88.846
		2	DC10-30C	CF6-50CA	3	45.525	5.666	73.524
		2	DC10-30C	CF6-50E1	3	45.393	5.732	78.595
		2	DC10-30C	CF6-50E2	3	45.393	5.732	78.595
		2	DC10-30C	CF6-50E2 (non-LEFN)	3	142.79	55.86	94.226
		2	DC10-30C	CF6-50E2B	3	45.129	5.688	82.563
		2	DC10-30C	CF6-50C non-LEFN	3	142.74	57.91	88.846
		2	DC10-30CF Series	CF6-50C2	3	45.393	5.732	78.595
		2	DC10-30ER	CF6-50C2B	3	45.129	5.688	82.563

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
		2	DC10-30F	CF6-50C2	3	45.393	5.732	78.595
DC8-71F	183	34	DC8-71F	CFM56-2B-1	4	58.004	3.66	34.436
		33	DC8-71F	CFM56-2A SERIES	4	45.636	2.337	40.323
		33	DC8-71F	CFM56-2B	4	53.638	3.263	34.701
DC8-73F	81	34	DC8-73F	CFM56-2B-1	4	58.004	3.66	34.436
		33	DC8-73F	CFM56-2A SERIES	4	45.636	2.337	40.323
		33	DC8-73F	CFM56-2B	4	53.638	3.263	34.701
DC-9	221	20	DC9-15F	JT8D-7B	2	14.043	4.012	14.484
		20	DC9-20	JT8D-11	2	39.617	11.86	16.491
		5	DC9-10	JT8D-7	2	14.043	4.012	14.484
		5	DC9-10	JT8D-7A	2	14.043	4.012	14.484
		5	DC9-10	JT8D-7B	2	14.043	4.012	14.484
		5	DC9-10	JT8D-7series OldCom	2	35.913	11.17	13.58
		5	DC9-10C	JT8D-7	2	14.043	4.012	14.484
		5	DC9-10C	JT8D-7B	2	14.043	4.012	14.484
		5	DC9-10C	JT8D-7A	2	14.043	4.012	14.484
		5	DC9-10C	JT8D-7series OldCom	2	35.913	11.17	13.58
		4	DC9-10F	JT8D-7series OldCom	2	35.913	11.17	13.58
		4	DC9-10F	JT8D-7B	2	14.043	4.012	14.484
		4	DC9-10F	JT8D-7A	2	14.043	4.012	14.484
		4	DC9-10F	JT8D-7	2	14.043	4.012	14.484
		4	DC9-10F	JT8D-9series OldCom	2	35.362	10.86	14.859
DC9-31	3	50	DC9-30	JT8D-7B	2	14.043	4.012	14.484
		50	DC9-30F	JT8D-9A	2	14.308	3.417	15.41
DC9-31A	6	50	DC9-30	JT8D-7B	2	14.043	4.012	14.484
		50	DC9-30F	JT8D-9A	2	14.308	3.417	15.41
DC9-32	209	50	DC9-30	JT8D-7B	2	14.043	4.012	14.484
		50	DC9-30F	JT8D-9A	2	14.308	3.417	15.41

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
DC9-33	34	50	DC9-30	JT8D-7B	2	14.043	4.012	14.484
		50	DC9-30F	JT8D-9A	2	14.308	3.417	15.41
DeHavilland Dash 8-100	2190	100	Dash 8-100	PW120A	2	5.004	0	3.131
DHC2 Beaver	212	100	Comanche	TIO-540-J2B2	1	53.484	1.124	0.022
DIAMOND DA42 TWINSTAR (1P)	140	100	Cessna T337	IO-360-B	2	24.317	0.485	0.11
DIAMOND DV10 DIAMONDSTAR (1P)	140	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
DIAMOND DV20 KATANA (1P)	140	100	Cessna 150	O-200	1	9.193	0.265	0.022
DIAMOND GA7 COUGAR (2P)	70	100	Twin Comanche	IO-320-D1AD	2	21.517	0.419	0.088
Dornier Jets	70	80	Dornier 328JET	PW306B	2	1.257	12.54	6.57
		20	Canadair Reg-700	CF34-8C1	2	12.522	0.066	9.348
EMB-145	83	50	Embraer ERJ 145LR	AE3007A1/3 (Type 1)	2	8.62	1.676	5.798
		25	Embraer ERJ 145	AE3007A	2	6.46	1.08	6.9
		25	Embraer ERJ 145	AE3007A1E	2	13.316	1.213	6.614
Embraer Jets (various)	280	8	Embraer ERJ 145	AE3007A1E	2	13.316	1.213	6.614
		8	Embraer ERJ 145	AE3007A	2	6.46	1.08	6.9
		8	Embraer ERJ 145LR	AE3007A1/3 (Type 1)	2	8.62	1.676	5.798
		7	Embraer ERJ 135/140	AE3007A1/3 (Type 2)	2	10.207	1.742	6.437
		7	Embraer ERJ 135/140	AE3007A1/3	2	8.135	1.455	6.019
		7	Embraer ERJ 135/140	AE3007A1/3 (Type 3)	2	12.875	1.257	5.49
		7	Embraer ERJ 135/140	AE3007A1P (Type 1)	2	8.223	1.455	6.371
		7	Embraer ERJ 135/140	AE3007A1P (Type 2)	2	10.516	1.72	6.9
		7	Embraer ERJ 135/140	AE3007A1P (Type 3)	2	13.625	1.301	5.864
		7	Embraer ERJ 135/140	AE3007A1/3 (Type 1)	2	8.62	1.676	5.798
		6	Embraer ERJ 135/140	AE3007A3 (Type 3)	2	13.735	1.345	5.445
		6	Embraer ERJ 135/140	AE3007A3 (Type 2)	2	10.957	1.874	6.283
		6	Embraer ERJ 135/140	AE3007A3 (Type 1)	2	8.642	1.698	5.798
		5	Embraer ERJ 170	CF34-8E5A1	2	8.907	0.088	10.692
		4	Embraer ERJ 170	CF34-8E5	2	9.127	0.088	9.811

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
ERJ-135	1018	10	Embraer ERJ 135/140	AE3007A1/3 (Type 2)	2	10.207	1.742	6.437
		10	Embraer ERJ 135/140	AE3007A3 (Type 3)	2	13.735	1.345	5.445
		10	Embraer ERJ 135/140	AE3007A3 (Type 2)	2	10.957	1.874	6.283
		10	Embraer ERJ 135/140	AE3007A3 (Type 1)	2	8.642	1.698	5.798
		10	Embraer ERJ 135/140	AE3007A1P (Type 3)	2	13.625	1.301	5.864
		10	Embraer ERJ 135/140	AE3007A1P (Type 2)	2	10.516	1.72	6.9
		10	Embraer ERJ 135/140	AE3007A1/3 (Type 3)	2	12.875	1.257	5.49
		10	Embraer ERJ 135/140	AE3007A1/3 (Type 1)	2	8.62	1.676	5.798
		10	Embraer ERJ 135/140	AE3007A1/3	2	8.135	1.455	6.019
		10	Embraer ERJ 135/140	AE3007A1P (Type 1)	2	8.223	1.455	6.371
ERJ-140	345	10	Embraer ERJ 135/140	AE3007A1/3 (Type 3)	2	12.875	1.257	5.49
		10	Embraer ERJ 135/140	AE3007A3 (Type 3)	2	13.735	1.345	5.445
		10	Embraer ERJ 135/140	AE3007A3 (Type 2)	2	10.957	1.874	6.283
		10	Embraer ERJ 135/140	AE3007A3 (Type 1)	2	8.642	1.698	5.798
		10	Embraer ERJ 135/140	AE3007A1P (Type 3)	2	13.625	1.301	5.864
		10	Embraer ERJ 135/140	AE3007A1P (Type 2)	2	10.516	1.72	6.9
		10	Embraer ERJ 135/140	AE3007A1/3 (Type 2)	2	10.207	1.742	6.437
		10	Embraer ERJ 135/140	AE3007A1/3 (Type 1)	2	8.62	1.676	5.798
		10	Embraer ERJ 135/140	AE3007A1/3	2	8.135	1.455	6.019
		10	Embraer ERJ 135/140	AE3007A1P (Type 1)	2	8.223	1.455	6.371
ERJ-145	6982	34	Embraer ERJ 145	AE3007A	2	6.46	1.08	6.9
		33	Embraer ERJ 145	AE3007A1E	2	13.316	1.213	6.614
		33	Embraer ERJ 145LR	AE3007A1/3 (Type 1)	2	8.62	1.676	5.798
ERJ-170	1616	50	Embraer ERJ 170	CF34-8E5	2	9.127	0.088	9.811
		50	Embraer ERJ 170	CF34-8E5A1	2	8.907	0.088	10.692
Experimental Exp. Zodiac	91	100	Cessna 150	O-200	1	9.193	0.265	0.022
Experimental Glassair III	90	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Experimental GlassAir RG	180	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
Experimental RV 6	90	50	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		50	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
Experimental Sonerai II	90	100	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
Extra EA - 300	45	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
F15/16	4	25	F-15	F100-PW-100	2	34.965	9.149	19.709
		25	F-15	F100-PW-100 (w/AB)	2	41.756	9.149	19.158
		25	F-16	F100-PW-100	1	17.483	4.586	9.833
		25	F-16	F100-PW-100 (w/AB)	1	20.856	4.586	9.568
Fairchild 24	20	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
Falcon 10	335	100	Falcon 100	TFE731-2	2	10.384	3.66	1.279
Falcon 20	269	100	Falcon 20	CF700-2D	2	66.624	7.694	0.816
Falcon 2000	1056	100	Falcon 2000EX	PW308C	2	13.36	1.94	2.888
Falcon 50	2103	100	Falcon 50	TFE731-3	3	13.603	2.646	2.579
Falcon 900	927	100	Falcon 2000EX	PW308C	2	13.36	1.94	2.888
Fleet 1	15	100	Cessna 150	O-200	1	9.193	0.265	0.022
Grumman A-5A	91	100	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
Grumman AA 5-A	91	100	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
Grumman AA 5-B	91	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
Grumman AA-5	91	100	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
Grumman Tiger	2891	100	Rockwell Commander	IO-360-B	1	12.17	0.265	0.066
Gulfstream II	765	100	Gulfstream II	SPEY MK511-8	2	28.814	3.549	16.336
Gulfstream II or III	3239	50	Gulfstream II	SPEY MK511-8	2	28.814	3.549	16.336
		50	Gulfstream III	SPEY MK511-8	2	28.814	3.549	16.336
Gulfstream III	965	100	Gulfstream III	SPEY MK511-8	2	28.814	3.549	16.336
Gulfstream IV	6212	100	Gulfstream IV	TAY Mk611-8	2	19.555	3.197	12.412
Gulfstream IV-V	500	50	Gulfstream IV	TAY Mk611-8	2	19.555	3.197	12.412
		50	Gulfstream V	BR700-710A1-10 GulfV	2	18.585	0.728	12.302
Gulfstream Jets (Various)	140	16	Gulfstream I	RDa7	2	36.112	9.48	0.882

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
		16	Gulfstream II	SPEY MK511-8	2	28.814	3.549	16.336
		16	Gulfstream III	SPEY MK511-8	2	28.814	3.549	16.336
		16	Gulfstream IV	TAY Mk611-8	2	19.555	3.197	12.412
		16	Gulfstream V	BR700-710A1-10 GulfV	2	18.585	0.728	12.302
		10	Gulfstream G350/G450	TAY 611-8C	2	21.319	0.86	5.225
		10	Gulfstream G550	BR700-710C4-11	2	18.629	1.389	6.085
Gulfstream V	3497	100	Gulfstream V	BR700-710A1-10 GulfV	2	18.585	0.728	12.302
H-3	52	100	H-3 SEA KING	T58-GE-8F	2	15.895	9.744	1.455
H53	12	20	H-53D Sea Stallion	T64-GE-413	2	7.54	2.734	7.165
		20	H-53D Sea Stallion	T64-GE-415	2	11.31	3.77	7.562
		20	H-53D Sea Stallion	T64-GE-6B	2	10.759	2.624	5.445
		20	H-53E Stallion	T64-GE-100	3	19.445	6.746	7.231
		20	H-53J Pave Low	T64-GE-100	2	12.963	4.519	4.806
H-60 Black Hawk	2954	100	H-60 Black Hawk	T700-GE-700	2	4.63	4.277	2.227
H-65 Helicopter	70	100	SH-60B Seahawk	T700-GE-401 -401C	2	4.365	0.243	2.006
Hawker 400	265	100	Hawker Horizon	PW308A	2	11.993	2.161	2.734
Hawker 700	793	100	Citation VII	TFE731-3	2	9.083	1.764	1.742
Hawker 700 or Falcon 50 like Jets	25	100	Falcon 50	TFE731-3	3	13.603	2.646	2.579
Hawker 800	1322	100	Hawker Horizon	PW308A	2	11.993	2.161	2.734
Hawker 800XP	265	100	Hawker Horizon	PW308A	2	11.993	2.161	2.734
Hawker Jets	140	60	Citation VII	TFE731-3	2	9.083	1.764	1.742
		40	Hawker Horizon	PW308A	2	11.993	2.161	2.734
Hawker XP	265	100	Hawker Horizon	PW308A	2	11.993	2.161	2.734
Hawkers, Navajos	324	50	Citation VII	TFE731-3	2	9.083	1.764	1.742
		25	Hawker Horizon	PW308A	2	11.993	2.161	2.734
		25	Navajo	TIO-540-J2B2	2	106.99	2.271	0.022
Hughes Helicopter 500C	150	50	Bell 206	250B17B	1	1.367	0.198	0.198
		50	OH-6 Cayuse	250B17B	1	2.249	0.419	0.22

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
Husky Jets	70	100	KC-135B	JT3D-7 SERIES	4	268.63	242.5	28.528
IAI Westwind	486	100	IAI Westwind	TFE731-3	2	9.083	1.764	1.742
IAI WW 24	300	100	IAI Westwind	TFE731-3	2	9.083	1.764	1.742
IO-360-B Eng. Eq.	12391	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
Kaman H-43 Helicopter	72	100	UH-1N Iroquois	T400-CP-400	1	0.309	0.022	0.882
Kaman K-1200 Helicopter	120	100	AH-1S Cobra	T53-L-13	2	4.74	6.349	1.301
Kaman SH-2 Helicopter	200	50	H-2 SEASPRITE	T58-GE-8F	2	15.895	9.744	1.455
		50	H-2 Super Seasprite	T700-GE-401 -401C	2	4.365	0.243	2.006
Lear 45	265	100	Learjet 35/36	TFE 731-2-2B	2	10.384	3.66	1.279
Lear Jets (Various)	561	70	Learjet 35/36	TFE 731-2-2B	2	10.384	3.66	1.279
		15	Dornier 328JET	PW306B	2	1.257	12.54	6.57
		15	Learjet 24D	CJ610-6	2	75.089	8.422	0.772
Learjet 24, 31, 45, 55, 60	1800	70	Learjet 35/36	TFE 731-2-2B	2	10.384	3.66	1.279
		15	Dornier 328JET	PW306B	2	1.257	12.54	6.57
		15	Learjet 24D	CJ610-6	2	75.089	8.422	0.772
Learjet 35	90	100	Learjet 35/36	TFE 731-2-2B	2	10.384	3.66	1.279
Learjet 35/36	5466	100	Learjet 35/36	TFE 731-2-2B	2	10.384	3.66	1.279
Learjet 35/36 (TFE 731-2-2B)	287	100	Learjet 35/36	TFE 731-2-2B	2	10.384	3.66	1.279
Learjet 35A	46	100	Learjet 35/36	TFE 731-2-2B	2	10.384	3.66	1.279
Learjet 35B	198	100	Learjet 35/36	TFE 731-2-2B	2	10.384	3.66	1.279
Learjet 60	102	100	Dornier 328JET	PW306B	2	1.257	12.54	6.57
Learjet Lear 35-60	100	75	Learjet 35/36	TFE 731-2-2B	2	10.384	3.66	1.279
		25	Dornier 328JET	PW306B	2	1.257	12.54	6.57
LifeStar	3224	100	**LifeStar (BK-117)	PT6A-36	2	0.705	0.044	1.036
LUSCOMB 8A - 65 HP CONTINENTAL	64	100	Cessna 150	O-200	1	9.193	0.265	0.022
Maule	391	80	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
		10	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		10	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
Maule Jets	70	100	Air Tractor AT602	PT6A-60, -60A, -60AG	1	4.74	0.728	0.485
Maule M-4-220C	91	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Maule M7 Turbine (Jet A)	30	100	Air Tractor AT602	PT6A-60, -60A, -60AG	1	4.74	0.728	0.485
MD-80	4834	15	MD-80	JT8D-209	2	15.3	5.049	22.377
		15	MD-80	JT8D-219	2	17.725	0	20.283
		14	MD-80	JT8D-217C	2	18.739	0	18.585
		14	MD-80	JT8D-219 old comb	2	14.264	4.586	26.918
		14	MD-80	JT8D-217 (old comb)	2	14.242	4.497	26.367
		14	MD-80	JT8D-217	2	16.27	0	20.194
		14	MD-80	JT8D-217A	2	16.27	0	20.194
Military Helicopters	150	36	H-60 Black Hawk	T700-GE-700	2	4.63	4.277	2.227
		13	H-3 SEA KING	T58-GE-8F	2	15.895	9.744	1.455
		13	SH-3E Sea King	T58-GE-5	2	15.3	6.967	2.227
		12	H-53J Pave Low	T64-GE-100	2	12.963	4.519	4.806
		7	AH-1J Cobra	T400-CP-400	2	0.573	0.044	1.742
		7	AH-1S Cobra	T53-L-11D	2	4.74	5.445	1.301
		6	UH-1N Iroquois	T400-CP-400	1	0.309	0.022	0.882
		3	H-2 SEASPRITE	T58-GE-8F	2	15.895	9.744	1.455
		3	H-2 Super Seasprite	T700-GE-401 -401C	2	4.365	0.243	2.006
Misc	250	20	Cessna 150	O-200	1	9.193	0.265	0.022
		20	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044
		20	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		20	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		20	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
MOONEY ERCO AIRCOUPE (1P)	70	100	Cessna 150	O-200	1	9.193	0.265	0.022
Mooney Exec.	91	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
MOONEY M10 CADET (1P)	140	100	Cessna 150	O-200	1	9.193	0.265	0.022
Mooney M-20	3362	60	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
		20	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		20	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
MOONEY M20P ALLEGRO/EAGLE/RANGER (1P)	140	50	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		50	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Mooney M20R	91	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
MOONEY M20T ENCORE/BRAVO (1P)	140	50	Cessna 172 Skyhawk	TSIO-360C	1	17.681	0.794	0.066
		50	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Mooney w Textron Engine	2400	34	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		33	Cessna 172 Skyhawk	TSIO-360C	1	17.681	0.794	0.066
		33	Comanche	TIO-540-J2B2	1	53.484	1.124	0.022
MU-300 (JT15D-4 (B,C,D))	94	100	MU-300	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
Multi Engine Piston	938	20	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
		20	Cessna T337	IO-360-B	2	24.317	0.485	0.11
		20	Navajo	TIO-540-J2B2	2	106.99	2.271	0.022
		20	Twin Comanche	IO-320-D1AD	2	21.517	0.419	0.088
		8	FT337P	TSIO-360C	2	35.384	1.631	0.132
		6	337H Skymaster	TSIO-360C	2	35.384	1.631	0.132
		6	P-337P Skymaster	TSIO-360C	2	35.384	1.631	0.132
Multi Engine Turbine	330	10	ATR42	PW120	2	5.004	0	3.285
		10	ATR42-500	PW127E	2	3.638	0	5.027
		10	Beech King Air 200	PT6A-41	2	16.336	14.81	0.772
		10	Beech King Air 300	PT6A-60, -60A, -60AG	2	9.48	1.455	0.948
		10	Beech King Air 350	PT6A-60, -60A, -60AG	2	9.48	1.455	0.948
		10	DHC-8-300	PW123	2	3.439	0	5.115
		8	Dash 7	PT6A-50	4	5.908	0.794	2.91
		5	BH-1900	PT6A-67D	2	13.228	4.343	1.146
		5	Cessna 441 Conquest2	TPE331-8	2	2.094	0.154	1.301
		5	Fokker 50	PW125-B	2	3.682	0	4.938

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
		5	PA-31T Cheyenne	PT6A-28	2	1.852	0.132	0.838
		5	PA-42 Cheyenne	PT6A-41	2	16.38	14.83	0.794
		5	Shorts 330	PT6A-45R	2	3.968	0.683	1.19
		2	Vickers 953 Vanguard	TYNE	4	74.34	13.97	8.157
N2S3 Stearman 220 Hp	500	76	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		24	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Navajo (Twin Engine TIO-540-J2B2)	2081	100	Navajo	TIO-540-J2B2	2	106.99	2.271	0.022
NAVY N-3-N - 220 HP WRIGHT	64	76	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		24	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
O-320 Eng Eq.	832	100	Piper PA-28	O-320	1	16.05	0.309	0.022
Other M&M (SEL-Piston)	1725	26	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		22	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		20	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044
		20	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
		10	Cessna 150	O-200	1	9.193	0.265	0.022
		2	Cessna 172 Skyhawk	TSIO-360C	1	17.681	0.794	0.066
Other Small BDR Aircraft (assume O-320)	862	15	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		15	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		10	337H Skymaster	TSIO-360C	2	35.384	1.631	0.132
		10	ATR42-500	PW127E	2	3.638	0	5.027
		10	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
		10	Beech King Air 300	PT6A-60, -60A, -60AG	2	9.48	1.455	0.948
		10	Cessna 208 Caravan	PT6A-114	1	0.992	0.066	0.419
		10	Cessna T337	IO-360-B	2	24.317	0.485	0.11
		10	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
P-337P Skymaster (Twin Engine TSIO-360C)	86	100	P-337P Skymaster	TSIO-360C	2	35.384	1.631	0.132
Piaggio	300	66	BH-1900	PT6A-67D	2	13.228	4.343	1.146
		34	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
Pilatus Jets	140	100	Air Tractor AT602	PT6A-60, -60A, -60AG	1	4.74	0.728	0.485
Pilatus PC-12	300	100	Air Tractor AT602	PT6A-60, -60A, -60AG	1	4.74	0.728	0.485
Pilatus PC-12/45	727	100	Air Tractor AT602	PT6A-60, -60A, -60AG	1	4.74	0.728	0.485
Piper	91	50	Piper PA-28	IO-320-D1AD	1	10.737	0.198	0.044
		50	Piper PA-28	O-320	1	16.05	0.309	0.022
Piper 140	1000	100	Piper PA-28	O-320	1	16.05	0.309	0.022
PIPER AEST AEROSTAR (2P)	70	100	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
Piper Arrow	5091	90	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		5	Piper PA-28	O-320	1	16.05	0.309	0.022
		5	Piper PA-28	IO-320-D1AD	1	10.737	0.198	0.044
Piper Aztec	2273	100	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
Piper Cherokee	7592	34	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
		33	Piper PA-28	IO-320-D1AD	1	10.737	0.198	0.044
		33	Piper PA-28	O-320	1	16.05	0.309	0.022
Piper Cheyenne	440	50	PA-31T Cheyenne	PT6A-28	2	1.852	0.132	0.838
		50	PA-42 Cheyenne	PT6A-41	2	16.38	14.83	0.794
Piper Chieftain	91	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Piper Cub	708	100	Cessna 150	O-200	1	9.193	0.265	0.022
Piper Dakota	91	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Piper J3C-65	60	100	Cessna 150	O-200	1	9.193	0.265	0.022
Piper Mojave	300	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Piper Navajo	500	100	Navajo	TIO-540-J2B2	2	106.99	2.271	0.022
PIPER P28A ARCHER / CADET / CHEROKEE / WARRIOR (1P)	2242	50	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		50	Piper PA-28	O-320	1	16.05	0.309	0.022
PIPER P28B CHEROKEE / CHARGER / PATHFINDER / DAKOTA (1P)	2249	50	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		24	Piper PA-28	IO-320-D1AD	1	10.737	0.198	0.044
		24	Piper PA-28	O-320	1	16.05	0.309	0.022

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
		2	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
PIPER P28R ARROW (1P)	561	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
PIPER P28T TURBO ARROW (1P)	280	100	Cessna 172 Skyhawk	TSIO-360C	1	17.681	0.794	0.066
PIPER P46T MALIBU / MERIDIAN (1T)	140	100	400A Hustler	PT6A-41	1	8.179	7.385	0.419
Piper PA 28-140	91	50	Piper PA-28	IO-320-D1AD	1	10.737	0.198	0.044
		50	Piper PA-28	O-320	1	16.05	0.309	0.022
Piper PA 28-161	91	100	Piper PA-28	O-320	1	16.05	0.309	0.022
PIPER PA16 CLIPPER (1P)	70	58	Cessna 150	O-200	1	9.193	0.265	0.022
		42	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
Piper PA18	6	100	Piper PA-28	O-320	1	16.05	0.309	0.022
PIPER PA-18 - 150 HP LYCOMING	64	100	Piper PA-28	O-320	1	16.05	0.309	0.022
Piper PA-18 Supercub	342	57	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		43	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
Piper PA-18-150	900	100	Piper PA-28	O-320	1	16.05	0.309	0.022
PIPER PA20 PACER (1P)	70	60	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		40	Cessna 150	O-200	1	9.193	0.265	0.022
PIPER PA22 TRI-PACER/CARRIBBEAN/COLT (1P)	70	100	Piper PA-28	O-320	1	16.05	0.309	0.022
PIPER PA23 APACHE (2P)	70	100	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
Piper PA-25 Pawnee	320	100	Comanche	TIO-540-J2B2	1	53.484	1.124	0.022
Piper PA-28	301	50	Piper PA-28	IO-320-D1AD	1	10.737	0.198	0.044
		50	Piper PA-28	O-320	1	16.05	0.309	0.022
Piper PA-28 (IO-320-D1AD)	3063	100	Piper PA-28	IO-320-D1AD	1	10.737	0.198	0.044
Piper PA-28 (O-320)	3063	100	Piper PA-28	O-320	1	16.05	0.309	0.022
Piper PA-28 Warrior	91	50	Piper PA-28	IO-320-D1AD	1	10.737	0.198	0.044
		50	Piper PA-28	O-320	1	16.05	0.309	0.022
Piper PA-28-151	91	100	Piper PA-28	O-320	1	16.05	0.309	0.022
Piper PA-28R200	91	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
PIPER PA31 NAVAJO / CHEIFTAN / MOHAVE (2P)	140	100	Navajo	TIO-540-J2B2	2	106.99	2.271	0.022
Piper PA-31-350	930	100	Navajo	TIO-540-J2B2	2	106.99	2.271	0.022
Piper PA-31T Cheyenne	300	100	PA-31T Cheyenne	PT6A-28	2	1.852	0.132	0.838
Piper PA-32R	180	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
PIPER PA38 TOMAHAWK (1P)	140	80	Cessna 150	O-200	1	9.193	0.265	0.022
		20	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
Piper PA-42 Cheyenne	300	100	PA-42 Cheyenne	PT6A-41	2	16.38	14.83	0.794
PIPER PA44 SEMINOLE (2P)	140	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
PIPER PA46 MALIBU	140	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Piper Seneca	2340	100	Cessna T337	IO-360-B	2	24.317	0.485	0.11
Piper Warrior	14000	50	Piper PA-28	IO-320-D1AD	1	10.737	0.198	0.044
		50	Piper PA-28	O-320	1	16.05	0.309	0.022
Piper's Cherokee-Arrow-Clipper	1000	30	Cessna 150	O-200	1	9.193	0.265	0.022
		30	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		20	Piper PA-28	IO-320-D1AD	1	10.737	0.198	0.044
		20	Piper PA-28	O-320	1	16.05	0.309	0.022
Pit Special Jets	70	25	Cessna 150	O-200	1	9.193	0.265	0.022
		25	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		25	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		25	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Powered Para Gliders	3000	100	Cessna 150	O-200	1	9.193	0.265	0.022
Raytheon Hawker	800	100	Hawker Horizon	PW308A	2	11.993	2.161	2.734
Raytheon Hawker 125-800A/XP-1000A	250	100	Hawker Horizon	PW308A	2	11.993	2.161	2.734
Robinson R-22 Helicopter	37115	34	Robinson R22	IO-360-B	1	13.14	0.176	0.066
		33	Robinson R22	O-320	1	15.565	0.243	0.022
		33	Robinson R22	IO-320-D1AD	1	12.324	0.154	0.044
Robinson R-22-R44 Helicopter	150	50	**Robinson R-44	TIO-540-J2B2	1	52.58	0.772	0.022

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
		50	Robinson R22	IO-320-D1AD	1	12.324	0.154	0.044
Robinson R-44 Helicopter	167	100	**Robinson R-44	TIO-540-J2B2	1	52.58	0.772	0.022
Rockwell Commander (O-320)	2256	100	Rockwell Commander	O-320	1	16.05	0.309	0.022
RV4-6	250	50	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		50	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
SAAB 340	1527	100	SF-340-A	CT7-5	2	4.145	0.617	1.499
Saberliner 75A	1070	100	Saberliner 75A	CF700-2D	2	66.624	7.694	0.816
Schweizer Aircraft Corp Rotor Craft	12	34	Robinson R22	IO-360-B	1	13.14	0.176	0.066
		33	Bell 206	250B17B	1	1.367	0.198	0.198
		33	Robinson R22	O-320	1	15.565	0.243	0.022
Searay Experimental	250	100	Cessna 150	O-200	1	9.193	0.265	0.022
SH-33 Helicopter	70	100	H-53D Sea Stallion	T64-GE-415	2	11.31	3.77	7.562
Sikorsky S-61 Helicopter	1000	50	H-3 SEA KING	T58-GE-8F	2	15.895	9.744	1.455
		50	SH-3E Sea King	T58-GE-5	2	15.3	6.967	2.227
Sikorsky S-76 Helicopter	7160	100	**Sikorsky S76	PT6A-36	2	0.705	0.044	1.036
Sikorsky S-92 Helicopter	721	100	H-53D Sea Stallion	T64-GE-415	2	11.31	3.77	7.562
Silvaire Luscombe 8F	91	100	Cessna 150	O-200	1	9.193	0.265	0.022
Single Engine	9194	40	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		20	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		20	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044
		10	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
		5	Cessna 208 Caravan	PT6A-114	1	0.992	0.066	0.419
		5	Equator P-550 Turbo	PT6A-27	1	0.926	0.066	0.441
Single Engine Beechcraft Bonanza/Sierra/Musketeer	500	30	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044
		30	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		30	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		10	Cessna 172 Skyhawk	TSIO-360C	1	17.681	0.794	0.066
Single Engine Cessna 152/172/182	600	20	Cessna 150	O-200	1	9.193	0.265	0.022

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
		20	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		20	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044
		20	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		20	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Single Engine Helicopters	500	30	Bell 206	250B17B	1	1.367	0.198	0.198
		15	Robinson R22	IO-320-D1AD	1	12.324	0.154	0.044
		15	Robinson R22	IO-360-B	1	13.14	0.176	0.066
		15	Robinson R22	O-320	1	15.565	0.243	0.022
		15	Robinson R22	TSIO-360C	1	19.445	0.353	0.066
		10	**Robinson R-44	TIO-540-J2B2	1	52.58	0.772	0.022
Single Engine Piper Cherokee Series	475	34	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
		33	Piper PA-28	IO-320-D1AD	1	10.737	0.198	0.044
		33	Piper PA-28	O-320	1	16.05	0.309	0.022
Single Engine Piston	292	28	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
		25	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		20	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		20	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044
		5	Cessna 150	O-200	1	9.193	0.265	0.022
		2	Cessna 172 Skyhawk	TSIO-360C	1	17.681	0.794	0.066
Small Twin Engine Aircraft	100	60	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
		38	Cessna T337	IO-360-B	2	24.317	0.485	0.11
		2	337H Skymaster	TSIO-360C	2	35.384	1.631	0.132
SN601 Corvette (JT15D-4 (B,C,D))	26	100	SN601 Corvette	JT15D-4 (B,C,D)	2	18.32	7.76	0.926
Socata TBM 700	2353	100	Air Tractor AT602	PT6A-60, -60A, -60AG	1	4.74	0.728	0.485
Socata Tobago (IO-360-B)	2256	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
SPARTAN 7W - 450 HP PRATT&WHITNEY	64	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
Stinson Voyager	12	70	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		30	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
Taylor Craft	275	100	Cessna 150	O-200	1	9.193	0.265	0.022
Turbine powered helicopters mostly Black Hawks	125	100	H-60 Black Hawk	T700-GE-700	2	4.63	4.277	2.227
Turboprops like Beech King Air	100	10	ATR42	PW120	2	5.004	0	3.285
		10	Beech King Air 100	PT6A-28	2	1.852	0.132	0.838
		10	Beech King Air 200	PT6A-41	2	16.336	14.81	0.772
		10	Beech King Air 300	PT6A-60, -60A, -60AG	2	9.48	1.455	0.948
		10	Beech King Air 350	PT6A-60, -60A, -60AG	2	9.48	1.455	0.948
		10	Beech King Air 90	PT6A-28	2	1.852	0.132	0.838
		10	Beech King Air B200	PT6A-41	2	16.336	14.81	0.772
		10	Cessna 208 Caravan	PT6A-114	1	0.992	0.066	0.419
		10	King Air 200	PT6A-41	2	16.336	14.81	0.772
		10	King Air B200	PT6A-41	2	16.336	14.81	0.772
Twin Comanche	1013	100	Twin Comanche	IO-320-D1AD	2	21.517	0.419	0.088
Twin engine aircraft Beech Baron and Piper Aztec	150	100	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
Twin Engine Piper Aztec / Seneca / Navajo	375	34	Navajo	TIO-540-J2B2	2	106.99	2.271	0.022
		33	Aztec	TIO-540-J2B2	2	106.99	2.271	0.022
		33	Cessna T337	IO-360-B	2	24.317	0.485	0.11
UH-1 Helicopter	150	100	UH-1N Iroquois	T400-CP-400	1	0.309	0.022	0.882
UH-1H Helicopter	6	100	**UH-1H Helicopter	T53-L-13	1	2.381	3.175	0.661
Ultralights	3245	100	Cessna 150	O-200	1	9.193	0.265	0.022
Unassigned Itinerant AC/AT Flights BDL	1050	30	B757-200	PW2037	2	24.67	2.293	35.803
		30	Learjet 35/36	TFE 731-2-2B	2	10.384	3.66	1.279
		14	Embraer ERJ 145	AE3007A	2	6.46	1.08	6.9
		13	Embraer ERJ 145	AE3007A1E	2	13.316	1.213	6.614
		13	Embraer ERJ 145LR	AE3007A1/3 (Type 1)	2	8.62	1.676	5.798
Various Experimental Jets GON	280	100	A-10A Thunderbolt II	TF34-GE-100-100A	2	36.442	8.841	1.455
Various other single engine aircraft N41 Waterbury	2000	20	Cessna 150	O-200	1	9.193	0.265	0.022
		20	Cessna 172 Skyhawk	IO-320-D1AD	1	10.737	0.198	0.044

TABLE 3.4-2B

2005 Aircraft Survey Results Linked to EDMS 4.5 Aircraft Model and Engine

(Sorted by Aircraft Model per Survey, Percent Applied, EDMS Aircraft and EDMS Engine)

Aircraft Make Model Summary	Annual LTOs	Percent Applied	EDMS Aircraft	EDMS Engine	No of Engines	Emission Factor (pounds per 100 LTOs) CO	VOC	NOx
		20	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066
		20	Cessna 172 Skyhawk	O-320	1	16.05	0.309	0.022
		20	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
WACO CTO - 350 HP WRIGHT	64	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
WACO YKC-S - 300 HP JACOBS	64	100	Cherokee six	TIO-540-J2B2	1	53.484	1.124	0.022
West Wind	70	34	IAI Westwind	TFE731-3	2	9.083	1.764	1.742
		33	Westwind 1	TFE731-3	2	9.083	1.764	1.742
		33	Westwind 2	TFE731-3	2	9.083	1.764	1.742
Whelan RV-8 SP	300	100	Cessna 172 Skyhawk	IO-360-B	1	12.17	0.265	0.066

TABLE 3.4-3
SUMMARY OF 2005 ANNUAL AND DAILY EMISSIONS FROM AIRCRAFT
(Sorted by County and Airport Name for airports having greater than zero activity)

County / Airport Name	Annual LTO	SUMMER DAILY EMISSIONS (LBS/DAY)			WINTER DAILY CO EMISSIONS	ANNUAL EMISSIONS (TONS/YEAR)		
		VOC (LBS/DAY)	CO (LBS/DAY)	NOx (LBS/DAY)	(LBS/DAY)	VOC (TONS/YR)	CO (TONS/YR)	NOx (TONS/YR)
Fairfield County								
Bridgeport Hospital Heliport	32	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Canal Street Heliport	34	0.0	0.1	0.2	0.0	0.0	0.0	0.0
Capt. Cove Sea/Heliport	5	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Danbury Hospital Heliport	31	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Danbury Municipal Airport	36,596	135.4	3,043.8	12.2	2,078.4	21.8	494.3	2.0
Flying Ridge Airstrip	12	0.0	1.6	0.0	1.6	0.0	0.1	0.0
General Electric Co. Heliport	522	0.1	0.8	1.2	0.8	0.0	0.2	0.3
Greenwich Hospital	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Igor I. Sikorsky Memorial	33,712	176.8	2,802.3	127.4	1,906.1	32.0	444.6	23.3
Norwalk Hospital Heliport	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sikorsky Bridgeport Heliport	10	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Sikorsky Helipad	2,893	34.1	53.9	29.6	43.8	5.4	8.7	4.9
St Vincent's Medical Center	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stamford Hospital	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
USSC Heliport	1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Fairfield County Total	**73,883**	**346.5**	**5,902.9**	**171.0**	**4,031.0**	**59.2**	**948.1**	**30.6**
Hartford County								
Avon LifeStar Emergency Site	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bancroft Airport	50	0.3	14.7	0.0	14.7	0.0	1.3	0.0
Berlin LifeStar Emergency Site	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 3.4-3

SUMMARY OF 2005 ANNUAL AND DAILY EMISSIONS FROM AIRCRAFT

(Sorted by County and Airport Name for airports having greater than zero activity)

County / Airport Name	Annual LTO	SUMMER DAILY EMISSIONS (LBS/DAY)			WINTER DAILY CO EMISSIONS	ANNUAL EMISSIONS (TONS/YEAR)		
		VOC (LBS/DAY)	CO (LBS/DAY)	NOx (LBS/DAY)	(LBS/DAY)	VOC (TONS/YR)	CO (TONS/YR)	NOx (TONS/YR)
Blanchette Heliport	16	0.1	6.9	0.0	2.3	0.0	0.4	0.0
Bradley International Airport	78,985	555.1	4,674.7	3,494.9	4,233.3	97.8	819.5	622.2
Bristol Hospital Heliport	12	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Bristol LifeStar Emergency Site	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Burlington LifeStar Emergency	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Canton LifeStar Emergency Site	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Clark Hill Heliport	45	0.1	6.8	0.0	0.0	0.0	0.3	0.0
East Granby LifeStar Emergency	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
East Windsor LifeStar	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Enfield LifeStar Emergency Site	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Farmington LifeStar Emergency	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Glastonbury LifeStar Emergency	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Granby LifeStar Emergency Site	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Acres Airstrip	156	0.1	0.7	0.3	0.7	0.0	0.1	0.1
Hartford Hospital Helipad	1,646	0.2	3.7	5.4	2.8	0.0	0.6	0.9
Hartford LifeStar Emergency Site	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hartford-Brainard Airport	45,500	250.0	5,001.3	68.6	1,594.4	28.0	552.3	6.6

TABLE 3.4-3
SUMMARY OF 2005 ANNUAL AND DAILY EMISSIONS FROM AIRCRAFT
(Sorted by County and Airport Name for airports having greater than zero activity)

County / Airport Name	Annual LTO	SUMMER DAILY EMISSIONS (LBS/DAY)			WINTER DAILY CO EMISSIONS	ANNUAL EMISSIONS (TONS/YEAR)		
		VOC (LBS/DAY)	CO (LBS/DAY)	NOx (LBS/DAY)	(LBS/DAY)	VOC (TONS/YR)	CO (TONS/YR)	NOx (TONS/YR)
Hartland LifeStar Emergency Site	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kaman Heliport	392	4.1	5.7	1.3	3.6	0.9	1.3	0.3
Laurie Field	20	0.1	3.8	0.0	1.3	0.0	0.3	0.0
Manchester LifeStar Emergency	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Marlborough LifeStar Emergency	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middlesex Marlborough Clinic	16	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Mountain Meadows Airport	18	0.0	2.9	0.0	1.4	0.0	0.3	0.0
N B G H Heliport	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Newington LifeStar Emergency	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Otis Elevator Co. Heliport	232	0.0	0.4	0.5	0.4	0.0	0.1	0.1
Plainville LifeStar Emergency	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rentschler Heliport	112	0.0	0.2	0.3	0.2	0.0	0.0	0.1
Roberts Farm Airport	50	0.1	4.3	0.0	2.9	0.0	0.3	0.0
Robertson Field	29,550	86.7	2,487.1	13.7	1,338.5	14.0	364.4	2.4
Salmon River Airfield	555	3.2	151.4	0.1	103.3	0.2	11.6	0.0
Simsbury LifeStar Emergency	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Simsbury Tri-Town Airport	5,795	10.0	471.3	0.8	212.4	1.3	60.9	0.1
Skylark's Air Park	15,150	46.9	2,207.1	2.9	441.4	4.3	200.8	0.3
South Meadows Heliport	50	0.0	1.4	0.0	0.8	0.0	0.3	0.0

TABLE 3.4-3
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County / Airport Name	Annual LTO	SUMMER DAILY EMISSIONS (LBS/DAY)			WINTER DAILY CO EMISSIONS	ANNUAL EMISSIONS (TONS/YEAR)		
		VOC (LBS/DAY)	CO (LBS/DAY)	NOx (LBS/DAY)	(LBS/DAY)	VOC (TONS/YR)	CO (TONS/YR)	NOx (TONS/YR)
South Windsor LifeStar	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Southington LifeStar Emergency	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
St. Francis Hospital Heliport	86	0.0	0.1	0.2	0.2	0.0	0.0	0.0
Stones Ranch	20	0.5	0.9	0.3	0.9	0.0	0.1	0.0
Suffield LifeStar Emergency Site	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCONN Med Hurlbrink Heliport	19	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ultimate Heliport	2	0.0	0.6	0.0	0.6	0.0	0.1	0.0
Veterans Home & Hospital	4	0.1	0.1	0.0	0.1	0.0	0.0	0.0
West Hartford LifeStar	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hartford County Total	**178,551**	**957.8**	**15,046.3**	**3,590.2**	**7,956.2**	**146.6**	**2,015.3**	**633.1**
Litchfield County								
Barkhamsted LifeStar Emergency	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Candlelight Farms Airport	1,035	3.6	167.0	0.4	16.6	0.2	10.4	0.0
Candlelight Farms Heliport	40	0.0	0.2	0.3	0.1	0.0	0.0	0.0
Charlotte Hungerford	77	0.0	0.2	0.3	0.1	0.0	0.0	0.0
Docktors Field	1	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Good Hill Farm	70	0.3	13.2	0.0	6.5	0.0	1.2	0.0
Goshen LifeStar Emergency Site	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Harwinton LifeStar	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 3.4-3
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		VOC (LBS/DAY)	CO (LBS/DAY)	NOx (LBS/DAY)	(LBS/DAY)	VOC (TONS/YR)	CO (TONS/YR)	NOx (TONS/YR)
Emergency								
Kent LifeStar Emergency Site	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litchfield LifeStar Emergency	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long View Landing Airport	204	0.4	15.2	0.1	14.9	0.1	2.7	0.0
New Hartford LifeStar	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
New Milford Hospital	44	0.0	0.1	0.1	0.1	0.0	0.0	0.0
New Milford LifeStar Emergency	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North Canaan Airport	1,800	4.5	219.1	0.3	3.2	0.4	19.9	0.0
North Canaan LifeStar	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plymouth LifeStar Emergency	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roxbury LifeStar Emergency Site	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salisbury LifeStar Emergency Site	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Seavair's Landing Airport	150	0.3	14.0	0.0	3.4	0.0	1.2	0.0
Sharon Hospital Heliport	28	0.0	0.1	0.1	0.1	0.0	0.0	0.0
Sharon LifeStar Emergency Site	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shingle Mill Heliport	20	0.0	0.9	0.0	2.1	0.0	0.1	0.0
Thomaston LifeStar Emergency	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Torrington LifeStar	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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County / Airport Name	Annual LTO	SUMMER DAILY EMISSIONS (LBS/DAY)			WINTER DAILY CO EMISSIONS	ANNUAL EMISSIONS (TONS/YEAR)		
		VOC (LBS/DAY)	CO (LBS/DAY)	NOx (LBS/DAY)	(LBS/DAY)	VOC (TONS/YR)	CO (TONS/YR)	NOx (TONS/YR)
Emergency								
Warren LifeStar Emergency Site	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Washington LifeStar Emergency	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waterbury-Plymouth Airport	2,980	6.8	323.3	0.6	51.9	0.7	34.1	0.1
Whelan Farms Airport	900	1.5	67.9	0.1	14.4	0.2	7.8	0.0
Winchester LifeStar Emergency	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wings Ago Airstrip	3	0.0	1.3	0.0	0.0	0.0	0.1	0.0
Winsted Medical Center	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Litchfield County Total	**7,412**	**17.4**	**823.0**	**2.5**	**113.4**	**1.6**	**77.6**	**0.3**
Middlesex County								
Aetna @ Middletown Heliport	10	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Bemer Heliport	12	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Chester Airport	2,410	9.5	250.8	1.0	97.1	1.3	31.8	0.1
Chester LifeStar Emergency Site	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Clinton LifeStar Emergency Site	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cromwell LifeStar Emergency	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deep River LifeStar	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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		VOC (LBS/DAY)	CO (LBS/DAY)	NOx (LBS/DAY)		VOC (TONS/YR)	CO (TONS/YR)	NOx (TONS/YR)
Emergency								
Devil's Hopyard Field	250	1.5	66.6	0.0	31.6	0.1	4.5	0.0
Durham LifeStar Emergency Site	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
East Haddam LifeStar Emergency	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
East Hampton LifeStar	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Essex LifeStar Emergency Site	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fetske Water Strip	3	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Goodspeed Airport & Seaplane	1,500	2.0	98.1	0.2	24.5	0.2	11.2	0.0
Haddam LifeStar Emergency Site	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Killingworth LifeStar Emergency	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maplewood Farm Airport	60	0.1	3.0	0.0	1.0	0.0	0.3	0.0
Middlefield LifeStar Emergency	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middlesex Hospital	30	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Middlesex Medical Center	37	0.0	0.1	0.1	0.1	0.0	0.0	0.0
Middletown LifeStar Emergency	14	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Old Saybrook LifeStar	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Portland LifeStar Emergency Site	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 3.4-3
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County / Airport Name	Annual LTO	SUMMER DAILY EMISSIONS (LBS/DAY)			WINTER DAILY CO EMISSIONS	ANNUAL EMISSIONS (TONS/YEAR)		
		VOC (LBS/DAY)	CO (LBS/DAY)	NOx (LBS/DAY)	(LBS/DAY)	VOC (TONS/YR)	CO (TONS/YR)	NOx (TONS/YR)
Westbrook LifeStar Emergency	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middlesex County Total	**4,378**	**13.1**	**419.4**	**1.8**	**154.5**	**1.6**	**47.7**	**0.2**
New Haven County								
Bristol-Myers Squibb Co.	309	0.1	0.9	1.4	0.5	0.0	0.1	0.2
Griswold Airport	9,914	14.9	596.1	1.5	155.2	1.7	68.4	0.2
Hummingbird Heliport	1,000	0.4	3.2	1.9	1.0	0.1	0.5	0.3
Meriden - Wallingford Hospital	22	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Meriden LifeStar Emergency Site	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Meriden-Markham Municpal	10,024	13.8	524.6	4.5	363.2	2.4	91.8	0.8
Middlebury LifeStar Emergency	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Milford Hospital	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oxford LifeStar Emergency Site	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Southbury LifeStar Emergency	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
St. Mary's Hospital Heliport	19	0.0	0.1	0.1	0.0	0.0	0.0	0.0
St. Raphael Heliport	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tweed-New Haven Airport	34,157	103.9	2,312.8	69.8	1,590.1	15.4	339.9	10.3
U.S. Surgical Rooftop Heliport	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 3.4-3

SUMMARY OF 2005 ANNUAL AND DAILY EMISSIONS FROM AIRCRAFT

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County / Airport Name	Annual LTO	SUMMER DAILY EMISSIONS (LBS/DAY)			WINTER DAILY CO EMISSIONS	ANNUAL EMISSIONS (TONS/YEAR)		
		VOC (LBS/DAY)	CO (LBS/DAY)	NOx (LBS/DAY)	(LBS/DAY)	VOC (TONS/YR)	CO (TONS/YR)	NOx (TONS/YR)
Wallingford LifeStar Emergency	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waterbury Hospital Center	14	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waterbury-Oxford Airport	27,823	138.5	1,802.5	301.7	1,188.6	23.2	294.4	51.9
Yale New Haven Shoreline	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yale-New Haven Hospital	248	0.0	0.5	0.7	0.5	0.0	0.1	0.1
New Haven County Total	**83,552**	**271.5**	**5,240.8**	**381.9**	**3,299.2**	**42.8**	**795.3**	**63.8**
New London County								
Backus Hospital Heliport	503	0.1	1.1	1.5	0.8	0.0	0.2	0.3
Camp Rell	30	0.7	1.1	0.4	1.1	0.1	0.1	0.0
Colchester Heliport	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Colchester LifeStar Emergency	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
East Lyme LifeStar Emergency	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gallup Farm Airport	21	0.1	3.4	0.0	0.1	0.0	0.2	0.0
Global Development Facility	276	0.0	0.3	0.5	0.5	0.0	0.1	0.1
Griswold LifeStar Emergency Site	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Groton LifeStar Emergency Site	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Groton-New London Airport	28,942	240.1	2,505.9	103.8	1,565.3	35.3	369.2	15.2
Lawrence & Memorial Hospital	47	0.0	0.0	0.0	0.1	0.0	0.0	0.0

TABLE 3.4-3
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		VOC (LBS/DAY)	CO (LBS/DAY)	NOx (LBS/DAY)	(LBS/DAY)	VOC (TONS/YR)	CO (TONS/YR)	NOx (TONS/YR)
Lebanon LifeStar Emergency Site	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ledyard LifeStar Emergency Site	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lyme LifeStar Emergency Site	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mile Creek Airport	60	0.4	17.6	0.0	11.6	0.0	1.6	0.0
MPTN Heliport	50	0.0	0.1	0.2	0.1	0.0	0.0	0.0
New London LifeStar Emergency	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Old Lyme LifeStar Emergency	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salem LifeStar Emergency Site	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ski's Landing Area	6	0.0	1.8	0.0	1.8	0.0	0.2	0.0
Spruce Airport	35	0.1	3.7	0.0	0.8	0.0	0.2	0.0
Stonington LifeStar Emergency	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waterford LifeStar Emergency	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
New London County Total	**30,009**	**241.5**	**2,535.2**	**106.6**	**1,582.2**	**35.4**	**371.7**	**15.8**
Tolland County								
Andover LifeStar Emergency Site	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 3.4-3

SUMMARY OF 2005 ANNUAL AND DAILY EMISSIONS FROM AIRCRAFT

(Sorted by County and Airport Name for airports having greater than zero activity)

County / Airport Name	Annual LTO	SUMMER DAILY EMISSIONS (LBS/DAY) VOC (LBS/DAY)	CO (LBS/DAY)	NOx (LBS/DAY)	WINTER DAILY CO EMISSIONS (LBS/DAY)	ANNUAL EMISSIONS (TONS/YEAR) VOC (TONS/YR)	CO (TONS/YR)	NOx (TONS/YR)
Bolton LifeStar Emergency Site	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Columbia LifeStar Emergency	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coventry LifeStar Emergency	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ellington Airport	38,225	27.3	1,792.8	6.9	1,209.9	4.0	270.4	0.9
Ellington LifeStar Emergency	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hebron LifeStar Emergency Site	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Heckler Field	124	0.1	5.0	0.0	0.0	0.0	0.6	0.0
Johnson Memorial Hospital	26	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Mansfield LifeStar Emergency	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rockville General Hospital	16	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Somers LifeStar Emergency Site	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stafford LifeStar Emergency Site	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tolland LifeStar Emergency Site	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Valley Farms Airport	30	0.0	2.2	0.0	0.0	0.0	0.2	0.0
Vernon LifeStar Emergency Site	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Willington LifeStar	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 3.4-3
SUMMARY OF 2005 ANNUAL AND DAILY EMISSIONS FROM AIRCRAFT
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County / Airport Name	Annual LTO	SUMMER DAILY EMISSIONS (LBS/DAY) VOC (LBS/DAY)	CO (LBS/DAY)	NOx (LBS/DAY)	WINTER DAILY CO EMISSIONS (LBS/DAY)	ANNUAL EMISSIONS (TONS/YEAR) VOC (TONS/YR)	CO (TONS/YR)	NOx (TONS/YR)
Emergency								
Windward Heights Airstrip	5	0.0	0.5	0.0	0.0	0.0	0.0	0.0
Wysocki Airport	11	0.0	0.0	0.0	1.2	0.0	0.3	0.0
Tolland County Total	**38,500**	**27.5**	**1,800.7**	**7.1**	**1,211.3**	**4.0**	**271.5**	**1.0**
Windham County								
Ashford LifeStar Emergency Site	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brooklyn LifeStar Emergency	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BUELL FARM	120	0.2	8.1	0.0	0.0	0.0	0.6	0.0
Canterbury LifeStar Emergency	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chaplin LifeStar Emergency Site	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Danielson Airport	12,170	29.6	1,421.0	4.0	91.0	2.1	97.2	0.2
Day Kimball Hospital	47	0.0	0.1	0.2	0.1	0.0	0.0	0.0
Eastford LifeStar Emergency Site	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hampton LifeStar Emergency	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Killingly LifeStar Emergency Site	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plainfield LifeStar Emergency	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 3.4-3
SUMMARY OF 2005 ANNUAL AND DAILY EMISSIONS FROM AIRCRAFT
(Sorted by County and Airport Name for airports having greater than zero activity)

County / Airport Name	Annual LTO	SUMMER DAILY EMISSIONS (LBS/DAY) VOC (LBS/DAY)	CO (LBS/DAY)	NOx (LBS/DAY)	WINTER DAILY CO EMISSIONS (LBS/DAY)	ANNUAL EMISSIONS (TONS/YEAR) VOC (TONS/YR)	CO (TONS/YR)	NOx (TONS/YR)
Putnam LifeStar Emergency Site	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scotland LifeStar Emergency Site	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Thompson LifeStar Emergency	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Toutant Airport	5	0.0	1.2	0.0	0.0	0.0	0.1	0.0
Westford Airstrip	3	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Windham Airport	9,025	13.8	449.4	3.0	133.8	1.8	53.0	0.4
Windham Community Memorial	62	0.0	0.1	0.2	0.0	0.0	0.0	0.0
Windham LifeStar Emergency	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Woodstock Airport	750	1.6	72.4	0.1	36.2	0.2	8.2	0.0
Woodstock LifeStar Emergency	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Windham County Total	**22,216**	**45.3**	**1,952.8**	**7.7**	**261.1**	**4.1**	**159.2**	**0.8**
State Total	**438,501**	**1,920.6**	**33,721.1**	**4,268.7**	**18,609.0**	**295.3**	**4,686.3**	**745.5**

3.6 LOCOMOTIVES

Locomotive emissions were determined following guidance contained in the Procedures Document. Table 3.6-7 presents an estimate for the VOC, NO_x, and CO produced by locomotives activities for a typical ozone season day and annually. Table 3.6-7 also presents an estimate for the CO produced by locomotives activities for a winter day.

Thirteen companies operated locomotives in 2005:

- Amtrak
- Branford Steam Railroad
- Central New England Railroad
- Connecticut Southern Railroad
- CSX Transportation, Inc.
- Housatonic Railroad Company
- Metro-North Commuter Railroad Company
- Naugatuck Railroad Company
- New England Central Railroad, Inc.
- Providence and Worcester Railroad Company
- Shoreline East Railway
- Springfield Terminal Railway Company (now called Pan Am Railway)
- Valley Railroad Company

CSX Transportation, Inc. is the only Class I company providing freight service within Connecticut.

Branford Steam Railroad, Central New England Railroad, Connecticut Southern Railroad, Housatonic Railroad Company, New England Central Railroad, Inc., Providence and Worcester Railroad Company, and Springfield Terminal Railway (aka Pan Am Railway) Company are Class II and III companies that provide freight service within Connecticut. Naugatuck Railroad Company and Valley Railroad Company are tourist attractions that were classified with the same designations as these Class II and III companies. These two tourist attractions only account for 0.4% of the locomotive diesel fuel usage and are not a significant influence in emissions or in the seasonal distribution of emissions.

Amtrak, Shoreline East Railway and the Metro-North Commuter Railroad Company provide commuter and passenger service for Connecticut. Amtrak Line Haul Locomotives are classified under SCC 22-85-002-008 “Line Haul Locomotives Passenger (Diesel)”, while Shoreline East Railway and the Metro-North Commuter Railroad Company are classified under 22-85-002-009 “Line Haul Locomotives Commuter Lines (Diesel)”. While Shoreline East Railway is a subsidiary of Amtrak, the Shoreline East Railway functions primarily as a commuter line.

Table 3.6-1 provides a tabulation of track mileage usage by diesel line haul locomotives. The track mileage assignments previously used in apportioning the locomotive emissions in 1999 and 2002 Ozone and Carbon Monoxide Periodic Emissions Inventories were used with one exception. Hartford County track mileage for CSX Transportation, Inc was changed from 33.75 to 0 miles. Amtrak's Track 10 listed on Reference 15 was interpreted as showing track rights for both Connecticut Southern Railroad and CSX Transportation, Inc; consequently CSX Transportation, Inc had track miles in Hartford County. Reference 16 indicated that CSX Transportation, Inc did not have track rights in Hartford County. CSX Transportation, Inc confirmed that track mileage should only be applied to Fairfield and New Haven Counties.

Each company that operates locomotives in Connecticut provided an estimate for the amount of fuel consumed in 2005 in the state. Amtrak, Branford Steam Railroad, Connecticut Southern Railroad, CSX Railroad, Metro-North Railroad, Springfield Terminal Railway (aka Pan Am Railway) Company and Valley Railroad were the only railroad companies that reported switchyard activity. Naugatuck Railroad Company data was not available at the time of this draft, so 2002 activity data was used calculate emissions. Total locomotive diesel fuel usage for 2005 was estimated at 4,878,977 gallons based on Connecticut DEP survey results. The Energy Information Administration (EIA) Fuel Oil and Kerosene Sales[8] Table 23 estimates total railroad distillate fuel use for transportation and heating at 3,715,000 gallons. While these numbers are differ (i.e. energy information numbers are 24% lower than the survey data), locomotive fuel usage survey results are considered to provide a better estimate of locomotive diesel fuel usage, especially considering Connecticut's size and the ability for out of state railroads to refuel outside of Connecticut (i.e. Providence and Worcester Railroad Company, CSX Transportation, Inc, and Springfield Terminal Railway Company). See Table 23 of Reference 8 for further information related to transportation related distillate diesel fuel sales.

The Valley Railroad Company is the only locomotive company in Connecticut that reported using a coal fired locomotive. In 2005, Valley Railroad Company used 303 tons of Pocahontas brand anthracite coal, and 3,056 gallons of diesel fuel, all in Middlesex County.

The amount of fuel consumed by line haul locomotives in each county annually was apportioned by track mileage by the following equation (see Tables 3.6-1 and 3.6-2):

$$Q = \frac{QCT \times TMZ}{TMCT}$$

Where:

Q	=	amount of fuel consumed by line haul or switchyard locomotives by company in each county (gal)
QCT	=	amount of fuel consumed by line haul or switchyard locomotives by company in Connecticut (gal)
TMZ	=	miles of track used by each company in each county (miles)
TMCT	=	miles of track used by each company in Connecticut (miles)

A sample calculation for the quantity of diesel fuel consumed for line haul use by Metro-North Railroad in New Haven County is:

$$Q = \frac{1,075,446 \times 27.06}{51.26}$$

Q = 567,725 gallons of diesel fuel consumed in New Haven County

The emission factors for both diesel-powered line haul locomotives and diesel-powered switchyard locomotives were taken from Table 3 of the Technical Highlights Document[12]. Since the Technical Highlights document presented an emission factor for total hydrocarbons (THC or HC), the value for the Diesel Engine Type was presented in that Table for Conversion Factors for Hydrocarbon Emission Results in EPA's Conversion Factors for Hydrocarbon Emission Components[13] was used to convert the emission factor to provide a VOC emission factor (i.e. 1.053 VOC/THC times the THC based emission factor yields a VOC emission factor). The emission factors for coal powered locomotives were obtained from Table 1.2-1 in Compilation of Air Pollution Emission Factors (AP-42)[10].

Locomotives were assumed to operate 5 days per week 52 weeks of the year, with uniform activity throughout the year (i.e. typical summer and winter daily emissions are identical). The seasonal adjustment factor for uniform activity is 0.25 for all four seasons. The equation used to calculate daily emissions for this category is as follows:

$$E = \frac{Q \times EF \times SF}{DAYS \times 13}$$

Where:

E	=	county daily emissions from locomotives (lbs./day)
Q	=	amount of fuel consumed by locomotives by county
EF	=	emission factor (lbs./gal)
SF	=	seasonal adjustment factor (%/100)
DAYS	=	activity days per week (5 days)
13	=	52 weeks per year divided by 4 seasons is 13 weeks per season

A sample calculation for the VOC emissions from Metro-North line haul locomotives in New Haven County is:

$$E = \frac{567,725 \times 0.022 \times 0.25}{5 \times 13}$$

E = 48.0 lb. VOC per day

Calculated emissions are presented in Tables 3.6-4, 3.6-5, 3.6-6, 3.6-7 and 3.6-8.

Table 3.6-1
2005 DIESEL LINE HAUL LOCOMOTIVES TRACK MILEAGE IN EACH COUNTY BY COMPANY

Railroad Company Name	Track Rights for Each Connecticut County								Railroad Total for State
	Fairfield	Hartford	Litchfield	Middlesex	New Haven	New London	Tolland	Windham	
Amtrak	0.00	33.90	0.00	11.60	38.90	33.90	0.00	0.00	118.30
Branford Steam Railroad	0	0	0	0	5	0	0	0	5.00
Central New England Railroad	0	3.75	0	0	0	0	0	0	3.75
Connecticut Southern Railroad	0	39	0	0	19	0	0	0	58.00
CSX Railroad	39.38	0	0	0	30	0	0	0	69.38
Housatonic Railroad Company	36	0	46	0	0	0	0	0	82.00
Metro-North Commuter Railroad Company	24.2	0	0	0	27.06	0	0	0	51.26
Naugatuck Railroad Company	0	0	15.5	0	4.1	0	0	0	19.60
New England Central Railroad, Inc	0	0	0	0	0	23	23.2	7	53.20
Providence and Worcester Railroad Company	72.4	0	0	17.1	58.2	73.5	0	46.2	267.40
Shoreline East Railway	0	0	0	10	21.8	0	0	0	31.80

Table 3.6-1
2005 DIESEL LINE HAUL LOCOMOTIVES TRACK MILEAGE IN EACH COUNTY BY COMPANY

Springfield Terminal Railway Company	0	18.4	24.1	0	28.5	0	0	0	71.00
Valley Railroad Company	0	0	0	13	0	0	0	0	13.00
All Railroads	171.98	95.05	85.60	51.70	232.56	130.40	23.20	53.20	843.69

Table 3.6-2
2005 GALLONS OF DIESEL FUEL USE FOR LINE HAUL LOCOMOTIVES BY COMPANY AND COUNTY APPORTIONED BASED ON TRACK RIGHT MILAGE IN EACH COUNTY

Railroad Company	Fairfield	Hartford	Litchfield	Middlesex	New Haven	New London	Tolland	Windham	Railroad State Total
Amtrak		362,776		124,136	416,283	362,776			1,265,971
Branford Steam Railroad					29,358				29,358
Central New England Railroad		28,214							28,214
Connecticut Southern Railroad		174,478			85,002				259,480
CSX Railroad	146,415				111,555				257,970
Housatonic Railroad Company	62,512		79,876						142,387
Metro-North Commuter Railroad Company	507,721				567,725				1,075,446
Naugatuck Railroad Company			11,307		2,991				14,298
New England Central Railroad, Inc						74,007	74,650	22,524	171,181
Providence and Worcester Railroad Company	130,608			30,848	104,991	132,592		83,344	482,382
Shoreline East Railway				252,229	549,858				802,087

Table 3.6-2
2005 GALLONS OF DIESEL FUEL USE FOR LINE HAUL LOCOMOTIVES BY COMPANY AND COUNTY APPORTIONED BASED ON TRACK RIGHT MILAGE IN EACH COUNTY

Springfield Terminal Railway Company		3,537	4,633		5,479				13,650
Valley Railroad Company				2,636					2,636
Line Haul Total	**847,256**	**569,005**	**95,816**	**409,848**	**1,873,242**	**569,375**	**74,650**	**105,867**	**4,545,060**

Table 3.6-3
2005 GALLONS OF DIESEL FUEL USED BE EACH COMPANY FOR SWITCHYARD LOCOMOTIVES IN EACH COUNTY

County	Fairfield	Hartford	Middlesex	New Haven	Railroad State Total
Amtrak	0	0	0	75,679	75,679
Branford Steam Railroad	0	0	0	16,148	16,148
Connecticut Southern Railroad	0	93,027	0	0	93,027
CSX Railroad	14,032	0	0	14,032	28,065
Metro-North Commuter Railroad Company	97,179	0	0	0	97,179
Springfield Terminal Railway Company	0	11,700	0	11,700	23,400
Valley Railroad Company	0	0	420	0	420
Total Switchyard	**111,211**	**104,727**	**420**	**117,559**	**333,917**

TABLE 3.6-4
2005 SUMMARY OF DIESEL LINE HAUL LOCOMOTIVES EMISSIONS BY COUNTY

(OZONE SEASON DAY CO EMISSIONS ARE IDENTICAL TO CO WINTER DAY EMISSIONS)

County	CO (lbs/day)	VOC (lbs/day)	NOx (lbs/day)
Fairfield	191.10	75.65	1,939.69
Hartford	128.34	50.80	1,302.67
Litchfield	21.61	8.56	219.36
Middlesex	92.44	36.59	938.30
New Haven	422.50	167.25	4,288.56
New London	128.42	50.84	1,303.51
Tolland	16.84	6.67	170.90
Windham	23.88	9.45	242.37
State Total	**1,025.12**	**405.81**	**10,405.36**

TABLE 3.6-5
2005 SUMMARY OF DIESEL POWERED SWITCHYARD LOCOMOTIVE EMISSIONS BY COUNTY

(OZONE SEASON DAY CO EMISSIONS ARE IDENTICAL TO CO WINTER DAY EMISSIONS)

County	CO (lbs/day)	VOC (lbs/day)	NOx (lbs/day)
Fairfield	35.93	20.85	341.36
Hartford	33.83	19.64	321.45
Middlesex	0.14	0.08	1.29
New Haven	37.98	22.04	360.84
STATE TOTAL	**107.87**	**62.61**	**1,024.95**

TABLE 3.6-6
2005 SUMMARY OF COAL POWERED LOCOMOTIVE EMISSIONS

(OZONE SEASON DAY CO EMISSIONS ARE IDENTICAL TO CO WINTER DAY EMISSIONS)

County	CO (lbs/day)	VOC (lbs/day)	NOx (lbs/day)
Middlesex	104.89	20.98	3.50
STATE TOTAL	**104.89**	**20.98**	**3.50**

TABLE 3.6-7
2005 SUMMARY OF ANNUAL AND DAILY EMISSIONS FROM LOCOMOTIVES

(OZONE SEASON DAY CO EMISSIONS ARE IDENTICAL TO CO WINTER DAY EMISSIONS)

County	Daily CO (lbs/day)	Daily VOC (lbs/day)	Daily NOx (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Fairfield	227.02	96.50	2,281.05	29.51	12.54	296.54
Hartford	162.17	70.44	1,624.12	21.08	9.16	211.14
Litchfield	21.61	8.56	219.36	2.81	1.11	28.52
Middlesex	197.46	57.65	943.08	25.67	7.49	122.60
New Haven	460.48	189.30	4,649.40	59.86	24.61	604.42
New London	128.42	50.84	1,303.51	16.69	6.61	169.46
Tolland	16.84	6.67	170.90	2.19	0.87	22.22
Windham	23.88	9.45	242.37	3.10	1.23	31.51
TOTAL	**1,237.88**	**489.40**	**11,433.80**	**160.92**	**63.62**	**1,486.39**

TABLE 3.6-8
2005 SUMMARY OF ANNUAL AND DAILY EMISSIONS FROM LOCOMOTIVES BY USE AND COUNTY

(OZONE SEASON DAY CO EMISSIONS ARE IDENTICAL TO CO WINTER DAY EMISSIONS)

Locomotive Use / County	Daily CO (lbs/day)	Daily VOC (lbs/day)	Daily NOx (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Commuter Rail						
Fairfield	146	64	1,461	19	8.3	190
Hartford	0	0	0	0	0.0	0
Litchfield	0	0	0	0	0.0	0
Middlesex	57	23	577	7	2.9	75
New Haven	252	100	2,559	33	13.0	333
New London	0	0	0	0	0.0	0
Tolland	0	0	0	0	0.0	0
Windham	0	0	0	0	0.0	0
Commuter Rail Total:	**455**	**186**	**4,597**	**59**	**24.2**	**598**
Passenger Rail						
Fairfield	0	0	0	0	0.0	0
Hartford	82	32	831	11	4.2	108
Litchfield	0	0	0	0	0.0	0
Middlesex	28	11	284	4	1.4	37
New Haven	118	51	1,185	15	6.7	154
New London	82	32	831	11	4.2	108
Tolland	0	0	0	0	0.0	0
Windham	0	0	0	0	0.0	0
Passenger Rail Total:	**310**	**127**	**3,131**	**40**	**16.5**	**407**
Entertainment Rail						
Fairfield	0	0	0	0	0.0	0
Hartford	0	0	0	0	0.0	0
Litchfield	(*) 3	(*) 1	(*) 26	0	0.1	3
Middlesex	(*) 106	(*) 21	(*) 11	14	2.8	1
New Haven	(*) 1	(*) 0	(*) 7	0	0.0	1
New London	0	0	0	0	0.0	0
Tolland	0	0	0	0	0.0	0
Windham	0	0	0	0	0.0	0
Entertainment Rail Total:	**(*) 109**	**(*) 23**	**(*) 44**	**14**	**2.9**	**6**

TABLE 3.6-8 (Continued)
2005 SUMMARY OF ANNUAL AND DAILY EMISSIONS FROM LOCOMOTIVES BY USE AND COUNTY

(OZONE SEASON DAY CO EMISSIONS ARE IDENTICAL TO CO WINTER DAY EMISSIONS)

Locomotive Use / County	Daily CO (lbs/day)	Daily VOC (lbs/day)	Daily NOx (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Freight Class I						
Fairfield	38	16	378	5	2.0	49
Hartford	0	0	0	0	0.0	0
Litchfield	0	0	0	0	0.0	0
Middlesex	0	0	0	0	0.0	0
New Haven	30	13	298	4	1.6	39
New London	0	0	0	0	0.0	0
Tolland	0	0	0	0	0.0	0
Windham	0	0	0	0	0.0	0
Freight Class I Total:	**67**	**28**	**677**	**9**	**3.7**	**88**
Freight Class II / III						
Fairfield	44	17	442	6	2.2	57
Hartford	80	38	794	10	4.9	103
Litchfield	19	8	193	2	1.0	25
Middlesex	7	3	71	1	0.4	9
New Haven	60	25	600	8	3.3	78
New London	47	18	473	6	2.4	61
Tolland	17	7	171	2	0.9	22
Windham	24	9	242	3	1.2	32
Freight Class II / III Total	**297**	**125**	**2,986**	**39**	**16.3**	**388**
STATE TOTAL	**1,238**	**489**	**11,434**	**161**	**63.6**	**1,486**

(*) Daily estimates for Entertainment contribution are based on the uniform activity assumption stated in the analytic method description. The activity of the Entertainment Rail does not conform to this assumption, but is a very small contributor to railroad emissions. Annual estimates for the Entertainment Rail contribution reflect activity and usage; however accurate daily estimates for Entertainment Rail contribution would require additional efforts that are not required to support a periodic emissions inventory. Daily summer and daily winter CO are essentially equal due to similar activity and emission factors for locomotives.

3.7 REFERENCES FOR SECTION 3

1. 1990 Base Year Ozone and CO Emissions Inventory SIP, The Bureau of Air Management, Department of Environmental Protection, State of Connecticut, Hartford, CT, November 1993
2. User's Guide to MOBILE6.1 and MOBILE6.2 Mobile Source Emission Factor Model, Document EPA420-R-03-010, US EPA, OTAQ, January 2002
3. Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation, Document EPA420-R-04-013, US EPA, OAR/OTAQ, August, 2004
4. Procedures for Emission Inventory Preparation, Volume IV: MOBILE Sources, US EPA, OAQPS, 1992
5. 1999 RFG Survey, Fuels & Energy Division, US EPA, April 1997
6. Airport Activity Statistics of Certificated Route Air Carriers CY 1995, Federal Aviation Administration, U.S. Department of Transportation, Washington, DC
7. Part 1 Waterborne Commerce of the United States - 2005, Document Number IWR-WCUS-05-1, U.S. Department of Army Corps of Engineers, Alexandria, Virginia. For sale by: District Engineer, U.S. Army Engineer District, New Orleans, P.O. Box 60267, New Orleans, Lousiana 70160 available on the web at http://www.iwr.usace.army.mil/ndc/wcsc/pdf/wcusatl05.pdf
8. Energy Information Administration http://www.eia.doe.gov/emeu/states/main_ct.html or http://www.eia.doe.gov/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/foks_historical.html (for multiple years) or for 2005 go to http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/historical/2005/foks_2005.html
9. Procedures for Emission Inventory Preparation, Volume IV: MOBILE Sources, US EPA, OAQPS, July 1989
10. Compilation of Air Pollution Emission Factors (AP-42), Fifth Edition, with supplements A, B, C, D, E, and F, US EPA, OAQPS, Research Triangle Park, NC, May 1998
11. Fuels & Energy Division, US EPA: RFG Property and Performance Averages for Hartford, CT http://www.epa.gov/otaq/regs/fuels/rfg/properf/hart-ct.htm ; RFG Property and Performance Averages for CT – remainder http://www.epa.gov/otaq/regs/fuels/rfg/properf/ct-remain.htm ; and RFG Property and Performance Averages for NY-NJ-Long Is.-CT http://www.epa.gov/otaq/regs/fuels/rfg/properf/ny-nj-ct.htm (2005 Values presented on the page as of January 3, 2008)
12. Technical Highlights Emission Factors for Locomotives, US EPA, OMS, December 1997, Document Number EPA420-F-97-051
13. Conversion Factors for Hydrocarbon Emission Components, US EPA, OTAQ, May 2003, Document Number EPA420-P-03-002
14. Diesel Fuel Sulfur Inputs for the Model used in the 2004 Nonroad diesel Engine Final Rule, http://www.epa.gov/otaq/models/nonrdmdl/nonrdmdl2004/sulfur.txt
15. 2007 Connecticut Rail Transportation Ownership and Service, Connecticut Dept. of Transportation Bureau of Public Transportation Office of Rail as of October 2006.
16. Federal Railroad Administration Geographic Link off http://www.fra.dot.gov/us/content/23 website obtaining http://fragis.frasafety.net/GISFRASafety/default.aspx then zoomed to Connecticut

ATTACHMENT F1
Sample Airport Cover Letter and Survey Sheet

July 19, 2006

«Contact», «Title»
«AirportName»
«ContactAddr1»
«ContactAddr2»

Dear «Contact»,

The Connecticut Department of Environmental Protection (DEP) Bureau of Air Management is conducting a survey of airports operating in the state to determine the impact of fine particulate (PM2.5), hydrocarbon, carbon monoxide, and nitrogen oxide emissions on the air quality in Connecticut. Aircraft operations are a small contributor to Connecticut ground level ozone concentrations but Federal guidelines maintain that states must include airport activity in our emission inventories. The DEP requests your cooperation in providing the following information:

- Update airport contact information and provide seasonal and yearly Landing and Takeoff (LTO) cycles for the calendar year 2005 (An aircraft landing then taking off would be one LTO) for the various type(s) of aircraft (i.e., Beech 18, Cessna 150) using your runways.
- Hospitals and emergency service providers are requested to breakout LTO counts into two groups, those going to another airport or hospital and those going to an accident scene. This will allow the DEP to account for the LTO at the accident scene while avoiding any double counting that would have resulted at the other airport or hospital. Unless otherwise identified in the survey response, all accident scene LTOs will be assumed to be within the same county as the hospital.
- If aircraft specific LTO estimates are unavailable, a list of the predominant type(s) of aircraft using your runways with an estimation of percentages activity for each type of aircraft can be used with estimated LTO totals.

The DEP is aware this data is usually not kept in detail, but rough estimates are acceptable here. The DEP would appreciate your response to the enclosed survey by September 14, 2006. Your response to this survey will help in preparing the 2005 PM2.5, Ozone and Carbon Monoxide Emissions Inventory.

Your immediate response to this survey is very important. If you would like an alternative survey format (i.e. hardcopy via mail or fax or an electronic form) or if you have any questions, I can be contacted at (860) 424-3385 or by E-mail at Steven.Potter@po.state.ct.us. Thank you in advance for your time and cooperation.

Sincerely,

Steven Potter
Air Pollution Control Engineer II, Mobile Source Inventory

ATTACHMENT F1
Sample Airport Cover Letter and Survey Sheet

Connecticut Airport Activity Survey
CT Department of Environmental Protection

79 Elm Street, 5th Floor ♦ Hartford, CT 06106 ♦ 860-424-3385 ♦ 860-424-4063 (fax)

Please complete or correct the following information and return by September 14, 2006

Airport Name: ____

Location of Airport/Heliport: ______________________________________

Connecticut Aircraft specific data for 2005

Aircraft (Make & Model)	Annual LTOs (12 month total)	Jun., Jul., and Aug. LTOs	Jan., Feb., and Dec. LTOs

Name (print): ______________________ Title: ______________________

Telephone: ______________________ Email: ______________________

This information can be E-mailed to me at Steven.Potter@po.state.ct.us or faxed to 860-424-4063.

Optional Notes, Comments or Clarifications:

Sample Locomotive Cover Letter and Survey Sheet

January 4, 2006

«Contact_Person», «Title»
«RailroadCo»
«Address»
«City», «State» «PostalCode»

Dear «Contact_Person»:

The Connecticut Department of Environmental Protection (DEP) Bureau of Air Management is conducting a survey of companies operating locomotives in the state to determine the impact of hydrocarbon emissions on the air quality in Connecticut. The DEP requests your cooperation in providing the following information:

- ♦ Diesel fuel and/or coal use by Yard Locomotives in Connecticut in 2002.
- ♦ Diesel fuel and/or coal use by Line Haul Locomotives in Connecticut in 2002.

Or ***if*** *Connecticut specific information is unavailable*:

- ♦ Gross ton-miles traffic density in Connecticut in 2002.
- ♦ Gross ton-miles traffic density system wide in 2002.
- ♦ Diesel fuel and/or coal use by Line Haul Locomotives system wide in 2002.

Please also include the following track mileage information:

- ♦ Miles of track used by diesel and/or coal Yard Locomotives.
- ♦ Miles of track used by diesel and/or coal Line Haul Locomotives

Please keep in mind this fuel-related question is for the entire year. The DEP would appreciate your response to the enclosed survey by March 31, 2006. Your response to this survey will help in preparing the 2002 Ozone and Carbon Monoxide Emissions Inventory.

Your immediate response to this survey is very important. If you have any questions, I can be contacted at (860) 424-3385 or by E-mail at Steven.Potter@po.state.ct.us. Thank you in advance for your time and cooperation.

Sincerely,

Steven Potter
Air Pollution Control Engineer, Mobile Source Inventory

Sample Locomotive Cover Letter and Survey Sheet

CT Department of Environmental Protection

79 Elm Street, 5th Floor ♦ Hartford, CT 06106 ♦ 860-424-3385 ♦ 860-424-4063 fax

Please complete the following information and return by March 31, 2003

Railroad Co. Name ____
Total track mileage of Line Haul locomotives for 2002 _______________
Total track mileage of Switchyard locomotives for 2002 _______________
Location of Switchyard(s) _______________________________________

Connecticut specific information for 2002
Diesel fuel use by Line Haul Locomotives____

Coal fuel use by Line Haul Locomotives ____

Diesel fuel use by Yard Locomotives ____

Coal fuel use by Yard Locomotives ____

If Connecticut specific information is not available, then complete information below.
Connecticut and system wide information for 2002
Gross ton-miles traffic density in CT ____

Gross ton-miles traffic density systemwide ____________________________________

Diesel fuel use by Line Haul Locomotives systemwide __________________________________

Coal fuel use by Line Haul Locomotives system wide__________________________________

Name (Print) __________________________ Title _________________________

Telephone ___________________________ E-mail_________________________

This information can be E-mailed to me at Steven.Potter@po.state.ct.us or faxed to 860-424-4063.

4.5 SMALL STATIONARY SOURCE FUEL USE

Small stationary source fuel use is divided into three categories: residential, commercial/institutional, and industrial. This source category includes small boilers, furnaces, heaters, and other heating units too small to be considered point sources. The area source fuel use for each fuel type is determined by subtracting the annual point source fuel use from the annual state total fuel use. The emissions are estimated by multiplying the quantity of fuel consumed by the appropriate emission factor. The emission factors used in these calculations are from AP-42. The total fuel consumed for each category and fuel type was calculated using data obtained from the Energy Information Administration, which publishes the State Energy Data Reports. Data for 2005 consumption of residual and distillate oil were available, however, 2005 data were not available for natural gas, liquid propane gas, and coal use. Instead 2004 data were used for natural gas, liquid propane gas and coal consumption and assumed to be representative of 2005 consumption.

4.5.1 Residential Fuel Use

For residential fuel use, the fuel was apportioned to the counties relative to the number of housing units in a county. The number of housing units in each county were obtained from the U.S. Census Bureau and are listed on Table 4.5.1-1. Housing data were not available for 2005 since it was not a census year. It was assumed that the number of housing units in 2000 is representative of housing in 2005. According to the Energy Information Administration: 557,893 thousand gallons of distillate oil (including kerosene) were used in 2005; and 44,000 million cubic feet of natural gas, 72,408 thousand gallons of liquid propane gas, and 0 tons of anthracite coal were used in 2004.

Coal is used for space heating. Emissions resulting from burning coal occur only in the winter. Oil, natural gas, and liquid propane gas are used for space heating and the heating of water. Natural gas and liquid propane gas may also be used for appliances such as, ovens and clothes dryers. Therefore, emissions resulting from burning these fuels occur all year. Summertime emissions result from such things as heating water, cooking and clothes drying. To estimate summertime fuel use the DEP relied on the Energy Information Administration (EIA) data, which lists the amount of each fuel type consumed by end use and census region[9]. The end uses were broken out into 4 different categories; all uses, space heating, water heating, and appliances. There were 4 different census regions; Northeast, Midwest, South and West. Consumption data for Northeast Region was used and assumed to be representative of Connecticut households' relative fuel consumption between space heating, and water heating and appliances. These data were found in Tables 1, 2 and 3 of their website at http://www.eia.doe.gov/emeu/recs/byfuels/2001/byfuels_2001.html. The most recent data available was for 2001. According to the EIA data, 4,166 million gallons of oil were consumed for all residential uses in the Northeast, of which 900 million gallons were used for water heating. Therefore it is estimated that 22% of household oil used was for water heating. A similar calculation was done for liquid propane gas and natural gas. It was determined that 49% and 28% of liquid propane gas and natural gas, respectively were used for the heating of water and the running of appliances. It was assumed that the residential combustion of oil, natural gas and liquid propane gas takes place seven days a week throughout the year. There are no residential sources in the Point Source Inventory.

Summertime emissions resulting from burning coal are set equal to zero. The emissions resulting from burning oil, natural gas, and liquid propane gas on a typical ozone summer day are calculated using the following equation:

$$E = \frac{EF \ x \ Q \ x \ ADJ \ x \ H}{365 \ x \ HT}$$

Where:

E	= daily county emissions for fuel type expressed in pounds per day
EF	= emission factor for the pollutant and fuel type
Q	= State total annual residential fuel used expressed in units compatible with the emission factor
ADJ	= 22%, 28% and 49% of oil, natural gas and liquid propane gas were used for heating water and/or appliances, respectively. No coal was used for heating water and/or appliances
H	= housing units for fuel type in a county(Table 4.5.1-1)
HT	= State total housing units for fuel type (Table 4.5.1-1)
365	= 365 days per year, unit conversion factor

A sample CO calculation for oil use on a typical summer day in Hartford County is:

$$E = \frac{5.0 \ x \ 557{,}893 \ \ x \ 0.22 \ x \ 146{,}905}{365 \ x \ 682{,}434}$$

E = 361.93 lbs. CO per day

To determine the CO emissions resulting from burning a fuel other than wood on a typical winter day, the typical daily CO emissions resulting from heating water (the same as typical ozone summer day CO emissions as calculated above) are added to the typical winter daily CO emissions resulting from space heating.

According to the Local Climatological Data of NOAA[16], the heating degree-days (HDD) measured at Bradley Airport in 2005 was 6,185. For the 90-day winter period (January, February and December) there were 3,387 -degree days at Bradley Airport in 2005[16], or 54.76 percent of the yearly total. Therefore, it is assumed that 54.76 percent of the fuel used for space heating is consumed in January, February, and December. As stated above, all coal use is for space heating. Twenty-two percent, 28% and 49% of oil, natural gas, and liquid propane gas, respectively, were used for hot water and/or appliances. Therefore, the remaining 78%, 72% and 51% of oil, natural gas, and liquid propane gas, respectively were used for space heating.

The CO emissions resulting from burning a fuel other than wood on a typical winter day are calculated using the following equation:

$$E = \frac{EF\ x\ Q\ x\ ADJ\ x\ H}{365\ x\ HT} + \frac{EF\ x\ Q\ x\ (1 - ADJ)\ x\ H\ x\ 0.5476}{90\ x\ HT}$$

Where:

E	= daily county emissions for fuel type expressed in pounds per day
EF	= emission factor for the pollutant and fuel type[5]
Q	= State total annual residential fuel used expressed in units compatible with the emission factor[9]
ADJ	= 22%, 28% and 49% of oil, natural gas and liquid propane gas were used for heating water and/or appliances, respectively. No coal was used for heating water and/or appliances
H	= housing units for fuel type in a county (Table 4.5.1-1)
0. 5476	= 54.76% of fuel used for space heating in January, February, and December
365	= 365 days per year, unit conversion factor
90	= 90 days in January, February, and December, unit conversion factor
HT	= State total housing units for fuel type (sum from Table 4.5.1-1)

A sample CO calculation for oil use on a typical winter day in Hartford County is:

$$E = \frac{5.0\ x\ 557{,}893\ x\ 0.22\ x\ 146{,}905}{365\ x\ 682{,}434} + \frac{5.0\ x\ 557{,}893\ x\ (1 - 0.22)\ x\ 146{,}905\ x\ 0.5476}{90\ x\ 682{,}434}$$

E = 3,211.72 lbs. CO per day

Table 4.5.1-1
Summary of Household Residential Fuel Use

County	No. of Household	No. of Gas Household	No. of Oil Household	No. of LPG Household	No. of Coal Household
Fairfield	339,466	104,967	162,898	6,737	164
Hartford	353,022	135,763	146,905	7,522	384
Litchfield	79,267	8,892	46,349	1,902	136
Middlesex	67,285	6,074	40,271	1,942	56
New Haven	340,732	103,904	157,016	6,450	253
New London	110,674	10,411	65,677	3,335	231
Tolland	51,570	3,753	34,897	1,545	118
Windham	43,959	3,786	28,421	1,659	77
State Total	**1,385,975**	**377,550**	**682,434**	**31,092**	**1,419**

Table 4.5.1-2

Summary of Emissions from Residential Fuel Use of Natural Gas

County	No. of Households	Gas (mil cu. ft/year)	Daily CO (lbs/day)	Daily VOC (lbs/day)	Daily NOx (lbs/day)	Winter CO (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Fairfield	104,967	12,232.9	375.37	51.61	882.11	2,518.97	244.66	33.64	574.95
Hartford	135,763	15,821.9	485.50	66.76	1,140.91	3,258.00	316.44	43.51	743.63
Litchfield	8,892	1,036.3	31.80	4.37	74.73	213.39	20.73	2.85	48.71
Middlesex	6,074	707.9	21.72	2.99	51.04	145.76	14.16	1.95	33.27
New Haven	103,904	12,109.1	371.57	51.09	873.18	2,493.46	242.18	33.30	569.13
New London	10,411	1,213.3	37.23	5.12	87.49	249.84	24.27	3.34	57.03
Tolland	3,753	437.4	13.42	1.85	31.54	90.06	8.75	1.20	20.56
Windham	3,786	441.2	13.54	1.86	31.82	90.86	8.82	1.21	20.74
State Total	**377,550**	**44,000.0**	**1,350.14**	**185.64**	**3,172.82**	**9,060.34**	**880.00**	**121.00**	**2,068.00**

Table 4.5.1-3
Summary of Emissions from Residential Fuel Use of #2 Fuel Oil

County	No. of Households	#2 Oil (1,000 gal/year)	Daily CO (lbs/day)	Daily VOC (lbs/day)	Daily NOx (lbs/day)	Winter CO (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Fairfield	162,898	133,169.9	401.33	57.23	1,444.80	3,561.37	332.92	47.48	1,198.53
Hartford	146,905	120,095.5	361.93	51.61	1,302.95	3,211.72	300.24	42.81	1,080.86
Litchfield	46,349	37,890.5	114.19	16.28	411.09	1,013.31	94.73	13.51	341.01
Middlesex	40,271	32,921.7	99.22	14.15	357.18	880.43	82.30	11.74	296.30
New Haven	157,016	128,361.3	386.84	55.16	1,392.63	3,432.77	320.90	45.76	1,155.25
New London	65,677	53,691.3	161.81	23.07	582.51	1,435.87	134.23	19.14	483.22
Tolland	34,897	28,528.5	85.98	12.26	309.51	762.94	71.32	10.17	256.76
Windham	28,421	23,234.3	70.02	9.99	252.08	621.36	58.09	8.28	209.11
State Total	**682,434**	**557,893.0**	**1,681.32**	**239.76**	**6,052.76**	**14,919.75**	**1,394.73**	**198.89**	**5,021.04**

Table 4.5.1-4

Summary of Emissions from Residential Fuel Use of Liquid Propane Gas

County	No. of Households	LPG (1,000 gal/year)	Daily CO (lbs/day)	Daily VOC (lbs/day)	Daily NOx (lbs/day)	Winter CO (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Fairfield	6,737	15,689.3	40.02	11.37	294.87	132.52	14.90	4.24	109.83
Hartford	7,522	17,517.5	44.68	12.70	329.23	147.96	16.64	4.73	122.62
Litchfield	1,902	4,429.4	11.30	3.21	83.25	37.41	4.21	1.20	31.01
Middlesex	1,942	4,522.6	11.54	3.28	85.00	38.20	4.30	1.22	31.66
New Haven	6,450	15,021.0	38.31	10.89	282.31	126.87	14.27	4.06	105.15
New London	3,335	7,766.6	19.81	5.63	145.97	65.60	7.38	2.10	54.37
Tolland	1,545	3,598.0	9.18	2.61	67.62	30.39	3.42	0.97	25.19
Windham	1,659	3,863.5	9.85	2.80	72.61	32.63	3.67	1.04	27.04
State Total	**31,092**	**72,408.0**	**184.69**	**52.49**	**1,360.87**	**611.60**	**68.79**	**19.55**	**506.86**

4.5.2 Commercial/Institutional Fuel Use

For commercial/institutional fuel use, statewide annual fuel was apportioned to the counties relative to the number of non-manufacturing employees in a county. The number of non-manufacturing employees by county in 2005 was obtained from the Connecticut Labor Department, Employment Security Division[12] and is listed in Table 4.5.2-1. Similar to residential fuel use the statewide annual fuel use data for commercial/institutional operations were obtained from the Energy Information Administration. According to the Energy Administration: 14,690 thousand gallons of residual oil; and 120,939 thousand gallons of distillate oil (including kerosene) were used in 2005; and 36,000 million cubic feet of natural gas, 12,768 thousand gallons of liquid propane gas, and 4,000 tons of anthracite coal were consumed in 2004.

A computer search of the 2005 Point Source Inventory was used to determine the total statewide commercial/institutional fuel use that was accounted for in the Point Source Inventory. The fuel use by commercial/institutional sources already accounted for in the Point Source Inventory was subtracted from the total commercial/institutional fuel use to avoid being double counted. The fuel used by commercial/institutional sources from the Point Source Inventory is as follows: residual oil, 1,544 thousand gallons; distillate oil, 5,199 thousand gallons; natural gas, 4,630 million cubic feet; liquid propane, 22 thousand gallons; and anthracite coal, zero.

In this category, coal would only be used for space heating, a wintertime activity. As in the residential fuel use category, the emissions resulting from burning oil, natural gas, and liquid propane gas occur all year. Data are not available to calculate the amount of annual fuel used for purposes other than space heating as it was in the residential fuel use category. Therefore, the seasonal adjustment factors listed on Table 5.8-1 in the EPA Procedures document were used. The seasonal adjustment factor for the summer ozone season is 0.6 and the seasonal adjustment factor for the winter CO season is 1.4. Activities requiring the use of these fuels can take place seven days a week.

The annual fuel used in a county is calculated for each type of fuel using the following equation:

$$Q = (QT - PT)\ x\ \frac{NME}{NMET}$$

Where:

Q	= annual county fuel use expressed in the same units as QT
QT	= state total annual commercial/institutional fuel used
PT	= state annual commercial/institutional fuel use from Point Source Inventory in same units as QT
NME	= number of non-manufacturing employees in a county[12]
NMET	= number of non-manufacturing employees in the state [12]

A sample calculation for distillate oil use in Hartford County is:

$$Q = (120{,}939 \; - \; 5{,}199\,)\, x \,\frac{445{,}426}{1{,}482{,}389}$$

Q = 34,777.4 x 1,000 gallons

Summertime emissions resulting from burning coal were set equal to zero. Emissions resulting from burning oil, natural gas, and liquid propane gas on a typical ozone summer day and a typical CO winter day are calculated using the following equation:

$$E = \frac{EF \;x\, Q \;x\; ADJ}{365}$$

Where:

E	= daily county emissions for fuel type expressed in pounds per day
EF	= emission factor for the pollutant and fuel type[5]
Q	= annual county fuel used expressed in units compatible with EF
ADJ	= seasonal adjustment factor which 0.6 for ozone season and 1.4 for CO season
365	= 365 days per year, unit conversion factor

A sample CO calculation for a typical ozone summer day for distillate oil use in Hartford County is:

$$E = \frac{5.0 \,x\, 34{,}777.4 \,x\, 0.60}{365}$$

E = 285.84 lbs. CO per day

A sample CO calculation for a typical winter day for distillate oil use in Hartford County is:

$$E = \frac{5.0\,x\,34{,}777.4\,x\,1.4}{365}$$

E = 666.96 lbs. CO per day

4.5.3 Industrial Fuel Use

For industrial fuel use, statewide annual fuel was apportioned to the counties relative to the number of manufacturing employees in a county. The number of manufacturing employees in 2005 by county were obtained from the Connecticut Labor Department, Employment Security Division[12] and is listed on Table 4.5.3-1. Similar to residential and commercial fuel use the statewide annual fuel use data were obtained from the Energy Information Administration. According to the Energy Administration: 45,599 thousand gallons of residual oil; and 23,920 thousand gallons of distillate oil (including kerosene) were used in 2005; and 21,000 million cubic feet of natural gas, 41,874 thousand gallons of liquid propane gas, and 0 tons of anthracite coal consumed in 2004.

A computer search of the 2005 Point Source Inventory was used to determine the total statewide industrial fuel use that was accounted for in the Point Source Inventory. The fuel use by industrial sources already accounted for in the Point Source Inventory must be subtracted from the total industrial fuel use. The total fuel use by industrial sources from the Point Source Inventory is as follows: residual oil, 43,896 thousand gallons; distillate oil, 4,515 gallons; natural gas, 13,583 million cubic feet; liquid propane gas, 269 thousand gallons; anthracite coal, 84 tons.

The industrial sector uses fuel primarily to provide process heat. Space heating requirements consume a quantity of fuel that is not significant. Therefore, the fuel use by industrial sources is uniform throughout the year. Activities requiring the use of these fuels can take place six days a week.

$$Q = (QT - PT)\,x\,\frac{ME}{MET}$$

The annual fuel used in a county is calculated for each type of fuel using the following equation:

Where:

Q	= annual county fuel use expressed in the same units as QT
QT	= state total annual industrial fuel used
PT	= state annual industrial fuel use from Point Source inventory in same units as QT
ME	= number of manufacturing employees in a county from Table 4.5.3-1
MET	= number of manufacturing employees in the state sum from Table 4.5.3-1

A sample calculation for distillate oil use in Fairfield County is:

$$Q = (\,23{,}920\ -\ 4{,}515\,)\ x\ \frac{43{,}235}{197{,}316}$$

Q = 4,251.9 x 1,000 gallons

The emissions resulting from fuel use by industrial sources on a typical ozone summer day and a typical CO winter day are calculated using the following equation:

$$E = \frac{EF\ x\ Q}{6\ x\ 52}$$

Where:

E	= daily county emissions for fuel type expressed in pounds per day
EF	= emission factor for the pollutant and fuel type [5]
Q	= annual county fuel used expressed in units compatible with EF
6	= 6 activity days per week, unit conversion factor
52	= 52 weeks per year, unit conversion factor

A sample CO calculation for distillate oil use in Fairfield County is:

$$E = \frac{5.0\ x\ 4{,}251.9}{6\ \ x\ 52}$$

E = 68.14 lbs. CO per day

Table 4.5.2-1

Emissions Summary from Commercial Heating Using Natural Gas

County	Non-Mfg. Employees by County	Area Gas (mil ft^3/yr)	Daily CO (lbs/day)	Daily VOC (lbs/day)	Daily NOx (lbs/day)	Winter CO (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Fairfield	391,211	8,278.7	285.79	77.57	1,360.88	666.83	86.93	23.59	413.94
Hartford	445,426	9,426.0	325.39	88.32	1,549.48	759.24	98.97	26.86	471.30
Litchfield	53,792	1,138.3	39.30	10.67	187.12	91.69	11.95	3.24	56.92
Middlesex	60,873	1,288.2	44.47	12.07	211.76	103.76	13.53	3.67	64.41
New Haven	345,878	7,319.4	252.67	68.58	1,203.19	589.56	76.85	20.86	365.97
New London	116,011	2,455.0	84.75	23.00	403.56	197.74	25.78	7.00	122.75
Tolland	37,163	786.4	27.15	7.37	129.28	63.35	8.26	2.24	39.32
Windham	32,035	677.9	23.40	6.35	111.44	54.60	7.12	1.93	33.90
State Total	**1,482,389**	**31,370.0**	**1,082.91**	**293.93**	**5,156.70**	**2,526.78**	**329.39**	**89.40**	**1,568.50**

Table 4.5.2-2

Emissions Summary from Commercial Heating Using Residual (#6) Oil

County	Non-Mfg. Employees by County	Area #6 Oil (1000 gal)	Daily CO (lbs/day)	Daily VOC (lbs/day)	Daily NOx (lbs/day)	Winter CO (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Fairfield	391,211	3,469.3	28.51	6.44	313.66	66.53	8.67	1.96	95.41
Hartford	445,426	3,950.1	32.47	7.34	357.13	75.75	9.88	2.23	108.63
Litchfield	53,792	477.0	3.92	0.89	43.13	9.15	1.19	0.27	13.12
Middlesex	60,873	539.8	4.44	1.00	48.81	10.35	1.35	0.31	14.85
New Haven	345,878	3,067.3	25.21	5.70	277.32	58.82	7.67	1.73	84.35
New London	116,011	1,028.8	8.46	1.91	93.01	19.73	2.57	0.58	28.29
Tolland	37,163	329.6	2.71	0.61	29.80	6.32	0.82	0.19	9.06
Windham	32,035	284.1	2.33	0.53	25.68	5.45	0.71	0.16	7.81
State Total	**1,482,389**	**13,146.0**	**108.05**	**24.42**	**1,188.54**	**252.11**	**32.87**	**7.43**	**361.52**

Table 4.5.2-3

Emissions Summary from Commercial Heating Using Liquid Propane Gas

County	Non-Mfg. Employees by County	Area LPG (1000 gal)	Daily CO (lbs/day)	Daily VOC (lbs/day)	Daily NOx (lbs/day)	Winter CO (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Fairfield	391,211	3,363.7	10.51	2.99	77.41	24.51	3.20	0.91	23.55
Hartford	445,426	3,829.9	11.96	3.40	88.14	27.91	3.64	1.03	26.81
Litchfield	53,792	462.5	1.44	0.41	10.64	3.37	0.44	0.12	3.24
Middlesex	60,873	523.4	1.63	0.46	12.05	3.81	0.50	0.14	3.66
New Haven	345,878	2,974.0	9.29	2.64	68.44	21.67	2.83	0.80	20.82
New London	116,011	997.5	3.12	0.89	22.96	7.27	0.95	0.27	6.98
Tolland	37,163	319.5	1.00	0.28	7.35	2.33	0.30	0.09	2.24
Windham	32,035	275.4	0.86	0.24	6.34	2.01	0.26	0.07	1.93
State Total	**1,482,389**	**12,746.0**	**39.81**	**11.31**	**293.33**	**92.89**	**12.11**	**3.44**	**89.22**

Table 4.5.2-4

Emissions Summary from Commercial Heating Using Coal

County	Non- Mfg. Employees by County	Area Coal (tons)	Winter Day CO (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Fairfield	391,211	1,055.6	364.42	47.50	5.28	1.58
Hartford	445,426	1,201.9	414.93	54.09	6.01	1.80
Litchfield	53,792	145.1	50.11	6.53	0.73	0.22
Middlesex	60,873	164.3	56.70	7.39	0.82	0.25
New Haven	345,878	933.3	322.20	42.00	4.67	1.40
New London	116,011	313.0	108.07	14.09	1.57	0.47
Tolland	37,163	100.3	34.62	4.51	0.50	0.15
Windham	32,035	86.4	29.84	3.89	0.43	0.13
State Total	**1,482,389**	**4,000.0**	**1,380.89**	**180.00**	**20.00**	**6.00**

Table 4.5.2-5

Emissions Summary from Commercial Heating Using Distillate (#2) Oil

County	Non-Mfg. Employees by County	Area #2 Oil (1000 gal)	Daily CO (lbs/day)	Daily VOC (lbs/day)	Daily NOx (lbs/day)	Winter CO (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Fairfield	391,211	30,544.5	251.05	25.61	1,004.20	585.78	76.36	7.79	305.44
Hartford	445,426	34,777.4	285.84	29.16	1,143.36	666.96	86.94	8.87	347.77
Litchfield	53,792	4,199.9	34.52	3.52	138.08	80.55	10.50	1.07	42.00
Middlesex	60,873	4,752.8	39.06	3.98	156.25	91.15	11.88	1.21	47.53
New Haven	345,878	27,005.0	221.96	22.64	887.83	517.90	67.51	6.89	270.05
New London	116,011	9,057.8	74.45	7.59	297.79	173.71	22.64	2.31	90.58
Tolland	37,163	2,901.6	23.85	2.43	95.39	55.65	7.25	0.74	29.02
Windham	32,035	2,501.2	20.56	2.10	82.23	47.97	6.25	0.64	25.01
State Total	**1,482,389**	**115,740.0**	**951.29**	**97.03**	**3,805.14**	**2,219.67**	**289.35**	**29.51**	**1,157.40**

Table 4.5.3-1

Summary of Emissions from Industrial Heating Using #2 Oil

County	Mfg. Employees by County	Area Ind. #2 Oil (1000 gal)	Daily CO (lbs/day)	Daily VOC (lbs/day)	Daily NOx (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Fairfield	43,235	4,251.9	68.14	2.73	272.56	10.63	0.43	42.52
Hartford	59,883	5,889.2	94.38	3.78	377.51	14.72	0.59	58.89
Litchfield	11,437	1,124.8	18.03	0.72	72.10	2.81	0.11	11.25
Middlesex	10,814	1,063.5	17.04	0.68	68.17	2.66	0.11	10.64
New Haven	43,633	4,291.1	68.77	2.75	275.07	10.73	0.43	42.91
New London	17,691	1,739.8	27.88	1.12	111.53	4.35	0.17	17.40
Tolland	3,518	346.0	5.54	0.22	22.18	0.86	0.03	3.46
Windham	7,105	698.7	11.20	0.45	44.79	1.75	0.07	6.99
State Total	**197,316**	**19,405.0**	**310.98**	**12.44**	**1,243.91**	**48.51**	**1.94**	**194.05**

Table 4.5.3-2

Summary of Emissions from Industrial Heating Using Liquid Propane Gas

County	Mfg. Employees by County	Area Ind. LPG (1000 gal)	Daily CO (lbs/day)	Daily VOC (lbs/day)	Daily NOx (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Fairfield	43,235	9,116.3	93.50	15.78	555.16	14.59	2.46	86.60
Hartford	59,883	12,626.6	129.50	21.85	768.93	20.20	3.41	119.95
Litchfield	11,437	2,411.5	24.73	4.17	146.86	3.86	0.65	22.91
Middlesex	10,814	2,280.2	23.39	3.95	138.86	3.65	0.62	21.66
New Haven	43,633	9,200.2	94.36	15.92	560.27	14.72	2.48	87.40
New London	17,691	3,730.2	38.26	6.46	227.16	5.97	1.01	35.44
Tolland	3,518	741.8	7.61	1.28	45.17	1.19	0.20	7.05
Windham	7,105	1,498.1	15.37	2.59	91.23	2.40	0.40	14.23
State Total	**197,316**	**41,605.0**	**426.72**	**72.01**	**2,533.64**	**66.57**	**11.23**	**395.25**

Table 4.5.3-3

Summary of Emissions from Industrial Heating Using Natural Gas

County	Mfg. Employees by County	Area Ind. Gas (mil ft^3/yr)	Daily CO (lbs/day)	Daily VOC (lbs/day)	Daily NOx (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Fairfield	43,235	1,625.2	109.39	29.69	520.89	17.06	4.63	81.26
Hartford	59,883	2,251.0	151.51	41.12	721.46	23.64	6.42	112.55
Litchfield	11,437	429.9	28.94	7.85	137.79	4.51	1.23	21.50
Middlesex	10,814	406.5	27.36	7.43	130.29	4.27	1.16	20.32
New Haven	43,633	1,640.1	110.39	29.96	525.69	17.22	4.67	82.01
New London	17,691	665.0	44.76	12.15	213.14	6.98	1.90	33.25
Tolland	3,518	132.2	8.90	2.42	42.38	1.39	0.38	6.61
Windham	7,105	267.1	17.98	4.88	85.60	2.80	0.76	13.35
State Total	**197,316**	**7,417.0**	**499.22**	**135.50**	**2,377.24**	**77.88**	**21.14**	**370.85**

Table 4.5.3-4

Summary of Emissions from Industrial Heating Using Residual Oil

County	Mfg. Employees by Zone	Area Ind. #2 Oil (10^3 gal)	Daily CO (lbs/day)	Daily VOC (lbs/day)	Daily NOx (lbs/day)	Annual CO (tons/year)	Annual VOC (tons/year)	Annual NOx (tons/year)
Fairfield	43,235	373.2	5.98	0.48	65.78	0.93	0.07	10.26
Hartford	59,883	516.8	8.28	0.66	91.11	1.29	0.10	14.21
Litchfield	11,437	98.7	1.58	0.13	17.40	0.25	0.02	2.71
Middlesex	10,814	93.3	1.50	0.12	16.45	0.23	0.02	2.57
New Haven	43,633	376.6	6.04	0.48	66.39	0.94	0.08	10.36
New London	17,691	152.7	2.45	0.20	26.92	0.38	0.03	4.20
Tolland	3,518	30.4	0.49	0.04	5.35	0.08	0.01	0.83
Windham	7,105	61.3	0.98	0.08	10.81	0.15	0.01	1.69
State Total	**197,316**	**1,703.0**	**27.29**	**2.18**	**300.21**	**4.26**	**0.34**	**46.83**

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