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JET A FLIGHT TEST SAMPLES
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Sampling and Analysis of Vapors from the Center Wing Tank of a Test Boeing 747-100 Aircraft

Final Report

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EXECUTIVE SUMMARY

Background

This report describes the involvement of the Desert Research Institute (DRI) of the University of Nevada, in assisting the National Transportation Safety Board (NTSB) with the test flights of a 747 from New York's Kennedy Airport in July 1997. The objective of this work was to collect air samples from the Center Wing Tank of the aircraft during taxi and during flight and analyze the samples for jet fuel components.

Field Operations

The sampler, which was designed by personnel from NTSB, DRI and Boeing, is a six-port manifold contained within an aluminum case with a main shut-off valve at the inlet and six shut-off valves, one for each of the six canisters. To collect a sample, one sample bottle is opened to purge the lines and manifold and then shut. The next bottle is then immediately opened to collect the actual sample. The six bottles would thus allow three samples to be collected and it was decided that samples would be taken: 1) during taxi; 2) at approximately 10,000 feet during climb; and 3) at approximately 14,000 feet during climb. The sample canisters were cleaned, evacuated and checked for contamination at DRI prior to being sent to New York.

The sampler was installed in the test aircraft on Wednesday and Thursday, July 9th and 10th, 1997. On the 10th, it was tested by applying vacuum to the entire system for 4.5 hours. No change was detected in the vacuum level. The test flights took place the 15th and 16th of July, 1997, personnel from Boeing operated the sampler during those flights.

Laboratory Analysis

The canisters were returned to DRI via overnight courier. Analysis approximately followed EPA method TO-14 for C2 to C12 hydrocarbons. Calibration was performed with a certified standard of 100 ppm benzene in nitrogen. The gas chromatograph was equipped with a 60 m x 0.32 mm DB-1 (poly methyl siloxane) column and dual detector system (FID and ECD). The oven temperature started with a 2 minute hold at -65 ºC and increased to 220 ºC at 6 degrees per minute.

Results

The results showed between 60 and 110 ppthC of total fuel components in the vapor phase, which corresponded to fuel-to-air mass ratios between 0.03 and 0.05. The concentration went up with altitude and went from near or below the lower flammability limit at taxi to above it during flight. When converted to partial pressure, the results closely matched vapor pressure predictions made by the California Institute of Technology. Confirmation that the samples were representative of the vapor in the fuel tank was aided by the analysis of a non-reactive gas phase component that was present in the fuel tank. The constant concentration of this tracer within a given flight confirmed the well-mixed nature of the tank, and the loss of tracer as the flight tests progressed was explained by pressure and temperature changes during flight. The concentrations were similar at each altitude in terms of total mass in the vapor phase, but the composition changed from flight to flight by shifting from lighter to heavier components, a consequence of “weathering” of the fuel during the flights. However, since weathering did not reduce the total hydrocarbon concentration, the danger of explosion from weathered fuel is not lower than that from the fresh fuel.

1.0 INTRODUCTION

1.1 Background

As part of the investigation of accident DCA96MA070 (the crash of a 747-131, N93119, operated as TWA Flight 800), the National Transportation Safety Board (NTSB) planned a series of test flights using a rented Boeing 747-121 series aircraft similar to the one involved in the crash. The objective of these tests was to learn as much as possible about operating conditions just prior to the crash. One of the many specific tasks of these test flights was to determine the concentration of fuel vapors in the Center Wing Tank (CWT) of the test aircraft. In late June 1997 the NTSB requested the Desert Research Institute (DRI) to collect air samples from the Center Wing Tank of the test aircraft during taxi and during flight and analyze the samples for jet fuel components.

DRI has extensive experience in the use of pre-evacuated stainless-steel canisters for sample collection from various sources. DRI has used this technology for samples of ambient air, automobile and diesel truck exhaust, fireplace smoke, soil-gas vapors, and other locations where representative samples of air containing compounds of interest are needed. Once the sample is preserved in the canister, it can be safely transported back to DRI's laboratory in Reno, Nevada, for analysis. The fuel vapors targeted here were hydrocarbon species in the range of approximately four to twelve carbon atoms, which is the same range normally targeted in ambient air sampling for photochemical smog precursors. This is the exact range that DRI's laboratories have extensive experience in determining and quantifying.

1.2 Guide to Report

This section has provided some background as to the nature and origins of the project. Section 2 details the experimental methods used in both the field and laboratory phases of the project. The results are summarized in Section 3 and some conclusions and recommendations are provided in Section 4. Appendix A contains the field sampling sheets, Appendix B contains the chain-of-custody forms for the canisters, Appendix C has the individual sample canister results presented, while Appendix D contains the merged database for all sample canisters.

2.0 EXPERIMENTAL METHODS

This section describes both the field and laboratory methods used in this project. It also contains a description of the quality control efforts used.

2.1 Vapor Sampling System

Six, one-liter stainless steel sample bottles were attached to a six-port manifold with one main shut-off valve at the manifold inlet and a shut-off valve for each of the six pre-evacuated sample bottles. Neither a pump, nor any other electrical components were used for vapor sampling during the flight tests to eliminate the possibility of electrical sparks that could ignite the fuel vapors. The first pre-evacuated bottle was used to purge and flush the sampling line and manifold with a fresh vapor sample at a pre-selected time after which the valve to this bottle was closed. Immediately, a second bottle was opened to collect the sample used for vapor analysis. This process was followed for each of the 3 samples that were collected during each of the three the flight tests. Consequently, six bottles were used to collect 3 samples for analysis.

The vapor collection manifold was connected to the center wing tank with 1/8 inch (outside diameter) stainless steel tubing that was sheathed from the front spar to the box containing the manifold with 1/2 inch (outside diameter) copper tubing in order to provide a double wall between the aircraft environment and the fuel vapors. The sampling tube entered the tank through the front spar and through an access panel on spanwise beam # 3. The tube extended about 12 inches into the space between spanwise beam # 3 and # 2. The end of the sampling line was about 30 inches from the tank bottom and about 35 inches left of the tank center line. The 1/8 inch sampling line was about 25 feet long for a line volume of approximately 0.016 liters, based on an inside

diameter of 0.065 inches. Thus, the purge bottle flushed the line approximately 60 times prior to taking the sample. The nearest temperature probes were on the thermocouple tree located at butt line 0 (BL0) in this bay and midway between spanwise beams 3 and 2. Thermocouple number 6170274 was at BL 0 (about 35 inches to the right of the sample line port), and about 36 inches above the tank floor. The data from this thermocouple at the time of sampling are presented in Table 3-1.

The manifold and 6 bottles were enclosed in an aluminum box that could be sealed to prevent any vapors from escaping into the pressurized aircraft environment. The sampler box with manifold system is shown in Figures 2-1, 2-2, 2-3 and 2-4, which show, respectively, the entire sampler installed in the test aircraft, the top view of the sampler with the canisters, a close up of the canister connections and an exterior view of the sampler showing the valves.

After installation, the system was tested by applying vacuum to the entire system for 4.5 hours with a vacuum gauge at the CWT end of the sample line. No change was detected in the vacuum level after the 4.5 hours. The vacuum gauge was then removed and the time to fill the canister measured at 15 seconds to atmospheric pressure. The canisters were then installed and the sampler readied for the first flight.

Figure 2-1 Vapor sampler installed in the forward cargo hold of the test aircraft. The enclosure is approximately 30" in front of the Front Spar. Part of the fresh water tank is visible on the right edge of the figure.

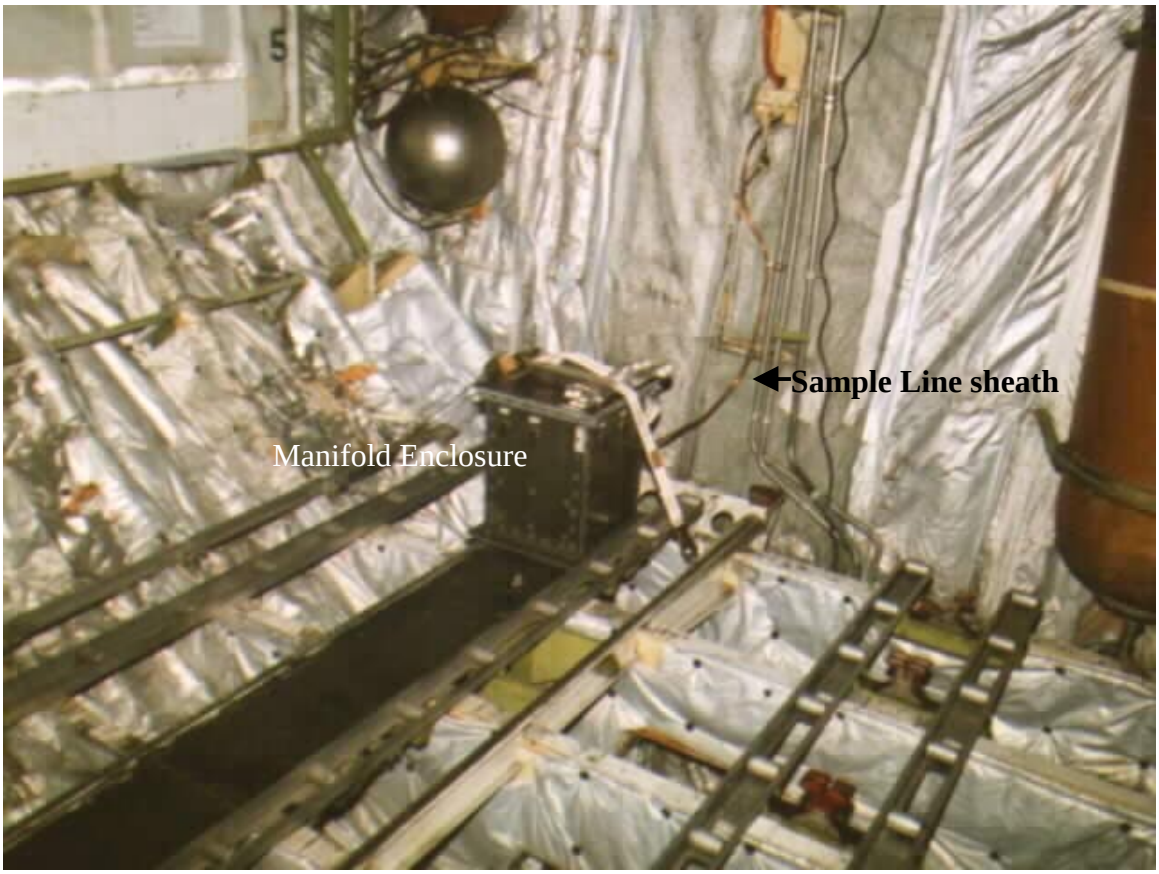
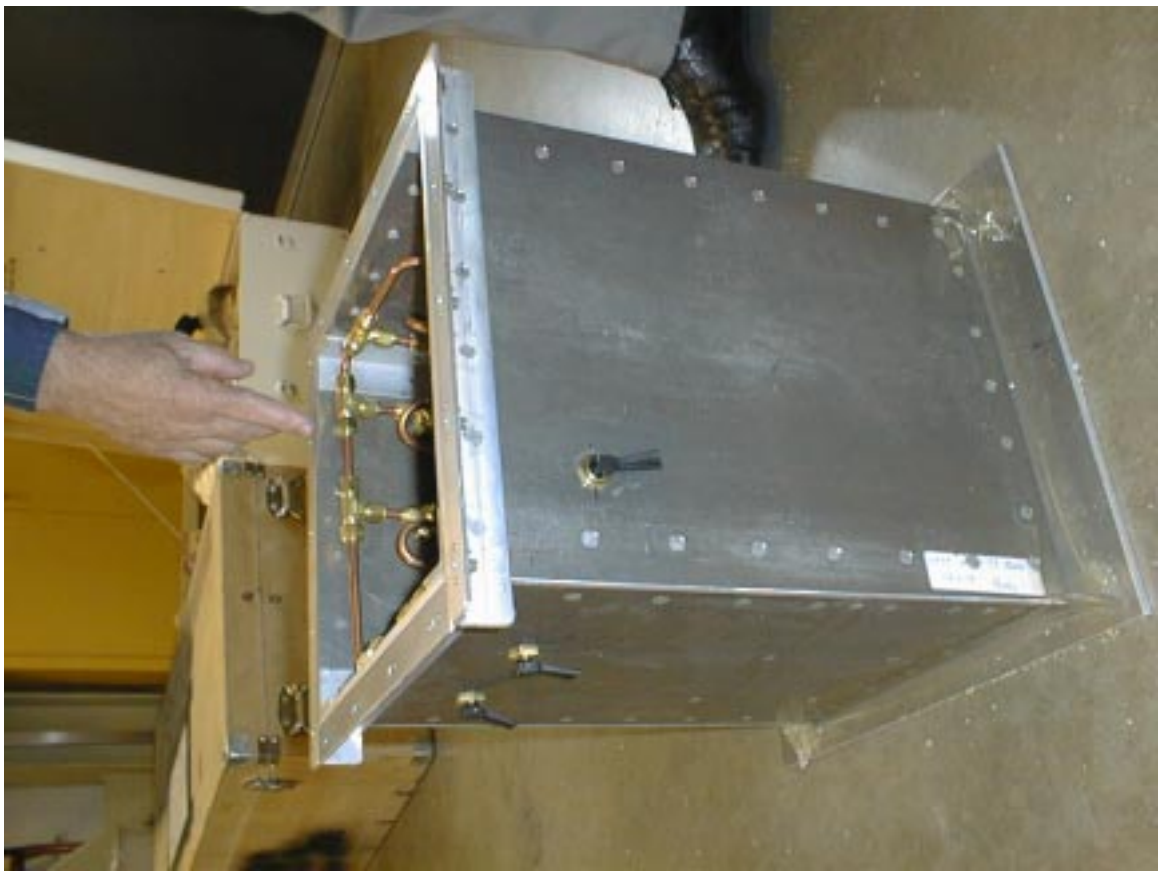


Figure 2-2. Top view of Sampler with Canisters Installed. Left front is attachment point for sample line to CWT.

Figure 2-3. Close-up view of sampler with canisters installed. Fitting attached to wall is canister valve which is operated from outside.

Figure 2-4. View of exterior of sampler. Black toggle switch is the operating lever for the canister valve.



2.2 Sampler Operation

The sampler operation protocol is reproduced here in Figure 2-5. The six bottles in the sampler would thus allow three samples to be collected and it was decided that these would be taken at: 1) taxi; 2) approximately 10,000 feet during climb; and 3) approximately 14,000 feet during climb. Each flight also had a field sampling log sheet, copies of which are included as Appendix A.

Figure 2-5. Sampling Protocol.

Sampling Protocol (7/7/97)

Pre Sampling:

1. Load canisters. Ensure fittings are tight.
2. Record position of canister on log sheet.
   I.e., which canister number is attached to which valve.
3. Label Canister with respect to:
   a) Location
   b) Date
   c) Intended use (i.e. purge or sample, ground sample or inflight)
4. Check to insure that all toggle valves are shut.
5. Open all canister valves. Listen for leaks.
6. Ensure log is filled out.
7. Close sample box, ensure all fittings are ready.

Sampling:

1. At appropriate time, open purge bottle toggle valve.
2. Exactly 15 seconds later, shut purge bottle toggle valve and open sample bottle toggle valve.
3. Exactly 15 seconds later, shut sample bottle toggle valve.
4. Record sample in log, note any unusual events/conditions.

Post-Sampling:

1. Open sample box.
2. Close all canister valves.
3. Confirm that positions of canisters match log sheet.
4. Write actual use on canister tag, if different from plan.
5. Remove canisters and recap.
6. Box and return canisters to John Sagebiel using pre-addressed FedEx labels.

2.3 Flight Operations Summary

Three samples were collected during each of three flight tests which took place among other flights of the whole flight test program. This section will briefly describe the flight test program to put the vapor sample fights in context. The entire flight test program description is in the NTSB report: "Flight Test Group Chairman's Factual Report of Investigation."

Prior to the flight test program, approximately 50 gallons of Athens-blended fuel taken from an outboard wing tank of an aircraft that had flown from Athens to JFK was loaded into the center wing tank of the test aircraft. In order to ensure that the fuel sample was representative, a nominally empty tank truck was used to first remove approximately 3000 lb of fuel from the tank and then off-loaded approximately 1000 lb of fuel to flush the truck's pumping system. The truck then pumped approximately 50 gallons of fuel to the CWT of the test aircraft. This took place on Monday, July 14, 1997, prior to any flight operations. This fuel was left on board for all flights including those in which vapors were sampled.

The first three days' flight operations are summarized in Table 2-1 which includes information on which air conditioning packs were used, and how long they were on prior to flight. For each flight, rotation time is given as is the highest altitude attained during the flight and landing time. Finally, an indication is given as to on which flights vapor samples were collected, and a numeric designation for that flight which will be used in the data analysis in Section 3.

Table 2-1. Summary of Flight Operations. All times are EDT.

Date	Event	A/C Packs Used	A/C Packs on Time	Rotation Time	Highest Altitude	Landing Time	Vapor Sample	Vapor Flight #
7/14	Fuel added to CWT							
7/14	Flight	2, 3	0950	1237	17,500’	1910	No	
7/15	Preconditioning Flight	1, 2, 3	0845	1211	35,000’	1628	Yes	Flight 1
7/15	TWA Simulation Flight	1, 3	1628	2021	19,000’	2257	Yes	Flight 2
7/16	Flight	1, 3	0750	1044	35,000’	1628	No	
7/16	Flight	1, 2	1636	1955	17,500’	2241	Yes	Flight 3

The first test flight took place on Monday, July 14, and involved the use of air conditioning packs 2 and 3. The first flight in which samples were collected occurred on July 15, 1997, and involved all three air conditioning packs on at once. This flight was designed to pre-condition the aircraft and systems for the actual simulation flight and included a two-hour soak at 35,000 feet. The second vapor sampling flight was the TWA Flight 800 simulation flight and it was basically a continuous operation with the previous flight. The third flight in which vapor samples were collected, occurred on July 16, 1997; however, there was an additional flight in between which added to the weathering of the fuel. The difference between the two flights on July 16 was a change in which of the air conditioning packs were running. In the first flight, packs 1 and 3 were operated, and in the second flight, packs 1 and 2. Prior to each flight, the air conditioning packs were operated for approximately a three-hour period.

2.4 Canister Handling

This section briefly describes the canister handling practices before and after shipment of the canisters to the field site for the test flights.

2.4.1 Cleaning and Evacuation

Standard protocol for canisters cleaning at the DRI laboratory is six cycles of repeated pressurization and evacuation using humidified zero air (an extremely clean blend of 20% oxygen and 80% nitrogen), while heated in an oven at 140ºC. Each pressure/vacuum cycle last approximately 40 minutes. Following the cleaning cycle, one canister of a lot of six is filled with the humidified zero air, equilibrated for 24 hours and analyzed. For this project the standard for cleanliness was less than 50 parts per billion of carbon (ppbC) total in the canister. Once certified clean, the test canister is evacuated to –29”Hg, fitted with a sample tag and stored with the other canisters from that lot. Canisters were then shipped to DRI personnel in New York, who oversaw installation and Boeing personnel who operated the sampler.

2.4.2 Pressurization

Once back at DRI following sampling, the canisters were pressurized to approximately +1 atm with dry zero air and allowed to equilibrate for 48 hours. This procedure served two purposes: it diluted the sample slightly and it served to stabilize the samples. In addition, analysis is easier as one does not have to use vacuum to pull samples out of the canisters, which would make reading volumes more difficult. The pressurization is a standard practice and is performed with a test-gauge and an inlet for controlling the pressurization flow. The test-gauge is a certified compound gauge that reads both vacuum and pressure. The initial vacuum in the canister is read, flow is started and run until a desired pressure is reached and then the final pressure is read. The initial and final pressures (gauge reading) are converted to absolute pressure by subtracting the atmospheric pressure (commonly 25”Hg at DRI’s altitude). This gives the dilution factor.

For these canisters, which arrived with indicating pressures between +1 psi and –10”Hg, the dilution factors were between 2.5x and 4.5x. Once pressurized, the canisters were equilibrated for approximately 48 hours before analysis.

2.5 Canister Analysis

The analysis of whole air samples for speciated hydrocarbons is not a routine analysis. Our prior experience in collecting and analyzing samples of ambient air and samples specifically resulting from motor-vehicle emissions (in tunnels and from dynamometer exhaust) has identified several significant challenges that we have worked to overcome. These include the analytical column selection and performance, and the inlet system and recovery of the higher molecular weight compounds. This section will address these challenges and present the technical approach to the analysis of speciated hydrocarbons for this project.

For the specific challenges of this study, we selected a standard column which met all the needs of this project. For the C2-C12 range we used a DB-1 column (60 m long 0.32 mm i.d., 1 µm film thickness polymethyl siloxane bonded phase). An oven program of -65 to 220 °C with an initial 2-min. hold and a 6 °C/min. program resolves most compounds in this range. The gas chromatograph is a Hewlett-Packard 5890 Series II, equipped with FID detector and an ECD (electron capture detector) with the column effluent split 9 parts to the FID and 1 part to the ECD. This allows us to monitor halogenated compounds on the ECD at the same time as the FID detects hydrocarbons.

The method we employ for injecting the sample on the DB-1 column involves a multi-port valve switching system that collects a small (ca. 0.09 ml) sample in a stainless steel loop, and upon switching, puts the sample loop in-line with the carrier gas which

forces the sample onto the column. Our inlet system has been modified to have an absolute minimum number of transfer lines and valves for getting the sample from the sample-loop to the column. In addition, the entire inlet is heated to prevent any condensation of compounds during the transfer.

Gas chromatography with flame ionization detector is the established technique for monitoring volatile hydrocarbons, ozone precursors, in ambient air. The DRI analytical procedure for analysis of C2-C12 hydrocarbons is consistent with the EPA document "Technical Assistance Document for Sampling and Analysis of Ozone Precursors" (October 1991, EPA/600-8-91/215).

2.5.1 Calibration

The GC/FID response is calibrated in ppmC, using primary calibration standards traceable to the National Institute of Standards and Technology (NIST) Standard Reference Materials (SRM). The NIST SRM 1805 (254 ppb of benzene in nitrogen) is generally used for calibrating the analytical system for C2-C12 hydrocarbon analysis, however, for this project a special standard of 100 ppm benzene in nitrogen was used. This standard was purchased from AGA gas, Cleveland, OH. Based on the uniform carbon response of the FID to hydrocarbons, the response factors determined from these calibration standards are used to convert area counts into concentration units (ppbC or ppmC) for every peak in the chromatogram.

Identification of individual compounds in an air sample is based on the comparison of linear retention indices (RI) with those RI values of authentic standard compounds, as well as with the RI values obtained by other laboratories performing the same type of analysis using the same chromatographic conditions (Auto/Oil Program,

Atmospheric Research and Exposure Assessment Laboratory, EPA). The DRI laboratory calibration table currently contains approximately 150 species, including all 55 target compounds listed in the EPA document "Technical Assistance Document for Sampling and Analysis of Ozone Precursors" (October 1991, EPA/600-8-91/215). The calibration list is contained in Appendix D.

All of the gas chromatographs are connected to a data acquisition system (ChromPerfect, designed and marketed by Justice Innovation, Inc.). The software performs data acquisition, peak integration and identification, hardcopy output, post-run calculations, calibrations, peak re-integration, and user program interfacing. Acquired data are automatically stored on a hard disk. A custom-designed database management system is used to confirm all peak identifications. This step is described below.

2.5.2 Quality Assurance

Quality assurance activities included canister cleaning and certification, calibration, blank system checks, daily calibration checks and replicate analyses of canister samples.

Canisters are cleaned as described above. Once a lot has been certified as clean the chromatograms of lot certification are stored in the laboratory’s permanent files. Any lot that fails is sent back and re-cleaned and re-certified.

The instrument was calibrated at the beginning of this project and then single point calibration checks were run each day immediately after running a system blank. These steps confirm the cleanliness of the system and the accuracy of the calibrations.

The replicate analyses confirm the analytical system performance and serve as a secondary check on calibration. Standard procedures call for 10% of samples to be

replicated; however, it was decided to run extra replicates on this project to confirm the equilibration of the higher molecular weight compounds. The results are in Table 2-2.

Table 2-2. Results of Replicate Analyses.

Canister	Date Pressurized	1st Anal. Date	Replicate Date	1st Anal. Amount	Replicate Amount	% Difference
DRI-F	16-Jul	20-Jul	22-Jul	101.6	103.5	1.9%
DRI-H	19-Jul	21-Jul	23-Jul	111.9	110.8	-1.0%
DRI-B	16-Jul	18-Jul	23-Jul	92.2	96.4	4.5%
DRI-N	19-Jul	21-Jul	23-Jul	95.3	96.4	1.1%

2.5.3 Data Processing

The goal of our data processing is to provide accurate data combined into a single database for each analysis. A raw data signal is collected from the detector and stored as a digitized signal by the computer system. This signal is translated into a chromatogram by the chromatography software and integrated to give peaks and areas of those peaks. Using the appropriate response factors, area counts are converted to the calibration parameter. The laboratory technician reviews this information and adjusts integration as necessary. A report is generated by the chromatography system.

For canister measurements, the report is imported into a custom-designed database program that has the user identify up to 12 reference peaks that are then used by a matching algorithm to compare them with a lookup table of all our identified compounds. This program also flags peaks it cannot uniquely identify and the user must then resolve any identification problems. A report can then be printed, and the individual sample data can be merged into a master database of identified compounds for the project.

The primary functions of data management are to have data stored in a consistent fashion that is both secure and available. To serve this need we have established a file server system that provides a central storage area for all laboratory and field data. The databases have defined structures that are maintained in one area so that all field names will be consistent, which permits easy merging and comparison of the various databases. Locating all data on a central file server prevents the problems associated with having multiple copies of the same data set, and allows the individuals charged with data processing, security, validation, and QA access to the same databases.

For security, all data are backed up on tape cartridges at regular intervals, depending on the sample load. Redundant backups of critical data are maintained to prevent loss due to failure of the backup media. The network that connects the organic analysis laboratory computers is an isolated local area network (LAN) that cannot be accessed by outside computers. There are no Internet or modem connections to this LAN, thus security cannot be breached from outside. Internal security is maintained by locking of offices and by password-protected accounts on the LAN that record each individual's log-ins and what data were accessed. Other security procedures include a history file in the data collection system for the canister gas chromatographs that records the date, time, and name of the individual making changes to any file. The chromatogram files generated by this system also bind the calibrations with the file, preventing accidental changes in the data by changes in calibrations.

Data from the field, laboratory, and various quality control activities must be unified prior to reporting in a measurement database. Values must be accepted, corrected, flagged as suspect, or removed from this database after they are evaluated

against validation criteria. Precision estimates associated with each value must be calculated from performance test data. The relational database FoxPro for Windows has been selected for this database management task.

Data validation is the most important function of data processing. Sample validation consists of procedures which identify deviations from measurement assumptions and procedures. Three levels of validation are applied which will result in the assignment to each measurement of one of the following ratings: 1) valid; 2) valid but suspect; or 3) invalid.

Level I sample validation takes place in the field or in the laboratory and consists of: 1) flagging samples when significant deviations from measurement assumptions have occurred; 2) verifying computer file entries against data sheets; 3) eliminating values for measurements which are known to be invalid because of instrument malfunctions; and 4) adjustment of measurement values for quantifiable calibration or interference biases. Each gas chromatogram is examined immediately after the run to verify that peak integrations have been performed properly. The peak integration, retention times, and peak identifications assigned by the ChromPerfect software are stored to disk as an ASCII file. The files are then read into a FoxPro data file for additional processing and verification of peak identifications. The peak assignments for the major constituents (typically about a dozen peaks) in the chromatogram are manually verified, and retention times are recalculated for all detectable peaks based upon regression between sample and reference retention times for the manually identified peaks. The adjusted retention times are used to assign peak identifications for all detectable peaks (the reference file currently contains approximately 150 identified compounds). The retention time adjustments and

peak assignments are executed automatically by a FoxPro program. The ChromPerfect and subsequent confirmatory peak identifications are then compared and discrepancies are resolved by the analyst based on peak patterns or confirmatory identification by GC/MS. In the final step, the Level I validated data are appended to the master database. Each sample appears as a record within the database and is identified by a unique sample identification, site, date, and time and as a primary, collocated, blank, spiked, or replicate sample.

When all data for a record have been assembled, the FoxPro programs perform Level II validation checks. Level II validation applies a consistency test based on known physical relationships between variables to the assembled data. Examples include range checks (both single species and ratios of species) and examination of scatterplots and time-series plots for outliers.

2.5.4 Reporting

Data are initially reported in units of volume ratio of carbon. For example the total hydrocarbon results are given in parts-per-thousand of carbon (ppthC). This is just a scale adjustment from parts-per-million of carbon (ppmC) or parts-per-billion of carbon (ppbC). For an individual compound this is equivalent to the parts-per-thousand by volume multiplied by the number of carbon atoms in the compound. This value is most of use because it can be summed over many different compounds easily and the calibration in ppmC allows for the maximum information to be obtained about unknown compounds.

3.0 RESULTS AND DISCUSSION

3.1 Overview of Results

This section describes the results of the analysis of the samples collected for the fuel vapor hydrocarbons. Both total hydrocarbons and the individual species that were determined are presented. The results are also presented as fuel to air ratios. The temperatures and pressures at the time of collection are used for a comparison with the CIT fuel vapor pressure determinations. In addition, Section 3.7 contains a discussion of an inert tracer that was present in the samples.

3.2 Summary of Results as Total Hydrocarbons

This section presents the total hydrocarbon results along with the conditions at the time of sampling. Table 3-1 shows a summary of the data. To identify the samples, the canister number is shown along with the sample flight number and altitude. The flight sequence shows which flight each sample is relative to when fuel was added to the CWT, as discussed in Section 2.3 and Table 2-1. The total hydrocarbons measured in the canister are reported in units of ppthC or parts-per-thousand of carbon. This is a standard unit used in atmospheric chemistry to quantitate the amount of hydrocarbons in a given air sample and is described in Section 2.5.4. Also shown in Table 3-1 is the temperature of thermocouple number 6170274, the nearest to the sample collection point, presented in both Fahrenheit and Celsius degrees. The temperature data are from the NTSB. It is noted that the temperature of the thermocouple nearest the sample collection point is not the same as the temperature of the fuel and this may complicate the temperature comparisons. Lastly, the reported approximate altitude at the time of sample collection is presented. Since sample collection takes approximately 15 seconds, and the aircraft is

climbing, the altitude did change slightly during collection, but this subtle change should not affect the sample interpretation, since the samples are quantitated on a volume of hydrocarbon to volume of air basis. Thus, this slight change in altitude and the corresponding change in pressure will not affect the sample, since the number of moles of hydrocarbons with respect to the number of moles of air (the equivalent of the volume to volume ratio) does not change.

Table 3-1. Summary of Samples Collected and Conditions at Time of Sample Collection.

Canister Number	Sample	Flight Sequence[1]	HC (ppthC)	Temp. (°F)	Temp. (°C)	Altitude (feet)
DRI-M	Flight 1 Taxi	Second	61.2	120	48.9	0
DRI-B	Flight 1 10,000		92.2	114	45.6	10,300
DRI-F	Flight 1 14,000		101.6	116	46.7	14,100
DRI- L	Fight 2 Taxi	Third	71.1	123	50.6	0
DRI- N	Flight 2 10,000		95.3	115	46.1	10,100
DRI- H	Flight 2 14,000		111.9	117	47.2	14,100
DRI-R	Fight 3 Taxi	Fifth	57.3	114	45.6	0
DRI-J	Flight 3 10,000		74.3	109	42.8	10,000
DRI-P	Flight 3 14,000		99.1	108	42.2	14,600

[1]Flight Sequence is the flight event since fueling of the CWT.

These data show that the concentration of hydrocarbons went up with altitude in all three flights, however, the increase was not linear. Two important factors are driving the concentration in the tank for any given sample: the temperature and the altitude.

The exact nature of the temperature effect can clearly be seen in that at any given altitude, the concentration goes up with temperature. This will be reviewed in Section 3.6 where a comparison is made with the CIT measurements for vapor pressures at various temperatures. To compare the effects of other changes, the increase in concentration over the taxi value was computed and is presented in Table 3-2.

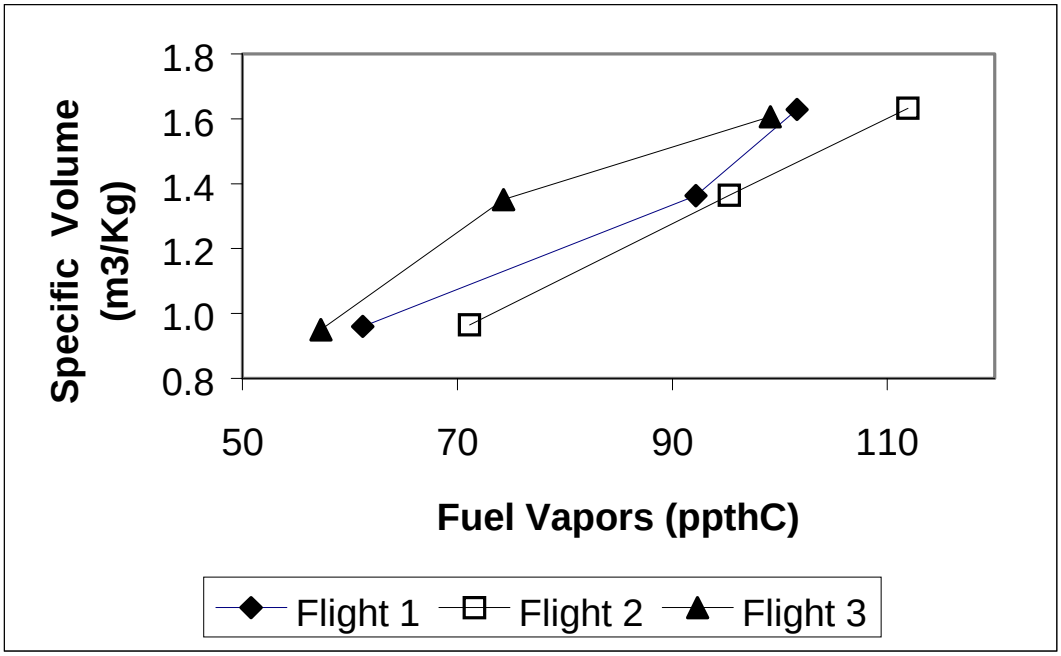
Table 3-2. Increases in Concentration at Altitude over Taxi Values.

	Percent Increase over Taxi		
Sample	Flight 1	Flight 2	Flight 3
10,000	51%	34%	30%
14,000	66%	57%	73%

Comparing the values in Table 3-2 is not straightforward because the temperature changes are not consistent (see Table 3-1), but some conclusions can be drawn. In all cases, the change from sea level to higher altitudes was reasonably consistent across the three samples. As discussed later in this section, the speciation changed considerably during these flights as the fuel aged, yet similar increases are still seen. One interpretation of this is that the heat transfer within the tank consistently results in evaporation during the aircraft climb. This results in maintaining a relatively consistent level of fuel concentration within the tank ullage.

Another approach to looking at the change in fuel vapor concentration is presented in Figure 3-1 which shows the change in fuel vapors with specific volume (m^3/kg) of air (reciprocal density). The specific volume is computed from the ideal gas law and the measured temperature and pressure. The specific volume increases with increasing altitude in the atmosphere. The three flights are plotted as separate lines and it can be seen that for all three flights the trend is linear with increasing concentration for increasing air specific volume. The reason this is occurring is that the amount of fuel vapor in absolute terms is staying approximately constant while specific volume in the tank is increasing as the altitude increases. However, the significance of this figure is the generally linear increase in concentration with decreasing pressure which is raising the fuel to air ratio as discussed in Section 3.8.

Figure 3-1. Change in Fuel Vapor Concentration with Change in Specific Volume.



3.3 Summary of Speciation

As part of this effort, each sample was carefully analyzed to determine the exact composition of each sample. The individual sample results are attached as Appendix C and the results of all identified peaks are attached as Appendix D. One measure of how successful this effort was is the measure of the percent of each sample that was identified in the speciation. The percent identified is presented in Table 3-3 for each sample and the average. On average we successfully identified over 80% of the mass of these samples which is generally considered very good.

Table 3-3. Percent of Mass Identified for Each Sample.

Sample	Percent Identified
Flight 1 Taxi	83.4%
Flight 1 10,000	82.1%
Flight 1 14,000	81.0%
Fight 2 Taxi	82.3%
Flight 2 10,000	81.0%
Flight 2 14,000	80.8%
Fight 3 Taxi	81.2%
Flight 3 10,000	80.0%
Flight 3 14,000	77.3%
Average	81.0%

The highest concentration species seen in these samples are the normal alkanes, with nonane (C_9) and decane (C_{10}) being the most prominent species. Table 3-4 lists the species with the highest average concentration for all nine samples collected. Of the eighteen species in this table, nine of them are alkanes, with eight straight-chain or brached-chain alkanes and one cyclo-alkane. The other nine compounds are aromatic compounds. Considering the significant differences in the chemical behaviors of these classes of compounds, an understanding of the exact speciation of this fuel vapor is very important.

The nearly complete speciation of these samples allows two important parameters to be calcuated: the average carbon number, and the average carbon to hydrogen ratio. These values are useful for looking at bulk properties of the composition of fuel vapor, and are helpful in combustion modeling of the fuel vapor. The average carbon number for the individual samples are presented in Table 3-5 in the next section and the overall average carbon number is presented in Table 3-7. The carbon number changed by at most less than 9%, trending toward higher carbon numbers as the fuel weathered. The carbon to hydrogen ratio was determined by looking at the detailed speciation (presented

in Appendix C is each compound's carbon to hydrogen ratio) and producing a weighted average which was 1.8. Thus the average compound in this study had the composition $C_{9.58}H_{17.2}$ for a molecular weight of 132.4. This is a very similar composition to that obtained by UNR using a completely independent technique.

The other interesting observation from the speciation of these samples was the prominence of cyclo-alkanes. While only one of these compounds made the top list, there are many more of these than are commonly seen in other hydrocarbon fuels such as gasoline and diesel.

Table 3-4. Highest Average Concentration Species Identified.

Species	Average Amount ppmC
n-decane	5416
n-nonane	4331
1,2,4-trimethylbenzene	3321
n-undecane	2829
isopropylcyclohexane	2579
m/p-xylene	2353
n-octane	2352
1,2,3-trimethylbenzene	1977
1,3,5-trimethylbenzene	1673
C10-parafin	1565
indene	1448
p-diethylbenzene	1423
m-ethyltoluene	1422
2-methyloctane	1386
3-methyloctane	1274
2,5-dimethylheptane	1237
p-ethyltoluene	1169
2-propyltoluene	1148

The other one hundred and forty-three compounds that were looked for or identified in these samples are listed in Appendix D. This listing should be of use for future assessments comparing the liquid fuel speciation with the vapor.

3.4 Summary of Carbon Groups

Another way of looking at the compounds found in this study is to group them by approximate carbon number group. This method is the same as that used by the University of Nevada, Reno (UNR) in the data analysis of headspace gas chromatographic results. To accomplish this separation, the retention times are divided such that each normal alkane is the center of that carbon number's grouping. For example, half-way between n-octane and n-nonane is the time that divides the C8 from the C9 group. Since the analyses conducted by DRI contain more separation than those conducted by UNR, we present more groupings. In DRI's groupings, the C3 fractions contains all the compounds lighter than C3 as well. Table 3-5 contains the results of the nine samples collected as part of this project presented as ppmC for each group.

The most striking feature of this Table is the change that occurs throughout the different flights and even within a single flight. The first taxi sample has almost equal amounts of C9 and C10 fractions, but by the last flight the taxi sample shows a clear dominance of the C10 fraction, by almost 50% over C9. Also comparing the same two samples for C12, we see that the concentration has nearly doubled over this time. This observation is consistent with the expected weathering of the fuel whereby the lighter components preferentially evaporate and are purged from the tank by the change in pressure as the plane ascends and then that portion of the tank ullage is replaced by clean air during descent. The lighter components preferentially evaporate because they have higher vapor pressures than the heavier components. It should be noted that while some significant changes in the speciation did occur, the weathering did not change the total mass of fuel vapor present in the CWT.

Table 3-5. Summary of Carbon Groups Totals as ppmC.

Carbon Group	Flight 1 Taxi	Flight 1 10,000'	Flight 1 14,000'	Flight 2 Taxi	Flight 2 10,000'	Flight 2 14,000'	Flight 3 Taxi	Flight 3 10,000'	Flight 3 14,000'
Total C3	15	15	18	18	18	19	9	9	9
Total C4	51	58	61	61	42	48	18	18	12
Total C5	198	252	211	325	167	150	92	72	73
Total C6	584	621	554	525	339	364	142	118	118
Total C7	4213	4588	4318	3229	3109	3567	1413	1262	1354
Total C8	11830	13886	13382	11177	11553	12954	6549	6651	7454
Total C9	18275	24835	25135	21042	24475	27905	15914	17639	20858
Total C10	18573	31647	35472	24404	35043	41391	22134	29615	38360
Total C11	6153	13700	18269	8762	17019	21142	9225	15632	24629
Total C12	861	2358	4108	1203	3248	4354	1516	3201	6088
Ave. Carbon	9.17	9.43	9.59	9.35	9.62	9.67	9.61	9.82	9.96

Also presented in Table 3-5 is the average carbon number for the composition present in each sample, determined by weighted averaging of the detailed speciation. This value increases with weathering of the fuel and with altitude. The shift due to weathering has already been discussed and is an effect of the preferential evaporation of the lighter components resulting in higher average carbon numbers. The increase with altitude within a given flight may be due in part to the decreasing atmospheric pressure which allows heavier compounds to evaporate.

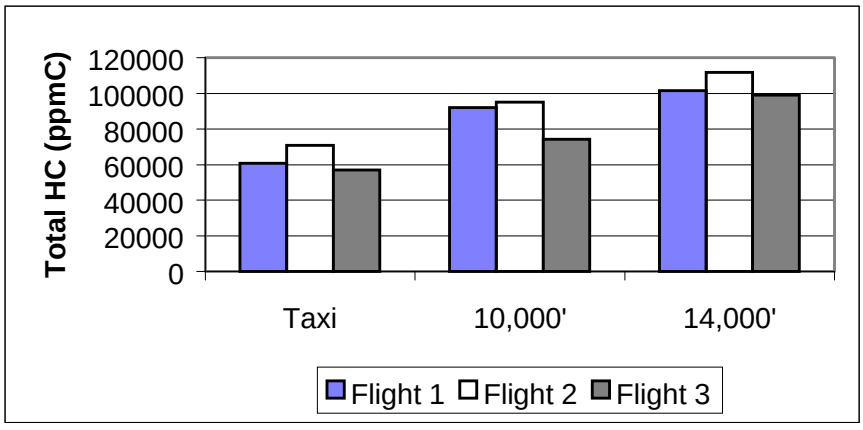
Another way of looking at the carbon group totals is presented in Table 3-6. Table 3-6 presents the data as the percent each group contributes to the total. In this view it is clear which of the fractions dominates any given sample. It can also be seen how much the fractions change as the fuel weathers. For example, on average, the fractions C9 and below decrease, while those C10 and above increase.

Table 3-6. Summary of Carbon Groups Totals as Percent of Each Sample.

Carbon Group	Flight 1 Taxi	Flight 1 10,000'	Flight 1 14,000'	Flight 2 Taxi	Flight 2 10,000'	Flight 2 14,000'	Flight 3 Taxi	Flight 3 10,000'	Flight 3 14,000'
Total C3	0.02%	0.02%	0.02%	0.03%	0.02%	0.02%	0.02%	0.01%	0.01%
Total C4	0.08%	0.06%	0.06%	0.09%	0.04%	0.04%	0.03%	0.02%	0.01%
Total C5	0.33%	0.27%	0.21%	0.46%	0.18%	0.13%	0.16%	0.10%	0.07%
Total C6	0.96%	0.68%	0.55%	0.74%	0.36%	0.33%	0.25%	0.16%	0.12%
Total C7	6.94%	4.99%	4.25%	4.56%	3.27%	3.19%	2.48%	1.70%	1.37%
Total C8	19.47%	15.10%	13.18%	15.80%	12.16%	11.58%	11.49%	8.96%	7.53%
Total C9	30.08%	27.01%	24.76%	29.74%	25.76%	24.94%	27.91%	23.77%	21.08%
Total C10	30.57%	34.42%	34.94%	34.50%	36.89%	36.99%	38.82%	39.91%	38.77%
Total C11	10.13%	14.90%	17.99%	12.39%	17.92%	18.89%	16.18%	21.06%	24.89%
Total C12	1.42%	2.56%	4.05%	1.70%	3.42%	3.89%	2.66%	4.31%	6.15%

Comparing the samples within one flight, the same kind of change can be see as from flight-to-flight. That is, from taxi to 14,000' the lower weight groups decrease while the higher weight groups increase. This is displayed graphically in Figure 3-2. The trend is toward similar results at each elevation with increases along with altitude.

Figure 3-2. Comparison of Total Hydrocarbons at Each Elevation.



Comparing Figure 3-2 with the results of the group speciation, we see a trend that from Flight 1 to Flight 3 at any given altitude, the total is similar, yet the speciation is dramatically different. The loss of the light species is made up for with a corresponding

increase in mass by the heavier species such that the total stays remarkably constant. Since the energy released in combustion will be proportional to the mass available, this indicates that the weathering will not reduce the energy available for an explosion, all other things being equal.

As discussed previously, another important value to determine is the average carbon number of the observed species. Table 3-7 shows that by using the carbon groups and weighting the average fraction with the number of carbons and summing over the range, we obtain an overall average carbon number of 9.58 for all samples. Applying the same methodology to each individual flight, we obtain values of 9.40 for flight 1, 9.54 for flight 2, and 9.80 for flight 3. This value will be important for comparing the ppmC values to the partial pressure values as in Section 3.6.

Table 3-7. Average Fraction of Each Carbon Group and Mass Mean Carbon Value.

Carbon Group	Average Fraction	Wt	Wt Ave
Total C3	0.00017	3	0.0005
Total C4	0.00050	4	0.0020
Total C5	0.00212	5	0.0106
Total C6	0.00459	6	0.0276
Total C7	0.03639	7	0.2547
Total C8	0.12808	8	1.0247
Total C9	0.26117	9	2.3505
Total C10	0.36200	10	3.6200
Total C11	0.17150	11	1.8865
Total C12	0.03352	12	0.4022
		Net:	9.58

The carbon grouping provides a clear way to compare these data with the headspace gas chromatography results prepared by UNR. It also gives a way to compare results both across test flights and within a given fight. The average number or carbons

for these samples is determined to be 9.58 which is important for assessing the total when the values are expressed as ppmC.

3.5 Changes Seen in Profiles

Another approach to looking at the carbon groups is to compare the light and heavy fractions for each flight. Figures 3-3 through 3-5 show the changes in fuel vapors from taxi, 10,000' and 14,000' for the C3 to C6 fraction. Figures 3-6 to 3-8 show the same sequence for C7 to C12. Each figure depicts the three fights next to each other so the change as the fuel weathers is clear.

For the low weight fractions (Figures 3-3 to 3-5) a clear pattern emerges with each successive flight showing decreases over the previous flight. For the heavier fraction (Figures 3-6 to 3-8) the pattern changes with the C7 to C9 fractions showing decreases and the C10 to C12 showing increases in fraction.

Another important comparison is presented in Figures 3-9 and 3-10 which show the concentration of fuel vapors for the three flights at the 14,000' level. Figure 3-9 should be compared to Figure 3-5 and Figure 3-10 should be compared to Figure 3-8. The concentrations follow the percents for the most part, a notable exception is the C10 fraction which looks different with flight 2 having the highest concentration of this group, yet flight 3 has the highest fraction of the mass in C10.

Figure 3-3. Comparison of C3 to C6 Fractions at Taxi.

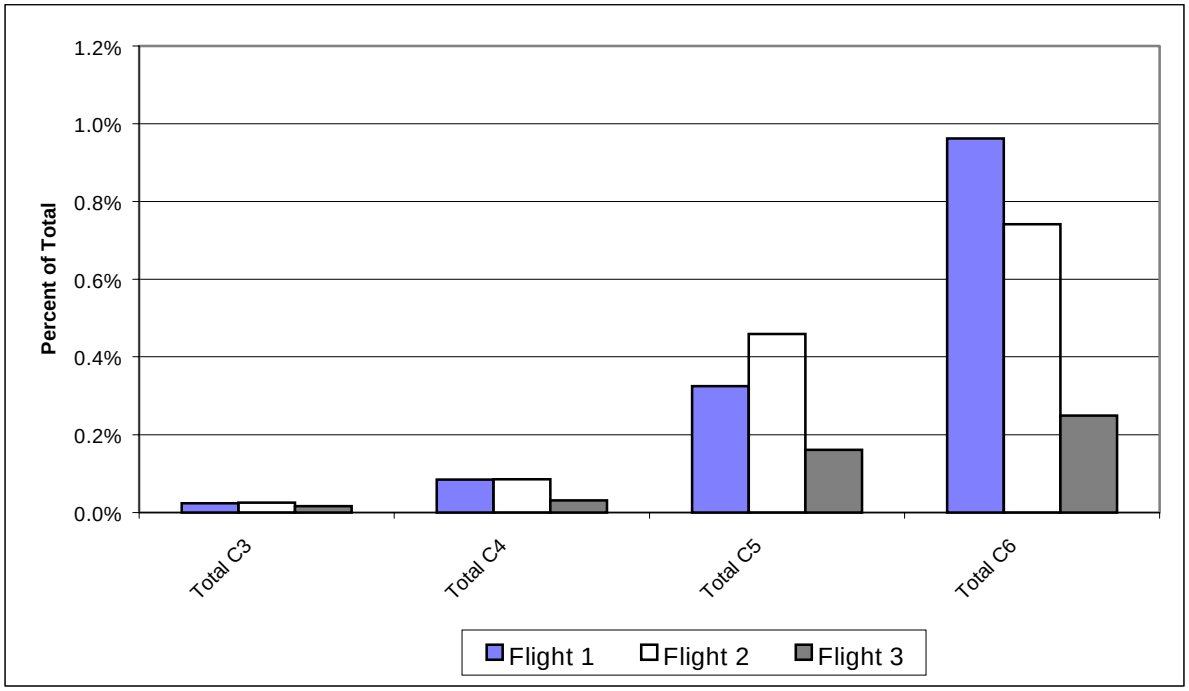


Figure 3-4. Comparison of C3 to C6 Fractions at 10,000'.

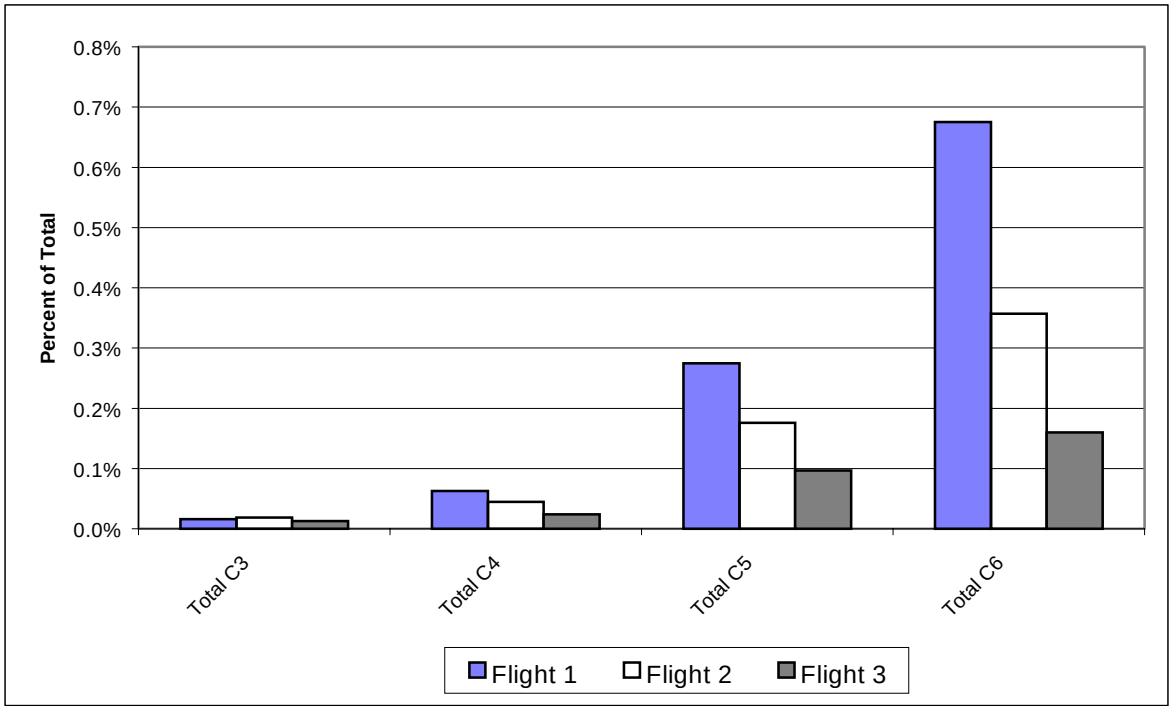


Figure 3-5. Comparison of C3 to C6 Fractions at 14,000'.

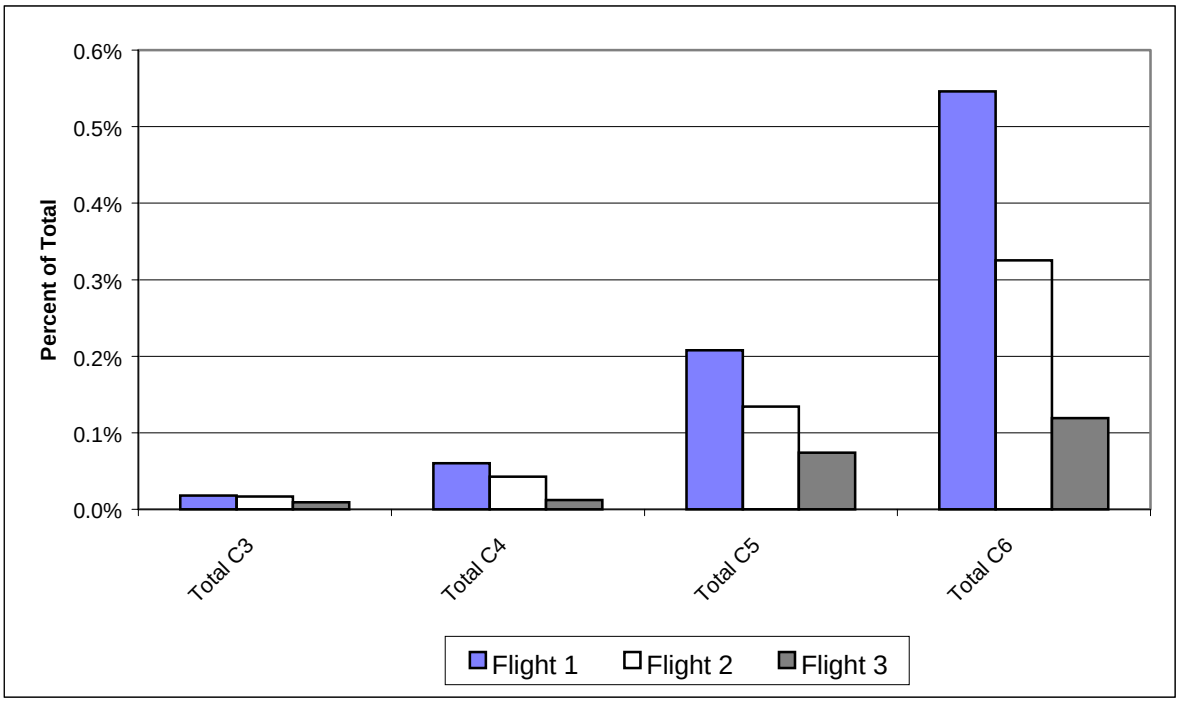


Figure 3-6. Comparison of C7 to C12 Fractions at Taxi.

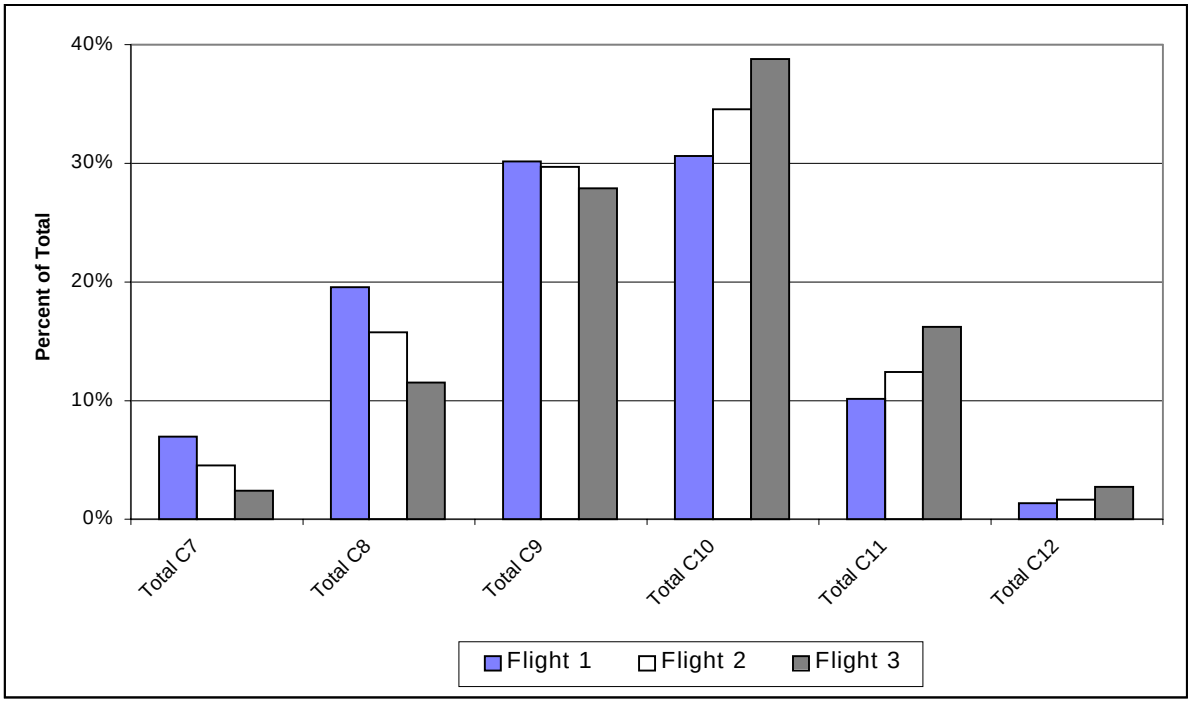


Figure 3-7. Comparison of C7 to C12 Fractions at 10,000'.

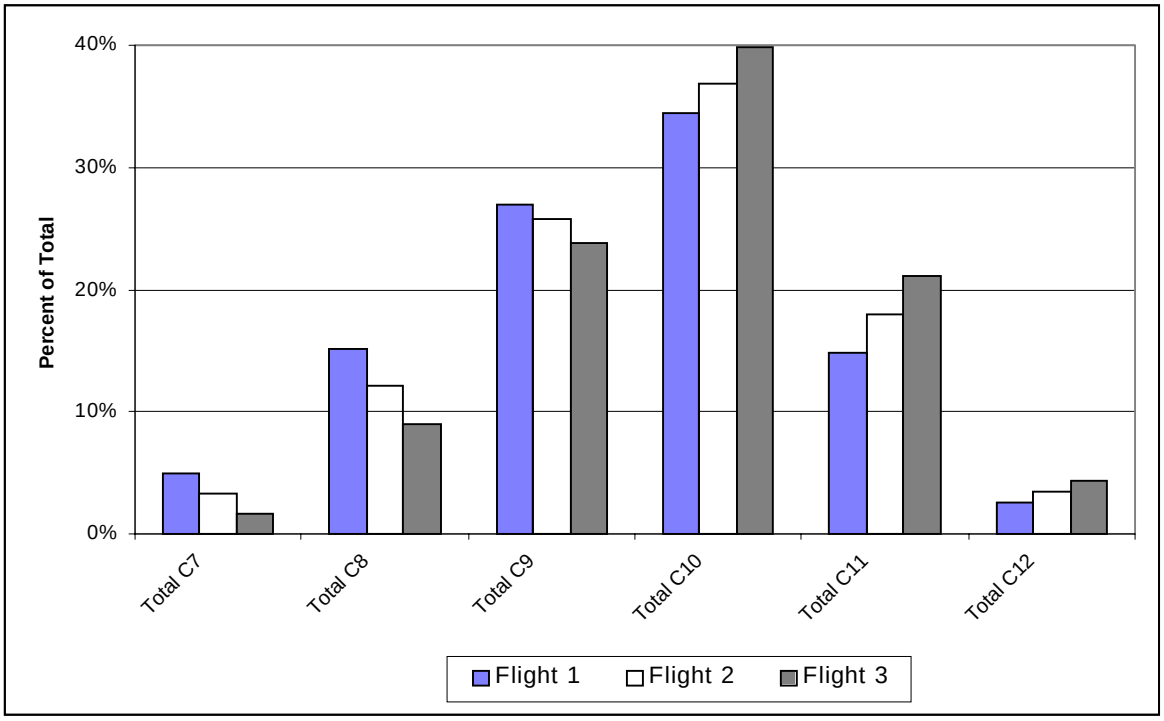


Figure 3-8. Comparison of C7 to C12 Fractions at 14,000'.

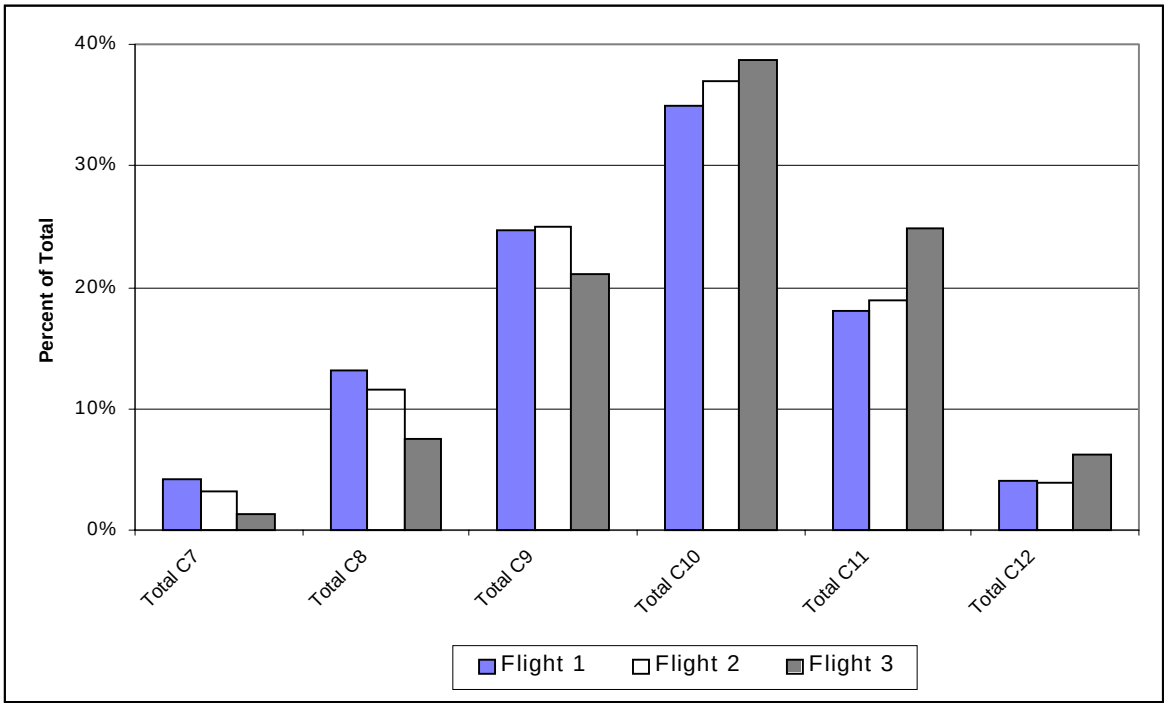


Figure 3-9. Comparison of C3 to C6 Concentrations at 14,000'.

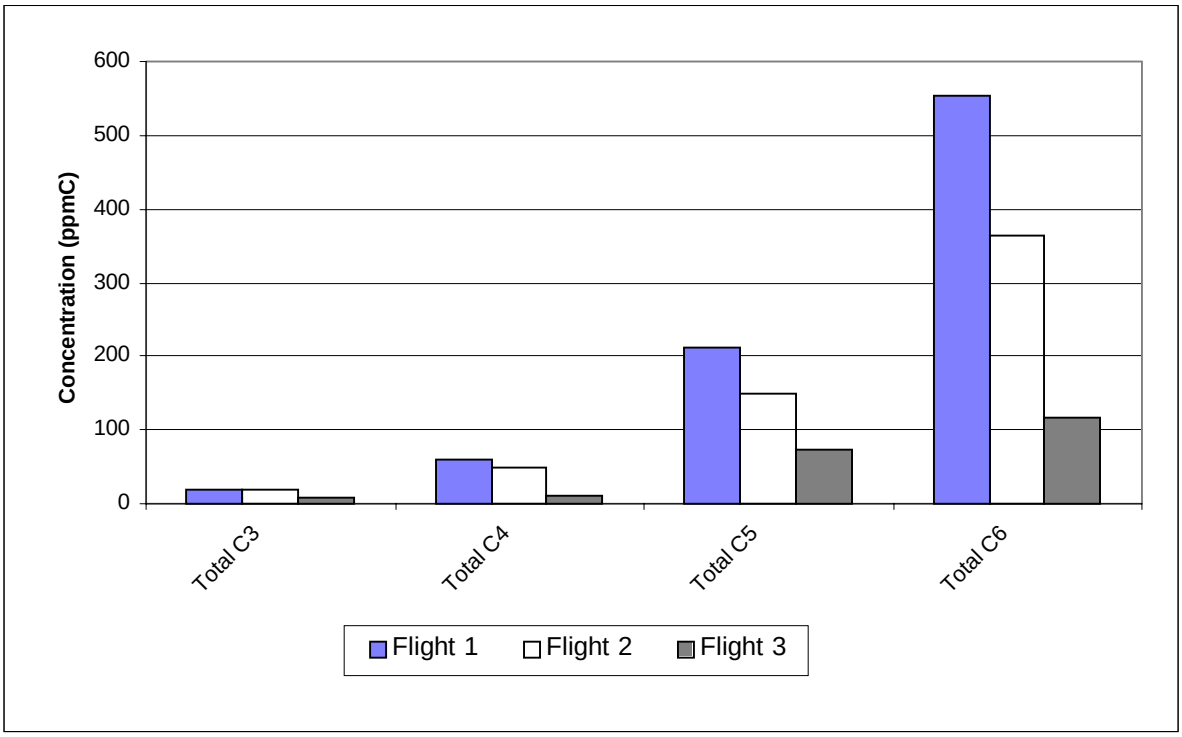
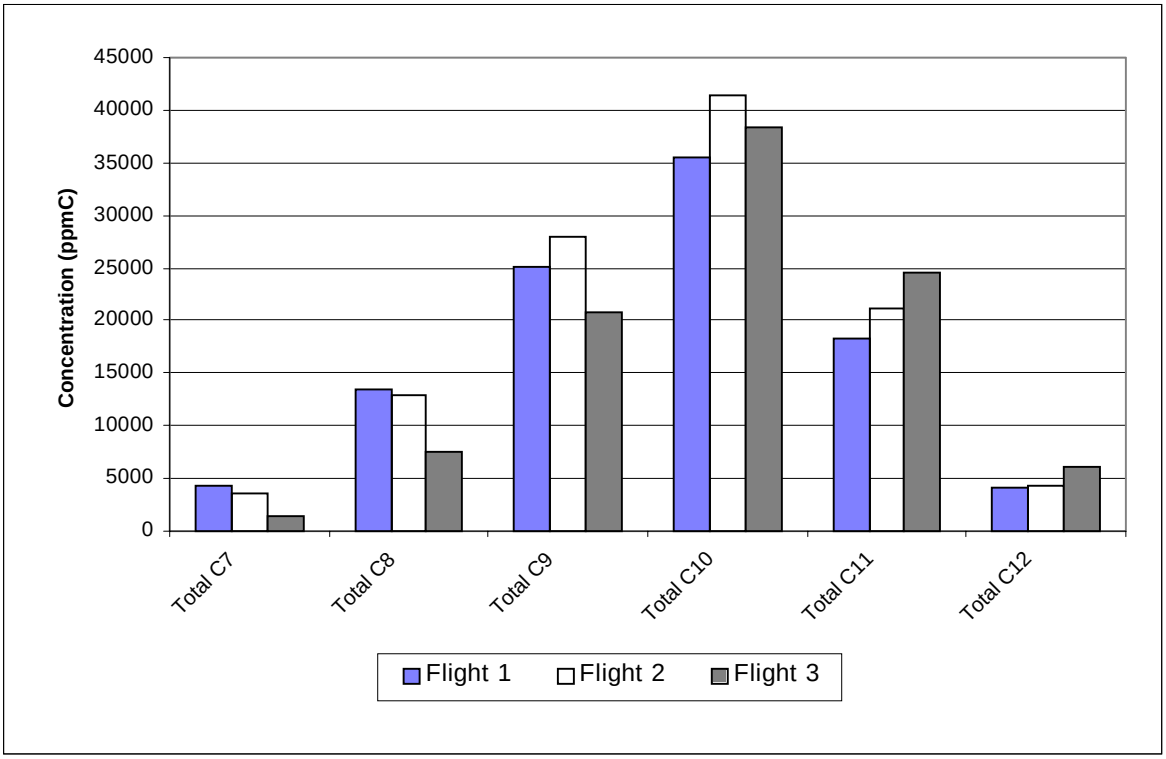


Figure 3-10. Comparison of C7 to C12 Concentrations at 14,000'.



3.6 Comparison with California Institute of Technology Vapor Pressure Results

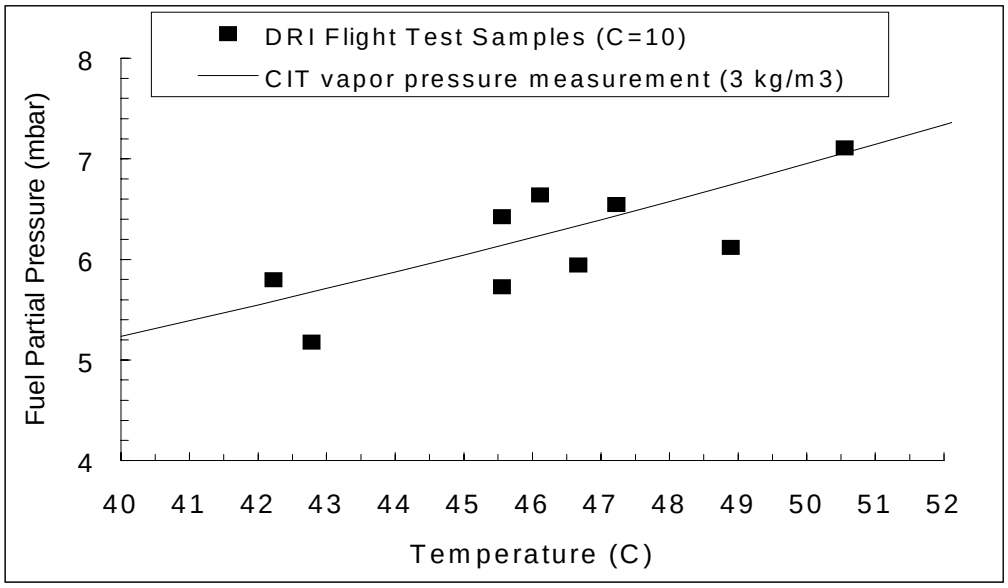
As previously shown (see Table 3-7), the speciation of the hydrocarbon in the samples concluded that the average species has approximately 10 carbon atoms. Using this as an approximation for the obviously more complex composition, we can estimate the partial pressure of the hydrocarbon vapors in the fuel tank, taking some standard values for the pressures at these altitudes. Table 3-8 presents the results of the calculations to determine the partial pressure of the fuel vapors in the CWT for each sample collected.

Table 3-8. Determination of Partial Pressure of Hydrocarbon Vapors in the CWT.

Sample	HC ppthC	Temp. (°C)	Press. (mbar)	Fuel Pres. (mbar)
Flight 1 Taxi	61.2	48.9	1000	6.12
Flight 1 10,000	92.2	45.6	697	6.43
Flight 1 14,000	101.6	46.7	585	5.94
Fight 2 Taxi	71.1	50.6	1000	7.11
Flight 2 10,000	95.3	46.1	697	6.64
Flight 2 14,000	111.9	47.2	585	6.55
Fight 3 Taxi	57.3	45.6	1000	5.73
Flight 3 10,000	74.3	42.8	697	5.18
Flight 3 14,000	99.1	42.2	585	5.80

The California Institute of Technology (CIT) team has also determined the pressure of jet fuels over the temperatures that were seen in the flight tests using a fuel loading of 3 kg/m^3 in the tank. CIT provided a comparison between the DRI flight sample partial pressures and their model calculations. Figure 3-11 shows the result of this comparison. It is clear that the determined vapor pressure and the observed concentrations agree very well, considering the inherent difficulty of making these measurements.

Figure 3-11. Comparison of DRI Flight Test Samples with CIT Vapor Pressure Measurements.



These results suggest that the partial pressure of the fuel vapors can be fairly accurately determined by knowing the temperature in the tank and the nominal fuel loading.

3.7 Results of Freon Component Analysis

One of the unexpected results of this investigation of the contents of the CWT samples was the finding of a freon component in the samples. This was a result of using the dual-channel gas chromatograph described in Section 2 which had both FID and ECD detectors. When conducting standard ambient air sample analyses, the ECD channel is used for the detection of halogenated hydrocarbon species such as freons and other industrial chemicals. In this case, the channel was left on for two reasons: it responds to oxygen and thus provides a confirmation of the operation of the sample inlet system, and it would allow detection of any other components the FID might miss.

The signal from this detector showed the oxygen peak and essentially only one other peak. This peak eluted near Freon 11 (trichlorofluoromethane), however, close investigation of the chromatograms showed that it was not Freon 11, but some unknown component. Mass specrometry of a few of these samples resulted in a tentative identification of the compound as 1,1-dichloro-1-fluoroethane, a freon-like substance that is of the newer class of freon replacements known as HCFC's or hydrochlorofluoro-carbons. For simplicity, this compound will be referred to simply as "freon" in the rest of this section. The identification of this compound is called tentative because no authentic standard was available to confirm the identity; however, the mass spectral fragmentation of the peak is consistent with this structure as is the response on the ECD detector. Discussion of this result with NTSB personnel resulted in the conclusion that this compound came from the spray cans that were used to cool the thermocouples and thus confirm the identity of each thermocouple on the data collection system. The use of this agent proved to be a useful adjunct to this analysis.

The component that was detected is a gas at ambient conditions, unlike the fuel which is a liquid, thus its behavior will be slightly yet importantly different. Since no authentic standard was available for this compound, the results presented in Table 3-9 are relative (volume/volume) concentrations only, based upon the response of the ECD. Thus the values could be considered equivalent to ppbV, only they are not precisely calibrated. Also shown in Table 3-9 is the average, standard deviation and relative standard deviation, expressed as a percent.

Table 3-9. Results of Freon Component Analysis.
Units are relative concentration.

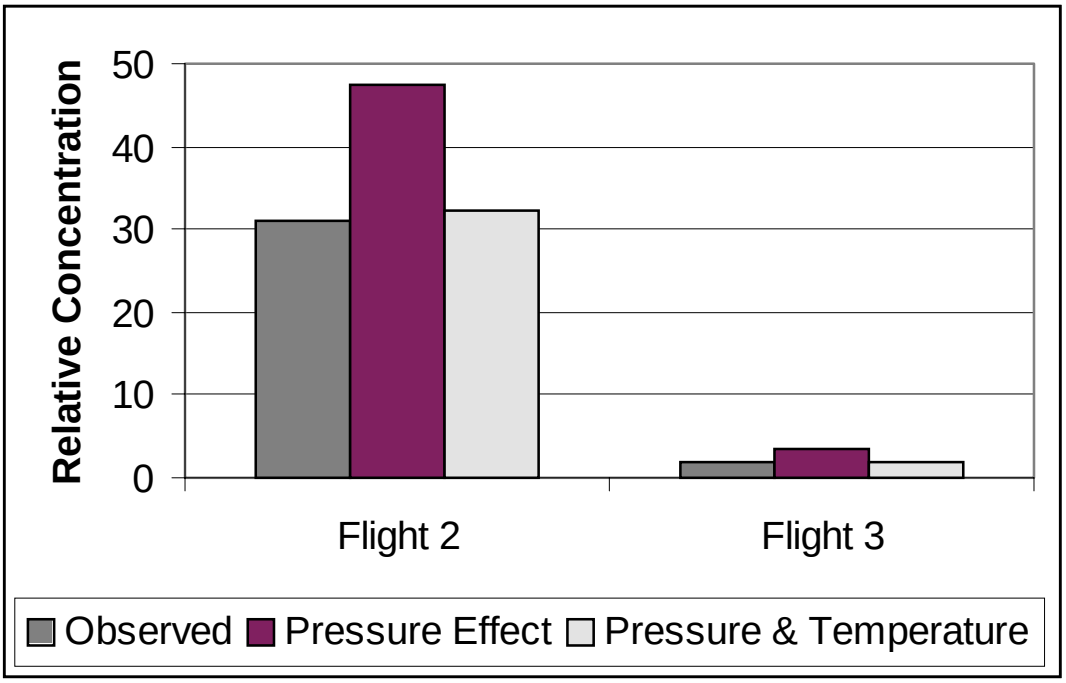
Sample	Taxi	10,000'	14,000'	Ave	Std Dev	RSD
Flight 1	196	216	205	206	10	4.8%
Flight 2	29.1	31.0	30.3	30.1	1.0	3.2%
Flight 3	1.85	1.89	1.82	1.85	0.04	1.9%

The important conclusion from these data are that the concentration, on a volume (or moles) of freon to moles of air basis did not change by more than approximately 5% (worst case) while the altitude went from sea level to 14,000'. We do know that during this time the absolute pressure inside the tank is decreasing considerably, and as a result, the absolute mass of freon in the tank goes down, but its concentration on a molar basis does not change. This is reasonable, considering that we are neither adding more freon or more air, thus the volume/volume ratio should remain constant. At the end of flight 1, as the plane descends, the absolute pressure inside the tank increases and "fresh" outside air is brought into the tank, thus diluting the freon. This is seen at the start of Flight 2 where the concentration is markedly reduced. Again during this flight the concentration stays constant and then is again decreased at the beginning of Flight 3. Between the second and third vapor sample flights was a flight that included a climb to 35,000', which would have purged the tank as well further reducing the concentration.

The flight operations that took place, including the altitudes that were attained during each flight are detailed in Section 2.3, and specifically in Table 2-1. To explain the loss of the freon component from the tank, we applied two sets of calculations using the data in Table 2-1. The first calculation assumes that only the change in pressure resulting from the altitude changes affected the freon concentration. A second analysis included the potential dilution due to the introduction of cold outside air into the

relatively warm CWT during descent. These calculations assumed that the pressure at 35,000' is 230 mbar, the pressure at 19,000' is 470 mbar, and the temperatures were 318 K in the tank, 217 K at 35,000' and 250 K at 19,000'. The results of these calculations are presented in Figure 3-12 which shows for the second and third flights, the observed values along with those estimated from the first flight's concentrations taking only the pressure differences into account and for the calculations including the effect of temperature. It is clear from Figure 3-12 that the changes seen in the freon concentration can be explained by this model of dilution of the tank components due to changes in pressure and temperature. It should be noted that the time spent at altitude is not an variable in this calculation since the time spent at a give altitude should not affect the eventual dilution effect, only the maximum altitude attained.

Figure 3-12. Comparison of Observed Freon Concentrations with Calculated Values.



The other conclusion for this study is that the changes seen in the hydrocarbon concentration at various altitudes are real changes, due to the changing atmospheric pressure at higher altitudes along with effects of temperature, and are not a dilution effect caused by the venting of the tank, nor any imhomogeneity in the tank concentration because those should have impacted the concentration of the freon component as well. Thus the tank was well mixed and the dilution that did occur can be simply explained. The presence of this non-reactive gas-phase component was a fortuitous event that helped in the interpretation of these results.

3.8 Results as Fuel to Air Mole and Mass Ratios

The results of the hydrocarbon analyses presented in this section were recalculated as fuel to air ratios. These results are presented in Table 3-10 as both fuel to air mole ratio and fuel to air mass ratios. These ratios are important in assessing the combustible potential of these mixtures. From work conducted at CIT, we know that the lower limit of flammability is a fuel to air mass ratio of approximately 0.03. Thus for these flight tests the taxi samples are very near the lower flammability limit while those at either 10,000' or 14,000' are clearly within the flammability range. The highest single value observed in this study was the 14,000' sample from flight 2, the TWA 800 simulation flight.

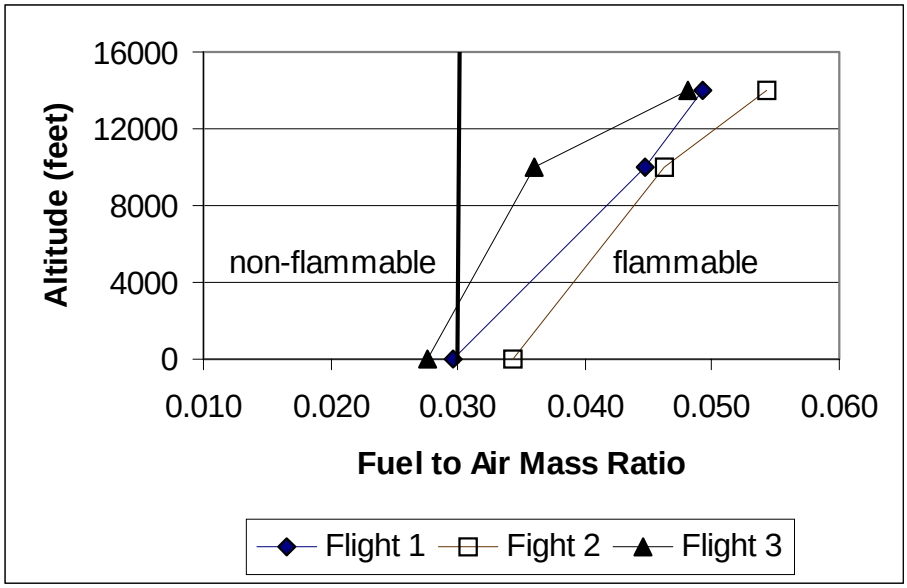
The change in fuel to air mass ratio with changing altitude is presented in Figure 3-13. The vertical line in this figure is approximately the lower flammability limit of the fuel. This figure clearly shows the increased flammability danger for the higher altitude samples over those at sea level. It is also important to note that the speciation changes

discussed above with regard to weathering of the fuel did not reduce the fuel to air mass ratio and thus did not reduce the explosive risk. Considering the time since the fuel was loaded, we see that over 60 hours and four flight had occurred between when the fuel was added and when the last vapor sample was taken, and there is still sufficient volatility in the fuel to produce flammable fuel to air ratios.

Table 3-10. Fuel to Air Mole and Mass Ratios for CWT Air Samples.

Sample	Concentration ppthC	Fuel to Air Mole Ratio	Fuel to Air Mass Ratio
Flight 1 taxi	61.2	0.006	0.030
Flight 1 10,000	92.2	0.010	0.045
Flight 1 14,000	101.6	0.011	0.049
Flight 2 taxi	71.1	0.007	0.034
Flight 2 10,000	95.3	0.010	0.046
Fligth 2 14,000	111.9	0.012	0.054
Fight 3 taxi	57.3	0.006	0.028
Flight 3 10,000	74.3	0.008	0.036
Flight 3 14,000	99.1	0.010	0.048

Figure 3-13. Fuel to air mass ratio vs. Altitude for CWT samples.
The vertical line represents the approximate lower flammability limit.



3.9 Summary of Results

The results of the analysis of the samples collected in the CWT of the test flight show that the samples collected are representative of the tank and that the samples within a sampling period are consistent, demonstrated by the freon component that was detected in the tank. This component also showed that the tank was well mixed and that the loss of the freon, and therefore the venting of the tank, could be explained by the flight patterns. The total values were converted to partial pressures and these compared well with the vapor pressure determinations made by CIT. The speciation showed a clear change with lighter species decreasing in fraction while the heavier species became more prominent as the fuel aged during flight tests. However, the change in speciation did not result in a change in the total fuel vapors found, thus the weathered fuel did not represent a lower risk than the original fuel. The concentration values were converted to fuel to air ratios and showed that while the taxi samples were near or below the flammability limit, the samples at 10,000’ and 14,000’ were clearly in the flammable range.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Several conclusions and recommendations emerge from this work. With respect to the field sampling, we find that it is possible to collect representative samples from inside the CWT of an operating 747-100 aircraft using slight modifications of standard air sampling practices. Also, with some modifications, similar methods to those used for the analysis of ambient air and source exhaust samples can be used to analyze these samples. Given the dominance of the C9 to C10 factions of these samples, extra care must be taken during the analysis phase to ensure adequate time has elapsed for equilibration within the sample canister.

The results of the gas chromatographic speciation showed a fairly strong dominance of alkane species with aromatic species also high. There were significant amounts of cyclo-alkanes, something not commonly seen in other hydrocarbon profiles such as gasoline or diesel vapor. The speciation showed a clear change with lighter species decreasing in fraction while the heavier species became more prominent as the fuel aged during flight tests. The measured species were divided into carbon groups which provide a convenient way of looking at the weathering of the fuel. The same change was seen with the groups toward a predominance of the higher molecular weight compounds and a loss of the lower molecular weight compounds following each test flight. These changes can be explained by the evaporation of the lighter components and their venting from the tank during the climb phase of the flights. As the plane descends, the vapor phase in the tank is then replaced with vapor-free air from outside, thus eliminating those components. One explanation of this change is that the heat transfer within the tank consistently results in evaporation during the aircraft climb. This results

in maintaining a relatively consistent level of fuel concentration within the tank ullage, even following weathering. Thus it does not appear that weathered fuel represents a lower risk than fresh fuel.

A freon-like component was left in the tank from the testing of the thermocouples and this served as a tracer-of-opportunity that clearly shows how well the sampling procedure collected representative samples. It also showed the well-mixed nature of the tank during the flight test program, and the loss of this compound was explained by changes in temperature and pressure during the flights.

The fuel to air mass ratios for the fuel vapors measured in this study fall within the flammable range for all samples at the 10,000' and 14,000' levels. The taxi samples are near the lower flammability limit. The single highest fuel to air ratio found was for flight 2, the TWA 800 simulation flight, at 14,000'. These results show that even after over 60 hours of operations (from time of fueling), the fuel can easily reach the flammable range at the altitude which the accident aircraft exploded.

The observations were compared to the vapor pressure model of CIT and show a very good comparison when the hydrocarbon results are expressed as a partial pressure.

While these studies are the first to investigate samples taken directly from the CWT of an in use 747 aircraft and analyze them for hydrocarbon vapors, they represent only a very small set of data to begin to draw conclusions about jet fuel behavior. Still, these results are very promising in how well they relate to other research results such as those from CIT's vapor pressure experiments, and in the ability of these results to clearly show some of the mixing and venting behavior of the CWT.

At the same time, several recommendations emerge:

- Protocol for this type of study should include collection of liquid fuel samples and speciation of those samples to relate fuel vapors to the liquid composition.
- Physical vapor pressure measurements at temperatures bracketing those seen in the tank should be conducted.
- If these experiments are repeated, an inert tracer gas should be used to confirm the sample collection from and mixing and venting of the CWT.

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APPENDIX A

Field Sampling Sheets

NTSB Aircraft Tank Sampling
New York, JFK Airport
Canister Sampling Log

Date: 7-14-97

Test Conditions: TEST # 001-02 (1st FLIGHT)

I. Pre-Sampling:

1. Install canisters, making sure all connections are tight.

Manifold Position	Canister ID	Toggle Valve Shut?	Canister Valve Open?	Fill out Canister Tag
1P	T	✓	✓	✓
2 1S	M	✓	✓	✓
3 2P	Z	✓	✓	✓
4 2S	B	✓	✓	✓
5 3P	A	✓	✓	✓
6 3S	F	✓	✓	

II. Sampling:

Manifold Position	Purge or Sample	Time	Sample location/alt./press./note
1P	✓	12:06	CWT / TAXING /
2 1S	✓	12:06	CWT / TAXING /
3 2P	✓	12:18	CWT / 9800 /
4 2S	✓	12:18	CWT / 10300 /
5 3P	✓	12:24	CWT / 13900 /
6 3S	✓	12:24	CWT / 14100 /

III. Post-Sampling

Manifold Position	Close Canister Valve	Cap Canister
1 1P	✓	✓
2 1S	✓	✓
3 2P	✓	✓
4 2S	✓	✓
5 3P	✓	✓
6 3S	✓	✓

7/15/97
per call
from Lorraine

NTSB Aircraft Tank Sampling
New York, JFK Airport
Canister Sampling Log

Date: 7-15-97

Test Conditions: TEST # 001-02 (2ND FLIGHT)

I. Pre-Sampling:

1. Install canisters, making sure all connections are tight.

Manifold Position	Canister ID	Toggle Valve Shut?	Canister Valve Open?	CANISTER LABELED
1 1P	G	✓	✓	✓
2 1S	L	✓	✓	✓
3 2P	X	✓	✓	✓
4 2S	N	✓	✓	✓
5 3P	K	✓	✓	✓
6 3S	H	✓	✓	✓

II. Sampling:

Manifold Position	Purge or Sample	Time	Sample location/alt./press./note
1 1P	P ✓	19:57	CWT / TAXIING
2 1S	S ✓	19:57	CWT / TAXIING
3 2P	P ✓	20:27	CWT / 9800'
4 2S	S ✓	20:27	CWT / 10100'
5 3P	P ✓	20:33	CWT / 3,800
6 3S	S ✓	20:33	CWT / 4,100

III. Post-Sampling

Manifold Position	Close Canister Valve	Cap Canister
1 1P	✓	✓
2 1S	✓	✓
3 2P	✓	✓
4 2S	✓	✓
5 3P	✓	✓
6 3S	✓	✓

NTSB Aircraft Tank Sampling
New York, JFK Airport
Canister Sampling Log

Date: 7-16-99

Test Conditions: TEST 001-04 (2ND FLIGHT OF DAY)

I. Pre-Sampling:

1. Install canisters, making sure all connections are tight.

Manifold Position	Canister ID	Toggle Valve Shut?	Canister Valve Open?
1 1P	W	✓	✓
2 1S	R	✓	✓
3 2P	E	✓	✓
4 2S	J	✓	✓
5 3P	S	✓	✓
6 3S	P	✓	✓

II. Sampling:

Manifold Position	Purge or Sample	Time	Sample location/alt./pres./note
1 1P	P	19:33	CWT / TAXIING
2 1S	S	19:33	CWT / TAXIING
3 2P	P	20:06	CWT / 9700'
4 2S	S	20:06	CWT / 10,000'
5 3P	P	20:12	CWT / 14,100'
6 3S	S	20:12	CWT / 14,600'

III. Post-Sampling

Manifold Position	Close Canister Valve	Cap Canister
1 1P	✓	✓
2 1S	✓	✓
3 2P	✓	✓
4 2S	✓	✓
5 3P	✓	✓
6 3S	✓	✓

APPENDIX B

Chain-of-Custody Records for Canister Samples

DRI Canister Sample Chain-of-Custody

Canister Number: DR1-T

Cleaning
Date Cleaned: 7/3/97 — Cleaned by: MK

Lot Certification ~~Lot~~ 595
Date Certified: 7/5/97 — Certified by: MK

Shipping: DRI to Field
Date Shipped: 7/7/97 — Shipped by: MK/JJ

Date Received: 7/8/97 — Received by: JJ in NV

Sampling
Date Sampled: 7/14/97 — Sampled by: Bob Lamm

Shipping: Field to DRI
Date Shipped: 7/15/97 — Shipped by: Bob/NTSF

Date Received: 7/16/97 — Received by: JJ

Analysis
Date Analyzed: 7/18/97 — Analyzed by: JJ

NOTES: TCS #001-02

1P

DRI Canister Sample Chain-of-Custody

Canister Number: DRI-M

Cleaning
Date Cleaned 7/3/97 Cleaned by MK

Lot Certification Lot 595
Date Certified 7/5/97 Certified by MK

Shipping: DRI to Field
Date Shipped 7/7/97 Shipped by MK JJ

Date Received 7/8/97 Received by JJ in NY

Sampling
Date Sampled 7/14/97 Sampled by Bob Lemmons

Shipping: Field to DRI
Date Shipped 7/15/97 Shipped by Brain / VTSB

Date Received 7/16/97 Received by CS

Analysis
Date Analyzed 7/23/97 Analyzed by

NOTES: Test #001-02
15

DRI Canister Sample Chain-of-Custody

Canister Number: DRI-Z

Cleaning
Date Cleaned 7/3/97 Cleaned by MK

Lot Certification ~~of~~ 595
Date Certified 7/5/97 Certified by MK

Shipping: DRI to Field
Date Shipped 7/7/97 Shipped by MK/SS

Date Received 7/8/97 Received by JRS in NV

Sampling
Date Sampled 7/14/97 Sampled by Bob Lonneman

Shipping: Field to DRI
Date Shipped 7/15/97 Shipped by Boeing/NTS

Date Received 7/16/97 Received by RS

Analysis
Date Analyzed 7/18/97 Analyzed by RS

NOTES: Test # 001-02
2P

61

DRI Canister Sample Chain-of-Custody

Canister Number: DRI - B

Cleaning
Date Cleaned 7/3/97 Cleaned by MK

Lot Certification Lot 595
Date Certified 7/5/97 Certified by MK

Shipping: DRI to Field
Date Shipped 7/7/97 Shipped by MK/TS

Date Received 7/8/97 Received by TS in NV

Sampling
Date Sampled 7/14/97 Sampled by BL Lonnemann

Shipping: Field to DRI
Date Shipped 7/15/97 Shipped by Boeing/NSO

Date Received 7/16/97 Received by JC

Analysis
Date Analyzed 7/18/97 Analyzed by

NOTES: TCE #001-02
25

62

DRI Canister Sample Chain-of-Custody

Canister Number: DRI-A

Cleaning
Date Cleaned 7/3/97 Cleaned by MK

Lot Certification lot 595
Date Certified 7/5/97 Certified by MK

Shipping: DRI to Field
Date Shipped 7/7/97 Shipped by MK/SS

Date Received 7/8/97 Received by BSI in NV

Sampling
Date Sampled 7/14/97 Sampled by Bob Lamarra

Shipping: Field to DRI
Date Shipped 7/15/97 Shipped by Bobby/NTSD

Date Received 7/16/97 Received by JC

Analysis
Date Analyzed 7/20/97 Analyzed by JC

NOTES: Test #001-02
3P

63

DRI Canister Sample Chain-of-Custody

Canister Number: DRI-F

Cleaning
Date Cleaned 7/3/97 Cleaned by MK

Lot Certification ~~for~~ 595
Date Certified 7/5/97 Certified by MK

Shipping: DRI to Field
Date Shipped 7/7/97 Shipped by MK / JCJ

Date Received 7/8/97 Received by JCJ in NY

Sampling
Date Sampled 7/14/97 Sampled by Bob Lonnem

Shipping: Field to DRI
Date Shipped 7/15/97 Shipped by Boeing / MTSD

Date Received 7/16/97 Received by JCJ

Analysis
Date Analyzed 7/16/97 Analyzed by JS

NOTES: Test #001-02
35

6.4

DRI Canister Sample Chain-of-Custody

Canister Number: DRI - D

Cleaning
Date Cleaned 7/4/97 Cleaned by JS

Lot Certification ~~Lot 596~~
Date Certified 7/5/97 Certified by JS

Shipping: DRI to Field
Date Shipped 7/7/97 Shipped by MK/JS

Date Received 7/8/97 Received by RS in NY

Sampling
Date Sampled 7/10/97 Sampled by JCJ

Shipping: Field to DRI
Date Shipped 7/11/97 Returned in luggage RS Shipped by JS

Date Received NA Received by NA

Analysis
Date Analyzed 7/14/97 Analyzed by SY

NOTES:
① Used to pull Vacuum on System to test for leaks 7/10/97 — none found. ② Can Vented to Atmospheric pressure to show time of sampling needed to equilibrate — 15 sec

65

DRI Canister Sample Chain-of-Custody

Canister Number: DRI-G

Cleaning
Date Cleaned: 6/30/97 — Cleaned by: MK

Lot Certification Lot 592
Date Certified: 7/2/97 — Certified by: MK

Shipping: DRI to Field
Date Shipped: 7/7/97 — Shipped by: MK/JG

Date Received: 7/8/97 — Received by: JS in Nevada

Sampling
Date Sampled: 7/15/97 2nd flt — Sampled by: Lanemm

Shipping: Field to DRI
Date Shipped: 7/18/97 — Shipped by: Benzon

Date Received: 7/19/97 — Received by: JG

Analysis
Date Analyzed: 7/22/97 — Analyzed by: JS

NOTES: Test #001-02 (2nd flt)
IP

(66)

DRI Canister Sample Chain-of-Custody

Canister Number: DRI - L

Cleaning
Date Cleaned: 6/30/97 — Cleaned by: MK

Lot Certification Lot 592
Date Certified: 7/2/97 — Certified by: MK

Shipping: DRI to Field
Date Shipped: 7/7/97 — Shipped by: MK JCS

Date Received: 7/8/97 — Received by: JCS in Newhall

Sampling
Date Sampled: 7/15/97 2nd — Sampled by: Bob Lawson

Shipping: Field to DRI
Date Shipped: 7/18/97 — Shipped by: Benson

Date Received: 7/19/97 — Received by: JCS

Analysis
Date Analyzed: 7/22/97 — Analyzed by: JCS

NOTES: Test #001-02 2nd flight

15

DRI Canister Sample Chain-of-Custody

Canister Number: DR1-X

Cleaning
Date Cleaned: 6/30/97 — Cleaned by: MK

Lot Certification Lot 592
Date Certified: 7/2/97 — Certified by: MK

Shipping: DRI to Field
Date Shipped: 7/7/97 — Shipped by: MK/JCJ

Date Received: 7/8/97 — Received by: Rs in NY

Sampling
Date Sampled: 7/15/97 2nd — Sampled by: Lemmeman

Shipping: Field to DRI
Date Shipped: 7/18/97 — Shipped by: Bergen

Date Received: 7/19/97 — Received by: JCJ

Analysis
Date Analyzed: 7/21/97 — Analyzed by: JCJ

NOTES: Test #001-02 (2nd fill)
2P

DRI Canister Sample Chain-of-Custody

Canister Number: DRI-N

Cleaning
Date Cleaned: 6/30/97 — Cleaned by: MK

Lot Certification Lot 592
Date Certified: 7/2/97 — Certified by: MK

Shipping: DRI to Field
Date Shipped: 7/7/97 — Shipped by: MK/JCJ

Date Received: 7/8/97 — Received by: RS in NV

Sampling
Date Sampled: 7/15/97 2nd — Sampled by: Lonergan

Shipping: Field to DRI
Date Shipped: 7/18/97 — Shipped by: Bergen

Date Received: 7/19/97 — Received by: RS

Analysis
Date Analyzed: 7/21/97 — Analyzed by: JCJ

NOTES: Tot #001-02 (2nd fill)

25

69

DRI Canister Sample Chain-of-Custody

Canister Number: DRI-K

Cleaning
Date Cleaned: 6/30/97 Cleaned by: MK

Lot Certification of 592
Date Certified: 7/2/97 Certified by: MK

Shipping: DRI to Field
Date Shipped: 7/7/97 Shipped by: MK/JS

Date Received: 7/8/97 Received by: JS in NY

Sampling
Date Sampled: 7/15/97 Sampled by: Coyne

Shipping: Field to DRI
Date Shipped: 7/18/97 Shipped by: Bryan

Date Received: 7/19/97 Received by: JS

Analysis
Date Analyzed: 7/21/97 Analyzed by: JS

NOTES: Test #001-02 (2nd fill)
3P

70

DRI Canister Sample Chain-of-Custody

Canister Number: DRI-H

Cleaning
Date Cleaned 6/30/97 Cleaned by MK

Lot Certification Lot 542
Date Certified 7/2/97 Certified by MK

Shipping: DRI to Field
Date Shipped 7/7/97 Shipped by MK/JY

Date Received 7/8/97 Received by JS in NY

Sampling
Date Sampled 7/15/97 2nd Sampled by Connemara

Shipping: Field to DRI
Date Shipped 7/18/97 Shipped by Bergen

Date Received 7/19/97 Received by JS

Analysis
Date Analyzed 7/21/97 Analyzed by JC

NOTES: Lot #001-02 (2nd lot)

35

DRI Canister Sample Chain-of-Custody

Canister Number: DR1-C

Cleaning
Date Cleaned 7/4/97 Cleaned by JS

Lot Certification Lot 596
Date Certified 7/5/97 Certified by JS

Shipping: DRI to Field
Date Shipped 7/7/97 Shipped by JBS/MK

Date Received 7/8/97 Received by JBS in NV

Sampling
Date Sampled _____ Sampled by _____

Shipping: Field to DRI
Date Shipped 7/18/97 Shipped by Benzon

Date Received 7/19/97 Received by JK

Analysis
Date Analyzed 7/20/97 Analyzed by RS

NOTES:
Can Not used, shipped & returned.
Filled w zero Air 7/19/97 as a field Blank

DRI Canister Sample Chain-of-Custody

Canister Number: DRI-W

Cleaning
Date Cleaned 7/1/97 Cleaned by MK

Lot Certification Lot 593
Date Certified 7/3/97 Certified by MK

Shipping: DRI to Field
Date Shipped 7/7/97 Shipped by MK/JC

Date Received 7/8/97 Received by JS in NY

Sampling
Date Sampled 7/16/97 Sampled by [illegible]

Shipping: Field to DRI
Date Shipped 7/18/97 Shipped by Benzon

Date Received 7/19/97 Received by JS

Analysis
Date Analyzed 7/20/97 Analyzed by [illegible]

NOTES: Test #001-04 (2nd flt. of day)
1P

DRI Canister Sample Chain-of-Custody

Canister Number: DRI-R

Cleaning
Date Cleaned: 7/1/97 Cleaned by: MK

Lot Certification/Lot 593
Date Certified: 7/3/97 Certified by: MK

Shipping: DRI to Field
Date Shipped: 7/7/97 Shipped by: MK/SCJ

Date Received: 7/8/97 Received by: JS in NY

Sampling
Date Sampled: 7/16/97 Sampled by: Customer

Shipping: Field to DRI
Date Shipped: 7/18/97 Shipped by: Benzon

Date Received: 7/19/97 Received by: JC

Analysis
Date Analyzed: 7/21/97 Analyzed by: JCS

NOTES: Test #001-04 (2nd filter of day)

IS

24

DRI Canister Sample Chain-of-Custody

Canister Number: DRI-E

Cleaning
Date Cleaned 7/1/97 Cleaned by MK

Lot Certification Lot 593
Date Certified 7/3/97 Certified by MK

Shipping: DRI to Field
Date Shipped 7/7/97 Shipped by MK/BS

Date Received 7/8/97 Received by BS in NV

Sampling
Date Sampled 7/16/97 Sampled by Lonneman

Shipping: Field to DRI
Date Shipped 7/18/97 Shipped by Benzon

Date Received 7/19/97 Received by BS

Analysis
Date Analyzed 7/21/97 Analyzed by [illegible]

NOTES:
Test #001-04 (2nd flt of Day)
2P

75

DRI Canister Sample Chain-of-Custody

Canister Number: DRI-J

Cleaning
Date Cleaned: 7/1/97 — Cleaned by: MK

Lot Certification Lot 593
Date Certified: 7/3/97 — Certified by: MK

Shipping: DRI to Field
Date Shipped: 7/7/97 — Shipped by: UPS (TC)

Date Received: 7/8/97 — Received by: DS in NY

Sampling
Date Sampled: 7/16/97 — Sampled by: Lawrence

Shipping: Field to DRI
Date Shipped: 7/18/97 — Shipped by: Benzon

Date Received: 7/19/97 — Received by: CS

Analysis
Date Analyzed: 7/21/97 — Analyzed by: TC

NOTES: Test #001-04 (2nd flight of day)
2S

70

DRI Canister Sample Chain-of-Custody

Canister Number: DRI-S

Cleaning
Date Cleaned: 7/1/97 — Cleaned by: MK

Lot Certification Lot 593
Date Certified: 7/3/97 — Certified by: MK

Shipping: DRI to Field
Date Shipped: 7/7/97 — Shipped by: MK/JCS

Date Received: 7/8/97 — Received by: JCS in NY

Sampling
Date Sampled: 7/16/97 — Sampled by: Lonnemann

Shipping: Field to DRI
Date Shipped: 7/18/97 — Shipped by: Benzon

Date Received: 7/19/97 — Received by: JCJ

Analysis
Date Analyzed: 7/21/97 — Analyzed by: CJ

NOTES: Test #001-04 (2nd flight of day)
3P

DRI Canister Sample Chain-of-Custody

Canister Number: DR1-P

Cleaning
Date Cleaned 7/1/97 Cleaned by MK

Lot Certification Lot 593
Date Certified 7/3/97 Certified by MK

Shipping: DRI to Field
Date Shipped 7/7/97 Shipped by MK/JG

Date Received 7/8/97 Received by JS in NY

Sampling
Date Sampled 7/16/97 Sampled by Lonnemann

Shipping: Field to DRI
Date Shipped 7/18/97 Shipped by Benzon

Date Received 7/19/97 Received by JS

Analysis
Date Analyzed 7/21/97 Analyzed by JG

NOTES: Tot #001-04 (2nd flight of day)
35

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APPENDIX C

Individual Sample Gas Chromatographic Results

Canister: DRI-M
Flight 1, 7/15/97 Taxi

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
3.05			8.38	0.41	0.00	0	0.00	0.000
3.78			1.36	0.41	0.00	0	0.00	0.000
7.05	propane	N_PROP	4.83	0.41	1.61	3	44.10	2.669
10.90	isobutane	I_BUTA	11.98	0.41	3.00	4	58.12	2.500
13.00	n-butane	N_BUTA	27.35	0.41	6.84	4	58.12	2.500
13.70	t-2-butene	T2BUTE	1.98	0.41	0.50	4	56.11	2.001
14.62	c-2-butene	C2BUTE	4.63	0.41	1.16	4	56.11	2.001
15.35			1.86	0.41	0.00	0	0.00	0.000
15.63			1.07	0.41	0.00	0	0.00	0.000
15.82			2.46	0.41	0.00	0	0.00	0.000
16.28	3-methyl-1-butene	B1E3ME	2.68	0.41	0.54	5	70.13	2.000
16.67			4.11	0.41	0.00	0	0.00	0.000
17.21	isopentane	IPENTA	62.64	0.41	12.53	5	72.15	2.401
17.75			2.07	0.41	0.00	0	0.00	0.000
17.91			1.06	0.41	0.00	0	0.00	0.000
17.99	1-pentene	PENTE1	36.24	0.41	7.25	5	70.13	2.000
18.28			2.34	0.41	0.00	0	0.00	0.000
18.43	2-methyl-1-butene	B1E2M	1.07	0.41	0.21	5	70.13	2.000
18.63	n-pentane	N_PENT	45.84	0.41	9.17	5	72.15	2.401
19.09	t-2-pentene	T2PENE	3.65	0.41	0.73	5	70.13	2.000
19.49	c-2-pentene	C2PENE	2.66	0.41	0.53	5	70.13	2.000
19.70	2-methyl-2-butene	B2E2M	3.29	0.41	0.66	5	70.13	2.000
19.82			3.91	0.41	0.00	0	0.00	0.000
20.01			1.93	0.41	0.00	0	0.00	0.000
20.14			3.71	0.41	0.00	0	0.00	0.000
20.30			1.00	0.41	0.00	0	0.00	0.000
20.41	2,2-dimethylbutane	BU22DM	8.61	0.41	1.44	6	86.17	2.333
20.57			1.40	0.41	0.00	0	0.00	0.000
20.73			3.46	0.41	0.00	0	0.00	0.000
20.87			1.92	0.41	0.00	0	0.00	0.000
20.98			3.97	0.41	0.00	0	0.00	0.000
21.13			1.99	0.41	0.00	0	0.00	0.000
21.23	cyclopentene	CPENTE	4.24	0.41	0.85	5	68.11	1.599
21.45	4-methyl-1-pentene	P1E4ME	2.85	0.41	0.48	6	84.16	2.001
21.60	3-methyl-1-pentene	P1E3ME	0.75	0.41	0.13	6	84.16	2.001
21.75	cyclopentane	CPENTA	11.95	0.41	2.39	5	70.13	2.000
21.90	2,3-dimethylbutane	BU23DM	19.23	0.41	3.21	6	86.17	2.333
22.14	2-methylpentane	PENA2M	97.81	0.41	16.30	6	86.17	2.333
22.31			2.77	0.41	0.00	0	0.00	0.000
22.52			5.07	0.41	0.00	0	0.00	0.000
22.69	2,2-dimethylpentane	PEN22M	2.78	0.41	0.40	7	100.20	2.286
22.81	3-methylpentane	PENA3M	67.38	0.41	11.23	6	86.17	2.333
23.07	1-hexene	HEX1E	2.40	0.41	0.40	6	84.16	2.001
23.27	C6 olefin	C6OLE1	1.50	0.41	0.25	6	84.16	2.001
23.40			1.85	0.41	0.00	0	0.00	0.000
23.63	n-hexane	N_HEX	169.93	0.41	28.32	6	86.17	2.333
23.87	t-2-hexene	T2HEXE	3.61	0.41	0.60	6	84.16	2.001
24.03			2.63	0.41	0.00	0	0.00	0.000
24.18	c-3-hexene	C3HEXE	3.93	0.41	0.66	6	84.16	2.001
24.34			3.57	0.41	0.00	0	0.00	0.000
24.50	trans-3-methyl-2-pentene	P2E3MT	4.93	0.41	0.82	6	84.16	2.001
24.63			2.61	0.41	0.00	0	0.00	0.000
24.74			8.62	0.41	0.00	0	0.00	0.000
24.84	methylcyclopentane	MCYPNA	136.21	0.41	22.70	6	84.16	2.001

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Canister: DRI-M
Flight 1, 7/15/97 Taxi

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
25.03	2,4-dimethylpentane	PEN24M	18.02	0.41	2.57	7	100.20	2.286
25.26			4.76	0.41	0.00	0	0.00	0.000
25.47	2,2,3-trimethylbutane	BU223M	1.36	0.41	0.19	7	100.20	2.286
25.60			1.66	0.41	0.00	0	0.00	0.000
25.91	benzene	BENZE	65.02	0.41	10.84	6	78.11	1.000
26.16	3,3-dimethylpentane	PEN33M	10.69	0.41	1.53	7	100.20	2.286
26.33	cyclohexane	CYHEXA	200.73	0.41	33.46	6	84.16	2.001
26.69	2-methylhexane	HEXA2M	219.25	0.41	31.32	7	98.19	2.001
26.78	2,3-dimethylpentane	PEN23M	113.27	0.41	16.18	7	100.20	2.286
26.93	cyclohexene	CYHEXE	38.63	0.41	6.44	6	82.15	1.668
27.07	3-methylhexane + pentanal	HEXA3M	331.47	0.41	47.35	7	100.20	2.286
27.39	1,3-dimethylcyclopentane	CPA13M	102.70	0.41	14.67	7	98.19	2.001
27.51	3-ethylpentane	PA3ET	137.83	0.41	17.23	8	114.23	2.251
27.63	2,2,4-trimethylpentane	PA224M	199.39	0.41	24.92	8	114.23	2.251
27.87	C7 olefin	C7OLE2	1.06	0.41	0.15	7	98.19	2.001
28.09	n-heptane	N_HEPT	956.15	0.41	136.59	7	100.20	2.286
28.49	C8 olefin	C8OLE3	1.17	0.41	0.15	8	112.21	2.000
29.06	methylcyclohexane	MECYHX	1162.22	0.41	166.03	7	98.19	2.001
29.15	C8 paraffin	C8PA1	93.82	0.41	11.73	8	114.23	2.251
29.44	2,5-diemthylhexane	HEX25M	94.81	0.41	11.85	8	114.23	2.251
29.52	2,4-diemthylhexane	HEX24M	292.89	0.41	36.61	8	114.23	2.251
29.85	C8 paraffin	C8PA2	192.19	0.41	24.02	8	114.23	2.251
30.14			173.15	0.41	0.00	0	0.00	0.000
30.24	2,3,-trimethylpentane	PA234M	44.62	0.41	5.58	8	114.23	2.251
30.44	toluene	TOLUE	854.22	0.41	122.03	7	92.14	1.144
30.62	2,3-dimethylhexane	HX23DM	163.36	0.41	20.42	8	114.23	2.251
30.70			89.85	0.41	0.00	0	0.00	0.000
30.81	2-methylheptane	HEP2ME	961.28	0.41	106.81	9	128.26	2.223
30.88	4-methylheptane	HEP4ME	293.55	0.41	32.62	9	128.26	2.223
31.01	C8 paraffin	C8PA3	110.31	0.41	13.79	8	114.23	2.251
31.12	3-methylheptane	HEP3ME	850.20	0.41	106.28	8	114.23	2.251
31.37			690.79	0.41	0.00	0	0.00	0.000
31.44	2,2,5-trimethylhexane	HEX225	277.78	0.41	30.86	9	128.26	2.223
31.56	octene-1	OCT1E	14.32	0.41	1.79	8	112.21	2.000
31.75	1,1-dimethylcyclohexane	CHX11M	237.16	0.41	29.65	8	112.21	2.000
31.84			104.26	0.41	0.00	0	0.00	0.000
31.90			228.67	0.41	0.00	0	0.00	0.000
32.02			46.20	0.41	0.00	0	0.00	0.000
32.12	n-octane	N_OCT	2605.36	0.41	325.67	8	114.23	2.251
32.31			84.76	0.41	0.00	0	0.00	0.000
32.43			227.26	0.41	0.00	0	0.00	0.000
32.55			2.51	0.41	0.00	0	0.00	0.000
32.69			71.39	0.41	0.00	0	0.00	0.000
32.83	2,3,5-trimethylhexane	HEX235	41.15	0.41	4.57	9	128.26	2.223
32.91	2,4-dimethylheptane	HEP24D	79.87	0.41	8.87	9	128.26	2.223
33.06	4,4-dimethylheptane	HEP44D	209.44	0.41	23.27	9	128.26	2.223
33.20			24.20	0.41	0.00	0	0.00	0.000
33.28	2,6-dimethylheptane	HEP26D	572.78	0.41	63.64	9	128.26	2.223
33.42			293.37	0.41	0.00	0	0.00	0.000
33.53	2,5-dimethylheptane	HEP25D	1260.22	0.41	140.02	9	128.26	2.223
33.73	3,3-dimethylheptane	HEP33D	880.57	0.41	97.84	9	128.26	2.223
33.84	C9 olefin	C9OLE1	223.96	0.41	24.88	9	126.24	2.001
33.92			113.38	0.41	0.00	0	0.00	0.000
34.03			65.98	0.41	0.00	0	0.00	0.000

Canister: DRI-M
Flight 1, 7/15/97 Taxi

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
34.14	ethylbenzene	ETBZ	858.78	0.41	107.35	8	106.16	1.250
34.32	C9 olefin	C9OLE3	848.74	0.41	94.30	9	126.24	2.001
34.45	m- & p-xylene	MP_XYL	2199.45	0.41	274.93	8	106.16	1.250
34.57	2-methyloctane	OCT2ME	1237.63	0.41	137.51	9	128.26	2.223
34.72			48.25	0.41	0.00	0	0.00	0.000
34.84	3-methyloctane	OCT3ME	1137.64	0.41	126.40	9	128.26	2.223
35.01	C9 paraffin	C9PAR1	117.56	0.41	13.06	9	128.26	2.223
35.09	styrene + heptanal	STYR	17.87	0.41	2.23	8	104.14	1.000
35.18			274.69	0.41	0.00	0	0.00	0.000
35.32	o-xylene	O_XYL	950.87	0.41	118.86	8	106.17	1.251
35.45			642.73	0.41	0.00	0	0.00	0.000
35.57	nonene-1	NONE1	509.27	0.41	56.59	9	126.24	2.001
35.67	C9 paraffin	C9PAR2	314.62	0.41	34.96	9	128.26	2.223
35.80	n-nonane	N_NON	3457.87	0.41	384.21	9	128.26	2.223
36.06	C9 olefin	C9OLE4	126.32	0.41	14.04	9	126.24	2.001
36.22			86.06	0.41	0.00	0	0.00	0.000
36.30			610.74	0.41	0.00	0	0.00	0.000
36.48	isopropylbenzene	IPRBZ	566.95	0.41	62.99	9	120.20	1.335
36.66			82.32	0.41	0.00	0	0.00	0.000
36.76	C9 paraffin 3	C9PA3	902.50	0.41	100.28	9	128.26	2.223
36.87			99.47	0.41	0.00	0	0.00	0.000
37.06	isopropylcyclohexane	IPCYHX	1926.59	0.41	214.07	9	126.24	2.001
37.21	2,6-dimethyloctane	OCT26D	312.04	0.41	31.20	10	142.29	2.201
37.27			240.46	0.41	0.00	0	0.00	0.000
37.37	3,6-dimethyloctane	OCT36M	639.59	0.41	63.96	10	142.29	2.201
37.50	n-propylbenzene	N_PRBZ	705.06	0.41	78.34	9	120.20	1.335
37.61			123.96	0.41	0.00	0	0.00	0.000
37.73	m-ethyltoluene	M_ETOL	1013.19	0.41	112.58	9	120.20	1.335
37.80	p-ethyltoluene	P_ETOL	803.32	0.41	89.26	9	120.20	1.335
37.90			202.61	0.41	0.00	0	0.00	0.000
37.96	1,3,5-trimethylbenzene	BZ135M	1097.96	0.41	122.00	9	120.20	1.335
38.04			675.69	0.41	0.00	0	0.00	0.000
38.18	C10 paraffin	C10P_A	733.96	0.41	73.40	10	142.29	2.201
38.27			655.86	0.41	0.00	0	0.00	0.000
38.38	o-ethyltoluene	O_ETOL	663.10	0.41	73.68	9	120.20	1.335
38.49			91.13	0.41	0.00	0	0.00	0.000
38.59			336.95	0.41	0.00	0	0.00	0.000
38.70			378.14	0.41	0.00	0	0.00	0.000
38.88	1,2,4-trimethylbenzene	BZ124M	2071.91	0.41	230.21	9	120.20	1.335
39.01			339.94	0.41	0.00	0	0.00	0.000
39.09			240.38	0.41	0.00	0	0.00	0.000
39.18	n-decane	N_DEC	2992.16	0.41	299.22	10	142.29	2.201
39.30	C10 aromatic	C10AR1	122.30	0.41	12.23	10	134.22	1.401
39.39	isobutylbenzene	I_BUBZ	330.13	0.41	33.01	10	134.22	1.401
39.48	sec-butylbenzene	S_BUBZ	420.72	0.41	42.07	10	134.22	1.401
39.72	C10 aromatic 7	C10AR7	440.04	0.41	44.00	10	134.22	1.401
39.85	1,2,3-trimethylbenzene	BZ123M	1111.38	0.41	123.49	9	120.20	1.335
39.98	C10 paraffin	C10P_C	796.15	0.41	79.62	10	142.29	2.201
40.17	limonene	LIMON	315.07	0.41	31.51	10	136.24	1.601
40.36	indan	INDAN	487.88	0.41	54.21	9	118.17	1.111
40.50	indene	INDENE	741.24	0.41	82.36	9	116.15	0.888
40.62	diethylbenzene	DETBZ1	225.99	0.41	22.60	10	134.22	1.401
40.70	C10 aromatic	C10AR2	456.43	0.41	45.64	10	134.22	1.401
40.88	1,4-diethylbenzene	DETBZ2	680.21	0.41	68.02	10	134.22	1.401

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Canister: DRI-M
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SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
41.03	1,2-diethylbenzene	DETBZ3	375.66	0.41	37.57	10	134.22	1.401
41.13			382.39	0.41	0.00	0	0.00	0.000
41.25	2-propyltoluene	TOL2PR	507.13	0.41	50.71	10	134.22	1.401
41.35			85.20	0.41	0.00	0	0.00	0.000
41.46			374.08	0.41	0.00	0	0.00	0.000
41.53	C10 aromatic	C10AR4	259.38	0.41	25.94	10	134.22	1.401
41.61	C10 aromatic	C10AR5	221.97	0.41	22.20	10	134.22	1.401
41.78	isopropyltoluene	IPRTOL	374.28	0.41	37.43	10	134.22	1.401
41.94			182.84	0.41	0.00	0	0.00	0.000
42.09			248.26	0.41	0.00	0	0.00	0.000
42.16			144.08	0.41	0.00	0	0.00	0.000
42.29	n-undecane	N_UNDE	1013.72	0.41	92.16	11	156.30	2.182
42.49	C10 aromatic	C10AR6	160.67	0.41	16.07	10	134.22	1.401
42.55			110.63	0.41	0.00	0	0.00	0.000
42.60			150.72	0.41	0.00	0	0.00	0.000
42.74	C11 paraffin	C11P_A	32.88	0.41	2.99	11	156.32	2.183
42.84	1,2,4,5-tetramethylbenzene	BZ1245	168.85	0.41	16.89	10	134.22	1.401
42.94	1,2,3,5-tetramethylbenzene	BZ1235	139.96	0.41	14.00	10	134.22	1.401
43.07			84.65	0.41	0.00	0	0.00	0.000
43.19			66.73	0.41	0.00	0	0.00	0.000
43.25			87.97	0.41	0.00	0	0.00	0.000
43.33			89.01	0.41	0.00	0	0.00	0.000
43.53	C11 paraffin	C11P_B	91.91	0.41	8.36	11	156.32	2.183
43.65			119.46	0.41	0.00	0	0.00	0.000
43.77			119.96	0.41	0.00	0	0.00	0.000
43.96	1,2,3,4-trimethylbenzene	BZ1234	183.33	0.41	18.33	10	134.22	1.401
44.08			66.00	0.41	0.00	0	0.00	0.000
44.20			49.56	0.41	0.00	0	0.00	0.000
44.28			90.36	0.41	0.00	0	0.00	0.000
44.41			59.19	0.41	0.00	0	0.00	0.000
44.57	C11 aromatic	C11AR3	22.09	0.41	2.01	11	148.22	1.453
44.76			18.33	0.41	0.00	0	0.00	0.000
44.93	naphthalene	NAPHTH	63.96	0.41	6.40	10	128.16	0.800
45.06			25.52	0.41	0.00	0	0.00	0.000
45.19	n-dodecane	N_DODE	84.84	0.41	7.07	12	170.34	2.168
45.29			32.65	0.41	0.00	0	0.00	0.000
45.40			8.48	0.41	0.00	0	0.00	0.000
45.50			8.32	0.41	0.00	0	0.00	0.000
45.64			11.90	0.41	0.00	0	0.00	0.000
45.74			4.03	0.41	0.00	0	0.00	0.000
45.88			12.09	0.41	0.00	0	0.00	0.000
	Total C3		14.57	0.02%				
	Total C4		51.33	0.08%				
	Total C5		197.56	0.33%				
	Total C6		584.41	0.96%				
	Total C7		4213.29	6.94%				
	Total C8		11829.94	19.47%				
	Total C9		18274.99	30.08%				
	Total C10		18572.65	30.57%				
	Total C11		6152.64	10.13%				
	Total C12		860.61	1.42%				

Canister: DRI-B
Flight 1, 7/15/97 10,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
3.07			8.49	0.27	0.00	0	0.00	0.000
3.80			1.15	0.27	0.00	0	0.00	0.000
7.06	propane	N_PROP	5.34	0.27	1.78	3	44.10	2.669
10.90	isobutane	I_BUTA	11.21	0.27	2.80	4	58.12	2.500
13.00	n-butane	N_BUTA	29.08	0.27	7.27	4	58.12	2.500
13.70	t-2-butene	T2BUTE	1.73	0.27	0.43	4	56.11	2.001
14.65	c-2-butene	C2BUTE	4.70	0.27	1.18	4	56.11	2.001
15.37			2.72	0.27	0.00	0	0.00	0.000
15.61			3.12	0.27	0.00	0	0.00	0.000
15.79			6.63	0.27	0.00	0	0.00	0.000
16.44	3-methyl-1-butene	B1E3ME	5.54	0.27	1.11	5	70.13	2.000
16.64			6.03	0.27	0.00	0	0.00	0.000
17.21	isopentane	IPENTA	65.95	0.27	13.19	5	72.15	2.401
17.74			3.83	0.27	0.00	0	0.00	0.000
17.99	1-pentene	PENTE1	41.91	0.27	8.38	5	70.13	2.000
18.18			0.86	0.27	0.00	0	0.00	0.000
18.43	2-methyl-1-butene	B1E2M	1.53	0.27	0.31	5	70.13	2.000
18.63	n-pentane	N_PENT	54.40	0.27	10.88	5	72.15	2.401
19.08	t-2-pentene	T2PENE	5.41	0.27	1.08	5	70.13	2.000
19.48	c-2-pentene	C2PENE	6.01	0.27	1.20	5	70.13	2.000
19.69	2-methyl-2-butene	B2E2M	4.46	0.27	0.89	5	70.13	2.000
19.83			6.07	0.27	0.00	0	0.00	0.000
20.16			8.78	0.27	0.00	0	0.00	0.000
20.40	2,2-dimethylbutane	BU22DM	15.36	0.27	2.56	6	86.17	2.333
20.73			9.00	0.27	0.00	0	0.00	0.000
20.98			10.48	0.27	0.00	0	0.00	0.000
21.24	cyclopentene	CPENTE	9.71	0.27	1.94	5	68.11	1.599
21.47	4-methyl-1-pentene	P1E4ME	6.91	0.27	1.15	6	84.16	2.001
21.74	cyclopentane	CPENTA	14.77	0.27	2.95	5	70.13	2.000
21.89	2,3-dimethylbutane	BU23DM	23.57	0.27	3.93	6	86.17	2.333
22.13	2-methylpentane	PENA2M	102.96	0.27	17.16	6	86.17	2.333
22.32			6.20	0.27	0.00	0	0.00	0.000
22.53			6.30	0.27	0.00	0	0.00	0.000
22.80	3-methylpentane	PENA3M	74.33	0.27	12.39	6	86.17	2.333
23.05	1-hexene	HEX1E	3.37	0.27	0.56	6	84.16	2.001
23.22	C6 olefin	C6OLE1	2.73	0.27	0.46	6	84.16	2.001
23.41			2.62	0.27	0.00	0	0.00	0.000
23.62	n-hexane	N_HEX	180.62	0.27	30.10	6	86.17	2.333
23.87	t-2-hexene	T2HEXE	4.04	0.27	0.67	6	84.16	2.001
24.04			1.10	0.27	0.00	0	0.00	0.000
24.19	c-3-hexene	C3HEXE	2.98	0.27	0.50	6	84.16	2.001
24.35			2.87	0.27	0.00	0	0.00	0.000
24.49	trans-3-methyl-2-pentene	P2E3MT	2.15	0.27	0.36	6	84.16	2.001
24.74			9.01	0.27	0.00	0	0.00	0.000
24.83	methylcyclopentane	MCYPNA	141.29	0.27	23.55	6	84.16	2.001
25.02	2,4-dimethylpentane	PEN24M	18.38	0.27	2.63	7	100.20	2.286
25.25			3.03	0.27	0.00	0	0.00	0.000
25.43	2,2,3-trimethylbutane	BU223M	1.88	0.27	0.27	7	100.20	2.286
25.90	benzene	BENZE	70.43	0.27	11.74	6	78.11	1.000
26.15	3,3-dimethylpentane	PEN33M	12.40	0.27	1.77	7	100.20	2.286
26.33	cyclohexane	CYHEXA	215.52	0.27	35.92	6	84.16	2.001
26.68	2-methylhexane	HEXA2M	234.55	0.27	33.51	7	98.19	2.001
26.78	2,3-dimethylpentane	PEN23M	121.18	0.27	17.31	7	100.20	2.286
26.92	cyclohexene	CYHEXE	41.76	0.27	6.96	6	82.15	1.668

Canister: DRI-B
Flight 1, 7/15/97 10,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
27.07	3-methylhexane + pentanal	HEXA3M	357.14	0.27	51.02	7	100.20	2.286
27.38	1,3-dimethylcyclopentane	CPA13M	110.79	0.27	15.83	7	98.19	2.001
27.50	3-ethylpentane	PA3ET	147.26	0.27	18.41	8	114.23	2.251
27.62	2,2,4-trimethylpentane	PA224M	213.77	0.27	26.72	8	114.23	2.251
27.86	C7 olefin	C7OLE2	1.81	0.27	0.26	7	98.19	2.001
28.09	n-heptane	N_HEPT	1044.76	0.27	149.25	7	100.20	2.286
28.48	C8 olefin	C8OLE3	1.35	0.27	0.17	8	112.21	2.000
28.64			2.59	0.27	0.00	0	0.00	0.000
29.05	methylcyclohexane	MECYHX	1270.19	0.27	181.46	7	98.19	2.001
29.14	C8 paraffin	C8PA1	102.11	0.27	12.76	8	114.23	2.251
29.32			0.56	0.27	0.00	0	0.00	0.000
29.43	2,5-diemthylhexane	HEX25M	104.12	0.27	13.02	8	114.23	2.251
29.52	2,4-diemthylhexane	HEX24M	321.80	0.27	40.23	8	114.23	2.251
29.84	C8 paraffin	C8PA2	213.85	0.27	26.73	8	114.23	2.251
30.14			192.51	0.27	0.00	0	0.00	0.000
30.24	2,3,-trimethylpentane	PA234M	47.73	0.27	5.97	8	114.23	2.251
30.43	toluene	TOLUE	968.94	0.27	138.42	7	92.14	1.144
30.62	2,3-dimethylhexane	HX23DM	183.67	0.27	22.96	8	114.23	2.251
30.70			100.14	0.27	0.00	0	0.00	0.000
30.81	2-methylheptane	HEP2ME	1098.25	0.27	122.03	9	128.26	2.223
30.88	4-methylheptane	HEP4ME	331.69	0.27	36.85	9	128.26	2.223
31.00	C8 paraffin	C8PA3	125.08	0.27	15.64	8	114.23	2.251
31.12	3-methylheptane	HEP3ME	972.48	0.27	121.56	8	114.23	2.251
31.36			788.79	0.27	0.00	0	0.00	0.000
31.44	2,2,5-trimethylhexane	HEX225	318.38	0.27	35.38	9	128.26	2.223
31.56	octene-1	OCT1E	15.27	0.27	1.91	8	112.21	2.000
31.74	1,1-dimethylcyclohexane	CHX11M	270.42	0.27	33.80	8	112.21	2.000
31.84			121.07	0.27	0.00	0	0.00	0.000
31.89			262.09	0.27	0.00	0	0.00	0.000
32.02			52.32	0.27	0.00	0	0.00	0.000
32.12	n-octane	N_OCT	3082.39	0.27	385.30	8	114.23	2.251
32.31			99.22	0.27	0.00	0	0.00	0.000
32.42			264.10	0.27	0.00	0	0.00	0.000
32.54			2.70	0.27	0.00	0	0.00	0.000
32.68			83.98	0.27	0.00	0	0.00	0.000
32.82	2,3,5-trimethylhexane	HEX235	49.60	0.27	5.51	9	128.26	2.223
32.91	2,4-dimethylheptane	HEP24D	95.71	0.27	10.63	9	128.26	2.223
33.05	4,4-dimethylheptane	HEP44D	253.87	0.27	28.21	9	128.26	2.223
33.19			29.30	0.27	0.00	0	0.00	0.000
33.28	2,6-dimethylheptane	HEP26D	705.34	0.27	78.37	9	128.26	2.223
33.41			353.02	0.27	0.00	0	0.00	0.000
33.53	2,5-dimethylheptane	HEP25D	1530.40	0.27	170.04	9	128.26	2.223
33.73	3,3-dimethylheptane	HEP33D	1074.32	0.27	119.37	9	128.26	2.223
33.84	C9 olefin	C9OLE1	274.96	0.27	30.55	9	126.24	2.001
33.92			138.33	0.27	0.00	0	0.00	0.000
34.02			82.99	0.27	0.00	0	0.00	0.000
34.14	ethylbenzene	ETBZ	1075.26	0.27	134.41	8	106.16	1.250
34.31	C9 olefin	C9OLE3	1074.21	0.27	119.36	9	126.24	2.001
34.44	m- & p-xylene	MP_XYL	2827.30	0.27	353.41	8	106.16	1.250
34.56	2-methyloctane	OCT2ME	1620.88	0.27	180.10	9	128.26	2.223
34.72			60.53	0.27	0.00	0	0.00	0.000
34.84	3-methyloctane	OCT3ME	1487.02	0.27	165.22	9	128.26	2.223
35.00	C9 paraffin	C9PAR1	152.06	0.27	16.90	9	128.26	2.223
35.09	styrene + heptanal	STYR	22.36	0.27	2.80	8	104.14	1.000

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Canister: DRI-B
Flight 1, 7/15/97 10,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
35.18			353.17	0.27	0.00	0	0.00	0.000
35.32	o-xylene	O_XYL	1255.70	0.27	156.96	8	106.17	1.251
35.44			844.47	0.27	0.00	0	0.00	0.000
35.56	nonene-1	NONE1	672.88	0.27	74.76	9	126.24	2.001
35.66	C9 paraffin 2	C9PAR2	414.73	0.27	46.08	9	128.26	2.223
35.80	n-nonane	N_NON	4847.28	0.27	538.59	9	128.26	2.223
36.06	C9 olefin	C9OLE4	172.82	0.27	19.20	9	126.24	2.001
36.22			113.26	0.27	0.00	0	0.00	0.000
36.29			830.86	0.27	0.00	0	0.00	0.000
36.48	isopropylbenzene	IPRBZ	799.49	0.27	88.83	9	120.20	1.335
36.65			117.28	0.27	0.00	0	0.00	0.000
36.75	C9 paraffin 3	C9PA3	1266.09	0.27	140.68	9	128.26	2.223
36.87			148.59	0.27	0.00	0	0.00	0.000
37.06	isopropylcyclohexane	IPCYHX	2815.25	0.27	312.81	9	126.24	2.001
37.21	2,6-dimethyloctane	OCT26D	454.67	0.27	45.47	10	142.29	2.201
37.27			362.06	0.27				
37.37	3,6-dimethyloctane	OCT36M	964.07	0.27	96.41	10	142.29	2.201
37.50	n-propylbenzene	N_PRBZ	1041.17	0.27	115.69	9	120.20	1.335
37.61			185.02	0.27	0.00	0	0.00	0.000
37.73	m-ethyltoluene	M_ETOL	1533.00	0.27	170.33	9	120.20	1.335
37.80	p-ethyltoluene	P_ETOL	1259.20	0.27	139.91	9	120.20	1.335
37.90			324.16	0.27	0.00	0	0.00	0.000
37.96	1,3,5-trimethylbenzene	BZ135M	1762.17	0.27	195.80	9	120.20	1.335
38.03			1116.91	0.27	0.00	0	0.00	0.000
38.18	C10 paraffin	C10P_A	1110.01	0.27	111.00	10	142.29	2.201
38.27			1088.17	0.27	0.00	0	0.00	0.000
38.38	o-ethyltoluene	O_ETOL	1035.40	0.27	115.04	9	120.20	1.335
38.49			142.36	0.27	0.00	0	0.00	0.000
38.58			532.91	0.27	0.00	0	0.00	0.000
38.69			593.53	0.27	0.00	0	0.00	0.000
38.88	1,2,4-trimethylbenzene	BZ124M	3441.00	0.27	382.33	9	120.20	1.335
39.01			556.80	0.27	0.00	0	0.00	0.000
39.09			397.22	0.27	0.00	0	0.00	0.000
39.18	n-decane	N_DEC	5478.77	0.27	547.88	10	142.29	2.201
39.30	C10 aromatic	C10AR1	212.29	0.27	21.23	10	134.22	1.401
39.39	isobutylbenzene	I_BUBZ	551.61	0.27	55.16	10	134.22	1.401
39.48	sec-butylbenzene	S_BUBZ	711.56	0.27	71.16	10	134.22	1.401
39.72	C10 aromatic 7	C10AR7	795.03	0.27	79.50	10	134.22	1.401
39.85	1,2,3-trimethylbenzene	BZ123M	1988.94	0.27	220.99	9	120.20	1.335
39.98	C10 paraffin	C10P_C	1550.37	0.27	155.04	10	142.29	2.201
40.17	limonene	LIMON	590.68	0.27	59.07	10	136.24	1.601
40.36	indan	INDAN	897.09	0.27	99.68	9	118.17	1.111
40.50	indene	INDENE	1419.06	0.27	157.67	9	116.15	0.888
40.61	diethylbenzene	DETBZ1	438.60	0.27	43.86	10	134.22	1.401
40.70	C10 aromatic	C10AR2	894.22	0.27	89.42	10	134.22	1.401
40.87	1,4-diethylbenzene	DETBZ2	1374.49	0.27	137.45	10	134.22	1.401
41.03	1,2-diethylbenzene	DETBZ3	789.13	0.27	78.91	10	134.22	1.401
41.13			790.59	0.27	0.00	0	0.00	0.000
41.24	2-propyltoluene	TOL2PR	1088.48	0.27	108.85	10	134.22	1.401
41.35			170.54	0.27	0.00	0	0.00	0.000
41.46			778.00	0.27	0.00	0	0.00	0.000
41.53	C10 aromatic	C10AR4	549.50	0.27	54.95	10	134.22	1.401
41.60	C10 aromatic	C10AR5	487.48	0.27	48.75	10	134.22	1.401
41.78	isopropyltoluene	IPRTOL	802.76	0.27	80.28	10	134.22	1.401

Canister: DRI-B
Flight 1, 7/15/97 10,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
41.94			376.73	0.27	0.00	0	0.00	0.000
42.09			559.40	0.27	0.00	0	0.00	0.000
42.16			296.05	0.27	0.00	0	0.00	0.000
42.29	n-undecane	N_UNDE	2506.07	0.27	227.82	11	156.30	2.182
42.49	C10 aromatic	C10AR6	369.10	0.27	36.91	10	134.22	1.401
42.55			244.10	0.27	0.00	0	0.00	0.000
42.60			359.39	0.27	0.00	0	0.00	0.000
42.73	C11 paraffin	C11P_A	75.99	0.27	6.91	11	156.32	2.183
42.84	1,2,4,5-tetramethylbenzene	BZ1245	411.38	0.27	41.14	10	134.22	1.401
42.94	1,2,3,5-tetramethylbenzene	BZ1235	343.32	0.27	34.33	10	134.22	1.401
43.06			194.21	0.27	0.00	0	0.00	0.000
43.19			172.32	0.27	0.00	0	0.00	0.000
43.25			196.74	0.27	0.00	0	0.00	0.000
43.33			222.04	0.27	0.00	0	0.00	0.000
43.53	C11 paraffin	C11P_B	239.73	0.27	21.79	11	156.32	2.183
43.65			302.83	0.27	0.00	0	0.00	0.000
43.77			296.36	0.27	0.00	0	0.00	0.000
43.96	1,2,3,4-trimethylbenzene	BZ1234	493.96	0.27	49.40	10	134.22	1.401
44.08			180.19	0.27	0.00	0	0.00	0.000
44.20			145.15	0.27	0.00	0	0.00	0.000
44.28			239.51	0.27	0.00	0	0.00	0.000
44.41			156.99	0.27	0.00	0	0.00	0.000
44.57	C11 aromatic	C11AR3	55.51	0.27	5.05	11	148.22	1.453
44.76			42.82	0.27	0.00	0	0.00	0.000
44.93	naphthalene	NAPHTH	185.35	0.27	18.54	10	128.16	0.800
45.06			72.94	0.27	0.00	0	0.00	0.000
45.18	n-dodecane	N_DODE	279.17	0.27	23.26	12	170.34	2.168
45.29			87.18	0.27	0.00	0	0.00	0.000
45.39			20.24	0.27	0.00	0	0.00	0.000
45.50			23.32	0.27	0.00	0	0.00	0.000
45.64			38.22	0.27	0.00	0	0.00	0.000
45.74			9.11	0.27	0.00	0	0.00	0.000
45.88			32.19	0.27	0.00	0	0.00	0.000
	Total C3		14.98	0.02%				
	Total C4		57.90	0.06%				
	Total C5		252.25	0.27%				
	Total C6		620.82	0.68%				
	Total C7		4587.94	4.99%				
	Total C8		13886.07	15.10%				
	Total C9		24835.28	27.01%				
	Total C10		31647.25	34.42%				
	Total C11		13700.37	14.90%				
	Total C12		2358.21	2.56%				

Canister: DRI-F
Flight 1, 7/15/97 14,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
3.03			10.69	0.23	0.00	0	0.00	0.000
3.75			1.42	0.23	0.00	0	0.00	0.000
7.03	propane	N_PROP	6.24	0.23	2.08	3	44.10	2.669
10.88	isobutane	I_BUTA	14.99	0.23	3.75	4	58.12	2.500
12.99	n-butane	N_BUTA	35.81	0.23	8.95	4	58.12	2.500
13.69	t-2-butene	T2BUTE	3.28	0.23	0.82	4	56.11	2.001
14.51	c-2-butene	C2BUTE	0.75	0.23	0.19	4	56.11	2.001
16.95			2.01	0.23	0.00	0	0.00	0.000
17.20	isopentane	IPENTA	78.59	0.23	15.72	5	72.15	2.401
17.98	1-pentene	PENTE1	37.37	0.23	7.47	5	70.13	2.000
18.30			1.06	0.23	0.00	0	0.00	0.000
18.42	2-methyl-1-butene	B1E2M	1.42	0.23	0.28	5	70.13	2.000
18.62	n-pentane	N_PENT	54.85	0.23	10.97	5	72.15	2.401
19.07	t-2-pentene	T2PENE	3.83	0.23	0.77	5	70.13	2.000
19.19			3.24	0.23	0.00	0	0.00	0.000
19.45	c-2-pentene	C2PENE	2.89	0.23	0.58	5	70.13	2.000
19.69	2-methyl-2-butene	B2E2M	3.53	0.23	0.71	5	70.13	2.000
19.83			2.22	0.23	0.00	0	0.00	0.000
20.17			3.02	0.23	0.00	0	0.00	0.000
20.40	2,2-dimethylbutane	BU22DM	9.14	0.23	1.52	6	86.17	2.333
20.73			3.04	0.23	0.00	0	0.00	0.000
20.88			1.72	0.23	0.00	0	0.00	0.000
20.99			3.10	0.23	0.00	0	0.00	0.000
21.22	cyclopentene	CPENTE	4.01	0.23	0.80	5	68.11	1.599
21.45	4-methyl-1-pentene	P1E4ME	3.27	0.23	0.55	6	84.16	2.001
21.74	cyclopentane	CPENTA	13.83	0.23	2.77	5	70.13	2.000
21.89	2,3-dimethylbutane	BU23DM	20.66	0.23	3.44	6	86.17	2.333
22.13	2-methylpentane	PENA2M	96.56	0.23	16.09	6	86.17	2.333
22.52			2.12	0.23	0.00	0	0.00	0.000
22.70	2,2-dimethylpentane	PEN22M	1.18	0.23	0.17	7	100.20	2.286
22.79	3-methylpentane	PENA3M	70.88	0.23	11.81	6	86.17	2.333
23.06	1-hexene	HEX1E	1.97	0.23	0.33	6	84.16	2.001
23.62	n-hexane	N_HEX	168.24	0.23	28.04	6	86.17	2.333
23.86	t-2-hexene	T2HEXE	1.82	0.23	0.30	6	84.16	2.001
24.50	trans-3-methyl-2-pentene	P2E3MT	2.49	0.23	0.42	6	84.16	2.001
24.73			7.81	0.23	0.00	0	0.00	0.000
24.82	methylcyclopentane	MCYPNA	136.21	0.23	22.70	6	84.16	2.001
25.01	2,4-dimethylpentane	PEN24M	17.84	0.23	2.55	7	100.20	2.286
25.25			3.80	0.23	0.00	0	0.00	0.000
25.57			1.63	0.23	0.00	0	0.00	0.000
25.89	benzene	BENZE	66.86	0.23	11.14	6	78.11	1.000
26.14	3,3-dimethylpentane	PEN33M	10.92	0.23	1.56	7	100.20	2.286
26.32	cyclohexane	CYHEXA	202.95	0.23	33.83	6	84.16	2.001
26.68	2-methylhexane	HEXA2M	219.63	0.23	31.38	7	98.19	2.001
26.77	2,3-dimethylpentane	PEN23M	114.45	0.23	16.35	7	100.20	2.286
26.91	cyclohexene	CYHEXE	38.76	0.23	6.46	6	82.15	1.668
27.06	3-methylhexane + pentanal	HEXA3M	333.53	0.23	47.65	7	100.20	2.286
27.37	1,3-dimethylcyclopentane	CPA13M	102.94	0.23	14.71	7	98.19	2.001
27.49	3-ethylpentane	PA3ET	138.28	0.23	17.29	8	114.23	2.251
27.61	2,2,4-trimethylpentane	PA224M	198.85	0.23	24.86	8	114.23	2.251
28.08	n-heptane	N_HEPT	978.10	0.23	139.73	7	100.20	2.286
29.04	methylcyclohexane	MECYHX	1198.63	0.23	171.23	7	98.19	2.001
29.13	C8 paraffin	C8PA1	98.21	0.23	12.28	8	114.23	2.251
29.42	2,5-diemthylhexane	HEX25M	99.94	0.23	12.49	8	114.23	2.251

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Canister: DRI-F
Flight 1, 7/15/97 14,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
29.51	2,4-diemthylhexane	HEX24M	309.30	0.23	38.66	8	114.23	2.251
29.83	C8 paraffin	C8PA2	206.71	0.23	25.84	8	114.23	2.251
30.13			183.48	0.23	0.00	0	0.00	0.000
30.22	2,3,-trimethylpentane	PA234M	48.24	0.23	6.03	8	114.23	2.251
30.42	toluene	TOLUE	931.99	0.23	133.14	7	92.14	1.144
30.61	2,3-dimethylhexane	HX23DM	176.05	0.23	22.01	8	114.23	2.251
30.69			96.20	0.23	0.00	0	0.00	0.000
30.79	2-methylheptane	HEP2ME	1040.98	0.23	115.66	9	128.26	2.223
30.86	4-methylheptane	HEP4ME	318.36	0.23	35.37	9	128.26	2.223
30.99	C8 paraffin	C8PA3	120.61	0.23	15.08	8	114.23	2.251
31.11	3-methylheptane	HEP3ME	927.93	0.23	115.99	8	114.23	2.251
31.35			755.61	0.23	0.00	0	0.00	0.000
31.43	2,2,5-trimethylhexane	HEX225	304.46	0.23	33.83	9	128.26	2.223
31.55	octene-1	OCT1E	17.07	0.23	2.13	8	112.21	2.000
31.73	1,1-dimethylcyclohexane	CHX11M	261.12	0.23	32.64	8	112.21	2.000
31.82			115.37	0.23	0.00	0	0.00	0.000
31.88			252.56	0.23	0.00	0	0.00	0.000
32.01			50.84	0.23	0.00	0	0.00	0.000
32.10	n-octane	N_OCT	2963.20	0.23	370.40	8	114.23	2.251
32.29			96.26	0.23	0.00	0	0.00	0.000
32.41			254.65	0.23	0.00	0	0.00	0.000
32.54			3.46	0.23	0.00	0	0.00	0.000
32.67			81.43	0.23	0.00	0	0.00	0.000
32.81	2,3,5-trimethylhexane	HEX235	47.46	0.23	5.27	9	128.26	2.223
32.90	2,4-dimethylheptane	HEP24D	92.87	0.23	10.32	9	128.26	2.223
33.04	4,4-dimethylheptane	HEP44D	245.27	0.23	27.25	9	128.26	2.223
33.18			28.46	0.23	0.00	0	0.00	0.000
33.26	2,6-dimethylheptane	HEP26D	682.46	0.23	75.83	9	128.26	2.223
33.40			342.78	0.23	0.00	0	0.00	0.000
33.52	2,5-dimethylheptane	HEP25D	1490.26	0.23	165.58	9	128.26	2.223
33.72	3,3-dimethylheptane	HEP33D	1048.20	0.23	116.47	9	128.26	2.223
33.83	C9 olefin	C9OLE1	269.22	0.23	29.91	9	126.24	2.001
33.91			134.70	0.23	0.00	0	0.00	0.000
34.01			79.75	0.23	0.00	0	0.00	0.000
34.13	ethylbenzene	ETBZ	1050.96	0.23	131.37	8	106.16	1.250
34.30	C9 olefin	C9OLE3	1056.95	0.23	117.44	9	126.24	2.001
34.43	m- & p-xylene	MP_XYL	2786.05	0.23	348.26	8	106.16	1.250
34.55	2-methyloctane	OCT2ME	1612.16	0.23	179.13	9	128.26	2.223
34.70			59.52	0.23	0.00	0	0.00	0.000
34.82	3-methyloctane	OCT3ME	1477.16	0.23	164.13	9	128.26	2.223
34.99	C9 paraffin	C9PAR1	149.79	0.23	16.64	9	128.26	2.223
35.07	styrene + heptanal	STYR	22.47	0.23	2.81	8	104.14	1.000
35.17			351.40	0.23	0.00	0	0.00	0.000
35.31	o-xylene	O_XYL	1252.96	0.23	156.62	8	106.17	1.251
35.43			843.60	0.23	0.00	0	0.00	0.000
35.55	nonene-1	NONE1	682.84	0.23	75.87	9	126.24	2.001
35.65	C9 paraffin	C9PAR2	416.44	0.23	46.27	9	128.26	2.223
35.78	n-nonane	N_NON	4968.67	0.23	552.07	9	128.26	2.223
36.04	C9 olefin	C9OLE4	175.24	0.23	19.47	9	126.24	2.001
36.21			116.63	0.23	0.00	0	0.00	0.000
36.28			845.98	0.23	0.00	0	0.00	0.000
36.46	isopropylbenzene	IPRBZ	814.34	0.23	90.48	9	120.20	1.335
36.64			119.57	0.23	0.00	0	0.00	0.000
36.74	C9 paraffin 3	C9PA3	1302.99	0.23	144.78	9	128.26	2.223

Canister: DRI-F
Flight 1, 7/15/97 14,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
36.85			154.11	0.23	0.00	0	0.00	0.000
37.04	isopropylcyclohexane	IPCYHX	2931.13	0.23	325.68	9	126.24	2.001
37.20	2,6-dimethyloctane	OCT26D	472.09	0.23	47.21	10	142.29	2.201
37.26			381.65	0.23	0.00	0	0.00	0.000
37.36	3,6-dimethyloctane	OCT36M	1010.85	0.23	101.09	10	142.29	2.201
37.49	n-propylbenzene	N_PRBZ	1086.45	0.23	120.72	9	120.20	1.335
37.60			190.06	0.23	0.00	0	0.00	0.000
37.71	m-ethyltoluene	M_ETOL	1630.83	0.23	181.20	9	120.20	1.335
37.79	p-ethyltoluene	P_ETOL	1326.14	0.23	147.35	9	120.20	1.335
37.88			353.74	0.23	0.00	0	0.00	0.000
37.95	1,3,5-trimethylbenzene	BZ135M	1893.29	0.23	210.37	9	120.20	1.335
38.02			1225.34	0.23	0.00	0	0.00	0.000
38.16	C10 paraffin	C10P_A	1190.37	0.23	119.04	10	142.29	2.201
38.26			1189.97	0.23	0.00	0	0.00	0.000
38.36	o-ethyltoluene	O_ETOL	1111.66	0.23	123.52	9	120.20	1.335
38.47			144.50	0.23	0.00	0	0.00	0.000
38.57			574.77	0.23	0.00	0	0.00	0.000
38.68			633.78	0.23				1.600
38.86	1,2,4-trimethylbenzene	BZ124M	3810.59	0.23	423.40	9	120.20	1.335
39.00			606.96	0.23	0.00	0	0.00	0.000
39.08			444.63	0.23	0.00	0	0.00	0.000
39.16	n-decane	N_DEC	6389.60	0.23	638.96	10	142.29	2.201
39.29	C10 aromatic	C10AR1	235.57	0.23	23.56	10	134.22	1.401
39.38	isobutylbenzene	I_BUBZ	607.36	0.23	60.74	10	134.22	1.401
39.47	sec-butylbenzene	S_BUBZ	785.70	0.23	78.57	10	134.22	1.401
39.71	C10 aromatic 7	C10AR7	900.32	0.23	90.03	10	134.22	1.401
39.84	1,2,3-trimethylbenzene	BZ123M	2285.86	0.23	253.98	9	120.20	1.335
39.96	C10 paraffin	C10P_C	1829.92	0.23	182.99	10	142.29	2.201
40.16	limonene	LIMON	688.53	0.23	68.85	10	136.24	1.601
40.35	indan	INDAN	1045.48	0.23	116.16	9	118.17	1.111
40.49	indene	INDENE	1704.42	0.23	189.38	9	116.15	0.888
40.60	diethylbenzene	DETBZ1	513.40	0.23	51.34	10	134.22	1.401
40.69	C10 aromatic	C10AR2	1072.85	0.23	107.29	10	134.22	1.401
40.86	1,4-diethylbenzene	DETBZ2	1673.87	0.23	167.39	10	134.22	1.401
41.02	1,2-diethylbenzene	DETBZ3	981.49	0.23	98.15	10	134.22	1.401
41.12			992.24	0.23	0.00	0	0.00	0.000
41.23	2-propyltoluene	TOL2PR	1380.97	0.23	138.10	10	134.22	1.401
41.34			213.83	0.23	0.00	0	0.00	0.000
41.44			1007.57	0.23	0.00	0	0.00	0.000
41.52	C10 aromatic	C10AR4	673.56	0.23	67.36	10	134.22	1.401
41.59	C10 aromatic	C10AR5	628.33	0.23	62.83	10	134.22	1.401
41.77	isopropyltoluene	IPRTOL	1021.58	0.23	102.16	10	134.22	1.401
41.93			468.35	0.23	0.00	0	0.00	0.000
42.08			1114.81	0.23	0.00	0	0.00	0.000
42.28	n-undecane	N_UNDE	3653.97	0.23	332.18	11	156.30	2.182
42.47	C10 aromatic	C10AR6	500.03	0.23	50.00	10	134.22	1.401
42.53			329.96	0.23	0.00	0	0.00	0.000
42.59			492.94	0.23	0.00	0	0.00	0.000
42.73	C11 paraffin	C11P_A	100.11	0.23	9.10	11	156.32	2.183
42.83	1,2,4,5-tetramethylbenzene	BZ1245	597.51	0.23	59.75	10	134.22	1.401
42.93	1,2,3,5-tetramethylbenzene	BZ1235	478.32	0.23	47.83	10	134.22	1.401
43.05			274.56	0.23	0.00	0	0.00	0.000
43.18			267.79	0.23	0.00	0	0.00	0.000
43.24			262.86	0.23	0.00	0	0.00	0.000

Canister: DRI-F
Flight 1, 7/15/97 14,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
43.32			333.92	0.23	0.00	0	0.00	0.000
43.52	C11 paraffin	C11P_B	353.11	0.23	32.10	11	156.32	2.183
43.64			467.28	0.23	0.00	0	0.00	0.000
43.76			448.64	0.23	0.00	0	0.00	0.000
43.94	1,2,3,4-trimethylbenzene	BZ1234	800.37	0.23	80.04	10	134.22	1.401
44.06			298.43	0.23	0.00	0	0.00	0.000
44.19			250.41	0.23	0.00	0	0.00	0.000
44.26			390.57	0.23	0.00	0	0.00	0.000
44.39			265.05	0.23	0.00	0	0.00	0.000
44.56	C11 aromatic	C11AR3	84.29	0.23	7.66	11	148.22	1.453
44.75			67.76	0.23	0.00	0	0.00	0.000
44.91	naphthalene	NAPHTH	353.44	0.23	35.34	10	128.16	0.800
45.05			131.17	0.23	0.00	0	0.00	0.000
45.17	n-dodecane	N_DODE	587.10	0.23	48.93	12	170.34	2.168
45.28			153.01	0.23	0.00	0	0.00	0.000
45.38			34.79	0.23	0.00	0	0.00	0.000
45.48			45.53	0.23	0.00	0	0.00	0.000
45.54			27.29	0.23	0.00	0	0.00	0.000
45.63			78.12	0.23	0.00	0	0.00	0.000
45.73			18.37	0.23	0.00	0	0.00	0.000
45.87			73.79	0.23	0.00	0	0.00	0.000
	Total C3		18.35	0.02%				
	Total C4		61.07	0.06%				
	Total C5		211.03	0.21%				
	Total C6		554.32	0.55%				
	Total C7		4318.06	4.25%				
	Total C8		13381.55	13.18%				
	Total C9		25135.30	24.76%				
	Total C10		35472.09	34.94%				
	Total C11		18268.96	17.99%				
	Total C12		4108.13	4.05%				

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Canister: DRI-L
Flight 2, 7/15/97 Taxi

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_NO	MW	CTOH
3.04			9.57	0.41	0.00	0	0.00	0.000
3.76			1.57	0.41	0.00	0	0.00	0.000
7.04	propane	N_PROP	6.85	0.41	2.28	3	44.10	2.669
10.90	isobutane	I_BUTA	14.51	0.41	3.63	4	58.12	2.500
12.50			0.78	0.41				
13.00	n-butane	N_BUTA	30.06	0.41	7.52	4	58.12	2.500
14.52	c-2-butene	C2BUTE	0.81	0.41	0.20	4	56.11	2.001
15.52	t-2-butene	T2BUTE	14.42	0.41	3.61	4	56.11	2.001
16.49			16.99	0.41	0.00	0	0.00	0.000
17.21	isopentane	IPENTA	83.98	0.41	16.80	5	72.15	2.401
17.87	1-pentene	PENTE1	14.76	0.41	2.95	5	70.13	2.000
18.00			6.46	0.41	0.00	0	0.00	0.000
18.42	2-methyl-1-butene	B1E2M	17.22	0.41	3.44	5	70.13	2.000
18.64	n-pentane	N_PENT	48.41	0.41	9.68	5	72.15	2.401
18.85	isoprene	I_PREN	18.03	0.41	3.61	5	68.11	1.599
19.09	t-2-pentene	T2PENE	2.04	0.41	0.41	5	70.13	2.000
19.26			15.63	0.41	0.00	0	0.00	0.000
19.47	c-2-pentene	C2PENE	0.92	0.41	0.18	5	70.13	2.000
19.68	2-methyl-2-butene	B2E2M	18.15	0.41	3.63	5	70.13	2.000
19.99			15.55	0.41	0.00	0	0.00	0.000
20.31			15.06	0.41	0.00	0	0.00	0.000
20.40	2,2-dimethylbutane	BU22DM	7.83	0.41	1.31	6	86.17	2.333
20.60			14.31	0.41	0.00	0	0.00	0.000
20.88			13.72	0.41	0.00	0	0.00	0.000
21.14	cyclopentene	CPENTE	15.60	0.41	3.12	5	68.11	1.599
21.40	4-methyl-1-pentene	P1E4ME	15.89	0.41	2.65	6	84.16	2.001
21.64	3-methyl-1-pentene	P1E3ME	12.12	0.41	2.02	6	84.16	2.001
21.75	cyclopentane	CPENTA	9.19	0.41	1.84	5	70.13	2.000
21.90	2,3-dimethylbutane	BU23DM	23.39	0.41	3.90	6	86.17	2.333
22.14	2-methylpentane	PENA2M	71.64	0.41	11.94	6	86.17	2.333
22.30			13.38	0.41	0.00	0	0.00	0.000
22.51			7.24	0.41	0.00	0	0.00	0.000
22.70	2,2-dimethylpentane	PEN22M	8.92	0.41	1.27	7	100.20	2.286
22.81	3-methylpentane	PENA3M	45.66	0.41	7.61	6	86.17	2.333
22.89			9.59	0.41	0.00	0	0.00	0.000
23.08	1-hexene	HEX1E	7.04	0.41	1.17	6	84.16	2.001
23.26	C6 olefin	C6OLE1	8.07	0.41	1.35	6	84.16	2.001
23.44			10.29	0.41	0.00	0	0.00	0.000
23.63	n-hexane	N_HEX	103.64	0.41	17.27	6	86.17	2.333
23.77	t-3-hexene + chloroform	T3HEXE	7.44	0.41	1.24	6	84.16	2.001
23.94	2-methyl-2-pentene	P2E2ME	10.85	0.41	1.81	6	84.16	2.001
24.10	cis-3-methyl-2-pentene	P2E3MC	4.02	0.41	0.67	6	84.16	2.001
24.26	c-2-hexene	C2HEXE	5.71	0.41	0.95	6	84.16	2.001
24.39			6.56	0.41	0.00	0	0.00	0.000
24.56	trans-3-methyl-2-pentene	P2E3MT	3.70	0.41	0.62	6	84.16	2.001
24.74			11.73	0.41	0.00	0	0.00	0.000
24.83	methylcyclopentane	MCYPNA	92.06	0.41	15.34	6	84.16	2.001
25.02	2,4-dimethylpentane	PEN24M	16.60	0.41	2.37	7	100.20	2.286
25.12			4.61	0.41	0.00	0	0.00	0.000
25.27			3.30	0.41	0.00	0	0.00	0.000
25.42	2,2,3-trimethylbutane	BU223M	5.87	0.41	0.84	7	100.20	2.286
25.75	1-methylcyclopentene	CPENE1	6.10	0.41	1.02	6	82.15	1.668
25.90	benzene	BENZE	50.39	0.41	8.40	6	78.11	1.000
26.06			4.78	0.41	0.00	0	0.00	0.000
26.15	3,3-dimethylpentane	PEN33M	7.92	0.41	1.13	7	100.20	2.286
26.33	cyclohexane	CYHEXA	145.21	0.41	24.20	6	84.16	2.001
26.69	2-methylhexane	HEXA2M	156.30	0.41	22.33	7	98.19	2.001
26.78	2,3-dimethylpentane	PEN23M	82.34	0.41	11.76	7	100.20	2.286

Canister: DRI-L
Flight 2, 7/15/97 Taxi

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_NO	MW	CTOH
26.92	cyclohexene	CYHEXE	28.79	0.41	4.80	6	82.15	1.668
27.07	3-methylhexane + pentanal	HEXA3M	236.46	0.41	33.78	7	100.20	2.286
27.38	1,3-dimethylcyclopentane	CPA13M	76.26	0.41	10.89	7	98.19	2.001
27.50	3-ethylpentane	PA3ET	100.81	0.41	12.60	8	114.23	2.251
27.62	2,2,4-trimethylpentane	PA224M	138.37	0.41	17.30	8	114.23	2.251
27.75	C7 olefin	C7OLE1	3.69	0.41	0.53	7	98.19	2.001
27.98	t-3-heptene	T3HEPE	5.27	0.41	0.75	7	98.19	2.001
28.09	n-heptane	N_HEPT	696.84	0.41	99.55	7	100.20	2.286
28.36	C8 olefin	C8OLE2	6.50	0.41	0.81	8	112.21	2.000
28.56	2,4,4-trimethyl-1-pentene	P1E244	5.05	0.41	0.63	8	112.21	2.000
28.74			4.76	0.41	0.00	0	0.00	0.000
29.05	methylcyclohexane	MECYHX	911.15	0.41	130.16	7	98.19	2.001
29.14			74.03	0.41	0.00	0	0.00	0.000
29.28	C8 paraffin	C8PA1	4.06	0.41	0.51	8	114.23	2.251
29.43	2,5-diemthylhexane	HEX25M	82.13	0.41	10.27	8	114.23	2.251
29.52	2,4-diemthylhexane	HEX24M	242.44	0.41	30.31	8	114.23	2.251
29.84	C8 paraffin	C8PA2	165.09	0.41	20.64	8	114.23	2.251
30.14			142.58	0.41	0.00	0	0.00	0.000
30.24	2,3,-trimethylpentane	PA234M	39.45	0.41	4.93	8	114.23	2.251
30.44	toluene	TOLUE	716.44	0.41	102.35	7	92.14	1.144
30.62	2,3-dimethylhexane	HX23DM	141.85	0.41	17.73	8	114.23	2.251
30.70			76.12	0.41	0.00	0	0.00	0.000
30.81	2-methylheptane	HEP2ME	846.33	0.41	94.04	9	128.26	2.223
30.88	4-methylheptane	HEP4ME	261.45	0.41	29.05	9	128.26	2.223
31.00	C8 paraffin	C8PA3	97.04	0.41	12.13	8	114.23	2.251
31.12	3-methylheptane	HEP3ME	771.27	0.41	96.41	8	114.23	2.251
31.36			624.79	0.41	0.00	0	0.00	0.000
31.44	2,2,5-trimethylhexane	HEX225	251.20	0.41	27.91	9	128.26	2.223
31.56	octene-1	OCT1E	14.76	0.41	1.85	8	112.21	2.000
31.74			216.85	0.41	0.00	0	0.00	0.000
31.83			93.04	0.41	0.00	0	0.00	0.000
31.89			209.60	0.41	0.00	0	0.00	0.000
32.02			43.26	0.41	0.00	0	0.00	0.000
32.12	n-octane	N_OCT	2473.64	0.41	309.21	8	114.23	2.251
32.30			80.56	0.41	0.00	0	0.00	0.000
32.42			216.62	0.41	0.00	0	0.00	0.000
32.54			3.12	0.41	0.00	0	0.00	0.000
32.68			69.35	0.41	0.00	0	0.00	0.000
32.82	2,3,5-trimethylhexane	HEX235	40.65	0.41	4.52	9	128.26	2.223
32.91	2,4-dimethylheptane	HEP24D	80.83	0.41	8.98	9	128.26	2.223
33.05	4,4-dimethylheptane	HEP44D	211.16	0.41	23.46	9	128.26	2.223
33.19			24.23	0.41	0.00	0	0.00	0.000
33.27	2,6-dimethylheptane	HEP26D	588.33	0.41	65.37	9	128.26	2.223
33.41			294.08	0.41	0.00	0	0.00	0.000
33.53	2,5-dimethylheptane	HEP25D	1288.07	0.41	143.12	9	128.26	2.223
33.73	3,3-dimethylheptane	HEP33D	909.96	0.41	101.11	9	128.26	2.223
33.84	C9 olefin	C9OLE1	233.28	0.41	25.92	9	126.24	2.001
33.92	1,1-dimethylcyclohexane	CHX11M	117.19	0.41	14.65	8	112.21	2.000
34.02			69.64	0.41	0.00	0	0.00	0.000
34.14	ethylbenzene	ETBZ	892.72	0.41	111.59	8	106.16	1.250
34.31	C9 olefin	C9OLE3	917.44	0.41	101.94	9	126.24	2.001
34.45	m- & p-xylene	MP_XYL	2396.08	0.41	299.51	8	106.16	1.250
34.56	2-methyloctane	OCT2ME	1373.32	0.41	152.59	9	128.26	2.223
34.72			53.40	0.41	0.00	0	0.00	0.000
34.84	3-methyloctane	OCT3ME	1268.96	0.41	141.00	9	128.26	2.223
35.00	C9 paraffin	C9PAR1	132.26	0.41	14.70	9	128.26	2.223
35.08	styrene	STYR	19.40	0.41	2.43	8	104.14	1.000
35.18			308.67	0.41	0.00	0	0.00	0.000

Canister: DRI-L
Flight 2, 7/15/97 Taxi

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_NO	MW	CTOH
35.32	o-xylene	O_XYL	1077.24	0.41	134.66	8	106.17	1.251
35.44			723.96	0.41	0.00	0	0.00	0.000
35.56	nonene-1	NONE1	587.42	0.41	65.27	9	126.24	2.001
35.66	C9 paraffin	C9PAR2	359.09	0.41	39.90	9	128.26	2.223
35.80	n-nonane	N_NON	4095.54	0.41	455.06	9	128.26	2.223
36.06	C9 olefin	C9OLE4	147.59	0.41	16.40	9	126.24	2.001
36.22			99.66	0.41	0.00	0	0.00	0.000
36.29			719.78	0.41	0.00	0	0.00	0.000
36.47	isopropylbenzene	IPRBZ	675.95	0.41	75.11	9	120.20	1.335
36.65			101.32	0.41	0.00	0	0.00	0.000
36.75	C9 paraffin 3	C9PA3	1074.70	0.41	119.41	9	128.26	2.223
36.86			123.42	0.41	0.00	0	0.00	0.000
37.06	isopropylcyclohexane	IPCYHX	2351.92	0.41	261.32	9	126.24	2.001
37.21	2,6-dimethyloctane	OCT26D	382.64	0.41	38.26	10	142.29	2.201
37.27			298.49	0.41	0.00	0	0.00	0.000
37.37	3,6-dimethyloctane	OCT36M	791.52	0.41	79.15	10	142.29	2.201
37.50	n-propylbenzene	N_PRBZ	864.40	0.41	96.04	9	120.20	1.335
37.61			155.22	0.41	0.00	0	0.00	0.000
37.72	m-ethyltoluene	M_ETOL	1281.36	0.41	142.37	9	120.20	1.335
37.80	p-ethyltoluene	P_ETOL	1003.72	0.41	111.52	9	120.20	1.335
37.90			260.41	0.41	0.00	0	0.00	0.000
37.96	1,3,5-trimethylbenzene	BZ135M	1406.78	0.41	156.31	9	120.20	1.335
38.03			874.45	0.41	0.00	0	0.00	0.000
38.17	C10 paraffin	C10P_A	923.88	0.41	92.39	10	142.29	2.201
38.27			836.94	0.41	0.00	0	0.00	0.000
38.37	o-ethyltoluene	O_ETOL	841.64	0.41	93.52	9	120.20	1.335
38.48			122.94	0.41	0.00	0	0.00	0.000
38.58			431.06	0.41	0.00	0	0.00	0.000
38.69			484.34	0.41	0.00	0	0.00	0.000
38.88	1,2,4-trimethylbenzene	BZ124M	2734.19	0.41	303.80	9	120.20	1.335
39.01			441.09	0.41	0.00	0	0.00	0.000
39.09			317.34	0.41	0.00	0	0.00	0.000
39.17	n-decane	N_DEC	3989.70	0.41	398.97	10	142.29	2.201
39.30	C10 aromatic	C10AR1	164.22	0.41	16.42	10	134.22	1.401
39.39	isobutylbenzene	I_BUBZ	430.97	0.41	43.10	10	134.22	1.401
39.48	sec-butylbenzene	S_BUBZ	558.33	0.41	55.83	10	134.22	1.401
39.72	C10 aromatic 7	C10AR7	596.44	0.41	59.64	10	134.22	1.401
39.85	1,2,3-trimethylbenzene	BZ123M	1518.81	0.41	168.76	9	120.20	1.335
39.97	C10 paraffin	C10P_C	1086.52	0.41	108.65	10	142.29	2.201
40.17	limonene	LIMON	432.18	0.41	43.22	10	136.24	1.601
40.36	indan	INDAN	671.05	0.41	74.56	9	118.17	1.111
40.49	indene	INDENE	1017.37	0.41	113.04	9	116.15	0.888
40.61	diethylbenzene	DETBZ1	316.22	0.41	31.62	10	134.22	1.401
40.70	C10 aromatic	C10AR2	642.92	0.41	64.29	10	134.22	1.401
40.87	1,4-diethylbenzene	DETBZ2	967.15	0.41	96.72	10	134.22	1.401
41.02	1,2-diethylbenzene	DETBZ3	529.98	0.41	53.00	10	134.22	1.401
41.13			531.92	0.41	0.00	0	0.00	0.000
41.24	2-propyltoluene	TOL2PR	723.68	0.41	72.37	10	134.22	1.401
41.35			118.39	0.41	0.00	0	0.00	0.000
41.46			527.67	0.41	0.00	0	0.00	0.000
41.52	C10 aromatic	C10AR4	371.02	0.41	37.10	10	134.22	1.401
41.60	C10 aromatic	C10AR5	329.42	0.41	32.94	10	134.22	1.401
41.78	isopropyltoluene	IPRTOL	546.29	0.41	54.63	10	134.22	1.401
41.94			266.67	0.41	0.00	0	0.00	0.000
42.08			349.64	0.41	0.00	0	0.00	0.000
42.15			211.51	0.41	0.00	0	0.00	0.000
42.29	n-undecane	N_UNDE	1408.31	0.41	128.03	11	156.30	2.182
42.48	C10 aromatic	C10AR6	238.21	0.41	23.82	10	134.22	1.401

Canister: DRI-L
Flight 2, 7/15/97 Taxi

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_NO	MW	CTOH
42.54			154.59	0.41	0.00	0	0.00	0.000
42.60			219.85	0.41	0.00	0	0.00	0.000
42.74			46.53	0.41	0.00	0	0.00	0.000
42.83	1,2,4,5-tetramethylbenzene	BZ1245	244.45	0.41	24.45	10	134.22	1.401
42.94	1,2,3,5-tetramethylbenzene	BZ1235	206.35	0.41	20.64	10	134.22	1.401
43.06			120.46	0.41	0.00	0	0.00	0.000
43.19			89.84	0.41	0.00	0	0.00	0.000
43.24			127.18	0.41	0.00	0	0.00	0.000
43.33			129.29	0.41	0.00	0	0.00	0.000
43.53	C11 paraffin	C11P_B	136.38	0.41	12.40	11	156.32	2.183
43.65			167.57	0.41	0.00	0	0.00	0.000
43.77			170.99	0.41	0.00	0	0.00	0.000
43.95	1,2,3,4-trimethylbenzene	BZ1234	271.62	0.41	27.16	10	134.22	1.401
44.07			90.03	0.41	0.00	0	0.00	0.000
44.20			58.52	0.41	0.00	0	0.00	0.000
44.27			140.37	0.41	0.00	0	0.00	0.000
44.40			77.54	0.41	0.00	0	0.00	0.000
44.57	C11 aromatic	C11AR3	28.90	0.41	2.63	11	148.22	1.453
44.76			22.96	0.41	0.00	0	0.00	0.000
44.92	naphthalene	NAPHTH	102.83	0.41	10.28	10	128.16	0.800
45.06			36.26	0.41	0.00	0	0.00	0.000
45.18	n-dodecane	N_DODE	111.34	0.41	9.28	12	170.34	2.168
45.29			42.80	0.41	0.00	0	0.00	0.000
45.39			9.24	0.41	0.00	0	0.00	0.000
45.49			10.02	0.41	0.00	0	0.00	0.000
45.64			12.51	0.41	0.00	0	0.00	0.000
45.74			3.28	0.41	0.00	0	0.00	0.000
45.88			13.57	0.41	0.00	0	0.00	0.000
	Total C3		17.99	0.03%				
	Total C4		60.58	0.09%				
	Total C5		324.66	0.46%				
	Total C6		524.61	0.74%				
	Total C7		3228.64	4.56%				
	Total C8		11177.10	15.80%				
	Total C9		21042.13	29.74%				
	Total C10		24404.49	34.50%				
	Total C11		8762.35	12.39%				
	Total C12		1202.78	1.70%				

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Canister: DRI -N
Flight 2, 7/15/97 10,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
3.03			9.57	0.29	0.00	0	0.00	0.000
3.75			1.52	0.29	0.00	0	0.00	0.000
7.03	propane	N_PROP	6.47	0.29	2.16	3	44.10	2.669
10.88	isobutane	I_BUTA	13.15	0.29	3.29	4	58.12	2.500
12.99	n-butane	N_BUTA	28.35	0.29	7.09	4	58.12	2.500
14.51	c-2-butene	C2BUTE	0.76	0.29	0.19	4	56.11	2.001
16.24	t-2-butene	T2BUTE	2.83	0.29	0.71	4	56.11	2.001
16.65			5.28	0.29	0.00	0	0.00	0.000
17.20	isopentane	IPENTA	66.53	0.29	13.31	5	72.15	2.401
17.76			2.70	0.29	0.00	0	0.00	0.000
17.99	1-pentene	PENTE1	6.26	0.29	1.25	5	70.13	2.000
18.42	2-methyl-1-butene	B1E2M	3.13	0.29	0.63	5	70.13	2.000
18.62	n-pentane	N_PENT	45.85	0.29	9.17	5	72.15	2.401
18.78			3.83	0.29	0.00	0	0.00	0.000
19.07	t-2-pentene	T2PENE	2.72	0.29	0.54	5	70.13	2.000
19.46	c-2-pentene	C2PENE	0.90	0.29	0.18	5	70.13	2.000
19.69	2-methyl-2-butene	B2E2M	4.55	0.29	0.91	5	70.13	2.000
19.83			3.06	0.29	0.00	0	0.00	0.000
20.17			4.31	0.29	0.00	0	0.00	0.000
20.40	2,2-dimethylbutane	BU22DM	7.93	0.29	1.32	6	86.17	2.333
20.73			2.27	0.29	0.00	0	0.00	0.000
20.86			1.94	0.29	0.00	0	0.00	0.000
21.01	cyclopentene	CPENTE	1.99	0.29	0.40	5	68.11	1.599
21.14	4-methyl-1-pentene	P1E4ME	0.99	0.29	0.17	6	84.16	2.001
21.44	3-methyl-1-pentene	P1E3ME	2.72	0.29	0.45	6	84.16	2.001
21.74	cyclopentane	CPENTA	10.95	0.29	2.19	5	70.13	2.000
21.89	2,3-dimethylbutane	BU23DM	13.11	0.29	2.19	6	86.17	2.333
22.13	2-methylpentane	PENA2M	55.07	0.29	9.18	6	86.17	2.333
22.46			2.59	0.29	0.00	0	0.00	0.000
22.67	2,2-dimethylpentane	PEN22M	1.68	0.29	0.24	7	100.20	2.286
22.79	3-methylpentane	PENA3M	42.17	0.29	7.03	6	86.17	2.333
23.05	1-hexene	HEX1E	1.80	0.29	0.30	6	84.16	2.001
23.24			1.57	0.29	0.00	0	0.00	0.000
23.62	n-hexane	N_HEX	97.05	0.29	16.18	6	86.17	2.333
23.85	t-2-hexene	T2HEXE	1.49	0.29	0.25	6	84.16	2.001
24.28	c-2-hexene	C2HEXE	1.64	0.29	0.27	6	84.16	2.001
24.73			6.05	0.29	0.00	0	0.00	0.000
24.82	methylcyclopentane	MCYPNA	87.66	0.29	14.61	6	84.16	2.001
25.01	2,4-dimethylpentane	PEN24M	11.33	0.29	1.62	7	100.20	2.286
25.24			2.21	0.29	0.00	0	0.00	0.000
25.90	benzene	BENZE	47.51	0.29	7.92	6	78.11	1.000
26.14	3,3-dimethylpentane	PEN33M	8.27	0.29	1.18	7	100.20	2.286
26.32	cyclohexane	CYHEXA	138.27	0.29	23.05	6	84.16	2.001
26.68	2-methylhexane	HEXA2M	147.00	0.29	21.00	7	98.19	2.001
26.77	2,3-dimethylpentane	PEN23M	77.07	0.29	11.01	7	100.20	2.286
26.92	cyclohexene	CYHEXE	26.41	0.29	4.40	6	82.15	1.668
27.06	3-methylhexane + pentanal	HEXA3M	224.17	0.29	32.02	7	100.20	2.286
27.37	1,3-dimethylcyclopentane	CPA13M	69.42	0.29	9.92	7	98.19	2.001
27.50	3-ethylpentane	PA3ET	95.61	0.29	11.95	8	114.23	2.251
27.61	2,2,4-trimethylpentane	PA224M	135.63	0.29	16.95	8	114.23	2.251
27.86	C7 olefin	C7OLE2	0.75	0.29	0.11	7	98.19	2.001
28.08	n-heptane	N_HEPT	678.99	0.29	97.00	7	100.20	2.286
29.04	methylcyclohexane	MECYHX	899.17	0.29	128.45	7	98.19	2.001
29.14	C8 paraffin	C8PA1	74.49	0.29	9.31	8	114.23	2.251

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Canister: DRI -N
Flight 2, 7/15/97 10,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
29.32			2.55	0.29	0.00	0	0.00	0.000
29.43	2,5-diemthylhexane	HEX25M	79.92	0.29	9.99	8	114.23	2.251
29.51	2,4-diemthylhexane	HEX24M	241.34	0.29	30.17	8	114.23	2.251
29.84	C8 paraffin	C8PA2	160.05	0.29	20.01	8	114.23	2.251
29.98			2.06	0.29	0.00	0	0.00	0.000
30.13			141.53	0.29	0.00	0	0.00	0.000
30.23	2,3,-trimethylpentane	PA234M	39.51	0.29	4.94	8	114.23	2.251
30.43	toluene	TOLUE	714.00	0.29	102.00	7	92.14	1.144
30.61	2,3-dimethylhexane	HX23DM	144.33	0.29	18.04	8	114.23	2.251
30.69			76.24	0.29	0.00	0	0.00	0.000
30.80	2-methylheptane	HEP2ME	857.40	0.29	95.27	9	128.26	2.223
30.87	4-methylheptane	HEP4ME	266.80	0.29	29.64	9	128.26	2.223
30.99	C8 paraffin	C8PA3	98.03	0.29	12.25	8	114.23	2.251
31.11	3-methylheptane	HEP3ME	782.79	0.29	97.85	8	114.23	2.251
31.36			634.10	0.29	0.00	0	0.00	0.000
31.43	2,2,5-trimethylhexane	HEX225	255.35	0.29	28.37	9	128.26	2.223
31.55	octene-1	OCT1E	15.24	0.29	1.91	8	112.21	2.000
31.74	1,1-dimethylcyclohexane	CHX11M	219.00	0.29	27.38	8	112.21	2.000
31.83			95.61	0.29	0.00	0	0.00	0.000
31.89			212.13	0.29	0.00	0	0.00	0.000
32.01			43.51	0.29	0.00	0	0.00	0.000
32.11	n-octane	N_OCT	2556.87	0.29	319.61	8	114.23	2.251
32.30			83.10	0.29	0.00	0	0.00	0.000
32.42			222.57	0.29	0.00	0	0.00	0.000
32.54			3.02	0.29	0.00	0	0.00	0.000
32.68			71.42	0.29	0.00	0	0.00	0.000
32.82	2,3,5-trimethylhexane	HEX235	42.71	0.29	4.75	9	128.26	2.223
32.90	2,4-dimethylheptane	HEP24D	84.58	0.29	9.40	9	128.26	2.223
33.05	4,4-dimethylheptane	HEP44D	223.11	0.29	24.79	9	128.26	2.223
33.19			25.44	0.29	0.00	0	0.00	0.000
33.27	2,6-dimethylheptane	HEP26D	630.01	0.29	70.00	9	128.26	2.223
33.41			306.05	0.29	0.00	0	0.00	0.000
33.52	2,5-dimethylheptane	HEP25D	1364.92	0.29	151.66	9	128.26	2.223
33.72	3,3-dimethylheptane	HEP33D	969.71	0.29	107.75	9	128.26	2.223
33.83	C9 olefin	C9OLE1	248.91	0.29	27.66	9	126.24	2.001
33.91			125.30	0.29	0.00	0	0.00	0.000
34.02			74.52	0.29	0.00	0	0.00	0.000
34.13	ethylbenzene	ETBZ	961.38	0.29	120.17	8	106.16	1.250
34.31	C9 olefin	C9OLE3	1005.40	0.29	111.71	9	126.24	2.001
34.44	m- & p-xylene	MP_XYL	2619.45	0.29	327.43	8	106.16	1.250
34.56	2-methyloctane	OCT2ME	1553.46	0.29	172.61	9	128.26	2.223
34.71			57.74	0.29	0.00	0	0.00	0.000
34.83	3-methyloctane	OCT3ME	1426.47	0.29	158.50	9	128.26	2.223
35.00	C9 paraffin	C9PAR1	146.59	0.29	16.29	9	128.26	2.223
35.08	styrene + heptanal	STYR	21.61	0.29	2.70	8	104.14	1.000
35.17			341.91	0.29	0.00	0	0.00	0.000
35.32	o-xylene	O_XYL	1208.36	0.29	151.05	8	106.17	1.251
35.44			819.24	0.29	0.00	0	0.00	0.000
35.56	nonene-1	NONE1	665.72	0.29	73.97	9	126.24	2.001
35.66	C9 paraffin	C9PAR2	409.47	0.29	45.50	9	128.26	2.223
35.79	n-nonane	N_NON	4879.10	0.29	542.12	9	128.26	2.223
36.05	C9 olefin	C9OLE4	172.43	0.29	19.16	9	126.24	2.001
36.21			112.74	0.29	0.00	0	0.00	0.000
36.29			838.12	0.29	0.00	0	0.00	0.000

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Canister: DRI -N
Flight 2, 7/15/97 10,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
36.47	isopropylbenzene	IPRBZ	808.78	0.29	89.86	9	120.20	1.335
36.65			121.82	0.29	0.00	0	0.00	0.000
36.75	C9 paraffin 3	C9PA3	1288.64	0.29	143.18	9	128.26	2.223
36.86			155.35	0.29	0.00	0	0.00	0.000
37.05	isopropylcyclohexane	IPCYHX	2916.50	0.29	324.06	9	126.24	2.001
37.21	2,6-dimethyloctane	OCT26D	476.67	0.29	47.67	10	142.29	2.201
37.27			382.70	0.29	0.00	0	0.00	0.000
37.36	3,6-dimethyloctane	OCT36M	1010.74	0.29	101.07	10	142.29	2.201
37.49	n-propylbenzene	N_PRBZ	1076.96	0.29	119.66	9	120.20	1.335
37.60			196.81	0.29	0.00	0	0.00	0.000
37.72	m-ethyltoluene	M_ETOL	1624.07	0.29	180.45	9	120.20	1.335
37.80	p-ethyltoluene	P_ETOL	1325.14	0.29	147.24	9	120.20	1.335
37.89			348.71	0.29	0.00	0	0.00	0.000
37.96	1,3,5-trimethylbenzene	BZ135M	1904.48	0.29	211.61	9	120.20	1.335
38.03			1207.57	0.29	0.00	0	0.00	0.000
38.17	C10 paraffin	C10P_A	1186.33	0.29	118.63	10	142.29	2.201
38.27			1172.05	0.29	0.00	0	0.00	0.000
38.37	o-ethyltoluene	O_ETOL	1111.05	0.29	123.45	9	120.20	1.335
38.48			149.53	0.29	0.00	0	0.00	0.000
38.58			579.56	0.29	0.00	0	0.00	0.000
38.69			637.18	0.29	0.00	0	0.00	0.000
38.87	1,2,4-trimethylbenzene	BZ124M	3792.12	0.29	421.35	9	120.20	1.335
39.01			609.75	0.29	0.00	0	0.00	0.000
39.09			442.48	0.29	0.00	0	0.00	0.000
39.17	n-decane	N_DEC	6145.75	0.29	614.58	10	142.29	2.201
39.30	C10 aromatic	C10AR1	235.68	0.29	23.57	10	134.22	1.401
39.39	isobutylbenzene	I_BUBZ	610.53	0.29	61.05	10	134.22	1.401
39.48	sec-butylbenzene	S_BUBZ	791.91	0.29	79.19	10	134.22	1.401
39.72	C10 aromatic 7	C10AR7	900.18	0.29	90.02	10	134.22	1.401
39.85	1,2,3-trimethylbenzene	BZ123M	2264.33	0.29	251.59	9	120.20	1.335
39.97	C10 paraffin	C10P_C	1791.81	0.29	179.18	10	142.29	2.201
40.16	limonene	LIMON	684.61	0.29	68.46	10	136.24	1.601
40.35	indan	INDAN	1044.18	0.29	116.02	9	118.17	1.111
40.50	indene	INDENE	1646.92	0.29	182.99	9	116.15	0.888
40.61	diethylbenzene	DETBZ1	518.76	0.29	51.88	10	134.22	1.401
40.70	C10 aromatic	C10AR2	1044.57	0.29	104.46	10	134.22	1.401
40.87	1,4-diethylbenzene	DETBZ2	1634.24	0.29	163.42	10	134.22	1.401
41.02	1,2-diethylbenzene	DETBZ3	948.43	0.29	94.84	10	134.22	1.401
41.12			946.51	0.29	0.00	0	0.00	0.000
41.24	2-propyltoluene	TOL2PR	1311.68	0.29	131.17	10	134.22	1.401
41.34			213.23	0.29	0.00	0	0.00	0.000
41.45			954.59	0.29	0.00	0	0.00	0.000
41.52	C10 aromatic	C10AR4	656.56	0.29	65.66	10	134.22	1.401
41.60	C10 aromatic	C10AR5	600.59	0.29	60.06	10	134.22	1.401
41.78	isopropyltoluene	IPRTOL	991.09	0.29	99.11	10	134.22	1.401
41.94			466.06	0.29	0.00	0	0.00	0.000
42.08			688.99	0.29	0.00	0	0.00	0.000
42.15			381.15	0.29	0.00	0	0.00	0.000
42.29	n-undecane	N_UNDE	3152.46	0.29	286.59	11	156.30	2.182
42.48	C10 aromatic	C10AR6	471.79	0.29	47.18	10	134.22	1.401
42.54			310.28	0.29	0.00	0	0.00	0.000
42.60			553.10	0.29	0.00	0	0.00	0.000
42.83	1,2,4,5-tetramethylbenzene	BZ1245	538.30	0.29	53.83	10	134.22	1.401
42.93	1,2,3,5-tetramethylbenzene	BZ1235	443.11	0.29	44.31	10	134.22	1.401

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Canister: DRI -N
Flight 2, 7/15/97 10,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
43.06			255.59	0.29	0.00	0	0.00	0.000
43.19			227.25	0.29	0.00	0	0.00	0.000
43.24			254.50	0.29	0.00	0	0.00	0.000
43.32			299.25	0.29	0.00	0	0.00	0.000
43.52	C11 paraffin	C11P_B	318.68	0.29	28.97	11	156.32	2.183
43.65			401.84	0.29	0.00	0	0.00	0.000
43.77			393.80	0.29	0.00	0	0.00	0.000
43.95	1,2,3,4-trimethylbenzene	BZ1234	666.86	0.29	66.69	10	134.22	1.401
44.07			236.40	0.29	0.00	0	0.00	0.000
44.19			176.72	0.29	0.00	0	0.00	0.000
44.27			339.15	0.29	0.00	0	0.00	0.000
44.40			149.77	0.29	0.00	0	0.00	0.000
44.46	C11 aromatic	C11AR1	63.48	0.29	5.77	11	148.22	1.453
44.57	C11 aromatic	C11AR3	80.05	0.29	7.28	11	148.22	1.453
44.76			66.91	0.29	0.00	0	0.00	0.000
44.92	naphthalene	NAPHTH	289.40	0.29	28.94	10	128.16	0.800
45.06			106.93	0.29	0.00	0	0.00	0.000
45.18	n-dodecane	N_DODE	350.23	0.29	29.19	12	170.34	2.168
45.29			120.93	0.29	0.00	0	0.00	0.000
45.39			30.29	0.29	0.00	0	0.00	0.000
45.49			58.75	0.29	0.00	0	0.00	0.000
45.63			46.21	0.29	0.00	0	0.00	0.000
45.74			15.65	0.29	0.00	0	0.00	0.000
45.87			56.76	0.29	0.00	0	0.00	0.000
	Total C3		17.56	0.02%				
	Total C4		42.26	0.04%				
	Total C5		167.07	0.18%				
	Total C6		339.09	0.36%				
	Total C7		3108.68	3.27%				
	Total C8		11553.29	12.16%				
	Total C9		24474.91	25.76%				
	Total C10		35043.02	36.89%				
	Total C11		17019.27	17.92%				
	Total C12		3248.29	3.42%				

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Canister: DRI-H
Flight 2, 7/15/97 14,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
3.04			9.48	0.24	0.00	0	0.00	0.000
3.77			1.79	0.24	0.00	0	0.00	0.000
7.04	propane	N_PROP	7.37	0.24	2.46	3	44.10	2.669
10.89	isobutane	I_BUTA	14.54	0.24	3.64	4	58.12	2.500
13.00	n-butane	N_BUTA	30.87	0.24	7.72	4	58.12	2.500
14.52	c-2-butene	C2BUTE	2.35	0.24	0.59	4	56.11	2.001
16.30	3-methyl-1-butene	B1E3ME	0.47	0.24	0.09	5	70.13	2.000
17.21	isopentane	IPENTA	72.30	0.24	14.46	5	72.15	2.401
17.99	1-pentene	PENTE1	4.70	0.24	0.94	5	70.13	2.000
18.43	2-methyl-1-butene	B1E2M	1.47	0.24	0.29	5	70.13	2.000
18.63	n-pentane	N_PENT	48.68	0.24	9.74	5	72.15	2.401
19.08	t-2-pentene	T2PENE	1.72	0.24	0.34	5	70.13	2.000
19.46	c-2-pentene	C2PENE	3.36	0.24	0.67	5	70.13	2.000
19.69	2-methyl-2-butene	B2E2M	3.61	0.24	0.72	5	70.13	2.000
20.17			4.42	0.24	0.00	0	0.00	0.000
20.40	2,2-dimethylbutane	BU22DM	7.04	0.24	1.17	6	86.17	2.333
20.89			2.28	0.24	0.00	0	0.00	0.000
21.74	cyclopentane	CPENTA	9.66	0.24	1.93	5	70.13	2.000
21.89	2,3-dimethylbutane	BU23DM	13.98	0.24	2.33	6	86.17	2.333
22.13	2-methylpentane	PENA2M	63.23	0.24	10.54	6	86.17	2.333
22.66	2,2-dimethylpentane	PEN22M	1.36	0.24	0.19	7	100.20	2.286
22.80	3-methylpentane	PENA3M	46.47	0.24	7.75	6	86.17	2.333
23.06	1-hexene	HEX1E	2.25	0.24	0.38	6	84.16	2.001
23.62	n-hexane	N_HEX	105.84	0.24	17.64	6	86.17	2.333
24.73			6.08	0.24	0.00	0	0.00	0.000
24.82	methylcyclopentane	MCYPNA	96.85	0.24	16.14	6	84.16	2.001
25.01	2,4-dimethylpentane	PEN24M	12.31	0.24	1.76	7	100.20	2.286
25.24			3.71	0.24	0.00	0	0.00	0.000
25.59			2.46	0.24	0.00	0	0.00	0.000
25.90	benzene	BENZE	56.14	0.24	9.36	6	78.11	1.000
26.14	3,3-dimethylpentane	PEN33M	10.75	0.24	1.54	7	100.20	2.286
26.32	cyclohexane	CYHEXA	157.60	0.24	26.27	6	84.16	2.001
26.68	2-methylhexane	HEXA2M	165.84	0.24	23.69	7	98.19	2.001
26.77	2,3-dimethylpentane	PEN23M	88.78	0.24	12.68	7	100.20	2.286
26.92	cyclohexene	CYHEXE	33.34	0.24	5.56	6	82.15	1.668
27.06	3-methylhexane + pentanal	HEXA3M	260.63	0.24	37.23	7	100.20	2.286
27.37	1,3-dimethylcyclopentane	CPA13M	82.03	0.24	11.72	7	98.19	2.001
27.50	3-ethylpentane	PA3ET	110.41	0.24	13.80	8	114.23	2.251
27.61	2,2,4-trimethylpentane	PA224M	157.88	0.24	19.74	8	114.23	2.251
28.08	n-heptane	N_HEPT	779.47	0.24	111.35	7	100.20	2.286
28.64			10.96	0.24	0.00	0	0.00	0.000
29.04	methylcyclohexane	MECYHX	1006.21	0.24	143.74	7	98.19	2.001
29.14			88.17	0.24	0.00	0	0.00	0.000
29.43	2,5-diemthylhexane	HEX25M	95.52	0.24	11.94	8	114.23	2.251
29.51	2,4-diemthylhexane	HEX24M	275.94	0.24	34.49	8	114.23	2.251
29.84	C8 paraffin	C8PA2	182.26	0.24	22.78	8	114.23	2.251
29.99			4.82	0.24	0.00	0	0.00	0.000
30.13			160.49	0.24	0.00	0	0.00	0.000
30.23	2,3,-trimethylpentane	PA234M	44.60	0.24	5.58	8	114.23	2.251
30.43	toluene	TOLUE	804.94	0.24	114.99	7	92.14	1.144
30.61	2,3-dimethylhexane	HX23DM	163.34	0.24	20.42	8	114.23	2.251
30.69			85.90	0.24	0.00	0	0.00	0.000
30.80	2-methylheptane	HEP2ME	959.85	0.24	106.65	9	128.26	2.223
30.87	4-methylheptane	HEP4ME	298.86	0.24	33.21	9	128.26	2.223

Canister: DRI-H
Flight 2, 7/15/97 14,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
31.00	C8 paraffin	C8PA3	111.17	0.24	13.90	8	114.23	2.251
31.11	3-methylheptane	HEP3ME	876.92	0.24	109.62	8	114.23	2.251
31.36			708.29	0.24	0.00	0	0.00	0.000
31.43	2,2,5-trimethylhexane	HEX225	288.28	0.24	32.03	9	128.26	2.223
31.55	octene-1	OCT1E	17.65	0.24	2.21	8	112.21	2.000
31.74	1,1-dimethylcyclohexane	CHX11M	245.16	0.24	30.65	8	112.21	2.000
31.83			109.08	0.24	0.00	0	0.00	0.000
31.89			235.97	0.24	0.00	0	0.00	0.000
32.01			49.26	0.24	0.00	0	0.00	0.000
32.11	n-octane	N_OCT	2869.91	0.24	358.74	8	114.23	2.251
32.30			93.66	0.24	0.00	0	0.00	0.000
32.42			248.31	0.24	0.00	0	0.00	0.000
32.54			3.63	0.24	0.00	0	0.00	0.000
32.68			79.61	0.24	0.00	0	0.00	0.000
32.82	2,3,5-trimethylhexane	HEX235	47.71	0.24	5.30	9	128.26	2.223
32.90	2,4-dimethylheptane	HEP24D	94.36	0.24	10.48	9	128.26	2.223
33.05	4,4-dimethylheptane	HEP44D	249.48	0.24	27.72	9	128.26	2.223
33.19			28.49	0.24	0.00	0	0.00	0.000
33.27	2,6-dimethylheptane	HEP26D	705.43	0.24	78.38	9	128.26	2.223
33.41			343.75	0.24	0.00	0	0.00	0.000
33.52	2,5-dimethylheptane	HEP25D	1526.86	0.24	169.65	9	128.26	2.223
33.72	3,3-dimethylheptane	HEP33D	1084.61	0.24	120.51	9	128.26	2.223
33.83	C9 olefin	C9OLE1	276.90	0.24	30.77	9	126.24	2.001
33.91			141.13	0.24	0.00	0	0.00	0.000
34.02			83.56	0.24	0.00	0	0.00	0.000
34.13	ethylbenzene	ETBZ	1082.03	0.24	135.25	8	106.16	1.250
34.31	C9 olefin	C9OLE3	1132.74	0.24	125.86	9	126.24	2.001
34.44	m- & p-xylene	MP_XYL	2974.02	0.24	371.75	8	106.16	1.250
34.56	2-methyloctane	OCT2ME	1752.87	0.24	194.76	9	128.26	2.223
34.71			64.95	0.24	0.00	0	0.00	0.000
34.83	3-methyloctane	OCT3ME	1613.06	0.24	179.23	9	128.26	2.223
35.00	C9 paraffin	C9PAR1	164.30	0.24	18.26	9	128.26	2.223
35.08	styrene + heptanal	STYR	23.33	0.24	2.92	8	104.14	1.000
35.17			384.80	0.24	0.00	0	0.00	0.000
35.31	o-xylene	O_XYL	1373.50	0.24	171.69	8	106.17	1.251
35.44			932.65	0.24	0.00	0	0.00	0.000
35.56	nonene-1	NONE1	751.20	0.24	83.47	9	126.24	2.001
35.66	C9 paraffin	C9PAR2	464.16	0.24	51.57	9	128.26	2.223
35.79	n-nonane	N_NON	5598.66	0.24	622.07	9	128.26	2.223
36.05	C9 olefin	C9OLE4	195.60	0.24	21.73	9	126.24	2.001
36.21			130.46	0.24	0.00	0	0.00	0.000
36.29			950.44	0.24	0.00	0	0.00	0.000
36.47	isopropylbenzene	IPRBZ	924.80	0.24	102.76	9	120.20	1.335
36.65			138.62	0.24	0.00	0	0.00	0.000
36.74	C9 paraffin 3	C9PA3	1474.81	0.24	163.87	9	128.26	2.223
36.86			178.41	0.24	0.00	0	0.00	0.000
37.05	isopropylcyclohexane	IPCYHX	3359.91	0.24	373.32	9	126.24	2.001
37.21	2,6-dimethyloctane	OCT26D	548.95	0.24	54.90	10	142.29	2.201
37.26			439.01	0.24	0.00	0	0.00	0.000
37.36	3,6-dimethyloctane	OCT36M	1167.83	0.24	116.78	10	142.29	2.201
37.49	n-propylbenzene	N_PRBZ	1243.03	0.24	138.11	9	120.20	1.335
37.60			222.48	0.24	0.00	0	0.00	0.000
37.72	m-ethyltoluene	M_ETOL	1880.37	0.24	208.93	9	120.20	1.335
37.79	p-ethyltoluene	P_ETOL	1550.47	0.24	172.27	9	120.20	1.335

Canister: DRI-H
Flight 2, 7/15/97 14,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
37.89			404.29	0.24	0.00	0	0.00	0.000
37.96	1,3,5-trimethylbenzene	BZ135M	2233.70	0.24	248.19	9	120.20	1.335
38.03			1419.59	0.24	0.00	0	0.00	0.000
38.17	C10 paraffin	C10P_A	1373.36	0.24	137.34	10	142.29	2.201
38.27			1377.29	0.24	0.00	0	0.00	0.000
38.37	o-ethyltoluene	O_ETOL	1288.94	0.24	143.22	9	120.20	1.335
38.48			175.71	0.24	0.00	0	0.00	0.000
38.58			672.10	0.24	0.00	0	0.00	0.000
38.69			736.84	0.24	0.00	0	0.00	0.000
38.87	1,2,4-trimethylbenzene	BZ124M	4467.51	0.24	496.39	9	120.20	1.335
39.00			712.30	0.24	0.00	0	0.00	0.000
39.08			518.61	0.24	0.00	0	0.00	0.000
39.17	n-decane	N_DEC	7372.22	0.24	737.22	10	142.29	2.201
39.29	C10 aromatic	C10AR1	275.50	0.24	27.55	10	134.22	1.401
39.39	isobutylbenzene	I_BUBZ	715.27	0.24	71.53	10	134.22	1.401
39.48	sec-butylbenzene	S_BUBZ	920.37	0.24	92.04	10	134.22	1.401
39.71	C10 aromatic 7	C10AR7	1064.71	0.24	106.47	10	134.22	1.401
39.84	1,2,3-trimethylbenzene	BZ123M	2699.21	0.24	299.91	9	120.20	1.335
39.97	C10 paraffin	C10P_C	2154.05	0.24	215.41	10	142.29	2.201
40.16	limonene	LIMON	812.90	0.24	81.29	10	136.24	1.601
40.35	indan	INDAN	1231.20	0.24	136.80	9	118.17	1.111
40.49	indene	INDENE	1990.84	0.24	221.20	9	116.15	0.888
40.61	diethylbenzene	DETBZ1	614.89	0.24	61.49	10	134.22	1.401
40.69	C10 aromatic	C10AR2	1263.10	0.24	126.31	10	134.22	1.401
40.87	1,4-diethylbenzene	DETBZ2	1984.86	0.24	198.49	10	134.22	1.401
41.02	1,2-diethylbenzene	DETBZ3	1155.65	0.24	115.57	10	134.22	1.401
41.12			1148.38	0.24	0.00	0	0.00	0.000
41.23	2-propyltoluene	TOL2PR	1613.02	0.24	161.30	10	134.22	1.401
41.34			255.22	0.24	0.00	0	0.00	0.000
41.45			1135.88	0.24	0.00	0	0.00	0.000
41.52	C10 aromatic	C10AR4	832.14	0.24	83.21	10	134.22	1.401
41.60	C10 aromatic	C10AR5	740.86	0.24	74.09	10	134.22	1.401
41.78	isopropyltoluene	IPRTOL	1209.98	0.24	121.00	10	134.22	1.401
41.93			562.05	0.24	0.00	0	0.00	0.000
42.08			845.66	0.24	0.00	0	0.00	0.000
42.15			464.00	0.24	0.00	0	0.00	0.000
42.28	n-undecane	N_UNDE	4058.50	0.24	368.95	11	156.30	2.182
42.48	C10 aromatic	C10AR6	582.85	0.24	58.29	10	134.22	1.401
42.54			385.68	0.24	0.00	0	0.00	0.000
42.60			576.06	0.24	0.00	0	0.00	0.000
42.73	C11 paraffin	C11P_A	115.30	0.24	10.48	11	156.32	2.183
42.83	1,2,4,5-tetramethylbenzene	BZ1245	686.52	0.24	68.65	10	134.22	1.401
42.93	1,2,3,5-tetramethylbenzene	BZ1235	557.25	0.24	55.73	10	134.22	1.401
43.05			318.68	0.24	0.00	0	0.00	0.000
43.18			291.51	0.24	0.00	0	0.00	0.000
43.24			314.04	0.24	0.00	0	0.00	0.000
43.32			380.67	0.24	0.00	0	0.00	0.000
43.52	C11 paraffin	C11P_B	406.03	0.24	36.91	11	156.32	2.183
43.64			520.85	0.24	0.00	0	0.00	0.000
43.76			504.93	0.24	0.00	0	0.00	0.000
43.95	1,2,3,4-trimethylbenzene	BZ1234	880.40	0.24	88.04	10	134.22	1.401
44.07			316.32	0.24	0.00	0	0.00	0.000
44.19			252.74	0.24	0.00	0	0.00	0.000
44.27			437.31	0.24	0.00	0	0.00	0.000

Canister: DRI-H
Flight 2, 7/15/97 14,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
44.40			199.60	0.24	0.00	0	0.00	0.000
44.46	C11 aromatic	C11AR1	82.24	0.24	7.48	11	148.22	1.453
44.56	C11 aromatic	C11AR3	95.62	0.24	8.69	11	148.22	1.453
44.75			79.70	0.24	0.00	0	0.00	0.000
44.92	naphthalene	NAPHTH	385.94	0.24	38.59	10	128.16	0.800
45.05			145.80	0.24	0.00	0	0.00	0.000
45.18	n-dodecane	N_DODE	544.90	0.24	45.41	12	170.34	2.168
45.28			158.87	0.24	0.00	0	0.00	0.000
45.39			36.45	0.24	0.00	0	0.00	0.000
45.49			45.84	0.24	0.00	0	0.00	0.000
45.55			27.56	0.24	0.00	0	0.00	0.000
45.63			71.35	0.24	0.00	0	0.00	0.000
45.73			17.26	0.24	0.00	0	0.00	0.000
45.87			71.48	0.24	0.00	0	0.00	0.000
	Total C3		18.64	0.02%				
	Total C4		47.76	0.04%				
	Total C5		150.05	0.13%				
	Total C6		364.20	0.33%				
	Total C7		3566.75	3.19%				
	Total C8		12953.60	11.58%				
	Total C9		27904.67	24.94%				
	Total C10		41390.85	36.99%				
	Total C11		21141.64	18.89%				
	Total C12		4354.31	3.89%				

Canister: DRI-R
Flight 3, 7/16/97 Taxi

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
3.02			5.97	0.43	0.00	0	0.00	0.000
3.74			1.02	0.43	0.00	0	0.00	0.000
7.02	propane	N_PROP	2.31	0.43	0.77	3	44.10	2.669
10.88	isobutane	I_BUTA	4.81	0.43	1.20	4	58.12	2.500
12.99	n-butane	N_BUTA	11.15	0.43	2.79	4	58.12	2.500
14.66	c-2-butene	C2BUTE	1.57	0.43	0.39	4	56.11	2.001
16.28	3-methyl-1-butene	B1E3ME	1.81	0.43	0.36	5	70.13	2.000
16.63			3.35	0.43	0.00	0	0.00	0.000
17.20	isopentane	IPENTA	25.79	0.43	5.16	5	72.15	2.401
17.71			3.73	0.43	0.00	0	0.00	0.000
17.89	1-pentene	PENTE1	3.69	0.43	0.74	5	70.13	2.000
18.16			2.49	0.43	0.00	0	0.00	0.000
18.42	2-methyl-1-butene	B1E2M	2.25	0.43	0.45	5	70.13	2.000
18.63	n-pentane	N_PENT	16.43	0.43	3.29	5	72.15	2.401
19.08	t-2-pentene	T2PENE	1.46	0.43	0.29	5	70.13	2.000
19.47	c-2-pentene	C2PENE	2.94	0.43	0.59	5	70.13	2.000
19.69	2-methyl-2-butene	B2E2M	2.43	0.43	0.49	5	70.13	2.000
19.84			2.51	0.43	0.00	0	0.00	0.000
20.02			2.61	0.43	0.00	0	0.00	0.000
20.17			2.91	0.43	0.00	0	0.00	0.000
20.32			2.33	0.43	0.00	0	0.00	0.000
20.40	2,2-dimethylbutane	BU22DM	4.86	0.43	0.81	6	86.17	2.333
20.61			2.69	0.43	0.00	0	0.00	0.000
20.74			2.35	0.43	0.00	0	0.00	0.000
20.87			2.87	0.43	0.00	0	0.00	0.000
21.00			2.40	0.43	0.00	0	0.00	0.000
21.17	cyclopentene	CPENTE	1.14	0.43	0.23	5	68.11	1.599
21.47	4-methyl-1-pentene	P1E4ME	4.57	0.43	0.76	6	84.16	2.001
21.74	cyclopentane	CPENTA	6.49	0.43	1.30	5	70.13	2.000
21.89	2,3-dimethylbutane	BU23DM	7.42	0.43	1.24	6	86.17	2.333
22.13	2-methylpentane	PENA2M	19.32	0.43	3.22	6	86.17	2.333
22.29			2.76	0.43	0.00	0	0.00	0.000
22.51			2.99	0.43	0.00	0	0.00	0.000
22.80	3-methylpentane	PENA3M	11.37	0.43	1.90	6	86.17	2.333
23.05	1-hexene	HEX1E	4.01	0.43	0.67	6	84.16	2.001
23.24	C6 olefin	C6OLE1	3.75	0.43	0.63	6	84.16	2.001
23.42			2.12	0.43	0.00	0	0.00	0.000
23.62	n-hexane	N_HEX	31.91	0.43	5.32	6	86.17	2.333
23.90			1.85	0.43	0.00	0	0.00	0.000
24.20	c-3-hexene	C3HEXE	2.13	0.43	0.36	6	84.16	2.001
24.34			1.04	0.43	0.00	0	0.00	0.000
24.47	trans-3-methyl-2-pentene	P2E3MT	1.01	0.43	0.17	6	84.16	2.001
24.73			2.54	0.43	0.00	0	0.00	0.000
24.82	methylcyclopentane	MCYPNA	30.64	0.43	5.11	6	84.16	2.001
25.02	2,4-dimethylpentane	PEN24M	4.90	0.43	0.70	7	100.20	2.286
25.90	benzene	BENZE	17.10	0.43	2.85	6	78.11	1.000
26.15	3,3-dimethylpentane	PEN33M	3.31	0.43	0.47	7	100.20	2.286
26.32	cyclohexane	CYHEXA	51.52	0.43	8.59	6	84.16	2.001
26.68	2-methylhexane	HEXA2M	55.65	0.43	7.95	7	98.19	2.001
26.77	2,3-dimethylpentane	PEN23M	29.18	0.43	4.17	7	100.20	2.286
26.92	cyclohexene	CYHEXE	10.76	0.43	1.79	6	82.15	1.668
27.06	3-methylhexane + pentanal	HEXA3M	89.24	0.43	12.75	7	100.20	2.286
27.37	1,3-dimethylcyclopentane	CPA13M	27.30	0.43	3.90	7	98.19	2.001
27.50	3-ethylpentane	PA3ET	37.34	0.43	4.67	8	114.23	2.251

Canister: DRI-R
Flight 3, 7/16/97 Taxi

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
27.61	2,2,4-trimethylpentane	PA224M	53.67	0.43	6.71	8	114.23	2.251
27.85	C7 olefin	C7OLE2	1.16	0.43	0.17	7	98.19	2.001
28.08	n-heptane	N_HEPT	286.45	0.43	40.92	7	100.20	2.286
28.48	C8 olefin	C8OLE3	2.35	0.43	0.29	8	112.21	2.000
28.63			2.67	0.43	0.00	0	0.00	0.000
28.81			1.95	0.43	0.00	0	0.00	0.000
29.04	methylcyclohexane	MECYHX	401.06	0.43	57.29	7	98.19	2.001
29.14	C8 paraffin	C8PA1	37.12	0.43	4.64	8	114.23	2.251
29.43	2,5-diemthylhexane	HEX25M	39.67	0.43	4.96	8	114.23	2.251
29.51	2,4-diemthylhexane	HEX24M	116.52	0.43	14.57	8	114.23	2.251
29.84	C8 paraffin	C8PA2	79.33	0.43	9.92	8	114.23	2.251
30.13			69.38	0.43	0.00	0	0.00	0.000
30.23	2,3,-trimethylpentane	PA234M	20.63	0.43	2.58	8	114.23	2.251
30.43	toluene	TOLUE	336.88	0.43	48.13	7	92.14	1.144
30.61	2,3-dimethylhexane	HX23DM	76.02	0.43	9.50	8	114.23	2.251
30.69			39.33	0.43	0.00	0	0.00	0.000
30.80	2-methylheptane	HEP2ME	453.20	0.43	50.36	9	128.26	2.223
30.87	4-methylheptane	HEP4ME	144.19	0.43	16.02	9	128.26	2.223
30.99	C8 paraffin	C8PA3	52.62	0.43	6.58	8	114.23	2.251
31.11	3-methylheptane	HEP3ME	427.61	0.43	53.45	8	114.23	2.251
31.35			348.02	0.43	0.00	0	0.00	0.000
31.43	2,2,5-trimethylhexane	HEX225	142.06	0.43	15.78	9	128.26	2.223
31.55	octene-1	OCT1E	9.15	0.43	1.14	8	112.21	2.000
31.74	1,1-dimethylcyclohexane	CHX11M	121.26	0.43	15.16	8	112.21	2.000
31.83			54.00	0.43	0.00	0	0.00	0.000
31.88			117.39	0.43	0.00	0	0.00	0.000
32.01			24.41	0.43	0.00	0	0.00	0.000
32.11	n-octane	N_OCT	1475.92	0.43	184.49	8	114.23	2.251
32.30			48.64	0.43	0.00	0	0.00	0.000
32.42			129.06	0.43	0.00	0	0.00	0.000
32.54			1.94	0.43	0.00	0	0.00	0.000
32.68			42.23	0.43	0.00	0	0.00	0.000
32.81	2,3,5-trimethylhexane	HEX235	25.50	0.43	2.83	9	128.26	2.223
32.90	2,4-dimethylheptane	HEP24D	51.62	0.43	5.74	9	128.26	2.223
33.04	4,4-dimethylheptane	HEP44D	135.78	0.43	15.09	9	128.26	2.223
33.19			15.93	0.43	0.00	0	0.00	0.000
33.27	2,6-dimethylheptane	HEP26D	388.28	0.43	43.14	9	128.26	2.223
33.40			186.14	0.43	0.00	0	0.00	0.000
33.52	2,5-dimethylheptane	HEP25D	841.75	0.43	93.53	9	128.26	2.223
33.72	3,3-dimethylheptane	HEP33D	605.47	0.43	67.27	9	128.26	2.223
33.83	C9 olefin	C9OLE1	155.89	0.43	17.32	9	126.24	2.001
33.91			78.43	0.43	0.00	0	0.00	0.000
34.01			46.99	0.43	0.00	0	0.00	0.000
34.13	ethylbenzene	ETBZ	581.06	0.43	72.63	8	106.16	1.250
34.31	C9 olefin	C9OLE3	644.33	0.43	71.59	9	126.24	2.001
34.44	m- & p-xylene	MP_XYL	1621.83	0.43	202.73	8	106.16	1.250
34.56	2-methyloctane	OCT2ME	1001.03	0.43	111.23	9	128.26	2.223
34.71			37.13	0.43	0.00	0	0.00	0.000
34.83	3-methyloctane	OCT3ME	921.83	0.43	102.43	9	128.26	2.223
34.99	C9 paraffin	C9PAR1	94.23	0.43	10.47	9	128.26	2.223
35.08	styrene + heptanal	STYR	13.95	0.43	1.74	8	104.14	1.000
35.17			222.95	0.43	0.00	0	0.00	0.000
35.31	o-xylene	O_XYL	757.80	0.43	94.73	8	106.17	1.251
35.44			537.50	0.43	0.00	0	0.00	0.000

Canister: DRI-R
Flight 3, 7/16/97 Taxi

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
35.55	nonene-1	NONE1	438.63	0.43	48.74	9	126.24	2.001
35.65	C9 paraffin 2	C9PAR2	270.18	0.43	30.02	9	128.26	2.223
35.79	n-nonane	N_NON	3214.95	0.43	357.22	9	128.26	2.223
36.05	C9 olefin	C9OLE4	114.10	0.43	12.68	9	126.24	2.001
36.28			634.00	0.43	0.00	0	0.00	0.000
36.47	isopropylbenzene	IPRBZ	531.99	0.43	59.11	9	120.20	1.335
36.65			81.32	0.43	0.00	0	0.00	0.000
36.74	C9 paraffin 3	C9PA3	857.99	0.43	95.33	9	128.26	2.223
36.86			103.81	0.43	0.00	0	0.00	0.000
37.05	isopropylcyclohexane	IPCYHX	1942.43	0.43	215.83	9	126.24	2.001
37.20	2,6-dimethyloctane	OCT26D	322.26	0.43	32.23	10	142.29	2.201
37.26			249.12	0.43	0.00	0	0.00	0.000
37.36	3,6-dimethyloctane	OCT36M	672.23	0.43	67.22	10	142.29	2.201
37.49	n-propylbenzene	N_PRBZ	707.37	0.43	78.60	9	120.20	1.335
37.60			129.86	0.43	0.00	0	0.00	0.000
37.72	m-ethyltoluene	M_ETOL	1051.99	0.43	116.89	9	120.20	1.335
37.79	p-ethyltoluene	P_ETOL	856.82	0.43	95.20	9	120.20	1.335
37.89			231.33	0.43	0.00	0	0.00	0.000
37.95	1,3,5-trimethylbenzene	BZ135M	1235.99	0.43	137.33	9	120.20	1.335
38.03			781.47	0.43	0.00	0	0.00	0.000
38.17	C10 paraffin	C10P_A	794.12	0.43	79.41	10	142.29	2.201
38.27			760.31	0.43	0.00	0	0.00	0.000
38.37	o-ethyltoluene	O_ETOL	711.19	0.43	79.02	9	120.20	1.335
38.48			101.79	0.43	0.00	0	0.00	0.000
38.57			382.50	0.43	0.00	0	0.00	0.000
38.68			427.61	0.43	0.00	0	0.00	0.000
38.87	1,2,4-trimethylbenzene	BZ124M	2412.01	0.43	268.00	9	120.20	1.335
39.00			399.79	0.43	0.00	0	0.00	0.000
39.08			288.99	0.43	0.00	0	0.00	0.000
39.17	n-decane	N_DEC	3794.45	0.43	379.45	10	142.29	2.201
39.29	C10 aromatic	C10AR1	151.33	0.43	15.13	10	134.22	1.401
39.39	isobutylbenzene	I_BUBZ	393.53	0.43	39.35	10	134.22	1.401
39.47	sec-butylbenzene	S_BUBZ	508.93	0.43	50.89	10	134.22	1.401
39.71	C10 aromatic 7	C10AR7	560.15	0.43	56.02	10	134.22	1.401
39.84	1,2,3-trimethylbenzene	BZ123M	1396.39	0.43	155.15	9	120.20	1.335
39.97	C10 paraffin	C10P_C	1074.50	0.43	107.45	10	142.29	2.201
40.16	limonene	LIMON	420.86	0.43	42.09	10	136.24	1.601
40.35	indan	INDAN	639.38	0.43	71.04	9	118.17	1.111
40.49	indene	INDENE	999.06	0.43	111.01	9	116.15	0.888
40.60	diethylbenzene	DETBZ1	302.54	0.43	30.25	10	134.22	1.401
40.69	C10 aromatic	C10AR2	619.49	0.43	61.95	10	134.22	1.401
40.87	1,4-diethylbenzene	DETBZ2	941.42	0.43	94.14	10	134.22	1.401
41.02	1,2-diethylbenzene	DETBZ3	539.23	0.43	53.92	10	134.22	1.401
41.12			543.92	0.43	0.00	0	0.00	0.000
41.23	2-propyltoluene	TOL2PR	729.46	0.43	72.95	10	134.22	1.401
41.34			122.88	0.43	0.00	0	0.00	0.000
41.45			542.53	0.43	0.00	0	0.00	0.000
41.52	C10 aromatic	C10AR4	370.92	0.43	37.09	10	134.22	1.401
41.59	C10 aromatic	C10AR5	326.57	0.43	32.66	10	134.22	1.401
41.77	isopropyltoluene	IPRTOL	551.12	0.43	55.11	10	134.22	1.401
41.93			264.39	0.43	0.00	0	0.00	0.000
42.07			593.55	0.43	0.00	0	0.00	0.000
42.28	n-undecane	N_UNDE	1602.17	0.43	145.65	11	156.30	2.182
42.47	C10 aromatic	C10AR6	251.67	0.43	25.17	10	134.22	1.401

Canister: DRI-R
Flight 3, 7/16/97 Taxi

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
42.53			166.14	0.43	0.00	0	0.00	0.000
42.59			241.94	0.43	0.00	0	0.00	0.000
42.72	C11 paraffin	C11P_A	51.67	0.43	4.70	11	156.32	2.183
42.83	1,2,4,5-tetramethylbenzene	BZ1245	272.31	0.43	27.23	10	134.22	1.401
42.93	1,2,3,5-tetramethylbenzene	BZ1235	223.82	0.43	22.38	10	134.22	1.401
43.05			135.84	0.43	0.00	0	0.00	0.000
43.18			111.59	0.43	0.00	0	0.00	0.000
43.24			138.29	0.43	0.00	0	0.00	0.000
43.32			150.48	0.43	0.00	0	0.00	0.000
43.52	C11 paraffin	C11P_B	154.40	0.43	14.04	11	156.32	2.183
43.64			198.21	0.43	0.00	0	0.00	0.000
43.76			198.93	0.43	0.00	0	0.00	0.000
43.95	1,2,3,4-trimethylbenzene	BZ1234	313.49	0.43	31.35	10	134.22	1.401
44.07			110.82	0.43	0.00	0	0.00	0.000
44.19			85.54	0.43	0.00	0	0.00	0.000
44.27			153.94	0.43	0.00	0	0.00	0.000
44.40			101.99	0.43	0.00	0	0.00	0.000
44.56	C11 aromatic	C11AR3	39.30	0.43	3.57	11	148.22	1.453
44.75			32.29	0.43	0.00	0	0.00	0.000
44.92	naphthalene	NAPHTH	126.04	0.43	12.60	10	128.16	0.800
45.05			48.47	0.43	0.00	0	0.00	0.000
45.17	n-dodecane	N_DODE	159.64	0.43	13.30	12	170.34	2.168
45.28			57.37	0.43	0.00	0	0.00	0.000
45.39			14.82	0.43	0.00	0	0.00	0.000
45.48			16.61	0.43	0.00	0	0.00	0.000
45.63			22.72	0.43	0.00	0	0.00	0.000
45.73			8.01	0.43	0.00	0	0.00	0.000
45.87			25.78	0.43	0.00	0	0.00	0.000
	Total C3		9.30	0.02%				
	Total C4		17.53	0.03%				
	Total C5		91.90	0.16%				
	Total C6		141.96	0.25%				
	Total C7		1412.73	2.48%				
	Total C8		6549.35	11.49%				
	Total C9		15913.64	27.91%				
	Total C10		22133.75	38.82%				
	Total C11		9224.52	16.18%				
	Total C12		1515.76	2.66%				

Canister: DRI-J
Flight 3, 7/16/97 10,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
3.03			5.94	0.28	0.00	0	0.00	0.000
3.76			1.23	0.28	0.00	0	0.00	0.000
7.02	propane	N_PROP	2.12	0.28	0.71	3	44.10	2.669
10.89	isobutane	I_BUTA	4.68	0.28	1.17	4	58.12	2.500
12.99	n-butane	N_BUTA	9.12	0.28	2.28	4	58.12	2.500
15.82			4.23	0.28	0.00	0	0.00	0.000
16.43	3-methyl-1-butene	B1E3ME	3.53	0.28	0.71	5	70.13	2.000
17.20	isopentane	IPENTA	23.14	0.28	4.63	5	72.15	2.401
17.87	1-pentene	PENTE1	4.55	0.28	0.91	5	70.13	2.000
18.14			2.45	0.28	0.00	0	0.00	0.000
18.43	2-methyl-1-butene	B1E2M	1.92	0.28	0.38	5	70.13	2.000
18.63	n-pentane	N_PENT	14.32	0.28	2.86	5	72.15	2.401
19.18	t-2-pentene	T2PENE	3.93	0.28	0.79	5	70.13	2.000
19.54	c-2-pentene	C2PENE	2.60	0.28	0.52	5	70.13	2.000
19.69	2-methyl-2-butene	B2E2M	2.60	0.28	0.52	5	70.13	2.000
19.89			1.61	0.28	0.00	0	0.00	0.000
20.08			1.56	0.28	0.00	0	0.00	0.000
20.40	2,2-dimethylbutane	BU22DM	2.07	0.28	0.35	6	86.17	2.333
20.68			2.07	0.28	0.00	0	0.00	0.000
20.96			4.33	0.28	0.00	0	0.00	0.000
21.09			1.33	0.28	0.00	0	0.00	0.000
21.23	cyclopentene	CPENTE	2.79	0.28	0.56	5	68.11	1.599
21.36			1.35	0.28	0.00	0	0.00	0.000
21.46	4-methyl-1-pentene	P1E4ME	2.02	0.28	0.34	6	84.16	2.001
21.58	3-methyl-1-pentene	P1E3ME	1.23	0.28	0.21	6	84.16	2.001
21.74	cyclopentane	CPENTA	3.70	0.28	0.74	5	70.13	2.000
21.88	2,3-dimethylbutane	BU23DM	5.26	0.28	0.88	6	86.17	2.333
22.13	2-methylpentane	PENA2M	17.58	0.28	2.93	6	86.17	2.333
22.28			2.69	0.28	0.00	0	0.00	0.000
22.50			2.37	0.28	0.00	0	0.00	0.000
22.69	2,2-dimethylpentane	PEN22M	1.04	0.28	0.15	7	100.20	2.286
22.80	3-methylpentane	PENA3M	11.31	0.28	1.89	6	86.17	2.333
23.07	1-hexene	HEX1E	1.27	0.28	0.21	6	84.16	2.001
23.17	C6 olefin	C6OLE1	0.50	0.28	0.08	6	84.16	2.001
23.62	n-hexane	N_HEX	27.53	0.28	4.59	6	86.17	2.333
23.87	t-2-hexene	T2HEXE	1.29	0.28	0.22	6	84.16	2.001
24.13	c-3-hexene	C3HEXE	1.43	0.28	0.24	6	84.16	2.001
24.74			2.10	0.28	0.00	0	0.00	0.000
24.82	methylcyclopentane	MCYPNA	28.13	0.28	4.69	6	84.16	2.001
25.02	2,4-dimethylpentane	PEN24M	4.01	0.28	0.57	7	100.20	2.286
25.42			0.69	0.28	0.00	0	0.00	0.000
25.90	benzene	BENZE	16.24	0.28	2.71	6	78.11	1.000
26.14	3,3-dimethylpentane	PEN33M	3.71	0.28	0.53	7	100.20	2.286
26.32	cyclohexane	CYHEXA	48.55	0.28	8.09	6	84.16	2.001
26.68	2-methylhexane	HEXA2M	51.86	0.28	7.41	7	98.19	2.001
26.77	2,3-dimethylpentane	PEN23M	28.22	0.28	4.03	7	100.20	2.286
26.92	cyclohexene	CYHEXE	10.45	0.28	1.74	6	82.15	1.668
27.06	3-methylhexane + pentanal	HEXA3M	83.61	0.28	11.94	7	100.20	2.286
27.37	1,3-dimethylcyclopentane	CPA13M	26.21	0.28	3.74	7	98.19	2.001
27.50	3-ethylpentane	PA3ET	35.27	0.28	4.41	8	114.23	2.251
27.61	2,2,4-trimethylpentane	PA224M	50.20	0.28	6.28	8	114.23	2.251
28.08	n-heptane	N_HEPT	268.05	0.28	38.29	7	100.20	2.286
28.81	C8 olefin	C8OLE1	1.07	0.28	0.13	8	112.21	2.000
29.04	methylcyclohexane	MECYHX	381.91	0.28	54.56	7	98.19	2.001

Canister: DRI-J
Flight 3, 7/16/97 10,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
29.14	C8 paraffin	C8PA1	32.04	0.28	4.01	8	114.23	2.251
29.43	2,5-diemthylhexane	HEX25M	37.72	0.28	4.72	8	114.23	2.251
29.51	2,4-diemthylhexane	HEX24M	110.34	0.28	13.79	8	114.23	2.251
29.84	C8 paraffin	C8PA2	76.49	0.28	9.56	8	114.23	2.251
30.13			66.86	0.28	0.00	0	0.00	0.000
30.23	2,3,-trimethylpentane	PA234M	19.91	0.28	2.49	8	114.23	2.251
30.43	toluene	TOLUE	332.94	0.28	47.56	7	92.14	1.144
30.61	2,3-dimethylhexane	HX23DM	74.67	0.28	9.33	8	114.23	2.251
30.69			38.38	0.28	0.00	0	0.00	0.000
30.80	2-methylheptane	HEP2ME	446.70	0.28	49.63	9	128.26	2.223
30.87	4-methylheptane	HEP4ME	141.03	0.28	15.67	9	128.26	2.223
30.99	C8 paraffin	C8PA3	52.16	0.28	6.52	8	114.23	2.251
31.11	3-methylheptane	HEP3ME	421.84	0.28	52.73	8	114.23	2.251
31.35			344.15	0.28	0.00	0	0.00	0.000
31.43	2,2,5-trimethylhexane	HEX225	139.75	0.28	15.53	9	128.26	2.223
31.55	octene-1	OCT1E	9.53	0.28	1.19	8	112.21	2.000
31.74	1,1-dimethylcyclohexane	CHX11M	119.70	0.28	14.96	8	112.21	2.000
31.83			53.79	0.28	0.00	0	0.00	0.000
31.89			116.11	0.28	0.00	0	0.00	0.000
32.01			24.22	0.28	0.00	0	0.00	0.000
32.11	n-octane	N_OCT	1485.17	0.28	185.65	8	114.23	2.251
32.30			49.03	0.28	0.00	0	0.00	0.000
32.42			128.72	0.28	0.00	0	0.00	0.000
32.54			2.25	0.28	0.00	0	0.00	0.000
32.68			42.34	0.28	0.00	0	0.00	0.000
32.81	2,3,5-trimethylhexane	HEX235	25.88	0.28	2.88	9	128.26	2.223
32.90	2,4-dimethylheptane	HEP24D	52.18	0.28	5.80	9	128.26	2.223
33.05	4,4-dimethylheptane	HEP44D	138.35	0.28	15.37	9	128.26	2.223
33.19			15.90	0.28	0.00	0	0.00	0.000
33.27	2,6-dimethylheptane	HEP26D	398.65	0.28	44.29	9	128.26	2.223
33.41			189.04	0.28	0.00	0	0.00	0.000
33.52	2,5-dimethylheptane	HEP25D	860.48	0.28	95.61	9	128.26	2.223
33.72	3,3-dimethylheptane	HEP33D	620.83	0.28	68.98	9	128.26	2.223
33.83	C9 olefin	C9OLE1	159.45	0.28	17.72	9	126.24	2.001
33.91			81.04	0.28	0.00	0	0.00	0.000
34.02			48.10	0.28	0.00	0	0.00	0.000
34.13	ethylbenzene	ETBZ	610.27	0.28	76.28	8	106.16	1.250
34.31	C9 olefin	C9OLE3	674.41	0.28	74.93	9	126.24	2.001
34.44	m- & p-xylene	MP_XYL	1734.98	0.28	216.87	8	106.16	1.250
34.56	2-methyloctane	OCT2ME	1074.63	0.28	119.40	9	128.26	2.223
34.71			38.78	0.28	0.00	0	0.00	0.000
34.83	3-methyloctane	OCT3ME	985.58	0.28	109.51	9	128.26	2.223
35.00	C9 paraffin	C9PAR1	99.17	0.28	11.02	9	128.26	2.223
35.08	styrene + heptanal	STYR	13.96	0.28	1.75	8	104.14	1.000
35.17			236.36	0.28	0.00	0	0.00	0.000
35.31	o-xylene	O_XYL	827.95	0.28	103.49	8	106.17	1.251
35.44			578.09	0.28	0.00	0	0.00	0.000
35.56	nonene-1	NONE1	476.24	0.28	52.92	9	126.24	2.001
35.66	C9 paraffin	C9PAR2	295.26	0.28	32.81	9	128.26	2.223
35.79	n-nonane	N_NON	3623.52	0.28	402.61	9	128.26	2.223
36.05	C9 olefin	C9OLE4	125.34	0.28	13.93	9	126.24	2.001
36.22			81.74	0.28	0.00	0	0.00	0.000
36.29			615.76	0.28	0.00	0	0.00	0.000
36.47	isopropylbenzene	IPRBZ	600.67	0.28	66.74	9	120.20	1.335

Canister: DRI-J
Flight 3, 7/16/97 10,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
36.65			90.72	0.28	0.00	0	0.00	0.000
36.74	C9 paraffin 3	C9PA3	968.74	0.28	107.64	9	128.26	2.223
36.86			121.13	0.28	0.00	0	0.00	0.000
37.05	isopropylcyclohexane	IPCYHX	2255.16	0.28	250.57	9	126.24	2.001
37.21	2,6-dimethyloctane	OCT26D	370.47	0.28	37.05	10	142.29	2.201
37.26			296.19	0.28	0.00	0	0.00	0.000
37.36	3,6-dimethyloctane	OCT36M	796.02	0.28	79.60	10	142.29	2.201
37.49	n-propylbenzene	N_PRBZ	833.49	0.28	92.61	9	120.20	1.335
37.60			149.18	0.28	0.00	0	0.00	0.000
37.72	m-ethyltoluene	M_ETOL	1250.24	0.28	138.92	9	120.20	1.335
37.79	p-ethyltoluene	P_ETOL	1080.07	0.28	120.01	9	120.20	1.335
37.89			288.87	0.28	0.00	0	0.00	0.000
37.96	1,3,5-trimethylbenzene	BZ135M	1567.65	0.28	174.18	9	120.20	1.335
38.03			992.60	0.28	0.00	0	0.00	0.000
38.17	C10 paraffin	C10P_A	953.75	0.28	95.38	10	142.29	2.201
38.27			981.15	0.28	0.00	0	0.00	0.000
38.37	o-ethyltoluene	O_ETOL	883.04	0.28	98.12	9	120.20	1.335
38.48			121.21	0.28	0.00	0	0.00	0.000
38.58			474.90	0.28	0.00	0	0.00	0.000
38.69			523.74	0.28	0.00	0	0.00	0.000
38.87	1,2,4-trimethylbenzene	BZ124M	3169.83	0.28	352.20	9	120.20	1.335
39.00			507.01	0.28	0.00	0	0.00	0.000
39.08			372.72	0.28	0.00	0	0.00	0.000
39.17	n-decane	N_DEC	5392.87	0.28	539.29	10	142.29	2.201
39.29	C10 aromatic	C10AR1	202.60	0.28	20.26	10	134.22	1.401
39.39	isobutylbenzene	I_BUBZ	512.92	0.28	51.29	10	134.22	1.401
39.48	sec-butylbenzene	S_BUBZ	665.29	0.28	66.53	10	134.22	1.401
39.72	C10 aromatic 7	C10AR7	775.17	0.28	77.52	10	134.22	1.401
39.85	1,2,3-trimethylbenzene	BZ123M	1960.03	0.28	217.78	9	120.20	1.335
39.97	C10 paraffin	C10P_C	1581.68	0.28	158.17	10	142.29	2.201
40.16	limonene	LIMON	601.15	0.28	60.12	10	136.24	1.601
40.35	indan	INDAN	910.31	0.28	101.15	9	118.17	1.111
40.50	indene	INDENE	1473.36	0.28	163.71	9	116.15	0.888
40.61	diethylbenzene	DETBZ1	453.18	0.28	45.32	10	134.22	1.401
40.70	C10 aromatic	C10AR2	936.59	0.28	93.66	10	134.22	1.401
40.87	1,4-diethylbenzene	DETBZ2	1467.83	0.28	146.78	10	134.22	1.401
41.02	1,2-diethylbenzene	DETBZ3	854.18	0.28	85.42	10	134.22	1.401
41.12			850.78	0.28	0.00	0	0.00	0.000
41.24	2-propyltoluene	TOL2PR	1190.22	0.28	119.02	10	134.22	1.401
41.34			190.12	0.28	0.00	0	0.00	0.000
41.45			872.80	0.28	0.00	0	0.00	0.000
41.52	C10 aromatic	C10AR4	595.21	0.28	59.52	10	134.22	1.401
41.60	C10 aromatic	C10AR5	544.11	0.28	54.41	10	134.22	1.401
41.78	isopropyltoluene	IPRTOL	904.62	0.28	90.46	10	134.22	1.401
41.93			415.57	0.28	0.00	0	0.00	0.000
42.08			640.59	0.28	0.00	0	0.00	0.000
42.15			337.34	0.28	0.00	0	0.00	0.000
42.28	n-undecane	N_UNDE	2973.88	0.28	270.35	11	156.30	2.182
42.48	C10 aromatic	C10AR6	437.32	0.28	43.73	10	134.22	1.401
42.54			286.03	0.28	0.00	0	0.00	0.000
42.60			505.90	0.28	0.00	0	0.00	0.000
42.83	1,2,4,5-tetramethylbenzene	BZ1245	507.39	0.28	50.74	10	134.22	1.401
42.93	1,2,3,5-tetramethylbenzene	BZ1235	413.11	0.28	41.31	10	134.22	1.401
43.06			234.95	0.28	0.00	0	0.00	0.000

Canister: DRI-J
Flight 3, 7/16/97 10,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
43.19			210.87	0.28	0.00	0	0.00	0.000
43.24			238.07	0.28	0.00	0	0.00	0.000
43.32			279.37	0.28	0.00	0	0.00	0.000
43.52	C11 paraffin	C11P_B	300.22	0.28	27.29	11	156.32	2.183
43.64			381.98	0.28	0.00	0	0.00	0.000
43.76			373.57	0.28	0.00	0	0.00	0.000
43.95	1,2,3,4-trimethylbenzene	BZ1234	653.17	0.28	65.32	10	134.22	1.401
44.07			231.78	0.28	0.00	0	0.00	0.000
44.19			182.23	0.28	0.00	0	0.00	0.000
44.27			325.45	0.28	0.00	0	0.00	0.000
44.40			145.57	0.28	0.00	0	0.00	0.000
44.46	C11 aromatic	C11AR1	60.33	0.28	5.48	11	148.22	1.453
44.56	C11 aromatic	C11AR3	68.90	0.28	6.26	11	148.22	1.453
44.75			58.48	0.28	0.00	0	0.00	0.000
44.92	naphthalene	NAPHTH	289.03	0.28	28.90	10	128.16	0.800
45.05			102.70	0.28	0.00	0	0.00	0.000
45.18	n-dodecane	N_DODE	398.28	0.28	33.19	12	170.34	2.168
45.28			118.24	0.28	0.00	0	0.00	0.000
45.39			26.91	0.28	0.00	0	0.00	0.000
45.49			53.42	0.28	0.00	0	0.00	0.000
45.63			49.64	0.28	0.00	0	0.00	0.000
45.74			12.29	0.28	0.00	0	0.00	0.000
45.87			51.39	0.28	0.00	0	0.00	0.000
	Total C3		9.29	0.01%				
	Total C4		18.03	0.02%				
	Total C5		72.01	0.10%				
	Total C6		118.29	0.16%				
	Total C7		1261.94	1.70%				
	Total C8		6651.05	8.96%				
	Total C9		17639.24	23.77%				
	Total C10		29614.60	39.91%				
	Total C11		15632.46	21.06%				
	Total C12		3201.38	4.31%				

Canister: DRI-P
Flight 3, 7/16/97 14,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
3.04			5.71	0.24	0.00	0	0.00	0.000
3.77			1.20	0.24	0.00	0	0.00	0.000
7.04	propane	N_PROP	2.19	0.24	0.73	3	44.10	2.669
10.91	isobutane	I_BUTA	3.82	0.24	0.96	4	58.12	2.500
13.00	n-butane	N_BUTA	8.03	0.24	2.01	4	58.12	2.500
16.21	3-methyl-1-butene	B1E3ME	3.36	0.24	0.67	5	70.13	2.000
16.63			3.83	0.24	0.00	0	0.00	0.000
17.21	isopentane	IPENTA	18.62	0.24	3.72	5	72.15	2.401
17.86	1-pentene	PENTE1	3.50	0.24	0.70	5	70.13	2.000
18.13			2.82	0.24	0.00	0	0.00	0.000
18.63	n-pentane	N_PENT	16.92	0.24	3.38	5	72.15	2.401
19.17	t-2-pentene	T2PENE	3.79	0.24	0.76	5	70.13	2.000
19.71	2-methyl-2-butene	B2E2M	3.15	0.24	0.63	5	70.13	2.000
19.84			2.53	0.24	0.00	0	0.00	0.000
20.01			3.03	0.24	0.00	0	0.00	0.000
20.16			2.26	0.24	0.00	0	0.00	0.000
20.40	2,2-dimethylbutane	BU22DM	6.24	0.24	1.04	6	86.17	2.333
20.99			1.81	0.24	0.00	0	0.00	0.000
21.12			1.51	0.24	0.00	0	0.00	0.000
21.23	cyclopentene	CPENTE	1.93	0.24	0.39	5	68.11	1.599
21.47	4-methyl-1-pentene	P1E4ME	4.71	0.24	0.79	6	84.16	2.001
21.63	3-methyl-1-pentene	P1E3ME	2.02	0.24	0.34	6	84.16	2.001
21.74	cyclopentane	CPENTA	3.59	0.24	0.72	5	70.13	2.000
21.89	2,3-dimethylbutane	BU23DM	5.81	0.24	0.97	6	86.17	2.333
22.13	2-methylpentane	PENA2M	14.91	0.24	2.49	6	86.17	2.333
22.52			3.33	0.24	0.00	0	0.00	0.000
22.62	2,2-dimethylpentane	PEN22M	2.84	0.24	0.41	7	100.20	2.286
22.80	3-methylpentane	PENA3M	13.42	0.24	2.24	6	86.17	2.333
23.05	2-methyl-1-pentene	P1E2ME	2.26	0.24	0.38	6	84.16	2.001
23.62	n-hexane	N_HEX	27.91	0.24	4.65	6	86.17	2.333
24.74			2.26	0.24	0.00	0	0.00	0.000
24.83	methylcyclopentane	MCYPNA	27.83	0.24	4.64	6	84.16	2.001
25.01	2,4-dimethylpentane	PEN24M	3.31	0.24	0.47	7	100.20	2.286
25.25			1.64	0.24	0.00	0	0.00	0.000
25.90	benzene	BENZE	17.59	0.24	2.93	6	78.11	1.000
26.14	3,3-dimethylpentane	PEN33M	4.11	0.24	0.59	7	100.20	2.286
26.32	cyclohexane	CYHEXA	48.66	0.24	8.11	6	84.16	2.001
26.68	2-methylhexane	HEXA2M	55.99	0.24	8.00	7	98.19	2.001
26.77	2,3-dimethylpentane	PEN23M	28.99	0.24	4.14	7	100.20	2.286
26.92	cyclohexene	CYHEXE	11.07	0.24	1.85	6	82.15	1.668
27.06	3-methylhexane + pentanal	HEXA3M	90.99	0.24	13.00	7	100.20	2.286
27.38	1,3-dimethylcyclopentane	CPA13M	27.54	0.24	3.93	7	98.19	2.001
27.50	3-ethylpentane	PA3ET	37.85	0.24	4.73	8	114.23	2.251
27.61	2,2,4-trimethylpentane	PA224M	53.95	0.24	6.74	8	114.23	2.251
28.08	n-heptane	N_HEPT	289.20	0.24	41.31	7	100.20	2.286
29.04	methylcyclohexane	MECYHX	414.02	0.24	59.15	7	98.19	2.001
29.14	C8 paraffin	C8PA1	34.70	0.24	4.34	8	114.23	2.251
29.43	2,5-diemthylhexane	HEX25M	40.69	0.24	5.09	8	114.23	2.251
29.52	2,4-diemthylhexane	HEX24M	117.13	0.24	14.64	8	114.23	2.251
29.84	C8 paraffin	C8PA2	81.50	0.24	10.19	8	114.23	2.251
30.13			72.47	0.24	0.00	0	0.00	0.000
30.23	2,3,-trimethylpentane	PA234M	19.58	0.24	2.45	8	114.23	2.251
30.43	toluene	TOLUE	367.32	0.24	52.47	7	92.14	1.144
30.61	2,3-dimethylhexane	HX23DM	81.03	0.24	10.13	8	114.23	2.251

Canister: DRI-P
Flight 3, 7/16/97 14,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
30.69			41.39	0.24	0.00	0	0.00	0.000
30.80	2-methylheptane	HEP2ME	492.86	0.24	54.76	9	128.26	2.223
30.87	4-methylheptane	HEP4ME	155.13	0.24	17.24	9	128.26	2.223
31.00	C8 paraffin	C8PA3	56.67	0.24	7.08	8	114.23	2.251
31.11	3-methylheptane	HEP3ME	465.66	0.24	58.21	8	114.23	2.251
31.36			380.87	0.24	0.00	0	0.00	0.000
31.43	2,2,5-trimethylhexane	HEX225	154.12	0.24	17.12	9	128.26	2.223
31.55	octene-1	OCT1E	9.65	0.24	1.21	8	112.21	2.000
31.74	1,1-dimethylcyclohexane	CHX11M	132.56	0.24	16.57	8	112.21	2.000
31.83			58.40	0.24	0.00	0	0.00	0.000
31.89			129.69	0.24	0.00	0	0.00	0.000
32.01			26.82	0.24	0.00	0	0.00	0.000
32.11	n-octane	N_OCT	1663.45	0.24	207.93	8	114.23	2.251
32.30			55.16	0.24	0.00	0	0.00	0.000
32.42			144.40	0.24	0.00	0	0.00	0.000
32.54			2.51	0.24	0.00	0	0.00	0.000
32.68			48.09	0.24	0.00	0	0.00	0.000
32.81	2,3,5-trimethylhexane	HEX235	29.52	0.24	3.28	9	128.26	2.223
32.90	2,4-dimethylheptane	HEP24D	59.49	0.24	6.61	9	128.26	2.223
33.05	4,4-dimethylheptane	HEP44D	157.95	0.24	17.55	9	128.26	2.223
33.19			18.69	0.24	0.00	0	0.00	0.000
33.27	2,6-dimethylheptane	HEP26D	456.01	0.24	50.67	9	128.26	2.223
33.41			214.20	0.24	0.00	0	0.00	0.000
33.52	2,5-dimethylheptane	HEP25D	978.69	0.24	108.74	9	128.26	2.223
33.72	3,3-dimethylheptane	HEP33D	706.67	0.24	78.52	9	128.26	2.223
33.83	C9 olefin	C9OLE1	182.38	0.24	20.26	9	126.24	2.001
33.91			92.97	0.24	0.00	0	0.00	0.000
34.02			55.01	0.24	0.00	0	0.00	0.000
34.13	ethylbenzene	ETBZ	704.14	0.24	88.02	8	106.16	1.250
34.31	C9 olefin	C9OLE3	780.04	0.24	86.67	9	126.24	2.001
34.44	m- & p-xylene	MP_XYL	2017.86	0.24	252.23	8	106.16	1.250
34.56	2-methyloctane	OCT2ME	1251.38	0.24	139.04	9	128.26	2.223
34.71			44.54	0.24	0.00	0	0.00	0.000
34.83	3-methyloctane	OCT3ME	1150.58	0.24	127.84	9	128.26	2.223
35.00	C9 paraffin	C9PAR1	116.31	0.24	12.92	9	128.26	2.223
35.08	styrene + heptanal	STYR	16.31	0.24	2.04	8	104.14	1.000
35.17			274.72	0.24	0.00	0	0.00	0.000
35.31	o-xylene	O_XYL	972.97	0.24	121.62	8	106.17	1.251
35.44			675.50	0.24	0.00	0	0.00	0.000
35.56	nonene-1	NONE1	558.67	0.24	62.07	9	126.24	2.001
35.66	C9 paraffin	C9PAR2	342.88	0.24	38.10	9	128.26	2.223
35.79	n-nonane	N_NON	4300.16	0.24	477.80	9	128.26	2.223
36.05	C9 olefin	C9OLE4	149.00	0.24	16.56	9	126.24	2.001
36.22			92.53	0.24	0.00	0	0.00	0.000
36.29			730.23	0.24	0.00	0	0.00	0.000
36.47	isopropylbenzene	IPRBZ	718.56	0.24	79.84	9	120.20	1.335
36.65			109.56	0.24	0.00	0	0.00	0.000
36.74	C9 paraffin 3	C9PA3	1153.24	0.24	128.14	9	128.26	2.223
36.86			146.93	0.24	0.00	0	0.00	0.000
37.05	isopropylcyclohexane	IPCYHX	2719.83	0.24	302.20	9	126.24	2.001
37.21	2,6-dimethyloctane	OCT26D	448.20	0.24	44.82	10	142.29	2.201
37.26			358.96	0.24	0.00	0	0.00	0.000
37.36	3,6-dimethyloctane	OCT36M	970.31	0.24	97.03	10	142.29	2.201
37.49	n-propylbenzene	N_PRBZ	1006.74	0.24	111.86	9	120.20	1.335

Canister: DRI-P
Flight 3, 7/16/97 14,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
37.60			180.68	0.24	0.00	0	0.00	0.000
37.72	m-ethyltoluene	M_ETOL	1541.37	0.24	171.26	9	120.20	1.335
37.79	p-ethyltoluene	P_ETOL	1319.98	0.24	146.66	9	120.20	1.335
37.89			351.51	0.24	0.00	0	0.00	0.000
37.96	1,3,5-trimethylbenzene	BZ135M	1957.15	0.24	217.46	9	120.20	1.335
38.03			1256.21	0.24	0.00	0	0.00	0.000
38.17			1164.75	0.24	0.00	0	0.00	0.000
38.27			1232.63	0.24	0.00	0	0.00	0.000
38.37	o-ethyltoluene	O_ETOL	1090.94	0.24	121.22	9	120.20	1.335
38.48			149.76	0.24	0.00	0	0.00	0.000
38.58			584.69	0.24	0.00	0	0.00	0.000
38.69			636.75	0.24	0.00	0	0.00	0.000
38.87	1,2,4-trimethylbenzene	BZ124M	3993.25	0.24	443.69	9	120.20	1.335
39.00			639.01	0.24	0.00	0	0.00	0.000
39.08			469.93	0.24	0.00	0	0.00	0.000
39.17	n-decane	N_DEC	7190.20	0.24	719.02	10	142.29	2.201
39.29	C10 aromatic	C10AR1	259.29	0.24	25.93	10	134.22	1.401
39.39	isobutylbenzene	I_BUBZ	645.20	0.24	64.52	10	134.22	1.401
39.48	sec-butylbenzene	S_BUBZ	843.95	0.24	84.40	10	134.22	1.401
39.72	C10 aromatic 7	C10AR7	1031.65	0.24	103.17	10	134.22	1.401
39.84	1,2,3-trimethylbenzene	BZ123M	2574.75	0.24	286.08	9	120.20	1.335
39.97	C10 paraffin	C10P_C	2228.10	0.24	222.81	10	142.29	2.201
40.16	limonene	LIMON	823.62	0.24	82.36	10	136.24	1.601
40.35	indan	INDAN	1223.37	0.24	135.93	9	118.17	1.111
40.50	indene	INDENE	2040.78	0.24	226.75	9	116.15	0.888
40.61	diethylbenzene	DETBZ1	625.50	0.24	62.55	10	134.22	1.401
40.69	C10 aromatic	C10AR2	1298.65	0.24	129.87	10	134.22	1.401
40.87	1,4-diethylbenzene	DETBZ2	2088.64	0.24	208.86	10	134.22	1.401
41.02	1,2-diethylbenzene	DETBZ3	1263.61	0.24	126.36	10	134.22	1.401
41.12			1263.86	0.24	0.00	0	0.00	0.000
41.24	2-propyltoluene	TOL2PR	1789.57	0.24	178.96	10	134.22	1.401
41.34			280.44	0.24	0.00	0	0.00	0.000
41.45			1301.16	0.24	0.00	0	0.00	0.000
41.52	C10 aromatic	C10AR4	870.10	0.24	87.01	10	134.22	1.401
41.60	C10 aromatic	C10AR5	827.19	0.24	82.72	10	134.22	1.401
41.78	isopropyltoluene	IPRTOL	1343.45	0.24	134.35	10	134.22	1.401
41.93			606.64	0.24	0.00	0	0.00	0.000
42.09			1505.46	0.24	0.00	0	0.00	0.000
42.29	n-undecane	N_UNDE	5094.87	0.24	463.17	11	156.30	2.182
42.48	C10 aromatic	C10AR6	687.52	0.24	68.75	10	134.22	1.401
42.54			459.57	0.24	0.00	0	0.00	0.000
42.60			843.20	0.24	0.00	0	0.00	0.000
42.83	1,2,4,5-tetramethylbenzene	BZ1245	862.92	0.24	86.29	10	134.22	1.401
42.93	1,2,3,5-tetramethylbenzene	BZ1235	686.22	0.24	68.62	10	134.22	1.401
43.05			394.47	0.24	0.00	0	0.00	0.000
43.18			385.68	0.24	0.00	0	0.00	0.000
43.24			380.00	0.24	0.00	0	0.00	0.000
43.32			492.95	0.24	0.00	0	0.00	0.000
43.52	C11 paraffin	C11P_B	530.24	0.24	48.20	11	156.32	2.183
43.64			671.12	0.24	0.00	0	0.00	0.000
43.76			653.67	0.24	0.00	0	0.00	0.000
43.95	1,2,3,4-trimethylbenzene	BZ1234	1172.40	0.24	117.24	10	134.22	1.401
44.07			438.40	0.24	0.00	0	0.00	0.000
44.19			370.40	0.24	0.00	0	0.00	0.000

Canister: DRI-P
Flight 3, 7/16/97 14,000'

SAM_RT	NEWNAME	MNEMONIC	AMOUNT	AMT_INJ	PPBV	C_N	MW	CTOH
44.27			570.70	0.24	0.00	0	0.00	0.000
44.40			395.14	0.24	0.00	0	0.00	0.000
44.56	C11 aromatic	C11AR3	137.61	0.24	12.51	11	148.22	1.453
44.75			113.94	0.24	0.00	0	0.00	0.000
44.92	naphthalene	NAPHTH	549.24	0.24	54.92	10	128.16	0.800
45.05			203.82	0.24	0.00	0	0.00	0.000
45.18	n-dodecane	N_DODE	814.27	0.24	67.86	12	170.34	2.168
45.28			225.56	0.24	0.00	0	0.00	0.000
45.39			56.54	0.24	0.00	0	0.00	0.000
45.48			70.85	0.24	0.00	0	0.00	0.000
45.54			43.63	0.24	0.00	0	0.00	0.000
45.63			116.81	0.24	0.00	0	0.00	0.000
45.73			32.04	0.24	0.00	0	0.00	0.000
45.87			117.42	0.24	0.00	0	0.00	0.000
45.96			5.60	0.24	0.00	0	0.00	0.000
	Total C3		9.10	0.01%				
	Total C4		11.85	0.01%				
	Total C5		73.37	0.07%				
	Total C6		117.77	0.12%				
	Total C7		1353.98	1.37%				
	Total C8		7454.40	7.53%				
	Total C9		20858.42	21.08%				
	Total C10		38360.41	38.77%				
	Total C11		24628.88	24.89%				
	Total C12		6088.04	6.15%				

APPENDIX D

Merged Gas Chromatographic Results

REF_RT	NAME	MNEMONIC	GROUP	C_	MW	CTOH
2.00	dummy entry	DUMMY	0	1	1.00	-99.000
3.85	C2 compounds	C2CMPD	2	2	28.05	1.999
6.82	propene	PROPE	2	3	42.08	2.001
7.10	propane	N_PROP	1	3	44.10	2.669
10.91	isoButane	i_BUTA	1	4	58.12	2.500
12.46	1Butene+iButylene	BEABYL	2	4	56.11	2.001
12.70	1,3-Butadiene	BUDI13	2	4	54.09	1.500
12.98	n-Butane	N_BUTA	1	4	58.12	2.500
13.69	t-2-Butene	T2BUTE	2	4	56.11	2.001
14.46	c-2-Butene	C2BUTE	2	4	56.11	2.001
16.22	3-Me-1-Butene	B1E3ME	2	5	70.13	2.000
17.17	isopentane	IPENTA	1	5	72.15	2.401
17.99	1-Pentene	PENTE1	2	5	70.13	2.000
18.37	2-Me-1-Butene	B1E2M	2	5	70.13	2.000
18.57	n-Pentane	N_PENT	1	5	72.15	2.401
18.78	Isoprene	I_PREN	2	5	68.11	1.599
19.02	t-2-Pentene	T2PENE	2	5	70.13	2.000
19.40	c-2-Pentene	C2PENE	2	5	70.13	2.000
19.63	2-Me-2-Butene	B2E2M	2	5	70.13	2.000
20.32	22DiMeButane	BU22DM	1	6	86.17	2.333
21.14	CycloPentene	CPENTE	2	5	68.11	1.599
21.39	4-Me-1-Pentene	P1E4ME	2	6	84.16	2.001
21.42	3-Me-1-Pentene	P1E3ME	2	6	84.16	2.001
21.68	CycloPentane	CPENTA	1	5	70.13	2.000
21.80	23DiMeButane	BU23DM	1	6	86.17	2.333
21.95	MTBE	MTBE	0	4	88.14	2.400
22.08	2-MePentane	PENA2M	1	6	86.17	2.333
22.61	22-DiMePentane	PEN22M	1	7	100.20	2.286
22.68	3-MePentane	PENA3M	1	6	86.17	2.333
22.92	2-Me-1-Pentene	P1E2ME	2	6	84.16	2.001
22.99	1-Hexene	HEX1E	2	6	84.16	2.001
23.18	C6Olefin	C6OLE1	2	6	84.16	2.001
23.51	n-Hexane	N_HEX	1	6	86.17	2.333
23.62	t-3-Hexene	T3HEXE	2	6	84.16	2.001
23.74	t-2-Hexene	T2HEXE	2	6	84.16	2.001
23.84	2-Me-2-Pentene	P2E2ME	2	6	84.16	2.001
23.97	c-3-Me-2-Pentene	P2E3MC	2	6	84.16	2.001
24.07	c-3-Hexene	C3HEXE	2	6	84.16	2.001
24.15	c-2-Hexene	C2HEXE	2	6	84.16	2.001
24.43	t-3-Me-2-Pentene	P2E3MT	2	6	84.16	2.001
24.69	MeCyPentane	MCYPNA	1	6	84.16	2.001
24.89	24-DiMePentane	PEN24M	1	7	100.20	2.286
25.35	223TriMeButane	BU223M	1	7	100.20	2.286
25.61	1MeCypentene	CPENE1	2	6	82.15	1.668
25.77	Benzene	BENZE	3	6	78.11	1.000
25.99	33DiMePentane	PEN33M	1	7	100.20	2.286
26.18	CycloHexane	CYHEXA	1	6	84.16	2.001
26.40	4MeHexene	HEXE4M	2	7	98.19	2.001
26.54	2MeHexane	HEXA2M	1	7	98.19	2.001
26.63	23DiMePentane	PEN23M	1	7	100.20	2.286
26.78	Cyclohexene	CYHEXE	2	6	82.15	1.668
26.90	3MeHexane	HEXA3M	1	7	100.20	2.286
27.02	C7Olefin	C7OLE1	2	7	98.19	2.001
27.20	13DiMeCyPentane	CPA13M	1	7	98.19	2.001
27.35	3EtPentane	PA3ET	1	8	114.23	2.251
27.51	224TrMePentane	PA224M	1	8	114.23	2.251
27.70	C7Olefin	C7OLE2	2	7	98.19	2.001
27.83	t-3-Heptene	T3HEPE	2	7	98.19	2.001
27.94	n-Heptane	N_HEPT	1	7	100.20	2.286
28.08	C8Olefin	C8OLE1	2	8	112.21	2.000
28.18	C8Olefin	C8OLE2	2	8	112.21	2.000
28.31	C8Olefin	C8OLE3	2	8	112.21	2.000
28.43	244TMe-1-Pentene	P1E244	2	8	112.21	2.000
28.89	MeCyHexane	MECYHX	1	7	98.19	2.001
29.08	C8Paraffin	C8PA1	1	8	114.23	2.251
29.27	25DiMeHexane	HEX25M	1	8	114.23	2.251
29.34	24DiMeHexane	HEX24M	1	8	114.23	2.251
29.69	C8Paraffin	C8PA2	1	8	114.23	2.251
30.08	234TrMePentane	PA234M	1	8	114.23	2.251
30.28	Toluene	TOLUE	3	7	92.14	1.144
30.45	23DiMeHexane	HX23DM	1	8	114.23	2.251
30.65	2MeHeptane	HEP2ME	1	9	128.26	2.223

30.73	4MeHeptane	HEP4ME	1	9	128.26	2.223
30.86	C8Paraffin	C8PA3	1	8	114.23	2.251
30.96	3MeHeptane	HEP3ME	1	8	114.23	2.251
31.31	225TMHexane	HEX225	1	9	128.26	2.223
31.40	Octene-1	OCT1E	2	8	112.21	2.000
31.51	11DMeCyHexane	CHX11M	1	8	112.21	2.000
31.96	n-Octane	N_OCT	1	8	114.23	2.251
32.67	235TriMeHexane	HEX235	0	9	128.26	2.223
32.76	24DiMeHeptane	HEP24D	1	9	128.26	2.223
32.84	C9Olefin	C9OLE2	2	9	126.24	2.001
32.89	44DiMeHeptane	HEP44D	1	9	128.26	2.223
33.13	26DiMeHeptane	HEP26D	1	9	128.26	2.223
33.38	25DiMeHeptane	HEP25D	1	9	128.26	2.223
33.58	33DiMeHeptane	HEP33D	1	9	128.26	2.223
33.68	C9Olefin	C9OLE1	2	9	126.24	2.001
33.98	EtBenzene	ETBZ	3	8	106.16	1.250
34.15	C9Olefin	C9OLE3	2	9	126.24	2.001
34.28	m/p-Xylene	MP_XYL	3	8	106.16	1.250
34.45	2MeOctane	OCT2ME	1	9	128.26	2.223
34.66	3MeOctane	OCT3ME	1	9	128.26	2.223
34.84	C9Paraffin	C9PAR1	1	9	128.26	2.223
34.95	Styrene	STYR	3	8	104.14	1.000
35.15	o-Xylene	O_XYL	3	8	106.17	1.251
35.40	Nonene-1	NONE1	2	9	126.24	2.001
35.52	C9Paraffin	C9PAR2	1	9	128.26	2.223
35.61	n-Nonane	N_NON	1	9	128.26	2.223
35.73	C9Paraffin	C9PAR3	1	9	128.26	2.223
35.89	C9Olefin	C9OLE4	2	9	126.24	2.001
36.29	iPropBenzene	IPRBZ	3	9	120.20	1.335
36.57	C9 Paraffin 3	C9PA3	1	9	128.26	2.223
36.84	iPropCyHexane	IPCYHX	1	9	126.24	2.001
36.98	26DiMeOctane	OCT26D	1	10	142.29	2.201
37.08	alpha-pinene	A_PINE	2	10	136.23	1.600
37.18	36DiMeOctane	OCT36M	1	10	142.29	2.201
37.31	nPropBenzene	N_PRBZ	3	9	120.20	1.335
37.54	mEtToluene	M_ETOL	3	9	120.20	1.335
37.62	pEtToluene	P_ETOL	3	9	120.20	1.335
37.79	135TriMeBenzene	BZ135M	3	9	120.20	1.335
37.92	C10Paraffin	C10P_A	1	10	142.29	2.201
38.19	oEtToluene	O_ETOL	3	9	120.20	1.335
38.53	beta-pinene	B_PINE	1	10	136.23	1.600
38.68	124TriMeBenzene	BZ124M	3	9	120.20	1.335
38.97	n-Decane	N_DEC	1	10	142.29	2.201
39.08	C10Aromatic	C10AR1	3	10	134.22	1.401
39.13	iButBenzene	I_BUBZ	3	10	134.22	1.401
39.27	sButBenzene	S_BUBZ	3	10	134.22	1.401
39.50	C10 Aromatic 7	C10AR7	3	10	134.22	1.401
39.63	123TriMeBenzene	BZ123M	3	9	120.20	1.335
39.75	C10Paraffin	C10P_C	1	10	142.29	2.201
39.99	Limonene	LIMON	2	10	136.24	1.601
40.07	Indan	INDAN	3	9	118.17	1.111
40.28	Indene	INDENE	3	9	116.15	0.888
40.40	13diethylbenzene	DETBZ1	3	10	134.22	1.401
40.47	C10Aromatic	C10AR2	3	10	134.22	1.401
40.64	14diethylbenzene	DETBZ2	3	10	134.22	1.401
40.80	12diethylbenzene	DETBZ3	3	10	134.22	1.401
41.08	2-propylToluene	TOL2PR	3	10	134.22	1.401
41.31	C10Aromatic	C10AR4	3	10	134.22	1.401
41.39	C10Aromatic	C10AR5	3	10	134.22	1.401
41.57	iPrToluene	IPRTOL	3	10	134.22	1.401
42.04	n-Undecane	N_UNDE	1	11	156.30	2.182
42.24	C10Aromatic	C10AR6	3	10	134.22	1.401
42.47	C11Paraffin	C11P_A	1	11	156.32	2.183
42.59	1245tetraMeBenzene	BZ1245	3	10	134.22	1.401
42.71	1235tetraMeBenzene	BZ1235	3	10	134.22	1.401
43.35	C11Paraffin	C11P_B	1	11	156.32	2.183
43.72	1234tetraMeBenzene	BZ1234	3	10	134.22	1.401
44.12	1MeIndan	IND_1M	3	10	132.21	1.201
44.24	C11Aromatic	C11AR1	3	11	148.22	1.453
44.33	C11Aromatic	C11AR3	3	11	148.22	1.453
44.69	Naphthalene	NAPHTH	3	10	128.16	0.800
44.92	n-Dodecane	N_DODE	1	12	170.34	2.168
50.00	end of file	DUM2	0	0	0.00	-99.000

Appendix D

Merged Gas Chromatographic Results

CID	AN_T	CANISTER	QA_LOT	AN_DATE	RAW_FILE	AFLAG	C2C3MPD	PROPE	N_PROP	I_BUTA	BEABYL	BUDI13	N_BUTA	T2BUTE	C2BUTE	B1E3ME	IPENTA	PENTE1	B1E2M	N_PENT	I_PREN	T2PENE	C2PENE
CWT1S97071501	p	DRI-M	595	7/18/97	HPAF1771		0.00	0.00	4.83	11.96	0.00	0.00	27.35	1.98	4.63	2.68	62.64	36.24	1.07	45.84	0.00	3.65	2.66
CWT2S97071501	p	DRI-B	595	7/18/97	HPAF1772		0.00	0.00	5.34	11.21	0.00	0.00	29.08	1.73	4.70	5.54	65.95	41.91	1.53	54.40	0.00	5.41	6.01
CWT3S97071501	p	DRI-F	595	7/20/97	HPAF1778		0.00	0.00	6.24	14.99	0.00	0.00	35.81	3.28	0.75	0.00	78.59	37.37	1.42	54.85	0.00	3.83	2.89
CWT1S97071502	p	DRI- L	592	7/22/97	HPAF1793		0.00	0.00	6.85	14.51	0.00	0.00	30.06	14.42	0.81	0.00	83.96	14.76	17.22	48.41	0.00	2.04	0.92
CWT2S97071502	p	DRI- N	592	7/21/97	HPAF1789		0.00	0.00	6.47	13.15	0.00	0.00	28.35	2.83	0.76	0.00	66.53	6.26	3.13	45.85	0.00	2.72	0.90
CWT3S97071502	p	DRI- H	592	7/21/97	HPAF1787		0.00	0.00	7.37	14.54	0.00	0.00	30.87	0.00	2.35	0.47	72.30	4.70	1.47	48.68	0.00	1.72	3.36
CWT1S970716	p	DRI-R	593	7/21/97	HPAF1782		0.00	0.00	2.31	4.81	0.00	0.00	11.15	0.00	1.57	1.81	25.79	3.69	2.25	16.43	0.00	1.46	2.94
CWT2S970716	p	DRI-J	593	7/21/97	HPAF1784		0.00	0.00	2.12	4.68	0.00	0.00	9.12	0.00	0.00	3.53	23.14	4.55	1.92	14.32	0.00	3.93	2.60
CWT3S970716	p	DRI-P	593	7/21/97	HPAF1786		0.00	0.00	2.19	3.82	0.00	0.00	8.03	0.00	0.00	3.36	18.62	3.50	0.00	16.92	0.00	3.79	0.00
Average							0.00	0.00	4.86	10.41	0.00	0.00	23.31	2.89	1.73	1.93	55.28	17.00	3.33	38.41	0.00	3.17	2.48
Ave ppmV							0.00	0.00	1.62	2.60	0.00	0.00	5.83	0.67	0.43	0.39	11.06	3.40	0.67	7.68	0.00	0.63	0.50
C_NO							2.00	3.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
MW							28.05	42.08	44.10	58.12	56.11	54.09	58.12	56.11	56.11	70.13	72.15	70.13	70.13	72.15	68.11	70.13	70.13
CTOH							2.00	2.00	2.67	2.50	2.00	1.50	2.50	2.00	2.00	2.00	2.40	2.00	2.00	2.40	1.60	2.00	2.00
ppmv*ctoh							0.00	0.00	4.32	6.51	0.00	0.00	14.57	1.35	0.87	0.77	26.55	6.80	1.33	18.45	0.00	1.27	0.99

Appendix D

Merged Gas Chromatographic Results

CID	B2E2M	BU22DM	CPENTE	P1E4ME	P1E3ME	CPENTA	BU23DM	MTBE	PENA2M	PEN22M	PENA3M	P1E2ME	HEX1E	C6OLE1	N_HEX	T3HEXE	T2HEXE	P2E2ME	P2E3MC	C3HEXE	C2HEXE	P2E3MT	MCYPNA
CWT1S97071501	3.29	8.61	4.24	2.85	0.75	11.95	19.23	0.00	97.81	2.78	67.38	0.00	2.40	1.50	169.93	0.00	3.61	0.00	0.00	3.93	0.00	4.93	136.21
CWT2S97071501	4.46	15.36	9.71	6.91	0.00	14.77	23.57	0.00	102.96	0.00	74.33	0.00	3.37	2.73	180.62	0.00	4.04	0.00	0.00	2.98	0.00	2.15	141.29
CWT3S97071501	3.53	9.14	4.01	3.27	0.00	13.83	20.66	0.00	96.56	1.18	70.88	0.00	1.97	0.00	168.24	0.00	1.82	0.00	0.00	0.00	0.00	2.49	136.21
CWT1S97071502	18.15	7.83	15.60	15.89	12.12	9.19	23.39	0.00	71.64	8.92	45.66	0.00	7.04	8.07	103.64	7.44	0.00	10.85	4.02	0.00	5.71	3.70	92.06
CWT2S97071502	4.55	7.93	1.99	0.99	2.72	10.95	13.11	0.00	55.07	1.68	42.17	0.00	1.80	0.00	97.05	0.00	1.49	0.00	0.00	0.00	1.64	0.00	87.66
CWT3S97071502	3.61	7.04	0.00	0.00	0.00	9.66	13.98	0.00	63.23	1.36	46.47	0.00	2.25	0.00	105.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96.85
CWT1S970716	2.43	4.86	1.14	4.57	0.00	6.49	7.42	0.00	19.32	0.00	11.37	0.00	4.01	3.75	31.91	0.00	0.00	0.00	0.00	2.13	0.00	1.01	30.64
CWT2S970716	2.60	2.07	2.79	2.02	1.23	3.70	5.26	0.00	17.58	1.04	11.31	0.00	1.27	0.50	27.53	0.00	1.29	0.00	0.00	1.43	0.00	0.00	28.13
CWT3S970716	3.15	6.24	1.93	4.71	2.02	3.59	5.81	0.00	14.91	2.84	13.42	2.26	0.00	0.00	27.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.83
Average	5.09	7.68	4.60	4.58	2.09	9.35	14.71	0.00	59.90	2.20	42.55	0.25	2.68	1.84	101.41	0.83	1.36	1.21	0.45	1.16	0.82	1.59	86.32
Ave ppmV	1.02	1.28	0.92	0.76	0.35	1.87	2.45	0.00	9.98	0.31	7.09	0.04	0.45	0.31	16.90	0.14	0.23	0.20	0.07	0.19	0.14	0.26	14.39
C_NO	5.00	6.00	5.00	6.00	6.00	5.00	6.00	4.00	6.00	7.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
MW	70.13	86.17	68.11	84.16	84.16	70.13	86.17	88.14	86.17	100.20	86.17	84.16	84.16	84.16	86.17	84.16	84.16	84.16	84.16	84.16	84.16	84.16	84.16
CTOH	2.00	2.33	1.60	2.00	2.00	2.00	2.33	2.40	2.33	2.29	2.33	2.00	2.00	2.00	2.33	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
ppmv*ctoh	2.03	2.98	1.47	1.53	0.70	3.74	5.72	0.00	23.29	0.72	16.55	0.08	0.89	0.61	39.43	0.28	0.45	0.40	0.15	0.39	0.27	0.53	28.79

Appendix D

Merged Gas Chromatographic Results

CID	PEN24M	BU223M	CPENE1	BENZE	PEN33M	CYHEXA	HEXE4M	HEXA2M	PEN23M	CYHEXE	HEXA3M	C7OLE1	CPA13M	PA3ET	PA224M	C7OLE2	T3HEPE	N_HEPT	C8OLE1	C8OLE2	C8OLE3	P1E244	MECYHX
CWT1S97071501	18.02	1.36	0.00	65.02	10.69	200.73	0.00	219.25	113.27	38.63	331.47	0.00	102.70	137.83	199.39	1.06	0.00	956.15	0.00	0.00	1.17	0.00	1162.22
CWT2S97071501	18.38	1.88	0.00	70.43	12.40	215.52	0.00	234.55	121.18	41.76	357.14	0.00	110.79	147.26	213.77	1.81	0.00	1044.76	0.00	0.00	1.35	0.00	1270.19
CWT3S97071501	17.84	0.00	0.00	66.86	10.92	202.95	0.00	219.63	114.45	38.76	333.53	0.00	102.94	138.28	198.85	0.00	0.00	978.10	0.00	0.00	0.00	0.00	1196.63
CWT1S97071502	16.60	5.87	6.10	50.39	7.92	145.21	0.00	156.30	82.34	28.79	236.46	3.69	76.26	100.81	136.37	0.00	5.27	696.84	0.00	6.50	0.00	5.05	911.15
CWT2S97071502	11.33	0.00	0.00	47.51	8.27	138.27	0.00	147.00	77.07	26.41	224.17	0.00	69.42	95.61	135.63	0.75	0.00	678.99	0.00	0.00	0.00	0.00	899.17
CWT3S97071502	12.31	0.00	0.00	56.14	10.75	157.60	0.00	165.84	88.78	33.34	260.63	0.00	82.03	110.41	157.88	0.00	0.00	779.47	0.00	0.00	0.00	0.00	1006.21
CWT1S970716	4.90	0.00	0.00	17.10	3.31	51.52	0.00	55.65	29.18	10.76	89.24	0.00	27.30	37.34	53.67	1.16	0.00	286.45	0.00	0.00	2.35	0.00	401.06
CWT2S970716	4.01	0.00	0.00	16.24	3.71	48.55	0.00	51.86	28.22	10.45	83.61	0.00	26.21	35.27	50.20	0.00	0.00	268.05	1.07	0.00	0.00	0.00	381.91
CWT3S970716	3.31	0.00	0.00	17.59	4.11	48.66	0.00	55.99	28.99	11.07	90.99	0.00	27.54	37.85	53.95	0.00	0.00	289.20	0.00	0.00	0.00	0.00	414.02
Average	11.86	1.01	0.68	45.25	8.01	134.33	0.00	145.12	75.94	26.66	223.03	0.41	69.47	93.41	133.52	0.53	0.59	664.22	0.12	0.72	0.54	0.56	849.40
Ave ppmV	1.69	0.14	0.11	7.54	1.14	22.39	0.00	20.73	10.85	4.44	31.86	0.06	9.92	11.68	16.69	0.08	0.08	94.89	0.01	0.09	0.07	0.07	121.34
C_NO	7.00	7.00	6.00	6.00	7.00	6.00	7.00	7.00	7.00	6.00	7.00	7.00	7.00	8.00	8.00	7.00	7.00	7.00	8.00	8.00	8.00	8.00	7.00
MW	100.20	100.20	82.15	78.11	100.20	84.16	98.19	98.19	100.20	82.15	100.20	98.19	98.19	114.23	114.23	98.19	98.19	100.20	112.21	112.21	112.21	112.21	98.19
CTOH	2.29	2.29	1.67	1.00	2.29	2.00	2.00	2.00	2.29	1.67	2.29	2.00	2.00	2.25	2.25	2.00	2.00	2.29	2.00	2.00	2.00	2.00	2.00
ppmv*ctoh	3.87	0.33	0.19	7.54	2.62	44.80	0.00	41.48	24.80	7.41	72.83	0.12	19.86	26.28	37.57	0.15	0.17	216.92	0.03	0.18	0.14	0.14	242.81

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Appendix D

Merged Gas Chromatographic Results

CID	C8PA1	HEX25M	HEX24M	C8PA2	PA234M	TOLUE	HX23DM	HEP2ME	HEP4ME	C8PA3	HEP3ME	HEX225	OCT1E	CHX11M	N_OCT	HEX235	HEP24D	C9OLE2	HEP44D	HEP26D	HEP25D	HEP33D	C9OLE1
CWT1S97071501	93.82	94.81	292.89	192.19	44.62	854.22	163.36	961.26	293.55	110.31	850.20	277.78	14.32	237.16	2605.36	41.15	79.87	0.00	209.44	572.78	1260.22	880.57	223.96
CWT2S97071501	102.11	104.12	321.80	213.85	47.73	968.94	183.67	1098.25	331.69	125.08	972.48	318.38	15.27	270.42	3082.39	49.60	95.71	0.00	253.87	705.34	1530.40	1074.32	274.96
CWT3S97071501	98.21	99.94	309.30	206.71	48.24	931.99	176.05	1040.98	318.36	120.61	927.93	304.46	17.07	261.12	2983.20	47.46	92.87	0.00	245.27	682.46	1490.26	1048.20	269.22
CWT1S97071502	4.06	82.13	242.44	165.09	39.45	716.44	141.85	846.33	261.45	97.04	771.27	251.20	14.76	117.19	2473.64	40.65	80.83	0.00	211.16	586.33	1268.07	909.96	233.28
CWT2S97071502	74.49	79.92	241.34	160.05	39.51	714.00	144.33	857.40	266.80	98.03	782.79	255.35	15.24	219.00	2556.87	42.71	84.58	0.00	223.11	630.01	1364.92	969.71	248.91
CWT3S97071502	0.00	95.52	275.94	182.26	44.60	804.94	163.34	959.85	298.86	111.17	876.92	288.28	17.65	245.16	2869.91	47.71	94.36	0.00	249.48	705.43	1526.86	1084.61	276.90
CWT1S970716	37.12	39.67	116.52	79.33	20.63	336.88	76.02	453.20	144.19	52.62	427.61	142.08	9.15	121.26	1475.92	25.50	51.62	0.00	135.78	368.28	841.75	605.47	155.89
CWT2S970716	32.04	37.72	110.34	76.49	19.91	332.94	74.67	446.70	141.03	52.16	421.84	139.75	9.53	119.70	1485.17	25.88	52.18	0.00	136.35	398.65	860.48	620.83	159.45
CWT3S970716	34.70	40.69	117.13	81.50	19.58	367.32	81.03	492.86	155.13	56.67	465.66	154.12	9.65	132.56	1663.45	29.52	59.49	0.00	157.95	456.01	978.69	706.67	182.36
Average	52.95	74.95	225.30	150.83	36.03	669.74	133.81	795.21	245.67	91.52	721.86	236.82	13.63	191.51	2352.88	38.91	76.83	0.00	202.71	589.70	1237.96	877.82	224.99
Ave ppmV	6.62	9.37	28.16	18.85	4.50	95.68	16.73	88.36	27.30	11.44	90.23	26.31	1.70	23.94	294.11	4.32	8.54	0.00	22.52	63.30	137.55	97.54	25.00
C_NO	8.00	8.00	8.00	8.00	8.00	7.00	8.00	9.00	9.00	8.00	8.00	9.00	8.00	8.00	8.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
MW	114.23	114.23	114.23	114.23	114.23	92.14	114.23	128.26	128.26	114.23	114.23	128.26	112.21	112.21	114.23	128.26	128.26	126.24	128.26	128.26	128.26	128.26	126.24
CTOH	2.25	2.25	2.25	2.25	2.25	1.14	2.25	2.22	2.22	2.25	2.25	2.22	2.00	2.00	2.25	2.22	2.22	2.00	2.22	2.22	2.22	2.22	2.00
ppmv*ctoh	14.90	21.09	63.39	42.44	10.14	109.45	37.65	196.42	60.68	25.75	203.11	58.49	3.41	47.88	662.04	9.61	18.98	0.00	50.07	140.72	305.78	216.82	50.02

Appendix D

Merged Gas Chromatographic Results

CID	ETBZ	C9OLE3	MP_XYL	OCT2ME	OCT3ME	C9PAR1	STYR	O_XYL	NONE1	C9PAR2	N_NON	C9PAR3	C9OLE4	IPRBZ	C9PA3	IPCYHX	OCT26D	A_PINE	OCT36M	N_PRBZ	M_ETOL	P_ETOL	BZ135M
CWT1S97071501	858.78	848.74	2199.45	1237.63	1137.64	117.56	17.87	950.87	509.27	314.62	3457.87	0.00	126.32	566.95	902.50	1926.59	312.04	0.00	639.59	705.06	1013.19	803.32	1097.96
CWT2S97071501	1075.26	1074.21	2827.30	1620.88	1487.02	152.06	22.36	1255.70	672.88	414.73	4847.28	0.00	172.82	799.49	1266.09	2815.25	454.67	0.00	964.07	1041.17	1533.00	1259.20	1762.17
CWT3S97071501	1050.96	1056.95	2786.05	1612.16	1477.16	149.79	22.47	1252.96	682.84	416.44	4968.67	0.00	175.24	814.34	1302.99	2931.13	472.09	0.00	1010.85	1066.45	1630.83	1326.14	1893.29
CWT1S97071502	892.72	917.44	2396.08	1373.32	1268.96	132.26	19.40	1077.24	587.42	359.09	4095.54	0.00	147.59	675.95	1074.70	2351.92	392.64	0.00	791.52	864.40	1281.36	1003.72	1406.78
CWT2S97071502	961.38	1005.40	2619.45	1553.46	1426.47	146.59	21.61	1208.36	665.72	409.47	4879.10	0.00	172.43	808.78	1286.64	2916.50	476.67	0.00	1010.74	1076.96	1624.07	1325.14	1904.48
CWT3S97071502	1082.03	1132.74	2974.02	1752.87	1613.06	164.30	23.33	1373.50	751.20	464.16	5598.66	0.00	195.60	924.80	1474.81	3359.91	548.95	0.00	1167.83	1243.03	1880.37	1550.47	2233.70
CWT1S970716	581.06	644.33	1621.83	1001.03	921.83	94.23	13.95	757.80	436.63	270.18	3214.95	0.00	114.10	531.99	857.99	1942.43	322.26	0.00	672.23	707.37	1051.99	856.82	1235.99
CWT2S970716	610.27	674.41	1734.98	1074.63	985.58	99.17	13.96	827.95	476.24	295.26	3823.52	0.00	125.34	600.67	968.74	2255.16	370.47	0.00	796.02	833.49	1250.24	1080.07	1567.65
CWT3S970716	704.14	780.04	2017.86	1251.36	1150.58	116.31	16.31	972.97	558.67	342.88	4300.16	0.00	149.00	718.56	1153.24	2719.83	448.20	0.00	970.31	1008.74	1541.37	1319.96	1957.15
Average	868.51	903.81	2353.00	1386.37	1274.26	130.25	19.03	1075.26	593.65	365.20	4331.75	0.00	153.16	715.73	1143.30	2579.86	420.89	0.00	891.46	951.63	1422.94	1169.43	1673.24
Ave ppmV	108.56	100.42	294.13	154.04	141.58	14.47	2.38	134.41	65.96	40.58	481.31	0.00	17.02	79.53	127.03	286.65	42.09	0.00	89.15	105.74	158.10	129.94	185.92
C_NO	8.00	9.00	8.00	9.00	9.00	9.00	8.00	8.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	10.00	10.00	10.00	9.00	9.00	9.00	9.00
MW	106.16	126.24	106.16	128.26	128.26	128.26	104.14	106.17	126.24	128.26	128.26	128.26	126.24	120.20	128.26	126.24	142.29	136.23	142.29	120.20	120.20	120.20	120.20
CTOH	1.25	2.00	1.25	2.22	2.22	2.22	1.00	1.25	2.00	2.22	2.22	2.22	2.00	1.34	2.22	2.00	2.20	1.60	2.20	1.34	1.34	1.34	1.34
ppmv*ctoh	135.70	200.95	367.66	342.43	314.74	32.17	2.38	168.14	131.99	90.21	1069.94	0.00	34.05	106.17	282.40	573.59	92.64	0.00	196.21	141.16	211.07	173.47	248.20

Appendix D

Merged Gas Chromatographic Results

CID	C10P_A	O_ETOL	B_PINE	BZ124M	N_DEC	C10AR1	I_BUBZ	S_BUBZ	C10AR7	BZ123M	C10P_C	LIMON	INDAN	INDENE	DETBZ1	C10AR2	DETBZ2	DETBZ3	TOL2PR	C10AR4	C10AR5	IPRTOL	N_UNDE
CWT1S97071501	733.96	663.10	0.00	2071.91	2992.16	122.30	330.13	420.72	440.04	1111.38	796.15	315.07	487.68	741.24	225.99	456.43	680.21	375.66	507.13	259.38	221.97	374.28	1013.72
CWT2S97071501	1110.01	1035.40	0.00	3441.00	5478.77	212.29	551.61	711.56	795.03	1988.94	1550.37	590.68	897.09	1419.06	438.60	894.22	1374.49	789.13	1088.48	549.50	487.48	802.76	2506.07
CWT3S97071501	1190.37	1111.66	0.00	3810.59	6389.60	235.57	607.36	785.70	900.32	2285.86	1829.92	698.53	1045.48	1704.42	513.40	1072.85	1673.87	981.49	1380.97	673.56	628.33	1021.58	3653.97
CWT1S97071502	923.88	841.64	0.00	2734.19	3989.70	164.22	430.97	558.33	596.44	1518.81	1086.52	432.18	671.05	1017.37	316.22	642.92	987.15	529.98	723.68	371.02	329.42	546.29	1408.31
CWT2S97071502	1186.33	1111.05	0.00	3792.12	6145.75	235.68	610.53	791.91	900.18	2264.33	1791.81	684.61	1044.18	1646.92	518.76	1044.57	1634.24	948.43	1311.68	656.56	600.59	991.09	3152.46
CWT3S97071502	1373.36	1286.94	0.00	4467.51	7372.22	275.50	715.27	920.37	1064.71	2699.21	2154.05	812.90	1231.20	1990.84	614.89	1263.10	1984.86	1155.65	1613.02	832.14	740.86	1209.98	4058.50
CWT1S970716	794.12	711.19	0.00	2412.01	3794.45	151.33	393.53	508.93	560.15	1396.39	1074.50	420.86	639.36	999.06	302.54	619.49	941.42	539.23	729.46	370.92	326.57	551.12	1602.17
CWT2S970716	953.75	883.04	0.00	3169.83	5382.87	202.80	512.92	665.29	775.17	1960.03	1581.68	601.15	910.31	1473.36	453.18	936.59	1467.83	854.18	1190.22	595.21	544.11	904.62	2973.88
CWT3S970716	0.00	1090.94	0.00	3993.25	7190.20	259.29	645.20	843.95	1031.65	2574.75	2228.10	823.62	1223.37	2040.78	625.50	1298.65	2088.64	1263.61	1789.57	870.10	827.19	1343.45	5094.87
Average	918.42	970.77	0.00	3321.38	5416.19	206.53	533.06	689.64	784.85	1977.74	1585.90	596.62	905.55	1448.12	445.45	914.31	1423.63	826.37	1148.25	575.38	522.95	860.57	2829.33
Ave ppmV	91.84	107.86	0.00	369.04	541.62	20.65	53.31	68.96	78.49	219.75	156.59	59.66	100.62	160.90	44.55	91.43	142.36	82.64	114.82	57.54	52.29	86.06	257.21
C_NO	10.00	9.00	10.00	9.00	10.00	10.00	10.00	10.00	10.00	9.00	10.00	10.00	9.00	9.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	11.00
MW	142.29	120.20	136.23	120.20	142.29	134.22	134.22	134.22	134.22	120.20	142.29	136.24	118.17	116.15	134.22	134.22	134.22	134.22	134.22	134.22	134.22	134.22	156.30
CTOH	2.20	1.34	1.60	1.34	2.20	1.40	1.40	1.40	1.40	1.34	2.20	1.60	1.11	0.89	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	2.18
ppmv*ctoh	202.14	144.00	0.00	492.67	1192.10	28.94	74.68	96.62	109.96	293.37	344.65	95.52	111.78	142.88	62.41	128.10	199.45	115.77	160.87	80.61	73.26	120.57	561.24

Merged Gas Chromatographic Results

CID	C10AR6	C11P_A	BZ1245	BZ1235	C11P_B	BZ1234	IND_1M	C11AR1	C11AR3	NAPHTH	N_DODE	IDNMHC	UNID	TOTAL
CWT1S97071501	160.67	32.88	168.85	139.96	91.91	183.33	0.00	0.00	22.09	63.96	84.84	50692.89	10059.10	60751.99
CWT2S97071501	369.10	75.99	411.38	343.32	239.73	493.96	0.00	0.00	55.51	185.35	279.17	75509.27	16446.46	91955.73
CWT3S97071501	500.03	100.11	597.51	478.32	353.11	800.37	0.00	0.00	84.29	353.44	587.10	82254.94	19267.68	101522.62
CWT1S97071502	238.21	0.00	244.45	206.35	136.38	271.62	0.00	0.00	28.90	102.83	111.34	58201.86	12543.47	70745.33
CWT2S97071502	471.79	0.00	538.30	443.11	318.68	666.86	0.00	63.48	80.05	289.40	350.23	76923.52	18089.92	95013.44
CWT3S97071502	582.85	115.30	686.52	557.25	406.03	880.40	0.00	82.24	95.62	385.94	544.90	90364.73	21527.74	111892.47
CWT1S970716	251.67	51.67	272.31	223.82	154.40	313.49	0.00	0.00	39.30	126.04	159.64	46296.87	10713.57	57010.44
CWT2S970716	437.32	0.00	507.39	413.11	300.22	653.17	0.00	60.33	68.90	289.03	398.28	58338.22	14880.07	74218.29
CWT3S970716	687.52	0.00	862.92	686.22	530.24	1172.40	0.00	0.00	137.61	549.24	814.27	76485.66	22470.56	98956.22
Average	411.02	41.77	476.63	387.94	281.19	603.96	0.00	22.89	68.03	280.58	399.97	68452.00		
Ave ppmV	41.10	3.80	47.66	38.79	25.56	60.40	0.00	2.08	6.18	26.06	30.83			
C_NO	10.00	11.00	10.00	10.00	11.00	10.00	10.00	11.00	11.00	10.00	12.00	7552.46		
MW	134.22	156.32	134.22	134.22	156.32	134.22	132.21	148.22	148.22	128.16	170.34			
CTOH	1.40	2.18	1.40	1.40	2.18	1.40	1.20	1.45	1.45	0.80	2.17			
ppmv*ctoh	57.58	8.29	66.78	54.35	55.80	84.61	0.00	3.02	8.99	20.85	66.84	13487.81		