Determination of Alternative Fuels Combustion Products: Phase 2 Final Report

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1617 Cole Boulevard
Golden, Colorado 80401-3393
A national laboratory of the
U.S. Department of Energy
Managed by the Midwest Research Institute
For the U.S. Department of Energy
Under Contract No. DE-AC36-83CH10093

Prepared under Subcontract Number YAW-3-13253-01
June 1997

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Foreword

This report covers the second year of a continuing program conducted for the National Renewable Energy Laboratory (NREL) by the Department of Emissions Research of Southwest Research Institute (SwRI). This program was authorized by NREL Subcontract No. YAW-3-13253-01. Midwest Research Institute operates and manages NREL for the United States Department of Energy under Prime Contract No. DE-AC36-83CH10093. This program began on October 1, 1993 and is currently scheduled to continue through August 20, 1997. Testing covered in this report was conducted from March 1995 through February 1996. The initial project was based on SwRI Proposal 08-14326 to NREL. The tasks covered in this report are based on SwRI Proposal 08-17314. The overall program was identified within SwRI as Project 08-6068. The NREL technical monitors for this program were Mr. Brent Bailey and Mr. Chris Colucci of NREL's Center for Transportation Technologies and Systems in Golden, Colorado. The SwRI project manager was Dr. Lawrence R. Smith, and the project leader was Mr. Kevin A. Whitney. Individual task leaders included Mr. Matthew S. Newkirk, Mr. Patrick M. Merritt, and Mr. E. Robert Fanick. Mr. Danny Terrazas, laboratory supervisor, was responsible for emissions testing.

Abstract

This report describes the laboratory efforts to accomplish four independent tasks: (1) speciation of hydrocarbon exhaust emissions from a light-duty vehicle operated over the chassis dynamometer portion of the light-duty FTP after modifications for operation on butane and butane blends; (2) evaluation of NREL's Variable Conductance Vacuum Insulated Catalytic Converter Test Article 4 for the reduction of cold-start FTP exhaust emissions after extended soak periods for a Ford FFV Taurus operating on E85; (3) support of UDRI in an attempt to define correlations between engine-out combustion products identified by SwRI during chassis dynamometer testing, and those found during flow tube reactor experiments conducted by UDRI; and (4) characterization of small-diameter particulate matter from a Ford Taurus FFV operating in a simulated fuel-rich failure mode on CNG, LPG, M85, E85, and reformulated gasoline.

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Acronyms and Abbreviations

μL	microliter
μm	micron
ADP	Adaptive Digital Processor
cfm	cubic foot per minute
CFR	Code of Federal Regulations
CH ₄	Methane
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CP2	California Phase 2
CRC	Coordinating Research Council
CVS	Constant Volume Sampler
DNPH	2,4-dinitrophenylhydrazine
E85	85% denatured ethanol and 15% gasoline
ECU	Engine Control Unit
EGO	Exhaust Gas Oxygen
EGR	Exhaust Gas Recirculation
EP	End Point
EPA	Environmental Protection Agency
FFV	Flexible Fuel Vehicle
FID	Flame Ionization Detector
FTP	Federal Test Procedure
g/mi	grams per mile
gal	gallon
GC	Gas Chromatograph
h	hour
HC	Hydrocarbons
HFET	Highway Fuel Economy Test
HPLC	High Performance Liquid Chromatograph
IBP	Initial Boiling Point
L	liter
LEV	Low Emission Vehicle
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
M85	85% methanol and 15% gasoline
MAP	Manifold Absolute Pressure
mi	mile
min	minute
MIR	Maximum Incremental Reactivity
mL	milliliter
mm	millimeter
MON	Motor Octane Number
MPFI	Multi-Point Fuel Injection
MTBE	methyl tertiary-butyl ether
NAAQS	National Ambient Air Quality Standard
NDIR	Non-Dispersive Infrared

Acronyms and Abbreviations Concluded

NMOG	Non-Methane Organic Gas
NO _x	Oxides of Nitrogen
NREL	National Renewable Energy Laboratory
O ₃	Ozone
OEM	Original Equipment Manufacturer
OFP	Ozone Forming Potential
OMHCE	Organic Material Hydrocarbon Equivalent
OMNMHCE	Organic Material Non-Methane Hydrocarbon Equivalent
PCM	Phase Change Material
ppm	parts per million
psi	pounds per square inch
RAF	Reactivity Adjustment Factor
RF-A	Industry Average Gasoline
RFG	Reformulated Gasoline
RON	Research Octane Number
RVP	Reid Vapor Pressure
s	second
SAE	Society of Automotive Engineers
scfm	standard cubic feet per minute
SwRI	Southwest Research Institute
TA-CC4	Test Article 4
THC	Total Hydrocarbons
TLEV	Transitional Low Emission Vehicle
UDDS	Urban Dynamometer Driving Schedule
UDRI	University of Dayton Research Institute
UEGO	Universal Exhaust Gas Oxygen
ULEV	Ultra-Low Emission Vehicle
uv	ultraviolet
VOC	Volatile Organic Compound

Summary

Four separate tasks were conducted under the second year of this program to determine combustion products from vehicles operating on alternative fuels: (1) speciation of hydrocarbon exhaust emissions from a light-duty vehicle modified to operate on butane and butane blends; (2) evaluation of NREL's Variable Conductance Vacuum Insulated Catalytic Converter (TA-CC4) for the reduction of cold-start FTP exhaust emissions from a Ford FFV Taurus operating on E85 after extended soak periods; (3) support of UDRI in an attempt to define correlations between engine-out combustion products identified by SwRI during chassis dynamometer testing, and those found during flow tube reactor experiments conducted by UDRI; and (4) characterization of small-diameter particulate matter from a Ford Taurus FFV operating in a simulated fuel-rich failure mode on CNG, LPG, M85, E85, and reformulated gasoline.

Under Task 1, "Hydrocarbon Speciation of Emissions from a Vehicle Operating on Butane-Blended Fuels," regulated exhaust emissions, speciated hydrocarbon emissions, ozone-forming potentials, and specific reactivity factors were determined for 11 test fuels. These fuels included California Phase 2 gasoline, industry-average gasoline (RF-A), 100% n-propane, 100% n-butane, and a variety of butane blends. In all, 18 exhaust emission tests were conducted on a light-duty vehicle (equipped with a gaseous-fuel conversion kit) using the chassis dynamometer portion of the FTP. Some of the findings are outlined below.

- Optimum post-conversion emissions performance appeared to be achieved with the vehicle operating on 100% propane. The next best performance was achieved with the 50% n-butane/50% propane blend.
- All of the alternative fuels allowed a converted California TLEV to potentially meet ULEV NMOG and NO_x standards at the mileage tested. All fuels except a 100% n-butane fuel and a 90% n-butane/10% pentane fuel blend met the ULEV CO standard.
- In general, for all alternative fuels tested, more than three-fourths of the calculated total FTP potential ozone came from the cold-start segment of the FTP test. Primary ozone hydrocarbon precursors were unburned fuel components and two partial combustion products, ethylene and propylene.

Under Task 2, "Evaluation of a Vacuum Insulated Catalyst in Reducing Cold-Start Exhaust Emissions," the effectiveness of NREL's Vacuum Insulated Catalytic Converter (TA-CC4) in reducing cold-start FTP exhaust emissions after extended soak periods was evaluated. Regulated exhaust emissions and estimated NMOG emissions from a light-duty vehicle (operating on a blend of 85% denatured ethanol and 15% gasoline and equipped with the TA-CC4 test article) were determined utilizing the chassis dynamometer portion of the FTP. Five different combinations of vehicle preconditioning type and soak period duration were evaluated. Some of the findings are summarized below.

- Compared to a similar but uninsulated catalyst, reductions of more than 90% were observed for HC and CO emissions, and 75% for NO_x emissions for tests

conducted following extended vehicle preconditioning and soak sequences (18- and 24-hour soak periods).

- Results following an extended vehicle preconditioning sequence and a 36-hour soak showed reductions of more 70% from baseline levels for HC, CO, and NO_x exhaust emissions.
- After conducting a standard vehicle prep and a 36-hour soak, exhaust emissions were found to be approximately 30%, 20%, and 55% lower for the HC, CO, and NO_x emissions, respectively, compared to baseline levels. In addition, THC and CO levels were approximately 20% less than those from testing with a similar, but uninsulated, catalyst configuration while NO_x levels were similar.
- As expected, most of the emission reductions were achieved in the first few minutes of the cold-start phase of the FTP.

Under Task 3, "Technical Support of the University of Dayton Research Institute," SwRI provided technical support to UDRI in its attempt to define correlations between engine-out combustion products identified by SwRI during chassis dynamometer testing, and those found by UDRI during flow tube reactor experiments.

Under Task 4, "Characterization of Exhaust Particulate from Alternative Fuels," particulate and regulated gaseous emissions were characterized from a flexible fuel vehicle operating on five different test fuels. These fuels included Federal reformulated gasoline; M85 - 85% methanol and 15% gasoline; E85 - 85% ethanol denatured with 5% gasoline, and 15% gasoline; LPG meeting HD-5 specifications; and industry-average CNG. The vehicle was operated fuel-rich to simulate a vehicle failure mode for the increased production of particulate matter. Particulate emissions were characterized by total mass and particle size. Ten exhaust emission evaluations were performed using the chassis dynamometer portion of the FTP for light-duty vehicles. Some of the findings are outlined below.

- Even while operating at rich fuel/air equivalence ratios, total particulate mass did not exceed the 1996 light-duty vehicle particulate standard for any of the fuels. In addition, particulate emissions while running rich on LPG and CNG were similar to those measured during the baseline run on gasoline.
- While operating fuel-rich, the trend for total particulate mass was LPG ≈ CNG < E85 ≈ M85 < RFG.
- Approximately one-third of all particulate produced was <0.2μm while operating on RFG, M85, E85, and CNG. While operating on LPG, nearly two-thirds of all particulate was <0.2μm.
- Alcohol fuels produced particle size distributions in relation to the soot-forming ability of the specific alcohol in a flame.
- Gaseous fuels produced a lower percentage of larger particles than the other fuels.

- Particle agglomeration appeared to be one of the mechanisms for larger particle formation; smaller particles agglomerate to form different equivalent aerodynamic diameter ranges depending on the fuel. Predominant particle agglomeration ranges by fuel were:

RFG - greater than 1 μm (44% of total)

M85 - broad range from 0.7 to greater than 3 μm (44% of total)

E85 - 1 to 2 μm (36% of total)

LPG - greater than 3 μm (12% of total)

CNG - greater than 1 μm (43% of total).

I. Introduction

In recent years, both government and industry have increased their efforts to develop and advance technology that allows an effective use of alternative transportation fuels, including LPG, CNG, ethanol, methanol, and butane. However, concerns continue about the potential impact of these fuels on air quality. For alternative fuels to be viable candidates for replacing conventional fuels, it must be demonstrated that their impact on air quality will be no worse than that of existing fuels, and preferably they should show characteristics that will improve air quality. To make this determination, it is necessary to identify the exhaust components that may be generated from alternative fuels and compare them to those from conventional fuels, to investigate new applications of alternative fuel blends, and to evaluate novel aftertreatment systems for use with alternative fuel vehicles.

A. Objective

The objectives of the four separate tasks in this project were: (1) speciation of hydrocarbon exhaust emissions from a light-duty vehicle modified to operate on butane and butane blends; (2) evaluation of NREL's Variable Conductance Vacuum Insulated Catalytic Converter TA-CC4 for the reduction of cold-start FTP exhaust emissions from a Ford FFV Taurus operating on E85 after extended soak periods; (3) support of UDRI in an attempt to define correlations between engine-out combustion products identified by SwRI during chassis dynamometer testing, and those found during flow tube reactor experiments conducted by UDRI; and (4) characterization of small-diameter particulate matter from a Ford Taurus FFV operating in a simulated fuel-rich failure mode on CNG, LPG, M85, E85, and reformulated gasoline.

B. Scope

The four tasks conducted under this program were fully independent, and will be dealt with in detail in the following sections of this report. A brief overview of each task is given below.

1. Task 1 - Hydrocarbon Speciation of Emissions from a Vehicle Operating on Butane-Blended Fuels

Under this task, which was jointly funded by ARCO Products Company, NREL, and SwRI's Department of Emissions Research, regulated exhaust emissions, speciated hydrocarbon emissions, ozone-forming potentials, and specific reactivity factors were determined for 11 test fuels. These fuels included California Phase 2 gasoline, industry average gasoline (RF-A), 100% n-propane, 100% n-butane, and a variety of butane blends. In all, 18 exhaust emissions tests were conducted on a light-duty vehicle, equipped with a gaseous-fuel conversion kit, using the chassis dynamometer portion of the FTP.

2. Task 2 - Evaluation of a Vacuum Insulated Catalyst in Reducing Cold-Start Exhaust Emissions

The effectiveness of NREL's Vacuum Insulated Catalytic Converter TA-CC4 in reducing cold-start exhaust emissions after extended soak periods was evaluated in this task.

Regulated exhaust emissions and estimated NMOG emissions from a light-duty vehicle, operating on a blend of 85% denatured ethanol and 15% gasoline and equipped with TA-CC4, were determined utilizing the chassis dynamometer portion of the FTP. Five different combinations of vehicle preconditioning cycles and soak period durations were evaluated.

3. Task 3 - Technical Support of the UDRI

Under this task, SwRI provided technical support to UDRI in an attempt to define correlations between engine-out combustion products identified by SwRI during chassis dynamometer testing, and those found during flow tube reactor experiments conducted by UDRI.

4. Task 4 - Characterization of Exhaust Particulate from Alternative Fuels

Particulate and regulated gaseous emissions were characterized under this task for a flexible fuel vehicle operating on five different test fuels. These fuels included RFG, M85, E85, LPG meeting HD-5 specifications, and industry-average CNG. The vehicle was operated fuel-rich to simulate a vehicle failure mode for the increased production of particulate matter. Particulate emissions were characterized by total mass and particle size. Ten exhaust emission evaluations were performed using the chassis dynamometer portion of the FTP for light-duty vehicles.

C. Test Vehicles

A detailed description of the test vehicles used in Tasks 1, 2, and 4 may be found in the appropriate task sections of this report.

D. Test Fuels

Details of the specific fuels used in each task of this project can be found in the corresponding task sections of this report.

E. Test Procedures

1. Driving Cycle

All exhaust emissions were evaluated using the chassis dynamometer portion of the FTP for light-duty vehicles as specified in the *Code of Federal Regulations, Title 40, Part 86, Subpart B*. The FTP utilizes the UDDS, which is 1372 in duration. The UDDS is divided into a 505-second segment and an 867-second segment. An FTP is composed of a 505 cold-start transient portion (Bag 1) and an 867 cold stabilized portion (Bag 2), followed by a 10-min soak and then a 505 hot-start transient portion (Bag 3). A summary of the cycle duration, driving distance, and average speed is given in Table 1. The FTP driving schedule with the cold and hot test segments identified is given in Figure 1.

Table 1. Summary of FTP Driving Schedule

Segment	Duration, seconds	Distance, miles	Average Speed, miles/hr
Transient phase	505	3.60	25.7
Stabilized phase	867	3.90	16.2
UDDS	1372	7.50	19.7

Figure 1. FTP Driving Cycle

2. Chassis Dynamometer and CVS

A Clayton Model ECE-50 passenger car dynamometer with a direct drive variable inertia flywheel system was used for all testing. The inertia weight simulates equivalent weights of vehicles from 1,000 lb to 4,875 lb in 125-lb increments. A nominal 10-inch diameter by 16-ft long full-flow exhaust dilution tunnel was used in conjunction with a CVS and a positive displacement pump. This unit has a nominal capacity of 325 scfm. The filter box at the entrance of the dilution tunnel was equipped with an MSA Ultra™ filter to remove small particles, a charcoal filter to absorb background HC, and a MSA Dustfoe™ Space Filter as a backup filter to collect any particles that pass through the first two filters. The average temperature in the dilution tunnel at the particulate sampling zone was 110°F, and did not exceed 125°F during testing. The vehicle hood was maintained fully open during all cycles and was closed during the soak periods. A cooling fan of 5,000 cfm capacity was used in front of the test vehicle to provide air flow during all tests. During soak periods, the fan was turned off.

F. Emissions Sampling and Analysis Procedures

1. Regulated Gaseous Emissions

THC or OMHCE, CO, NO_x, and CO₂ emissions were quantified in a manner consistent with EPA protocols for light-duty emissions testing as given in the *Code of Federal Regulations, Title 40, Part 86, Subpart B*. HC, CO, NO_x, and CO₂ were sampled using proportional exhaust gas samples collected in Tedlar bags. HC were measured using an FID. CO and CO₂ were determined using NDIR instruments. NO_x was measured using a chemiluminescent instrument. Wet absorption techniques were employed to collect methanol, ethanol, and aldehydes for the determination of OMHCE. These techniques are discussed in more detail below.

Methane levels were determined using proportional exhaust gas samples collected in Tedlar bags. A GC equipped with an FID was utilized in accordance with the SAE J1151 procedure to analyze the samples. The GC system was equipped with a packed column to resolve methane from other hydrocarbons in the sample. Samples were introduced into a 5-mL sample loop via a diaphragm pump. For analysis, the valve was switched to the inject position and the helium carrier gas swept the sample from the loop toward the detector through a 61 cm $\times$ 0.3 cm Porapak N column in series with a 122 cm $\times$ 0.3 cm molecular sieve 13X column. As soon as the methane peak passed into the molecular sieve column, the helium flow was reversed through the Porapak N column to vent. Peak areas were compared to an external calibration standard.

2. Particulate Emissions

Total particulate mass was measured using a 47-mm fluorocarbon-coated glass fiber filter, which collected a proportional exhaust sample from the dilution tunnel. Filters were conditioned and weighed in accordance with the appropriate sections of the CFR for light-duty vehicles.⁽¹⁾ Particle size distribution measurements were performed with a Sierra Series 220 In-Stack Cascade Impactor using a 0.375-in. internal-diameter isokinetic sampling nozzle.⁽²⁾ Stages 3 through 8 were used to collect particulate mass in equivalent aerodynamic diameter cut-off ranges from about 0.2 μ m to greater than 3 μ m. The particles were collected on stainless steel substrates. This system uses a patented radial-slot impactor design with four radial rectangular slots 90° apart. The slots between adjacent stages were 45° apart. The last stage was followed by a fluorocarbon-coated glass fiber filter to collect particles below 0.2 μ m.

3. Hydrocarbon Speciation Procedures

NMOG emissions were determined by hydrocarbon speciation. Analytical procedures for conducting the hydrocarbon speciation (C_1 to C_{12} hydrocarbons, aldehydes and ketones, and alcohols) were similar to the CRC Auto/Oil Phase II methods. With these methods, exhaust samples are analyzed for the presence of more than 190 different exhaust species. The sum of the masses of non-methane species is equivalent to the NMOG emissions rate. Three GC procedures and one HPLC procedure were used to identify and quantify specific compounds. A brief description of these procedures is given below.

a. C_1 - C_4 Species

The first GC procedure allowed the separation and determination of exhaust concentrations of C_1 - C_4 individual hydrocarbon species, including methane; ethane; ethylene; acetylene; propane; propylene; propadiene; butane; trans-2-butene; 1-butene; 2-methylpropene; 2,2-dimethylpropane; propyne; 1,3-butadiene; 2-methylpropane; 1-butyne; and cis-2-butene. Bag samples were analyzed using a gas chromatograph equipped with an FID. The gas chromatograph system utilized a Hewlett-Packard Model 5890 Series II GC with an FID, two pneumatically operated and electrically controlled valves, and two analytical columns. The carrier gas was helium. An external multiple component standard in zero air was used to quantify the results. Detection limits for the procedure were on the order of 5 ppbC in dilute exhaust for all compounds.

b. C₅-C₁₂ Species

The second GC procedure provided separation and exhaust concentrations for more than 100 C₅-C₁₂ individual HC compounds. Bag samples were analyzed using a gas chromatograph equipped with an FID. The GC system utilized a Hewlett-Packard Model 5890 Series II GC with an FID, a pneumatically operated and electrically controlled valve, and an analytical column. The carrier gas was helium. An external multiple component standard in zero air was used to quantify the results. Detection limits for the procedure were on the order of 10 ppbC in dilute exhaust for all compounds.

c. Benzene and Toluene

The third GC procedure used a separate system configured similarly to those mentioned above to determine individual concentrations of benzene and toluene according to the CRC Auto/Oil Phase II Protocol.

d. Aldehydes and Ketones

An HPLC procedure was utilized for the analysis of aldehydes and ketones. Samples were collected by bubbling dilute exhaust at a nominal flowrate of 4 L/min through chilled glass impingers containing an acetonitrile solution of 2,4-DNPH and perchloric acid. For analysis, a portion of the acetonitrile solution was injected into a liquid chromatograph equipped with a UV detector. External standards of the aldehyde and ketone DNPH derivatives were used to quantify the results. The aldehydes and ketones measured were: formaldehyde, acetaldehyde, acrolein, acetone, propionaldehyde, crotonaldehyde, isobutyraldehyde/methylethylketone (not resolved from each other during normal operating conditions, and so reported together), benzaldehyde, and hexanaldehyde. Detection limits for this procedure were on the order of 0.005 ppm aldehyde or ketone in dilute exhaust.

4. Alcohols

The collection of methanol and ethanol in exhaust was accomplished by bubbling exhaust through glass impingers. Each impinger contained 25 mL of deionized water maintained at ice-bath temperature. Exhaust samples were collected continuously during test cycles at a nominal flow rate of 4 L/min through a Teflon sample line held at 102°C (215°F). For analysis, a 1-μL portion of the sample was injected into the GC equipped with an FID and an analytical column. The analytical column was a 0.53-mm × 30-m capillary column with a 1-μm film of DB-WAX as the stationary phase. The GC carrier gas was helium at a column head pressure of approximately 4 psi. The column oven temperature was maintained at 70°C for 1 min, then ramped to 110°C at 10°/min, and held at 110°C for 5 min. External standards in deionized water were used to quantify the results. Detection limits for this procedure were on the order of 0.06 ppm in dilute exhaust.

II. Task 1- Hydrocarbon Speciation of Emissions from a Vehicle Operating on Butane-Blended Fuels

A. Background

Butane has been an important gasoline blending component for many years. With a road octane number of 92 and a high blending vapor pressure, butane has been used to upgrade the octane of gasoline blends and to aid in wintertime cold starting. Because of RFG requirements for reduced maximums in fuel vapor pressure, industry has had to remove increasing amounts of butane from the gasoline pool. However, butane has many of the attributes of propane, and tends to be in slight oversupply in the United States. Thus, butane appears to be an attractive candidate for use as an alternative fuel.

LPG currently is the most widely used alternative fuel in the United States. The primary constituent of LPG used for this purpose is propane. Propane has many attributes that make it an attractive vehicular fuel. Because it is a single relatively simple species, engines and aftertreatment systems can be designed to burn it cleanly. It also reacts very slowly in the atmosphere so it tends to form less ground-level ozone in cities. Propane is also stored on board as a liquid at ambient temperature in a pressurized system; therefore, by definition, it produces no evaporative emissions. As a liquid, it has a good volumetric energy content, improving vehicle range in comparison to many of the other alternative fuels.

However, barriers exist that may inhibit the growth of propane as a motor fuel. There are other developed, mature markets for propane such as its use as a heating fuel or as a chemical feedstock. Propane is produced as a side product from natural gas production or petroleum refinery processing. Additional demand could create shortages and/or price increases, because it is unlikely that either of these two sources would be ramped up solely to produce more propane. Although vehicle range is good, it remains three-fourths that of conventional gasoline vehicles. These constraints have limited LPG vehicle implementation.

A thoughtful consideration of the use of butane as a motor fuel shows that it should have many of the positive attributes of propane. Butane is also a single, relatively simple chemical species, so theoretically, engines and exhaust catalysts could be optimized for low emissions with its use. It also has relatively low reactivity in the atmosphere, and like propane, would be stored on board as a pressurized liquid. Consequently, a butane-fueled vehicle should also have no evaporative emissions. Butane has a greater volumetric energy content than propane, so vehicle range could be extended over that of propane. Because butane storage pressure is lower than that of propane, there is an opportunity to use the same equipment for delivery and refueling of butane as is currently used for propane.

Butane tends to be in slight oversupply on a yearly basis in the United States, and this excess should grow larger as gasoline volatility is reduced. The imbalance is projected to equal as much as 100,000 barrels per day this year and increase by 20% by the year 2000.⁽³⁾ Although butane is used as a chemical feedstock, it has not been used extensively as a heating fuel as has propane. Like propane, butane production is associated with natural gas production and petroleum refining. However, because of current configurations for refining reformulated gasoline, it is easier to increase the amount of butane from the refinery stream than it is for propane. This flexibility could allow butane supply to more easily balance demand than propane.

B. Objectives

In order to investigate the use of butane as a vehicular fuel, ARCO Products Company (ARCO), NREL, and SwRI jointly conducted a project with the following objectives: (1) determine if a current technology vehicle could be properly operated on butane or on butane-blended fuels using currently available LPG conversion kit technology; (2) determine regulated FTP emissions from a "converted" vehicle operating on gasoline, LPG, and butane; (3) determine regulated FTP emissions from the conversion vehicle operating on various butane blends that could potentially be distributed as real world fuels; (4) conduct detailed hydrocarbon speciation analyses on FTP-generated exhaust from the converted vehicle operating on each fuel, to allow calculation of fuel-specific OFPs using MIRs adopted by CARB⁽⁴⁾; and (5) use the calculated OFPs to determine a specific reactivity and RAF for each fuel tested⁽⁴⁾.

C. Approach

The vehicle selected for this program was a 1994 Pontiac Grand Am, California emission-certified to be a TLEV. This vehicle was chosen because of its widespread distribution, its availability, and because it was representative of current technology. Prior to converting the vehicle to operate on butane, it was subjected to 1,000 miles of operation over the Modified Durability Driving Schedule to provide a limited amount of vehicle break-in and to stabilize the catalyst. Following mileage accumulation, emission tests were conducted using CP2 gasoline to ensure proper vehicle operation and to obtain baseline emission data prior to vehicle conversion.

Next, the vehicle was converted by IMPCO Technologies, Inc. to operate in a dual-fuel mode using gasoline or butane/LPG. Baseline emission tests were again conducted using California Phase 2 gasoline to ensure that the vehicle was operating in the same manner as before the conversion. In addition, emissions tests were conducted using RF-A gasoline, a fuel used by CARB as the reference point for determining RAFs. Subsequently, vehicle emission tests were conducted using 100% n-propane, and without any fuel control system adjustments, 100% n-butane. These emissions data were then used as a comparison to reactivity data currently available from CARB for LPG fuel and for CP2. In addition, data were also used to determine if vehicles operating on propane could be operated on butane (without modification or adjustment of any kind) and still provide acceptable emissions. Following these initial emission tests, the converted vehicle was operated on a variety of butane blends, which included mixtures with propane, other C₄ components, and pentane. During the course of testing, the vehicle was again tested on CP2 and 100% n-butane to ensure that no drift in emission levels had occurred. To ensure that the vehicle adaptive learning system was stable, an extended vehicle prep cycle was run after each fuel change. This extended prep cycle was similar to that used in the CRC Auto/Oil Research Program.

D. Vehicle Description and Conversion

The vehicle used for testing in this program was a 1994 Pontiac Grand Am equipped with a California emissions system, and certified to be a TLEV. A more detailed description of the vehicle is provided in Table 2.

Table 2. Vehicle Description

Item	Configuration of Pontiac Grand Am
Model year	1994
Body style	4-door sedan
Transmission	Automatic-4
VIN	1G2NE1538RM542537
Tires	P185/75 R14
Accessories	Power locks, steering, brakes, air conditioning
Engine family	R1G2.3V7G2EA
Engine displacement	2.3L (138 CID)
Number of cylinders	4
Fuel system	MPFI
Ignition system	Electronic
Emission control system	Underbody three-way catalyst, EGR, knock sensor
Chassis dynamometer: Inertia setting Road load @ 50 mph	1530 kg (3375 lb) 4.9 kW (6.6 hp)

The vehicle was converted to operate on butane for this project by IMPCO Technologies, Inc. using commercially available equipment. Conversion equipment included an ADP controller and a carburetion system consisting of a carburetor and converter. The IMPCO ADP is a closed-loop fuel controller designed for use with LPG, CNG, or LNG. It incorporates an engine MAP sensor and engine speed input. Feedback information from the EGO sensor is used to update the digital block learn memory. This strategy is similar to fuel control strategies used by OEMs. The carburetor is an air valve design that utilizes a relatively constant pressure drop to draw fuel into the system. The air metering device (or mixer) is self-contained (i.e., it requires no idle vacuum line to the intake manifold). The converter is a combined two-stage regulator and vaporizer that uses engine coolant circulated through a heat exchanger to assist fuel vaporization⁽⁵⁾. During emission testing using the IMPCO system, the alternative fuels were supplied as liquids from an external tank to the vaporizer. To maintain sufficient fuel pressure, a heating blanket was used to elevate the tank temperature.

E. Test Fuels

Eleven fuels were used in this project. Two of the fuels were gasolines: CP2 and RF-A (see Table 3). The remaining nine fuels were either single components (propane or butane), or were butane blends prepared to cover a broad range of LPG that could potentially be marketed. These nine fuels were nominally 100% n-butane, 100% propane, 90% n-butane/10% isobutane, 90% n-butane/10% mixed butenes (roughly equal amounts of isobutylene, 1-butene, cis-2-butene, and trans-2-butene), 60% n-butane/40% isobutane, 80% n-butane/20% propane, 90% n-butane/10% pentane, 50% n-butane/50% propane, and 20% n-butane/80% propane. A summary of the composition of each of these fuels is given in Table 4.

F. Emission Test Procedures

The Pontiac Grand Am was evaluated using the chassis dynamometer portion of the FTP for light-duty vehicles. A Clayton Model ECE-50 passenger car dynamometer in conjunction with a positive displacement pump constant volume sampler was used for all testing. THC, CO, NO_x, and CO₂ emissions were collected as dilute exhaust in Tedlar gas sample bags, in a manner consistent with EPA protocols for light-duty emission testing. Fuel economy was determined by carbon balance. Hydrocarbon speciation analysis and determination of OFP and specific reactivities were conducted in a manner consistent with Auto/Oil Phase 2 procedures and CARB methodologies. A more detailed description of these procedures is presented in Sections I.E and I.F.

G. Emission Test Results

1. Baseline Emissions

To establish baseline FTP emissions prior to converting the vehicle to operate in a dual-fuel mode (i.e., either gasoline or alternative fuels) and to ensure that the vehicle was operating properly after conversion and throughout the project, duplicate FTPs on CP2 and 100% n-butane were conducted. Complete hydrocarbon speciation was conducted for one of the duplicate tests. Table 5 contains a summary of *average* bag 1, bag 2, bag 3, and composite FTP emissions. Included in this summary are values representing the average of the duplicate test points for THC by FID, CO, NO_x, and fuel economy. Values given for NMOG emissions were determined for one of the two tests (i.e., not an average) using hydrocarbon speciation data up to C₁₂. Based on data presented in Table 5, the conversion did not appear to significantly change vehicle emissions or performance. Furthermore, emission test results for CP2 run during the project appeared similar to the pre-conversion and post-conversion results, suggesting that the vehicle performance remained consistent throughout the project.

Table 3. Summary of RF-A and CP2 Fuel Properties

Fuel Property	RF-A	CP2
RVP, psi	9.0	6.8
HC Composition, vol %		
Aromatics	32.9	26.6
Olefins	8.3	5.3
Saturates	58.8	68.1
MON	83.7	88.1
RON	92.9	97.5
Distillation temp., °F		
IBP	98	90
10%	131	137
50%	219	208
90%	329	292
EP	414	380
Oxygenate, vol %	0.0	11.2 ^a
Benzene, vol %	1.4	0.8
Sulfur, ppm	348	39
Specific gravity	0.7461	0.7385
Carbon, wt. %	86.4	84.3
Hydrogen, wt. %	13.6	13.7
Oxygen, wt. %	0.0	2.0
^a MTBE		

Table 4 . Summary of Alternative Fuel Compositions

Nominal Fuel Blend	Analysis Results, mole percent			
	Propane	n-Butane	Isobutane	Other
100% n-butane	nd	100.0	nd	nd
100% propane	100.0	nd	nd	nd
90% n-butane/10% isobutane	nd	90.3	9.7	nd
90% n-butane/10% mixed butenes	nd	89.3	nd	10.7 ^a
60% n-butane/40% isobutane	0.1	60.9	39.0	nd
80% n-butane/20% propane	22.2	77.8	nd	nd
90% n-butane/10% pentane	nd	91.2	nd	8.8 ^b
50% n-butane/50% propane	53.4	46.6	nd	nd
20% n-butane/80% propane	82.1	17.9	nd	nd
nd - none detected				
^a 2.6% isobutylene, 2.6% 1-butene, 2.8% cis-2-butene, 2.7% trans-2-butene				
^b n-pentane				

Table 5. Summary of Pre- and Post-Conversion Average Regulated Emissions

Fuel	Test Cycle	Average Emissions, g/mi				Fuel Economy mi/gal
		THC	NMOG ^a	CO	NO _x	
CP2 (pre-conversion)	Bag 1	0.273	0.227	2.795	0.200	21.87
	Bag 2	0.008	0.007	0.246	0.002	20.78
	Bag 3	<u>0.053</u>	<u>0.038</u>	<u>0.736</u>	<u>0.017</u>	<u>24.27</u>
	FTP	0.075	0.061	0.910	0.047	21.89
CP2 (post-conversion)	Bag 1	0.248	0.196	2.438	0.275	21.16
	Bag 2	0.011	0.009	0.109	0.016	20.81
	Bag 3	<u>0.043</u>	<u>0.025</u>	<u>0.380</u>	<u>0.022</u>	<u>24.27</u>
	FTP	0.069	0.052	0.668	0.072	21.76
CP2 (during testing)	Bag 1	0.238	0.194	2.711	0.239	21.70
	Bag 2	0.005	0.004	0.085	0.025	21.09
	Bag 3	<u>0.036</u>	<u>0.023</u>	<u>0.453</u>	<u>0.027</u>	<u>24.79</u>
	FTP	0.062	0.049	0.734	0.070	22.14

^a Values for NMOG are based on one test for each fuel.

2. Candidate Fuel Emissions

Following vehicle conversion and testing using CP2, duplicate FTP tests were conducted using each of the remaining ten fuels with the OEM catalytic converters still installed on the vehicle. In addition, duplicate emission tests were also conducted without the catalysts to determine engine-out emissions using 100% n-butane, 100% propane, 50% n-butane/50% propane, and CP2. Complete hydrocarbon speciation was conducted for one of each of the duplicate tests. Table 6 contains a summary of *average* bag 1, bag 2, bag 3, and composite FTP emissions for each configuration and fuel tested following vehicle conversion. Individual FTP regulated emission test results for all emission tests conducted during this project are given in Appendix A.

Several observations can be made based on an analysis of the regulated emissions data (summarized in Table 6) with the exhaust system in the OEM configuration (i.e., with catalysts). FTP THC emission rates for all fuels tested (including CP2 and RF-A) ranged between about 0.06 and 0.08 g/mi. FTP NMOG emissions for CP2 (0.052 g/mi) were slightly lower than those for RF-A (0.054 g/mi), but both were still equal to or lower than several of the alternative fuels before adjustment for reactivity was taken into account. For the alternative fuels, FTP NMOG emissions (non-reactivity adjusted) were lowest for the 100% propane (0.042 g/mi) and highest for the 100% n-butane (0.066 g/mi). FTP CO emissions were lowest for the 100% propane fuel (0.319 g/mi) and were highest for the 90% n-butane/10% n-pentane blend (2.052 g/mi). FTP NO_x emissions for all of the alternative fuels except 100% propane ranged between 0.011 and 0.017 g/mi. However, the FTP NO_x emissions for the 100% propane fuel (0.047 g/mi) remained lower than the NO_x emissions for CP2 (0.072 g/mi) and RF-A (0.071 g/mi).

Based on the Auto/Oil method of calculating equivalence ratio⁽⁶⁾, it appears that the converted vehicle was operating slightly rich of stoichiometric for all of the alternative fuels except 100% propane. This observation is consistent with the higher CO emissions

Table 6. Summary of Average Regulated Emissions Data

Fuel	Test Cycle	Average Emissions, g/mi				Fuel Economy mi/gal
		THC	NMOG ^a	CO	NO _x	
CP2 (after conversion)	Bag 1	0.248	0.196	2.438	0.275	21.16
	Bag 2	0.011	0.009	0.109	0.016	20.81
	<u>Bag 3</u>	<u>0.043</u>	<u>0.025</u>	<u>0.380</u>	<u>0.022</u>	<u>24.27</u>
	FTP	0.069	0.052	0.668	0.072	21.76
RF-A	Bag 1	0.261	0.209	2.333	0.304	21.84
	Bag 2	0.010	0.006	0.185	0.003	21.01
	<u>Bag 3</u>	<u>0.045</u>	<u>0.031</u>	<u>0.507</u>	<u>0.023</u>	<u>24.52</u>
	FTP	0.072	0.054	0.721	0.071	22.06
100% n-Butane	Bag 1	0.273	0.251	4.237	0.052	17.43
	Bag 2	0.009	0.002	0.695	0.002	16.54
	<u>Bag 3</u>	<u>0.074</u>	<u>0.044</u>	<u>2.015</u>	<u>0.002</u>	<u>19.91</u>
	FTP	0.081	0.065	1.787	0.012	17.56
100% Propane	Bag 1	0.221	0.174	0.800	0.098	16.45
	Bag 2	0.009	0.004	0.166	0.015	15.49
	<u>Bag 3</u>	<u>0.025</u>	<u>0.012</u>	<u>0.248</u>	<u>0.066</u>	<u>18.85</u>
	FTP	0.057	0.042	0.319	0.047	16.52
90% n-Butane 10% Isobutane	Bag 1	0.260	0.181	4.603	0.032	17.81
	Bag 2	0.007	0.002	0.724	0.001	16.68
	<u>Bag 3</u>	<u>0.049</u>	<u>0.018</u>	<u>1.239</u>	<u>0.009</u>	<u>20.58</u>
	FTP	0.071	0.044	1.661	0.010	17.86
90% n-Butane 10% Mixed Butenes	Bag 1	0.233	0.174	3.838	0.049	17.95
	Bag 2	0.008	0.003	0.707	0.002	17.26
	<u>Bag 3</u>	<u>0.053</u>	<u>0.031</u>	<u>1.462</u>	<u>0.001</u>	<u>20.39</u>
	FTP	0.067	0.045	1.547	0.011	18.17
60% n-Butane 40% Isobutane	Bag 1	0.242	0.198	4.051	0.045	17.38
	Bag 2	0.020	0.007	0.739	0.000	16.50
	<u>Bag 3</u>	<u>0.059</u>	<u>0.033</u>	<u>1.321</u>	<u>0.002</u>	<u>20.06</u>
	FTP	0.077	0.054	1.583	0.010	17.56
80% n-Butane 20% Propane	Bag 1	0.224	0.207	3.093	0.051	17.51
	Bag 2	0.006	0.002	0.433	0.003	16.57
	<u>Bag 3</u>	<u>0.075</u>	<u>0.052</u>	<u>1.467</u>	<u>0.004</u>	<u>20.16</u>
	FTP	0.071	0.058	1.272	0.013	17.65
90% n-Butane 10% n-Pentane	Bag 1	0.270	0.194	5.683	0.045	17.80
	Bag 2	0.007	0.005	0.730	0.015	16.94
	<u>Bag 3</u>	<u>0.066</u>	<u>0.030</u>	<u>1.800</u>	<u>0.017</u>	<u>20.80</u>
	FTP	0.078	0.051	2.052	0.017	18.03

Table 6 (Concluded). Summary of Average Regulated Emissions Data

Fuel	Test Cycle	Average Emissions, g/mi				Fuel Economy mi/gal
		THC	NMOG ^a	CO	NO _x	
50% n-Butane 50% Propane	Bag 1	0.227	0.182	1.241	0.068	16.91
	Bag 2	0.004	0.004	0.350	0.004	15.82
	Bag 3	<u>0.056</u>	<u>0.036</u>	<u>0.769</u>	<u>0.005</u>	<u>19.63</u>
	FTP	0.065	0.050	0.651	0.017	16.97
20% n-Butane 80% Propane	Bag 1	0.205	0.197	1.278	0.088	16.17
	Bag 2	0.007	0.005	0.365	0.021	15.32
	Bag 3	<u>0.039</u>	<u>0.018</u>	<u>0.591</u>	<u>0.030</u>	<u>18.69</u>
	FTP	0.058	0.049	0.619	0.036	16.33
100% n-Butane (second set of runs)	Bag 1	0.257	0.184	5.401	0.041	17.64
	Bag 2	0.003	0.001	0.697	0.006	16.84
	Bag 3	<u>0.028</u>	<u>0.030</u>	<u>1.757</u>	<u>0.015</u>	<u>20.52</u>
	FTP	0.072	0.047	1.984	0.016	17.91
Engine-out (no catalyst) Emissions						
100% n-Butane	Bag 1	1.244	1.274	16.021	4.541	17.45
	Bag 2	1.082	1.066	11.413	3.680	16.83
	Bag 3	<u>0.975</u>	<u>0.942</u>	<u>12.300</u>	<u>4.403</u>	<u>20.41</u>
	FTP	1.086	1.075	12.623	4.061	17.85
100% Propane	Bag 1	1.015	0.969	7.946	4.331	16.56
	Bag 2	0.942	0.915	7.803	3.672	15.46
	Bag 3	<u>0.795</u>	<u>0.761</u>	<u>8.022</u>	<u>4.223</u>	<u>18.17</u>
	FTP	0.915	0.884	7.882	3.958	16.37
50% n-Butane 50% Propane	Bag 1	1.067	1.070	9.662	4.316	17.47
	Bag 2	1.025	0.971	9.187	3.707	16.51
	Bag 3	<u>0.836</u>	<u>0.834</u>	<u>9.280</u>	<u>4.210</u>	<u>19.96</u>
	FTP	0.951	0.954	9.281	3.961	17.56
^a Values for NMOG are based on one test for each fuel.						

measured for all other alternative fuels compared to 100% propane. However, an inspection of the results indicates that rich operation accounts for only some of the extremely low NO_x results observed for the higher concentration butane fuels. While equivalence ratio accounts for nearly all of the variation in CO emissions for these fuels, NO_x emissions are correlated much less strongly.

It also appears that the volatility of the alternative fuels may have played a role in bag 1 and bag 3 FTP THC emissions. In general, as fuel volatility increased, start-up emissions decreased. This observation is logical because the IMPCO alternative fuel management system uses engine coolant to vaporize the fuel. Less volatile fuels would, therefore, be less likely to fully vaporize during the start-up phases of the FTP when the engine coolant is not as hot. Because catalyst light-off times should not vary significantly for similar fuels, this fuel volatility hypothesis could partially explain the greater amount of unburned fuel emissions found in bags 1 and 3 with the lower volatility fuels.

As expected, fuel economy of each of the alternative fuels was related to its respective liquid density and heat of combustion (energy content). The average FTP fuel economy for the 100% n-butane fuel (17.56 mi/gal) was 81% that of CP2 (21.76 mi/gal). Fuel economy for the 100% propane fuel (16.52 mi/gal) was 76% that of CP2. All of the other alternative fuels had FTP fuel economies within this range.

3. Toxic Emissions

The Clean Air Act Amendments of 1990 define four toxics of importance for gasoline vehicles. They are 1,3-butadiene, benzene, formaldehyde, and acetaldehyde. Table 7 provides bag 1, bag 2, bag 3, and composite FTP emission rates for these compounds for each fuel tested. The last column of Table 7 is the summed total of all toxics emitted for each fuel.

None of the butane fuels produced higher FTP levels of 1,3-butadiene, including the 90% n-butane/10% mixed butenes blend, than the gasolines. The 90%/10% mixed butenes blend did produce slightly higher bag 1 emissions of 1,3-butadiene (0.4 mg/mi) than the other alternative fuels (0.2 mg/mi or less), but no significant amounts of 1,3-butadiene were detected in bags 2 or 3. For the gasoline fuels, FTP emissions of 1,3-butadiene were three to four times those of the 90% n-butane/10% mixed butenes blend.

As might be expected, FTP benzene emissions for the alternative fuels were very low (0.1 to 0.3 mg/mi) compared to benzene emissions for CP2 or RF-A (2.4 and 3.7 mg/mi, respectively). Formaldehyde and acetaldehyde emissions were similar for all of the gasoline and alternative fuels tested in the OEM exhaust configuration. Engine-out formaldehyde emissions, however, were high for the alternative fuels, indicating that it is a significant combustion product. On average, FTP total toxics were roughly three to four times higher for the gasoline fuels compared to the alternative fuels. It is worth noting that the levels of toxic emissions observed during this study were extremely low for all fuels evaluated, including the gasolines, when the vehicle was in the OEM exhaust configuration.

4. Speciated Hydrocarbon Emissions

Each hydrocarbon speciation conducted in this project resulted in a five-page table of individual organics emitted, from methane through C₁₂ compounds (see Appendix B). For gasolines, many of the 190 compounds analyzed were detected at measurable levels. For the alternative fuels, comparatively few compounds were found. To allow for a comparison of emissions on the basis of OFP, CARB has published a list of MIRs for a number of VOCs, defined as grams of ozone per gram of specific VOC emitted.⁽⁴⁾ These MIRs were either estimated by CARB or derived from smog chamber experiments based on Los Angeles atmospheric conditions. Each MIR can be multiplied by the mass emission rate of that compound to yield potential mass of ozone (O₃) formed. The summation of these products yields the OFP for a specific fuel (i.e., $\text{g O}_3/\text{mi} = \sum (\text{VOC}_i \times \text{MIR}_i)$). Both the masses of the individual organics and the potential masses of ozone formed were summed over all the compounds emitted during each test.

Values for NMOG, calculated ozone formed, specific reactivity, RAFs, and reactivity-adjusted NMOG for each fuel combination are summarized in Table 8. RAFs and reactivity-adjusted NMOG emissions have not been given for tests conducted without a

Table 7. Summary of Toxic Emissions Data

Fuel	Test Cycle	Emissions, mg/mi			
		1,3-Butadiene	Benzene	Formaldehyde	Acetaldehyde
CP2 (after conversion)	Bag 1	1.4	7.8	2.0	0.7
	Bag 2	0.0	0.2	0.0	0.0
	<u>Bag 3</u>	<u>0.0</u>	<u>2.5</u>	<u>0.0</u>	<u>0.0</u>
	FTP	0.3	2.4	0.4	0.2
RF-A	Bag 1	1.6	13.4	1.7	0.9
	Bag 2	0.0	0.0	0.0	0.0
	<u>Bag 3</u>	<u>0.0</u>	<u>3.3</u>	<u>0.0</u>	<u>0.0</u>
	FTP	0.4	3.7	0.4	0.2
100% n-Butane	Bag 1	0.2	0.5	2.1	0.6
	Bag 2	0.0	0.0	0.0	0.0
	<u>Bag 3</u>	<u>0.0</u>	<u>0.2</u>	<u>0.4</u>	<u>0.0</u>
	FTP	0.0	0.1	0.6	0.1
100% Propane	Bag 1	0.0	0.3	1.3	0.8
	Bag 2	0.0	0.2	0.0	0.0
	<u>Bag 3</u>	<u>0.0</u>	<u>0.2</u>	<u>0.0</u>	<u>0.0</u>
	FTP	0.0	0.2	0.3	0.2
90% n-Butane 10% Isobutane	Bag 1	0.1	0.2	1.5	0.3
	Bag 2	0.0	0.1	0.0	0.0
	<u>Bag 3</u>	<u>0.0</u>	<u>0.0</u>	<u>0.1</u>	<u>0.0</u>
	FTP	0.0	0.1	0.3	0.1
90% n-Butane 10% Mixed Butenes	Bag 1	0.4	0.3	1.8	0.6
	Bag 2	0.0	0.3	0.0	0.0
	<u>Bag 3</u>	<u>0.0</u>	<u>0.4</u>	<u>0.1</u>	<u>0.0</u>
	FTP	0.1	0.3	0.4	0.1
60% n-Butane 40% Isobutane	Bag 1	0.0	0.2	1.7	0.5
	Bag 2	0.0	0.3	0.2	0.0
	<u>Bag 3</u>	<u>0.0</u>	<u>0.3</u>	<u>0.2</u>	<u>0.0</u>
	FTP	0.0	0.3	0.5	0.1
80% n-Butane 20% Propane	Bag 1	0.0	0.2	1.7	0.8
	Bag 2	0.0	0.4	0.0	0.0
	<u>Bag 3</u>	<u>0.0</u>	<u>0.3</u>	<u>0.2</u>	<u>0.0</u>
	FTP	0.0	0.3	0.4	0.2
90% n-Butane 10% n-Pentane	Bag 1	0.1	0.5	1.6	0.7
	Bag 2	0.0	0.2	0.3	0.0
	<u>Bag 3</u>	<u>0.0</u>	<u>0.1</u>	<u>0.4</u>	<u>0.0</u>
	FTP	0.0	0.3	0.6	0.1

Table 7 (Concluded). Summary of Toxic Emissions Data

Fuel	Test Cycle	Emissions, mg/mi			
		1,3-Butadiene	Benzene	Formaldehyde	Acetaldehyde
50% n-Butane 50% Propane	Bag 1	0.1	0.3	1.6	1.1
	Bag 2	0.0	0.3	0.2	0.7
	<u>Bag 3</u>	<u>0.0</u>	<u>0.1</u>	<u>0.4</u>	<u>0.0</u>
	FTP	0.0	0.2	0.6	0.6
20% n-Butane 80% Propane	Bag 1	0.1	0.2	0.7	0.7
	Bag 2	0.0	0.2	0.2	0.0
	<u>Bag 3</u>	<u>0.0</u>	<u>0.1</u>	<u>0.2</u>	<u>0.0</u>
	FTP	0.0	0.2	0.3	0.2
100% n-Butane (second set of runs)	Bag 1	0.1	0.2	1.4	0.7
	Bag 2	0.0	0.0	0.1	0.1
	<u>Bag 3</u>	<u>0.0</u>	<u>0.0</u>	<u>0.1</u>	<u>0.0</u>
	FTP	0.0	0.0	0.4	0.2
Engine-out (no catalyst) Emissions					
100% n-Butane	Bag 1	1.9	0.7	39.0	9.1
	Bag 2	2.0	0.6	44.8	9.6
	<u>Bag 3</u>	<u>1.4</u>	<u>1.2</u>	<u>37.1</u>	<u>8.0</u>
	FTP	1.8	0.8	41.4	9.1
100% Propane	Bag 1	0.9	0.3	16.6	7.6
	Bag 2	0.8	0.6	21.7	8.0
	<u>Bag 3</u>	<u>0.9</u>	<u>0.3</u>	<u>21.7</u>	<u>6.1</u>
	FTP	0.8	0.4	20.7	7.4
50% n-Butane 50% Propane	Bag 1	1.4	0.6	36.6	8.2
	Bag 2	1.3	0.3	41.8	8.3
	<u>Bag 3</u>	<u>1.2</u>	<u>0.5</u>	<u>33.2</u>	<u>6.7</u>
	FTP	1.3	0.4	38.4	7.9

Table 8. Summary of Specific Reactivity and Adjusted NMOG Emissions

Fuel	Test Cycle	NMOG, g/mi	Potential Ozone (O₃), g/mi	Specific Reactivity, g O₃/g NMOG	FTP RAF	Reactivity Adjusted NMOG, g/mi
CP2 (after conversion)	Bag 1	0.194	0.72	3.72	0.98 ^a	0.051
	Bag 2	0.009	0.02	1.87		
	<u>Bag 3</u>	<u>0.025</u>	<u>0.05</u>	<u>2.19</u>		
	FTP	0.052	0.17	3.35		
RF-A	Bag 1	0.206	0.80	3.87	1.05 ^a	0.057
	Bag 2	0.006	0.01	2.24		
	<u>Bag 3</u>	<u>0.031</u>	<u>0.08</u>	<u>2.74</u>		
	FTP	0.054	0.20	3.59		
100% n-Butane	Bag 1	0.251	0.48	1.89	0.62 ^b	0.040
	Bag 2	0.002	0.00	2.00		
	<u>Bag 3</u>	<u>0.044</u>	<u>0.09</u>	<u>2.10</u>		
	FTP	0.065	0.13	1.93		
100% Propane	Bag 1	0.174	0.23	1.30	0.41 ^b	0.017
	Bag 2	0.004	0.01	1.80		
	<u>Bag 3</u>	<u>0.012</u>	<u>0.01</u>	<u>0.95</u>		
	FTP	0.042	0.05	1.29		
90% n-Butane 10% Isobutane	Bag 1	0.181	0.37	2.06	0.65 ^b	0.029
	Bag 2	0.002	0.00	2.48		
	<u>Bag 3</u>	<u>0.018</u>	<u>0.03</u>	<u>1.70</u>		
	FTP	0.044	0.09	2.03		
90% n-Butane 10% Mixed Butenes	Bag 1	0.174	0.44	2.52	0.77 ^b	0.035
	Bag 2	0.003	0.00	1.77		
	<u>Bag 3</u>	<u>0.031</u>	<u>0.06</u>	<u>1.97</u>		
	FTP	0.045	0.11	2.40		
60% n-Butane 40% Isobutane	Bag 1	0.198	0.41	2.07	0.64 ^b	0.034
	Bag 2	0.007	0.01	1.85		
	<u>Bag 3</u>	<u>0.033</u>	<u>0.06</u>	<u>1.71</u>		
	FTP	0.054	0.11	1.99		
80% n-Butane 20% Propane	Bag 1	0.207	0.34	1.65	0.53 ^b	0.031
	Bag 2	0.002	0.00	2.01		
	<u>Bag 3</u>	<u>0.052</u>	<u>0.09</u>	<u>1.66</u>		
	FTP	0.058	0.10	1.66		
90% n-Butane 10% n-Pentane	Bag 1	0.194	0.41	2.12	0.66 ^b	0.034
	Bag 2	0.005	0.01	2.59		
	<u>Bag 3</u>	<u>0.030</u>	<u>0.05</u>	<u>1.67</u>		
	FTP	0.051	0.11	2.07		

Table 8 (Concluded). Summary of Specific Reactivity and Adjusted NMOG Emissions

Fuel	Test Cycle	NMOG, g/mi	Potential Ozone (O ₃), g/mi	Specific Reactivity, g O ₃ /g NMOG	FTP RAF	Reactivity Adjusted NMOG, g/mi
50% n-Butane 50% Propane	Bag 1	0.182	0.27	1.48		
	Bag 2	0.004	0.01	3.23		
	Bag 3	<u>0.036</u>	<u>0.04</u>	<u>1.06</u>		
	FTP	0.050	0.07	1.47	0.47^b	0.024
20% n-Butane 80% Propane	Bag 1	0.197	0.27	1.35		
	Bag 2	0.005	0.00	0.98		
	Bag 3	<u>0.018</u>	<u>0.02</u>	<u>0.89</u>		
	FTP	0.049	0.06	1.29	0.41^b	0.020
100% n-Butane (second set of runs)	Bag 1	0.184	0.39	2.12		
	Bag 2	0.001	0.00	2.88		
	Bag 3	<u>0.030</u>	<u>0.06</u>	<u>1.89</u>		
	FTP	0.047	0.10	2.09	0.67^b	0.031
Engine-out (no catalyst) Emissions						
100% n-Butane	Bag 1	1.274	3.91	3.07		
	Bag 2	1.066	3.64	3.41		
	Bag 3	0.942	2.95	3.13		
	FTP	1.075	3.50	3.26	n/a	n/a
100% Propane	Bag 1	0.969	2.28	2.35		
	Bag 2	0.915	2.42	2.64		
	Bag 3	0.761	1.97	2.59		
	FTP	0.884	2.26	2.56	n/a	n/a
50% n-Butane 50% Propane	Bag 1	1.070	2.78	2.60		
	Bag 2	0.971	2.87	2.95		
	Bag 3	0.834	2.41	2.89		
	FTP	0.954	2.72	2.85	n/a	n/a
^a RAFs for gasolines were calculated by dividing FTP specific reactivity by CARB TLEV average specific reactivity of 3.42 g O ₃ /g NMOG. ^b RAFs for alternative fuels were calculated by dividing FTP specific reactivity by CARB LEV/ULEV average specific reactivity of 3.13 g O ₃ /g NMOG.						

catalyst because no baseline "industry average" gasoline tests were speciated (without catalyst) to allow calculation of these values. "Specific reactivity" is defined as the ratio of mass of O₃ formation potential to mass of NMOG in the total exhaust. The CARB TLEV average specific reactivity of 3.42 g O₃/g NMOG was then used as a basis for normalizing all gasoline data and determining RAFs. For the alternative fuels, however, with the application of a RAF, the vehicle could potentially be certified to LEV or ULEV standards. Therefore, the LEV/ULEV specific reactivity of 3.13 g O₃/g NMOG was used to calculate RAFs for the

alternative fuels. This method of calculation is consistent with that used by CARB.⁽³⁾ RAFs for each fuel were then multiplied by the respective NMOG emission rates to give reactivity-adjusted NMOG emission rates. The overriding result shown in Table 8 is that the resulting O₃ formation potential (and hence specific reactivity) did depend strongly on the fuel.

An analysis of the data contained in Table 8 shows that for this TLEV vehicle all of the alternative fuels gave reactivity-adjusted FTP NMOG emission rates less than the 0.040 g/mi CARB ULEV 50,000-mile emission standard when the vehicle was equipped with the OEM catalyst system. The FTP RAF for all of the alternative fuels ranged from a low of 0.41 for 100% propane to a high of 0.77 for the 90% n-butane/10% mixed butenes blend. In general, about three-fourths or more of the NMOG mass emissions and potential ozone came from bag 1, primarily from unburned and partially-burned fuel. Propane has an assigned MIR (0.48 g O₃/g NMOG), which is roughly one-half that of n-butane (1.02 g O₃/g NMOG). As the concentration of propane in the fuel blends increases, the RAF decreases. Specifically, even though the bag 1 NMOG emission rates for all of the alternative fuels were similar, reactivity-adjusted NMOG emissions were lower for the fuels containing propane.

For the engine-out tests, FTP NMOG, potential ozone and specific reactivity were highest for 100% n-butane, followed by 50% n-butane/50% propane, and 100% propane, respectively. This trend is the same as was observed for tailpipe emissions using these fuels and implies that catalytic reductions were, in general, proportional and based on engine-out concentrations of specific emission products. These observations make sense as the predominant emission products from these three fuels are similar (ethylene, propylene, and unburned fuel components).

H. Discussion

Based on results of hydrocarbon speciation data contained in Appendix B, it appears that approximately 80% of the potential ozone formed from combustion of CP2 and RF-A is derived from olefins and aromatics. Approximately 12% to 16% of the potential ozone is derived from paraffins. In contrast, aromatics account for less than 2% of the potential ozone for the 100% n-butane and 100% propane fuels. Most of the potential ozone from combustion of these fuels is derived from a relatively small emission rate of alkenes and a larger amount of alkanes (primarily in bag 1, and to a lesser extent bag 3). In addition, it can be seen that for CP2 and RF-A, the potential ozone formed comes from compounds of all molecular sizes, from C₁ through C₁₂. For the 100% n-butane fuel, almost all of the potential ozone is derived from C₂, C₃, and C₄ compounds (mostly ethylene, propylene, and n-butane). For the 100% propane fuel, the majority of the potential ozone comes from C₂ and C₃ compounds (ethylene, propylene, and propane).

Table 9 provides a summary of major HC contributors to FTP potential ozone. In general, from these data, it is evident that the majority of the potential ozone for all of the alternative fuels is derived from ethylene, propylene, and unburned fuel emissions, and that these species are found primarily in bag 1, and to a lesser extent bag 3 (refer to Table 8).

**Table 9. Summary of Major HC Contributors to
FTP Potential Ozone**

Hydrocarbon Species	Weight Percent of Potential FTP Ozone Formed								
	100NB	100P	90NB/ 10IB	90NB/ 10BE	60NB/ 40IB	80NB/ 20P	90NB/ 10NP	50NB/ 50P	20NB/ 80P
Ethane	0.32	0.28	0.32	0.28	0.28	0.90	0.42	0.34	0.19
Ethylene	29.83	27.86	31.68	25.14	23.15	32.85	30.60	26.94	29.39
Propane	0.05	28.04	0.05	0.04	0.04	8.69	0.12	18.04	25.68
Propylene	14.88	18.25	17.50	14.09	16.78	17.03	15.47	16.57	19.97
Acetylene	0.47	0.27	1.37	0.53	0.57	0.37	0.73	0.32	0.32
n-butane	41.17	1.83	32.32	28.78	21.79	27.39	30.25	16.51	13.29
trans-2-Butene	1.17	0.22	0.54	5.51	0.84	0.49	0.88	0.34	0.24
1-Butene	1.39	0.65	1.32	4.98	1.24	1.44	1.38	0.72	0.78
Isobutylene	0.49	0.10	1.05	2.91	2.92	0.35	0.15	0.00	0.18
1,3-Butadiene	0.29	0.18	0.30	0.72	0.00	0.23	0.29	0.20	0.27
Isobutane	0.00	0.37	3.47	0.01	18.56	0.11	0.07	0.07	0.05
cis-2-Butene	1.07	0.00	0.00	7.61	0.19	0.00	0.13	0.00	0.00
Benzene	0.05	0.19	0.05	0.12	0.11	0.15	0.11	0.13	0.11
Formaldehyde	3.38	4.26	2.73	2.65	3.49	2.88	3.81	5.46	3.37
Acetaldehyde	0.57	1.77	0.39	0.66	0.55	0.93	0.74	4.33	1.44
n-Pentane	0.07	0.45	0.11	0.17	0.23	0.15	3.67	0.05	0.06
Total for all Selected Species	95.18	84.71	93.18	94.19	90.75	94.00	88.82	90.02	95.34
Fuels: 100NB - 100% n-Butane 100P - 100% Propane 90NB/10IB - 90% n-Butane/10% Isobutane 90NB/10BE - 90% n-Butane/10% Mixed Butenes 60NB/40IB - 60% n-Butane/40% Isobutane 80NB/20P - 80% n-Butane/20% Propane 90NB/10NP - 90% n-Butane/10% n-Pentane 50NB/50P - 50% n-Butane/50% Propane 20NB/80P - 20% n-Butane/80% Propane									

I. Conclusions

Although the data presented in this report are representative of only a single current technology vehicle, the following conclusions have been derived from the results.

- Because of conversion system calibration, the optimum post-conversion emissions performance appeared to be achieved with the vehicle operating on 100% propane. The next best performance was achieved with the 50% n-butane/50% propane blend. This observation is encouraging because it suggests that operators of LPG vehicles could potentially use this blend, without modification to their vehicles, and see no detrimental effects on emissions and potential ozone.
- In general, for all of the alternative fuels tested, more than three-fourths of the total FTP potential ozone came from bag 1. The primary ozone HC precursors were unburned fuel, ethylene, and propylene.
- Overall, volumetric fuel economy for the butane fuels was approximately 81% of CP2. The fuel economy for the 100% propane fuel was 76% of CP2. The fuel economy for the 50% n-butane/50% propane blend was 78% of CP2.
- All of the alternative fuels allowed the converted California TLEV to potentially meet ULEV NMOG and NO_x standards at the mileage tested. All but the 100% n-butane and 90% n-butane/10% pentane alternative fuels met the ULEV CO standard. It is thought, however, that the conversion system calibration could be optimized slightly to allow all the alternative fuels to meet all California ULEV emission standards.
- Although the conversion system was optimized for 100% propane, it provided better reactivity-adjusted NMOG and NO_x emission performance for all of the alternative fuels (without adjustment) evaluated in this study than with the gasolines. The highest NO_x result for the alternative fuels was seen with the 100% propane fuel.
- The primary incomplete (engine-out) hydrocarbon combustion products of 100% n-butane are methane, ethylene, and propylene. They are produced primarily during the cold-start phase of the FTP.
- It is thought that additional exhaust aftertreatment (i.e., utilizing a close coupled catalyst) would provide bag 1 and bag 3 HC emission reductions that could, in turn, reduce the OFP and the FTP RAF adjusted NMOG for all the alternative fuels tested.

J. Recommendations

Although this project produced a relatively consistent data set, it should by no means be considered representative of the performance of all alternative fuel conversion systems or vehicles. There is a great deal more research that must be conducted using other vehicles, including those that have undergone significant mileage accumulation, different conversion technologies, etc., before broad conclusions can be made. When using the data developed for this report, care must be taken not to overgeneralize the results. Once a sufficient database has been developed, it will be possible to make more general conclusions related to specific reactivities and OFPs for butane and butane-blended alternative fuels.

The results presented here indicate areas for future study. More vehicles and real-world (i.e., on-road) conditions should be tested to delineate emissions benefits in fleet operations.

III. Task 2 - Evaluation of a Vacuum Insulated Catalyst in Reducing Cold-Start Exhaust Emissions

A. Background

Currently, 70% to 90% of the HC and CO emissions from the EPA certification test for light-duty vehicles are produced in the first few minutes of the vehicle cold-start. During this period, the engine is operating very rich to maintain driveability. However, during this period, the catalyst is not at its operating temperature and can not effectively control exhaust emissions. To achieve future emission standards, the catalytic converter must be immediately effective after the engine is started. When operating a vehicle on E85, catalyst light-off is a further problem because the heat of combustion for ethanol is much lower than that of gasoline. This leads to lower exhaust temperatures, which lengthens the time required for the catalyst to reach light-off temperature. Further, the lower volatility of E85 may dictate additional enrichment during the initial cold start.

Cold-start emissions can be reduced by several methods. One method is to electrically preheat the catalytic converter. This approach has been developed to the point where suppliers are introducing systems to the automotive industry. Great strides have also been made with other technologies, such as HC traps, gas-fired catalyst pre-heaters, and close-coupled catalysts, in reducing cold-start emissions. Of these, close-coupled catalysts are favored because they are not as mechanically complex as the other approaches. Yet, it is likely that even these catalysts will need a temperature boost to perform adequately in low ambient temperature conditions.

Beginning with 1996 production, 100% of OEM production vehicles must comply with the EPA cold (20°F) CO emissions standards. That standard requires all light-duty vehicles and light-duty trucks weighing less than 3750 lb to emit less than 10.0 g/mile CO at 20°F.⁽⁷⁾ In addition, California has specified 100% compliance for all 1996 model year light-duty vehicles for standards issued for CO, NO_x, NMOG, and formaldehyde measured at 50°F⁽⁸⁾.

The EPA has shown in the "Baltimore Study"⁽¹⁰⁾ that average trip patterns in urban areas are quite short, 2.5 to 4.9 miles. Forty percent of all soak periods were between 10 min and 2 h. In addition, the study indicated that only 30% of all in-use starts occur with the catalyst hot enough for prompt light-off. Thus, technology to effectively combat emissions from in-use vehicles should accommodate both short trips and frequent re-starts after soak periods longer than 10 min.

The approach followed by researchers at NREL to answer these challenges was to store waste exhaust energy, and to use that energy to maintain the vehicle catalytic converter at elevated temperatures for future cold-engine starting. Of the various approaches to reducing cold-start emissions, storage of energy that would be otherwise wasted holds the most appeal. No additional energy input is required for such a system, and its operation is passive. To this end, NREL fabricated a Vacuum Insulated Catalytic Converter (TA-CC4) for evaluations over the chassis dynamometer portion of the FTP for light-duty vehicles. The testing of TA-CC4 complemented other work performed at SwRI under NREL Subcontract No. YAW-3-12243-01, "Development of a Dedicated Ethanol Ultra-Low Emission Vehicle (ULEV)."

Energy storage in TA-CC4 is accomplished with PCM and vacuum insulation. During the FTP vehicle emissions test, the catalyst bed temperature of the typical vehicle often exceeds 600°C, well above the 350°C range required for catalyst light-off. This thermal energy can be stored and later used to provide nearly instantaneous catalyst light-off. PCMs absorb substantial amounts of thermal energy by virtue of their heat of fusion during the transition from a solid phase to a liquid phase. This stored energy is later released isothermally as the material solidifies. Harnessing this latent heat characteristic allows much greater energy storage density. Coupling this high-density heat storage medium with the efficiency of vacuum insulation yields a device that can maintain the catalyst bed at elevated temperatures for more than 36 h.

Vacuum insulation coupled with PCM has been successfully demonstrated in an automotive application by Schatz, in a system to store heat that is subsequently dumped to the engine coolant.⁽¹¹⁾ The system is currently being offered by Volkswagen in Germany as a dealer-installed option. Furthermore, Ivanov and co-workers reported using PCM heat storage for comfort heating in electric vehicles.⁽¹²⁾ Both of these applications operate at much lower temperatures than those found in automotive exhaust systems, however.

B. Objective

The objective of this task was to evaluate the effectiveness of NREL's Vacuum Insulated Catalytic Converter TA-CC4 in reducing cold-start exhaust emissions after extended soak periods when using ethanol-based fuel. In particular, evaluation of the effects of the test article in overcoming the inherently lower exhaust temperatures from ethanol was desired. TA-CC4 was evaluated over five FTPs with varying vehicle preconditioning sequences and soak periods.

C. Approach

As received, the insulated catalyst had not been exposed to vehicle exhaust. Before emissions evaluations, it was installed in an engine dynamometer test cell for break-in. Following break-in, the catalyst was installed on a Ford FFV Taurus. To establish a baseline, an FTP was conducted with the catalyst at room temperature prior to testing. Complete melting of the internal PCM in TA-CC4 was desired, so an extended vehicle preconditioning sequence was devised. After the extended preconditioning sequence, the insulated catalyst was evaluated over the FTP following either an 18-, 24-, or 36-h soak period. An additional test was conducted following a standard vehicle preconditioning sequence and a 36-h soak.

D. Vehicle Description

The vehicle used in this evaluation was a 1993 Ford FFV Taurus. This vehicle is designed to operate satisfactorily on gasoline and gasoline-methanol blends. A description of the vehicle is given in Table 10.

Table 10. Vehicle Description

Item	Configuration of Ford Taurus FFV
Model year	1993
Body style	4-door sedan
Transmission	Automatic-4
VIN	1FALP5218P6281001
Tires	P205/65 R15
Accessories	Power locks, windows, steering, brakes, air conditioning
Engine family	PFM3.0V5FFFC3
Engine displacement	3.0L
Number of cylinders	6
Fuel system	SFI
Ignition system	Electronic
Emission control system	Insulated underbody three-way catalyst, TA-CC4, heated oxygen sensor, EGR
Chassis Dynamometer: Inertia Setting Road Load @ 50 mph	3500 lb 6.8 hp

The test vehicle was fitted with an exhaust system modified to accommodate the insulated catalyst. Because of space constraints under the vehicle and the large diameter of the catalyst, it was installed much further downstream in the exhaust system than the OEM catalysts. Figure 2 shows the OEM and experimental exhaust system configurations. The twin OEM catalysts both reside approximately 14 in. downstream of the exhaust manifold flange. In the case of the experimental exhaust system, blank pipes were installed where the OEM catalysts were removed, and the insulated catalyst was installed at the termination of the Y-pipe. This placed the face of the insulated catalyst approximately 37 in. from the exhaust manifold flange on one side of the exhaust system, and 58 in. downstream of the manifold flange on the other side. In an effort to compensate for the heat loss, the exhaust system was wrapped with insulated fiber tape from the exhaust manifold flange to the termination of the Y-pipe.

E. Test Fuels

For these evaluations, the vehicle was operated on E85. A summary of properties for this fuel is given in Table 11.

Figure 2. Exhaust System Configuration

Table 11. Summary of E85 Fuel Properties

Fuel Property	E85
RVP, psi	6.76
Specific gravity	0.7795
Carbon, wt. %	61.20
Hydrogen, wt. %	13.21
Oxygen, wt. %	25.59

F. Emission Test Procedures

The insulated catalyst was evaluated using the chassis dynamometer portion of the FTP for light-duty vehicles. Complete melting of the internal PCM in TA-CC4 was desired, so an extended vehicle prep sequence was devised. This sequence consisted of the standard UDDS, followed by three highway fuel economy test schedules (HFETs). This extended prep sequence was used for each test except the baseline test and one of the 36-h soak tests, which used a standard preconditioning sequence. A Clayton Model ECE-50 passenger car dynamometer in conjunction with a positive displacement pump constant volume sampler was used for all testing. THC, methane, CO, NO_x, and CO₂ emissions were collected as dilute exhaust in Tedlar gas sample bags. Aldehydes and ketones, and ethanol were sampled using wet adsorption techniques. All sampling was conducted in a manner consistent with EPA protocols for light-duty emissions testing. A detailed description of these procedures is presented in Sections I.E. and I.F. NMOG was estimated using NMHC from the gasoline portion of the fuel as measured by an FID rather than by HC speciation. Gasoline-derived NMHC was determined by measuring HC with a FID calibrated on propane, then correcting the results for the removal of methane and ethanol.

G. Test Results and Discussion

1. Catalyst Break-In and Cool-Down

Before emissions evaluations were conducted, TA-CC4 was installed in an engine dynamometer test cell for catalyst break-in. The catalyst was broken in for 24 h using a Ford 460 in.³ V-8 engine running on gasoline. Engine parameters were set to achieve 500° ± 50°C at the thermocouple located between the intumescent mat and the steel wall which are positioned between the catalyst brick and the container for the PCM. As shown in Figure 3, temperature measurements recorded during the cool-down period after break-in correspond very closely to those temperatures observed by NREL during bench-testing at its facilities.

2. Exhaust Emissions Testing

Weighted exhaust emissions results from the five FTPs are given in Table 12 and Figure 4. Detailed computer printouts of these tests can be found in Appendix C. For these tests, supplemental air was injected into the exhaust system prior to the insulated catalyst during the first 100 s of the cold-start phase (Bag 1), and for 15 s at the beginning of

Figure 3. Insulated Catalyst Cooldown Temperature Profile

Table 12. FTP Exhaust Emissions from Ford FFV Equipped with TA-CC4

Test Condition	Uninsulated Catalyst Baseline ^g	Baseline	18-h Soak	24-h Soak	36-h Soak	36-h Soak
Vehicle Preconditioning Sequence	UDDS	UDDS	UDDS + 3 HFETs	UDDS + 3 HFETs	UDDS + 3 HFETs	UDDS
Catalyst Temperature at Start of Test (°C)	22	25	290	234	175	118
Test Number	E-80-CATA&INS	TA4-E85-BASE	TA4-E85-18HR	TA4-E85-24HR	TA4-E85-36HR	TA4-E85-36HRC
THC ^a (g/mi)	0.313	0.393	0.040	0.034	0.088	0.258
CO (g/mi)	1.75	1.71	0.125	0.124	0.465	1.38
NO _x (g/mi)	0.068	0.177	0.044	0.044	0.049	0.078
CH ₄ (g/mi)	0.043	0.080	0.032	0.026	0.029	0.031
NMHC ^b (g/mi)	0.073	0.115	0.006	0.005	0.037	0.080
Total Carbonyls ^c (g/mi)	0.04	0.045	0.003	0.002	0.013	0.034
Alcohols ^d (g/mi)	0.156	0.153	ND	ND	0.010	0.113
Estimated NMOG ^e (g/mi)	0.27	0.314	0.009	0.008	0.059	0.227
Est NMOG x RAF ^f (g/mi)	0.181	0.210	0.006	0.005	0.040	0.152
Formaldehyde (mg/mi)	8.67	6.29	2.28	1.73	1.64	3.31
Acetaldehyde (mg/mi)	30.4	37.8	0.159	0.214	10.1	28.8
^a THC = NMOG + CH ₄ ^b Gasoline derived NMHC = FIDHC - (CH ₄ x FIDRCH ₄) - (Ethanol x FIDRETH); FIDHC = HC measured with FID calibrated on propane; FIDRCH ₄ = FID response factor for methane; FIDRETH = FID response factor for ethanol ^c Summation of all measured aldehydes and ketones including: formaldehyde, acetaldehyde, acrolein, acetone, propionaldehyde, crotonaldehyde, isobutyraldehyde + methyl ethyl ketone, and hexanaldehyde ^d Methanol and ethanol ^e NMOG = NMHC + Carbonyls + Alcohols ^f RAF = 0.67 as measured by Kroll at Volkswagen (SAE 932676) ^g Represents testing with different catalyst system installed, using a similar catalyst formulation. ND = not detected above limit of quantitation

Figure 4. Taurus FFV with Insulated Catalyst, Summary of FTP Emissions

hot-start phase (Bag 3). The nominal flow rate was 5 ft³/min. Supplemental air provided sufficient oxygen levels in the exhaust stream so unburned fuel and CO would be more effectively oxidized in the catalyst. Air injection is necessary because the catalyst is at operating temperatures when the engine is first started and is in open loop operation (running rich). Air injection is not effective in conventional vehicles because the catalyst has not reached light-off temperature while the engine is in open loop operation.

For comparison purposes, results from a previous test conducted on this vehicle (E80-CATA&INS) are also presented in Table 12. This test was conducted in September 1994, as part of Subcontract No. YAW-3-12243-01, "Development of a Dedicated Ethanol Ultra-Low Emission Vehicle (ULEV)." The catalytic converter used during this test was the same size, and had the same formulation as TA-CC4 but was insulated. Similar break-in procedures were conducted on both catalysts, and both catalysts were located in the same position under the vehicle.

Data from the baseline test with TA-CC4 (TA4-E85-BASE) show the performance of the system without the initial temperature assist from the vacuum insulation and heat storage via PCM. Following a standard vehicle preconditioning sequence and a soaking period of nearly 43 h, the catalyst had not cooled to ambient temperature. Therefore, dry filtered shop air was blown through the exhaust system until the PCM and catalyst reached ambient temperature.

A comparison of exhaust emissions from the previously tested uninsulated catalyst (E80-CATA&INS) and the baseline test with TA-CC4 (TA4-E85-BASE) shows slightly higher THC and NO_x exhaust emissions with the insulated catalyst. CO levels were similar between the two tests. These slightly higher exhaust emissions with TA-CC4 are likely due to heat being conducted away from the catalyst brick into the PCM, lengthening the time it takes for the catalyst to reach light-off temperature. Higher than normal emissions result from this situation, which represents the case in which a vehicle would sit until all stored heat energy was depleted. This phenomenon is illustrated in Figure 5, which gives catalyst front brick temperature and exhaust outlet temperature for the uninsulated catalyst and the baseline test with the insulated catalyst (TA-CC4). Although the front face temperature of the catalyst is similar during both tests, the temperature of the exhaust exiting the insulated catalyst is substantially lower. However, EPA estimates that approximately 98% of all trips occur within 36 h of the previous trip.⁽¹³⁾ Therefore, most common driving patterns will result in the catalyst being at elevated temperatures at the next cold start, minimizing the heat sink effect. Careful analysis of both the effect that this cooling has on the exhaust emissions and the frequency with which this situation is likely to occur is necessary to determine whether use of such device will impart any net improvement in exhaust emissions from the vehicle under normal use.

Tests conducted after 18- and 24-h soak periods produced similar results, and demonstrated the effectiveness of the insulated catalyst in reducing exhaust emissions after an overnight soak. Reductions of more than 90% were observed for HC and CO emissions, while NO_x emissions were reduced approximately 75%. Results following an extended vehicle preconditioning sequence and a 36-h soak show reductions of more than 80% from baseline levels for HC, CO, and NO_x exhaust emissions. For emissions certification testing, a vehicle may soak up to 36 h following a single UDDS prep. Test TA4-E85-36HRC was to demonstrate the system performance at the maximum soak period following a standard prep with the PCM

a. Catalyst Front Face Temperatures

b. Catalyst Outlet Temperatures

Figure 5. Comparison of Uninsulated and Insulated Catalyst Temperatures

initially at ambient temperature (i.e., no extended prep sequence to ensure full melt of the PCM). This test showed reductions of approximately 30%, 20%, and 55% in HC, CO, and NO_x emissions, respectively, compared to baseline levels. In addition, THC and CO levels were approximately 20% less than those from testing with the uninsulated catalyst, while NO_x levels were similar.

Most of the emissions reductions were achieved in the first few minutes of the cold-start phase of the FTP. Figures 6 through 8 show continuous raw exhaust emissions concentrations measured after the insulated catalyst for the first 140 s of the FTP, for tests conducted following an extended vehicle preconditioning sequence and 24- and 36-h soaks, and for the test conducted following a standard prep and a 36-h soak. Exhaust emissions levels were similar for all tests following the first few minutes of operation.

Figure 9 shows representative temperature profiles of the front of the catalyst during soak following standard and extended vehicle preps. Other tests conducted with extended or standard preconditioning sequences showed similar results. Figure 9 illustrates the differences between starting with the PCM melted and with it only partially melted. The tests in which the PCM was fully melted clearly show the isothermal period in which the PCM was fusing between the 5- and 10-h marks, thus prolonging the time at elevated temperature. Figure 9 also shows the temperature gains made with the extended preconditioning sequence compared to the standard vehicle prep. Also note the rise in temperature during the first hour following a standard prep as heat from the catalyst brick is transferred to the PCM.

H. Conclusions and Observations

A number of conclusions can be drawn from the results of this testing:

- Compared with an uninsulated catalyst of similar configuration, baseline tests (no stored energy) with TA-CC4 show slightly higher THC and NO_x exhaust emissions, with similar CO levels. These slightly higher exhaust emissions are likely due to heat being conducted away from the catalyst brick into the PCM.
- Reductions from baseline of more than 90% were observed for HC and CO emissions, and 75% for NO_x emissions for tests conducted following an extended vehicle preconditioning sequence and 18- and 24-h soak periods.
- Results following an extended vehicle preconditioning sequence and a 36-h soak show reductions of more than 70% from baseline levels for HC, CO, and NO_x exhaust emissions.
- After conducting a standard vehicle prep and a 36-h soak, exhaust emissions were approximately 30%, 20%, and 55% lower for HC, CO, and NO_x emissions, respectively, compared to baseline levels. In addition, THC and CO levels were approximately 20% less than those from testing with the uninsulated catalyst, while NO_x levels were similar.
- Most of the emissions reductions were achieved in the first few minutes of the cold-start phase of the FTP.

Figure 6. Taurus FFV with Insulated Catalyst, FTP FID HC after Catalyst

Figure 7. Taurus FFV with Insulated Catalyst, FTP CO after Catalyst

Figure 8. Taurus FFV with Insulated Catalyst, FTP NO_x After Catalyst

Figure 9. Temperature of TA-CC4 During Soak

I. Recommendations

Further design improvements to hasten the full melt of the PCM would likely improve the net utility of the device, although the effects of the heat sink properties under certain circumstances can be detrimental. In its present state, a 38-mile extended prep sequence consisting of an UDDS followed by three HFETs was required to achieve full melt of the PCM. For the device to be fully effective, it would need to achieve full melt within the average in-use trip length, which was shown earlier to be on the order of 2.5 to 4.9 miles.

Heat storage capacity does not come without a weight penalty. Along with alternate configurations to accommodate the constricted space allotted to exhaust aftertreatment systems, weight is a big concern for automakers. As the system is refined, it would be expected that each of these design criteria would be further addressed.

Many studies of heat storage through PCM indicate that there is degradation of performance after a certain number of cycles, which varies with the particular PCM. Degradation of PCM performance can also be brought about by impurities, so not only will manufacturing practices need to be tightly controlled, but the PCM containment structure will have to exclude contamination as well as allow for expansion and contraction. Furthermore, material compatibility issues will have to be taken into account. Whether the PCM is a inorganic salt eutectic or a eutectic metal, interaction of the molten material with the container can be a daunting technical challenge. Failure of the PCM containment could lead to catastrophic results. Again, design for long-term durability will need to address these two concerns.

In selecting a PCM, not only will the above performance criteria need to be addressed, but the lifecycle environmental impact of the selected material must be carefully evaluated. As with any new technology, environmental consequences of manufacture, use, and re-use or disposal must be studied and factored into the material selection process.

IV. Task 3 - Technical Support of the University of Dayton Research Institute

A. Background

UDRI has been conducting experiments with a flow reactor to determine alternative fuel combustion products. These studies are being conducted for NREL under Subcontract HZ 1-11208-1. One objective of this study is to compare results from flow reactor studies with data generated from engine and vehicle tests. SwRI conducted similar studies to determine alternative fuel combustion products in the first year of this program using vehicles operating on a chassis dynamometer.

B. Approach and Results

SwRI provided technical support to the UDRI in its effort to define correlations between engine-out combustion products identified by SwRI during chassis dynamometer testing, and those found during flow tube reactor experiments conducted at UDRI. Support included consultations concerning data previously provided by SwRI, providing fuel samples used in the first year of the SwRI program to UDRI for use in flow reactor experiments, and providing analyses of the fuels used at SwRI. When fuel samples were not available, SwRI staff provided fuel compositions to UDRI. In addition, SwRI staff reviewed data and reports generated by UDRI. UDRI will report the results of this correlation effort.

V. Task 4 - Characterization of Exhaust Particulate Emissions from Alternative Fuels

A. Background

Particulate emissions have normally been a concern for diesel engines, but smoky and ill-smelling exhaust from spark-ignited engines was mentioned in the literature as early as 1910.⁽¹⁴⁾ At that time, the New York City Department of Health adopted a resolution regarding the discharge of smoke from motor vehicles within the city. This resolution suggests that people were becoming aware of a growing problem. Almost 60 years later in 1968, HC and CO emissions from light-duty vehicles were first regulated by EPA, but this action did not include a particulate emission standard. Particulate emissions for light-duty diesels were first regulated starting in 1982, at 0.37 g/km (0.60 g/mi). More recently, particulate emissions from all light-duty vehicles operating on gasoline, methanol, CNG, and LPG have been regulated for the first time. The EPA 1994 Tier 1 standards require that a minimum of 40% of a manufacturer's sales meet a 0.05 g/km (0.08 g/mi) intermediate useful life standard and a 0.06 g/km (0.10 g/mi) full useful life standard. In 1995, 80% of the manufacturer's sales had to meet these standards; in 1996, 100% had to meet the standards.⁽¹⁵⁾

Because of demonstrated adverse health effects, particulate matter was designated a "criteria pollutant" under the Clean Air Act of 1970. The current 24-h NAAQS for PM_{10} is 150 $\mu\text{g}/\text{m}^3$, and California is considering a more stringent 50 $\mu\text{g}/\text{m}^3$ standard. The term PM_{10} is defined as the portion of the total suspended particulate matter with an equivalent aerodynamic diameter of less than 10 μm . Particles in this size range are considered respirable, and have properties of biological importance because they are able to adsorb chemicals, and because of their specific compositions (such as containing asbestos). These properties have resulted in regulations for this particle size. More recently, particles in the smaller end of the PM_{10} size range have also been considered separately for their health effects and for air quality standards. Smaller particles in the range less than 2.5 μm , called $PM_{2.5}$ or fine particulate matter, have unique properties in terms of selectively penetrating deep into the lungs. The uptake of fine particulate matter is about 70%, which is higher than for larger particles.⁽¹⁶⁾ One major difference between these two particle sizes is the deposition of the larger particles from gravitational settling within several hours, whereas fine particles may remain suspended for days. With the pending changes to the NAAQS to include a standard for $PM_{2.5}$, the contribution of particulate mass from all sources will be important.

The number and size of particles in engine exhaust are a function of many variables. The 1994 EPA definition of particulate is any mass collected on a fluorocarbon-coated glass fiber or fluorocarbon-based (membrane) filter, from a dilute exhaust stream, at a sample zone temperature less than 52°C (125°F).⁽¹⁾ For a given engine, the particle size and number depend on where the measurement is taken in the exhaust plume. This dependency on location is the result of the temperature, dilution, and "age" of the particles. As engine exhaust cools, the heavier gaseous HC begin to condense into aerosols, and the particles tend to agglomerate.

Particle size can be defined in several ways based on different assumptions about properties of the particles. If exhaust particulate was all perfect spheres, the particle size

could be defined as the diameter of the sphere. Unfortunately, particles from combustion sources have highly irregular shapes. Several definitions of particle size result from these irregular shapes:

- Aerodynamic diameter
- Geometric size
- Stokes' diameter
- Electrical mobility diameter
- Equivalent light extinction diameter.

The definition used in this study is the equivalent aerodynamic diameter, which is defined as the diameter of a unit density sphere (1 g/cc) having the same settling speed in air as the measured particle. Because particles may have many different physical sizes, shapes, and densities, the equivalent aerodynamic diameter indicates how the particle will behave in the environment in terms of particle transport. Sizing devices such as cascade impactors use aerodynamic principles to size particles. In an impactor, a sample containing particles with a mixture of shapes and densities is fractionated and collected according to aerodynamic characteristics. Particles that are aerodynamically equivalent in size to the unit density spheres that would collect on a specific stage during calibration under similar conditions are collected. As the sample stream passes through stages in the impactor with apertures of decreasing width or diameter, flow is accelerated and progressively smaller particles collect on impaction plates.⁽²⁾ The mass collected on each stage indicates the percentage of particles within a specific equivalent aerodynamic diameter range.

B. Objective

Particulate and regulated gaseous emissions were characterized for a 1994 Ford Taurus FFV operating on five fuels. The five fuels included RFG, M85, E85, LPG meeting HD-5 specifications, and industry-average CNG. Particulate emissions were characterized by total mass and particle size. The regulated gaseous emissions included: either THC and NMHC, or OMHCE and OMNMHCE; CO; and NO_x.

C. Approach

Experiments to evaluate the particulate emissions from five different fuels involved:

- Establishing a baseline condition with RFG under stoichiometric operating conditions
- Installing duplicate wide-range oxygen sensors and associated control circuitry to allow rich operation on liquid fuels (RFG, M85, and E85)
- Installing kits for operation on LPG and CNG
- Performing two repetitive cold-start FTP tests with each of the five fuels to collect gaseous and particulate emissions.

To collect sufficient particulate for mass determination, samples were collected on the same filters over the duration of duplicate FTP tests performed on consecutive days.

D. Vehicle

A 1994 Ford Taurus FFV with a 3.0 L V-6 engine, a three-way catalyst, exhaust gas recirculation, and about 20,000 odometer miles was used for the testing. This vehicle conformed to EPA and CARB regulations applicable to 1994 model year vehicles introduced into commerce solely for sale in California, and has been certified to meet the CARB TLEV standards.

The vehicle was operated fuel-rich to simulate a failure mode for the increased production of particulate matter. No other changes were made to the vehicle calibration while operating on RFG, M85, or E85. For operation on CNG and LPG, the vehicle was equipped with an appropriate conversion kit for each of the gaseous fuels. Both kits were carbureted systems, and were obtained from IMPCO Technologies, Inc. These kits utilized feedback signals from the OEM EGO sensor to regulate a fuel control valve, maintaining fuel/air stoichiometry.

To simulate a fuel-rich failure mode while operating on all five fuels, the EGO sensors were replaced with UEGO sensors, which were capable of operating throughout the range of fuel/air equivalence ratios required by this program. The UEGO signals were passed through a compactor circuit to generate a switching output similar to that of an EGO sensor. A compactor output was connected to the fuel control system's EGO sensor inputs. By using a tunable compactor switch point, the closed loop controller was able to operate the vehicle at a rich fuel/air equivalence ratio.

For each fuel, the fuel control system was tuned to a rich fuel/air equivalence ratio set point by operating the vehicle on a chassis dynamometer at a steady-state condition of 80 kph (50 mph) and 5.1 kW (6.8 hp) actual road load. Nominal fuel/air equivalence ratio at this condition was set at approximately 1.1 for all fuels. Vehicle performance and driveability were satisfactory over the FTP (no significant stumbling or hesitation) for all fuels at this mixture setting.

It should be noted that the goal of this study was to determine the feasibility of measuring particulate emissions from alternative fuels. Rich vehicle operation was chosen to increase the chance of collecting a measurable mass of particulate from each of the fuels. Due to the nature of this feasibility study, tests were not conducted on the alternative fuels during stoichiometric operation.

E. Fuels

The five fuels included RFG, M85, E85, LPG meeting HD-5 specifications, and industry-average CNG.⁽¹⁷⁾ Industry-average gasoline (RF-A) was used as the blending agent and denaturant when preparing the M85 and E85 alcohol blends. The denatured ethanol was prepared with 5% RF-A gasoline and 95% ethanol. RFG and LPG were purchased from commercial suppliers, while the E85, M85, and CNG were blended in house. The HD-5 specifications for LPG included less than 5% propylene and greater than 90% propane. Table 13 lists the fuel properties for the three liquid fuels, and Table 14 presents the fuel gas analysis for the two gaseous fuels.

Table 13. Fuel Analysis for Liquid Fuels

Property	RFG	M85	E85
Carbon, Hydrogen, and Oxygen, wt%			
Carbon	84.37	43.06	61.20
Hydrogen	13.24	12.72	13.21
Oxygen	2.39	44.22	25.59
Other Properties			
RVP	7.12	8.05	6.76
Specific gravity	0.7538	0.7935	0.7795
API gravity	56.2	46.8	50.0

Table 14. Fuel Gas Analysis Summary

Component	Compound Concentration, mole %	
	CNG	LPG
Carbon dioxide	0.00	0.00
Nitrogen	3.72	0.00
Methane	90.13	0.00
Ethane	4.04	3.00
Propane	2.12	96.40
Propylene	0.00	0.30
Isobutane	0.00	0.28
Normal butane	0.00	0.02
Pentane +	0.00	0.00
Energy equivalent fuel density, kg/L	0.642	0.687
Fuel fraction carbon	0.712	0.817
Fuel fraction hydrogen	0.229	0.183
Fuel fraction nitrogen	0.059	0.000

F. Emission Test Procedures

The Ford Taurus FFV was evaluated using the chassis dynamometer portion of the FTP for light-duty vehicles. In addition, the vehicle was preconditioned using three consecutive UDDS cycles to minimize the effects of the fuel changes on the ECU's adaptive learning and to help condition the dilution tunnel to minimize particulate carryover between fuels. A Clayton Model ECE-50 passenger car dynamometer, in conjunction with a positive displacement pump constant volume sampler, was used for all testing. THC, CO, NO_x, and CO₂ emissions were collected as dilute exhaust in Tedlar gas sample bags, in a manner consistent with EPA protocols for light-duty emission testing. Fuel economy was determined by carbon balance. Wet absorption techniques were employed to collect methanol, ethanol, and aldehydes and ketones for the determination of OMHCE. A detailed description of these procedures is presented in Sections I.E. and I.F.

Total particulate mass was measured using a 47-mm fluorocarbon-coated glass fiber filter that collected a portion of the sample from the dilution tunnel. Particle size distribution measurements were performed with an in-stack cascade impactor. To collect sufficient particulate for mass determination, samples were collected on the same filters over the duration of duplicate FTP tests performed on consecutive days. Particulate filters and impactor stages were stored in a temperature- and humidity-controlled weighing chamber between tests. This chamber is maintained at 75°F ± 10°F and a relative humidity of 58% ± 10%.

G. Results

1. Gaseous Emissions

Table 15 summarizes the FTP composite emissions for each fuel, and Figures 10 through 14 illustrate the average regulated emissions and fuel economy for each fuel. Detailed printouts of individual test results are given in Appendix D. With the vehicle operating at stoichiometry on RFG, the emission rates were well below the 1994 EPA Tier 1 standards for pollutants. The fuel economy for the gaseous fuels was based on an energy equivalent fuel density of 5.360 lb/gal for CNG and 5.729 lb/gal for LPG.

In the following tables and figures, fuel code RFG-Base indicates that the vehicle was tested at stoichiometric operating condition, and fuel codes RFG-1 and RFG-3 were repeat tests using RFG with the vehicle at a rich fuel/air equivalence ratio. Fuel code CNG-1 was tested at a lean fuel/air equivalence ratio because the emissions test results indicated that the vehicle, operating with the wide-range oxygen sensors and associated control circuitry, was actually adjusted to allow lean operation. The system, during this initial test with CNG, was not functioning as expected; so an additional test was performed (fuel code CNG-2) at a rich fuel/air equivalence ratio. When the fuel code RFG appears in tables and figures, it represents the average results for tests RFG-1 and RFG-3. When CNG appears, it represents the results for Test CNG-2.

Figure 10. Comparison of HC Emission Rates

Figure 11. Comparison of CO Emission Rates

Figure 12. Comparison of NO_x Emission Rates

Figure 13. Comparison of Total Particulate Emission Rates

Figure 14. Comparison of Average Fuel Economy Values

Table 15. Summary of Composite FTP Regulated Emissions

Fuel	Emissions Results, g/mi ^a				Particulate, mg/mi	Fuel economy, mi/gal
	THC ^b	NMHC ^c	CO	NO _x		
Tier 1 standard	0.41	0.25	3.4	0.4	80	NA ^d
RFG-base ^e	0.14	0.11	1.44	0.18	5.5	21.67
RFG	3.55	3.18	69.45	0.49	19.9	18.98
M85	1.91	1.80	51.93	0.03	13.1	11.48
E85	3.31	2.40	66.63	0.03	10.7	15.07
LPG	2.82	2.30	87.90	0.07	4.2	18.03 ^f
CNG	4.78	0.54	107.57	0.00	6.1	14.44 ^g

^a Numbers in parentheses in terms of g/mi; conversion factor - g/km × 1.609 km/mi = g/mi
^b THC for gasoline, CNG, and LPG; and OMHCE for methanol and ethanol
^c NMHC for gasoline, CNG, and LPG; and OMNMHCE for methanol and ethanol
^d NA-Not applicable
^e Vehicle operating at stoichiometry; all others rich operation
^f Energy equivalent fuel density of 5.729 lb/gal for LPG
^g Energy equivalent fuel density of 5.360 lb/gal for CNG

Baseline THC, CO, and NO_x exhaust emission rates on RFG correlate with historical data from this vehicle, and with measurements from other Taurus FFVs. When the vehicle was operated on RFG at a rich fuel air equivalence ratio, THC emissions increased by 25 times, and CO emissions increased by nearly 50 times. These trends are typical for rich operation. However, NO_x emissions also increased, by nearly 3 times, during rich operation on RFG. Replicate tests confirmed this result, and all other observations indicated the vehicle was operating rich. Although high NO_x exhaust emissions are not expected during rich operation, it was outside the scope of the program to investigate this phenomenon any further. Rich operation on all other fuels (M85, E85, CNG, and LPG) resulted in high HC and CO exhaust emissions, and low NO_x emissions.

2. Alcohols, Aldehydes and Ketones

Samples were analyzed for alcohols, aldehydes, and ketones from the three liquid fuels. Table 16 summarizes the individual compounds for each fuel. Detailed data for individual tests are given in Appendix D. In general, these emissions followed expected trends. With rich operation, all alcohols, aldehydes, and ketones increased when compared to RFG at a stoichiometric fuel/air equivalence ratio. In addition, the alcohol and aldehydes with the corresponding carbon number to the alcohol in the fuel produced higher concentrations in the exhaust when compared to the tests with RFG under rich operation. These results were used to calculate OMNMHCE.

**Table 16. Composite Emission Results for Alcohols,
Aldehydes, and Ketones**

	Composite Results, mg/mi			
	RFG-BASE	RFG-3	M85	E85
Formaldehyde	1.27	18.13	85.85	14.93
Acetaldehyde	0.36	23.81	4.37	476.10
Acrolein	0.00	1.25	0.02	0.36
Acetone	0.00	13.03	1.73	8.19
Propionaldehyde	0.00	4.18	0.76	1.65
Crotonaldehyde	0.17	2.33	0.17	0.89
isobutyraldehyde and methyl ethyl ketone	0.04	2.21	0.76	1.21
Benzaldehyde	0.09	6.20	1.13	1.08
Hexanaldehyde	0.94	0.40	0.00	0.00
Methanol	1.99	66.41	2149	98.33
Ethanol	0.22	1.31	0.00	1172

The proposed Title 13, *California Code of Regulations*, Section 1960.1 includes a formaldehyde standard for 1992 and subsequent model-year light-duty vehicles. For TLEV and LEV, the standard is 9.3 mg/km (15 mg/mi) with an intermediate in-use compliance standard for 31,000 km (50,000 mi) of 14 mg/km (23 mg/mi) and 9.3 mg/km (15 mg/mi), respectively. ULEV must meet 5.0 mg/km (8 mg/mi) with a 31,000 km (50,000 mi) in-use standard of 7.5 mg/km (12 mg/mi). With RFG at the baseline condition, the emission rate of formaldehyde was well below the proposed standard. When the vehicle was operated fuel-rich with RFG and M85, the formaldehyde emissions exceeded the proposed standard by about 20% and 470%, respectively. The fuel rich test with E85 was just able to meet the 9.3 mg/km (15 mg/mi) formaldehyde standard.

3. Total Particulate Mass and Particle Size Distribution

Prior to performing emission tests on the vehicle, background samples were taken from the ambient air in the laboratory and from the CVS background (in the dilution tunnel) to determine the sizes of the particles that pass through the CVS filter box. Figure 15 shows the ambient and CVS background results from these measurements. The largest particles in the laboratory ambient air had equivalent aerodynamic diameters larger than 3 μm . These particles accounted for more than 50% of the particle mass in the laboratory ambient air. After the air was passed through the CVS filter box, nearly all the large particles were removed, and the largest contribution to the CVS background became particles in the 0.16 μm to 0.52 μm equivalent aerodynamic diameter size range. The CVS background was estimated to contribute less than 0.03% of the total mass collected on all of the impactor stages during each test on the vehicle. In addition, the filter box was capable of removing about 84% of the laboratory ambient air particle mass and about 51% of the ambient particle mass in the equivalent aerodynamic diameter range produced by the vehicle. In summary, the background contributions to the total mass collected by the impactor were small; therefore, no background corrections were made for the measurements.

Figure 15. Particle Size Distribution of Laboratory Ambient and CVS Background Particulate

The general trend in particle size distribution for particulate mass from this spark-ignited engine was significantly different from typical results for particulate mass from diesel (compression-ignition) engines. In the case of diesel engines, the majority of the particles are smaller than about 0.8 μm equivalent aerodynamic diameter, and a significant percentage occurs in the range less than 0.2 μm .⁽¹⁸⁻¹⁹⁾ Very few particles are larger than about 1 μm .

In these experiments with a spark-ignited engine, the results at a stoichiometric fuel/air equivalence ratio indicated that the particle size range containing most of the mass was less than about 0.2 μm (about 65% of the total particulate mass), and the next largest percentage of particle cutoff diameters was in the 2 to 3 μm range (about 26%). Figure 16 shows the equivalent aerodynamic diameter particulate emission rates compared by fuel, and Figure 17 illustrates the mass percentage of each particle size cutoff in relation to the equivalent aerodynamic diameter. Table 17 and Figure 18 present the particle size distribution data for each fuel.

When the vehicle was operated fuel rich with RFG, more total mass of particulate was collected, and a significant shift in the particle size distribution occurred when compared to the baseline condition with RFG. Total particulate mass increased by a factor of almost four, from 5.5 mg/mi to 19.9 mg/mi. The percentage of particle mass was greatest in the less than 0.2 μm size range. The second most abundant particle size was in the greater than 3 μm range. Percentages of particle mass in each equivalent aerodynamic diameter range decreased from the range greater than 3 μm to a minimum at the 0.2 - 0.4 μm range.

In the case of M85, the total particulate rate was about twice that for the RFG baseline and about 35% less than that for RFG rich operation. The most abundant particle mass was in the size range less than 0.2 μm . Percentages of particle mass in the size ranges from 0.7 μm to greater than 3 μm were relatively constant, and the percentages for the 0.2 to 0.7 μm ranges were less than half of the larger sizes.

For E85, the total particulate mass was also about twice the RFG baseline, and 47% less than RFG rich operation. With this fuel, the largest percentages of particle mass were in the 1 to 2 μm range and in the below 0.2 μm range. In addition, the percentage of particle mass increased from smaller to larger particle sizes with a maximum in the 1 to 2 μm range, and then decreased toward the larger particle sizes.

With rich LPG operation, the total particulate rate was 24% less than the RFG baseline condition, and 79% less than the RFG rich condition. Most of the particle mass was in the size range less than 0.2 μm (about 60% of the total particle mass). The percentages of particle mass in the size range from 0.4 μm to 0.2 μm and greater than 3 μm were the next highest.

Figure 16. Particle Size Distribution by Fuel

Figure 17. Equivalent Aerodynamic Diameter Particle Size Distribution

Table 17. Particle Size Distribution ^a

Test Number	Particle Size Cutoff Diameters														
	>3 µm		3 - 2 µm		2 - 1 µm		1 - 0.7 µm		0.7 - 0.4 µm		0.4 - 0.2 µm		<0.2 µm		Total Particulate, mg/ml
	Percent	mg/ml	Percent	mg/ml	Percent	mg/ml	Percent	mg/ml	Percent	mg/ml	Percent	mg/ml	Percent	mg/ml	
RFQ-BASE	2.5	0.10	26.4	1.08	0.0	0.00	0.0	0.00	2.5	0.10	3.1	0.13	65.4	2.68	4.1
RFQ	19.6	2.59	13.5	1.78	11.2	1.48	7.5	0.99	3.1	0.41	2.2	0.29	42.9	5.66	13.2
M85	15.1	1.45	16.0	1.54	12.9	1.24	14.8	1.42	7.4	0.71	5.8	0.56	28	2.69	9.6
E85	2.1	0.17	17.8	1.48	35.6	2.95	8.9	0.74	3.4	0.28	2.1	0.17	30.1	2.50	8.3
LPG	12.0	0.42	2.4	0.08	4.8	0.17	0.0	0.00	6.4	0.22	14.4	0.50	60	2.10	3.5
CNG	14.5	0.64	17.8	0.78	10.4	0.46	5.8	0.26	13.3	0.59	13.3	0.59	24.9	1.10	4.4
CNG ^b	0.0	0.00	14.9	0.86	13.2	0.77	12.1	0.70	11.0	0.64	8.9	0.52	39.9	2.31	5.8
^a Mass emission rates for each particle size are based on the overall mass emission rate determined by particle collection on a 20x20-Inch Pallflex filter.															
^b Test with lean misfire

Figure 18. Particle Size Distribution Data for Each Fuel

The tests on CNG were performed with both lean and rich equivalence ratios. When the vehicle was operated rich, the total particulate rate was about 24% more than that for the RFG baseline, and about 66% less than the RFG rich condition. As with the other fuels, the particle size range less than 0.2 μm contained the majority of the particulate mass. The distribution of mass within the other particle sizes was relatively even through the size ranges, but the 0.7 to 1 μm range produced the smallest percentage of mass, and the 2 to 3 μm range resulted in the second highest percentage of mass. When CNG was run with a lean fuel/air equivalence ratio, the particle size ranges were relatively constant except for lower levels in the 0.7 to 0.2 μm range and higher levels in the less than 0.2 μm range.

H. Discussion

1. Regulated Emissions

The regulated emissions followed typical trends for changes to the fuel/air equivalence ratio. When the vehicle operated fuel rich, THC and NMHC (gasoline, CNG, and LPG), OMHCE, and OMNMHCE (methanol and ethanol), and CO increased; and fuel economy decreased. For RFG at a rich fuel/air equivalence ratio, the NO_x increased, and for the alcohol fuels and gaseous fuels, the NO_x decreased when compared to the baseline condition with RFG. This increased NO_x emission rate during rich RFG operation was unexpected, and further investigation is needed to understand this observed phenomenon.

2. Particle Size Distribution

One possible mechanism may aid in explaining the particle size distribution test results: the agglomeration of smaller particles into larger ones. The mechanism for particle agglomeration suggests that very small particles (less than 0.2 μm) are produced by combustion of the fuel and any excess lubricating oil in the cylinder. As the temperature of the exhaust cools, the smaller particles begin to agglomerate as they pass through the exhaust system. In addition, some of the heavier gaseous HC also begin to condense into aerosols or adsorb onto the particles. These particles and aerosols further agglomerate until the agglomerated particles range from about 2 to 3 μm in size.

The majority of the fuels had the largest percentage of particle mass in the equivalent aerodynamic diameter range smaller than about 0.2 μm . An exception to this observation was E85, which had 35% of the particle mass in the 1 to 2 μm range, and only about 30% of the total particle mass in the smaller than 0.2 μm range. As the particles pass out of the cylinder and through the exhaust system, agglomeration begins, resulting in larger particles. This agglomeration mechanism appears to depend on the fuel as well as the total particulate mass in the exhaust stream.

When the engine was operated at a fuel/air equivalence ratio greater than stoichiometric (fuel rich operation), the total mass of particles increased, when compared to the RFG baseline condition, with four of the five fuels. The tests with LPG were the exception, yielding less total particulate mass than the RFG baseline condition. RFG under rich operation gave the highest total particulate mass rate; however, this rate was well below the 80 mg/mi particulate standard for 1996 model year light-duty vehicles. The trend toward

particle agglomeration was also more pronounced with RFG under fuel rich operation, probably because of the increase in total particulate mass.

With M85 and E85 at a rich fuel/air equivalence ratio, the total particulate mass was about a factor of 2 greater than RFG at a stoichiometric fuel/air ratio. For M85, particle agglomeration was distributed evenly between about 0.7 μm and the greater than 3 μm equivalent aerodynamic diameter range. The particle size distribution indicated a lesser tendency toward particle agglomeration. More total particulate mass was measured for M85 than for E85, but the E85 measurements suggested a greater tendency toward particle agglomeration. With E85, particle agglomeration reached a maximum in the 1 to 2 μm range, and the total mass of particulate in this size range was greater than the less than 0.2 μm equivalent aerodynamic particle diameter range. These trends for the alcohol fuels may be explained in terms of their combustion characteristics at atmospheric conditions. The luminosity of a methanol flame in air is very low, because there is less tendency to form soot particles as it burns. Ethanol, on the other hand, has a comparatively luminous flame because of the formation of soot particles.⁽²⁰⁻²²⁾ If a similar mechanism is present with the in-cylinder combustion, the size distribution of particle mass in the exhaust can be at least partially explained in terms of the alcohol's tendency to form soot particles. With CNG and LPG under rich operation, the total mass of particulate was smaller than with the liquid fuels. These results indicated that particle agglomeration may not as predominant with the gaseous fuels as compared to the liquid fuels.

I. Conclusions and Observations

Some conclusions and observations that can be drawn from this study include:

- Baseline emissions for the test vehicle met the 1994 EPA Tier 1 standards.
- This vehicle operated satisfactorily on five different fuels, and fuel/air enrichment produced, for the most part, expected changes in gaseous emissions and fuel economy with all five fuels. For RFG at a rich fuel/air equivalence ratio, the NO_x increased, and for the alcohol fuels and gaseous fuels the NO_x decreased when compared to the baseline condition with RFG. This increased NO_x emission with RFG was unexpected, and further investigation is needed to understand this observed phenomenon.
- Even while operating at rich fuel/air equivalence ratios, total particulate mass did not exceed the 1996 light-duty vehicle particulate standard for any of the fuels. In fact, particulate emissions while running rich on LPG were actually lower than those measured during the baseline run on gasoline.
- While operating fuel-rich, the trend for total particulate mass was $\text{LPG} \approx \text{CNG} < \text{E85} \approx \text{M85} < \text{RFG}$.

- Particle agglomeration appeared to be one of the mechanisms for larger particle formation; smaller particles agglomerated to form different equivalent aerodynamic diameter ranges depending on the fuel. Predominant particle agglomeration ranges by fuel were:

RFG - greater than 3 μm

M85 - broad range from 0.7 to greater than 3 μm

E85 - 1 to 2 μm

LPG - greater than 3 μm

CNG - 2 to 3 μm .

- For all fuels except LPG, the mass percentage of particles with sizes greater than 0.7 μm (indicative of particle agglomeration), were quite similar: 52%, 59%, 64%, and 49% for RFG, M85, E85, and CNG, respectively.
- Gaseous fuels produced a lower percentage of larger particles than the liquid fuels.

J. Recommendations

In general, these tests indicated that the size distribution of spark-ignited engine particulate could be characterized, and that sufficient quantity of particulate mass could be collected to measure these trends. Although it is unknown whether the observed trends in particulate mass formation would be the same during stoichiometric operation, this study indicates the potential alternative fuels have to reduce particulate emissions from light-duty vehicles. However, additional work is needed to better characterize the particulate emissions from spark-ignited engines according to composition and to understand the production mechanisms and sources of the particulate during combustion.

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Appendix A

Detailed Computer Printouts of the FTP Regulated Emission Test Results from Task 1

Fuel	Catalyst	Test No.	Page No.
CP2 (pre-conversion)	Yes	BL-CP2-01 BL-CP2-02S	A-1 A-2
CP2 (post conversion)	Yes	BLB-CP2-01 BLB-CP2-02S	A-3 A-4
RFA	Yes	BLB-RFA-01 BLB-RFA-02S	A-5 A-6
100% n-Butane	Yes	100NB-01 100NB-02S	A-7 A-8
HD-5 LPG	Yes	HD5-01 HD5-02S	A-9 A-10
90% n-Butane 10% Isobutane	Yes	90NB/10IB-01 90NB/10IB-02S	A-11 A-12
90% n-Butane 10% Mixed Butenes	Yes	90NB/10BE-01 90NB/10BE-02S	A-13 A-14
60% n-Butane 40% Isobutane	Yes	60NB/40IB-01 60NB/40IB-02S	A-15 A-16
80% n-Butane 20% Propane	Yes	80NB/20NP-01 80NB/20NP-02S	A-17 A-18
90% n-Butane 10% n-Pentane	Yes	90NB/10PE-01 90NB/10PE-02S	A-19 A-20
50% n-Butane 50% Propane	Yes	50NB/50NP-01 50NB/50NP-02S	A-21 A-22
20% n-Butane 80% Propane	Yes	20NB/80P-02S 20NB/80P-03	A-23 A-24
100% n-Butane (repeat tests)	Yes	100NB-03 100NB-04S	A-25 A-26
CP2 (repeat tests)	Yes	BLB-CP2-03 BLB-CP2-04S	A-27 A-28
100% n-Butane	No	100NB(NC)-01 100NB(NC)-02S 100NB(NC)-03	A-29 A-30 A-31
100% Propane	No	100P(NC)-01 100P(NC)-02S	A-32 A-33
50% n-Butane 50% Propane	No	50NB/50P(NC)-01 50NB/50P(NC)-02S	A-34 A-35

VEHICLE NUMBER GA2	TEST BL-CP2-01	GASOLINE PHASE II EM-1968-F
VEHICLE MODEL 94 PONT GRANDAM	DATE 8/22/95 RUN	FUEL DENSITY 6.163 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .137 C .843 O .020 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER 1529 MILES (2460 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.20 IN HG (741.7 MM HG) DRY BULB TEMPERATURE 73.0°F (22.8°C) NOX HUMIDITY C.F. 1.032

RELATIVE HUMIDITY 65.4 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.2	868.4	505.9
DRY/WET CORRECTION FACTOR, SAMP/BACK	.971/.981	.975/.981	.972/.981
MEASURED DISTANCE MILES (KM)	3.67 (5.90)	3.93 (6.33)	3.66 (5.89)
BLOWER FLOW RATE SCFM (SCMH)	320.5 (9.08)	323.2 (9.15)	322.6 (9.14)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCH)	2698. (76.4)	4678. (132.5)	2720. (77.0)

HC SAMPLE METER/RANGE/PPM (BAG)	26.9/ 2/ 26.88	47.9/ 1/ 4.82	87.7/ 1/ 8.83
HC BCKGRD METER/RANGE/PPM	5.0/ 2/ 5.00	48.8/ 1/ 4.91	49.2/ 1/ 4.95
CO SAMPLE METER/RANGE/PPM	51.7/ 13/ 119.81	7.3/ 12/ 7.21	34.7/ 12/ 33.90
CO BCKGRD METER/RANGE/PPM	.7/ 13/ 1.55	.9/ 12/ .90	1.1/ 12/ 1.09
CO2 SAMPLE METER/RANGE/PCT	57.9/ 1/ 1.0647	83.0/ 14/ .7124	93.8/ 14/ .9673
CO2 BCKGRD METER/RANGE/PCT	2.6/ 1/ .0482	13.1/ 14/ .0425	13.2/ 14/ .0429
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	20.1/ 1/ 5.04	.5/ 1/ .13	2.3/ 1/ .58
NOX BCKGRD METER/RANGE/PPM	.7/ 1/ .18	.4/ 1/ .10	.4/ 1/ .10
CH4 SAMPLE PPM (1.160)	4.12	2.30	3.08
CH4 BCKGRD PPM	2.40	2.35	2.25

DILUTION FACTOR	12.33	18.65	13.70
HC CONCENTRATION PPM	22.29	.17	4.24
CO CONCENTRATION PPM	113.38	6.13	31.55
CO2 CONCENTRATION PCT	1.0204	.6722	.9275
NOX CONCENTRATION PPM	4.88	.03	.48
CH4 CONCENTRATION PPM	1.92	.08	.99
NMHC CONCENTRATION PPM	20.07	.08	3.09

FIDHC MASS GRAMS	1.009	.014	.193
CO MASS GRAMS	10.086	.945	2.829
CO2 MASS GRAMS	1427.59	1630.31	1308.21
NOX MASS GRAMS	.736	.008	.074
CH4 MASS GRAMS	.098	.007	.051
NMHC MASS GRAMS (FID)	.884	.006	.137
FUEL MASS KG	.468	.528	.425
FUEL ECONOMY MPG (L/100KM)	21.88 (10.75)	20.80 (11.31)	24.07 (9.77)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.073	CH4 G/MI	.010
CO G/MI	.907	NMHC G/MI	.061
NOX G/MI	.048		
FUEL ECONOMY MPG (L/100KM)	21.85 (10.77)		

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VEHICLE NUMBER GA2	TEST BL-CP2-02S	GASOLINE PHASE II EM-1968-F
VEHICLE MODEL 94 PONT GRANDAM	DATE 8/23/95 RUN	FUEL DENSITY 6.163 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .137 C .843 O .020 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER 1543 MILES (2482 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.16 IN HG (740.7 MM HG) DRY BULB TEMPERATURE 72.0°F (22.2°C) NOX HUMIDITY C.F. 1.041
 RELATIVE HUMIDITY 69.0 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0-505 SEC.)
RUN TIME SECONDS	505.6	869.0	506.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.971/.981	.974/.981	.972/.981
MEASURED DISTANCE MILES (KM)	3.61 (5.81)	3.87 (6.23)	3.64 (5.86)
BLOWER FLOW RATE-SCFM (SCMH)	319.8 (9.06)	322.1 (9.12)	321.8 (9.11)
GAS METER FLOW RATE SCFM (SCMH)	.13 (.00)	.14 (.00)	.13 (.00)
TOTAL FLOW SCF (SCM)	2696. (76.4)	4668. (132.2)	2715. (76.9)

HC SAMPLE METER/RANGE/PPM (BAG)	27.1/ 2/ 27.08	60.6/ 1/ 6.10	9.9/ 2/ 9.89
HC BCKGRD METER/RANGE/PPM	5.7/ 2/ 5.70	59.2/ 1/ 5.96	6.2/ 2/ 6.20
CO SAMPLE METER/RANGE/PPM	52.5/ 13/ 121.81	7.6/ 12/ 7.50	31.2/ 12/ 30.48
CO BCKGRD METER/RANGE/PPM	.6/ 13/ 1.33	1.0/ 12/ .99	.9/ 12/ .90
CO2 SAMPLE METER/RANGE/PCT	57.0/ 1/ 1.0478	82.5/ 14/ .7026	93.1/ 14/ .9479
CO2 BCKGRD METER/RANGE/PCT	2.4/ 1/ .0445	12.5/ 14/ .0402	12.9/ 14/ .0418
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	19.3/ 1/ 4.84	.4/ 1/ .10	1.9/ 1/ .48
NOX BCKGRD METER/RANGE/PPM	.4/ 1/ .10	.3/ 1/ .08	.6/ 1/ .15
CH4 SAMPLE PPM (1.160)	4.02	2.31	3.04
CH4 BCKGRD PPM	2.38	2.34	2.34

DILUTION FACTOR	12.53	18.91	13.98
HC CONCENTRATION PPM	21.84	.46	4.14
CO CONCENTRATION PPM	115.39	6.31	28.42
CO2 CONCENTRATION PCT	1.0069	.6644	.9091
NOX CONCENTRATION PPM	4.75	.03	.34
CH4 CONCENTRATION PPM	1.83	.09	.87
NMHC CONCENTRATION PPM	19.72	.35	3.13

THC MASS GRAMS	.978	.046	.190
CO MASS GRAMS	10.257	.971	2.544
CO2 MASS GRAMS	1407.63	1608.12	1279.76
NOX MASS GRAMS	.722	.008	.052
CH4 MASS GRAMS	.093	.008	.045
NMHC MASS GRAMS (FID)	.868	.027	.139
FUEL MASS KG	.462	.521	.416
FUEL ECONOMY MPG (L/100KM)	21.86 (10.76)	20.76 (11.33)	24.46 (9.62)

3-BAG COMPOSITE RESULTS

THC G/MI	.077	CH4 G/MI	.010
CO G/MI	.912	NMHC G/MI	.064
NOX G/MI	.046	CARBONYL G/MI	.003
FUEL ECONOMY MPG (L/100KM)	21.92 (10.73)	NMOG G/MI	.067 (RAF=1.00)

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VEHICLE NUMBER GA2	TEST BLB-CP2-01	GASOLINE PHASE II EM-1968-F
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/16/95 RUN	FUEL DENSITY 6.163 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .137 C .843 O .020 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	CALIFORNIA PHASE 2
ODOMETER 1855 MILES (2984 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.18 IN HG (741.2 MM HG) DRY BULB TEMPERATURE 73.0°F (22.8°C) NOX HUMIDITY C.F. 1.087
 RELATIVE HUMIDITY 73.5 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.2	867.1	505.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.969/.979	.972/.979	.970/.979
MEASURED DISTANCE MILES (KM)	3.62 (5.82)	3.88 (6.24)	3.62 (5.83)
BLOWER FLOW RATE SCFM (SCMH)	322.5 (9.13)	325.4 (9.21)	323.1 (9.15)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2715. (76.9)	4702. (133.2)	2719. (77.0)
HC SAMPLE METER/RANGE/PPM (BAG)	25.8/ 2/ 25.79	56.6/ 1/ 5.70	85.5/ 1/ 8.61
HC BCKGRD METER/RANGE/PPM	5.3/ 2/ 5.30	53.6/ 1/ 5.40	53.1/ 1/ 5.35
CO SAMPLE METER/RANGE/PPM	50.4/ 13/ 116.57	3.0/ 12/ 2.89	15.9/ 12/ 15.38
CO BCKGRD METER/RANGE/PPM	.0/ 13/ .00	.0/ 12/ .00	.1/ 12/ .10
CO2 SAMPLE METER/RANGE/PCT	58.4/ 1/ 1.0741	82.3/ 14/ .6986	93.5/ 14/ .9589
CO2 BCKGRD METER/RANGE/PCT	2.4/ 1/ .0445	11.9/ 14/ .0380	11.9/ 14/ .0380
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	27.2/ 1/ 6.82	1.6/ 1/ .40	2.1/ 1/ .53
NOX BCKGRD METER/RANGE/PPM	2.0/ 1/ .50	1.1/ 1/ .28	.5/ 1/ .13
CH4 SAMPLE PPM (1.160)	3.80	2.12	2.79
CH4 BCKGRD PPM	2.19	2.15	2.19
DILUTION FACTOR	12.23	19.02	13.84
HC CONCENTRATION PPM	20.92	.59	3.65
CO CONCENTRATION PPM	111.34	2.79	14.64
CO2 CONCENTRATION PCT	1.0332	.6626	.9237
NOX CONCENTRATION PPM	6.36	.14	.41
CH4 CONCENTRATION PPM	1.79	.08	.76
NMHC CONCENTRATION PPM	18.85	.49	2.77
FIDHC MASS GRAMS	.953	.046	.166
CO MASS GRAMS	9.967	.432	1.312
CO2 MASS GRAMS	1454.57	1615.54	1302.31
NOX MASS GRAMS	1.017	.039	.066
CH4 MASS GRAMS	.092	.007	.039
NMHC MASS GRAMS (FID)	.836	.038	.123
FUEL MASS KG	.477	.523	.423
FUEL ECONOMY MPG (L/100KM)	21.21 (11.09)	20.71 (11.36)	23.95 (9.82)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.073	CH4 G/MI	.009
CO G/MI	.729	NMHC G/MI	.062
NOX G/MI	.068		
FUEL ECONOMY MPG (L/100KM)	21.64 (10.87)		

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VEHICLE NUMBER GA2	TEST BLB-CP2-02S	GASOLINE PHASE II EM-1968-F
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/15/95 RUN	FUEL DENSITY 6.163 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .137 C .843 O .020 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER 1843 MILES (2965 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.24 IN HG (742.7 MM HG) DRY BULB TEMPERATURE 74.0°F (23.3°C) NOX HUMIDITY C.F. 1.023
 RELATIVE HUMIDITY 61.9 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.3	867.1	505.5
DRY/WET CORRECTION FACTOR, SAMP/BACK	.971/.982	.975/.982	.973/.982
MEASURED DISTANCE MILES (KM)	3.62 (5.82)	3.87 (6.22)	3.61 (5.81)
BLOWER FLOW RATE-SCFM (SCMH)	323.3 (9.16)	326.4 (9.24)	-324.6 (9.19)
GAS METER FLOW RATE SCFM (SCMH)	.13 (.00)	.14 (.00)	.13 (.00)
TOTAL FLOW SCF (SCM)	2724. (77.1)	4719. (133.6)	2736. (77.5)

HC SAMPLE METER/RANGE/PPM (BAG)	23.9/ 2/ 23.89	56.2/ 1/ 5.66	83.0/ 1/ 8.36
HC BCKGRD METER/RANGE/PPM	5.5/ 2/ 5.50	53.8/ 1/ 5.42	55.2/ 1/ 5.56
CO SAMPLE METER/RANGE/PPM	90.3/ 12/ 90.40	4.0/ 12/ 3.86	18.0/ 12/ 17.42
CO BCKGRD METER/RANGE/PPM	1.3/ 12/ 1.25	1.2/ 12/ 1.16	.9/ 12/ .87
CO2 SAMPLE METER/RANGE/PCT	58.7/ 1/ 1.0797	81.9/ 14/ .6909	92.4/ 14/ .9289
CO2 BCKGRD METER/RANGE/PCT	2.5/ 1/ .0463	12.6/ 14/ .0406	12.6/ 14/ .0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	25.8/ 1/ 6.47	1.3/ 1/ .33	2.5/ 1/ .63
NOX BCKGRD METER/RANGE/PPM	.0/ 1/ .00	.0/ 1/ .00	.0/ 1/ .00
CH4 SAMPLE PPM (1.160)	3.83	2.39	2.92
CH4 BCKGRD PPM	2.46	2.51	2.48

DILUTION FACTOR	12.20	19.23	14.29
HC CONCENTRATION PPM	18.84	.52	3.19
CO CONCENTRATION PPM	85.55	2.65	15.97
CO2 CONCENTRATION PCT	1.0372	.6524	.8912
NOX CONCENTRATION PPM	6.47	.33	.63
CH4 CONCENTRATION PPM	1.57	.01	.61
NMHC CONCENTRATION PPM	17.02	.51	2.48

THC MASS GRAMS	.850	.040	.142
CO MASS GRAMS	7.683	.413	1.440
CO2 MASS GRAMS	1464.92	1596.23	1264.21
NOX MASS GRAMS	.976	.085	.095
CH4 MASS GRAMS	.081	.001	.032
NMHC MASS GRAMS (FID)	.757	.040	.111
FUEL MASS KG	.479	.517	.410
FUEL ECONOMY MPG (L/100KM)	21.10 (11.15)	20.91 (11.25)	24.59 (9.57)

3-BAG COMPOSITE RESULTS

THC G/MI	.065	CH4 G/MI	.007
CO G/MI	.606	NMHC G/MI	.057
NOX G/MI	.075	CARBONYL G/MI	.001
FUEL ECONOMY MPG (L/100KM)	21.88 (10.75)	NMOG G/MI	.058 (RAF=1.00)

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 COMPUTER PROGRAM LDT 1.2-R 3-BAG CARB FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-6969-001

VEHICLE NUMBER GA2	TEST BLB-RFA-01	GASOLINE RFA EM-1700-F
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/17/95 RUN	FUEL DENSITY 6.163 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .137 C .863 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	INDUSTRY AVERAGE
ODOMETER 1893 MILES (3045 KM)	TEST WEIGHT 3375 LBS (1530 KG)	RF-A

BAROMETER 29.18 IN HG (741.2 MM HG) DRY BULB TEMPERATURE 72.0°F (22.2°C) NOX HUMIDITY C.F. 1.041
 RELATIVE HUMIDITY 69.0 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.0	867.4	505.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.971/.981	.974/.981	.972/.981
MEASURED DISTANCE MILES (KM)	3.62 (5.82)	3.84 (6.19)	3.61 (5.81)
BLOWER FLOW RATE SCFM (SCHM)	322.1 (9.12)	325.2 (9.21)	323.6 (9.16)
GAS METER FLOW RATE SCFM (SCHM)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCH)	2711. (76.8)	4701. (133.1)	2726. (77.2)

HC SAMPLE METER/RANGE/PPM (BAG)	27.6/ 2/ 27.58	59.1/ 1/ 5.95	87.5/ 1/ 8.81
HC BCKGRD METER/RANGE/PPM	5.7/ 2/ 5.70	56.3/ 1/ 5.67	53.9/ 1/ 5.43
CO SAMPLE METER/RANGE/PPM	48.5/ 13/ 111.87	4.6/ 12/ 4.44	22.8/ 12/ 22.10
CO BCKGRD METER/RANGE/PPM	.2/ 13/ .44	.0/ 12/ .00	.0/ 12/ .00
CO2 SAMPLE METER/RANGE/PCT	58.0/ 1/ 1.0666	82.6/ 14/ .7045	93.8/ 14/ .9673
CO2 BCKGRD METER/RANGE/PCT	2.3/ 1/ .0426	12.0/ 14/ .0384	12.0/ 14/ .0384
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	27.9/ 1/ 7.00	.8/ 1/ .20	2.2/ 1/ .55
NOX BCKGRD METER/RANGE/PPM	.6/ 1/ .15	.6/ 1/ .15	.4/ 1/ .10
CH4 SAMPLE PPM (1.160)	4.07	2.46	2.88
CH4 BCKGRD PPM	2.47	2.50	2.34

DILUTION FACTOR	12.37	18.94	13.77
HC CONCENTRATION PPM	22.35	.58	3.78
CO CONCENTRATION PPM	106.66	4.28	21.19
CO2 CONCENTRATION PCT	1.0274	.6682	.9317
NOX CONCENTRATION PPM	6.86	.06	.46
CH4 CONCENTRATION PPM	1.80	.09	.71
NMHC CONCENTRATION PPM	20.26	.47	2.95

FIDHC MASS GRAMS	.992	.045	.169
CO MASS GRAMS	9.533	.663	1.905
CO2 MASS GRAMS	1444.12	1628.72	1316.71
NOX MASS GRAMS	1.048	.015	.070
CH4 MASS GRAMS	.092	.008	.036
NMHC MASS GRAMS (FID)	.897	.036	.131
FUEL MASS KG	.463	.516	.418
FUEL ECONOMY MPG (L/100KM)	21.86 (10.76)	20.85 (11.29)	24.19 (9.73)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.076	CH4 G/MI	.009
CO G/MI	.784	NMHC G/MI	.067
NOX G/MI	.068		
FUEL ECONOMY MPG (L/100KM)	21.90 (10.74)		

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 COMPUTER PROGRAM LDT 1.2-R 3-BAG CARB FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-6969-001

VEHICLE NUMBER GA2	TEST BLB-RFA-02S	GASOLINE RFA	EM-1700-F
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/18/95 RUN	FUEL DENSITY 6.163 LB/GAL	
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .137 C .863 O .000 X .000	
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	INDUSTRY AVERAGE	
ODOMETER 1904 MILES (3063 KM)	TEST WEIGHT 3375 LBS (1530 KG)	RF-A	

BAROMETER 29.18 IN HG (741.2 MM HG) DRY BULB TEMPERATURE 72.0°F (22.2°C) NOX HUMIDITY C.F. .993
 RELATIVE HUMIDITY 61.0 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.1	866.4	505.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.973/.983	.977/.983	.974/.983
MEASURED DISTANCE MILES (KM)	3.62 (5.83)	3.89 (6.26)	3.64 (5.86)
BLOWER FLOW RATE SCFM (SCMH)	325.0 (9.20)	326.2 (9.24)	324.4 (9.19)
GAS METER FLOW RATE SCFM (SCMH)	.13 (.00)	.14 (.00)	.13 (.00)
TOTAL FLOW SCF (SCM)	2737. (77.5)	4712. (133.5)	2733. (77.4)

HC SAMPLE METER/RANGE/PPM (BAG)	24.3/ 2/ 24.29	53.9/ 1/ 5.43	82.9/ 1/ 8.35
HC BCKGRD METER/RANGE/PPM	5.0/ 2/ 5.00	52.4/ 1/ 5.28	53.2/ 1/ 5.36
CO SAMPLE METER/RANGE/PPM	85.6/ 12/ 85.51	5.7/ 12/ 5.50	21.6/ 12/ 20.93
CO BCKGRD METER/RANGE/PPM	.6/ 12/ .58	.4/ 12/ .39	.6/ 12/ .58
CO2 SAMPLE METER/RANGE/PCT	58.1/ 1/ 1.0685	82.6/ 14/ .7045	93.2/ 14/ .9506
CO2 BCKGRD METER/RANGE/PCT	2.6/ 1/ .0482	13.1/ 14/ .0425	13.2/ 14/ .0429
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	31.6/ 1/ 7.92	.6/ 1/ .15	3.2/ 1/ .80
NOX BCKGRD METER/RANGE/PPM	.5/ 1/ .13	.5/ 1/ .13	.7/ 1/ .18
CH4 SAMPLE PPM (1.160)	3.67	2.31	2.73
CH4 BCKGRD PPM	2.33	2.31	2.27

DILUTION FACTOR	12.38	18.94	14.01
HC CONCENTRATION PPM	19.69	.43	3.37
CO CONCENTRATION PPM	81.52	4.96	19.60
CO2 CONCENTRATION PCT	1.0241	.6642	.9108
NOX CONCENTRATION PPM	7.81	.03	.64
CH4 CONCENTRATION PPM	1.52	.12	.63
NMEC CONCENTRATION PPM	17.92	.29	2.65

THC MASS GRAMS	.895	.036	.153
CO MASS GRAMS	7.356	.771	1.767
CO2 MASS GRAMS	1453.27	1622.95	1290.81
NOX MASS GRAMS	1.149	.008	.094
CH4 MASS GRAMS	.079	.011	.032
NMEC MASS GRAMS (FTD)	.801	.023	.118
FUEL MASS KG	.464	.514	.409
FUEL ECONOMY MPG (L/100KM)	21.81 (10.79)	21.16 (11.12)	24.85 (9.47)

3-BAG COMPOSITE RESULTS

THC G/MI	.068	CH4 G/MI	.008
CO G/MI	.657	NMEC G/MI	.058
NOX G/MI	.074	CARBONYL G/MI	.001
FUEL ECONOMY MPG (L/100KM)	22.22 (10.59)	NMOG G/MI	.059 (RAF=1.00)

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COMPUTER PROGRAM LDT 1.2-R

3-BAG CARB FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6969-001

VEHICLE NUMBER	GA2	TEST	100NB-01	BUTANE	BUTANE
VEHICLE MODEL	94 PONT GRANDAM	DATE	9/ 7/95	RUN	FUEL DENSITY
ENGINE	2.3 L (138 CID)--4	DYNO	3	BAG CART	2
TRANSMISSION	A4	ACTUAL ROAD LOAD	6.60 HP (4.92 KW)	H	.172 C .828 0 .000 X .000
ODOMETER	1636 MILES (2632 KM)	TEST WEIGHT	3375 LBS (1530 KG)		

BAROMETER 29.14 IN HG (740.2 MM HG)
RELATIVE HUMIDITY 69.8 PCT.

DRY BULB TEMPERATURE 74.0°F (23.3°C)

NOX HUMIDITY C.F. 1.078

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	505.5	866.7	505.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.967/.979	.971/.979	.968/.979
MEASURED DISTANCE MILES (KM)	3.64 (5.86)	3.89 (6.25)	3.64 (5.86)
BLOWER FLOW RATE SCFM (SCMH)	319.9 (9.06)	320.7 (9.08)	320.9 (9.09)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2695. (76.3)	4632. (131.2)	2702. (76.5)

HC SAMPLE METER/RANGE/PPM (BAG)	26.0/ 2/ 25.98	58.8/ 1/ 5.92	10.7/ 2/ 10.69
HC BCKGRD METER/RANGE/PPM	6.0/ 2/ 6.00	56.8/ 1/ 5.72	6.3/ 2/ 6.30
CO SAMPLE METER/RANGE/PPM	78.8/ 13/ 190.17	19.0/ 12/ 18.61	68.3/ 12/ 67.60
CO BCKGRD METER/RANGE/PPM	.4/ 13/ .88	.5/ 12/ .50	.7/ 12/ .70
CO2 SAMPLE METER/RANGE/PCT	95.8/ 14/ 1.0256	81.7/ 14/ .6871	91.4/ 14/ .9027
CO2 BCKGRD METER/RANGE/PCT	12.8/ 14/ .0414	12.6/ 14/ .0406	12.8/ 14/ .0414
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	4.6/ 1/ 1.15	.7/ 1/ .18	.8/ 1/ .20
NOX BCKGRD METER/RANGE/PPM	.9/ 1/ .23	.7/ 1/ .18	.7/ 1/ .18
CH4 SAMPLE PPM (1.160)	4.13	2.38	4.10
CH4 BCKGRD PPM	2.29	2.22	2.30

DILUTION FACTOR	11.47	17.41	13.19
HC CONCENTRATION PPM	20.51	.53	4.87
CO CONCENTRATION PPM	180.73	17.45	64.08
CO2 CONCENTRATION PCT	.9878	.6488	.8644
NOX CONCENTRATION PPM	.95	.01	.04
CH4 CONCENTRATION PPM	2.04	.28	1.98
NMHC CONCENTRATION PPM	18.15	.20	2.58

FIDHC MASS GRAMS	.943	.042	.225
CO MASS GRAMS	16.058	2.664	5.709
CO2 MASS GRAMS	1380.36	1558.09	1211.12
NOX MASS GRAMS	.149	.003	.006
CH4 MASS GRAMS	.104	.025	.101
NMHC MASS GRAMS (FID)	.799	.015	.114
FUEL MASS KG	.465	.515	.403
FUEL ECONOMY MPG (L/100KM)	17.16 (13.71)	16.53 (14.23)	19.82 (11.87)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.076	CH4 G/MI	.017
CO G/MI	1.704	NMHC G/MI	.056
NOX G/MI	.009		
FUEL ECONOMY MPG (L/100KM)	17.48 (13.46)		

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VEHICLE NUMBER GA2	TEST 100NB-02S	BUTANE BUTANE
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/ 6/95 RUN	FUEL DENSITY 4.830 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .172 C .828 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER 1624 MILES (2613 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.23 IN HG (742.4 MM HG)	DRY BULB TEMPERATURE 74.0°F (23.3°C)	NOX HUMIDITY C.F. 1.049
RELATIVE HUMIDITY 65.8 PCT.		

	1	2	3
BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	506.0	866.1	505.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.969/.981	.972/.981	.970/.981
MEASURED DISTANCE MILES (KM)	3.63 (5.84)	3.90 (6.28)	3.62 (5.83)
BLOWER FLOW RATE SCFM (SCMH)	325.4 (9.21)	325.8 (9.23)	324.2 (9.18)
GAS METER FLOW RATE SCFM (SCMH)	.13 (.00)	.14 (.00)	.13 (.00)
TOTAL FLOW SCF (SCM)	2745. (77.7)	4704. (133.2)	2731. (77.3)

HC SAMPLE METER/RANGE/PPM (BAG)	29.3/ 2/ 29.28	69.4/ 1/ 6.99	13.3/ 2/ 13.29
HC BCKGRD METER/RANGE/PPM	7.0/ 2/ 7.00	70.8/ 1/ 7.13	6.9/ 2/ 6.90
CO SAMPLE METER/RANGE/PPM	71.0/ 13/ 169.42	19.8/ 12/ 19.39	45.4/ 13/ 104.25
CO BCKGRD METER/RANGE/PPM	.3/ 13/ .66	1.2/ 12/ 1.19	.7/ 13/ 1.55
CO2 SAMPLE METER/RANGE/PCT	94.1/ 14/ .9758	81.3/ 14/ .6794	90.4/ 14/ .8772
CO2 BCKGRD METER/RANGE/PCT	12.6/ 14/ .0406	12.8/ 14/ .0414	12.9/ 14/ .0418
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	6.4/ 1/ 1.60	.7/ 1/ .18	.7/ 1/ .18
NOX BCKGRD METER/RANGE/PPM	.6/ 1/ .15	.6/ 1/ .15	.5/ 1/ .13
CH4 SAMPLE PPM (1.160)	4.21	2.47	4.60
CH4 BCKGRD PPM	2.45	2.32	2.29

DILUTION FACTOR	12.06	17.60	13.51
HC CONCENTRATION PPM	22.87	.26	6.91
CO CONCENTRATION PPM	161.52	17.58	98.59
CO2 CONCENTRATION PCT	.9385	.6404	.8386
NOX CONCENTRATION PPM	1.47	.03	.06
CH4 CONCENTRATION PPM	1.96	.29	2.48
NMHC CONCENTRATION PPM	20.59	-.07	4.03

THC MASS GRAMS	1.035	.030	.309
CO MASS GRAMS	14.618	2.727	8.877
CO2 MASS GRAMS	1335.84	1562.10	1187.42
NOX MASS GRAMS	.229	.009	.009
CH4 MASS GRAMS	.102	.026	.128
NMHC MASS GRAMS (FID)	.923	.000	.180
FUEL MASS KG	.449	.517	.397
FUEL ECONOMY MPG (L/100KM)	17.70 (13.29)	16.55 (14.21)	20.00 (11.76)

3-BAG COMPOSITE RESULTS

THC G/MI	.086	CH4 G/MI	.019
CO G/MI	1.869	NMHC G/MI	.066
NOX G/MI	.015	CARBONYL G/MI	.001
FUEL ECONOMY MPG (L/100KM)	17.64 (13.34)	NMOG G/MI	.068 (RAF=1.00)

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VEHICLE NUMBER GA2	TEST HD5-01	PROPANE
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/19/95 RUN	FUEL DENSITY 4.410 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .183 C .817 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	100% PROPANE
ODOMETER 1943 MILES (3126 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.07 IN HG (738.4 MM HG) DRY BULB TEMPERATURE 74.0°F (23.3°C) NOX HUMIDITY C.F. 1.080
 RELATIVE HUMIDITY 69.8 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	504.9	867.1	505.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.967/.979	.971/.979	.968/.979
MEASURED DISTANCE MILES (KM)	3.63 (5.83)	3.90 (6.27)	3.64 (5.85)
BLOWER FLOW RATE SCFH (SCMH)	322.5 (9.13)	323.7 (9.17)	321.9 (9.12)
GAS METER FLOW RATE SCFH (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2714. (76.9)	4677. (132.5)	2710. (76.7)

HC SAMPLE METER/RANGE/PPM (BAG)	23.1/ 2/ 23.09	61.2/ 1/ 6.16	71.8/ 1/ 7.23
HC BCKGRD METER/RANGE/PPM	5.7/ 2/ 5.70	59.4/ 1/ 5.98	56.6/ 1/ 5.70
CO SAMPLE METER/RANGE/PPM	35.7/ 12/ 34.78	4.9/ 12/ 4.73	10.7/ 12/ 10.34
CO BCKGRD METER/RANGE/PPM	.5/ 12/ .48	.2/ 12/ .19	.1/ 12/ .10
CO2 SAMPLE METER/RANGE/PCT	93.6/ 14/ .9617	80.0/ 14/ .6552	89.6/ 14/ .8575
CO2 BCKGRD METER/RANGE/PCT	12.7/ 14/ .0410	12.6/ 14/ .0406	12.7/ 14/ .0410
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.2/ 1/ 2.56	.9/ 1/ .23	7.9/ 1/ 1.98
NOX BCKGRD METER/RANGE/PPM	.6/ 1/ .15	.5/ 1/ .13	.7/ 1/ .18
CH4 SAMPLE PPM (1.160)	2.83	2.13	2.74
CH4 BCKGRD PPM	2.25	2.19	2.13

DILUTION FACTOR	12.02	17.71	13.53
HC CONCENTRATION PPM	17.86	.52	1.95
CO CONCENTRATION PPM	32.78	4.37	9.81
CO2 CONCENTRATION PCT	.9241	.6169	.8196
NOX CONCENTRATION PPM	2.42	.11	1.82
CH4 CONCENTRATION PPM	.77	.06	.77
NMHC CONCENTRATION PPM	16.98	.45	1.06

HC MASS GRAMS	.839	.042	.091
CO MASS GRAMS	2.933	.674	.876
CO2 MASS GRAMS	1300.27	1496.16	1151.41
NOX MASS GRAMS	.384	.029	.288
CH4 MASS GRAMS	.039	.006	.040
NMHC MASS GRAMS (FID)	.796	.036	.049
FUEL MASS KG	.437	.500	.385
FUEL ECONOMY MPG (L/100KM)	16.60 (14.17)	15.59 (15.09)	18.87 (12.46)

3-BAG COMPOSITE RESULTS

HC	G/MI	.060	CH4	G/MI	.006
CO	G/MI	.323	NMHC	G/MI	.054
NOX	G/MI	.048			
FUEL ECONOMY MPG (L/100KM)		16.61 (14.17)			

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VEHICLE NUMBER GA2	TEST HD5-02S	PROPANE 100%
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/20/95 RUN	FUEL DENSITY 4.410 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .183 C .817 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER 1957 MILES (3148 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.20 IN HG (741.7 MM HG)	DRY BULB TEMPERATURE 72.0°F (22.2°C)	NOX HUMIDITY C.F. .993
RELATIVE HUMIDITY 60.9 PCT.		

	1	2	3
BAG NUMBER	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
BAG DESCRIPTION	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	505.2	866.3	505.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.970/.983	.975/.983	.972/.983
MEASURED DISTANCE MILES (KM)	3.65 (5.88)	3.88 (6.24)	3.61 (5.81)
BLOWER FLOW RATE SCFM (SCMM)	325.5 (9.22)	326.8 (9.25)	326.6 (9.25)
GAS METER FLOW RATE SCFM (SCMM)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2740. (77.6)	4718. (133.6)	2750. (77.9)

HC SAMPLE METER/RANGE/PPM (BAG)	20.5/ 2/ 20.49	52.8/ 1/ 5.32	68.5/ 1/ 6.90
HC BCKGRD METER/RANGE/PPM	4.9/ 2/ 4.90	52.2/ 1/ 5.26	52.9/ 1/ 5.33
CO SAMPLE METER/RANGE/PPM	34.3/ 12/ 33.40	4.6/ 12/ 4.44	11.8/ 12/ 11.40
CO BCKGRD METER/RANGE/PPM	.4/ 12/ .39	.4/ 12/ .39	.9/ 12/ .87
CO2 SAMPLE METER/RANGE/PCT	53.5/ 1/ .9824	79.9/ 14/ .6534	88.9/ 14/ .8407
CO2 BCKGRD METER/RANGE/PCT	2.5/ 1/ .0463	12.2/ 14/ .0391	12.3/ 14/ .0395
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.7/ 1/ 2.43	1.8/ 1/ .45	5.7/ 1/ 1.43
NOX BCKGRD METER/RANGE/PPM	.9/ 1/ .23	.4/ 1/ .10	.3/ 1/ .08
CH4 SAMPLE PPM (1.140)	2.62	2.07	2.76
CH4 BCKGRD PPM	2.14	2.11	2.12

DILUTION FACTOR	11.77	17.76	13.80
HC CONCENTRATION PPM	16.01	.36	1.96
CO CONCENTRATION PPM	31.63	3.93	10.17
CO2 CONCENTRATION PCT	.9400	.6165	.8041
NOX CONCENTRATION PPM	2.23	.36	1.36
CH4 CONCENTRATION PPM	.66	.08	.79
NMHC CONCENTRATION PPM	15.25	.26	1.05

HC MASS GRAMS	.759	.029	.093
CO MASS GRAMS	2.857	.611	.922
CO2 MASS GRAMS	1335.61	1508.12	1146.39
NOX MASS GRAMS	.328	.090	.201
CH4 MASS GRAMS	.034	.007	.041
NMHC MASS GRAMS (FID)	.722	.021	.050
FUEL MASS KG	.449	.504	.384
FUEL ECONOMY MPG (L/100KM)	16.29 (14.44)	15.39 (15.28)	18.82 (12.50)

3-BAG COMPOSITE RESULTS

HC G/MI	.054	CH4 G/MI	.006
CO G/MI	.315	NMHC G/MI	.048
NOX G/MI	.046		
FUEL ECONOMY MPG (L/100KM) 16.42 (14.33)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 1.2-R 3-BAG CARB FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-6969-001

VEHICLE NUMBER GA2	TEST 90NB/10IB-01	BUTANE BUTANE
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/ 9/95 RUN	FUEL DENSITY 4.859 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .170 C .830 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	90% BUTANE
ODOMETER 1724 MILES (2773 KM)	TEST WEIGHT 3375 LBS (1530 KG)	10% ISOBUTANE

BAROMETER 29.18 IN HG (741.2 MM HG)	DRY BULB TEMPERATURE 75.0°F (23.9°C)	NOX HUMIDITY C.F. 1.041
RELATIVE HUMIDITY 62.4 PCT.		

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	506.1	867.2	505.6
DRY/WET CORRECTION FACTOR, SAMP/BACK	.969/.981	.973/.981	.970/.981
MEASURED DISTANCE MILES (KM)	3.63 (5.84)	3.90 (6.28)	3.63 (5.84)
BLOWER FLOW RATE SCFM (SCMH)	321.5 (9.10)	322.9 (9.15)	321.7 (9.11)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2712. (76.8)	4667. (132.2)	2711. (76.8)

HC SAMPLE METER/RANGE/PPM (BAG)	28.2/ 2/ 28.18	63.9/ 1/ 6.43	10.4/ 2/ 10.39
HC BCKGRD METER/RANGE/PPM	6.2/ 2/ 6.20	62.3/ 1/ 6.27	6.1/ 2/ 6.10
CO SAMPLE METER/RANGE/PPM	81.8/ 13/ 198.23	20.2/ 12/ 19.78	59.5/ 12/ 58.61
CO BCKGRD METER/RANGE/PPM	.5/ 13/ 1.10	1.1/ 12/ 1.09	.9/ 12/ .90
CO2 SAMPLE METER/RANGE/PCT	54.0/ 1/ .9917	81.3/ 14/ .6794	90.4/ 14/ .8772
CO2 BCKGRD METER/RANGE/PCT	2.6/ 1/ .0482	12.8/ 14/ .0414	12.8/ 14/ .0414
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.7/ 1/ .93	.6/ 1/ .15	.6/ 1/ .15
NOX BCKGRD METER/RANGE/PPM	.7/ 1/ .18	.6/ 1/ .15	.6/ 1/ .15
CH4 SAMPLE PPM (1.160)	4.06	2.43	4.25
CH4 BCKGRD PPM	2.16	2.33	2.47

DILUTION FACTOR	11.92	17.72	13.67
HC CONCENTRATION PPM	22.51	.51	4.74
CO CONCENTRATION PPM	188.88	18.07	55.47
CO2 CONCENTRATION PCT	.9476	.6404	.8389
NOX CONCENTRATION PPM	.77	.01	.01
CH4 CONCENTRATION PPM	2.08	.23	1.97
NMHC CONCENTRATION PPM	20.10	.24	2.46

FIDHC MASS GRAMS	1.040	.041	.219
CO MASS GRAMS	16.887	2.780	4.958
CO2 MASS GRAMS	1332.36	1549.71	1179.17
NOX MASS GRAMS	.117	.002	.002
CH4 MASS GRAMS	.106	.021	.101
NMHC MASS GRAMS (FID)	.890	.019	.109
FUEL MASS KG	.448	.511	.391
FUEL ECONOMY MPG (L/100KM)	17.86 (13.17)	16.82 (13.98)	20.48 (11.49)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.081	CH4 G/MI	.016
CO G/MI	1.709	NMHC G/MI	.062
NOX G/MI	.007		
FUEL ECONOMY MPG (L/100KM)	17.93 (13.12)		

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 1.2-R 3-BAG CARB FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-6969-001

VEHICLE NUMBER GA2	TEST 90NB/10IB-02S	BUTANE BUTANE
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/ 8/95 RUN	FUEL DENSITY 4.859 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .170 C .830 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	90% BUTANE
ODOMETER 1674 MILES (2693 KM)	TEST WEIGHT 3375 LBS (1530 KG)	10% ISOBUTANE

BAROMETER 29.14 IN HG (740.2 MM HG) DRY BULB TEMPERATURE 76.0°F (24.4°C) NOX HUMIDITY C.F. 1.089
 RELATIVE HUMIDITY 66.7 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	506.2	867.2	505.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.967/.979	.971/.979	.968/.979
MEASURED DISTANCE MILES (KM)	3.66 (5.89)	3.89 (6.27)	3.67 (5.90)
BLOWER FLOW RATE SCFM (SCMH)	319.8 (9.06)	321.3 (9.10)	319.9 (9.06)
GAS METER FLOW RATE SCFM (SCMH)	.13 (.00)	.14 (.00)	.13 (.00)
TOTAL FLOW SCF (SCM)	2699. (76.4)	4646. (131.6)	2696. (76.3)

HC SAMPLE METER/RANGE/PPM (BAG)	25.6/ 2/ 25.59	68.1/ 1/ 6.86	86.4/ 1/ 8.70
HC BCKGRD METER/RANGE/PPM	7.4/ 2/ 7.40	70.8/ 1/ 7.13	61.4/ 1/ 6.18
CO SAMPLE METER/RANGE/PPM	80.4/ 13/ 194.47	20.6/ 12/ 20.16	48.7/ 12/ 47.73
CO BCKGRD METER/RANGE/PPM	.6/ 13/ 1.33	1.0/ 12/ .99	.7/ 12/ .70
CO2 SAMPLE METER/RANGE/PCT	55.0/ 1/ 1.0104	82.1/ 14/ .6948	90.7/ 14/ .8848
CO2 BCKGRD METER/RANGE/PCT	2.6/ 1/ .0482	13.5/ 14/ .0441	13.1/ 14/ .0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.9/ 1/ .98	.9/ 1/ .23	2.4/ 1/ .60
NOX BCKGRD METER/RANGE/PPM	1.1/ 1/ .28	.9/ 1/ .23	.9/ 1/ .23
CH4 SAMPLE PPM (1.160)	3.65	2.23	3.44
CH4 BCKGRD PPM	2.18	2.23	2.16

DILUTION FACTOR	11.72	17.33	13.58
HC CONCENTRATION PPM	18.82	.14	2.97
CO CONCENTRATION PPM	184.73	18.50	45.14
CO2 CONCENTRATION PCT	.9663	.6532	.8454
NOX CONCENTRATION PPM	.73	.01	.39
CH4 CONCENTRATION PPM	1.66	.14	1.44
NMHC CONCENTRATION PPM	16.89	-.02	1.30

THC MASS GRAMS	.843	.015	.134
CO MASS GRAMS	16.437	2.834	4.012
CO2 MASS GRAMS	1352.21	1573.66	1181.71
NOX MASS GRAMS	.116	.004	.062
CH4 MASS GRAMS	.085	.012	.073
NMHC MASS GRAMS (FID)	.745	.000	.057
FUEL MASS KG	.454	.519	.391
FUEL ECONOMY MPG (L/100KM)	17.76 (13.24)	16.54 (14.23)	20.67 (11.38)

3-BAG COMPOSITE RESULTS

THC G/MI	.060	CH4 G/MI	.012
CO G/MI	1.613	NMHC G/MI	.047
NOX G/MI	.012	CARBONYL G/MI	.001
FUEL ECONOMY MPG (L/100KM)	17.79 (13.22)	NMOG G/MI	.048 (RAF=1.00)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 1.2-R 3-BAG CARB FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-6969-001

VEHICLE NUMBER GA2	TEST 90NB/10BE-01	BUTANE BUTANE
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/10/95 RUN	FUEL DENSITY 4.916 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .170 C .830 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	90% BUTANE
ODOMETER 1724 MILES (2773 KM)	TEST WEIGHT 3375 LBS (1530 KG)	10% MIXED BUTENE

BAROMETER 29.25 IN HG (743.0 MM HG) DRY BULB TEMPERATURE 75.0°F (23.9°C) NOX HUMIDITY C.F. 1.015
 RELATIVE HUMIDITY 58.6 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.9	867.1	505.7
DRY/WET CORRECTION FACTOR, SAMP/BACK	.970/.982	.974/.982	.971/.982
MEASURED DISTANCE MILES (KM)	3.62 (5.82)	3.90 (6.28)	3.62 (5.83)
BLOWER FLOW RATE SCFM (SCHM)	322.6 (9.14)	323.3 (9.16)	322.5 (9.13)
GAS METER FLOW RATE SCFM (SCHM)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCH)	2720. (77.0)	4672. (132.3)	2718. (77.0)

HC SAMPLE METER/RANGE/PPM (BAG)	24.2/ 2/ 24.19	58.3/ 1/ 5.87	95.9/ 1/ 9.65
HC BCKGRD METER/RANGE/PPM	5.4/ 2/ 5.40	57.0/ 1/ 5.74	67.8/ 1/ 6.83
CO SAMPLE METER/RANGE/PPM	65.8/ 13/ 155.78	20.0/ 12/ 19.58	56.9/ 12/ 55.97
CO BCKGRD METER/RANGE/PPM	.1/ 13/ .22	.3/ 12/ .30	.3/ 12/ .30
CO2 SAMPLE METER/RANGE/PCT	54.0/ 1/ .9917	81.2/ 14/ .6775	90.7/ 14/ .8848
CO2 BCKGRD METER/RANGE/PCT	2.6/ 1/ .0482	12.7/ 14/ .0410	12.8/ 14/ .0414
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	4.9/ 1/ 1.23	.6/ 1/ .15	.5/ 1/ .13
NOX BCKGRD METER/RANGE/PPM	.3/ 1/ .08	.6/ 1/ .15	.4/ 1/ .10
CH4 SAMPLE PPM (1.160)	3.43	2.21	3.48
CH4 BCKGRD PPM	2.13	2.11	2.06

DILUTION FACTOR	11.98	17.77	13.56
HC CONCENTRATION PPM	19.24	.45	3.33
CO CONCENTRATION PPM	149.20	18.64	53.54
CO2 CONCENTRATION PCT	.9476	.6388	.8465
NOX CONCENTRATION PPM	1.16	.01	.03
CH4 CONCENTRATION PPM	1.48	.22	1.57
NMHC CONCENTRATION PPM	17.52	.20	1.51

FIDEC MASS GRAMS	.891	.036	.154
CO MASS GRAMS	13.379	2.871	4.799
CO2 MASS GRAMS	1336.25	1547.66	1193.10
NOX MASS GRAMS	.173	.002	.005
CH4 MASS GRAMS	.076	.019	.081
NMHC MASS GRAMS (FID)	.778	.015	.067
FUEL MASS KG	.447	.511	.395
FUEL ECONOMY MPG (L/100KM)	18.03 (13.05)	17.05 (13.80)	20.46 (11.50)

3-BAG COMPOSITE RESULTS

FIDEC G/MI	.067	CH4 G/MI	.013
CO G/MI	1.510	NMHC G/MI	.052
NOX G/MI	.011		
FUEL ECONOMY MPG (L/100KM)	18.09 (13.00)		

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.2-R

3-BAG CARB FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6969-001

VEHICLE NUMBER	GA2	TEST	90NB/10BE-02S	BUTANE	BUTANE
VEHICLE MODEL	94 PONT GRANDAM	DATE	9/11/95 RUN	FUEL DENSITY	4.916 LB/GAL
ENGINE	2.3 L (138 CID)--4	DYNO	3 BAG CART 2	H	.170 C .830 O .000 X .000
TRANSMISSION	A4	ACTUAL ROAD LOAD	6.60 HP (4.92 KW)	90% BUTANE	
ODOMETER	1724 MILES (2773 KM)	TEST WEIGHT	3375 LBS (1530 KG)	10% MIXED BUTENE	

BAROMETER	29.27 IN HG (743.5 MM HG)	DRY BULB TEMPERATURE	73.0°F (22.8°C)	NOX HUMIDITY C.F.	1.007
RELATIVE HUMIDITY	61.4 PCT.				

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.2	866.9	505.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.971/.983	.974/.983	.972/.983
MEASURED DISTANCE MILES (KM)	3.60 (5.80)	4.03 (6.49)	3.62 (5.83)
BLOWER FLOW RATE SCFM (SCMH)	322.6 (9.14)	325.4 (9.22)	323.1 (9.15)
GAS METER FLOW RATE SCFM (SCMH)	.13 (.00)	.15 (.00)	.13 (.00)
TOTAL FLOW SCF (SCM)	2717. (77.0)	4704. (133.2)	2721. (77.1)

HC SAMPLE METER/RANGE/PPM (BAG)	23.9/ 2/ 23.89	84.8/ 1/ 8.54	13.2/ 2/ 13.19
HC BCKGRD METER/RANGE/PPM	6.7/ 2/ 6.70	86.1/ 1/ 8.67	8.7/ 2/ 8.69
CO SAMPLE METER/RANGE/PPM	70.8/ 13/ 168.89	18.8/ 12/ 18.42	68.6/ 12/ 67.90
CO BCKGRD METER/RANGE/PPM	.5/ 13/ 1.10	1.0/ 12/ .99	.8/ 12/ .80
CO2 SAMPLE METER/RANGE/PCT	94.7/ 14/ .9930	81.4/ 14/ .6813	90.9/ 14/ .8898
CO2 BCKGRD METER/RANGE/PCT	13.5/ 14/ .0441	13.4/ 14/ .0437	13.4/ 14/ .0437
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	5.5/ 1/ 1.38	.7/ 1/ .18	.6/ 1/ .15
NOX BCKGRD METER/RANGE/PPM	.7/ 1/ .18	.6/ 1/ .15	.6/ 1/ .15
CH4 SAMPLE PPM (1.160)	3.85	2.53	4.05
CH4 BCKGRD PPM	2.48	2.48	2.34

DILUTION FACTOR	11.95	17.67	13.46
HC CONCENTRATION PPM	17.75	.36	5.14
CO CONCENTRATION PPM	160.82	16.85	64.49
CO2 CONCENTRATION PCT	.9527	.6401	.8494
NOX CONCENTRATION PPM	1.22	.03	.01
CH4 CONCENTRATION PPM	1.58	.19	1.89
NMHC CONCENTRATION PPM	15.91	.14	2.95

THC MASS GRAMS	.797	.028	.230
CO MASS GRAMS	14.407	2.614	5.787
CO2 MASS GRAMS	1342.12	1561.30	1198.54
NOX MASS GRAMS	.180	.009	.002
CH4 MASS GRAMS	.081	.017	.097
NMHC MASS GRAMS (FID)	.706	.010	.131
FUEL MASS KG	.450	.515	.397
FUEL ECONOMY MPG (L/100KM)	17.87 (13.16)	17.46 (13.48)	20.32 (11.57)

3-BAG COMPOSITE RESULTS

THC	G/MI	.066	CH4	G/MI	.014
CO	G/MI	1.584	NMHC	G/MI	.051
NOX	G/MI	.011	CARBONYL	G/MI	.001
FUEL ECONOMY MPG (L/100KM)	18.25 (12.89)		NMOG	G/MI	.052 (RAF=1.00)

VEHICLE NUMBER GA2	TEST 60NB/40IB-01	BUTANE BUTANE
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/14/95 RUN	FUEL DENSITY 4.806 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .172 C .828 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	60% BUTANE
ODOMETER 1800 MILES (2896 KM)	TEST WEIGHT 3375 LBS (1530 KG)	40% ISOBUTANE

BAROMETER 29.28 IN HG (743.7 MM HG) DRY BULB TEMPERATURE 74.0°F (23.3°C) NOX HUMIDITY C.F. 1.076

RELATIVE HUMIDITY 69.8 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	506.2	866.9	505.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.967/.980	.971/.980	.969/.980
MEASURED DISTANCE MILES (KM)	3.62 (5.83)	3.87 (6.22)	3.61 (5.80)
BLOWER FLOW RATE SCFM (SCHM)	321.2 (9.10)	322.9 (9.14)	323.4 (9.16)
GAS METER FLOW RATE SCFM (SCHM)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCH)	2710. (76.8)	4665. (132.1)	2723. (77.1)

HC SAMPLE METER/RANGE/PPM (BAG)	24.6/ 2/ 24.59	60.8/ 1/ 6.12	90.7/ 1/ 9.13
HC BCKGRD METER/RANGE/PPM	5.3/ 2/ 5.30	52.1/ 1/ 5.24	51.4/ 1/ 5.17
CO SAMPLE METER/RANGE/PPM	73.7/ 13/ 176.57	19.7/ 12/ 19.08	50.9/ 12/ 49.94
CO BCKGRD METER/RANGE/PPM	.5/ 13/ 1.10	.8/ 12/ .77	.6/ 12/ .58
CO2 SAMPLE METER/RANGE/PCT	95.4/ 14/ 1.0136	81.8/ 14/ .6890	91.0/ 14/ .8924
CO2 BCKGRD METER/RANGE/PCT	14.1/ 14/ .0464	13.5/ 14/ .0441	14.3/ 14/ .0472
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	5.5/ 1/ 1.38	.5/ 1/ .13	.8/ 1/ .20
NOX BCKGRD METER/RANGE/PPM	.6/ 1/ .15	.6/ 1/ .15	.5/ 1/ .13
CH4 SAMPLE PPM (1.160)	4.08	2.45	3.73
CH4 BCKGRD PPM	2.35	2.31	2.30

DILUTION FACTOR	11.63	17.38	13.38
HC CONCENTRATION PPM	19.74	1.18	4.34
CO CONCENTRATION PPM	167.60	17.64	47.30
CO2 CONCENTRATION PCT	.9712	.6475	.8487
NOX CONCENTRATION PPM	1.24	-.02	.08
CH4 CONCENTRATION PPM	1.93	.28	1.60
NMHC CONCENTRATION PPM	17.50	.86	2.49

FIDHC MASS GRAMS	.914	.094	.202
CO MASS GRAMS	14.975	2.714	4.246
CO2 MASS GRAMS	1364.75	1566.15	1198.21
NOX MASS GRAMS	.196	.000	.013
CH4 MASS GRAMS	.099	.024	.082
NMHC MASS GRAMS (FID)	.775	.065	.111
FUEL MASS KG	.459	.518	.397
FUEL ECONOMY MPG (L/100KM)	17.23 (13.65)	16.28 (14.45)	19.79 (11.89)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.080	CH4 G/MI	.015
CO G/MI	1.546	NMHC G/MI	.062
NOX G/MI	.012		
FUEL ECONOMY MPG (L/100KM)	17.34 (13.57)		

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
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VEHICLE NUMBER GA2	TEST 60NB/40IB-02S	BUTANE BUTANE
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/13/95 RUN	FUEL DENSITY 4.806 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .172 C .828 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	60% BUTANE
ODOMETER 1788 MILES (2876 KM)	TEST WEIGHT 3375 LBS (1530 KG)	40% ISOBUTANE

BAROMETER 29.22 IN HG (742.2 MM HG) DRY BULB TEMPERATURE 74.0°F (23.3°C) NOX HUMIDITY C.F. 1.077
 RELATIVE HUMIDITY 69.8 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.9	867.6	505.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.967/.980	.971/.980	.969/.980
MEASURED DISTANCE MILES (KM)	3.64 (5.86)	3.90 (6.27)	3.66 (5.89)
BLOWER FLOW RATE SCFM (SCMH)	325.8 (9.23)	325.5 (9.22)	-323.7 (9.17)
GAS METER FLOW RATE SCFM (SCMH)	.13 (.00)	.10 (.00)	.13 (.00)
TOTAL FLOW SCF (SCM)	2748. (77.8)	4709. (133.4)	2726. (77.2)

HC SAMPLE METER/RANGE/PPM (BAG)	23.6/ 2/ 23.59	61.8/ 1/ 6.22	10.0/ 2/ 9.99
HC BCKGRD METER/RANGE/PPM	5.6/ 2/ 5.60	56.8/ 1/ 5.72	5.4/ 2/ 5.40
CO SAMPLE METER/RANGE/PPM	70.1/ 13/ 167.05	21.6/ 12/ 20.93	63.5/ 12/ 62.71
CO BCKGRD METER/RANGE/PPM	.6/ 13/ 1.33	.8/ 12/ .77	1.0/ 12/ .96
CO2 SAMPLE METER/RANGE/PCT	94.4/ 14/ .9844	80.7/ 14/ .6682	90.3/ 14/ .8748
CO2 BCKGRD METER/RANGE/PCT	12.9/ 14/ .0418	12.7/ 14/ .0410	13.0/ 14/ .0421
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	4.0/ 1/ 1.00	.7/ 1/ .18	.8/ 1/ .20
NOX BCKGRD METER/RANGE/PPM	.9/ 1/ .23	.7/ 1/ .18	.8/ 1/ .20
CH4 SAMPLE PPM (1.160)	4.15	2.62	3.95
CH4 BCKGRD PPM	2.48	2.41	2.41

DILUTION FACTOR	11.98	17.91	13.62
HC CONCENTRATION PPM	18.46	.82	4.99
CO CONCENTRATION PPM	158.41	19.43	59.20
CO2 CONCENTRATION PCT	.9461	.6295	.8357
NOX CONCENTRATION PPM	.80	.01	.01
CH4 CONCENTRATION PPM	1.88	.35	1.72
NMHC CONCENTRATION PPM	16.28	.42	2.99

THC MASS GRAMS	.839	.064	.224
CO MASS GRAMS	14.353	3.017	5.319
CO2 MASS GRAMS	1348.06	1536.83	1181.03
NOX MASS GRAMS	.128	.003	.002
CH4 MASS GRAMS	.097	.031	.089
NMHC MASS GRAMS (FID)	.730	.032	.133
FUEL MASS KG	.453	.508	.392
FUEL ECONOMY MPG (L/100KM)	17.53 (13.42)	16.71 (14.07)	20.33 (11.57)

3-BAG COMPOSITE RESULTS

THC G/MI	.073	CH4 G/MI	.016
CO G/MI	1.620	NMHC G/MI	.056
NOX G/MI	.008	CARBONYL G/MI	.001
FUEL ECONOMY MPG (L/100KM)	17.78 (13.23)	NMOG G/MI	.057 (RAF=1.00)

VEHICLE NUMBER GA2	TEST 80NB/20NP-01	BUTANE PROPANE
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/21/95 RUN	FUEL DENSITY 4.748 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .175 C .825 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	80% BUTANE
ODOMETER 1995 MILES (3209 KM)	TEST WEIGHT 3375 LBS (1530 KG)	20% PROPANE

BAROMETER 29.14 IN HG (740.2 MM HG) DRY BULB TEMPERATURE 73.0°F (22.8°C) ROX HUMIDITY C.F. 1.059

RELATIVE HUMIDITY 69.4 PCT.

	1	2	3
BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	506.3	866.5	505.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.968/.980	.972/.980	.969/.980
MEASURED DISTANCE MILES (KM)	3.64 (5.86)	3.85 (6.20)	3.59 (5.78)
BLOWER FLOW RATE SCFM (SCHM)	320.7 (9.08)	324.1 (9.18)	322.3 (9.13)
GAS METER FLOW RATE SCFM (SCHM)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCH)	2706. (76.6)	4680. (132.5)	2715. (76.9)

HC SAMPLE METER/RANGE/PPH (BAG)	21.6/ 2/ 21.59	54.7/ 1/ 5.51	87.0/ 1/ 8.76
HC BCKGRD METER/RANGE/PPH	5.3/ 2/ 5.30	53.1/ 1/ 5.35	53.1/ 1/ 5.35
CO SAMPLE METER/RANGE/PPH	67.2/ 13/ 159.44	13.7/ 12/ 13.25	44.9/ 12/ 43.93
CO BCKGRD METER/RANGE/PPH	.5/ 13/ 1.10	1.0/ 12/ .96	.7/ 12/ .68
CO2 SAMPLE METER/RANGE/PCT	94.3/ 14/ .9815	80.5/ 14/ .6644	89.6/ 14/ .8575
CO2 BCKGRD METER/RANGE/PCT	13.7/ 14/ .0448	13.4/ 14/ .0437	13.3/ 14/ .0433
NOX SAMPLE METER/RANGE/PPH (BAG) (D)	4.7/ 1/ 1.18	.5/ 1/ .13	1.1/ 1/ .28
NOX BCKGRD METER/RANGE/PPH	.6/ 1/ .15	.5/ 1/ .13	.5/ 1/ .13
CH4 SAMPLE PPM (1.160)	3.66	2.30	3.74
CH4 BCKGRD PPM	2.40	2.32	2.37

DILUTION FACTOR	11.92	17.87	13.80
HC CONCENTRATION PPM	16.73	.46	3.80
CO CONCENTRATION PPM	151.33	11.86	41.48
CO2 CONCENTRATION PCT	.9404	.6232	.8174
NOX CONCENTRATION PPM	1.04	.01	.16
CH4 CONCENTRATION PPM	1.47	.11	1.54
NMHC CONCENTRATION PPM	15.03	.34	2.01

FIDHC MASS GRAMS	.776	.037	.177
CO MASS GRAMS	13.502	1.830	3.713
CO2 MASS GRAMS	1319.51	1512.33	1150.68
NOX MASS GRAMS	.162	.002	.025
CH4 MASS GRAMS	.075	.010	.079
NMHC MASS GRAMS (FID)	.664	.026	.089
FUEL MASS KG	.444	.501	.383
FUEL ECONOMY MPG (L/100KM)	17.64 (13.33)	16.55 (14.22)	20.21 (11.64)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.063	CH4 G/MI	.012
CO G/MI	1.304	NMHC G/MI	.048
NOX G/MI	.011		
FUEL ECONOMY MPG (L/100KM)	17.67 (13.31)		

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 1.2-R 3-BAG CARB FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-6969-001

VEHICLE NUMBER GA2	TEST 80NB/20NP-02S	BUTANE PROPANE
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/22/95 RUN	FUEL DENSITY 4.748 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .175 C .825 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	80% BUTANE
ODOMETER 2008 MILES (3230 KM)	TEST WEIGHT 3375 LBS (1530 KG)	20% PROPANE

BAROMETER 29.33 IN HG (745.0 MM HG) DRY BULB TEMPERATURE 70.0°F (21.1°C) WOX HUMIDITY C.F. .877
 RELATIVE HUMIDITY 40.5 PCT.

	1	2	3
BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	505.5	866.4	505.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.977/.990	.981/.990	.979/.990
MEASURED DISTANCE MILES (KM)	3.64 (5.85)	3.89 (6.25)	3.64 (5.86)
BLOWER FLOW RATE SCFM (SCMH)	323.5 (9.16)	328.7 (9.31)	328.3 (9.30)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2726. (77.2)	4746. (134.4)	2765. (78.3)

HC SAMPLE METER/RANGE/PPM (BAG)	21.3/	2/	21.29	35.0/	1/	3.52	11.0/	2/	10.99
HC BCKGRD METER/RANGE/PPM	3.4/	2/	3.40	35.6/	1/	3.58	3.5/	2/	3.50
CO SAMPLE METER/RANGE/PPM	45.0/	13/	103.28	10.4/	12/	10.05	79.0/	12/	78.65
CO BCKGRD METER/RANGE/PPM	.0/	13/	.00	.0/	12/	.00	.0/	12/	.00
CO2 SAMPLE METER/RANGE/PCT	94.5/	14/	.9872	80.0/	14/	.6552	89.3/	14/	.8503
CO2 BCKGRD METER/RANGE/PCT	12.1/	14/	.0387	12.1/	14/	.0387	12.1/	14/	.0387
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	7.0/	1/	1.76	.5/	1/	.13	.6/	1/	.15
NOX BCKGRD METER/RANGE/PPM	.6/	1/	.15	.1/	1/	.03	.5/	1/	.13
CH4 SAMPLE PPM (1.150)			3.11			1.95			3.94
CH4 BCKGRD PPM			1.99			1.99			2.03

DILUTION FACTOR	11.91	18.13	13.86
HC CONCENTRATION PPM	18.17	.14	7.75
CO CONCENTRATION PPM	99.62	9.77	76.11
CO2 CONCENTRATION PCT	.9517	.6186	.8143
NOX CONCENTRATION PPM	1.62	.10	.03
CH4 CONCENTRATION PPM	1.28	.07	2.05
NMHC CONCENTRATION PPM	16.70	.06	5.39

FIDHC MASS GRAMS	.849	.011	.367
CO MASS GRAMS	8.952	1.528	6.937
CO2 MASS GRAMS	1345.08	1522.43	1167.28
NOX MASS GRAMS	.209	.023	.004
CH4 MASS GRAMS	.066	.006	.107
NMHC MASS GRAMS (FID)	.743	.005	.243
FUEL MASS KG	.451	.505	.390
FUEL ECONOMY MPG (L/100KM)	17.37 (13.54)	16.59 (14.18)	20.10 (11.71)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.078	CH4 G/MI	.013
CO G/MI	1.240	NMHC G/MI	.062
NOX G/MI	.015		
FUEL ECONOMY MPG (L/100KM)	17.62 (13.35)		

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.2-R

3-BAG CARB FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6969-001

VEHICLE NUMBER	GA2	TEST	90NB/10PE-01	BUTANE	PENTANE
VEHICLE MODEL	94 PONT GRANDAM	DATE	9/27/95 RUN	FUEL DENSITY	4.916 LB/GAL
ENGINE	2.3 L (138 CID)--4	DYNO	3 BAG CART 2	H	.172 C .828 O .000 X .000
TRANSMISSION	A4	ACTUAL ROAD LOAD	6.60 HP (4.92 KW)	90% BUTANE	
ODOMETER	2081 MILES (3348 KH)	TEST WEIGHT	3375 LBS (1530 KG)	10% PENTANE	

BAROMETER	29.12 IN HG (739.6 MM HG)	DRY BULB TEMPERATURE	71.0°F (21.7°C)	NOX HUMIDITY C.F.	1.002
RELATIVE HUMIDITY	64.5 PCT.				

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	506.2	866.6	505.7
DRY/WET CORRECTION FACTOR, SAMP/BACK	.971/.983	.975/.983	.972/.983
MEASURED DISTANCE MILES (KH)	3.63 (5.84)	3.90 (6.28)	3.64 (5.85)
BLOWER FLOW RATE SCFH (SCHM)	325.1 (9.21)	325.8 (9.23)	322.9 (9.14)
GAS METER FLOW RATE SCFH (SCHM)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCH)	2743. (77.7)	4705. (133.3)	2721. (77.1)

HC SAMPLE METER/RANGE/PPH (BAG)	28.7/ 2/ 28.68	51.5/ 1/ 5.18	9.9/ 2/ 9.89
HC BCKGRD METER/RANGE/PPH	5.0/ 2/ 5.00	51.6/ 1/ 5.19	5.0/ 2/ 5.00
CO SAMPLE METER/RANGE/PPH	57.2/ 14/ 259.41	19.4/ 12/ 18.79	82.6/ 12/ 82.39
CO BCKGRD METER/RANGE/PPH	.1/ 14/ .40	.4/ 12/ .39	.5/ 12/ .48
CO2 SAMPLE METER/RANGE/PCT	94.3/ 14/ .9815	81.1/ 14/ .6757	90.4/ 14/ .8772
CO2 BCKGRD METER/RANGE/PCT	12.6/ 14/ .0406	12.8/ 14/ .0414	13.0/ 14/ .0421
NOX SAMPLE METER/RANGE/PPH (BAG) (D)	5.7/ 1/ 1.43	1.6/ 1/ .40	.7/ 1/ .18
NOX BCKGRD METER/RANGE/PPH	.5/ 1/ .13	.5/ 1/ .13	.7/ 1/ .18
CH4 SAMPLE PPM (1.150)	4.53	2.68	4.76
CH4 BCKGRD PPM	2.78	2.64	2.62

DILUTION FACTOR	11.90	17.72	13.56
HC CONCENTRATION PPM	24.11	.28	5.27
CO CONCENTRATION PPM	247.94	17.75	78.61
CO2 CONCENTRATION PCT	.9443	.6366	.8382
NOX CONCENTRATION PPM	1.31	.28	.01
CH4 CONCENTRATION PPM	1.98	.19	2.33
NMHC CONCENTRATION PPM	21.83	.06	2.59

FIDHC MASS GRAHS	1.129	.023	.245
CO MASS GRAHS	22.425	2.754	7.054
CO2 MASS GRAHS	1343.08	1553.10	1182.78
NOX MASS GRAHS	.196	.072	.002
CH4 MASS GRAHS	.103	.017	.120
NMHC MASS GRAHS (FID)	.978	.005	.115
FUEL MASS KG	.456	.514	.394
FUEL ECONOMY HPG (L/100KH)	17.78 (13.23)	16.95 (13.88)	20.59 (11.42)

3-BAG COMPOSITE RESULTS

FIDHC	G/HI	.086	CH4	G/HI	.017
CO	G/HI	2.178	NMHC	G/HI	.065
NOX	G/HI	.021			
FUEL ECONOMY HPG (L/100KH)		18.02 (13.06)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.2-R

3-BAG CARB FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6969-001

VEHICLE NUMBER	GA2	TEST	90NB/10PE-02S	BUTANE	PENTANE
VEHICLE MODEL	94 PONT GRANDAM	DATE	9/28/95 RUN	FUEL DENSITY	4.916 LB/GAL
ENGINE	2.3 L (138 CID)--4	DYNO	3 BAG CART 2	H	.172 C .828 O .000 X .000
TRANSMISSION	A4	ACTUAL ROAD LOAD	6.60 HP (4.92 KW)	90% BUTANE	
ODOMETER	2133 MILES (3431 KM)	TEST WEIGHT	3375 LBS (1530 KG)	10% PENTANE	

BAROMETER 29.14 IN HG (740.2 MM HG)
RELATIVE HUMIDITY 62.0 PCT.

DRY BULB TEMPERATURE 74.0°F (23.3°C)

NOX HUMIDITY C.F. 1.025

	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.5	866.9	505.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.970/.982	.973/.982	.971/.982
MEASURED DISTANCE MILES (KM)	3.63 (5.84)	3.88 (6.24)	3.61 (5.81)
BLOWER FLOW RATE SCFM (SCMH)	322.5 (9.13)	324.7 (9.20)	322.8 (9.14)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCH)	2717. (76.9)	4691. (132.9)	2719. (77.0)

HC SAMPLE METER/RANGE/PPH (BAG)	22.4/ 2/ 22.39	49.0/ 1/ 4.93	93.6/ 1/ 9.42
HC BCKGRD METER/RANGE/PPH	4.9/ 2/ 4.90	47.8/ 1/ 4.81	46.8/ 1/ 4.71
CO SAMPLE METER/RANGE/PPH	49.8/ 14/ 221.07	20.5/ 12/ 19.86	70.8/ 12/ 70.19
CO BCKGRD METER/RANGE/PPH	.4/ 14/ 1.62	.4/ 12/ .39	.4/ 12/ .39
CO2 SAMPLE METER/RANGE/PCT	94.7/ 14/ .9930	81.0/ 14/ .6738	90.0/ 14/ .8673
CO2 BCKGRD METER/RANGE/PCT	12.8/ 14/ .0414	12.6/ 14/ .0406	12.9/ 14/ .0418
NOX SAMPLE METER/RANGE/PPH (BAG) (D)	4.3/ 1/ 1.08	1.1/ 1/ .28	.9/ 1/ .23
NOX BCKGRD METER/RANGE/PPH	.9/ 1/ .23	.5/ 1/ .13	.9/ 1/ .23
CH4 SAMPLE PPM (1.150)	3.91	2.28	4.14
CH4 BCKGRD PPM	2.29	2.27	2.21

DILUTION FACTOR	11.82	17.77	13.73
HC CONCENTRATION PPM	17.90	.39	5.05
CO CONCENTRATION PPM	210.28	18.80	67.07
CO2 CONCENTRATION PCT	.9551	.6354	.8286
NOX CONCENTRATION PPM	.87	.16	.02
CH4 CONCENTRATION PPM	1.81	.14	2.10
NMHC CONCENTRATION PPM	15.82	.24	2.64

FIDHC MASS GRAMS	.830	.031	.235
CO MASS GRAMS	18.835	2.909	6.013
CO2 MASS GRAMS	1345.46	1545.71	1168.32
NOX MASS GRAMS	.131	.041	.002
CH4 MASS GRAMS	.093	.012	.108
NMHC MASS GRAMS (FID)	.702	.018	.117
FUEL MASS KG	.454	.511	.389
FUEL ECONOMY MPG (L/100KM)	17.81 (13.21)	16.92 (13.91)	20.73 (11.35)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.070	CH4 G/MI	.015
CO G/MI	1.925	NMHC G/MI	.052
NOX G/MI	.013		
FUEL ECONOMY MPG (L/100KM)	18.04 (13.04)		

VEHICLE NUMBER GA2	TEST 50NB/50NP-01	BUTANE PROPANE
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/25/95 RUN	FUEL DENSITY 4.558 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .178 C .822 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	50% BUTANE
ODOMETER 2060 MILES (3314 KM)	TEST WEIGHT 3375 LBS (1530 KG)	50% PROPANE

BAROMETER 29.14 IN HG (740.2 MM HG) DRY BULB TEMPERATURE 72.0°F (22.2°C) NOX HUMIDITY C.F. .951

RELATIVE HUMIDITY 53.2 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	504.8	866.9	505.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.973/.985	.977/.985	.974/.985
MEASURED DISTANCE MILES (KM)	3.63 (5.84)	3.87 (6.22)	3.63 (5.84)
BLOWER FLOW RATE SCFM (SCMH)	322.9 (9.14)	325.9 (9.23)	324.0 (9.18)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2717. (76.9)	4709. (133.4)	2727. (77.2)

HC SAMPLE METER/RANGE/PPM (BAG)	23.8/ 2/ 23.79	50.6/ 1/ 5.09	91.6/ 1/ 9.22
HC BCKGRD METER/RANGE/PPM	4.9/ 2/ 4.90	50.0/ 1/ 5.03	49.7/ 1/ 5.00
CO SAMPLE METER/RANGE/PPM	43.3/ 12/ 42.33	10.9/ 12/ 10.53	32.9/ 12/ 32.01
CO BCKGRD METER/RANGE/PPM	1.2/ 12/ 1.16	.7/ 12/ .68	.8/ 12/ .77
CO2 SAMPLE METER/RANGE/PCT	94.3/ 14/ .9815	80.7/ 14/ .6682	89.2/ 14/ .8479
CO2 BCKGRD METER/RANGE/PCT	13.7/ 14/ .0448	13.6/ 14/ .0444	12.9/ 14/ .0418
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	7.8/ 1/ 1.96	.5/ 1/ .13	.7/ 1/ .18
NOX BCKGRD METER/RANGE/PPM	.9/ 1/ .23	.5/ 1/ .13	.3/ 1/ .08
CH4 SAMPLE PPM (1.150)	3.02	2.24	3.19
CH4 BCKGRD PPM	2.29	2.26	2.22

DILUTION FACTOR	11.94	17.62	13.85
HC CONCENTRATION PPM	19.30	.35	4.58
CO CONCENTRATION PPM	39.61	9.56	30.14
CO2 CONCENTRATION PCT	.9404	.6262	.8091
NOX CONCENTRATION PPM	1.75	.01	.11
CH4 CONCENTRATION PPM	.92	.11	1.13
NMHC CONCENTRATION PPM	18.24	.22	3.29

FIDHC MASS GRAMS	.902	.028	.215
CO MASS GRAMS	3.547	1.485	2.710
CO2 MASS GRAMS	1324.63	1528.92	1144.22
NOX MASS GRAMS	.245	.002	.015
CH4 MASS GRAMS	.047	.010	.058
NMHC MASS GRAMS (FID)	.809	.017	.146
FUEL MASS KG	.443	.509	.382
FUEL ECONOMY MPG (L/100KM)	16.94 (13.89)	15.72 (14.96)	19.67 (11.96)

3-BAG COMPOSITE RESULTS

FIDHC G/HI	.072	CH4 G/HI	.008
CO G/HI	.608	NMHC G/HI	.060
NOX G/HI	.015		
FUEL ECONOMY MPG (L/100KM)	16.93 (13.90)		

VEHICLE NUMBER	GA2	TEST	50NB/50NP-02S	BUTANE	PROPANE
VEHICLE MODEL	94 PONT GRANDAM	DATE	9/26/95 RUN	FUEL DENSITY	4.558 LB/GAL
ENGINE	2.3 L (138 CID)--4	DYNO	3 BAG CART 2	H	.178 C .822 O .000 X .000
TRANSMISSION	A4	ACTUAL ROAD LOAD	6.60 HP (4.92 KW)	50% BUTANE	
ODOMETER	2081 MILES (3348 KM)	TEST WEIGHT	3375 LBS (1530 KG)	50% PROPANE	

BAROMETER 29.11 IN HG (739.4 MM HG)
RELATIVE HUMIDITY 52.6 PCT.

DRY BULB TEMPERATURE 71.0°F (21.7°C)

NOX HUMIDITY C.F. .940

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.3	866.8	504.5
DRY/WET CORRECTION FACTOR, SAMP/BACK	.973/.986	.977/.986	.975/.986
MEASURED DISTANCE MILES (KM)	3.65 (5.87)	3.90 (6.27)	3.63 (5.84)
BLOWER FLOW RATE SCFM (SCMH)	324.4 (9.19)	325.7 (9.22)	323.8 (9.17)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2732. (77.4)	4705. (133.2)	2722. (77.1)

HC SAMPLE METER/RANGE/PPM (BAG)	20.6/ 2/ 20.59	50.7/ 1/ 5.10	88.9/ 1/ 8.95
HC BCKGRD METER/RANGE/PPM	5.2/ 2/ 5.20	53.8/ 1/ 5.42	51.7/ 1/ 5.20
CO SAMPLE METER/RANGE/PPM	64.3/ 12/ 63.53	8.8/ 12/ 8.50	34.6/ 12/ 33.69
CO BCKGRD METER/RANGE/PPM	.4/ 12/ .39	.3/ 12/ .29	.5/ 12/ .48
CO2 SAMPLE METER/RANGE/PCT	94.3/ 14/ .9815	80.5/ 14/ .6644	89.5/ 14/ .8551
CO2 BCKGRD METER/RANGE/PCT	13.3/ 14/ .0433	13.2/ 14/ .0429	13.6/ 14/ .0444
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	7.5/ 1/ 1.88	.8/ 1/ .20	.9/ 1/ .23
NOX BCKGRD METER/RANGE/PPM	.5/ 1/ .13	.4/ 1/ .10	.3/ 1/ .08
CH4 SAMPLE PPM (1.150)	3.13	2.35	3.30
CH4 BCKGRD PPM	2.44	2.42	2.41

DILUTION FACTOR	11.92	17.72	13.73
HC CONCENTRATION PPM	15.83	-.01	4.12
CO CONCENTRATION PPM	60.67	7.96	32.02
CO2 CONCENTRATION PCT	.9418	.6240	.8139
NOX CONCENTRATION PPM	1.77	.11	.16
CH4 CONCENTRATION PPM	.90	.06	1.07
NMHC CONCENTRATION PPM	14.80	-.08	2.90

FIDHC MASS GRAMS	.744	.000	.193
CO MASS GRAMS	5.465	1.234	2.874
CO2 MASS GRAMS	1334.10	1522.08	1148.80
NOX MASS GRAMS	.245	.025	.022
CH4 MASS GRAMS	.046	.005	.055
NMHC MASS GRAMS (FID)	.660	.000	.129
FUEL MASS KG	.447	.506	.383
FUEL ECONOMY MPG (L/100KM)	16.88 (13.93)	15.91 (14.78)	19.59 (12.01)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.057	CH4 G/MI	.008
CO G/MI	.693	NMHC G/MI	.047
NOX G/MI	.019		
FUEL ECONOMY MPG (L/100KM)	17.01 (13.83)		

VEHICLE NUMBER GA2	TEST 20NB/80P-02S	20% BUTANE 80% PROP
VEHICLE MODEL 94 PONT GRANDAM	DATE 11/16/95 RUN	FUEL DENSITY 4.366 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .181 C .819 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER 2306 MILES (3710 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.35 IN HG (745.5 MM HG) DRY BULB TEMPERATURE 71.0°F (21.7°C) NOX HUMIDITY C.F. .856

RELATIVE HUMIDITY 34.2 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.8	866.6	505.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.991	.983/.991	.980/.991
MEASURED DISTANCE MILES (KM)	3.63 (5.84)	3.84 (6.17)	3.64 (5.85)
BLOWER FLOW RATE SCFM (SCMH)	326.6 (9.25)	328.5 (9.30)	327.2 (9.27)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2753. (78.0)	4744. (134.4)	2755. (78.0)

HC SAMPLE METER/RANGE/PPM (BAG)	21.9/ 2/ 21.89	81.3/ 1/ 8.18	10.2/ 2/ 10.19
HC BCKGRD METER/RANGE/PPM	7.0/ 2/ 7.00	81.3/ 1/ 8.18	7.9/ 2/ 7.90
CO SAMPLE METER/RANGE/PPM	43.1/ 12/ 42.13	9.6/ 12/ 9.27	23.1/ 12/ 22.40
CO BCKGRD METER/RANGE/PPM	.4/ 12/ .39	.3/ 12/ .29	.0/ 12/ .00
CO2 SAMPLE METER/RANGE/PCT	53.1/ 1/ .9749	79.3/ 14/ .6426	88.9/ 14/ .8407
CO2 BCKGRD METER/RANGE/PCT	2.6/ 1/ .0482	13.0/ 14/ .0421	12.9/ 14/ .0418
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	12.7/ 1/ 3.28	3.1/ 1/ .81	5.0/ 1/ 1.30
NOX BCKGRD METER/RANGE/PPM	1.4/ 1/ .37	.8/ 1/ .21	.6/ 1/ .16
CH4 SAMPLE PPM (1.160)	2.73	2.07	3.19
CH4 BCKGRD PPM	2.13	2.12	2.14

DILUTION FACTOR	11.91	18.14	13.85
HC CONCENTRATION PPM	15.48	.45	2.87
CO CONCENTRATION PPM	40.36	8.76	21.71
CO2 CONCENTRATION PCT	.9308	.6028	.8019
NOX CONCENTRATION PPM	2.94	.61	1.15
CH4 CONCENTRATION PPM	.78	.07	1.21
NMHC CONCENTRATION PPM	14.57	.37	1.46

FIDEC MASS GRAMS	.736	.037	.136
CO MASS GRAMS	3.664	1.371	1.972
CO2 MASS GRAMS	1328.73	1482.64	1145.68
NOX MASS GRAMS	.376	.134	.148
CH4 MASS GRAMS	.041	.006	.063
NMHC MASS GRAMS (FID)	.655	.029	.066
FUEL MASS KG	.446	.495	.383
FUEL ECONOMY MPG (L/100KM)	16.12 (14.59)	15.34 (15.33)	18.80 (12.51)

3-BAG COMPOSITE RESULTS

FIDEC G/MI	.058	CH4 G/MI	.008
CO G/MI	.545	NMHC G/MI	.047
NOX G/MI	.051		
FUEL ECONOMY MPG (L/100KM)	16.36 (14.38)		

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VEHICLE NUMBER	GA2	TEST 20NB/80P-03	20%BUTANE 80% PROP
VEHICLE MODEL	94 PONT GRANDAM	DATE 11/17/95 RUN	FUEL DENSITY 4.366 LB/GAL
ENGINE	2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .181 C .819 O .000 X .000
TRANSMISSION	A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER	2320 MILES (3732 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.22 IN HG (742.2 MM HG) DRY BULB TEMPERATURE 72.0°F (22.2°C) NOX HUMIDITY C.F. .971
 RELATIVE HUMIDITY 57.0 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	507.1	865.4	505.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.972/.984	.976/.984	.973/.984
MEASURED DISTANCE MILES (KM)	3.62 (5.82)	3.85 (6.19)	3.60 (5.79)
BLOWER FLOW RATE SCFH (SCMH)	322.6 (9.14)	324.2 (9.18)	322.6 (9.14)
GAS METER FLOW RATE SCFH (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2726. (77.2)	4676. (132.4)	2716. (76.9)

HC SAMPLE METER/RANGE/PPM (BAG)	21.7/ 2/ 21.69	63.0/ 1/ 6.34	92.8/ 1/ 9.34
HC BCKGRD METER/RANGE/PPM	6.3/ 2/ 6.30	64.4/ 1/ 6.48	66.9/ 1/ 6.73
CO SAMPLE METER/RANGE/PPM	66.4/ 12/ 65.67	10.5/ 12/ 10.14	28.2/ 12/ 27.39
CO BCKGRD METER/RANGE/PPM	.6/ 12/ .58	.6/ 12/ .58	.5/ 12/ .48
CO2 SAMPLE METER/RANGE/PCT	93.8/ 14/ .9673	80.0/ 14/ .6552	89.4/ 14/ .8527
CO2 BCKGRD METER/RANGE/PCT	12.8/ 14/ .0414	13.0/ 14/ .0421	12.9/ 14/ .0418
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	7.2/ 1/ 1.87	.8/ 1/ .21	1.2/ 1/ .31
NOX BCKGRD METER/RANGE/PPM	.2/ 1/ .05	.4/ 1/ .10	.6/ 1/ .16
CH4 SAMPLE PPM (1.160)	3.05	2.18	3.28
CH4 BCKGRD PPM	2.25	2.16	2.14

DILUTION FACTOR	11.98	17.80	13.65
HC CONCENTRATION PPM	15.92	.22	3.10
CO CONCENTRATION PPM	62.47	9.27	25.91
CO2 CONCENTRATION PCT	.9294	.6155	.8140
NOX CONCENTRATION PPM	1.82	.11	.17
CH4 CONCENTRATION PPM	.99	.14	1.29
NMHC CONCENTRATION PPM	14.77	.06	1.60

FIDHC MASS GRAMS	.749	.018	.145
CO MASS GRAMS	5.615	1.429	2.320
CO2 MASS GRAMS	1313.78	1492.15	1146.26
NOX MASS GRAMS	.261	.027	.024
CH4 MASS GRAMS	.051	.013	.066
NMHC MASS GRAMS (FID)	.658	.004	.071
FUEL MASS KG	.442	.498	.383
FUEL ECONOMY MPG (L/100KM)	16.21 (14.51)	15.30 (15.38)	18.58 (12.66)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.057	CH4 G/MI	.010
CO G/MI	.693	NMHC G/MI	.044
NOX G/MI	.021		
FUEL ECONOMY MPG (L/100KM)	16.30 (14.43)		

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VEHICLE NUMBER GA2	TEST 100NB-03	BUTANE BUTANE
VEHICLE MODEL 94 PONT GRANDAM	DATE 10/ 3/95 RUN	FUEL DENSITY 4.830 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .172 C .828 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER 2233 MILES (3592 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.03 IN HG (737.4 MM HG) DRY BULB TEMPERATURE 73.0°F (22.8°C) NOX HUMIDITY C.F. .966
 RELATIVE HUMIDITY 53.9 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.6	867.1	505.6
DRY/WET CORRECTION FACTOR, SAMP/BACK	.973/.985	.976/.985	.974/.985
MEASURED DISTANCE MILES (KM)	3.61 (5.81)	3.84 (6.18)	3.61 (5.82)
BLOWER FLOW RATE SCFH (SCMH)	324.4 (9.19)	325.1 (9.21)	322.1 (9.12)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2733. (77.4)	4698. (133.1)	2715. (76.9)

HC SAMPLE METER/RANGE/PPH (BAG)	25.9/ 2/ 25.88	41.3/ 1/ 4.16	82.0/ 1/ 8.26
HC BCKGRD METER/RANGE/PPH	4.3/ 2/ 4.30	40.8/ 1/ 4.11	41.0/ 1/ 4.13
CO SAMPLE METER/RANGE/PPH	92.3/ 13/ 226.62	17.7/ 12/ 17.13	73.0/ 12/ 72.45
CO BCKGRD METER/RANGE/PPH	.1/ 13/ .22	.3/ 12/ .29	.0/ 12/ .00
CO2 SAMPLE METER/RANGE/PCT	52.7/ 1/ .9675	80.3/ 14/ .6607	89.4/ 14/ .8527
CO2 BCKGRD METER/RANGE/PCT	2.3/ 1/ .0426	12.1/ 14/ .0387	12.1/ 14/ .0387
NOX SAMPLE METER/RANGE/PPH (BAG) (D)	4.8/ 1/ 1.20	.5/ 1/ .13	1.7/ 1/ .43
NOX BCKGRD METER/RANGE/PPH	.2/ 1/ .05	.0/ 1/ .00	.3/ 1/ .08
CH4 SAMPLE PPM (1.150)	3.77	2.13	3.81
CH4 BCKGRD PPM	2.07	2.09	2.02

DILUTION FACTOR	12.10	18.11	13.95
HC CONCENTRATION PPM	21.94	.28	4.42
CO CONCENTRATION PPM	217.56	16.31	69.81
CO2 CONCENTRATION PCT	.9284	.6241	.8167
NOX CONCENTRATION PPM	1.16	.13	.36
CH4 CONCENTRATION PPM	1.87	.15	1.93
NMHC CONCENTRATION PPM	19.80	.10	2.21

FIDHC MASS GRAMS	1.024	.022	.205
CO MASS GRAMS	19.607	2.527	6.248
CO2 MASS GRAMS	1315.74	1520.46	1149.51
NOX MASS GRAMS	.166	.031	.051
CH4 MASS GRAMS	.096	.014	.099
NMHC MASS GRAMS (FID)	.884	.008	.098
FUEL MASS KG	.445	.503	.383
FUEL ECONOMY MPG (L/100KM)	17.76 (13.24)	16.75 (14.05)	20.70 (11.36)

3-BAG COMPOSITE RESULTS

FIDHC G/HI	.078	CH4 G/HI	.015
CO G/HI	1.948	NMHC G/HI	.060
NOX G/HI	.018		
FUEL ECONOMY MPG (L/100KM)	17.93 (13.12)		

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VEHICLE NUMBER GA2	TEST 100MB-04S	BUTANE BUTANE
VEHICLE MODEL 94 PONT GRANDAM	DATE 10/ 4/95 RUN	FUEL DENSITY 4.830 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .172 C .828 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER 2247 MILES (3615 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 28.90 IN HG (734.1 MM HG) DRY BULB TEMPERATURE 73.0°F (22.8°C) NOX HUMIDITY C.F. .928
 RELATIVE HUMIDITY 46.7 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	504.8	867.1	504.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.974/.987	.978/.987	.976/.987
MEASURED DISTANCE MILES (KM)	3.61 (5.80)	3.82 (6.14)	3.57 (5.74)
BLOWER FLOW RATE SCFH (SCHH)	320.8 (9.09)	321.4 (9.10)	320.1 (9.06)
GAS METER FLOW RATE SCFH (SCHH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCH)	2699. (76.4)	4645. (131.5)	2690. (76.2)

HC SAMPLE METER/RANGE/PPM (BAG)	24.0/ 2/ 23.99	6.0/ 2/ 6.00	10.2/ 2/ 10.19
HC BCKGRD METER/RANGE/PPM	6.2/ 2/ 6.20	6.6/ 2/ 6.60	6.2/ 2/ 6.20
CO SAMPLE METER/RANGE/PPM	93.7/ 13/ 230.41	20.3/ 12/ 19.66	77.3/ 12/ 76.89
CO BCKGRD METER/RANGE/PPM	.5/ 13/ 1.10	.8/ 12/ .77	1.0/ 12/ .96
CO2 SAMPLE METER/RANGE/PCT	94.7/ 14/ .9930	80.3/ 14/ .6607	90.0/ 14/ .8673
CO2 BCKGRD METER/RANGE/PCT	13.4/ 14/ .0437	13.2/ 14/ .0429	13.0/ 14/ .0421
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	4.3/ 1/ 1.08	.5/ 1/ .13	2.0/ 1/ .50
NOX BCKGRD METER/RANGE/PPM	.4/ 1/ .10	.3/ 1/ .08	.4/ 1/ .10
CH4 SAMPLE PPM (1.150)	3.89	2.21	3.76
CH4 BCKGRD PPM	2.21	2.19	2.19

DILUTION FACTOR	11.80	18.10	13.71
HC CONCENTRATION PPM	18.31	-.24	4.45
CO CONCENTRATION PPM	220.81	18.36	73.36
CO2 CONCENTRATION PCT	.9531	.6202	.8283
NOX CONCENTRATION PPM	.99	.05	.41
CH4 CONCENTRATION PPM	1.87	.15	1.73
NMHC CONCENTRATION PPM	16.17	-.40	2.46

FIDEC MASS GRAMS	.844	.000	.204
CO MASS GRAMS	19.651	2.811	6.507
CO2 MASS GRAMS	1333.86	1493.63	1155.32
NOX MASS GRAMS	.134	.013	.055
CH4 MASS GRAMS	.095	.013	.088
NMHC MASS GRAMS (FID)	.713	.000	.108
FUEL MASS KG	.451	.494	.385
FUEL ECONOMY HPG (L/100KH)	17.52 (13.43)	16.93 (13.90)	20.33 (11.57)

3-BAG COMPOSITE RESULTS

FIDEC G/HI	.065	CH4 G/HI	.014
CO G/HI	2.020	NMHC G/HI	.050
NOX G/HI	.014		
FUEL ECONOMY HPG (L/100KH)	17.90 (13.14)		

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VEHICLE NUMBER GA2	TEST BLB-CP2-03	GASOLINE PHASE II EM-1968-F
VEHICLE MODEL 94 PONT GRANDAM	DATE 9/29/95 RUN	FUEL DENSITY 6.163 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .137 C .843 O .020 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER 2174 MILES (3497 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.08 IN HG (738.6 MM HG) DRY BULB TEMPERATURE 77.0°F (25.0°C) NOX HUMIDITY C.F. .957
 RELATIVE HUMIDITY 45.8 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.3	867.2	504.6
DRY/WET CORRECTION FACTOR, SAMP/BACK	.975/.985	.979/.985	.976/.985
MEASURED DISTANCE MILES (KM)	3.63 (5.84)	3.89 (6.26)	3.62 (5.82)
BLOWER FLOW RATE SCFM (SCMH)	324.5 (9.19)	325.1 (9.21)	323.4 (9.16)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2733. (77.4)	4699. (133.1)	2719. (77.0)

HC SAMPLE METER/RANGE/PPM (BAG)	22.9/ 2/ 22.89	47.0/ 1/ 4.73	73.7/ 1/ 7.42
HC BCKGRD METER/RANGE/PPM	4.7/ 2/ 4.70	46.9/ 1/ 4.72	48.5/ 1/ 4.88
CO SAMPLE METER/RANGE/PPM	47.2/ 13/ 108.66	2.8/ 12/ 2.70	20.7/ 12/ 20.05
CO BCKGRD METER/RANGE/PPM	.4/ 13/ .88	.6/ 12/ .58	.5/ 12/ .48
CO2 SAMPLE METER/RANGE/PCT	56.8/ 1/ 1.0441	81.5/ 14/ .6832	92.2/ 14/ .9236
CO2 BCKGRD METER/RANGE/PCT	2.5/ 1/ .0463	12.8/ 14/ .0414	13.0/ 14/ .0421
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	21.4/ 1/ 5.37	1.3/ 1/ .33	2.6/ 1/ .65
NOX BCKGRD METER/RANGE/PPM	1.0/ 1/ .25	.5/ 1/ .13	.4/ 1/ .10
CH4 SAMPLE PPM (1.150)	4.06	2.54	3.03
CH4 BCKGRD PPM	2.62	2.61	2.54

DILUTION FACTOR	12.59	19.46	14.37
HC CONCENTRATION PPM	18.56	.25	2.88
CO CONCENTRATION PPM	104.02	2.08	18.95
CO2 CONCENTRATION PCT	1.0014	.6440	.8844
NOX CONCENTRATION PPM	5.14	.21	.56
CH4 CONCENTRATION PPM	1.65	.07	.67
NMHC CONCENTRATION PPM	16.67	.18	2.11

FIDHC MASS GRAMS	.851	.020	.131
CO MASS GRAMS	9.374	.323	1.699
CO2 MASS GRAMS	1419.19	1569.18	1247.03
NOX MASS GRAMS	.727	.050	.079
CH4 MASS GRAMS	.085	.006	.034
NMHC MASS GRAMS (FID)	.744	.014	.094
FUEL MASS KG	.465	.508	.405
FUEL ECONOMY MPG (L/100KM)	21.82 (10.78)	21.39 (11.00)	24.99 (9.41)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.061	CH4 G/MI	.008
CO G/MI	.708	NMHC G/MI	.051
NOX G/MI	.054		
FUEL ECONOMY MPG (L/100KM)	22.39 (10.51)		

VEHICLE NUMBER	GA2	TEST BLB-CP2-04S	GASOLINE PHASE II EM-1968-F
VEHICLE MODEL	94 PONT GRANDAM	DATE 10/ 2/95 RUN	FUEL DENSITY 6.163 LB/GAL
ENGINE	2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .137 C .843 O .020 X .000
TRANSMISSION	A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	CALIFORNIA PHASE 2
ODOMETER	2195 MILES (3531 KH)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.00 IN HG (736.6 MM HG)	DRY BULB TEMPERATURE 73.0°F (22.8°C)	NOX HUMIDITY C.F. .988
RELATIVE HUMIDITY 57.7 PCT.		

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.0	867.1	505.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.973/.984	.977/.984	.974/.984
MEASURED DISTANCE MILES (KH)	3.62 (5.82)	3.86 (6.21)	3.60 (5.79)
BLOWER FLOW RATE SCFH (SCMH)	319.1 (9.04)	323.8 (9.17)	322.0 (9.12)
GAS METER FLOW RATE SCFH (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2685. (76.1)	4680. (132.5)	2712. (76.8)

HC SAMPLE METER/RANGE/PPH (BAG)	23.7/ 2/ 23.69	45.6/ 1/ 4.59	71.6/ 1/ 7.21
HC BCKGRD METER/RANGE/PPH	4.6/ 2/ 4.60	45.3/ 1/ 4.56	45.8/ 1/ 4.61
CO SAMPLE METER/RANGE/PPH	52.7/ 13/ 122.31	3.3/ 12/ 3.18	19.8/ 12/ 19.18
CO BCKGRD METER/RANGE/PPH	.5/ 13/ 1.10	1.0/ 12/ .96	.8/ 12/ .77
CO2 SAMPLE METER/RANGE/PCT	58.3/ 1/ 1.0722	82.4/ 14/ .7006	92.7/ 14/ .9370
CO2 BCKGRD METER/RANGE/PCT	2.7/ 1/ .0500	13.1/ 14/ .0425	13.2/ 14/ .0429
NOX SAMPLE METER/RANGE/PPH (BAG) (D)	28.3/ 1/ 7.10	2.7/ 1/ .68	3.6/ 1/ .90
NOX BCKGRD METER/RANGE/PPH	.4/ 1/ .10	.4/ 1/ .10	.4/ 1/ .10
CH4 SAMPLE PPM (1.150)	4.14	2.24	2.74
CH4 BCKGRD PPM	2.43	2.70	2.20

DILUTION FACTOR	12.25	18.97	14.16
HC CONCENTRATION PPM	19.46	.27	2.92
CO CONCENTRATION PPM	116.45	2.18	17.76
CO2 CONCENTRATION PCT	1.0262	.6603	.8971
NOX CONCENTRATION PPM	7.00	.58	.81
CH4 CONCENTRATION PPM	1.91	-.31	.69
NMHC CONCENTRATION PPM	17.27	.63	2.13

FIDHC MASS GRAHS	.877	.021	.133
CO MASS GRAHS	10.311	.337	1.588
CO2 MASS GRAHS	1428.96	1602.37	1261.34
NOX MASS GRAHS	1.006	.146	.117
CH4 MASS GRAHS	.097	.000	.035
NMHC MASS GRAHS (FID)	.757	.048	.094
FUEL MASS KG	.469	.519	.409
FUEL ECONOMY MPG (L/100KM)	21.57 (10.91)	20.78 (11.32)	24.59 (9.57)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.063	CH4 G/MI	.008
CO G/MI	.760	NMHC G/MI	.057
NOX G/MI	.086		
FUEL ECONOMY MPG (L/100KM)	21.90 (10.74)		

VEHICLE NUMBER GA2	TEST 100NB(NC)-01	BUTANE 100%
VEHICLE MODEL 94 PONT GRANDAM	DATE 11/21/95 RUN	FUEL DENSITY 4.878 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .173 C .827 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER 2376 MILES (3822 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.44 IN HG (747.8 MM HG) DRY BULB TEMPERATURE 72.0°F (22.2°C) NOX HUMIDITY C.F. .948

RELATIVE HUMIDITY 53.1 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.7	867.1	505.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.974/.986	.978/.986	.975/.986
MEASURED DISTANCE MILES (KM)	3.61 (5.82)	3.85 (6.19)	3.62 (5.82)
BLOWER FLOW RATE SCFM (SCMH)	329.4 (9.33)	330.0 (9.35)	327.6 (9.28)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2776. (78.6)	4769. (135.1)	2759. (78.1)

HC SAMPLE METER/RANGE/PPM (BAG)	11.3/ 3/ 112.75	63.3/ 2/ 63.26	84.5/ 2/ 84.45
HC BCKGRD METER/RANGE/PPM	1.4/ 3/ 13.97	13.7/ 2/ 13.69	14.8/ 2/ 14.79
CO SAMPLE METER/RANGE/PPM	71.5/ 1/ 688.69	62.8/ 14/ 289.50	55.4/ 1/ 500.89
CO BCKGRD METER/RANGE/PPM	.3/ 1/ 2.10	.3/ 14/ 1.21	.3/ 1/ 2.10
CO2 SAMPLE METER/RANGE/PCT	92.4/ 14/ .9289	78.6/ 14/ .6301	87.8/ 14/ .8150
CO2 BCKGRD METER/RANGE/PCT	13.6/ 14/ .0444	13.3/ 14/ .0433	13.2/ 14/ .0429
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	45.1/ 3/ 112.98	56.5/ 2/ 56.70	45.2/ 3/ 113.23
NOX BCKGRD METER/RANGE/PPM	.0/ 3/ .00	.0/ 2/ .00	.2/ 3/ .50
CH4 SAMPLE PPM (1.150)	5.76	4.11	5.19
CH4 BCKGRD PPM	2.18	2.14	2.14

DILUTION FACTOR	11.89	18.00	13.72
HC CONCENTRATION PPM	99.95	50.33	70.74
CO CONCENTRATION PPM	660.60	279.31	481.20
CO2 CONCENTRATION PCT	.8882	.5892	.7752
NOX CONCENTRATION PPM	112.98	56.70	112.76
CH4 CONCENTRATION PPM	3.76	2.09	3.21
NMHC CONCENTRATION PPM	95.63	47.93	67.04

FIDHC MASS GRAMS	4.746	4.105	3.337
CO MASS GRAMS	60.467	43.914	43.766
CO2 MASS GRAMS	1278.61	1456.96	1108.80
NOX MASS GRAMS	16.100	13.879	15.968
CH4 MASS GRAMS	.197	.188	.167
NMHC MASS GRAMS (FID)	4.336	3.732	3.020
FUEL MASS KG	.458	.508	.392
FUEL ECONOMY MPG (L/100KM)	17.45 (13.48)	16.75 (14.05)	20.41 (11.52)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	1.078	CH4 G/MI	.049
CO G/MI	12.712	NMHC G/MI	.981
NOX G/MI	4.007		
FUEL ECONOMY MPG (L/100KM)	17.80 (13.22)		

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VEHICLE NUMBER GA2	TEST 100NB(HC)-02S	BUTANE 100%
VEHICLE MODEL 94 PONT GRANDAM	DATE 11/20/95 RUN	FUEL DENSITY 4.878 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .173 C .827 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER 2364 MILES (3803 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.30 IN HG (744.2 MM HG) DRY BULB TEMPERATURE 72.0°F (22.2°C) NOX HUMIDITY C.F. .970
 RELATIVE HUMIDITY 57.0 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.9	867.9	505.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.973/.984	.977/.984	.974/.984
MEASURED DISTANCE MILES (KM)	3.62 (5.82)	3.84 (6.18)	3.62 (5.82)
BLOWER FLOW RATE SCFM (SCMH)	327.7 (9.28)	327.5 (9.27)	326.5 (9.25)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2763. (78.2)	4737. (134.2)	2750. (77.9)

HC SAMPLE METER/RANGE/PPM (BAG)	97.3/ 2/ 97.24	59.1/ 2/ 59.07	89.9/ 2/ 89.85
HC BCKGRD METER/RANGE/PPM	7.1/ 2/ 7.10	7.9/ 2/ 7.90	11.2/ 2/ 11.19
CO SAMPLE METER/RANGE/PPM	67.4/ 1/ 638.98	62.8/ 14/ 289.50	57.2/ 1/ 520.91
CO BCKGRD METER/RANGE/PPM	.1/ 1/ .70	.4/ 14/ 1.62	.0/ 1/ .00
CO2 SAMPLE METER/RANGE/PCT	92.8/ 14/ .9397	78.5/ 14/ .6284	87.8/ 14/ .8150
CO2 BCKGRD METER/RANGE/PCT	13.5/ 14/ .0441	13.5/ 14/ .0441	13.5/ 14/ .0441
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	46.5/ 3/ 116.48	57.6/ 2/ 57.80	44.4/ 3/ 111.22
NOX BCKGRD METER/RANGE/PPM	.1/ 3/ .25	.3/ 2/ .30	.2/ 3/ .50
CH4 SAMPLE PPM (1.150)	6.06	4.27	5.91
CH4 BCKGRD PPM	2.42	2.40	2.38

DILUTION FACTOR	11.84	18.06	13.69
HC CONCENTRATION PPM	90.75	51.61	79.47
CO CONCENTRATION PPM	613.08	278.58	501.77
CO2 CONCENTRATION PCT	.8994	.5868	.7741
NOX CONCENTRATION PPM	116.26	57.52	110.76
CH4 CONCENTRATION PPM	3.85	2.00	3.71
NMHC CONCENTRATION PPM	86.32	49.31	75.21

FIDHC MASS GRAMS	4.288	4.181	3.738
CO MASS GRAMS	55.848	43.509	45.500
CO2 MASS GRAMS	1288.44	1441.16	1103.96
NOX MASS GRAMS	16.868	14.308	15.997
CH4 MASS GRAMS	.201	.179	.192
NMHC MASS GRAMS (FID)	3.895	3.814	3.378
FUEL MASS KG	.459	.503	.392
FUEL ECONOMY MPG (L/100KM)	17.45 (13.48)	16.90 (13.92)	20.41 (11.53)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	1.094	CH4 G/MI	.050
CO G/MI	12.534	NMHC G/MI	.994
NOX G/MI	4.115		
FUEL ECONOMY MPG (L/100KM)	17.89 (13.15)		

VEHICLE NUMBER GA2	TEST 100NB(NC)-03	BUTANE 100%
VEHICLE MODEL 94 PONT GRANDAM	DATE 11/22/95 RUN	FUEL DENSITY 4.878 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .173 C .827 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER 2390 MILES (3845 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.23 IN HG (742.4 MM HG) DRY BULB TEMPERATURE 74.0°F (23.3°C) NOX HUMIDITY C.F. .936

RELATIVE HUMIDITY 47.2 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.1	867.6	505.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.974/.986	.978/.986	.976/.986
MEASURED DISTANCE MILES (KM)	3.64 (5.86)	3.88 (6.24)	3.63 (5.84)
BLOWER FLOW RATE SCFM (SCMH)	320.7 (9.08)	323.6 (9.17)	322.4 (9.13)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2700. (76.5)	4680. (132.5)	2715. (76.9)

HC SAMPLE METER/RANGE/PPM (BAG)	10.9/ 3/ 108.76	59.8/ 2/ 59.77	77.0/ 2/ 76.96
HC BCKGRD METER/RANGE/PPM	1.1/ 3/ 10.98	8.0/ 2/ 8.00	5.8/ 2/ 5.80
CO SAMPLE METER/RANGE/PPM	70.8/ 1/ 680.11	63.1/ 14/ 291.14	57.5/ 1/ 524.28
CO BCKGRD METER/RANGE/PPM	.4/ 1/ 2.80	.3/ 14/ 1.21	.4/ 1/ 2.80
CO2 SAMPLE METER/RANGE/PCT	92.8/ 14/ .9397	79.1/ 14/ .6390	88.2/ 14/ .8242
CO2 BCKGRD METER/RANGE/PCT	13.0/ 14/ .0421	12.7/ 14/ .0410	12.7/ 14/ .0410
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	45.7/ 3/ 114.48	60.3/ 2/ 60.51	44.3/ 3/ 110.97
NOX BCKGRD METER/RANGE/PPM	.1/ 3/ .25	.3/ 2/ .30	.2/ 3/ .50
CH4 SAMPLE PPM (1.150)	5.94	4.23	5.37
CH4 BCKGRD PPM	2.25	2.26	2.32

DILUTION FACTOR	11.77	17.77	13.56
HC CONCENTRATION PPM	98.71	52.22	71.59
CO CONCENTRATION PPM	652.85	281.39	504.01
CO2 CONCENTRATION PCT	.9012	.6003	.7862
NOX CONCENTRATION PPM	114.25	60.23	110.51
CH4 CONCENTRATION PPM	3.88	2.10	3.23
NMHC CONCENTRATION PPM	94.26	49.81	67.88

FIDHC MASS GRAMS	4.558	4.179	3.324
CO MASS GRAMS	58.107	43.416	45.117
CO2 MASS GRAMS	1261.37	1456.58	1106.83
NOX MASS GRAMS	15.640	14.293	15.215
CH4 MASS GRAMS	.198	.185	.165
NMHC MASS GRAMS (FID)	4.155	3.806	3.009
FUEL MASS KG	.451	.508	.392
FUEL ECONOMY MPG (L/100KM)	17.86 (13.17)	16.91 (13.91)	20.46 (11.50)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	1.069	CH4 G/MI	.049
CO G/MI	12.524	NMHC G/MI	.972
NOX G/MI	3.951		
FUEL ECONOMY MPG (L/100KM)	17.98 (13.08)		

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VEHICLE NUMBER GA2	TEST 100P(NC)-01	PROPANE 100%
VEHICLE MODEL 94 PONT GRANDAM	DATE 11/29/95 RUN	FUEL DENSITY 4.410 LB/GAL
ENGINE 2.3 L (138 CID)---4	DYNO 3 BAG CART 2	H .183 C .817 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER 2437 MILES (3921 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.32 IN HG (744.7 MM HG) DRY BULB TEMPERATURE 70.0°F (21.1°C) NOX HUMIDITY C.F. .823
 RELATIVE HUMIDITY 26.4 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.9	867.1	504.9
DRY/WET CORRECTION FACTOR, SAMP/BACK	.981/.993	.985/.993	.982/.993
MEASURED DISTANCE MILES (KM)	3.64 (5.85)	3.84 (6.18)	3.63 (5.84)
BLOWER FLOW RATE-SCFM (SCMH)	322.7 (9.14)	326.3 (9.24)	325.0 (9.21)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2721. (77.1)	4716. (133.5)	2735. (77.5)

HC SAMPLE METER/RANGE/PPH (BAG)	85.8/ 2/ .85.75	48.9/ 2/ 48.87	66.4/ 2/ 66.36
HC BCKGRD METER/RANGE/PPH	4.6/ 2/ 4.60	4.7/ 2/ 4.70	4.5/ 2/ 4.50
CO SAMPLE METER/RANGE/PPH	71.9/ 14/ 340.21	48.6/ 14/ 215.01	72.1/ 14/ 341.34
CO BCKGRD METER/RANGE/PPH	.4/ 14/ 1.62	.4/ 14/ 1.62	1.0/ 14/ 4.04
CO2 SAMPLE METER/RANGE/PCT	51.1/ 1/ .9377	78.3/ 14/ .6249	89.4/ 14/ .8527
CO2 BCKGRD METER/RANGE/PCT	2.6/ 1/ .0482	13.5/ 14/ .0441	14.4/ 14/ .0476
NOX SAMPLE METER/RANGE/PPH (BAG) (D)	52.6/ 3/ 131.77	68.8/ 2/ 69.04	49.8/ 3/ 124.75
NOX BCKGRD METER/RANGE/PPH	.2/ 3/ .50	.6/ 2/ .60	.2/ 3/ .50
CH4 SAMPLE PPM (1.150)	4.73	3.91	4.57
CH4 BCKGRD PPM	2.27	2.22	2.22

DILUTION FACTOR	11.87	17.86	13.02
HC CONCENTRATION PPM	81.54	44.44	62.21
CO CONCENTRATION PPM	328.39	208.52	327.94
CO2 CONCENTRATION PCT	.8935	.5833	.8088
NOX CONCENTRATION PPM	131.31	68.47	124.29
CH4 CONCENTRATION PPM	2.64	1.81	2.52
NMHC CONCENTRATION PPM	78.50	42.35	59.31

HC MASS GRAMS	3.839	3.626	2.944
CO MASS GRAMS	29.458	32.420	29.573
CO2 MASS GRAMS	1260.51	1426.14	1146.97
NOX MASS GRAMS	15.926	14.395	15.155
CH4 MASS GRAMS	.136	.161	.130
NMHC MASS GRAMS (FID)	3.692	3.453	2.805
FUEL MASS KG	.441	.497	.402
FUEL ECONOMY MPG (L/100KM)	16.51 (14.25)	15.46 (15.21)	18.06 (13.02)

3-BAG COMPOSITE RESULTS

HC	G/MI	.930	CH4	G/MI	.039
CO	G/MI	8.287	NMHC	G/MI	.888
NOX	G/MI	3.998			
FUEL ECONOMY MPG (L/100KM)		16.34 (14.40)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.3-R

3-BAG CARB FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6969-001

VEHICLE NUMBER	GA2	TEST	100P(NC)-02S	PROPANE	100%
VEHICLE MODEL	94 PONT GRANDAM	DATE	11/30/95 RUN	FUEL DENSITY	4.410 LB/GAL
ENGINE	2.3 L (138 CID)--4	DYNO	3 BAG CART 2	H	.183 C .817 O .000 X .000
TRANSMISSION	A4	ACTUAL ROAD LOAD	6.60 HP (4.92 KW)		
ODOMETER	2448 MILES (3938 KM)	TEST WEIGHT	3375 LBS (1530 KG)		

BAROMETER	29.32 IN HG (744.7 MM HG)	DRY BULB TEMPERATURE	70.0°F (21.1°C)	NOX HUMIDITY C.F.	.836
RELATIVE HUMIDITY	29.8 PCT.				

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.6	866.4	504.7
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.992	.984/.992	.981/.992
MEASURED DISTANCE MILES (KM)	3.61 (5.81)	3.85 (6.19)	3.63 (5.84)
BLOWER FLOW RATE SCFM (SCHM)	323.5 (9.16)	328.8 (9.31)	326.9 (9.26)
GAS METER FLOW RATE SCFM (SCHM)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCH)	2726. (77.2)	4748. (134.5)	2750. (77.9)

HC SAMPLE METER/RANGE/PPM (BAG)	79.1/ 2/ 79.05	48.3/ 2/ 48.27	63.9/ 2/ 63.86
HC BCKGRD METER/RANGE/PPM	4.7/ 2/ 4.70	4.9/ 2/ 4.90	4.9/ 2/ 4.90
CO SAMPLE METER/RANGE/PPM	69.4/ 14/ 326.08	41.7/ 14/ 181.01	69.6/ 14/ 327.20
CO BCKGRD METER/RANGE/PPM	.5/ 14/ 2.02	.5/ 14/ 2.02	.4/ 14/ 1.62
CO2 SAMPLE METER/RANGE/PCT	92.2/ 14/ .9236	78.4/ 14/ .6266	88.9/ 14/ .8407
CO2 BCKGRD METER/RANGE/PCT	13.8/ 14/ .0452	13.9/ 14/ .0456	14.6/ 14/ .0484
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	50.5/ 3/ 126.50	25.8/ 3/ 64.63	50.0/ 3/ 125.25
NOX BCKGRD METER/RANGE/PPM	.3/ 3/ .75	.3/ 3/ .75	.3/ 3/ .75
CH4 SAMPLE PPM (1.150)	4.86	4.19	4.76
CH4 BCKGRD PPM	2.45	2.52	2.53

DILUTION FACTOR	12.07	17.91	13.23
HC CONCENTRATION PPM	74.75	43.65	59.34
CO CONCENTRATION PPM	314.07	174.73	316.15
CO2 CONCENTRATION PCT	.8821	.5836	.7960
NOX CONCENTRATION PPM	125.82	63.92	124.56
CH4 CONCENTRATION PPM	2.61	1.81	2.43
NMHC CONCENTRATION PPM	71.74	41.57	56.55

HC MASS GRAMS	3.526	3.586	2.824
CO MASS GRAMS	28.227	27.351	28.666
CO2 MASS GRAMS	1246.82	1436.58	1135.01
NOX MASS GRAMS	15.520	13.733	15.501
CH4 MASS GRAMS	.134	.162	.126
NMHC MASS GRAMS (FID)	3.381	3.412	2.688
FUEL MASS KG	.435	.498	.397
FUEL ECONOMY MPG (L/100KM)	16.60 (14.17)	15.45 (15.23)	18.28 (12.87)

3-BAG COMPOSITE RESULTS

HC	G/MI	.899	CH4	G/MI	.039
CO	G/MI	7.477	NMHC	G/MI	.857
NOX	G/MI	3.917			
FUEL ECONOMY MPG (L/100KM)		16.39 (14.35)			

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VEHICLE NUMBER GA2	TEST 50NB/50P(NC)-01	50% BUTAN 50% PROP
VEHICLE MODEL 94 PONT GRANDAM	DATE 12/ 1/95 RUN	FUEL DENSITY 4.558 LB/GAL
ENGINE 2.3 L (138 CID)--4	DYNO 3 BAG CART 2	H .178 C .822 O .000 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.60 HP (4.92 KW)	
ODOMETER 2487 MILES (4001 KM)	TEST WEIGHT 3375 LBS (1530 KG)	

BAROMETER 29.15 IN HG (740.4 MM HG) DRY BULB TEMPERATURE 71.0°F (21.7°C) NOX HUMIDITY C.F. .939
 RELATIVE HUMIDITY 52.6 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.5	866.4	504.9
DRY/WET CORRECTION FACTOR, SAMP/BACK	.975/.986	.978/.986	.976/.986
MEASURED DISTANCE MILES (KM)	3.64 (5.86)	3.85 (6.19)	3.63 (5.85)
BLOWER FLOW RATE SCFM (SCHM)	323.4 (9.16)	324.6 (9.19)	323.1 (9.15)
GAS METER FLOW RATE SCFM (SCHM)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCH)	2724. (77.2)	4687. (132.7)	2719. (77.0)

HC SAMPLE METER/RANGE/PPM (BAG)	86.3/ 2/ 86.25	50.0/ 2/ 49.97	68.8/ 2/ 68.76
HC BCKGRD METER/RANGE/PPM	5.1/ 2/ 5.10	5.4/ 2/ 5.40	5.4/ 2/ 5.40
CO SAMPLE METER/RANGE/PPM	82.7/ 14/ 402.56	50.4/ 14/ 224.11	77.3/ 14/ 371.16
CO BCKGRD METER/RANGE/PPM	.3/ 14/ 1.21	.4/ 14/ 1.62	.3/ 14/ 1.21
CO2 SAMPLE METER/RANGE/PCT	48.6/ 1/ .8912	76.7/ 14/ .5975	86.5/ 14/ .7857
CO2 BCKGRD METER/RANGE/PCT	2.6/ 1/ .0482	13.0/ 14/ .0421	12.9/ 14/ .0418
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	44.7/ 3/ 111.98	57.0/ 2/ 57.20	44.3/ 3/ 110.97
NOX BCKGRD METER/RANGE/PPM	.3/ 3/ .75	.6/ 2/ .60	.1/ 3/ .25
CH4 SAMPLE PPM (1.150)	5.07	4.05	4.86
CH4 BCKGRD PPM	2.44	2.41	2.38

DILUTION FACTOR	12.57	18.90	14.24
HC CONCENTRATION PPM	81.56	44.86	63.74
CO CONCENTRATION PPM	386.40	215.73	357.07
CO2 CONCENTRATION PCT	.8468	.5576	.7469
NOX CONCENTRATION PPM	111.28	56.63	110.74
CH4 CONCENTRATION PPM	2.82	1.77	2.64
NMHC CONCENTRATION PPM	78.32	42.83	60.70

FIDHC MASS GRAMS	3.821	3.616	2.980
CO MASS GRAMS	34.707	33.336	32.004
CO2 MASS GRAMS	1196.18	1355.05	1052.79
NOX MASS GRAMS	15.419	13.499	15.312
CH4 MASS GRAMS	.145	.157	.136
NMHC MASS GRAMS (FID)	3.484	3.278	2.695
FUEL MASS KG	.419	.471	.369
FUEL ECONOMY MPG (L/100KM)	17.96 (13.10)	16.88 (13.94)	20.34 (11.57)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.930	CH4 G/MI	.040
CO G/MI	8.887	NMHC G/MI	.843
NOX G/MI	3.856		
FUEL ECONOMY MPG (L/100KM)	17.96 (13.09)		

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.3-R

3-BAG CARB FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6969-001

VEHICLE NUMBER	GA2	TEST	50NB/50P(NC)-02S	50% BUTAN 50% PROP
VEHICLE MODEL	94 PONT GRANDAM	DATE	12/ 4/95 RUN	FUEL DENSITY 4.558 LB/GAL
ENGINE	2.3 L (138 CID)--4	DYNO	3 BAG CART 2	H .178 C .822 O .000 X .000
TRANSMISSION	A4	ACTUAL ROAD LOAD	6.60 HP (4.92 KW)	
ODOMETER	2509 MILES (4036 KM)	TEST WEIGHT	3375 LBS (1530 KG)	

BAROMETER	29.23 IN HG (742.4 MM HG)	DRY BULB TEMPERATURE	70.0°F (21.1°C)	NOX HUMIDITY C.F.	.878
RELATIVE HUMIDITY	40.6 PCT.				

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.2	867.4	505.7
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.990	.982/.990	.979/.990
MEASURED DISTANCE MILES (KM)	3.63 (5.83)	3.87 (6.23)	3.61 (5.81)
BLOWER FLOW RATE SCFM (SCMH)	327.9 (9.29)	328.7 (9.31)	327.4 (9.27)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCH)	2761. (78.2)	4752. (134.6)	2759. (78.1)

HC SAMPLE METER/RANGE/PPM (BAG)	87.3/ 2/ 87.25	52.1/ 2/ 52.07	70.3/ 2/ 70.26
HC BCKGRD METER/RANGE/PPM	5.0/ 2/ 5.00	5.6/ 2/ 5.60	5.6/ 2/ 5.60
CO SAMPLE METER/RANGE/PPM	83.0/ 14/ 404.31	54.3/ 14/ 244.18	82.7/ 14/ 402.56
CO BCKGRD METER/RANGE/PPM	.3/ 14/ 1.21	.3/ 14/ 1.21	.3/ 14/ 1.21
CO2 SAMPLE METER/RANGE/PCT	50.3/ 1/ .9228	77.9/ 14/ .6179	87.0/ 14/ .7968
CO2 BCKGRD METER/RANGE/PCT	2.4/ 1/ .0445	13.0/ 14/ .0421	13.1/ 14/ .0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	48.5/ 3/ 121.49	66.1/ 2/ 66.33	46.6/ 3/ 116.74
NOX BCKGRD METER/RANGE/PPM	.1/ 3/ .25	.4/ 2/ .40	.2/ 3/ .50
CH4 SAMPLE PPM (1.150)	4.87	3.94	4.91
CH4 BCKGRD PPM	2.28	2.19	2.20

DILUTION FACTOR	12.16	18.24	14.00
HC CONCENTRATION PPM	82.66	46.78	65.06
CO CONCENTRATION PPM	389.37	236.40	388.82
CO2 CONCENTRATION PCT	.8819	.5781	.7573
NOX CONCENTRATION PPM	121.26	65.95	116.27
CH4 CONCENTRATION PPM	2.78	1.87	2.87
NMHC CONCENTRATION PPM	79.46	44.63	61.77

FIDHC MASS GRAMS	3.925	3.823	3.087
CO MASS GRAMS	35.441	37.035	35.372
CO2 MASS GRAMS	1262.46	1424.30	1083.52
NOX MASS GRAMS	15.913	14.896	15.249
CH4 MASS GRAMS	.145	.168	.149
NMHC MASS GRAMS (FID)	3.583	3.463	2.783
FUEL MASS KG	.442	.496	.381
FUEL ECONOMY MPG (L/100KM)	16.97 (13.86)	16.13 (14.59)	19.57 (12.02)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	.971	CH4 G/MI	.042
CO G/MI	9.675	NMHC G/MI	.880
NOX G/MI	4.065		
FUEL ECONOMY MPG (L/100KM)	17.15 (13.72)

Appendix B

FTP Detailed Speciation Data from Task 1

Fuel	Catalyst	Test No.	Page No.
CP2 (pre-conversion)	Yes	BL-CP2-02S	B-1
CP2 (post conversion)	Yes	BLB-CP2-02S	B-6
RFA	Yes	BLB-RFA-02S	B-11
100% n-Butane	Yes	100NB-02S	B-16
HD-5 LPG	Yes	HD5-02S	B-21
90% n-Butane 10% Isobutane	Yes	90NB/10IB-02S	B-26
90% n-Butane 10% Mixed Butenes	Yes	90NB/10BE-02S	B-31
60% n-Butane 40% Isobutane	Yes	60NB/40IB-02S	B-36
80% n-Butane 20% Propane	Yes	80NB/20NP-02S	B-41
90% n-Butane 10% n-Pentane	Yes	90NB/10PE-02S	B-46
50% n-Butane 50% Propane	Yes	50NB/50NP-02S	B-51
20% n-Butane 80% Propane	Yes	20NB/80P-02S	B-56
100% n-Butane (repeat tests)	Yes	100NB-04S	B-61
CP2 (repeat tests)	Yes	BLB-CP2-04S	B-66
100% n-Butane	No	100NB(NC)-02S	B-71
100% Propane	No	100P(NC)-02S	B-76
50% n-Butane 50% Propane	No	50NB/50P(NC)-02S	B-81

TEST NO: BL-CP2-O2S
 TEST CAR: 1994 PONTIAC GRAND AM
 TEST DATE: 8/23/95
 TEST FUEL: EM-1968-F

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	25.8		0.4	2.1		0.0	12.4		0.2	9.8		0.15
ETHANE	5.3	2.35	1.3	0.0	0.03	0.0	1.8	4.24	0.4	1.6	2.53	0.39
ETHYLENE	12.8	5.66	93.4	0.0	0.30	0.2	1.2	3.06	8.4	3.0	4.88	21.80
PROPANE	0.1	0.05	0.1	0.0	0.00	0.0	0.1	0.24	0.0	0.0	0.08	0.02
PROPYLENE	11.1	4.90	104.3	0.0	0.13	0.1	1.0	2.63	9.4	2.8	4.21	24.27
ACETYLENE	6.5	2.87	3.3	0.0	0.00	0.0	0.0	0.05	0.0	1.4	2.21	0.68
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	3.0	1.32	3.1	0.0	0.00	0.0	0.4	0.99	0.4	0.7	1.18	0.74
TRANS-2-BUTENE	0.9	0.39	8.9	0.0	0.00	0.0	0.1	0.30	1.1	0.2	0.35	2.15
1-BUTENE	1.2	0.53	10.7	0.0	0.00	0.0	0.1	0.30	1.0	0.3	0.46	2.51
2-METHYLPROPENE (ISOBUTYLENE)	9.6	4.25	51.1	0.1	1.20	0.5	1.4	3.72	7.5	2.4	3.97	12.91
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.1	0.05	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.01
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	1.2	0.53	13.1	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.41	2.71
2-METHYLPROPANE (ISOBUTANE)	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.16	0.1	0.0	0.03	0.02
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.7	0.29	6.5	0.0	0.00	0.0	0.1	0.19	0.7	0.2	0.26	1.56
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	18.5	8.18	25.6	0.3	4.38	0.4	3.4	9.07	4.7	5.0	8.10	6.85
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1-BUTENE	0.6	0.27	3.0	0.0	0.00	0.0	0.1	0.33	0.6	0.2	0.26	0.79
PENTANE	2.0	0.90	2.1	0.2	2.86	0.2	0.4	0.96	0.4	0.6	1.03	0.66
UNIDENTIFIED C5 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	0.8	0.34	7.0	0.0	0.00	0.0	0.2	0.43	1.5	0.2	0.34	1.86
TRANS-2-PENTENE	0.5	0.22	4.5	0.0	0.00	0.0	0.1	0.25	0.8	0.1	0.21	1.16
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.3	0.13	2.5	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.10	0.62
2-METHYL-2-BUTENE	1.4	0.62	9.0	0.1	0.94	0.4	0.1	0.31	0.8	0.4	0.59	2.32
CYCLOPENTADIENE	0.4	0.17	2.9	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.13	0.60
2,2-DIMETHYLBUTANE	0.3	0.12	0.2	0.0	0.00	0.0	0.1	0.30	0.1	0.1	0.14	0.07
CYCLOPENTENE	0.1	0.06	1.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.20
4-METHYL-1-PENTENE	0.2	0.07	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.14
3-METHYL-1-PENTENE	0.1	0.05	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.11
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	1.5	0.67	1.6	0.1	0.78	0.1	0.4	1.11	0.4	0.5	0.75	0.49
MTBE	11.6	5.10	7.2	0.0	0.00	0.0	0.0	0.00	0.0	2.4	3.91	1.49

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	1.6	0.71	2.4	0.3	3.69	0.4	0.8	2.22	1.3	0.7	1.15	1.08
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	1.3	0.55	1.9	0.1	1.69	0.2	0.7	1.72	1.0	0.5	0.82	0.77
2-METHYL-1-PENTENE	0.2	0.07	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.14
1-HEXENE	0.2	0.07	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.15
HEXANE	0.9	0.40	0.9	0.2	2.77	0.2	0.4	1.19	0.4	0.4	0.68	0.41
UNIDENTIFIED C6 OLEFINS	0.3	0.14	2.1	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.11	0.44
TRANS-3-HEXENE	0.2	0.09	1.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.28
CIS-3-HEXENE	0.3	0.13	2.0	0.0	0.15	0.1	0.1	0.26	0.7	0.1	0.16	0.64
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.4	0.17	2.5	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.13	0.52
2-METHYL-2-PENTENE	0.3	0.11	1.7	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.08	0.35
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.1	0.06	0.9	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.20
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.3	0.14	2.2	0.0	0.00	0.0	0.1	0.23	0.6	0.1	0.15	0.61
2,2-DIMETHYLPENTANE	0.6	0.25	0.8	0.1	1.01	0.1	0.5	1.29	0.7	0.3	0.48	0.41
METHYLCYCLOPENTANE	0.1	0.04	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.06
2,4-DIMETHYLPENTANE	4.3	1.90	7.7	0.1	0.90	0.1	1.2	3.06	2.1	1.2	2.03	2.22
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.2	0.10	0.3	0.0	0.52	0.1	0.1	0.36	0.2	0.1	0.17	0.14
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.3	0.14	1.9	0.2	2.38	1.0	0.3	0.68	1.5	0.2	0.38	1.30
BENZENE	10.0	4.40	4.2	0.3	3.38	0.1	3.5	9.26	1.5	3.2	5.16	1.33
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.2	0.07	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.02
CYCLOHEXANE	0.2	0.09	0.3	0.0	0.00	0.0	0.2	0.50	0.2	0.1	0.15	0.12
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	8.5	3.74	12.8	0.1	1.91	0.2	2.3	5.97	3.4	2.5	4.00	3.70
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	0.0	0.00	0.0	0.1	1.19	0.1	0.6	1.54	0.8	0.2	0.34	0.29
CIS-1,3-DIMETHYLCYCLOPENTANE	0.2	0.09	0.5	0.0	0.00	0.0	0.1	0.24	0.2	0.1	0.11	0.18
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	17.1	7.55	15.9	0.2	2.88	0.2	4.0	10.58	3.7	4.8	7.77	4.43
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	1.2	0.51	0.9	0.0	0.21	0.0	0.2	0.60	0.2	0.3	0.51	0.25
UNIDENTIFIED C7	1.1	0.48	4.9	0.0	0.37	0.1	0.3	0.87	1.5	0.3	0.54	1.50

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.1	0.05	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.16
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.2	0.07	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.09
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.1	0.05	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.13
METHYLCYCLOHEXANE	0.2	0.09	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.07
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	1.7	0.77	2.1	0.0	0.00	0.0	0.4	1.09	0.5	0.5	0.78	0.57
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	2.2	0.98	3.3	0.0	0.00	0.0	0.4	1.13	0.6	0.6	0.95	0.87
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.1	0.04	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.02
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	3.9	1.72	4.7	0.1	0.99	0.1	0.9	2.32	1.1	1.1	1.78	1.31
TOLUENE	18.6	8.22	50.8	0.6	7.52	1.5	2.6	6.90	7.1	4.9	7.95	13.30
2,3-DIMETHYLHEXANE	2.9	1.27	3.8	0.0	0.00	0.0	0.0	0.00	0.0	0.6	0.98	0.79
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	1.4	0.60	1.3	0.0	0.00	0.0	0.2	0.57	0.2	0.3	0.56	0.33
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.4	0.19	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.14	0.10
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	1.5	0.67	1.5	0.0	0.00	0.0	0.3	0.80	0.3	0.4	0.65	0.39
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	1.7	0.74	3.3	0.0	0.00	0.0	0.4	1.07	0.8	0.5	0.75	0.89
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.1	0.04	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.05
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.9	0.39	0.5	0.0	0.00	0.0	0.2	0.42	0.1	0.2	0.37	0.14
UNIDENTIFIED C8	1.4	0.62	4.8	0.1	1.15	0.3	0.1	0.30	0.4	0.4	0.60	1.25
TRANS-2-OCTENE	0.1	0.05	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.12
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.1	0.06	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.05
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,5-TRIMETHYLHEXANE	0.2	0.11	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.06
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.1	0.03	0.1	0.3	4.07	0.4	0.0	0.11	0.1	0.2	0.29	0.24
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.2	0.09	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.09
ETHYLCYCLOHEXANE	0.3	0.14	0.6	0.0	0.00	0.0	0.1	0.23	0.2	0.1	0.15	0.18
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	6.1	2.67	16.4	0.2	2.07	0.4	0.6	1.60	1.6	1.5	2.45	4.06
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m-&p-XYLENE	13.5	5.96	99.6	0.2	2.26	1.2	1.2	3.14	8.7	3.2	5.25	23.72
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.7	0.31	0.8	0.0	0.00	0.0	0.1	0.33	0.1	0.2	0.30	0.21
3-METHYLOCTANE	0.4	0.19	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.15	0.10
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	4.6	2.04	29.9	0.1	1.71	0.8	0.6	1.47	3.6	1.2	1.92	7.62
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.4	0.18	0.9	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.14	0.19
NONANE	0.3	0.14	0.2	0.0	0.00	0.0	0.1	0.23	0.0	0.1	0.15	0.05
ISOPROPYLBENZENE (CUMENE)	0.2	0.08	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.09
2,2-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.7	0.31	1.5	0.0	0.00	0.0	0.1	0.24	0.2	0.2	0.28	0.36
1-METHYL-3-ETHYLBENZENE	2.9	1.28	20.9	0.0	0.00	0.0	0.3	0.73	2.0	0.7	1.11	4.88
1-METHYL-4-ETHYLBENZENE	1.2	0.55	9.0	0.0	0.00	0.0	0.2	0.44	1.2	0.3	0.50	2.19
1,3,5-TRIMETHYLBENZENE	1.2	0.52	12.0	0.0	0.00	0.0	0.1	0.31	1.2	0.3	0.45	2.81
1-METHYL-2-ETHYLBENZENE	0.9	0.39	6.4	0.0	0.00	0.0	0.2	0.49	1.3	0.2	0.38	1.70
1,2,4-TRIMETHYLBENZENE	3.4	1.52	30.4	0.0	0.00	0.0	0.2	0.50	1.7	0.8	1.25	6.77
DECANE	0.0	0.00	0.0	0.0	0.17	0.0	0.0	0.00	0.0	0.0	0.01	0.00
ISOBUTYLBENZENE	0.0	0.00	0.0	0.0	0.16	0.0	0.0	0.00	0.0	0.0	0.01	0.01

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYLPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLBENZENE	0.2	0.09	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.08
1-METHYL-3-ISOPROPYLBENZENE	0.6	0.28	3.4	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.20	0.71
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.2	0.11	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.08	0.05
1-METHYL-2-ISOPROPYLBENZENE	0.2	0.10	1.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.29
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.3	0.13	1.8	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.10	0.38
1-METHYL-3-N-PROPYLBENZENE	0.1	0.08	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.17
1-METHYL-4-N-PROPYLBENZENE	0.5	0.23	3.3	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.17	0.69
1,2-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.3	0.12	2.5	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.09	0.52
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.4	0.18	3.6	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.13	0.75
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,5-TETRAMETHYLBENZENE	0.1	0.08	1.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.25
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLCUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C9-C12+	3.2	1.43	12.3	0.4	5.56	1.6	0.6	1.50	2.2	1.0	1.70	3.97
FORMALDEHYDE	1.4	0.62	10.0	0.0	0.00	0.0	0.0	0.00	0.0	0.3	0.47	2.08
ACETALDEHYDE	0.6	0.28	3.5	0.4	4.75	1.9	0.0	0.09	0.2	0.3	0.53	1.78
ACROLEIN	0.1	0.05	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.17
ACETONE	1.6	0.65	0.8	1.7	23.38	1.0	1.4	3.61	0.8	1.6	2.57	0.88
PROPIONALDEHYDE	0.4	0.19	2.8	0.3	4.68	2.3	0.0	0.00	0.0	0.3	0.44	1.75
CROTONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOBUTYRALDEHYDE	0.1	0.05	0.6	0.1	1.78	0.7	0.1	0.28	0.6	0.1	0.20	0.63
METHYL ETHYL KETONE	0.1	0.05	0.1	0.1	1.78	0.2	0.1	0.28	0.1	0.1	0.20	0.14
BENZALDEHYDE	0.2	0.10	-0.1	0.3	4.31	-0.2	0.2	0.62	-0.1	0.3	0.45	-0.15
HEXANALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

TEST NO: BLB-CP2-O2S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 9/15/95
 TEST FUEL: EM-1988-F

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	22.4		0.3	0.3		0.0	8.9		0.1	7.2		0.11
ETHANE	5.4	2.79	1.4	0.0	0.06	0.0	1.0	4.08	0.3	1.4	2.72	0.35
ETHYLENE	12.8	6.62	93.7	0.0	0.19	0.1	0.9	3.54	6.4	2.9	5.65	21.30
PROPANE	0.1	0.08	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.01
PROPYLENE	11.1	5.70	104.0	0.0	0.00	0.0	0.0	0.00	0.0	2.3	4.44	21.81
ACETYLENE	6.7	3.48	3.4	0.0	0.02	0.0	0.0	0.00	0.0	1.4	2.70	0.70
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	1.8	0.85	1.9	0.4	4.64	0.4	0.3	1.16	0.3	0.7	1.30	0.69
TRANS-2-BUTENE	0.9	0.46	8.9	0.0	0.00	0.0	0.1	0.39	1.0	0.2	0.41	2.12
1-BUTENE	1.2	0.64	11.1	0.0	0.00	0.0	0.1	0.38	0.9	0.3	0.55	2.54
2-METHYLPROPENE (ISOBUTYLENE)	7.0	3.63	37.4	0.0	0.00	0.0	1.1	4.51	6.0	1.8	3.43	9.42
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.1	0.05	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.01
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	1.4	0.73	15.4	0.0	0.00	0.0	0.0	0.00	0.0	0.3	0.57	3.19
2-METHYLPROPANE (ISOBUTANE)	0.3	0.13	0.3	0.1	1.03	0.1	0.0	0.04	0.0	0.1	0.20	0.12
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.7	0.34	6.6	0.0	0.00	0.0	0.1	0.28	0.6	0.2	0.30	1.54
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1-BUTENE	12.9	6.67	17.9	0.6	6.49	0.8	2.2	8.97	3.1	3.6	6.96	4.97
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.47	0.7	0.0	0.06	0.20
2-METHYL-1-BUTENE	0.6	0.31	3.0	0.0	0.00	0.0	0.1	0.45	0.6	0.2	0.30	0.77
PENTANE	1.7	0.86	1.7	0.4	4.93	0.5	0.4	1.56	0.4	0.7	1.31	0.70
UNIDENTIFIED C5 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	0.9	0.44	7.8	0.0	0.00	0.0	0.2	0.74	1.7	0.2	0.44	2.09
TRANS-2-PENTENE	0.4	0.21	3.7	0.0	0.00	0.0	0.1	0.41	0.9	0.1	0.22	1.01
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.2	0.10	1.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.37
2-METHYL-2-BUTENE	1.1	0.58	7.2	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.45	1.49
CYCLOPENTADIENE	0.5	0.23	3.5	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.18	0.72
2,2-DIMETHYLBUTANE	0.3	0.15	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.12	0.05
CYCLOPENTENE	0.1	0.05	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.17
4-METHYL-1-PENTENE	0.1	0.06	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.10
3-METHYL-1-PENTENE	0.1	0.06	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.11
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	1.2	0.60	1.3	0.3	3.01	0.3	0.3	1.24	0.3	0.5	0.90	0.50
MTBE	8.3	4.29	5.2	0.0	0.00	0.0	0.0	0.00	0.0	1.7	3.34	1.07

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	1.7	0.88	2.6	1.0	10.99	1.5	0.7	2.82	1.1	1.1	2.03	1.61
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	1.2	0.60	1.8	0.5	5.79	0.8	0.4	1.63	0.6	0.6	1.19	0.94
2-METHYL-1-PENTENE	0.2	0.08	0.7	0.1	0.87	0.3	0.1	0.21	0.2	0.1	0.17	0.38
1-HEXENE	0.2	0.08	0.7	0.1	0.87	0.3	0.1	0.21	0.2	0.1	0.17	0.38
HEXANE	0.9	0.46	0.9	0.6	6.50	0.6	0.4	1.41	0.3	0.6	1.12	0.57
UNIDENTIFIED C6 OLEFINS	0.2	0.13	1.7	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.10	0.34
TRANS-3-HEXENE	0.2	0.10	1.3	0.0	0.00	0.0	0.1	0.43	0.7	0.1	0.14	0.48
CIS-3-HEXENE	0.2	0.10	1.4	0.0	0.45	0.3	0.0	0.17	0.3	0.1	0.14	0.50
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.3	0.17	2.2	0.0	0.00	0.0	0.1	0.35	0.6	0.1	0.18	0.63
2-METHYL-2-PENTENE	0.2	0.13	1.7	0.0	0.00	0.0	0.1	0.35	0.6	0.1	0.15	0.51
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.3	0.14	1.9	0.0	0.00	0.0	0.1	0.36	0.6	0.1	0.16	0.55
2,2-DIMETHYLPENTANE	0.6	0.31	0.9	0.2	2.27	0.3	0.2	0.64	0.2	0.3	0.53	0.38
METHYLCYCLOPENTANE	0.1	0.05	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.05
2,4-DIMETHYLPENTANE	3.8	1.94	6.7	0.3	3.02	0.5	0.8	3.19	1.4	1.1	2.20	2.03
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.3	0.14	0.4	0.1	1.03	0.1	0.0	0.13	0.0	0.1	0.22	0.15
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.3	0.16	1.8	0.2	2.48	1.2	0.1	0.34	0.5	0.2	0.39	1.14
BENZENE	7.8	4.04	3.3	0.2	2.10	0.1	2.5	10.04	1.1	2.4	4.66	1.01
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.2	0.13	0.2	0.1	1.64	0.1	0.1	0.48	0.1	0.2	0.31	0.11
CYCLOHEXANE	0.2	0.12	0.3	0.0	0.00	0.0	0.2	0.82	0.3	0.1	0.20	0.13
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	7.7	3.96	11.6	0.6	7.05	0.9	1.7	6.62	2.5	2.4	4.59	3.58
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	1.3	0.69	1.9	0.2	2.80	0.3	0.4	1.48	0.5	0.5	0.98	0.71
CIS-1,3-DIMETHYLCYCLOPENTANE	0.2	0.08	0.4	0.1	0.72	0.2	0.0	0.12	0.1	0.1	0.14	0.19
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	13.4	6.89	12.4	0.5	5.98	0.5	3.3	13.26	3.1	4.0	7.66	3.68
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	0.8	0.44	0.7	0.0	0.09	0.0	0.1	0.42	0.1	0.2	0.40	0.17
UNIDENTIFIED C7	1.0	0.51	4.4	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.39	0.92

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.2	0.09	1.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.21
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.1	0.05	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.13
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.1	0.06	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.07
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYLCYCLOHEXANE	0.1	0.07	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.06
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	1.2	0.62	1.5	0.2	2.33	0.2	0.3	1.08	0.3	0.4	0.83	0.52
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	1.5	0.77	2.2	0.1	1.68	0.2	0.3	1.24	0.5	0.5	0.91	0.70
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	2.7	1.41	3.3	0.0	0.13	0.0	0.7	2.76	0.8	0.8	1.48	0.92
TOLUENE	17.4	8.98	47.5	0.9	10.50	2.5	2.2	8.92	6.1	4.7	9.10	12.86
2,3-DIMETHYLHEXANE	2.0	1.02	2.6	0.0	0.00	0.0	0.0	0.00	0.0	0.4	0.80	0.55
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	1.0	0.53	1.0	0.0	0.00	0.0	0.2	0.82	0.2	0.3	0.52	0.26
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.3	0.17	0.4	0.0	0.00	0.0	0.2	0.83	0.2	0.1	0.24	0.15
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	1.0	0.53	1.0	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.41	0.21
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	1.2	0.62	2.3	0.0	0.00	0.0	0.3	1.34	0.6	0.3	0.66	0.66
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.1	0.08	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.08
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.6	0.32	0.4	0.0	0.00	0.0	0.1	0.60	0.1	0.2	0.33	0.10
UNIDENTIFIED C8	0.9	0.46	3.0	0.1	1.46	0.4	0.1	0.60	0.5	0.3	0.67	1.00
TRANS-2-OCTENE	0.1	0.05	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.11
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,5-TRIMETHYLHEXANE	0.2	0.09	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.04
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.1	0.07	0.2	0.2	2.31	0.3	0.5	2.10	0.7	0.3	0.53	0.37
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.2	0.10	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.08
ETHYLCYCLOHEXANE	0.3	0.14	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.11	0.11
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	5.3	2.73	14.3	0.1	0.63	0.1	0.9	3.72	2.5	1.4	2.68	3.74
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m- & p-XYLENE	12.1	6.22	89.1	0.2	1.73	1.1	0.0	0.00	0.0	2.6	5.00	19.10
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.5	0.27	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.21	0.12
3-METHYLOCTANE	0.3	0.15	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.12	0.07
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	4.0	2.08	26.0	0.1	1.58	0.9	0.4	1.48	2.4	1.0	1.95	6.53
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.3	0.13	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.10	0.12
NONANE	0.2	0.11	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.02
ISOPROPYLBENZENE (CUMENE)	0.2	0.08	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.07
2,2-DIMETHYLOCTANE	0.1	0.07	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.03
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.5	0.28	1.2	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.22	0.24
1-METHYL-3-ETHYLBENZENE	2.6	1.34	18.8	0.0	0.00	0.0	0.1	0.41	0.7	0.6	1.10	4.10
1-METHYL-4-ETHYLBENZENE	1.1	0.54	7.6	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.42	1.58
1,3,5-TRIMETHYLBENZENE	1.0	0.53	10.5	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.42	2.17
1-METHYL-2-ETHYLBENZENE	0.9	0.44	6.2	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.35	1.29
1,2,4-TRIMETHYLBENZENE	2.9	1.52	26.0	0.0	0.00	0.0	0.1	0.33	0.7	0.6	1.23	5.61
DECANE	0.1	0.06	0.1	0.1	0.95	0.0	0.0	0.00	0.0	0.1	0.13	0.03
ISOBUTYLBENZENE	0.1	0.05	0.2	0.1	0.89	0.1	0.0	0.00	0.0	0.1	0.12	0.12

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYLPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLBENZENE	0.5	0.24	2.8	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.19	0.57
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.2	0.11	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.05
1-METHYL-2-ISOPROPYLBENZENE	0.2	0.12	1.4	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.10	0.29
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.2	0.11	1.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.28
1-METHYL-3-N-PROPYLBENZENE	0.4	0.22	2.8	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.17	0.58
1-METHYL-4-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2 DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.2	0.12	2.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.43
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.3	0.18	3.2	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.14	0.66
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,5-TETRAMETHYLBENZENE	0.2	0.09	1.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.34
2-METHYLBUTYLBENZENE (890 AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4 DIMETHYLCUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C9-C12+	3.3	1.71	12.8	0.1	0.83	0.3	0.0	0.09	0.1	0.7	1.42	2.79
FORMALDEHYDE	2.0	1.08	14.8	0.0	0.00	0.0	0.0	0.00	0.0	0.4	0.82	3.04
ACETALDEHYDE	0.7	0.38	4.1	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.30	0.86
ACROLEIN	0.2	0.12	1.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.32
ACETONE	0.2	0.12	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.03
PROPIONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CROTONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOBUTYRALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYL ETHYL KETONE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BENZALDEHYDE	0.0	0.02	-0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.02	-0.00
HEXANALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

TEST NO: BLB-RFA-02S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 9/18/95
 TEST FUEL: EM-1700-F

B-11

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	21.8		0.3	2.8		0.0	8.8		0.1	8.4		0.12
ETHANE	4.8	2.31	1.2	0.0	0.53	0.0	1.4	4.53	0.3	1.4	2.54	0.35
ETHYLENE	13.5	6.57	98.7	0.0	0.75	0.4	1.5	4.89	10.9	3.2	5.96	23.66
PROPANE	0.2	0.10	0.1	0.0	0.00	0.0	0.0	0.12	0.0	0.1	0.10	0.03
PROPYLENE	9.7	4.70	90.9	0.1	1.60	1.0	1.0	3.20	9.2	2.3	4.27	21.89
ACETYLENE	6.4	3.12	3.2	0.0	0.23	0.0	0.0	0.03	0.0	1.3	2.47	0.67
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	5.2	2.53	5.3	0.1	1.69	0.1	1.3	4.22	1.3	1.5	2.74	1.52
TRANS-2-BUTENE	0.8	0.39	8.1	0.0	0.00	0.0	0.2	0.53	1.6	0.2	0.39	2.12
1-BUTENE	1.4	0.67	12.3	0.0	0.00	0.0	0.1	0.26	0.7	0.3	0.56	2.74
2-METHYLPROPENE (ISOBUTYLENE)	3.3	1.62	17.7	0.0	0.00	0.0	0.4	1.34	2.2	0.8	1.48	4.28
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.1	0.06	0.0	0.0	0.00	0.0	0.1	0.26	0.0	0.0	0.09	0.02
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	1.6	0.78	17.6	0.0	0.00	0.0	0.1	0.45	1.5	0.4	0.68	4.05
2-METHYLPROPANE (ISOBUTANE)	0.2	0.08	0.2	0.0	0.62	0.0	0.1	0.39	0.1	0.1	0.16	0.11
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.1	0.03	0.6	0.0	0.00	0.0	0.1	0.41	1.2	0.0	0.08	0.46
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	17.2	8.35	23.7	0.4	6.19	0.6	4.3	14.14	6.0	5.0	9.12	6.85
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.4	0.19	2.4	0.0	0.00	0.0	0.1	0.30	0.6	0.1	0.20	0.66
2-METHYL-1-BUTENE	0.6	0.30	3.0	0.0	0.00	0.0	0.0	0.15	0.2	0.1	0.26	0.69
PENTANE	2.1	1.03	2.2	0.2	2.90	0.2	0.4	1.38	0.4	0.7	1.20	0.68
UNIDENTIFIED C6 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	0.9	0.43	8.1	0.0	0.00	0.0	0.1	0.36	1.0	0.2	0.39	1.95
TRANS-2-PENTENE	0.7	0.32	5.8	0.0	0.00	0.0	0.1	0.37	1.0	0.2	0.31	1.47
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.3	0.16	3.0	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.13	0.61
2-METHYL-2-BUTENE	1.2	0.59	7.8	0.0	0.00	0.0	0.2	0.51	1.0	0.3	0.54	1.89
CYCLOPENTADIENE	0.5	0.25	3.9	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.19	0.80
2,2-DIMETHYLBUTANE	0.9	0.44	0.7	0.0	0.06	0.0	0.2	0.59	0.1	0.2	0.44	0.20
CYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.28	0.4	0.0	0.04	0.10
3-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	1.4	0.70	1.5	0.1	2.00	0.1	0.4	1.24	0.4	0.5	0.86	0.50
MTBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	4.0	1.97	6.2	0.4	5.90	0.6	1.0	3.36	1.6	1.3	2.42	2.02
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	2.3	1.09	3.4	0.4	5.89	0.6	0.6	1.91	0.9	0.8	1.51	1.25
2-METHYL-1-PENTENE	0.2	0.09	0.8	0.0	0.00	0.0	0.0	0.16	0.2	0.1	0.09	0.23
1-HEXENE	0.3	0.12	1.1	0.0	0.00	0.0	0.0	0.16	0.2	0.1	0.12	0.29
HEXANE	1.2	0.57	1.2	0.3	5.09	0.3	0.4	1.35	0.4	0.5	0.97	0.52
UNIDENTIFIED C6 OLEFINS	0.6	0.28	3.9	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.22	0.81
TRANS-3-HEXENE	0.3	0.14	1.9	0.1	2.25	1.0	0.1	0.33	0.7	0.2	0.30	1.08
CIS-3-HEXENE	0.3	0.16	2.3	0.1	0.90	0.4	0.1	0.24	0.5	0.1	0.22	0.80
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.5	0.23	3.2	0.0	0.00	0.0	0.1	0.29	0.6	0.1	0.22	0.82
2-METHYL-2-PENTENE	0.3	0.15	2.1	0.0	0.00	0.0	0.1	0.31	0.6	0.1	0.17	0.62
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.2	0.11	1.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.32
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.4	0.18	2.5	0.1	2.23	1.0	0.1	0.31	0.6	0.2	0.33	1.19
2,2-DIMETHYLPENTANE	0.9	0.43	1.2	0.2	3.05	0.3	0.2	0.65	0.3	0.3	0.63	0.48
METHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLPENTANE	1.3	0.64	2.3	0.2	2.34	0.3	0.3	1.13	0.6	0.4	0.82	0.79
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.2	0.08	0.2	0.1	1.25	0.1	0.0	0.12	0.0	0.1	0.16	0.11
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.3	0.15	1.8	0.2	2.63	1.0	0.1	0.16	0.3	0.2	0.31	0.94
BENZENE	13.4	6.53	5.6	0.0	0.11	0.0	3.3	10.77	1.4	3.7	6.79	1.55
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.4	0.21	0.3	0.0	0.00	0.0	0.2	0.64	0.1	0.1	0.27	0.10
CYCLOHEXANE	0.3	0.14	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.11	0.08
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	5.1	2.50	7.8	0.3	3.90	0.4	1.3	4.16	1.9	1.5	2.84	2.34
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.1	0.05	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.12
3-METHYLHEXANE	3.3	1.62	4.7	0.2	2.34	0.2	0.7	2.42	1.0	1.0	1.78	1.36
CIS-1,3-DIMETHYLCYCLOPENTANE	0.3	0.13	0.7	0.0	0.36	0.1	0.1	0.19	0.1	0.1	0.15	0.21
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	3.6	1.77	3.4	0.3	5.23	0.3	1.0	3.28	0.9	1.2	2.21	1.12
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	2.4	1.14	1.9	0.1	1.61	0.1	0.4	1.15	0.3	0.6	1.17	0.52
UNIDENTIFIED C7	1.2	0.61	5.6	0.1	1.71	0.5	0.2	0.73	1.0	0.4	0.69	1.70

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.2	0.10	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.12
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.2	0.07	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.18
METHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.28	0.2	0.0	0.04	0.04
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	0.6	0.29	0.7	0.0	0.00	0.0	0.2	0.72	0.3	0.2	0.34	0.22
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.30	0.5	0.0	0.05	0.13
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	0.8	0.40	1.2	0.0	0.00	0.0	0.2	0.72	0.3	0.2	0.43	0.35
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.2	0.10	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.05
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	0.9	0.42	1.0	0.0	0.49	0.0	0.2	0.81	0.3	0.3	0.48	0.32
TOLUENE	22.7	11.04	62.1	0.5	8.46	1.5	2.5	8.30	6.9	5.7	10.45	15.55
2,3-DIMETHYLHEXANE	0.7	0.35	1.0	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.28	0.20
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	1.2	0.57	1.1	0.0	0.00	0.0	0.2	0.87	0.2	0.3	0.55	0.29
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.4	0.19	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.15	0.10
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	1.3	0.63	1.3	0.0	0.00	0.0	0.2	0.74	0.2	0.3	0.61	0.33
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	0.6	0.27	1.1	0.0	0.00	0.0	0.2	0.57	0.3	0.2	0.30	0.32
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,5-TRIMETHYLHEXANE	0.1	0.07	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.03
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.1	0.08	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.07
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.6	0.30	0.4	0.0	0.00	0.0	0.1	0.42	0.1	0.2	0.30	0.10
UNIDENTIFIED C8	1.3	0.62	4.3	0.1	1.14	0.2	0.2	0.62	0.6	0.4	0.65	1.21
TRANS-2-OCTENE	0.2	0.10	1.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.22
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.1	0.05	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.04
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.0	0.01	0.0	0.2	3.82	0.3	0.1	0.32	0.1	0.2	0.29	0.21
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.2	0.11	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.09
ETHYLCYCLOHEXANE	0.2	0.12	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.09	0.10
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	6.4	3.09	17.2	0.2	2.83	0.5	0.5	1.69	1.4	1.8	2.86	4.21
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m- & p-XYLENE	13.7	6.63	100.8	0.1	1.15	0.5	1.0	3.33	7.5	3.2	5.78	23.25
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.6	0.28	0.6	0.0	0.00	0.0	0.2	0.49	0.2	0.2	0.29	0.18
3-METHYLOCTANE	0.3	0.15	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.12	0.07
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	4.9	2.38	31.7	0.1	2.31	1.0	0.5	1.71	3.4	1.2	2.28	8.01
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.2	0.09	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.09
NONANE	0.3	0.15	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.12	0.04
ISOPROPYLBENZENE (CUMENE)	0.2	0.10	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.10
2,2-DIMETHYLOCTANE	0.3	0.14	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.11	0.08
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.9	0.43	1.9	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.33	0.38
1-METHYL-3-ETHYLBENZENE	3.8	1.83	27.1	0.0	0.00	0.0	0.2	0.74	1.8	0.8	1.55	6.08
1-METHYL-4-ETHYLBENZENE	1.5	0.71	10.5	0.0	0.00	0.0	0.1	0.38	0.8	0.3	0.61	2.40
1,3,5-TRIMETHYLBENZENE	1.5	0.75	15.6	0.0	0.00	0.0	0.2	0.57	1.8	0.4	0.67	3.71
1-METHYL-2-ETHYLBENZENE	1.4	0.70	10.4	0.0	0.00	0.0	0.1	0.27	0.6	0.3	0.59	2.32
1,2,4-TRIMETHYLBENZENE	4.4	2.11	38.4	0.0	0.00	0.0	0.1	0.39	1.0	0.9	1.71	8.25
DECANE	0.2	0.09	0.1	0.1	1.58	0.0	0.0	0.00	0.0	0.1	0.17	0.04
ISOBUTYLBENZENE	0.1	0.05	0.2	0.1	1.49	0.2	0.0	0.00	0.0	0.1	0.13	0.14

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYL-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLBENZENE	0.7	0.36	4.3	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.28	0.90
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.3	0.16	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.13	0.07
1-METHYL-2-ISOPROPYLBENZENE	0.4	0.19	2.3	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.16	0.48
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.5	0.22	2.9	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.17	0.61
1-METHYL-3-N-PROPYLBENZENE	0.3	0.13	1.7	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.10	0.36
1-METHYL-4-N-PROPYLBENZENE	0.8	0.40	5.3	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.31	1.10
1,2-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.5	0.22	4.1	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.17	0.86
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.7	0.36	6.7	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.28	1.39
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.1	0.04	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.01
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,5-TETRAMETHYLBENZENE	0.3	0.14	2.6	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.11	0.55
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLOUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8-C12+	6.9	3.35	26.3	0.0	0.00	0.0	0.0	0.00	0.0	1.4	2.65	5.49
FORMALDEHYDE	1.7	0.81	11.9	0.0	0.32	0.1	0.0	0.06	0.1	0.4	0.66	2.57
ACETALDEHYDE	0.9	0.44	5.0	0.0	0.32	0.1	0.0	0.00	0.0	0.2	0.36	1.09
ACROLEIN	0.4	0.17	2.4	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.13	0.50
ACETONE	0.9	0.42	0.6	0.7	11.30	0.4	0.6	1.91	0.3	0.7	1.32	0.40
PROPIONALDEHYDE	0.0	0.01	0.1	0.0	0.00	0.0	0.0	0.02	0.0	0.0	0.01	0.04
CROTONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOBUTYRALDEHYDE	0.0	0.01	0.1	0.0	0.00	0.0	0.0	0.03	0.0	0.0	0.01	0.04
METHYL ETHYL KETONE	0.0	0.01	0.0	0.1	1.43	0.1	0.0	0.03	0.0	0.1	0.10	0.07
BENZALDEHYDE	0.4	0.18	-0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.14	-0.04
HEXANALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

TEST NO: 100NB-02S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 9/8/95
 TEST FUEL: BUTANE

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	28.1		0.4	6.7		0.1	35.4		0.5	19.0		0.28
ETHANE	3.2	1.29	0.8	0.0	1.15	0.0	3.5	8.06	0.9	1.7	2.55	0.41
ETHYLENE	19.0	7.60	138.8	0.0	1.66	0.2	4.3	9.88	31.7	5.2	7.93	37.59
PROPANE	0.4	0.15	0.2	0.0	0.00	0.0	0.2	0.37	0.1	0.1	0.19	0.06
PROPYLENE	8.1	3.22	75.9	0.0	0.73	0.1	1.1	2.61	10.8	2.0	3.07	18.76
ACETYLENE	5.4	2.16	2.7	0.1	5.05	0.0	0.0	0.09	0.0	1.2	1.82	0.59
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	204.7	81.67	208.8	0.7	38.50	0.7	29.4	66.73	30.0	50.9	78.24	51.88
TRANS-2-BUTENE	0.3	0.14	3.5	0.0	0.00	0.0	0.3	0.63	2.7	0.1	0.23	1.48
1-BUTENE	0.7	0.28	6.1	0.0	0.00	0.0	0.2	0.44	1.7	0.2	0.30	1.75
2-METHYLPROPENE (ISOBUTYLENE)	0.1	0.03	0.4	0.0	0.00	0.0	0.4	0.82	1.9	0.1	0.18	0.61
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.0	0.0	0.00	0.00
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	0.2	0.06	1.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.36
2-METHYLPROPANE (ISOBUTANE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.4	0.15	3.7	0.0	0.00	0.0	0.2	0.48	2.1	0.1	0.21	1.35
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	1.6	0.65	2.2	0.0	0.00	0.0	1.7	3.78	2.3	0.8	1.22	1.09
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PENTANE	0.2	0.06	0.2	0.0	0.00	0.0	0.2	0.46	0.2	0.1	0.14	0.09
UNIDENTIFIED C5 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-PENTENE	0.1	0.04	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.17
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-BUTENE	0.2	0.06	1.0	0.1	3.64	0.4	0.0	0.06	0.2	0.1	0.11	0.48
CYCLOPENTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLBUTANE	0.0	0.01	0.0	0.0	1.05	0.0	0.0	0.00	0.0	0.0	0.02	0.01
CYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.09	0.0	0.0	0.06	0.1	0.0	0.01	0.04
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	0.1	0.05	0.1	0.1	3.67	0.1	0.1	0.28	0.1	0.1	0.14	0.10
MTBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	0.3	0.11	0.4	0.0	0.00	0.0	0.2	0.48	0.3	0.1	0.17	0.17
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	0.1	0.06	0.2	0.0	0.00	0.0	0.1	0.31	0.2	0.1	0.10	0.10
2-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANE	0.2	0.07	0.2	0.0	0.00	0.0	0.0	0.08	0.0	0.0	0.06	0.04
UNIDENTIFIED C8 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.0	0.0	0.00	0.01
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLPENTANE	0.1	0.03	0.1	0.0	0.00	0.0	0.1	0.14	0.1	0.0	0.05	0.04
METHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLPENTANE	0.2	0.08	0.3	0.1	5.35	0.2	0.1	0.25	0.2	0.1	0.18	0.21
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.0	0.01	0.0	0.1	5.05	0.1	0.0	0.08	0.0	0.1	0.10	0.09
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.1	0.02	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.02	0.06
BENZENE	0.5	0.18	0.2	0.0	0.00	0.0	0.2	0.34	0.1	0.1	0.21	0.06
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.0	0.01	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.00
CYCLOHEXANE	0.0	0.00	0.0	0.3	16.84	0.4	0.0	0.00	0.0	0.2	0.26	0.21
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	0.3	0.11	0.4	0.0	0.00	0.0	0.2	0.44	0.3	0.1	0.17	0.17
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.20	0.2	0.0	0.04	0.06
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	0.4	0.14	0.3	0.0	1.38	0.0	0.2	0.55	0.2	0.2	0.24	0.14
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	0.0	0.00	0.0	0.1	3.36	0.1	0.0	0.00	0.0	0.0	0.05	0.03
UNIDENTIFIED C7	0.0	0.00	0.0	0.0	0.87	0.1	0.0	0.07	0.1	0.0	0.03	0.08

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	0.1	0.05	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.03
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	0.0	0.01	0.0	0.0	0.00	0.0	0.0	0.02	0.0	0.0	0.01	0.01
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	0.1	0.04	0.1	0.0	0.00	0.0	0.1	0.15	0.1	0.0	0.08	0.05
TOLUENE	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.34	0.4	0.0	0.08	0.11
2,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	0.1	0.05	0.1	0.0	0.00	0.0	0.1	0.25	0.1	0.1	0.09	0.08
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8	0.0	0.01	0.1	0.0	0.00	0.0	0.0	0.02	0.0	0.0	0.01	0.03
TRANS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	2.31	0.1	0.0	0.00	0.0	0.0	0.04	0.03
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	0.0	0.02	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.02
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m- & p-XYLENE	0.1	0.05	1.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.20
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	0.0	0.02	0.2	0.0	0.00	0.0	0.1	0.22	0.6	0.0	0.05	0.22
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NONANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOPROPYLBENZENE (CUMENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ETHYLBENZENE	0.0	0.02	0.3	0.0	0.00	0.0	0.1	0.24	0.8	0.0	0.06	0.28
1-METHYL-4-ETHYLBENZENE	0.1	0.03	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.12
1,3,5-TRIMETHYLBENZENE	0.1	0.03	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.17
1-METHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4-TRIMETHYLBENZENE	0.1	0.02	0.5	0.0	0.00	0.0	0.1	0.19	0.7	0.0	0.05	0.30
DECANE	0.0	0.02	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.00
ISOBUTYLBENZENE	0.0	0.01	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.01

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYLPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2 DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,5-TETRAMETHYLBENZENE	0.3	0.12	2.8	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.10	0.57
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4 DIMETHYLCUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C9-C12+	0.1	0.02	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.02	0.05
FORMALDEHYDE	2.1	0.82	14.7	0.1	6.33	0.9	0.4	0.88	2.8	0.6	0.92	4.26
ACETALDEHYDE	0.8	0.25	3.4	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.20	0.71
ACROLEIN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ACETONE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPIONALDEHYDE	0.0	0.01	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.04
CROTONALDEHYDE	0.0	0.00	0.0	0.1	2.96	0.3	0.0	0.02	0.0	0.0	0.05	0.17
ISOBUTYRALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYL ETHYL KETONE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BENZALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

TEST NO: HD5-02S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 9/20/85
 TEST FUEL: PROPANE

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	9.3		0.1	1.8		0.0	11.4		0.2	6.0		0.09
ETHANE	1.9	1.07	0.5	0.0	0.00	0.0	0.8	6.20	0.2	0.6	1.43	0.15
ETHYLENE	9.7	5.58	70.6	0.0	0.34	0.1	0.1	0.96	0.8	2.1	4.95	15.00
PROPANE	138.9	80.08	66.7	0.2	5.01	0.1	8.7	71.84	4.2	31.5	75.67	15.10
PROPYLENE	5.0	2.85	46.5	0.0	0.00	0.0	0.0	0.39	0.4	1.0	2.51	9.83
ACETYLENE	1.4	0.81	0.7	0.0	0.00	0.0	0.0	0.03	0.0	0.3	0.71	0.16
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	3.4	1.95	3.5	0.4	8.83	0.4	0.3	2.33	0.3	1.0	2.33	0.99
TRANS-2-BUTENE	0.1	0.03	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.12
1-BUTENE	0.2	0.11	1.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.35
2-METHYLPROPENE (ISOBUTYLENE)	0.1	0.03	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.06
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	0.0	0.02	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.02	0.10
2-METHYLPROPANE (ISOBUTANE)	0.7	0.40	0.8	0.0	0.44	0.0	0.0	0.27	0.0	0.2	0.39	0.20
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	2.9	1.70	4.1	0.3	8.33	0.5	0.3	2.58	0.4	0.9	2.10	1.20
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PENTANE	0.4	0.20	0.4	0.2	5.95	0.2	0.1	1.03	0.1	0.2	0.56	0.24
UNIDENTIFIED C5 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-PENTENE	0.1	0.06	0.9	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.20
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-BUTENE	0.2	0.09	1.0	0.1	2.20	0.6	0.0	0.00	0.0	0.1	0.19	0.51
CYCLOPENTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLBUTANE	0.1	0.07	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.02
CYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	0.2	0.12	0.2	0.1	2.23	0.1	0.1	0.43	0.1	0.1	0.25	0.11
MTBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	0.6	0.37	1.0	0.2	4.80	0.3	0.1	1.01	0.2	0.3	0.64	0.41
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	0.3	0.16	0.4	0.2	3.77	0.2	0.1	0.63	0.1	0.2	0.37	0.24
2-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANE	0.2	0.11	0.2	0.2	4.95	0.2	0.1	0.59	0.1	0.2	0.39	0.16
UNIDENTIFIED C6 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-3-HEXENE	0.1	0.05	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.12
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.2	2.02	1.6	0.1	0.16	0.45
2,2-DIMETHYLPENTANE	0.1	0.07	0.2	0.1	1.85	0.1	0.0	0.17	0.0	0.1	0.16	0.10
METHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLPENTANE	0.1	0.07	0.2	0.1	1.85	0.1	0.0	0.00	0.0	0.1	0.16	0.12
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.1	0.06	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.03
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.1	0.04	0.4	0.3	6.69	1.5	0.0	0.00	0.0	0.2	0.37	0.87
BENZENE	0.3	0.20	0.1	0.2	5.34	0.1	0.2	1.79	0.1	0.2	0.58	0.10
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	0.4	0.23	0.6	0.0	1.16	0.1	0.1	0.55	0.1	0.1	0.30	0.19
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	0.2	0.12	0.3	0.0	0.88	0.0	0.1	0.44	0.1	0.1	0.19	0.11
CIS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.75	0.2	0.0	0.06	0.06
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	0.2	0.14	0.2	0.3	6.64	0.2	0.1	0.65	0.1	0.2	0.50	0.19
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	0.1	0.08	0.1	0.1	1.87	0.1	0.0	0.00	0.0	0.1	0.13	0.04
UNIDENTIFIED C7	0.3	0.17	1.3	0.3	7.36	1.3	0.0	0.06	0.0	0.2	0.52	0.97

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	0.1	0.08	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.02
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	0.1	0.05	0.1	0.1	1.28	0.1	0.0	0.40	0.1	0.1	0.14	0.07
TOLUENE	0.8	0.43	2.1	0.1	2.26	0.2	0.3	2.78	0.9	0.3	0.71	0.81
2,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	0.1	0.05	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.02
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1					BAG 2					BAG 3					FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	WEIGHT NMOG %	OZONE MG/MI	
1-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
OCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
UNIDENTIFIED C8	0.0	0.02	0.1	0.0	1.23	0.2	0.0	0.34	0.1	0.0	0.10	0.14	0.0	0.10	0.14	0.10	0.14	
TRANS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
2,3,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
2,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.3	7.34	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.36	0.20	0.36	0.20	
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
CIS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
ETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
1,1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
2,2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
3,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
ETHYLBENZENE	0.1	0.04	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.0	0.04	0.04	
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
m- & p-XYLENE	0.1	0.07	0.9	0.0	0.00	0.0	0.0	0.21	0.2	0.0	0.08	0.24	0.0	0.08	0.24	0.08	0.24	
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
2-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
3-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
o-XYLENE	0.1	0.08	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.14	0.05	0.14	
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
1-NONENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
NONANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
ISOPROPYLBENZENE (CUMENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
2,2-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
n-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
1-METHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
1-METHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
1,3,5-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
1-METHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
1,2,4-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.00	0.00	
DECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	1.77	0.0	0.0	0.00	0.0	0.0	0.09	0.0	0.09	0.02	
ISOBUTYLBENZENE	0.0	0.00	0.0	0.1	1.67	0.1	0.1	1.67	0.1	0.0	0.00	0.0	0.0	0.08	0.0	0.08	0.08	

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYLPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,6-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLCUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C9-C12+	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
FORMALDEHYDE	1.3	0.78	9.6	0.0	0.13	0.0	0.1	1.12	1.0	0.3	0.77	2.29
ACETALDEHYDE	0.8	0.48	4.6	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.42	0.96
ACROLEIN	0.0	0.02	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.02	0.04
ACETONE	1.2	0.69	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.3	0.60	0.14
PROPIONALDEHYDE	0.1	0.07	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.17
CROTONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOBUTYRALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYL ETHYL KETONE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BENZALDEHYDE	0.3	0.15	-0.1	0.2	4.07	-0.1	0.1	0.43	-0.0	0.2	0.37	-0.08
HEXANALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

TEST NUMBER: 90NB/10IB-02S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 9/8/95
 TEST FUEL: BUTANE

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	23.2		0.3	3.1		0.0	19.9		0.3	11.9		0.18
ETHANE	2.5	1.40	0.8	0.0	0.57	0.0	2.2	12.11	0.6	1.1	2.62	0.29
ETHYLENE	16.7	9.24	121.9	0.0	0.00	0.0	1.4	7.55	10.1	3.9	8.83	28.19
PROPANE	0.3	0.14	0.1	0.0	0.00	0.0	0.1	0.77	0.1	0.1	0.21	0.04
PROPYLENE	7.5	4.12	70.1	0.0	0.00	0.0	0.4	2.01	3.5	1.7	3.78	15.57
ACETYLENE	9.8	5.43	4.9	0.0	0.00	0.0	1.4	7.74	0.7	2.4	5.57	1.22
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	122.0	67.42	124.4	0.0	0.00	0.0	10.0	54.53	10.2	28.2	64.37	28.78
TRANS-2-BUTENE	0.2	0.13	2.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.11	0.48
1-BUTENE	0.5	0.29	4.7	0.0	0.00	0.0	0.1	0.41	0.7	0.1	0.30	1.17
2-METHYLPROPENE (ISOBUTYLENE)	0.7	0.39	3.7	0.0	0.00	0.0	0.1	0.59	0.6	0.2	0.40	0.93
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.0	0.0	0.00	0.00
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	0.1	0.08	1.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.27
2-METHYLPROPANE (ISOBUTANE)	12.2	6.73	14.7	0.0	0.00	0.0	0.0	0.20	0.0	2.5	5.82	3.08
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	1.5	0.82	2.1	0.0	0.00	0.0	0.4	1.97	0.5	0.4	0.94	0.57
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1-BUTENE	0.1	0.05	0.5	0.1	7.27	0.7	0.0	0.00	0.0	0.1	0.21	0.46
PENTANE	0.2	0.11	0.2	0.1	2.68	0.1	0.1	0.45	0.1	0.1	0.21	0.10
UNIDENTIFIED C6 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-PENTENE	0.0	0.02	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.02	0.07
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.0	0.00	0.0	0.1	7.07	1.2	0.0	0.00	0.0	0.1	0.16	0.63
2-METHYL-2-BUTENE	0.2	0.09	1.0	0.0	0.00	0.0	0.0	0.22	0.3	0.0	0.10	0.29
CYCLOPENTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLBUTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-PENTENE	0.0	0.02	0.1	0.0	1.73	0.2	0.0	0.00	0.0	0.0	0.05	0.10
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	0.1	0.06	0.1	0.0	2.38	0.1	0.0	0.26	0.1	0.1	0.14	0.07
MTBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	0.2	0.10	0.3	0.1	5.51	0.2	0.2	0.94	0.3	0.1	0.32	0.22
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	0.1	0.07	0.2	0.0	2.12	0.1	0.1	0.37	0.1	0.1	0.15	0.10
2-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANE	0.1	0.07	0.1	0.0	0.00	0.0	0.1	0.34	0.1	0.0	0.10	0.04
UNIDENTIFIED C6 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEXENE	0.1	0.05	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.12
CIS-3-HEXENE	0.0	0.02	0.2	0.0	1.48	0.2	0.1	0.46	0.6	0.0	0.10	0.30
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLPENTANE	0.0	0.02	0.0	0.0	0.54	0.0	0.0	0.22	0.1	0.0	0.05	0.03
METHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLPENTANE	0.2	0.09	0.3	0.1	2.94	0.1	0.0	0.15	0.0	0.1	0.17	0.13
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.0	0.00	0.0	0.0	2.32	0.1	0.0	0.00	0.0	0.0	0.08	0.03
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.0	0.01	0.1	0.1	2.86	0.3	0.0	0.12	0.1	0.0	0.09	0.22
BENZENE	0.2	0.09	0.1	0.1	4.47	0.0	0.1	0.37	0.0	0.1	0.22	0.04
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.15	0.0	0.0	0.02	0.01
CYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	0.1	0.08	0.2	0.0	0.00	0.0	0.1	0.40	0.1	0.1	0.12	0.08
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	0.4	0.21	0.4	0.1	6.18	0.1	0.1	0.52	0.1	0.2	0.38	0.16
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C7	0.0	0.02	0.2	0.0	0.00	0.0	0.0	0.18	0.2	0.0	0.04	0.08

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	0.0	0.02	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.01
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	0.0	0.01	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.01
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	0.1	0.04	0.1	0.1	4.02	0.1	0.0	0.00	0.0	0.1	0.13	0.07
TOLUENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	0.1	0.05	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.02
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	0.1	0.07	0.1	0.0	0.20	0.0	0.0	0.00	0.0	0.0	0.06	0.03
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.1	0.05	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.01
UNIDENTIFIED C8	0.0	0.01	0.0	0.0	2.44	0.2	0.0	0.15	0.1	0.0	0.08	0.12
TRANS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.1	0.05	0.1	0.1	6.48	0.2	0.1	0.62	0.2	0.1	0.27	0.16
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m- & p-XYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.33	0.4	0.0	0.04	0.12
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NONANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOPROPYLBENZENE (CUMENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ETHYLBENZENE	0.1	0.06	0.8	0.0	2.07	0.3	0.0	0.00	0.0	0.0	0.10	0.32
1-METHYL-4-ETHYLBENZENE	0.1	0.04	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.12
1,3,5-TRIMETHYLBENZENE	0.1	0.04	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.17
1-METHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4-TRIMETHYLBENZENE	0.1	0.04	0.7	0.0	0.00	0.0	0.0	0.20	0.3	0.0	0.06	0.24
DECANE	0.0	0.02	0.0	0.0	0.00	0.0	0.0	0.09	0.0	0.0	0.03	0.01
ISOBUTYLBENZENE	0.0	0.02	0.1	0.0	0.00	0.0	0.0	0.08	0.0	0.0	0.02	0.02

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYLPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,6-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLCUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,6-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C9-C12+	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.0	0.0	0.00	0.01
FORMALDEHYDE	1.5	0.85	11.0	0.0	0.00	0.0	0.1	0.39	0.5	0.3	0.77	2.42
ACETALDEHYDE	0.3	0.16	1.6	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.14	0.34
ACROLEIN	0.2	0.11	1.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.28
ACETONE	0.0	0.00	0.0	0.0	0.00	0.0	0.8	4.56	0.5	0.2	0.53	0.13
PROPIONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CROTONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOBUTYRALDEHYDE	0.0	0.02	0.2	0.0	0.00	0.0	0.0	0.24	0.2	0.0	0.04	0.10
METHYL ETHYL KETONE	0.0	0.02	0.0	0.0	0.00	0.0	0.0	0.24	0.1	0.0	0.04	0.02
BENZALDEHYDE	1.8	0.97	-1.0	0.4	18.82	-0.2	0.0	0.00	0.0	0.6	1.30	-0.31
HEXANALDEHYDE	0.0	0.00	0.0	0.3	14.86	1.1	0.0	0.00	0.0	0.2	0.34	0.57

TEST NO: 90NB/10BE-02S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 9/11/95
 TEST FUEL: BUTANE

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	22.5		0.3	4.2		0.1	28.8		0.4	14.0		0.21
ETHANE	2.8	1.47	0.6	0.0	0.95	0.0	2.5	8.19	0.6	1.2	2.70	0.30
ETHYLENE	15.5	8.91	112.8	0.0	0.52	0.1	2.2	6.96	15.7	3.7	8.28	27.17
PROPANE	0.2	0.14	0.1	0.0	0.00	0.0	0.1	0.36	0.1	0.1	0.18	0.04
PROPYLENE	7.1	4.07	66.5	0.0	0.00	0.0	0.7	2.22	6.4	1.6	3.60	15.23
ACETYLENE	5.5	3.19	2.8	0.0	0.54	0.0	0.0	0.08	0.0	1.1	2.53	0.57
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	122.6	70.59	125.1	0.1	3.36	0.1	20.7	66.96	21.1	30.5	67.76	31.11
TRANS-2-BUTENE	2.9	1.65	28.5	0.0	0.00	0.0	0.1	0.22	0.7	0.6	1.33	5.96
1-BUTENE	3.0	1.72	26.6	0.0	0.00	0.0	0.0	0.00	0.0	0.6	1.34	5.39
2-METHYLPROPENE (ISOBUTYLENE)	2.8	1.62	14.9	0.0	0.23	0.0	0.1	0.22	0.4	0.6	1.32	3.14
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.1	0.03	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.00
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	0.4	0.20	3.8	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.16	0.78
2-METHYLPROPANE (ISOBUTANE)	0.0	0.00	0.0	0.0	0.32	0.0	0.0	0.00	0.0	0.0	0.01	0.01
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	2.9	1.66	28.6	0.0	0.00	0.0	0.9	2.93	9.0	0.8	1.84	8.23
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	2.0	1.16	2.8	0.5	17.79	0.7	1.2	3.99	1.7	1.0	2.22	1.38
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.29	0.6	0.0	0.05	0.15
2-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.46	0.7	0.0	0.08	0.19
PENTANE	0.2	0.12	0.2	0.2	6.52	0.2	0.1	0.44	0.1	0.2	0.38	0.18
UNIDENTIFIED C5 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-PENTENE	0.1	0.06	0.9	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.19
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-BUTENE	0.1	0.05	0.6	0.0	0.00	0.0	0.0	0.06	0.1	0.0	0.05	0.16
CYCLOPENTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLBUTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	0.1	0.06	0.1	0.1	2.62	0.1	0.1	0.21	0.1	0.1	0.17	0.08
MTBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	0.2	0.14	0.4	0.2	0.05	0.3	0.2	0.61	0.3	0.2	0.42	0.29
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	0.1	0.07	0.2	0.1	4.32	0.2	0.1	0.35	0.2	0.1	0.26	0.18
2-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANE	0.2	0.10	0.2	0.0	1.81	0.0	0.1	0.28	0.1	0.1	0.19	0.08
UNIDENTIFIED C6 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLPENTANE	0.1	0.05	0.1	0.1	3.48	0.1	0.1	0.21	0.1	0.1	0.19	0.12
METHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLPENTANE	0.2	0.11	0.3	0.1	2.34	0.1	0.0	0.13	0.1	0.1	0.19	0.15
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.1	0.06	0.1	0.1	5.45	0.2	0.1	0.37	0.2	0.1	0.29	0.17
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.1	0.07	0.7	0.1	4.95	0.8	0.0	0.00	0.0	0.1	0.21	0.54
BENZENE	0.3	0.17	0.1	0.3	10.93	0.1	0.4	1.14	0.1	0.3	0.69	0.13
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	0.3	0.17	0.5	0.1	4.58	0.2	0.1	0.22	0.1	0.1	0.32	0.22
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	0.1	0.04	0.1	0.0	1.02	0.0	0.0	0.14	0.1	0.0	0.09	0.05
CIS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	0.2	0.14	0.2	0.0	1.55	0.0	0.0	0.08	0.0	0.1	0.17	0.07
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	0.1	0.03	0.0	0.0	0.51	0.0	0.0	0.07	0.0	0.0	0.06	0.02
UNIDENTIFIED C7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	0.1	0.05	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.02
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	0.1	0.08	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.04
TOLUENE	0.5	0.29	1.4	0.2	8.41	0.6	0.2	0.79	0.7	0.3	0.65	0.79
2,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYL-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,6-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLOUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C9-C12+	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.10	0.1	0.0	0.02	0.03
FORMALDEHYDE	1.8	1.01	12.6	0.0	0.45	0.1	0.1	0.46	1.0	0.4	0.89	2.87
ACETALDEHYDE	0.6	0.37	3.5	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.29	0.71
ACROLEIN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ACETONE	0.0	0.00	0.0	0.0	0.00	0.0	0.4	1.22	0.2	0.1	0.23	0.06
PROPIONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CROTONALDEHYDE	0.2	0.10	0.9	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.19
ISOBUTYRALDEHYDE	0.1	0.06	0.5	0.0	1.18	0.2	0.0	0.00	0.0	0.0	0.08	0.19
METHYL ETHYL KETONE	0.1	0.06	0.1	0.0	1.18	0.0	0.0	0.00	0.0	0.0	0.08	0.04
BENZALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8	0.0	0.01	0.0	0.0	0.86	0.1	0.0	0.08	0.1	0.0	0.05	0.07
TRANS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.1	5.25	0.2	0.0	0.00	0.0	0.1	0.17	0.10
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m- & p-XYLENE	0.1	0.03	0.4	0.0	1.84	0.3	0.1	0.17	0.4	0.0	0.11	0.36
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	0.1	0.05	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.11
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NONANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOPROPYLBENZENE (CUMENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3,6-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DECANE	0.0	0.01	0.0	0.0	0.61	0.0	0.0	0.00	0.0	0.0	0.03	0.01
ISOBUTYLBENZENE	0.0	0.01	0.0	0.0	0.58	0.0	0.0	0.00	0.0	0.0	0.03	0.02

TEST NO: 60NB/40IB-02S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 9/13/95
 TEST FUEL: BUTANE

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	26.6		0.4	7.9		0.1	24.3		0.4	16.3		0.24
ETHANE	3.2	1.61	0.8	0.0	0.00	0.0	2.0	6.01	0.5	1.2	2.26	0.30
ETHYLENE	14.2	7.18	103.8	0.0	0.00	0.0	1.7	5.01	12.2	3.4	6.34	24.91
PROPANE	0.3	0.16	0.1	0.0	0.00	0.0	0.1	0.24	0.0	0.1	0.16	0.04
PROPYLENE	8.5	4.30	80.2	0.0	0.00	0.0	0.5	1.64	5.1	1.9	3.57	18.08
ACETYLENE	5.9	2.99	3.0	0.0	0.00	0.0	0.0	0.00	0.0	1.2	2.29	0.62
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	90.1	45.47	91.9	0.7	10.42	0.7	14.2	42.52	14.5	23.0	42.68	23.45
TRANS-2-BUTENE	0.3	0.15	3.0	0.0	0.00	0.0	0.1	0.31	1.0	0.1	0.17	0.91
1-BUTENE	0.6	0.30	5.4	0.0	0.00	0.0	0.1	0.28	0.8	0.1	0.28	1.33
2-METHYLPROPENE (ISOBUTYLENE)	2.5	1.28	13.5	0.0	0.00	0.0	0.2	0.70	1.2	0.6	1.10	3.14
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPROPANE (ISOBUTANE)	63.3	31.91	76.5	0.5	7.97	0.7	11.2	33.57	13.6	16.5	30.64	19.97
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.1	0.05	1.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.21
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBTANE (ISOPENTANE)	2.1	1.08	3.0	0.0	0.00	0.0	0.2	0.52	0.2	0.5	0.92	0.68
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.0	0.00	0.0	0.0	0.25	0.1	0.0	0.00	0.0	0.0	0.02	0.06
2-METHYL-1-BUTENE	0.1	0.05	0.5	0.0	0.00	0.0	0.1	0.43	0.7	0.1	0.11	0.29
PENTANE	0.2	0.11	0.2	0.3	4.03	0.3	0.2	0.53	0.2	0.2	0.44	0.25
UNIDENTIFIED C5 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-PENTENE	0.1	0.05	0.9	0.0	0.49	0.3	0.0	0.00	0.0	0.0	0.07	0.34
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-BUTENE	0.1	0.05	0.8	0.0	0.53	0.2	0.0	0.11	0.2	0.0	0.09	0.32
CYCLOPENTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLBUTANE	0.0	0.00	0.0	0.1	2.05	0.1	0.0	0.00	0.0	0.1	0.13	0.06
CYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-1-PENTENE	0.1	0.05	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.09
3-METHYL-1-PENTENE	0.1	0.05	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.10
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	0.1	0.06	0.1	0.2	2.79	0.2	0.1	0.21	0.1	0.1	0.26	0.15
MTBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	0.3	0.13	0.4	0.6	0.33	1.0	0.3	0.87	0.4	0.5	0.85	0.70
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	0.2	0.08	0.2	0.4	0.12	0.6	0.2	0.46	0.2	0.3	0.54	0.44
2-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANE	0.2	0.10	0.2	0.4	0.46	0.4	0.1	0.38	0.1	0.3	0.50	0.26
UNIDENTIFIED C6 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEXENE	0.1	0.06	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.18
CIS-3-HEXENE	0.1	0.03	0.4	0.2	2.33	1.1	0.0	0.00	0.0	0.1	0.17	0.63
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-PENTENE	0.1	0.05	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.14
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLPENTANE	0.1	0.05	0.1	0.3	3.90	0.4	0.1	0.35	0.2	0.2	0.36	0.27
METHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLPENTANE	0.1	0.07	0.3	0.2	2.59	0.3	0.1	0.25	0.1	0.1	0.27	0.26
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.0	0.01	0.0	0.1	1.18	0.1	0.0	0.12	0.1	0.1	0.11	0.08
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.1	0.05	0.6	0.0	0.00	0.0	0.0	0.04	0.1	0.0	0.05	0.14
BENZENE	0.2	0.10	0.1	0.3	4.55	0.1	0.3	0.92	0.1	0.3	0.53	0.12
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.2	2.33	0.1	0.0	0.00	0.0	0.1	0.15	0.06
CYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	0.3	0.13	0.4	0.5	6.65	0.7	0.1	0.34	0.2	0.3	0.59	0.48
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	0.1	0.04	0.1	0.1	1.54	0.1	0.0	0.03	0.0	0.1	0.14	0.10
CIS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.01	0.0	0.0	0.00	0.0	0.0	0.05	0.0	0.0	0.01	0.02
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	0.2	0.10	0.2	0.3	3.82	0.2	0.1	0.36	0.1	0.2	0.39	0.20
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	0.0	0.00	0.0	0.1	1.43	0.1	0.1	0.16	0.0	0.1	0.12	0.05
UNIDENTIFIED C7	0.1	0.06	0.5	0.1	1.49	0.5	0.1	0.27	0.4	0.1	0.19	0.46

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	0.0	0.02	0.0	0.0	0.08	0.0	0.1	0.28	0.1	0.0	0.07	0.04
TOLUENE	0.8	0.41	2.2	0.6	9.47	1.3	0.5	1.51	1.4	0.8	1.19	1.75
2,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8	0.0	0.00	0.0	0.1	1.27	0.3	0.0	0.05	0.1	0.0	0.09	0.17
TRANS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.2	2.57	0.2	0.0	0.00	0.0	0.1	0.17	0.12
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m- & p-XYLENE	0.1	0.04	0.6	0.0	0.64	0.3	0.0	0.00	0.0	0.0	0.07	0.29
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.1	0.0	0.00	0.02
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NONANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOPROPYLBENZENE (CUMENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3,5-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DECANE	0.0	0.00	0.0	0.1	0.79	0.0	0.0	0.00	0.0	0.0	0.05	0.01
ISOBUTYLBENZENE	0.0	0.00	0.0	0.1	0.75	0.1	0.0	0.00	0.0	0.0	0.05	0.05

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYLPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLCUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C9-C12+	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
FORMALDEHYDE	1.7	0.85	12.1	0.2	3.17	1.5	0.2	0.89	1.8	0.5	0.97	3.75
ACETALDEHYDE	0.5	0.26	2.9	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.20	0.69
ACROLEIN	0.2	0.08	1.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.21
ACETONE	0.6	0.29	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.22	0.07
PROPIONALDEHYDE	0.0	0.01	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.04
CROTONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.3	0.78	1.4	0.1	0.13	0.39
ISOBUTYRALDEHYDE	0.0	0.01	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.02
METHYLETHYL KETONE	0.0	0.01	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.00
BENZALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

TEST NO: 80NB/20NP-02S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 9/22/95
 TEST FUEL: PROPANE

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	18.1		0.3	1.5		0.0	42.3		0.8	16.2		0.24
ETHANE	2.5	1.21	0.6	0.0	1.91	0.0	10.7	20.72	2.7	3.5	5.96	0.87
ETHYLENE	14.3	6.87	103.9	0.1	6.57	1.1	4.9	9.49	35.6	4.4	7.50	31.97
PROPANE	68.9	33.24	33.1	0.1	2.47	0.0	11.9	23.05	5.7	17.6	30.18	8.46
PROPYLENE	6.8	3.28	63.9	0.0	0.00	0.0	1.3	2.47	11.9	1.8	3.02	16.57
ACETYLENE	3.5	1.68	1.7	0.0	0.00	0.0	0.0	0.00	0.0	0.7	1.24	0.36
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	101.0	48.68	103.0	0.2	8.49	0.2	18.3	35.60	18.7	26.1	44.72	26.66
TRANS-2-BUTENE	0.2	0.11	2.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.48
1-BUTENE	0.5	0.22	4.1	0.0	0.00	0.0	0.2	0.43	2.0	0.2	0.27	1.40
2-METHYLPROPENE (ISOBUTYLENE)	0.1	0.03	0.3	0.0	0.00	0.0	0.2	0.37	1.0	0.1	0.11	0.34
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	0.1	0.05	1.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.22
2-METHYLPROPANE (ISOBUTANE)	0.3	0.15	0.4	0.0	0.18	0.0	0.1	0.14	0.1	0.1	0.15	0.10
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	2.9	1.39	4.0	0.3	14.21	0.4	1.6	3.10	2.2	1.2	2.05	1.65
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PENTANE	0.3	0.14	0.3	0.1	2.98	0.1	0.2	0.32	0.2	0.1	0.24	0.14
UNIDENTIFIED C5 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-BUTENE	0.1	0.04	0.6	0.0	1.57	0.2	0.0	0.00	0.0	0.0	0.06	0.23
CYCLOPENTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLBUTANE	0.1	0.05	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.02
CYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	0.1	0.07	0.2	0.1	3.07	0.1	0.1	0.24	0.1	0.1	0.17	0.11
MTBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	0.4	0.19	0.6	0.1	6.51	0.2	0.2	0.40	0.3	0.2	0.36	0.32
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	0.2	0.10	0.3	0.1	2.99	0.1	0.1	0.28	0.2	0.1	0.20	0.18
2-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANE	0.1	0.08	0.1	0.0	1.22	0.0	0.2	0.35	0.2	0.1	0.16	0.09
UNIDENTIFIED C6 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLPENTANE	0.0	0.02	0.1	0.0	2.09	0.1	0.1	0.25	0.2	0.1	0.12	0.09
METHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLPENTANE	0.1	0.05	0.2	0.0	2.00	0.1	0.1	0.20	0.2	0.1	0.13	0.13
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.1	0.04	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.02
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BENZENE	0.2	0.11	0.1	0.4	17.29	0.2	0.3	0.67	0.1	0.3	0.58	0.14
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	0.3	0.14	0.4	0.0	0.00	0.0	0.1	0.20	0.2	0.1	0.15	0.13
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	0.2	0.08	0.2	0.0	0.12	0.0	0.1	0.22	0.2	0.1	0.11	0.09
CIS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	0.1	0.06	0.1	0.0	1.35	0.0	0.0	0.05	0.0	0.1	0.09	0.05
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	0.1	0.05	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.02
UNIDENTIFIED C7	0.1	0.04	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.08

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TOLUENE	0.4	0.20	1.1	0.2	7.59	0.5	0.2	0.39	0.5	0.2	0.39	0.62
2,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.01
TRANS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	0.1	0.04	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.05
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m-& p-XYLENE	0.2	0.08	1.2	0.0	0.00	0.0	0.1	0.18	0.7	0.1	0.10	0.44
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NONANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOPROPYLBENZENE (CUMENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3,5-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DECANE	0.0	0.01	0.0	0.0	1.24	0.0	0.0	0.04	0.0	0.0	0.04	0.01
ISOBUTYLBENZENE	0.0	0.01	0.0	0.0	1.17	0.0	0.0	0.04	0.0	0.0	0.04	0.04

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYLPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
9-BUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,6-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLCUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8-C12+	0.0	0.00	0.0	0.2	6.95	0.6	0.0	0.00	0.0	0.1	0.14	0.31
FORMALDEHYDE	1.7	0.80	11.8	0.0	0.00	0.0	0.2	0.34	1.3	0.4	0.67	2.80
ACETALDEHYDE	0.8	0.38	4.4	0.0	0.00	0.0	0.0	0.01	0.0	0.2	0.28	0.91
ACROLEIN	0.0	0.02	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.02	0.07
ACETONE	0.2	0.08	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.02
PROPIONALDEHYDE	0.1	0.03	0.4	0.1	2.33	0.3	0.2	0.30	1.0	0.1	0.14	0.53
CROTONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOBUTYRALDEHYDE	0.1	0.06	0.6	0.0	1.87	0.2	0.0	0.05	0.1	0.1	0.09	0.28
METHYL ETHYL KETONE	0.1	0.06	0.1	0.0	1.87	0.0	0.0	0.05	0.0	0.1	0.09	0.06
BENZALDEHYDE	0.1	0.06	-0.1	0.0	1.98	-0.0	0.0	0.05	-0.0	0.1	0.10	-0.03
HEXANALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

TEST NO: 90NB/10PE-02S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 9/28/95
 TEST FUEL: 90% BUTANE/10% PENTANE

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	25.8		0.4	3.1		0.0	29.9		0.4	15.1		0.22
ETHANE	2.8	1.45	0.7	0.0	0.68	0.0	4.3	14.27	1.1	1.8	3.46	0.44
ETHYLENE	19.1	9.83	139.1	0.0	0.76	0.3	1.8	5.93	13.0	4.5	8.73	32.62
PROPANE	1.0	0.50	0.5	0.0	0.00	0.0	0.2	0.68	0.1	0.3	0.50	0.12
PROPYLENE	7.7	3.98	72.7	0.0	0.00	0.0	0.5	1.79	5.0	1.8	3.42	16.49
ACETYLENE	7.5	3.85	3.7	0.0	0.00	0.0	0.0	0.00	0.0	1.6	3.03	0.78
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	127.8	65.84	130.4	0.4	8.61	0.5	17.5	58.54	17.9	31.6	61.66	32.25
TRANS-2-BUTENE	0.3	0.16	3.1	0.0	0.00	0.0	0.1	0.36	1.1	0.1	0.18	0.93
1-BUTENE	0.7	0.37	6.4	0.0	0.00	0.0	0.1	0.19	0.5	0.2	0.32	1.47
2-METHYLPROPENE (ISOBUTYLENE)	0.1	0.04	0.4	0.0	0.00	0.0	0.1	0.20	0.3	0.0	0.06	0.16
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.1	0.04	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.01
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	0.1	0.07	1.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.31
2-METHYLPROPANE (ISOBUTANE)	0.2	0.08	0.2	0.0	0.85	0.1	0.0	0.11	0.0	0.1	0.12	0.08
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.1	0.04	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.14
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	2.8	1.47	3.9	0.6	11.94	0.9	0.3	0.91	0.4	1.0	1.93	1.37
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1-BUTENE	0.1	0.06	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.12
PENTANE	14.8	7.60	15.3	0.2	4.40	0.2	2.1	7.06	2.2	3.8	7.35	3.92
UNIDENTIFIED C5 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-PENTENE	0.1	0.07	1.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.23
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.1	0.05	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.16
2-METHYL-2-BUTENE	0.1	0.04	0.5	0.0	0.29	0.1	0.0	0.08	0.1	0.0	0.08	0.20
CYCLOPENTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLBUTANE	0.1	0.06	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.02
CYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-PENTENE	0.1	0.05	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.08
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	0.2	0.09	0.2	0.1	1.08	0.1	0.1	0.25	0.1	0.1	0.17	0.09
MTBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	0.5	0.28	0.8	0.3	4.83	0.4	0.2	0.64	0.3	0.3	0.58	0.45
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	0.3	0.15	0.4	0.2	2.99	0.2	0.1	0.47	0.2	0.2	0.35	0.27
2-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANE	0.2	0.13	0.2	0.2	3.04	0.2	0.1	0.47	0.1	0.2	0.33	0.17
UNIDENTIFIED C6 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.33	0.7	0.0	0.05	0.18
TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-3-HEXENE	0.1	0.05	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.13
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLPENTANE	0.1	0.05	0.1	0.1	1.39	0.1	0.1	0.28	0.1	0.1	0.16	0.11
METHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLPENTANE	0.1	0.06	0.2	0.0	0.94	0.1	0.1	0.22	0.1	0.1	0.13	0.12
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.1	0.06	0.2	0.1	1.11	0.1	0.1	0.28	0.1	0.1	0.15	0.10
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.1	0.0	0.01	0.03
BENZENE	0.5	0.28	0.2	0.2	3.58	0.1	0.3	0.92	0.1	0.3	0.58	0.12
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	0.3	0.16	0.5	0.2	3.11	0.2	0.2	0.52	0.2	0.2	0.37	0.29
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	0.2	0.08	0.2	0.1	1.08	0.1	0.1	0.20	0.1	0.1	0.16	0.11
CIS-1,3-DIMETHYLCYCLOPENTANE	0.1	0.05	0.2	0.1	2.38	0.3	0.0	0.00	0.0	0.1	0.16	0.21
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	0.2	0.12	0.2	0.2	4.10	0.2	0.2	0.51	0.1	0.2	0.39	0.19
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	0.0	0.01	0.0	0.0	0.74	0.0	0.0	0.00	0.0	0.0	0.05	0.02
UNIDENTIFIED C7	0.2	0.10	0.9	0.1	2.71	0.6	0.1	0.28	0.4	0.1	0.27	0.62

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	0.1	0.07	0.2	0.2	3.02	0.2	0.0	0.00	0.0	0.1	0.22	0.13
TOLUENE	1.1	0.55	2.9	0.5	9.90	1.4	0.2	0.67	0.5	0.5	1.06	1.49
2,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8	0.0	0.02	0.1	0.1	1.00	0.2	0.0	0.16	0.2	0.0	0.08	0.17
TRANS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.1	0.05	0.1	0.2	3.60	0.3	0.1	0.33	0.1	0.1	0.28	0.19
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	0.1	0.05	0.2	0.0	0.00	0.0	0.0	0.08	0.1	0.0	0.05	0.07
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m- & p-XYLENE	0.2	0.08	1.2	0.0	0.95	0.4	0.0	0.16	0.4	0.1	0.14	0.53
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	0.1	0.06	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.16
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NONANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOPROPYLBENZENE (CUMENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3,5-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.2	3.16	1.2	0.0	0.00	0.0	0.1	0.17	0.61
1,2,4-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DECANE	0.1	0.04	0.0	0.0	0.00	0.0	0.1	0.17	0.0	0.0	0.06	0.01
ISOBUTYLBENZENE	0.1	0.03	0.1	0.0	0.00	0.0	0.0	0.16	0.1	0.0	0.05	0.05

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYLPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLCUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C9-C12+	0.2	0.09	0.6	0.0	0.14	0.0	0.0	0.00	0.0	0.0	0.08	0.15
FORMALDEHYDE	1.6	0.83	11.5	0.3	4.89	1.8	0.4	1.26	2.7	0.6	1.11	4.07
ACETALDEHYDE	0.7	0.34	3.7	0.0	0.15	0.0	0.0	0.00	0.0	0.1	0.28	0.79
ACROLEIN	0.1	0.06	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.16
ACETONE	0.4	0.23	0.2	0.0	0.84	0.0	0.1	0.19	0.0	0.1	0.25	0.07
PROPIONALDEHYDE	0.3	0.17	2.1	0.2	4.15	1.4	0.2	0.79	1.6	0.2	0.48	1.60
CROTONALDEHYDE	0.0	0.00	0.0	0.4	6.91	2.0	0.0	0.00	0.0	0.2	0.36	1.01
ISOBUTYRALDEHYDE	0.0	0.02	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.02	0.05
METHYL ETHYL KETONE	0.0	0.02	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.02	0.01
BENZALDEHYDE	0.0	0.00	-0.0	0.0	0.79	-0.0	0.2	0.51	-0.1	0.1	0.12	-0.04
HEXANALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

TEST NO: 50NB/50NP-02S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 9/26/95
 TEST FUEL: 50% BUTANE/50% PROPANE

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	12.6		0.2	1.3		0.0	15.2		0.2	7.4		0.11
ETHANE	2.1	1.15	0.5	0.0	0.14	0.0	2.0	5.49	0.5	1.0	1.98	0.25
ETHYLENE	11.3	6.19	82.3	0.0	0.38	0.1	1.3	3.67	9.7	2.7	5.45	19.85
PROPANE	104.0	56.99	49.9	0.0	0.00	0.0	22.1	60.73	10.6	27.7	55.37	13.29
PROPYLENE	5.7	3.14	53.8	0.0	0.00	0.0	0.4	1.09	3.7	1.3	2.60	12.20
ACETYLENE	2.3	1.24	1.1	0.0	0.18	0.0	0.0	0.02	0.0	0.5	0.95	0.24
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	46.2	25.32	47.1	0.0	0.00	0.0	8.4	23.20	8.8	11.9	23.85	12.16
TRANS-2-BUTENE	0.1	0.07	1.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.25
1-BUTENE	0.3	0.16	2.6	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.12	0.53
2-METHYLPROPENE (ISOBUTYLENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	0.1	0.04	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.15
2-METHYLPROPANE (ISOBUTANE)	0.2	0.10	0.2	0.0	0.00	0.0	0.0	0.06	0.0	0.0	0.09	0.05
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	2.5	1.37	3.5	0.0	0.00	0.0	0.0	0.00	0.0	0.5	1.04	0.72
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PENTANE	0.2	0.09	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.04
UNIDENTIFIED C5 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-BUTENE	0.1	0.04	0.5	0.0	0.27	0.1	0.0	0.00	0.0	0.0	0.04	0.14
CYCLOPENTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLBUTANE	0.1	0.05	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.02
CYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	0.1	0.07	0.1	0.0	0.35	0.0	0.0	0.00	0.0	0.0	0.07	0.04
MTBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	0.4	0.20	0.8	0.0	1.22	0.1	0.0	0.00	0.0	0.1	0.20	0.15
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	0.2	0.10	0.3	0.0	0.10	0.0	0.0	0.12	0.1	0.1	0.10	0.08
2-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANE	0.1	0.06	0.1	0.1	2.69	0.1	0.0	0.00	0.0	0.1	0.15	0.08
UNIDENTIFIED C6 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-3-HEXENE	0.1	0.05	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.12
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.1	0.05	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.13
2-METHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLPENTANE	0.1	0.04	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.02
METHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLPENTANE	0.0	0.03	0.1	0.0	0.01	0.0	0.0	0.02	0.0	0.0	0.02	0.02
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BENZENE	0.3	0.18	0.1	0.3	6.62	0.1	0.1	0.25	0.0	0.2	0.46	0.10
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	0.2	0.12	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.07
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	0.1	0.06	0.1	0.0	0.00	0.0	0.0	0.02	0.0	0.0	0.05	0.03
CIS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	0.0	0.02	0.0	0.0	0.00	0.0	0.0	0.04	0.0	0.0	0.03	0.01
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	0.1	0.06	0.1	0.1	3.74	0.1	0.0	0.00	0.0	0.1	0.20	0.08
UNIDENTIFIED C7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.2	4.08	0.2	0.0	0.00	0.0	0.1	0.17	0.10
TOLUENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8	0.1	0.05	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.07
TRANS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.2	4.16	0.2	0.0	0.00	0.0	0.1	0.17	0.12
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	0.0	0.01	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.01
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m- & p-XYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.24	0.6	0.0	0.05	0.15
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NONANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOPROPYLBENZENE (CUMENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.1	0.0	0.01	0.04
1-METHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3,5-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.2	0.0	0.01	0.06
DECANE	0.0	0.03	0.0	0.0	0.42	0.0	0.0	0.00	0.0	0.0	0.04	0.01
ISOBUTYLBENZENE	0.0	0.02	0.1	0.0	0.40	0.0	0.0	0.00	0.0	0.0	0.04	0.03

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYLPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2 DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,6-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTYLBENZENE (see AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4 DIMETHYLCUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,6-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,6-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C9-C12+	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
FORMALDEHYDE	1.6	0.89	11.6	0.2	5.76	1.7	0.4	1.07	2.8	0.6	1.13	4.02
ACETALDEHYDE	1.1	0.61	6.2	0.7	16.63	3.7	0.0	0.00	0.0	0.6	1.16	3.19
ACROLEIN	0.1	0.03	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.02	0.08
ACETONE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPIONALDEHYDE	0.3	0.19	2.2	0.5	13.62	3.6	0.0	0.00	0.0	0.4	0.71	2.31
CROTONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOBUTYRALDEHYDE	0.6	0.31	2.9	0.5	12.73	2.7	0.3	0.80	1.5	0.5	0.92	2.42
METHYL ETHYL KETONE	0.6	0.31	0.7	0.5	12.73	0.6	0.3	0.80	0.3	0.5	0.92	0.54
BENZALDEHYDE	1.0	0.57	-0.6	0.6	13.88	-0.3	0.8	2.27	-0.5	0.7	1.46	-0.40
HEXANALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

TEST NUMBER: 20NB/80P-02S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 11/16/95
 TEST FUEL: 20% BUTANE/80% PROPANE

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	11.3		0.2	1.6		0.0	17.3		0.3	8.0		0.12
ETHANE	2.3	1.18	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.5	1.00	0.12
ETHYLENE	11.6	5.90	84.9	0.1	1.10	0.4	0.2	1.38	1.8	2.5	5.20	18.43
PROPANE	134.2	67.98	64.4	3.5	72.37	1.7	13.5	75.60	6.5	33.5	68.98	16.10
PROPYLENE	6.1	3.11	57.6	0.0	0.42	0.2	0.1	0.83	1.4	1.3	2.74	12.52
ACETYLENE	1.9	0.98	0.9	0.0	0.14	0.0	0.0	0.02	0.0	0.4	0.82	0.20
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	35.0	17.75	35.7	0.4	7.72	0.4	2.4	13.27	2.4	8.2	16.79	8.33
TRANS-2-BUTENE	0.1	0.04	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.15
1-BUTENE	0.3	0.13	2.3	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.11	0.49
2-METHYLPROPENE (ISOBUTYLENE)	0.1	0.05	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.11
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	0.1	0.04	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.17
2-METHYLPROPANE (ISOBUTANE)	0.1	0.05	0.1	0.0	0.02	0.0	0.0	0.04	0.0	0.0	0.05	0.03
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	2.0	1.03	2.8	0.1	2.98	0.2	0.0	0.24	0.1	0.5	1.04	0.70
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PENTANE	0.1	0.07	0.1	0.0	0.00	0.0	0.0	0.19	0.0	0.0	0.08	0.04
UNIDENTIFIED C6 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-BUTENE	0.1	0.04	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.11
CYCLOPENTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLBUTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.63	0.1	0.0	0.08	0.03
MTBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	0.0	0.00	0.0	0.0	0.67	0.0	0.1	0.70	0.2	0.1	0.10	0.08
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.84	0.2	0.0	0.09	0.06
2-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.26	0.0	0.0	0.03	0.01
UNIDENTIFIED C6 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.98	0.2	0.0	0.10	0.07
METHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.61	0.2	0.0	0.06	0.05
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BENZENE	0.2	0.08	0.1	0.2	4.14	0.1	0.1	0.67	0.1	0.2	0.34	0.07
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.74	0.2	0.0	0.08	0.06
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.68	0.2	0.0	0.07	0.05
CIS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	0.3	0.13	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.11	0.05
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	0.0	0.00	0.0	0.2	3.20	0.1	0.0	0.00	0.0	0.1	0.16	0.08
UNIDENTIFIED C7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	0.1	0.04	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.02
TOLUENE	0.2	0.08	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.09
2,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	0.1	0.04	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.05
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m- & p-XYLENE	0.2	0.10	1.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.31
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	0.1	0.06	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.15
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NONANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOPROPYLBENZENE(CUMENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3,5-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4-TRIMETHYLBENZENE	0.1	0.04	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.15
DECANE	0.0	0.00	0.0	0.1	1.46	0.0	0.0	0.23	0.0	0.0	0.10	0.02
ISOBUTYLBENZENE	0.0	0.00	0.0	0.1	1.38	0.1	0.0	0.22	0.1	0.0	0.09	0.08

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYLPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.1	0.05	0.9	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.19
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLOUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8-C12+	0.1	0.04	0.3	0.0	0.00	0.0	0.0	0.16	0.1	0.0	0.05	0.10
FORMALDEHYDE	0.7	0.35	4.9	0.2	4.04	1.4	0.2	1.03	1.3	0.3	0.61	2.11
ACETALDEHYDE	0.7	0.37	4.0	0.0	0.38	0.1	0.0	0.00	0.0	0.2	0.33	0.90
ACROLEIN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ACETONE	0.5	0.28	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.22	0.08
PROPIONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.66	0.8	0.0	0.07	0.21
CROTONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOBUTYRALDEHYDE	0.0	0.02	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.03
METHYL ETHYL KETONE	0.0	0.02	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.01
BENZALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

TEST NO: 100B-04S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 10/4/95
 TEST FUEL: BUTANE

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	26.3		0.4	3.4		0.1	24.6		0.4	14.0		0.21
ETHANE	2.7	1.47	0.7	0.0	0.00	0.0	4.5	15.07	1.1	1.8	3.83	0.45
ETHYLENE	17.8	9.72	130.0	0.0	0.00	0.0	2.9	9.71	21.0	4.5	9.64	32.95
PROPANE	0.3	0.17	0.1	0.0	0.00	0.0	0.1	0.36	0.1	0.1	0.20	0.04
PROPYLENE	7.5	4.06	70.0	0.0	0.00	0.0	0.8	2.60	7.3	1.8	3.77	16.63
ACETYLENE	6.6	3.58	3.3	0.0	0.00	0.0	0.0	0.00	0.0	1.4	2.93	0.69
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	137.3	74.81	140.0	0.0	0.00	0.0	20.6	69.21	21.0	34.3	73.24	35.03
TRANS-2-BUTENE	0.3	0.15	2.8	0.0	0.00	0.0	0.1	0.49	1.4	0.1	0.21	0.97
1-BUTENE	0.6	0.33	5.3	0.0	0.00	0.0	0.1	0.32	0.8	0.2	0.32	1.34
2-METHYLPROPENE (ISOBUTYLENE)	0.1	0.05	0.4	0.0	0.00	0.0	0.1	0.25	0.4	0.0	0.08	0.20
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	0.1	0.07	1.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.27
2-METHYLPROPANE (ISOBUTANE)	0.1	0.07	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.03
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.3	0.19	3.5	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.16	0.73
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	2.6	1.42	3.6	0.0	0.00	0.0	0.0	0.00	0.0	0.5	1.16	0.75
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.32	0.5	0.0	0.06	0.13
PENTANE	0.3	0.19	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.15	0.07
UNIDENTIFIED C5 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-PENTENE	0.1	0.06	1.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.21
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-BUTENE	0.1	0.04	0.4	0.0	0.00	0.0	0.1	0.17	0.3	0.0	0.06	0.18
CYCLOPENTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLBUTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	0.1	0.07	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.03
MTBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	0.1	0.07	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.04
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	0.1	0.04	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.02
2-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C6 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEXENE	0.1	0.05	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.14
CIS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLPENTANE	0.0	0.02	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.02	0.01
METHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLPENTANE	0.2	0.12	0.4	0.0	2.95	0.0	0.0	0.00	0.0	0.1	0.12	0.10
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.0	0.00	0.0	0.1	18.73	0.2	0.0	0.00	0.0	0.1	0.15	0.09
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BENZENE	0.2	0.09	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.01
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	0.3	0.18	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.15	0.10
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	0.8	0.43	0.7	0.0	0.00	0.0	0.0	0.05	0.0	0.2	0.36	0.18
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	0.1	0.08	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.03
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	0.1	0.08	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.05
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	0.2	0.12	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.05
TOLUENE	0.7	0.39	2.0	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.32	0.41
2,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	0.0	0.01	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.00
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	0.0	0.02	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.01	0.01
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8	0.0	0.02	0.1	0.0	0.00	0.0	0.0	0.01	0.0	0.0	0.02	0.03
TRANS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.1	18.78	0.2	0.0	0.00	0.0	0.1	0.15	0.09
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	0.1	0.05	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.05
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m- & p-XYLENE	0.1	0.07	1.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.20
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	0.1	0.03	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.02	0.07
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NONANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOPROPYLBENZENE (CUMENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ETHYLBENZENE	0.1	0.06	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.16
1-METHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3,5-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4-TRIMETHYLBENZENE	0.1	0.07	1.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.22
DECANE	0.0	0.01	0.0	0.1	9.79	0.0	0.0	0.06	0.0	0.0	0.09	0.02
ISOBUTYLBENZENE	0.0	0.01	0.0	0.1	9.24	0.1	0.0	0.06	0.0	0.0	0.09	0.08

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYL-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
IS-BUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLCUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C9-C12+	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
FORMALDEHYDE	1.4	0.76	10.0	0.1	19.71	1.0	0.1	0.36	0.8	0.4	0.84	2.82
ACETALDEHYDE	0.7	0.39	3.9	0.1	11.68	0.5	0.0	0.14	0.2	0.2	0.44	1.13
ACROLEIN	0.2	0.12	1.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.10	0.31
ACETONE	0.1	0.05	0.1	0.1	9.12	0.0	0.0	0.00	0.0	0.1	0.11	0.03
PROPIONALDEHYDE	0.2	0.09	1.0	0.0	0.00	0.0	0.1	0.40	0.8	0.1	0.14	0.43
CROTONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOBUTYRALDEHYDE	0.0	0.02	0.2	0.0	0.00	0.0	0.1	0.22	0.3	0.0	0.05	0.13
METHYL ETHYL KETONE	0.0	0.02	0.0	0.0	0.00	0.0	0.1	0.22	0.1	0.0	0.05	0.03
BENZALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANALDEHYDE	0.3	0.16	1.1	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.13	0.23

TEST NO: BLB-CP2-04S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 10/2/95
 TEST FUEL: EM-1968-F

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	26.8		0.4	0.0		0.0	9.7		0.1	8.3		0.12
ETHANE	5.0	2.56	1.3	0.0	0.04	0.0	1.0	4.46	0.3	1.3	2.71	0.33
ETHYLENE	12.6	6.46	92.1	0.0	0.46	0.1	0.9	3.71	6.2	2.9	5.87	20.94
PROPANE	0.1	0.06	0.1	0.0	0.00	0.0	0.0	0.15	0.0	0.0	0.07	0.02
PROPYLENE	10.3	5.25	96.4	0.0	0.27	0.1	0.7	3.23	7.0	2.3	4.79	22.04
ACETYLENE	6.5	3.35	3.3	0.0	0.00	0.0	0.0	0.00	0.0	1.4	2.79	0.68
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	1.7	0.88	1.8	0.0	0.86	0.0	0.1	0.29	0.1	0.4	0.81	0.40
TRANS-2-BUTENE	0.8	0.39	7.6	0.0	0.00	0.0	0.1	0.44	1.0	0.2	0.38	1.87
1-BUTENE	1.0	0.53	9.2	0.0	0.00	0.0	0.1	0.41	0.8	0.2	0.49	2.15
2-METHYLPROPENE (ISOBUTYLENE)	9.0	4.61	47.8	0.0	0.00	0.0	1.1	4.84	5.7	2.2	4.43	11.51
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.1	0.05	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.01
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	1.1	0.57	12.2	0.0	0.00	0.0	0.1	0.41	1.0	0.3	0.53	2.82
2-METHYLPROPANE (ISOBUTANE)	0.1	0.07	0.2	0.0	0.44	0.0	0.0	0.00	0.0	0.0	0.07	0.04
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.6	0.30	5.8	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.25	1.22
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	12.8	6.54	17.6	0.3	6.98	0.4	1.8	7.67	2.4	3.3	6.71	4.53
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.3	0.14	1.7	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.11	0.35
2-METHYL-1-BUTENE	0.6	0.33	3.1	0.0	0.00	0.0	0.1	0.55	0.6	0.2	0.34	0.82
PENTANE	1.9	0.96	2.0	0.0	0.00	0.0	0.5	2.36	0.6	0.5	1.11	0.56
UNIDENTIFIED C5 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	1.0	0.49	8.8	0.0	0.00	0.0	0.1	0.39	0.8	0.2	0.46	2.05
TRANS-2-PENTENE	0.5	0.24	4.1	0.0	0.00	0.0	0.1	0.44	0.9	0.1	0.26	1.10
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.2	0.11	1.9	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.39
2-METHYL-2-BUTENE	1.4	0.70	8.8	0.0	0.00	0.0	0.2	0.79	1.2	0.3	0.68	2.14
CYCLOPENTADIENE	0.5	0.25	3.8	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.21	0.79
2,2-DIMETHYLBUTANE	0.2	0.11	0.2	0.0	0.00	0.0	0.1	0.38	0.1	0.1	0.14	0.06
CYCLOPENTENE	0.1	0.06	0.9	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.18
4-METHYL-1-PENTENE	0.1	0.06	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.11
3-METHYL-1-PENTENE	0.1	0.05	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.09
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	1.5	0.75	1.6	0.0	1.23	0.0	0.3	1.47	0.4	0.4	0.86	0.45
MTBE	7.1	3.64	4.4	0.0	0.00	0.0	0.0	0.00	0.0	1.5	3.02	0.92

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	2.3	1.19	3.6	0.2	5.89	0.3	0.6	2.84	0.9	0.8	1.66	1.17
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	1.5	0.76	2.2	0.1	2.77	0.2	0.4	1.65	0.6	0.5	0.95	0.71
2-METHYL-1-PENTENE	0.1	0.07	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.13
1-HEXENE	0.1	0.06	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.10
HEXANE	1.1	0.58	1.1	0.2	4.19	0.1	0.3	1.38	0.3	0.4	0.82	0.39
UNIDENTIFIED C6 OLEFINS	0.2	0.12	1.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.10	0.33
TRANS-3-HEXENE	0.2	0.09	1.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.25
CIS-3-HEXENE	0.3	0.13	1.8	0.0	0.00	0.0	0.1	0.40	0.6	0.1	0.16	0.54
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.4	0.18	2.4	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.15	0.50
2-METHYL-2-PENTENE	0.3	0.13	1.7	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.11	0.36
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.2	0.08	1.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.21
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.3	0.14	1.9	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.12	0.39
2,2-DIMETHYLPENTANE	0.7	0.38	1.0	0.1	2.47	0.1	0.2	0.83	0.3	0.3	0.52	0.36
METHYLCYCLOPENTANE	0.1	0.05	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.06
2,4-DIMETHYLPENTANE	3.9	2.00	7.0	0.1	2.63	0.2	0.7	3.09	1.3	1.1	2.17	1.89
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.3	0.16	0.4	0.2	4.14	0.2	0.1	0.55	0.2	0.2	0.36	0.23
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.5	0.23	2.6	0.3	7.03	1.5	0.0	0.00	0.0	0.2	0.46	1.29
BENZENE	8.6	4.42	3.6	0.2	6.19	0.1	2.1	9.15	0.9	2.5	5.11	1.05
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.2	0.11	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.03
CYCLOHEXANE	0.1	0.07	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.04
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	7.2	3.71	10.9	0.2	4.75	0.3	1.4	6.16	2.1	2.0	4.06	3.00
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	1.5	0.74	2.0	0.0	1.20	0.1	0.3	1.37	0.4	0.4	0.84	0.58
CIS-1,3-DIMETHYLCYCLOPENTANE	0.2	0.10	0.5	0.0	0.00	0.0	0.1	0.35	0.2	0.1	0.13	0.16
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	13.5	6.89	12.5	0.1	3.16	0.1	2.9	12.48	2.7	3.7	7.47	3.40
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	1.0	0.49	0.8	0.0	1.02	0.0	0.1	0.56	0.1	0.3	0.52	0.21
UNIDENTIFIED C7	1.1	0.58	5.1	0.0	0.36	0.1	0.2	0.84	0.9	0.3	0.61	1.34

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.2	0.08	0.9	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.19
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.1	0.05	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.13
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.1	0.08	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.06	0.08
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.1	0.08	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.13
METHYLCYCLOHEXANE	0.2	0.08	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.06
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	1.4	0.74	1.7	0.0	0.00	0.0	0.3	1.19	0.3	0.4	0.77	0.45
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	1.6	0.82	2.4	0.0	0.00	0.0	0.3	1.44	0.5	0.4	0.87	0.63
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.1	0.04	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.02
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	3.1	1.59	3.7	0.1	3.57	0.2	0.7	2.88	0.8	0.9	1.84	1.08
TOLUENE	16.7	8.56	45.7	0.7	20.21	2.0	1.8	7.94	5.0	4.4	8.93	11.92
2,3-DIMETHYLHEXANE	2.1	1.09	2.8	0.0	0.00	0.0	0.0	0.00	0.0	0.4	0.91	0.59
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	1.0	0.51	0.9	0.0	0.00	0.0	0.2	0.72	0.2	0.3	0.51	0.24
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.3	0.17	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.14	0.08
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	0.3	0.14	0.3	0.0	0.00	0.0	0.2	0.82	0.2	0.1	0.22	0.11
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	1.3	0.67	2.5	0.0	0.00	0.0	0.3	1.14	0.5	0.3	0.70	0.67
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,6-TRIMETHYLHEXANE	0.1	0.05	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.02
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.1	0.06	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.06
TRANS-4-OCTENE	0.1	0.04	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.09
OCTANE	0.7	0.34	0.4	0.0	0.00	0.0	0.1	0.48	0.1	0.2	0.34	0.10
UNIDENTIFIED C8	1.8	0.92	6.1	0.0	1.32	0.2	0.1	0.44	0.3	0.4	0.87	1.45
TRANS-2-OCTENE	0.1	0.05	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.11
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,5-TRIMETHYLHEXANE	0.2	0.10	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.05
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.1	0.07	0.2	0.2	6.55	0.3	0.0	0.00	0.0	0.2	0.31	0.21
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.2	0.08	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.06
ETHYLCYCLOHEXANE	0.3	0.14	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.12	0.11
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	5.0	2.55	13.5	0.0	0.00	0.0	0.5	2.20	1.4	1.2	2.41	3.18
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m- & p-XYLENE	11.2	5.72	82.5	0.0	1.07	0.3	0.8	3.34	5.7	2.6	5.23	18.88
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.6	0.28	0.6	0.0	0.00	0.0	0.1	0.50	0.1	0.1	0.30	0.17
3-METHYLOCTANE	0.3	0.16	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.13	0.07
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	3.8	1.95	24.6	0.2	4.86	1.1	0.3	1.32	2.0	1.0	1.98	6.25
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.3	0.17	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.14	0.15
NONANE	0.2	0.12	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.10	0.03
ISOPROPYLBENZENE (CUMENE)	0.2	0.09	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.08
2,2-DIMETHYLOCTANE	0.2	0.09	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.07	0.04
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.6	0.31	1.3	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.26	0.27
1-METHYL-3-ETHYLBENZENE	2.4	1.25	17.6	0.0	0.00	0.0	0.2	0.82	1.4	0.6	1.15	4.03
1-METHYL-4-ETHYLBENZENE	1.1	0.54	7.7	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.45	1.59
1,3,5-TRIMETHYLBENZENE	1.0	0.51	10.1	0.0	0.00	0.0	0.1	0.34	0.8	0.2	0.47	2.32
1-METHYL-2-ETHYLBENZENE	0.8	0.40	5.6	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.33	1.17
1,2,4-TRIMETHYLBENZENE	2.8	1.42	24.5	0.0	0.00	0.0	0.2	0.73	1.5	0.6	1.28	5.52
DECANE	0.0	0.02	0.0	0.0	1.29	0.0	0.0	0.11	0.0	0.0	0.08	0.02
ISOBUTYLBENZENE	0.0	0.02	0.1	0.0	1.22	0.1	0.0	0.11	0.0	0.0	0.08	0.07

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYLPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLBENZENE	0.1	0.04	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.03
1-METHYL-3-ISOPROPYLBENZENE	0.5	0.24	2.8	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.20	0.58
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.2	0.11	0.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.05
1-METHYL-2-ISOPROPYLBENZENE	0.3	0.14	1.6	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.12	0.33
1,3-DIETHYLBENZENE	0.2	0.10	1.2	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.08	0.25
1,4-DIETHYLBENZENE	0.2	0.13	1.6	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.11	0.33
1-METHYL-3-N-PROPYLBENZENE	0.1	0.06	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.16
1-METHYL-4-N-PROPYLBENZENE	0.4	0.22	2.8	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.18	0.57
1,2-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.2	0.11	1.9	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.09	0.40
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.3	0.16	2.8	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.13	0.57
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,5-TETRAMETHYLBENZENE	0.2	0.08	1.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.30
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLCUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.1	0.04	0.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.03	0.09
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8-C12+	3.0	1.51	11.3	0.0	0.00	0.0	0.1	0.28	0.2	0.6	1.29	2.41
FORMALDEHYDE	2.0	1.00	14.0	0.0	0.00	0.0	0.0	0.00	0.0	0.4	0.83	2.91
ACETALDEHYDE	0.8	0.41	4.4	0.1	3.83	0.8	0.0	0.00	0.0	0.2	0.49	1.32
ACROLEIN	0.1	0.06	0.7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.05	0.15
ACETONE	0.9	0.46	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.38	0.10
PROPIONALDEHYDE	0.1	0.05	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.04	0.12
CROTONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOBUTYRALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYL ETHYL KETONE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BENZALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

TEST NUMBER: 100NB(NC)-02S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 11/20/95
 TEST FUEL: 100% BUTANE

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	55.5		0.8	46.6		0.7	53.0		0.8	50.3		0.74
ETHANE	17.6	1.38	4.4	17.6	1.64	4.4	0.0	0.00	0.0	12.7	1.18	3.17
ETHYLENE	209.1	16.41	1524.1	199.2	18.69	1452.6	154.4	16.39	1125.4	188.9	17.57	1376.95
PROPANE	3.8	0.30	1.8	2.8	0.26	1.3	1.8	0.19	0.9	2.7	0.25	1.30
PROPYLENE	104.9	8.24	986.5	101.7	9.54	955.7	76.2	8.09	716.4	95.3	8.86	895.91
ACETYLENE	74.8	5.87	37.4	63.4	5.95	31.7	59.9	6.36	29.9	64.8	6.03	32.41
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	783.0	61.48	798.7	600.2	56.29	612.2	573.4	60.87	584.9	630.9	58.68	643.54
TRANS-2-BUTENE	3.0	0.23	29.6	2.8	0.26	27.8	2.4	0.26	23.9	2.7	0.25	27.12
1-BUTENE	8.1	0.64	72.3	7.7	0.73	68.9	6.1	0.65	54.4	7.4	0.68	65.58
2-METHYLPROPENE (ISOBUTYLENE)	0.5	0.04	2.7	0.5	0.05	2.6	1.5	0.16	8.1	0.8	0.07	4.12
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	1.9	0.15	20.2	2.0	0.19	21.9	1.4	0.15	15.2	1.8	0.17	19.66
2-METHYLPROPANE (ISOBUTANE)	0.7	0.05	0.8	0.5	0.04	0.6	0.5	0.05	0.6	0.5	0.05	0.63
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	2.1	0.17	21.1	2.0	0.19	20.3	1.8	0.19	17.5	2.0	0.18	19.68
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	2.7	0.21	3.7	0.5	0.05	0.8	4.8	0.50	6.6	2.2	0.20	2.97
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.1	0.01	0.6	0.3	0.03	2.1	0.1	0.01	0.6	0.2	0.02	1.39
2-METHYL-1-BUTENE	0.3	0.02	1.3	0.2	0.02	1.0	0.3	0.04	1.7	0.3	0.02	1.25
PENTANE	0.3	0.03	0.3	0.2	0.02	0.2	0.6	0.06	0.6	0.3	0.03	0.36
UNIDENTIFIED C6 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-1,3-BUTADIENE	1.2	0.09	10.7	0.6	0.05	5.1	1.0	0.11	9.0	0.8	0.08	7.33
TRANS-2-PENTENE	0.3	0.02	2.3	0.3	0.03	2.4	0.3	0.03	2.7	0.3	0.03	2.47
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.1	0.01	1.0	0.1	0.01	1.2	0.2	0.02	1.6	0.1	0.01	1.27
2-METHYL-2-BUTENE	0.1	0.01	0.8	0.2	0.02	1.1	0.2	0.02	1.0	0.2	0.01	1.02
CYCLOPENTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLBUTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.01	0.1	0.0	0.00	0.02
CYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	0.1	0.01	0.1	0.0	0.00	0.0	0.3	0.04	0.4	0.1	0.01	0.12
MTBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	0.1	0.01	0.2	0.2	0.02	0.3	0.5	0.05	0.7	0.3	0.02	0.39
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.3	0.03	0.4	0.1	0.01	0.12
2-METHYL-1-PENTENE	0.1	0.00	0.3	0.0	0.00	0.0	0.1	0.01	0.3	0.0	0.00	0.13
1-HEXENE	0.1	0.00	0.3	0.0	0.00	0.0	0.1	0.01	0.3	0.0	0.00	0.13
HEXANE	0.1	0.00	0.1	0.1	0.01	0.1	0.2	0.03	0.2	0.1	0.01	0.14
UNIDENTIFIED C6 OLEFINS	0.6	0.05	4.2	0.6	0.06	4.2	0.5	0.05	3.0	0.6	0.05	3.86
TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.6	0.07	0.9	0.2	0.02	0.25
METHYLCYCLOPENTANE	0.2	0.01	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.10
2,4-DIMETHYLPENTANE	0.1	0.01	0.1	0.0	0.00	0.0	0.3	0.03	0.5	0.1	0.01	0.18
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.1	0.01	0.1	0.1	0.01	0.2	0.1	0.01	0.1	0.1	0.01	0.17
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BENZENE	0.7	0.06	0.3	0.6	0.06	0.3	1.2	0.13	0.5	0.8	0.08	0.35
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.1	0.3	0.03	0.5	0.1	0.01	0.17
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.01	0.1	0.0	0.00	0.03
CIS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	0.3	0.03	0.3	0.1	0.01	0.1	0.3	0.04	0.3	0.2	0.02	0.22
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.01	0.1	0.0	0.00	0.03
UNIDENTIFIED C7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	0.1	0.01	0.1	0.0	0.00	0.0	0.1	0.01	0.1	0.1	0.00	0.08
TOLUENE	2.5	0.20	6.8	1.1	0.10	3.0	1.0	0.11	2.8	1.4	0.13	3.74
2,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8	0.0	0.00	0.0	0.1	0.01	0.4	0.1	0.01	0.3	0.1	0.01	0.31
TRANS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	0.2	0.01	0.5	0.2	0.02	0.5	0.2	0.02	0.4	0.2	0.02	0.60
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m- & p-XYLENE	0.3	0.03	2.5	0.3	0.03	2.5	0.3	0.04	2.4	0.3	0.03	2.52
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	0.4	0.03	2.3	0.2	0.02	1.3	0.2	0.02	1.5	0.2	0.02	1.55
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NONANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOPROPYLBENZENE (CUMENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ETHYLBENZENE	0.2	0.01	1.1	0.2	0.02	1.5	0.2	0.02	1.2	0.2	0.02	1.32
1-METHYL-4-ETHYLBENZENE	0.1	0.01	0.6	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.13
1,3,5-TRIMETHYLBENZENE	0.1	0.01	0.9	0.0	0.00	0.0	0.1	0.01	0.8	0.0	0.00	0.40
1-METHYL-2-ETHYLBENZENE	0.1	0.01	0.5	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.11
1,2,4-TRIMETHYLBENZENE	0.3	0.02	2.5	0.3	0.03	2.6	0.2	0.02	2.0	0.3	0.03	2.42
DECANE	0.1	0.01	0.0	0.1	0.01	0.0	0.0	0.00	0.0	0.1	0.01	0.03
ISOBUTYLBENZENE	0.1	0.01	0.1	0.1	0.01	0.1	0.0	0.00	0.1	0.1	0.01	0.11

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYL-PROPYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLENE	0.1	0.01	0.5	0.0	0.00	0.0	0.0	0.01	0.4	0.0	0.00	0.22
1,2,3-TRIMETHYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ISOPROPYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIETHYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-N-PROPYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-N-PROPYLENE	0.1	0.01	0.5	0.0	0.00	0.0	0.0	0.01	0.6	0.0	0.00	0.27
1,2-DIETHYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-4-ETHYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLENE	0.1	0.01	0.8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.17
1,3-DIMETHYL-2-ETHYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,6-TETRAMETHYLENE	2.9	0.23	26.2	2.6	0.24	23.7	1.5	0.16	13.8	2.4	0.22	21.48
2-METHYLBUTYLENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C9-C12+	0.1	0.01	0.5	0.1	0.01	0.4	0.1	0.01	0.2	0.1	0.01	0.38
FORMALDEHYDE	39.0	3.06	278.7	44.8	4.20	320.0	37.1	3.94	285.1	41.4	3.85	296.20
ACETALDEHYDE	9.1	0.72	50.4	9.6	0.90	53.2	8.0	0.85	44.0	9.1	0.84	50.05
ACROLEIN	0.6	0.05	4.2	1.0	0.09	6.7	0.6	0.06	3.8	0.8	0.07	5.35
ACETONE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPIONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CROTONALDEHYDE	0.2	0.02	1.1	0.2	0.02	0.9	0.0	0.00	0.0	0.1	0.01	0.71
ISOBUTYRALDEHYDE	0.1	0.01	0.6	0.1	0.01	0.6	0.1	0.01	0.5	0.1	0.01	0.57
METHYL ETHYL KETONE	0.1	0.01	0.1	0.1	0.01	0.1	0.1	0.01	0.1	0.1	0.01	0.13
BENZALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANALDEHYDE	0.0	0.00	0.0	0.4	0.04	1.5	0.2	0.02	0.7	0.3	0.02	0.99

TEST NUMBER: 100P(NC)-02S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 11/30/95
 TEST FUEL: 100% PROPANE

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	37.1		0.5	42.1		0.6	34.7		0.5	39.0		0.58
ETHANE	13.6	1.40	3.4	15.4	1.68	3.9	0.0	0.00	0.0	10.8	1.22	2.69
ETHYLENE	137.6	14.20	1003.2	151.3	16.53	1103.0	118.7	15.61	865.5	139.4	15.78	1016.54
PROPANE	659.5	68.07	316.6	580.3	63.39	278.6	493.4	64.87	236.8	572.8	64.81	274.93
PROPYLENE	68.1	7.03	640.1	74.5	8.14	700.5	58.3	7.67	548.1	68.7	7.77	645.77
ACETYLENE	46.2	4.77	23.1	49.0	5.35	24.5	41.9	5.51	21.0	46.4	5.26	23.22
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	2.1	0.21	2.1	0.3	0.03	0.3	1.6	0.21	1.6	1.0	0.12	1.04
TRANS-2-BUTENE	0.1	0.01	1.4	0.1	0.02	1.4	0.2	0.03	2.4	0.2	0.02	1.69
1-BUTENE	2.5	0.26	22.5	2.7	0.29	23.9	2.2	0.29	19.6	2.5	0.28	22.43
2-METHYLPROPENE (ISOBUTYLENE)	0.4	0.04	2.0	0.4	0.04	2.0	1.4	0.18	7.2	0.6	0.07	3.42
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	0.9	0.09	9.8	0.8	0.09	8.9	0.9	0.11	9.3	0.8	0.10	9.21
2-METHYLPROPANE (ISOBUTANE)	0.4	0.04	0.5	0.5	0.05	0.6	0.5	0.06	0.6	0.5	0.05	0.55
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.1	0.01	1.0	0.1	0.01	1.1	0.2	0.02	1.8	0.1	0.01	1.26
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	1.1	0.11	1.5	0.0	0.00	0.0	3.5	0.46	4.8	1.2	0.13	1.64
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.1	0.02	0.9	0.2	0.02	1.4	0.2	0.02	1.2	0.2	0.02	1.23
2-METHYL-1-BUTENE	0.2	0.02	0.9	0.0	0.00	0.0	0.2	0.03	1.1	0.1	0.01	0.50
PENTANE	0.2	0.02	0.2	0.1	0.01	0.1	0.4	0.05	0.4	0.2	0.02	0.19
UNIDENTIFIED C5 OLEFINS	0.1	0.01	1.1	0.0	0.00	0.0	0.2	0.02	1.4	0.1	0.01	0.62
2-METHYL-1,3-BUTADIENE	1.0	0.11	9.4	0.8	0.09	7.1	0.9	0.12	8.6	0.9	0.10	7.99
TRANS-2-PENTENE	0.1	0.01	1.2	0.2	0.02	1.7	0.2	0.03	2.0	0.2	0.02	1.69
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-BUTENE	0.1	0.01	0.5	0.0	0.00	0.1	0.1	0.01	0.7	0.1	0.01	0.37
CYCLOPENTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLBUTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.03	0.2	0.1	0.01	0.06
MTBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.03	0.3	0.1	0.01	0.09
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.01	0.1	0.0	0.00	0.04
2-METHYL-1-PENTENE	0.1	0.01	0.3	0.0	0.00	0.0	0.1	0.01	0.2	0.0	0.00	0.12
1-HEXENE	0.1	0.01	0.3	0.0	0.00	0.0	0.1	0.01	0.2	0.0	0.00	0.12
HEXANE	0.0	0.00	0.0	0.1	0.01	0.1	0.1	0.01	0.1	0.1	0.01	0.06
UNIDENTIFIED C8 OLEFINS	0.5	0.05	3.3	0.6	0.06	4.0	0.5	0.06	3.1	0.5	0.06	3.59
TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.01	0.1	0.0	0.00	0.03
METHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.02	0.3	0.0	0.01	0.09
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BENZENE	0.3	0.03	0.1	0.6	0.06	0.2	0.3	0.04	0.1	0.4	0.05	0.18
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.2	0.03	0.3	0.1	0.01	0.10
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.02	0.2	0.0	0.00	0.06
CIS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	0.2	0.02	0.2	0.0	0.00	0.0	0.2	0.03	0.2	0.1	0.01	0.09
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	0.0	0.00	0.0	0.1	0.01	0.1	0.1	0.01	0.1	0.1	0.01	0.04
UNIDENTIFIED C7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	0.1	0.01	0.1	0.0	0.00	0.0	0.1	0.01	0.1	0.0	0.01	0.05
TOLUENE	0.0	0.00	0.0	0.6	0.05	1.3	0.3	0.04	0.9	0.3	0.04	0.94
2,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-CIS-2-TRANS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	0.1	0.01	0.3	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.08
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m- & p-XYLENE	0.3	0.03	1.8	0.2	0.02	1.1	0.2	0.02	1.3	0.2	0.02	1.34
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	0.2	0.02	1.1	0.1	0.01	0.8	0.1	0.01	0.7	0.1	0.01	0.84
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NONANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOPROPYLBENZENE (CUMENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ETHYLBENZENE	0.1	0.01	0.6	0.0	0.00	0.0	0.1	0.01	0.6	0.0	0.00	0.31
1-METHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3,5-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4-TRIMETHYLBENZENE	0.2	0.02	1.4	0.0	0.00	0.0	0.1	0.02	1.2	0.1	0.01	0.61
DECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.02
ISOBUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.08

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYLPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.2	0.02	1.4	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.29
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,5-TETRAMETHYLBENZENE	4.7	0.49	43.0	3.4	0.37	30.9	2.5	0.34	23.1	3.4	0.39	31.28
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLCUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,5-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C9-C12+	0.1	0.01	0.3	0.0	0.00	0.0	0.1	0.01	0.2	0.0	0.00	0.11
FORMALDEHYDE	16.6	1.72	119.0	21.7	2.37	155.4	21.7	2.85	155.0	20.7	2.34	147.72
ACETALDEHYDE	7.6	0.78	41.8	8.0	0.88	44.2	6.1	0.81	33.8	7.4	0.84	40.85
ACROLEIN	1.8	0.19	12.2	1.9	0.21	13.1	1.0	0.13	6.9	1.6	0.19	11.16
ACETONE	0.5	0.06	0.3	0.5	0.06	0.3	0.4	0.05	0.2	0.5	0.06	0.28
PROPIONALDEHYDE	0.9	0.09	5.8	0.4	0.05	2.9	0.5	0.07	3.5	0.6	0.06	3.66
CROTONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOBUTYRALDEHYDE	0.0	0.00	0.0	0.2	0.02	1.2	0.0	0.00	0.0	0.1	0.01	0.61
METHYL ETHYL KETONE	0.0	0.00	0.0	0.2	0.02	0.3	0.0	0.00	0.0	0.1	0.01	0.14
BENZALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

TEST NUMBER: 50NB/50P(NC)-02S
 TEST CAR: 1994 PONTIAC GRANDAM
 TEST DATE: 12/4/95
 TEST FUEL: 50% BUTANE/50% PROPANE

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHANE	39.9		0.6	43.4		0.6	41.3		0.6	42.1		0.62
ETHANE	14.4	1.35	3.6	15.8	1.62	3.9	0.0	0.00	0.0	11.1	1.17	2.79
ETHYLENE	152.2	14.22	1109.2	163.5	16.84	1191.9	134.4	16.11	979.7	153.1	16.05	1116.33
PROPANE	451.5	42.18	216.7	364.7	37.56	175.1	317.8	38.10	152.6	369.9	38.77	177.53
PROPYLENE	77.4	7.23	727.8	82.6	8.50	776.2	66.6	7.98	625.6	77.1	8.08	724.68
ACETYLENE	51.2	4.78	25.6	53.4	5.50	26.7	49.2	5.89	24.6	51.8	5.43	25.60
PROPADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BUTANE	258.3	24.13	263.4	222.4	22.90	226.9	202.7	24.30	206.7	224.5	23.53	228.94
TRANS-2-BUTENE	1.0	0.09	9.5	1.0	0.10	10.1	1.0	0.12	9.7	1.0	0.10	9.88
1-BUTENE	4.1	0.38	36.3	4.3	0.44	38.2	3.6	0.43	31.6	4.0	0.42	35.99
2-METHYLPROPENE (ISOBUTYLENE)	0.4	0.04	2.4	0.5	0.05	2.5	1.4	0.17	7.4	0.7	0.08	3.80
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-BUTADIENE	1.4	0.13	15.0	1.3	0.14	14.5	1.2	0.15	13.4	1.3	0.14	14.28
2-METHYLPROPANE (ISOBUTANE)	1.1	0.10	1.3	0.9	0.09	1.1	0.7	0.09	0.9	0.9	0.10	1.10
1-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-BUTENE	0.7	0.07	7.1	0.8	0.08	7.5	0.7	0.09	7.2	0.7	0.08	7.34
3-METHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHANOL	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLBUTANE (ISOPENTANE)	2.9	0.27	4.0	0.7	0.07	1.0	3.9	0.47	5.4	2.1	0.21	2.83
2-BUTYNE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-PENTENE	0.1	0.01	0.8	0.3	0.03	2.0	0.2	0.02	1.0	0.2	0.03	1.61
2-METHYL-1-BUTENE	0.1	0.01	0.7	0.0	0.00	0.0	0.3	0.03	1.2	0.1	0.01	0.49
PENTANE	0.2	0.02	0.2	0.2	0.02	0.2	0.4	0.05	0.4	0.3	0.03	0.27
UNIDENTIFIED C5 OLEFINS	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.01	1.0	0.0	0.00	0.27
2-METHYL-1,3-BUTADIENE	1.1	0.11	10.2	0.8	0.08	7.2	1.0	0.12	8.9	0.9	0.10	8.32
TRANS-2-PENTENE	0.2	0.02	2.0	0.2	0.02	1.9	0.2	0.02	1.7	0.2	0.02	1.86
3,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-BUTENE	0.1	0.01	0.7	0.1	0.01	0.4	0.2	0.02	1.0	0.1	0.01	0.60
CYCLOPENTADIENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLBUTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.01	0.5	0.0	0.00	0.13
3-METHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLBUTANE	0.1	0.01	0.1	0.2	0.02	0.2	0.1	0.02	0.1	0.2	0.02	0.18
MTBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2,3-DIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLPENTANE	0.0	0.00	0.0	0.3	0.03	0.4	0.2	0.02	0.3	0.2	0.02	0.28
4-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLPENTANE	0.0	0.00	0.0	0.5	0.05	0.7	0.0	0.00	0.0	0.3	0.03	0.39
2-METHYL-1-PENTENE	0.1	0.01	0.3	0.0	0.00	0.0	0.1	0.01	0.3	0.0	0.00	0.13
1-HEXENE	0.1	0.01	0.3	0.0	0.00	0.0	0.1	0.01	0.3	0.0	0.00	0.13
HEXANE	0.0	0.00	0.0	0.2	0.02	0.2	0.1	0.01	0.1	0.1	0.01	0.13
UNIDENTIFIED C6 OLEFINS	0.4	0.04	2.8	0.5	0.05	3.5	0.4	0.05	2.6	0.5	0.05	3.08
TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETBE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLPENTANE	0.0	0.00	0.0	0.5	0.05	0.7	0.0	0.00	0.0	0.3	0.03	0.38
METHYLCYCLOPENTANE	0.1	0.01	0.4	0.1	0.02	0.4	0.0	0.00	0.0	0.1	0.01	0.29
2,4-DIMETHYLPENTANE	0.1	0.01	0.1	0.2	0.02	0.4	0.2	0.02	0.3	0.2	0.02	0.34
2,3,3-TRIMETHYL-1-BUTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLBUTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYLCYCLOPENTENE	0.0	0.00	0.0	0.3	0.03	1.7	0.0	0.00	0.0	0.2	0.02	0.88
BENZENE	0.6	0.05	0.2	0.3	0.03	0.1	0.5	0.05	0.2	0.4	0.04	0.17
3-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYLPENTANE	0.1	0.01	0.2	0.0	0.00	0.0	0.1	0.01	0.2	0.1	0.01	0.10
1,1-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CYCLOHEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.01	0.1	0.0	0.00	0.04
CIS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLPENTANE	0.3	0.03	0.3	0.1	0.01	0.1	0.2	0.03	0.2	0.2	0.02	0.17
2-METHYL-1-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-3-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C7	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
2-METHYL-2-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYL-TRANS-3-HEXENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYL-CIS-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYL-1-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3-DIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-HEPTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYL-2-PENTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,5-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,4-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,3-TRIMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TOLUENE	0.2	0.02	0.6	0.5	0.05	1.4	0.4	0.05	1.1	0.4	0.04	1.15
2,3-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,2-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4,4-TETRAMETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-3-ETHYLPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-1-ETHYL-CYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2,4-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
1-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-4-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
OCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C8	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TRANS-1,3-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,4-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-2-OCTENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,3,5-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1-METHYL-2-ETHYLCYCLOPENTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-2-ETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
4,4-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
CIS-1,2-DIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
PROPYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYL-4-ETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,1,3-TRIMETHYLCYCLOHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,6-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,5-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.1	0.01	0.2	0.0	0.00	0.07
2,3-DIMETHYLHEPTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
m- & p-XYLENE	0.2	0.02	1.2	0.2	0.02	1.2	0.1	0.02	1.0	0.2	0.02	1.18
4-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3-METHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
STYRENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
o-XYLENE	0.1	0.01	0.8	0.0	0.00	0.0	0.2	0.02	1.3	0.1	0.01	0.50
2,4,6-TRIMETHYLHEXANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-NONENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NONANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOPROPYLBENZENE (CUMENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,2-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
2,4-DIMETHYLOCTANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
n-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3,5-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DECANE	0.1	0.01	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.01
ISOBUTYLBENZENE	0.1	0.01	0.1	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.02

COMPOUND	BAG 1			BAG 2			BAG 3			FTP		
	MG/MI	WEIGHT NMOG %	OZONE, MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI	MG/MI	WEIGHT NMOG %	OZONE MG/MI
METHYLPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
S-BUTYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3-TRIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
INDAN	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-ISOPROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-3-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-4-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1-METHYL-2-N-PROPYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,4-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-4-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,3-DIMETHYL-2-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNDECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2-DIMETHYL-3-ETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,4,5-TETRAMETHYLBENZENE	1.3	0.12	12.1	1.0	0.10	8.7	3.2	0.38	28.9	1.6	0.17	14.96
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
3,4-DIMETHYLCUMENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,5-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-2-METHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
1,2,3,4-TETRAMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
N-PENT-BENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
TERT-1-BUT-3,6-DIMETHYLBENZENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
NAPHTHALENE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
DODECANE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
UNIDENTIFIED C9-C12+	0.1	0.01	0.3	0.0	0.00	0.0	0.0	0.01	0.2	0.0	0.00	0.11
FORMALDEHYDE	36.6	3.42	262.0	41.8	4.31	299.0	33.2	3.97	237.1	38.4	4.02	274.24
ACETALDEHYDE	8.2	0.77	45.4	8.3	0.86	45.9	6.7	0.81	37.2	7.9	0.82	43.39
ACROLEIN	2.1	0.20	14.1	2.1	0.22	14.2	1.5	0.18	10.2	1.9	0.20	13.08
ACETONE	0.3	0.03	0.2	0.1	0.02	0.1	0.4	0.05	0.2	0.3	0.03	0.14
PROPIONALDEHYDE	0.6	0.06	4.2	0.3	0.03	1.7	0.8	0.10	5.4	0.5	0.05	3.22
CROTONALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
ISOBUTYRALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
METHYL ETHYL KETONE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
BENZALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00
HEXANALDEHYDE	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.0	0.00	0.00

Appendix C

Detailed Computer Printouts of the FTP Regulated Emission Tests Results from Task 2

Test No.	Soak Time, hours	Vehicle Prep	Page No.
TA4-E85-BASE	0	Standard	C-1
TA4-E85-18HR	18	Extended	C-3
TA4-E85-24HR	24	Extended	C-5
TA4-E85-36HR	36	Extended	C-7
TA4-E85-36HRC	36	Standard	C-9

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 1.5-R 4-BAG CARB FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-6068-200

VEHICLE NUMBER E85	TEST TA4-E85-BASE	ETHANOL 85% EM-2154-F
VEHICLE MODEL 93 FORD TAURUS	DATE 11/16/95 RUN	FUEL DENSITY 6.480 LB/GAL
ENGINE 3.0 L (183 CID)- V6	DYNO 2 BAG CART 2	H .132 C .600 O .268 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.80 HP (5.07 KW)	
ODOMETER 4671 MILES (7515 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.34 IN HG (745.2 MM HG) DRY BULB TEMPERATURE 72.0°F (22.2°C) NOX HUMIDITY C.F. .865
 RELATIVE HUMIDITY 35.1 PCT.

BAG NUMBER	1A	1B	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-140 SEC.)	COLD TRANSIENT (140- 505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	139.8	365.6	866.7	506.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.981/.990	.976/.990	.981/.990	.979/.990
MEASURED DISTANCE MILES (KM)	.68 (1.09)	2.96 (4.76)	3.84 (6.18)	3.64 (5.86)
BLOWER FLOW RATE SCFM (SCMH)	322.7 (9.14)	322.5 (9.13)	326.8 (9.25)	325.6 (9.22)
GAS METER FLOW RATE SCFM (SCMH)	.28 (.01)	.29 (.01)	.28 (.01)	.28 (.01)
TOTAL FLOW SCF (SCM)	752. (21.3)	1967. (55.7)	4724. (133.8)	2748. (77.8)
HC SAMPLE METER/RANGE/PPM (BAG)	22.9/ 3/ 228.49	34.1/ 2/ 34.08	10.8/ 2/ 10.79	12.6/ 2/ 12.59
HC BCKGRD METER/RANGE/PPM	.8/ 3/ 7.98	7.6/ 2/ 7.60	7.3/ 2/ 7.30	7.1/ 2/ 7.10
CO SAMPLE METER/RANGE/PPM	88.8/ 1/ 914.16	59.4/ 12/ 58.54	10.0/ 12/ 9.66	12.3/ 12/ 11.89
CO BCKGRD METER/RANGE/PPM	1.5/ 1/ 10.57	1.5/ 12/ 1.45	1.2/ 12/ 1.16	1.1/ 12/ 1.06
CO2 SAMPLE METER/RANGE/PCT	83.9/ 14/ .7306	97.9/ 14/ 1.0918	81.9/ 14/ .6909	91.7/ 14/ .9104
CO2 BCKGRD METER/RANGE/PCT	11.4/ 14/ .0362	13.5/ 14/ .0441	13.3/ 14/ .0433	13.4/ 14/ .0437
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	33.9/ 2/ 34.02	10.3/ 1/ 2.66	3.8/ 1/ .99	5.7/ 1/ 1.48
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ .50	1.1/ 1/ .29	.8/ 1/ .21	.7/ 1/ .18
CH4 SAMPLE PPM (1.150)	15.32	10.31	4.87	6.29
CH4 BCKGRD PPM	2.18	2.12	2.12	2.13
DILUTION FACTOR	15.09	11.50	18.26	13.86
HC CONCENTRATION PPM	221.04	27.15	3.90	6.01
CO CONCENTRATION PPM	878.62	55.09	8.31	10.53
CO2 CONCENTRATION PCT	.6968	1.0516	.6500	.8699
NOX CONCENTRATION PPM	33.55	2.40	.79	1.31
CH4 CONCENTRATION PPM	13.29	8.37	2.86	4.31
NMHC CONCENTRATION PPM	114.38	13.04	.60	1.06
THC MASS GRAMS	4.479	1.248	.313	.290
CO MASS GRAMS	21.798	3.573	1.295	.954
CO2 MASS GRAMS	271.87	1072.45	1592.12	1239.59
NOX MASS GRAMS	1.183	.221	.175	.169
CH4 MASS GRAMS	.189	.311	.255	.223
NMHC MASS GRAMS (FID)	1.406	.419	.047	.047
FUEL MASS KG	.144	.492	.726	.565
FUEL ECONOMY MPG (L/100KM)	13.83 (17.01)	17.67 (13.31)	15.56 (15.12)	18.94 (12.42)

4-BAG COMPOSITE RESULTS

THC G/MI .393	CH4 G/MI .080	
CO G/MI 1.706	NMHC G/MI .115	
NOX G/MI .117	CARBONYL G/MI .045	
	ALCOHOL G/MI .153	
FUEL ECONOMY MPG (L/100KM) 16.65 (14.13)	NMOG G/MI .314 (RAF=1.00)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 1.5-R 4-BAG CARB FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-6068-200

VEHICLE NUMBER E85	TEST TA4-E85-BASE	ETHANOL 85% EM-2154-F
VEHICLE MODEL 93 FORD TAURUS	DATE 11/16/95 RUN	FUEL DENSITY 6.480 LB/GAL
ENGINE 3.0 L (183 CID)- V6	DYNO 2 BAG CART 2	H .132 C .600 O .268 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.80 HP (5.07 KW)	
ODOMETER 4671 MILES (7515 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.34 IN HG (745.2 MM HG)	DRY BULB TEMPERATURE 72.0°F (22.2°C)	NOX HUMIDITY C.F. .865
RELATIVE HUMIDITY 35.1 PCT.		

BAG NUMBER	1A	1B	2	3	BACKGROUND
BAG DESCRIPTION	COLD TRANSIENT (0-140 SEC.)	COLD TRANSIENT (140- 505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)	
FORMALDEHYDE					
PPM	2.053	.547	.041	.048	.006
MASS MG	53.46	36.79	5.88	4.06	
ACETALDEHYDE					
PPM	12.404	1.723	.045	.059	.030
MASS MG	473.95	168.82	3.96	4.28	
ACROLEIN					
PPM	.049	.000	.000	.000	.000
MASS MG	2.40	.00	.00	.00	
ACETONE					
PPM	.100	.021	.015	.018	.013
MASS MG	4.43	1.08	.71	.94	
PROPIONALDEHYDE					
PPM	.034	.005	.002	.000	.002
MASS MG	1.63	.43	.03	.00	
CROTONALDEHYDE					
PPM	.007	.000	.000	.000	.000
MASS MG	.45	.00	.00	.00	
ISOBUTYR+MEK					
PPM	.022	.010	.005	.008	.004
MASS MG	1.18	1.00	.62	1.14	
BENZALDEHYDE					
PPM	.028	.000	.000	.000	.000
MASS MG	2.58	.00	.00	.00	
HEXANALDEHYDE					
PPM	.023	.000	.000	.000	.000
MASS MG	2.01	.00	.00	.00	
METHANOL					
PPM	.405	.174	.000	.097	.013
MASS MG	10.94	11.71	.00	8.53	
ETHANOL					
PPM	58.219	2.863	.000	.000	.000
MASS MG	2331.81	298.31	.00	.00	

4-BAG COMPOSITE RESULTS

FORMALDEHYDE MG/MI	6.288	CROTONALD. MG/MI	.026
ACETALDEHYDE MG/MI	37.835	ISOBUTYR+MEK MG/MI	.295
ACROLEIN MG/MI	.138	BENZALDEHYDE MG/MI	.148
ACETONE MG/MI	.484	HEXANALDEHYDE MG/MI	.116
PROPIONALD. MG/MI	.122	METHANOL MG/MI	1.953
		ETHANOL MG/MI	151.315

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.5-R

4-BAG CARB FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6068-200

VEHICLE NUMBER	E85	TEST	TA4-E85-18HR	GASOLINE	85%	EM-2154-F
VEHICLE MODEL	93 FORD TAURUS	DATE	11/17/95	RUN		
ENGINE	3.0 L (183 CID)- V6	DYNO	2	BAG CART	2	FUEL DENSITY 6.480 LB/GAL
TRANSMISSION	A4	ACTUAL ROAD LOAD 6.80 HP (5.07 KW)		H	.132	C .600 O .268 X .000
ODOMETER	4711 MILES (7579 KM)	TEST WEIGHT	3500 LBS (1587 KG)			

BAROMETER	29.18 IN HG (741.2 MM HG)	DRY BULB TEMPERATURE	73.0°F (22.8°C)	NOX HUMIDITY C.F.	.964
RELATIVE HUMIDITY	53.8 PCT.				

BAG NUMBER	1A	1B	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-140 SEC.)	COLD TRANSIENT (140- 505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	141.2	364.4	867.0	505.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.972/.985	.971/.985	.976/.985	.973/.985
MEASURED DISTANCE MILES (KM)	.68 (1.09)	2.95 (4.74)	3.84 (6.18)	3.63 (5.85)
BLOWER FLOW RATE SCFM (SCMM)	324.8 (9.20)	325.9 (9.23)	326.2 (9.24)	323.7 (9.17)
GAS METER FLOW RATE SCFM (SCMM)	.28 (.01)	.28 (.01)	.28 (.01)	.28 (.01)
TOTAL FLOW SCF (SCM)	765. (21.7)	1981. (56.1)	4717. (133.6)	2727. (77.2)

HC SAMPLE METER/RANGE/PPM (BAG)	20.6/ 2/ 20.59	92.0/ 1/ 9.26	51.2/ 1/ 5.15	55.0/ 1/ 5.54
HC BCKGRD METER/RANGE/PPM	4.5/ 2/ 4.50	42.6/ 1/ 4.29	43.5/ 1/ 4.38	43.5/ 1/ 4.38
CO SAMPLE METER/RANGE/PPM	9.7/ 12/ 9.37	12.2/ 12/ 11.79	3.4/ 12/ 3.28	4.5/ 12/ 4.34
CO BCKGRD METER/RANGE/PPM	.8/ 12/ .77	.7/ 12/ .68	.8/ 12/ .77	1.2/ 12/ 1.16
CO2 SAMPLE METER/RANGE/PCT	93.3/ 14/ .9534	58.8/ 1/ 1.0816	81.4/ 14/ .6813	91.5/ 14/ .9052
CO2 BCKGRD METER/RANGE/PCT	12.8/ 14/ .0414	2.6/ 1/ .0482	13.1/ 14/ .0425	13.3/ 14/ .0433
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	63.6/ 1/ 16.09	.5/ 1/ .13	.3/ 1/ .08	2.5/ 1/ .65
NOX BCKGRD METER/RANGE/PPM	.3/ 1/ .08	.4/ 1/ .10	.3/ 1/ .08	.3/ 1/ .08
CH4 SAMPLE PPM (1.160)	14.47	5.39	2.95	3.15
CH4 BCKGRD PPM	2.26	2.21	2.25	2.25

DILUTION FACTOR	13.23	11.68	18.55	13.96
HC CONCENTRATION PPM	16.43	5.34	1.01	1.47
CO CONCENTRATION PPM	8.30	10.68	2.45	3.12
CO2 CONCENTRATION PCT	.9151	1.0375	.6411	.8651
NOX CONCENTRATION PPM	16.02	.04	.00	.58
CH4 CONCENTRATION PPM	12.38	3.37	.82	1.06
NMHC CONCENTRATION PPM	2.07	1.43	.05	.25

THC MASS GRAMS	.212	.182	.089	.072
CO MASS GRAMS	.209	.698	.382	.281
CO2 MASS GRAMS	363.04	1065.53	1567.97	1223.13
NOX MASS GRAMS	.640	.004	.001	.082
CH4 MASS GRAMS	.179	.126	.073	.054
NMHC MASS GRAMS (FID)	.026	.046	.004	.011
FUEL MASS KG	.166	.485	.714	.557
FUEL ECONOMY MPG (L/100KM)	12.01 (19.58)	17.84 (13.19)	15.81 (14.88)	19.18 (12.27)

4-BAG COMPOSITE RESULTS

THC	G/MI	.040	CH4	G/MI	.032
CO	G/MI	.125	NMHC	G/MI	.006
NOX	G/MI	.044	CARBONYL	G/MI	.003
			ALCOHOL	G/MI	.000
FUEL ECONOMY MPG (L/100KM)	16.76 (14.03)		NMOC	G/MI	.009 (RAF=1.00)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.5-R

4-BAG CARB PTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6068-200

VEHICLE NUMBER	E85	TEST	TA4-E85-18HR	GASOLINE	85%	EM-2154-F
VEHICLE MODEL	93 FORD TAURUS	DATE	11/17/95	RUN		
ENGINE	3.0 L (183 CID)- V6	DYNO	2	BAG CART	2	FUEL DENSITY 6.480 LB/GAL
TRANSMISSION	A4	ACTUAL ROAD LOAD	6.80 HP (5.07 KW)	H	.132	C .600 O .268 X .000
ODOMETER	4711 MILES (7579 KM)	TEST WEIGHT	3500 LBS (1587 KG)			

BAROMETER 29.18 IN HG (741.2 MM HG)

DRY BULB TEMPERATURE 73.0°F (22.8°C)

NOX HUMIDITY C.F. .964

RELATIVE HUMIDITY 53.8 PCT.

BAG NUMBER	1A	1B	2	3	
BAG DESCRIPTION	COLD TRANSIENT (0-140 SEC.)	COLD TRANSIENT (140- 505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)	BACKGROUND
FORMALDEHYDE					
PPM	.192	.088	.056	.059	.000
MASS MG	5.05	6.01	9.08	5.58	
ACETALDEHYDE					
PPM	.020	.012	.007	.009	.006
MASS MG	.55	.62	.41	.48	
ACROLEIN					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
ACETONE					
PPM	.023	.014	.003	.005	.004
MASS MG	.97	1.33	.00	.36	
PROPIONALDEHYDE					
PPM	.000	.000	.002	.003	.001
MASS MG	.00	.00	.22	.38	
CROTONALDEHYDE					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
ISOBUTYR+MEK					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.02	.00	.00	
BENZALDEHYDE					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
HEXANALDEHYDE					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
METHANOL					
PPM	.000	.000	.026	.000	.022
MASS MG	.00	.00	.90	.00	
ETHANOL					
PPM	.040	.034	.021	.014	.021
MASS MG	.81	1.47	.28	.00	

4-BAG COMPOSITE RESULTS

FORMALDEHYDE	MG/MI	2.279	CROTONALD.	MG/MI	.000
ACETALDEHYDE	MG/MI	.159	ISOBUTYR+MEK	MG/MI	.001
ACROLEIN	MG/MI	.000	BENZALDEHYDE	MG/MI	.000
ACETONE	MG/MI	.160	HEXANALDEHYDE	MG/MI	.000
PROPIONALD.	MG/MI	.058	METHANOL	MG/MI	.120
			ETHANOL	MG/MI	.169

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 1.5-R 4-BAG CARB FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-6068-200

VEHICLE NUMBER E85	TEST TA4-E85-24HR	ETHANOL 85% EM-2154-F
VEHICLE MODEL 93 FORD TAURUS	DATE 11/20/95 RUN	FUEL DENSITY 6.480 LB/GAL
ENGINE 3.0 L (183 CID)- V6	DYNO 2 BAG CART 2	H .132 C .600 O .268 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.80 HP (5.07 KW)	
ODOMETER 4767 MILES (7670 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.35 IN HG (745.5 MM HG)	DRY BULB TEMPERATURE 74.0°F (23.3°C)	NOX HUMIDITY C.F. .954
RELATIVE HUMIDITY 50.7 PCT.		

BAG NUMBER	1A	1B	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-140 SEC.)	COLD TRANSIENT (140- 505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	140.0	365.0	867.4	505.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.972/.985	.971/.985	.976/.985	.973/.985
MEASURED DISTANCE MILES (KM)	.68 (1.09)	2.96 (4.75)	3.86 (6.22)	3.62 (5.83)
BLOWER FLOW RATE SCFM (SCMH)	321.6 (9.11)	321.6 (9.11)	324.9 (9.20)	324.4 (9.19)
GAS METER FLOW RATE SCFM (SCMH)	.28 (.01)	.29 (.01)	.28 (.01)	.28 (.01)
TOTAL FLOW SCF (SCM)	751. (21.3)	1958. (55.5)	4701. (133.1)	2733. (77.4)

HC SAMPLE METER/RANGE/PPM (BAG)	24.5/ 2/ 24.49	9.9/ 2/ 9.89	58.0/ 1/ 5.84	69.4/ 1/ 6.99
HC BCKGRD METER/RANGE/PPM	6.4/ 2/ 6.40	6.0/ 2/ 6.00	56.7/ 1/ 5.71	55.7/ 1/ 5.61
CO SAMPLE METER/RANGE/PPM	27.2/ 12/ 26.41	6.5/ 12/ 6.28	4.0/ 12/ 3.86	4.4/ 12/ 4.25
CO BCKGRD METER/RANGE/PPM	2.2/ 12/ 2.12	1.4/ 12/ 1.35	1.3/ 12/ 1.25	1.3/ 12/ 1.25
CO2 SAMPLE METER/RANGE/PCT	54.4/ 1/ .9992	60.1/ 1/ 1.1060	81.9/ 14/ .6909	91.6/ 14/ .9078
CO2 BCKGRD METER/RANGE/PCT	2.8/ 1/ .0519	2.7/ 1/ .0500	13.5/ 14/ .0441	13.6/ 14/ .0444
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	63.7/ 1/ 16.12	.7/ 1/ .18	.4/ 1/ .10	3.1/ 1/ .81
NOX BCKGRD METER/RANGE/PPM	.6/ 1/ .16	.5/ 1/ .13	.4/ 1/ .10	.4/ 1/ .10
CH4 SAMPLE PPM (1.160)	14.83	5.10	2.57	3.57
CH4 BCKGRD PPM	2.43	2.36	2.35	2.28

DILUTION FACTOR	12.60	11.42	18.29	13.92
HC CONCENTRATION PPM	18.60	4.42	.44	1.78
CO CONCENTRATION PPM	23.44	4.80	2.57	2.94
CO2 CONCENTRATION PCT	.9514	1.0603	.6492	.8666
NOX CONCENTRATION PPM	15.97	.06	.01	.71
CH4 CONCENTRATION PPM	12.59	2.95	.35	1.45
NMHC CONCENTRATION PPM	4.02	.99	.04	.08

THC MASS GRAMS	.233	.148	.042	.087
CO MASS GRAMS	.581	.310	.398	.265
CO2 MASS GRAMS	370.48	1076.61	1582.44	1228.13
NOX MASS GRAMS	.620	.006	.001	.100
CH4 MASS GRAMS	.179	.109	.031	.075
NMHC MASS GRAMS (FID)	.049	.032	.003	.003
FUEL MASS KG	.169	.490	.720	.559
FUEL ECONOMY MPG (L/100KM)	11.74 (20.04)	17.72 (13.28)	15.76 (14.92)	19.04 (12.36)

4-BAG COMPOSITE RESULTS

THC G/MI	.034	CH4 G/MI	.026
CO G/MI	.124	NMHC G/MI	.005
NOX G/MI	.044	CARBONYL G/MI	.002
		ALCOHOL G/MI	.000
FUEL ECONOMY MPG (L/100KM)	16.67 (14.12)	NMOG G/MI	.008 (RAF=1.00)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.5-R

4-BAG CARB FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6068-200

VEHICLE NUMBER	E85	TEST	TA4-E85-24HR	ETHANOL	85%	EM-2154-F
VEHICLE MODEL	93 FORD TAURUS	DATE	11/20/95	RUN	FUEL DENSITY	6.480 LB/GAL
ENGINE	3.0 L (183 CID)- V6	DYNO	2	BAG CART	2	H .132 C .600 O .268 X .000
TRANSMISSION	A4	ACTUAL ROAD LOAD	6.80 HP (5.07 KW)			
ODOMETER	4767 MILES (7670 KM)	TEST WEIGHT	3500 LBS (1587 KG)			

BAROMETER	29.35 IN HG (745.5 MM HG)	DRY BULB TEMPERATURE	74.0°F (23.3°C)	NOX HUMIDITY C.F.	.954
RELATIVE HUMIDITY	50.7 PCT.				

BAG NUMBER	1A	1B	2	3	
BAG DESCRIPTION	COLD TRANSIENT (0-140 SEC.)	COLD TRANSIENT (140- 505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)	BACKGROUND
FORMALDEHYDE					
PPM	.157	.062	.050	.052	.006
MASS MG	3.91	3.79	7.13	4.37	
ACETALDEHYDE					
PPM	.034	.023	.008	.009	.007
MASS MG	1.02	1.58	.31	.32	
ACROLEIN					
PPM	.000	.003	.000	.000	.000
MASS MG	.00	.42	.00	.00	
ACETONE					
PPM	.000	.007	.002	.002	.003
MASS MG	.00	.67	.03	.00	
PROPIONALDEHYDE					
PPM	.000	.000	.001	.000	.000
MASS MG	.00	.00	.17	.00	
CROTONALDEHYDE					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
ISOBUTYR+MEK					
PPM	.000	.002	.000	.000	.000
MASS MG	.00	.22	.00	.06	
BENZALDEHYDE					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
HEXANALDEHYDE					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
METHANOL					
PPM	.000	.000	.000	.037	.018
MASS MG	.00	.00	.00	1.96	
ETHANOL					
PPM	.000	.025	.015	.032	.018
MASS MG	.00	.85	.00	2.08	

4-BAG COMPOSITE RESULTS

FORMALDEHYDE	MG/MI	1.727	CROTONALD.	MG/MI	.000
ACETALDEHYDE	MG/MI	.214	ISOBUTYR+MEK	MG/MI	.017
ACROLEIN	MG/MI	.024	BENZALDEHYDE	MG/MI	.000
ACETONE	MG/MI	.042	HEXANALDEHYDE	MG/MI	.000
PROPIONALD.	MG/MI	.023	METHANOL	MG/MI	.149
			ETHANOL	MG/MI	.207

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.5-R

4-BAG CARB FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6068-200

VEHICLE NUMBER E85	TEST TA4-E85-36HR	ETHANOL 85%	EW-2154-F
VEHICLE MODEL 93 FORD TAURUS	DATE 11/22/95 RUN	FUEL DENSITY 6.480 LB/GAL	
ENGINE 3.0 L (183 CID)- V6	DYNO 2 BAG CART 2	H .132 C .600 O .268 X .000	
TRANSMISSION A4	ACTUAL ROAD LOAD 6.80 HP (5.07 KW)		
ODOMETER 4817 MILES (7750 KM)	TEST WEIGHT 3500 LBS (1587 KG)		

BAROMETER 29.30 IN HG (744.2 MM HG)	DRY BULB TEMPERATURE 72.0°F (22.2°C)	NOX HUMIDITY C.F. .949
RELATIVE HUMIDITY 53.2 PCT.		

BAG NUMBER	1A	1B	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-140 SEC.)	COLD TRANSIENT (140- 505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	139.8	365.6	866.9	505.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.973/.986	.971/.986	.977/.986	.974/.986
MEASURED DISTANCE MILES (KM)	.67 (1.08)	2.94 (4.74)	3.84 (6.17)	3.63 (5.85)
BLOWER FLOW RATE SCFM (SCMM)	321.3 (9.10)	325.3 (9.21)	326.3 (9.24)	325.6 (9.22)
GAS METER FLOW RATE SCFM (SCMM)	.28 (.01)	.29 (.01)	.28 (.01)	.28 (.01)
TOTAL FLOW SCF (SCM)	749. (21.2)	1984. (56.2)	4718. (133.6)	2745. (77.7)
HC SAMPLE METER/RANGE/PPM (BAG)	55.5/ 2/ 55.47	17.0/ 2/ 16.99	52.0/ 1/ 5.23	64.6/ 1/ 6.50
HC BCKGRD METER/RANGE/PPM	5.7/ 2/ 5.70	5.5/ 2/ 5.50	49.9/ 1/ 5.02	47.8/ 1/ 4.81
CO SAMPLE METER/RANGE/PPM	51.8/ 14/ 231.27	24.4/ 12/ 23.67	3.6/ 12/ 3.47	5.0/ 12/ 4.83
CO BCKGRD METER/RANGE/PPM	.5/ 14/ 2.02	1.5/ 12/ 1.45	1.3/ 12/ 1.25	1.3/ 12/ 1.25
CO2 SAMPLE METER/RANGE/PCT	93.8/ 14/ .9673	97.7/ 14/ 1.0852	81.7/ 14/ .6871	91.0/ 14/ .8924
CO2 BCKGRD METER/RANGE/PCT	13.9/ 14/ .0456	14.1/ 14/ .0464	14.2/ 14/ .0468	14.1/ 14/ .0464
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	64.5/ 1/ 16.32	2.4/ 1/ .63	1.4/ 1/ .37	2.8/ 1/ .73
NOX BCKGRD METER/RANGE/PPM	1.1/ 1/ .29	.9/ 1/ .24	.8/ 1/ .21	.8/ 1/ .21
CH4 SAMPLE PPM (1.150)	15.88	6.81	2.63	3.85
CH4 BCKGRD PPM	2.71	2.66	2.59	2.46
DILUTION FACTOR	12.72	11.62	18.39	14.16
HC CONCENTRATION PPM	50.22	11.97	.48	2.03
CO CONCENTRATION PPM	220.29	21.37	2.19	3.50
CO2 CONCENTRATION PCT	.9253	1.0428	.6428	.8493
NOX CONCENTRATION PPM	16.05	.41	.17	.54
CH4 CONCENTRATION PPM	13.37	4.37	.18	1.56
NMHC CONCENTRATION PPM	29.88	6.33	.31	.28
THC MASS GRAMS	.813	.468	.051	.097
CO MASS GRAMS	5.442	1.398	.341	.317
CO2 MASS GRAMS	359.48	1072.76	1572.50	1208.59
NOX MASS GRAMS	.618	.042	.041	.076
CH4 MASS GRAMS	.189	.164	.016	.081
NMHC MASS GRAMS (FID)	.366	.205	.024	.012
FUEL MASS KG	.168	.490	.716	.550
FUEL ECONOMY MPG (L/100KM)	11.74 (20.03)	17.67 (13.31)	15.75 (14.93)	19.42 (12.12)

4-BAG COMPOSITE RESULTS

THC G/MI	.088	CH4 G/MI	.029
CO G/MI	.465	NMHC G/MI	.037
NOX G/MI	.049	CARBONYL G/MI	.013
		ALCOHOL G/MI	.010
FUEL ECONOMY MPG (L/100KM)	16.74 (14.05)	NMOG G/MI	.059 (RAF=1.00)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 1.5-R 4-BAG CARB FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-6068-200

VEHICLE NUMBER E85	TEST TA4-E85-36HR	ETHANOL 85% EM-2154-F
VEHICLE MODEL 93 FORD TAURUS	DATE 11/22/95 RUN	FUEL DENSITY 6.480 LB/GAL
ENGINE 3.0 L (183 CID)- V6	DYNO 2 BAG CART 2	H .132 C .600 O .268 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.80 HP (5.07 KW)	
ODOMETER 4817 MILES (7750 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.30 IN HG (744.2 MM HG)	DRY BULB TEMPERATURE 72.0°F (22.2°C)	NOX HUMIDITY C.F. .949
RELATIVE HUMIDITY 53.2 PCT.		

BAG NUMBER	1A	1B	2	3	
BAG DESCRIPTION	COLD TRANSIENT	COLD TRANSIENT	STABILIZED	HOT TRANSIENT	BACKGROUND
	(0-140 SEC.)	(140- 505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)	
FORMALDEHYDE					
PPM	.220	.079	.038	.030	.001
MASS MG	5.64	5.27	5.94	2.75	
ACETALDEHYDE					
PPM	3.146	.536	.009	.009	.005
MASS MG	118.80	53.12	1.02	.52	
ACROLEIN					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
ACETONE					
PPM	.030	.000	.013	.002	.002
MASS MG	1.39	.00	3.36	.03	
PROPIONALDEHYDE					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
CROTONALDEHYDE					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
ISOBUTYR+MEK					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
BENZALDEHYDE					
PPM	.073	.000	.000	.000	.000
MASS MG	6.64	.00	.00	.00	
HEXANALDEHYDE					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
METHANOL					
PPM	.000	.000	.000	.000	.014
MASS MG	.00	.00	.00	.00	
ETHANOL					
PPM	3.208	.416	.000	.000	.027
MASS MG	125.92	40.94	.00	.00	

4-BAG COMPOSITE RESULTS

FORMALDEHYDE MG/MI	1.635	CROTONALD. MG/MI	.000
ACETALDEHYDE MG/MI	10.096	ISOBUTYR+MEK MG/MI	.000
ACROLEIN MG/MI	.000	BENZALDEHYDE MG/MI	.383
ACETONE MG/MI	.533	HEXANALDEHYDE MG/MI	.000
PROPIONALD. MG/MI	.000	METHANOL MG/MI	.000
		ETHANOL MG/MI	9.629

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.5-R

4-BAG CARB FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6068-200

VEHICLE NUMBER	E85	TEST	TA4-E85-36HRC	ETHANOL	85%	EM-2154-F
VEHICLE MODEL	93 FORD TAURUS	DATE	12/ 1/95	RUN		
ENGINE	3.0 L (183 CID)- V6	DYNO	2	BAG CART	2	
TRANSMISSION	A4	ACTUAL ROAD LOAD	6.80 HP (5.07 KW)	FUEL DENSITY	6.480 LB/GAL	
ODOMETER	4874 MILES (7842 KM)	TEST WEIGHT	3500 LBS (1587 KG)	H	.132	C .600 O .268 X .000

BAROMETER	29.17 IN HG (740.9 MM HG)	DRY BULB TEMPERATURE	73.0°F (22.8°C)	NOX HUMIDITY C.F.	.964
RELATIVE HUMIDITY	53.8 PCT.				

BAG NUMBER	1A	1B	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-140 SEC.)	COLD TRANSIENT (140- 505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	140.2	365.4	866.8	505.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.973/.985	.970/.985	.976/.985	.973/.985
MEASURED DISTANCE MILES (KM)	.68 (1.09)	2.95 (4.75)	3.85 (6.20)	3.64 (5.86)
BLOWER FLOW RATE SCFM (SCHM)	319.1 (9.04)	322.2 (9.13)	323.9 (9.17)	322.3 (9.13)
GAS METER FLOW RATE SCFM (SCHM)	.27 (.01)	.29 (.01)	.28 (.01)	.27 (.01)
TOTAL FLOW SCF (SCHM)	746. (21.1)	1964. (55.6)	4684. (132.6)	2716. (76.9)
HC SAMPLE METER/RANGE/PPM (BAG)	19.9/ 3/ 198.56	18.0/ 2/ 17.99	59.0/ 1/ 5.94	67.9/ 1/ 6.84
HC BCKGRD METER/RANGE/PPM	.8/ 3/ 7.98	7.2/ 2/ 7.20	58.2/ 1/ 5.86	55.2/ 1/ 5.56
CO SAMPLE METER/RANGE/PPM	89.1/ 1/ 918.32	19.8/ 12/ 19.18	3.4/ 12/ 3.28	5.2/ 12/ 5.02
CO BCKGRD METER/RANGE/PPM	.3/ 1/ 2.10	1.4/ 12/ 1.35	1.1/ 12/ 1.06	1.2/ 12/ 1.16
CO2 SAMPLE METER/RANGE/PCT	91.2/ 14/ .8975	59.4/ 1/ 1.0928	81.6/ 14/ .6851	91.5/ 14/ .9052
CO2 BCKGRD METER/RANGE/PCT	13.7/ 14/ .0448	2.7/ 1/ .0500	14.0/ 14/ .0460	14.1/ 14/ .0464
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	29.5/ 2/ 29.60	3.4/ 1/ .89	.9/ 1/ .24	3.7/ 1/ .96
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ .40	1.1/ 1/ .29	.9/ 1/ .24	.8/ 1/ .21
CH4 SAMPLE PPM (1.150)	17.58	7.07	2.92	4.05
CH4 BCKGRD PPM	2.85	2.83	2.71	2.81
DILUTION FACTOR	12.62	11.54	18.44	13.96
HC CONCENTRATION PPM	191.21	11.42	.40	1.68
CO CONCENTRATION PPM	881.41	17.15	2.19	3.77
CO2 CONCENTRATION PCT	.8562	1.0471	.6416	.8622
NOX CONCENTRATION PPM	29.23	.62	.01	.77
CH4 CONCENTRATION PPM	14.96	4.49	.35	1.44
NMHC CONCENTRATION PPM	99.80	5.31	-.01	-.01
THC MASS GRAMS	3.820	.456	.049	.080
CO MASS GRAMS	21.685	1.110	.338	.338
CO2 MASS GRAMS	331.28	1066.38	1558.15	1214.25
NOX MASS GRAMS	1.139	.064	.003	.109
CH4 MASS GRAMS	.211	.166	.031	.074
NMHC MASS GRAMS (FID)	1.216	.170	.000	.000
FUEL MASS KG	.170	.486	.709	.553
FUEL ECONOMY MPG (L/100KM)	11.73 (20.05)	17.85 (13.18)	15.97 (14.73)	19.36 (12.15)

4-BAG COMPOSITE RESULTS

THC	G/MI	.258	CH4	G/MI	.031
CO	G/MI	1.380	NMHC	G/MI	.080
NOX	G/MI	.078	CARBONYL	G/MI	.034
			ALCOHOL	G/MI	.113
FUEL ECONOMY MPG (L/100KM)	16.88 (13.94)		NMOG	G/MI	.227 (RAF=1.00)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.5-R

4-BAG CARB FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6068-200

VEHICLE NUMBER	E85	TEST	TA4-E85-36HRC	ETHANOL	85%	EM-2154-F
VEHICLE MODEL	93 FORD TAURUS	DATE	12/ 1/95 RUN	FUEL DENSITY	6.480 LB/GAL	
ENGINE	3.0 L (183 CID)- V6	DYNO	2 BAG CART 2	H	.132 C .600 O .268 X .000	
TRANSMISSION	A4	ACTUAL ROAD LOAD	6.80 HP (5.07 KW)			
ODOMETER	4874 MILES (7842 KM)	TEST WEIGHT	3500 LBS (1587 KG)			

BAROMETER	29.17 IN HG (740.9 MM HG)	DRY BULB TEMPERATURE	73.0°F (22.8°C)	NOX HUMIDITY C.F.	.964
RELATIVE HUMIDITY	53.8 PCT.				

BAG NUMBER	1A	1B	2	3	
BAG DESCRIPTION	COLD TRANSIENT	COLD TRANSIENT	STABILIZED	HOT TRANSIENT	BACKGROUND
	(0-140 SEC.)	(140- 505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)	
FORMALDEHYDE					
PPM	1.367	.112	.039	.028	.006
MASS MG	34.97	7.21	5.46	2.09	
ACETALDEHYDE					
PPM	12.043	.481	.009	.011	.007
MASS MG	453.40	46.86	.50	.52	
ACROLEIN					
PPM	.085	.000	.000	.000	.000
MASS MG	4.08	.00	.00	.00	
ACETONE					
PPM	.107	.006	.040	.000	.003
MASS MG	5.20	.48	11.51	.00	
PROPIONALDEHYDE					
PPM	.062	.000	.000	.000	.000
MASS MG	3.10	.00	.00	.00	
CROTONALDEHYDE					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
ISOBUTYR+MEK					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
BENZALDEHYDE					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
HEXANALDEHYDE					
PPM	.000	.000	.000	.000	.000
MASS MG	.00	.00	.00	.00	
METHANOL					
PPM	.526	.035	.011	.023	.013
MASS MG	14.07	1.66	.00	1.09	
ETHANOL					
PPM	47.692	.636	.032	.046	.028
MASS MG	1877.87	63.09	1.10	2.77	

4-BAG COMPOSITE RESULTS

FORMALDEHYDE	MG/MI	3.311	CROTONALD.	MG/MI	.000
ACETALDEHYDE	MG/MI	28.842	ISOBUTYR+MEK	MG/MI	.000
ACROLEIN	MG/MI	.235	BENZALDEHYDE	MG/MI	.000
ACETONE	MG/MI	1.863	HEXANALDEHYDE	MG/MI	.000
PROPIONALD.	MG/MI	.178	METHANOL	MG/MI	.987
			ETHANOL	MG/MI	111.852

Appendix D

Detailed Computer Printouts of the FTP Regulated Emission Test Results from Task 4

Fuel	Test No.	Page
RFG	FT-RFG-BASE	D-1
RFG	FT-RFG-3A	D-2
M85	FT-M85-1	D-4
E85	FT-E85D-1	D6
CNG	FT-CNG-1	D-8
LPG	FT-LPG-1	D-10

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 1.4-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-6068-400

VEHICLE NUMBER 90X	TEST FT-RFG-BASE	GASOLINE RFG EM-2060-F
VEHICLE MODEL 94 FORD TAURUS	DATE 10/12/95 RUN	FUEL DENSITY 6.291 LB/GAL
ENGINE 3.0 L (181 CID)- A4	DYNO 3 BAG CART 2	H .135 C .849 O .016 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.80 HP (5.07 KW)	
ODOMETER 19420 MILES (31246 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.28 IN HG (743.7 MM HG) DRY BULB TEMPERATURE 73.0°F (22.8°C) NOX HUMIDITY C.F. .984
 RELATIVE HUMIDITY 57.6 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.2	867.0	505.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.973/.984	.977/.984	.974/.984
MEASURED DISTANCE MILES (KM)	3.60 (5.80)	3.83 (6.17)	3.59 (5.78)
BLOWER FLOW RATE SCFM (SCMM)	308.9 (8.75)	311.2 (8.81)	310.5 (8.79)
GAS METER FLOW RATE SCFM (SCMM)	.28 (.01)	.29 (.01)	.27 (.01)
TOTAL FLOW SCF (SCH)	2603. (73.7)	4501. (127.5)	2616. (74.1)

HC SAMPLE METER/RANGE/PPM (BAG)	46.7/ 2/ 46.67	62.5/ 1/ 6.29	88.9/ 1/ 8.95
HC BCKGRD METER/RANGE/PPM	5.4/ 2/ 5.40	49.7/ 1/ 5.00	46.3/ 1/ 4.66
CO SAMPLE METER/RANGE/PPM	73.8/ 13/ 176.83	22.3/ 12/ 21.61	33.2/ 12/ 32.31
CO BCKGRD METER/RANGE/PPM	.5/ 13/ 1.10	.8/ 12/ .77	.5/ 12/ .48
CO2 SAMPLE METER/RANGE/PCT	61.4/ 1/ 1.1304	85.1/ 14/ .7555	94.5/ 14/ .9872
CO2 BCKGRD METER/RANGE/PCT	2.8/ 1/ .0519	13.7/ 14/ .0448	13.5/ 14/ .0441
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	38.7/ 1/ 9.70	7.5/ 1/ 1.88	16.8/ 1/ 4.21
NOX BCKGRD METER/RANGE/PPM	.8/ 1/ .20	.7/ 1/ .18	.5/ 1/ .13
CH4 SAMPLE PPM (1.150)	5.11	2.98	3.35
CH4 BCKGRD PPM	2.29	2.14	2.25

DILUTION FACTOR	11.63	17.67	13.51
HC CONCENTRATION PPM	41.74	1.57	4.63
CO CONCENTRATION PPM	168.66	20.18	30.65
CO2 CONCENTRATION PCT	1.0830	.7132	.9464
NOX CONCENTRATION PPM	9.52	1.72	4.10
CH4 CONCENTRATION PPM	3.02	.96	1.26
NMHC CONCENTRATION PPM	38.27	.47	3.18

HC MASS GRAMS	1.809	.118	.202
CO MASS GRAMS	14.476	2.995	2.643
CO2 MASS GRAMS	1461.81	1664.39	1283.66
NOX MASS GRAMS	1.320	.411	.571
CH4 MASS GRAMS	.148	.082	.062
NMHC MASS GRAMS (FID)	1.627	.034	.136
FUEL MASS KG	.479	.537	.414
FUEL ECONOMY MPG (L/100KM)	21.45 (10.97)	20.37 (11.55)	24.74 (9.51)

3-BAG COMPOSITE RESULTS

HC	G/MI	.136	CH4	G/MI	.024
CO	G/MI	1.443	NMHC	G/MI	.109
NOX	G/MI	.176			
FUEL ECONOMY MPG (L/100KM)		21.67 (10.85)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.5-R

3-BAG EPA FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6068-400

VEHICLE NUMBER	90X	TEST FT-RFG-3A	GASOLINE RFG	EM-2060-F
VEHICLE MODEL	94 FORD TAURUS	DATE 10/30/95	RUN	FUEL DENSITY 6.291 LB/GAL
ENGINE	3.0 L (181 CID)- A4	DYNO 3	BAG CART 2	H .135 C .849 O .016 X .000
TRANSMISSION	A4	ACTUAL ROAD LOAD	6.80 HP (5.07 KW)	
ODOMETER	19533 MILES (31428 KM)	TEST WEIGHT	3500 LBS (1587 KG)	

BAROMETER 29.18 IN HG (741.2 MM HG)
RELATIVE HUMIDITY 54.4 PCT.

DRY BULB TEMPERATURE 74.0°F (23.3°C)

NOX HUMIDITY C.F. .977

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.3	867.1	505.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.974/.984	.977/.984	.975/.984
MEASURED DISTANCE MILES (KM)	3.62 (5.83)	3.83 (6.17)	3.64 (5.85)
BLOWER FLOW RATE SCFM (SCMM)	266.6 (7.55)	263.2 (7.45)	261.5 (7.41)
GAS METER FLOW RATE SCFM (SCMM)	.28 (.01)	.29 (.01)	.28 (.01)
TOTAL FLOW SCF (SCM)	2248. (63.7)	3808. (107.8)	2205. (62.4)

HC SAMPLE METER/RANGE/PPM (BAG)	44.6/ 3/ 445.01	20.7/ 3/ 206.54	36.0/ 3/ 359.20
HC BCKGRD METER/RANGE/PPM	1.0/ 3/ 9.98	1.4/ 3/ 13.97	1.5/ 3/ 14.97
CO SAMPLE METER/RANGE/PPM	77.5/ 3/4325.71	71.9/ 2/1803.88	76.3/ 3/4214.38
CO BCKGRD METER/RANGE/PPM	.0/ 3/ .00	.0/ 2/ .00	.0/ 3/ .00
CO2 SAMPLE METER/RANGE/PCT	57.9/ 1/ 1.0647	85.5/ 14/ .7640	93.5/ 14/ .9589
CO2 BCKGRD METER/RANGE/PCT	2.6/ 1/ .0482	13.7/ 14/ .0448	13.3/ 14/ .0433
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	45.8/ 1/ 11.63	40.9/ 1/ 10.40	52.2/ 1/ 13.24
NOX BCKGRD METER/RANGE/PPM	.5/ 1/ .13	.6/ 1/ .16	.6/ 1/ .16
CH4 SAMPLE PPM (1.160)	40.75	14.07	33.53
CH4 BCKGRD PPM	2.26	2.25	2.24

DILUTION FACTOR	8.79	13.97	9.56
HC CONCENTRATION PPM	436.17	193.57	345.80
CO CONCENTRATION PPM	4159.94	1745.33	4061.56
CO2 CONCENTRATION PCT	1.0220	.7224	.9202
NOX CONCENTRATION PPM	11.51	10.25	13.10
CH4 CONCENTRATION PPM	38.75	11.98	31.53
NMHC CONCENTRATION PPM	391.22	179.67	309.22

HC MASS GRAMS	16.322	12.272	12.695
CO MASS GRAMS	308.279	219.121	295.266
CO2 MASS GRAMS	1191.06	1426.25	1052.01
NOX MASS GRAMS	1.370	2.067	1.529
CH4 MASS GRAMS	1.644	.861	1.313
NMHC MASS GRAMS (FID)	14.360	11.173	11.134
FUEL MASS KG	.555	.582	.500
FUEL ECONOMY MPG (L/100KM)	18.61 (12.64)	18.81 (12.51)	20.74 (11.34)

3-BAG COMPOSITE RESULTS

HC	G/HI	3.554	CH4	G/HI	.310
CO	G/HI	69.668	NMHC	G/HI	3.175
NOX	G/HI	.473			
FUEL ECONOMY MPG (L/100KM)		19.28 (12.20)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 1.5-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-6068-400

VEHICLE NUMBER 90X	TEST FT-RFG-3A	GASOLINE RFG EM-2060-F
VEHICLE MODEL 94 FORD TAURUS	DATE 10/30/95 RUN	FUEL DENSITY 6.291 LB/GAL
ENGINE 3.0 L (181 CID)- A4	DYNO 3 BAG CART 2	H .135 C .849 O .016 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.80 HP (5.07 KW)	
ODOMETER 19533 MILES (31428 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.18 IN HG (741.2 MM HG)	DRY BULB TEMPERATURE 74.0°F (23.3°C)	NOX HUMIDITY C.F. .977
RELATIVE HUMIDITY 54.4 PCT.		

BAG NUMBER	1	2	3	
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)	BACKGROUND
FORMALDEHYDE				
PPM	.563	.871	.068	.004
MASS MG	43.29	113.99	4.88	
ACETALDEHYDE				
PPM	.591	.697	.247	.004
MASS MG	66.69	133.70	27.08	
ACROLEIN				
PPM	.028	.028	.010	.000
MASS MG	4.06	6.78	1.47	
ACETONE				
PPM	.296	.281	.084	.001
MASS MG	44.27	71.29	12.24	
PROPIONALDEHYDE				
PPM	.099	.087	.035	.001
MASS MG	14.72	21.97	5.11	
CROTONALDEHYDE				
PPM	.046	.043	.008	.000
MASS MG	8.26	13.09	1.38	
ISOBUTYR+MEK				
PPM	.047	.039	.003	.000
MASS MG	8.81	12.39	.54	
BENZALDEHYDE				
PPM	.072	.082	.001	.000
MASS MG	19.73	37.73	.13	
HEXANALDEHYDE				
PPM	.007	.005	.000	.000
MASS MG	1.68	2.26	.00	
METHANOL				
PPM	3.377	1.695	2.979	.000
MASS MG	279.00	237.97	241.65	
ETHANOL				
PPM	.050	.024	.035	.000
MASS MG	5.98	4.90	4.03	

3-BAG COMPOSITE RESULTS

FORMALDEHYDE MG/MI	18.141	CROTONALD. MG/MI	2.335
ACETALDEHYDE MG/MI	23.826	ISOBUTYR+MEK MG/MI	2.208
ACROLEIN MG/MI	1.255	BENZALDEHYDE MG/MI	6.202
ACETONE MG/MI	13.038	HEXANALDEHYDE MG/MI	.400
PROPIONALD. MG/MI	4.183	METHANOL MG/MI	66.413
		ETHANOL MG/MI	1.309

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.5-R

3-BAG EPA FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6068-400

VEHICLE NUMBER	90X	TEST FT-M85-1	METHANOL EM-2062-F
VEHICLE MODEL	94 FORD TAURUS	DATE 11/ 2/95 RUN	FUEL DENSITY 6.623 LB/GAL
ENGINE	3.0 L (181 CID)- A4	DYNO 3 BAG CART 2	H .127 C .431 O .442 X .000
TRANSMISSION	A4	ACTUAL ROAD LOAD 6.80 HP (5.07 KW)	
ODOMETER	19581 MILES (31505 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.10 IN HG (739.1 MM HG)	DRY BULB TEMPERATURE 77.0°F (25.0°C)	NOX HUMIDITY C.F. 1.001
RELATIVE HUMIDITY 52.6 PCT.		

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.2	866.5	505.9
DRY/WET CORRECTION FACTOR, SAMP/BACK	.964/.983	.970/.983	.966/.983
MEASURED DISTANCE MILES (KM)	3.62 (5.82)	3.82 (6.15)	3.61 (5.81)
BLOWER FLOW RATE SCFM (SCMH)	261.6 (7.41)	259.6 (7.35)	259.6 (7.35)
GAS METER FLOW RATE SCFM (SCMH)	.27 (.01)	.28 (.01)	.28 (.01)
TOTAL FLOW SCF (SCM)	2205. (62.4)	3753. (106.3)	2191. (62.1)

HC SAMPLE METER/RANGE/PPM (BAG)	24.2/ 3/ 241.46	11.2/ 3/ 111.75	13.6/ 3/ 135.70
HC BCKGRD METER/RANGE/PPM	1.0/ 3/ 9.98	.9/ 3/ 8.98	.8/ 3/ 7.98
CO SAMPLE METER/RANGE/PPM	62.8/ 3/3061.88	64.7/ 2/1543.31	91.1/ 2/2596.80
CO BCKGRD METER/RANGE/PPM	.0/ 3/ .00	.2/ 2/ 2.96	.2/ 2/ 2.96
CO2 SAMPLE METER/RANGE/PCT	58.3/ 1/ 1.0722	83.3/ 14/ .7184	93.2/ 14/ .9506
CO2 BCKGRD METER/RANGE/PCT	2.6/ 1/ .0482	13.0/ 14/ .0421	12.8/ 14/ .0414
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	11.0/ 1/ 2.84	.9/ 1/ .24	2.9/ 1/ .76
NOX BCKGRD METER/RANGE/PPM	.1/ 1/ .03	.1/ 1/ .03	.1/ 1/ .03
CH4 SAMPLE PPM (1.160)	14.05	8.34	11.16
CH4 BCKGRD PPM	2.15	2.09	2.07

DILUTION FACTOR	8.58	13.57	9.83
HC CONCENTRATION PPM	232.65	103.43	128.53
CO CONCENTRATION PPM	2919.26	1483.80	2481.94
CO2 CONCENTRATION PCT	1.0296	.6794	.9135
NOX CONCENTRATION PPM	2.82	.21	.73
CH4 CONCENTRATION PPM	12.15	6.40	9.30
RHC CONCENTRATION PPM	112.45	63.12	69.44

OMHCE MASS GRAMS	9.648	7.076	5.300
CO MASS GRAMS	212.184	183.584	179.291
CO2 MASS GRAMS	1176.92	1321.92	1037.74
NOX MASS GRAMS	.337	.043	.087
CH4 MASS GRAMS	.506	.454	.385
RHC MASS GRAMS (FID)	4.048	3.868	2.484
FUEL MASS KG	.977	1.035	.847
FUEL ECONOMY MPG (L/100KM)	11.13 (21.13)	11.10 (21.19)	12.81 (18.36)

3-BAG COMPOSITE RESULTS

OMHCE G/MI	1.914	CH4 G/MI	.120
CO G/MI	50.667	NMHC G/MI	.944
NOX G/MI	.032		
FUEL ECONOMY MPG (L/100KM)	11.55 (20.37)		

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.5-R

3-BAG EPA FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6068-400

VEHICLE NUMBER	90X	TEST FT-M85-1	METHANOL	EM-2062-F
VEHICLE MODEL	94 FORD TAURUS	DATE 11/ 2/95 RUN	FUEL DENSITY	6.623 LB/GAL
ENGINE	3.0 L (181 CID)- A4	DYNO 3 BAG CART 2	H .127 C .431 O .442 X .000	
TRANSMISSION	A4	ACTUAL ROAD LOAD	6.80 HP (5.07 KW)	
ODOMETER	19581 MILES (31505 KM)	TEST WEIGHT	3500 LBS (1587 KG)	

BAROMETER 29.10 IN HG (739.1 MM HG)

DRY BULB TEMPERATURE 77.0°F (25.0°C)

NOX HUMIDITY C.F. 1.001

RELATIVE HUMIDITY 52.6 PCT.

BAG NUMBER	1	2	3	
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)	BACKGROUND
FORMALDEHYDE				
PPM	5.369	1.986	4.939	.007
MASS MG	403.11	254.93	369.37	
ACETALDEHYDE				
PPM	.185	.084	.143	.004
MASS MG	20.02	15.16	15.34	
ACROLEIN				
PPM	.002	.000	.000	.000
MASS MG	.32	.00	.00	
ACETONE				
PPM	.046	.028	.040	.001
MASS MG	6.61	6.74	5.70	
PROPIONALDEHYDE				
PPM	.028	.010	.021	.001
MASS MG	4.01	2.24	2.95	
CROTONALDEHYDE				
PPM	.009	.000	.006	.000
MASS MG	1.63	.00	1.00	
ISOBUTYR+MEK				
PPM	.022	.008	.015	.000
MASS MG	3.96	2.45	2.59	
BENZALDEHYDE				
PPM	.025	.007	.016	.000
MASS MG	6.70	3.09	4.24	
HEXANALDEHYDE				
PPM	.000	.000	.000	.000
MASS MG	.00	.00	.00	
METHANOL				
PPM	155.860	51.945	76.458	.011
MASS MG	12500.17	7136.53	6107.49	
ETHANOL				
PPM	.000	.000	.000	.000
MASS MG	.00	.00	.00	

3-BAG COMPOSITE RESULTS

FORMALDEHYDE	MG/MI	85.849	CROTONALD.	MG/MI	.171
ACETALDEHYDE	MG/MI	4.370	ISOBUTYR+MEK	MG/MI	.756
ACROLEIN	MG/MI	.018	BENZALDEHYDE	MG/MI	1.127
ACETONE	MG/MI	1.725	HEXANALDEHYDE	MG/MI	.000
PROPIONALD.	MG/MI	.759	METHANOL	MG/MI	2149.126
			ETHANOL	MG/MI	.000

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 1.5-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-6068-400

VEHICLE NUMBER 90X	TEST FT-E85D-1	ETHANOL E85D EM-2061-F
VEHICLE MODEL 94 FORD TAURUS	DATE 11/ 7/95 RUN	FUEL DENSITY 6.506 LB/GAL
ENGINE 3.0 L (181 CID)- A4	DYNO 3 BAG CART 2	H .132 C .612 O .256 X .000
TRANSMISSION A4	ACTUAL ROAD LOAD 6.80 HP (5.07 KW)	
ODOMETER 19627 MILES (31579 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.15 IN HG (740.4 MM HG) DRY BULB TEMPERATURE 72.0°F (22.2°C) NOX HUMIDITY C.F. .932
 RELATIVE HUMIDITY 49.5 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	504.8	867.3	505.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.973/.986	.977/.986	.975/.986
MEASURED DISTANCE MILES (KM)	3.58 (5.77)	3.82 (6.15)	3.59 (5.78)
BLOWER FLOW RATE SCFM (SCMH)	264.4 (7.49)	265.4 (7.52)	263.4 (7.46)
GAS METER FLOW RATE SCFM (SCMH)	.28 (.01)	.29 (.01)	.28 (.01)
TOTAL FLOW SCF (SCM)	2227. (63.1)	3840. (108.8)	2220. (62.9)

HC SAMPLE METER/RANGE/PPM (BAG)	50.1/ 3/ 499.89	15.4/ 3/ 153.66	21.7/ 3/ 216.52
HC BCKGRD METER/RANGE/PPM	1.2/ 3/ 11.97	.7/ 3/ 6.98	.9/ 3/ 8.98
CO SAMPLE METER/RANGE/PPM	81.1/ 3/ 4668.44	73.6/ 2/ 1868.35	64.2/ 3/ 3172.84
CO BCKGRD METER/RANGE/PPM	.0/ 3/ .00	.0/ 2/ .00	.0/ 3/ .00
CO2 SAMPLE METER/RANGE/PCT	57.1/ 1/ 1.0497	83.0/ 14/ .7124	92.0/ 14/ .9183
CO2 BCKGRD METER/RANGE/PCT	2.7/ 1/ .0500	13.2/ 14/ .0429	13.3/ 14/ .0433
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	7.8/ 1/ 2.02	1.6/ 1/ .42	2.5/ 1/ .65
NOX BCKGRD METER/RANGE/PPM	1.2/ 1/ .31	1.0/ 1/ .26	.9/ 1/ .24
CH4 SAMPLE PPM (1.160)	62.90	23.26	29.42
CH4 BCKGRD PPM	2.25	2.33	2.27

DILUTION FACTOR	8.24	13.99	10.21
HC CONCENTRATION PPM	489.37	147.17	208.42
CO CONCENTRATION PPM	4481.79	1808.06	3055.52
CO2 CONCENTRATION PCT	1.0057	.6726	.8793
NOX CONCENTRATION PPM	1.75	.18	.44
CH4 CONCENTRATION PPM	60.92	21.09	27.37
RHC CONCENTRATION PPM	329.39	132.33	172.26

OMHCE MASS GRAMS	20.844	10.566	8.744
CO MASS GRAMS	329.099	228.924	223.673
CO2 MASS GRAMS	1161.43	1339.25	1012.23
NOX MASS GRAMS	.196	.034	.049
CH4 MASS GRAMS	2.562	1.529	1.147
RHC MASS GRAMS (FID)	11.980	8.299	6.246
FUEL MASS KG	.790	.779	.626
FUEL ECONOMY MPG (L/100KM)	13.38 (17.58)	14.49 (16.24)	16.94 (13.89)

3-BAG COMPOSITE RESULTS

OMHCE G/MI	3.308	CH4 G/MI	.443
CO G/MI	67.186	NMHC G/MI	2.295
NOX G/MI	.020		
FUEL ECONOMY MPG (L/100KM)	14.87 (15.82)		

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.5-R

3-BAG EPA FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6068-400

VEHICLE NUMBER	90X	TEST FT-E85D-1	ETHANOL	E85D	EM-2061-F
VEHICLE MODEL	94 FORD TAURUS	DATE 11/ 7/95	RUN	FUEL DENSITY	6.506 LB/GAL
ENGINE	3.0 L (181 CID)- A4	DYNO 3	BAG CART 2	H .132	C .612
TRANSMISSION	A4	ACTUAL ROAD LOAD	6.80 HP (5.07 KW)	O .256	X .000
ODOMETER	19627 MILES (31579 KM)	TEST WEIGHT	3500 LBS (1587 KG)		

BAROMETER 29.15 IN HG (740.4 MM HG)

DRY BULB TEMPERATURE 72.0°F (22.2°C)

NOX HUMIDITY C.F. .932

RELATIVE HUMIDITY 49.5 PCT.

BAG NUMBER	1	2	3	
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)	BACKGROUND
FORMALDEHYDE				
PPM	1.407	.312	.551	.006
MASS MG	107.43	40.64	41.70	
ACETALDEHYDE				
PPM	21.693	8.845	11.863	.007
MASS MG	2438.24	1721.15	1331.19	
ACROLEIN				
PPM	.041	.000	.001	.000
MASS MG	5.84	.06	.19	
ACETONE				
PPM	.287	.101	.197	.000
MASS MG	42.48	25.84	29.13	
PROPIONALDEHYDE				
PPM	.106	.018	.010	.000
MASS MG	15.66	4.63	1.46	
CROTONALDEHYDE				
PPM	.046	.006	.010	.000
MASS MG	8.27	2.00	1.82	
ISOBUTYR+MEK				
PPM	.045	.011	.018	.000
MASS MG	8.34	3.56	3.24	
BENZALDEHYDE				
PPM	.026	.006	.014	.000
MASS MG	7.14	2.83	3.70	
HEXANALDEHYDE				
PPM	.000	.000	.000	.000
MASS MG	.00	.00	.00	
METHANOL				
PPM	8.357	2.071	3.081	.009
MASS MG	682.69	292.10	250.90	
ETHANOL				
PPM	102.783	9.508	23.204	.019
MASS MG	12083.60	1932.55	2722.67	

3-BAG COMPOSITE RESULTS

FORMALDEHYDE	MG/MI	14.926	CROTONALD.	MG/MI	.889
ACETALDEHYDE	MG/MI	476.100	ISOBUTYR+MEK	MG/MI	1.213
ACROLEIN	MG/MI	.362	BENZALDEHYDE	MG/MI	1.081
ACETONE	MG/MI	8.192	HEXANALDEHYDE	MG/MI	.000
PROPIONALD.	MG/MI	1.646	METHANOL	MG/MI	98.331
			ETHANOL	MG/MI	1171.531

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
COMPUTER PROGRAM LDT 1.4-R

3-BAG EPA FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6068-400

VEHICLE NUMBER 90X
VEHICLE MODEL 94 FORD TAURUS
ENGINE 3.0 L (181 CID)-6
TRANSMISSION A-4
ODOMETER 19673 MILES (31653 KM)

TEST FT-CNG-1
DATE 12/18/95 RUN
DYNO 3 BAG CART 2
ACTUAL ROAD LOAD 6.80 HP (5.07 KW)
TEST WEIGHT 3500 LBS (1587 KG)

NAT GAS
FUEL DENSITY 5.360 LB/GAL
H .229 C .712 O .000 X .059

BAROMETER 29.01 IN HG (736.9 MM HG)
RELATIVE HUMIDITY 42.3 PCT.

DRY BULB TEMPERATURE 72.0°F (22.2°C)

NOX HUMIDITY C.F. .899

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.3	867.0	505.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.969/.988	.975/.988	.971/.988
MEASURED DISTANCE MILES (KM)	3.63 (5.84)	3.90 (6.28)	3.63 (5.84)
BLOWER FLOW RATE SCFM (SCMM)	263.0 (7.45)	260.9 (7.39)	260.8 (7.39)
GAS METER FLOW RATE SCFM (SCMM)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2215. (62.7)	3771. (106.8)	2197. (62.2)

HC SAMPLE METER/RANGE/PPM (BAG)	20.1/ 3/ 200.55	11.7/ 3/ 116.74	13.2/ 3/ 131.71
HC BCKGRD METER/RANGE/PPM	.5/ 3/ 4.99	.5/ 3/ 4.99	.5/ 3/ 4.99
CO SAMPLE METER/RANGE/PPM	4.7/ 12/ 4.54	.0/ 12/ .00	.2/ 12/ .19
CO BCKGRD METER/RANGE/PPM	.0/ 12/ .00	.0/ 12/ .00	.0/ 12/ .00
CO2 SAMPLE METER/RANGE/PCT	95.3/ 14/ 1.0106	82.0/ 14/ .6928	91.6/ 14/ .9078
CO2 BCKGRD METER/RANGE/PCT	12.5/ 14/ .0402	12.2/ 14/ .0391	12.3/ 14/ .0395
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	97.4/ 2/ 97.74	31.9/ 2/ 32.01	94.4/ 2/ 94.73
NOX BCKGRD METER/RANGE/PPM	.0/ 2/ .00	.0/ 2/ .00	.5/ 2/ .50
CH4 SAMPLE PPM (1.160)	165.52	98.34	111.50
CH4 BCKGRD PPM	2.36	2.36	2.31

DILUTION FACTOR	9.46	13.84	10.58
HC CONCENTRATION PPM	196.09	112.11	127.19
CO CONCENTRATION PPM	4.34	.00	.19
CO2 CONCENTRATION PCT	.9746	.6565	.8721
NOX CONCENTRATION PPM	97.74	32.01	94.28
CH4 CONCENTRATION PPM	163.41	96.15	109.41
NMHC CONCENTRATION PPM	6.54	.57	.27

FIDHC MASS GRAMS	8.624	8.393	5.548
CO MASS GRAMS	.317	.000	.013
CO2 MASS GRAMS	1119.35	1283.56	993.34
NOX MASS GRAMS	10.539	5.876	10.082
CH4 MASS GRAMS	6.834	6.845	4.538
NMHC MASS GRAMS (FID)	.236	.035	.010
FUEL MASS KG	.412	.471	.364
FUEL ECONOMY MPG (L/100KM)	21.42 (10.98)	20.15 (11.67)	24.28 (9.69)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	2.026	CH4 G/MI	1.642
CO G/MI	.019	NMHC G/MI	.019
NOX G/MI	2.144		
FUEL ECONOMY MPG (L/100KM)	21.43 (10.98)		

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH

COMPUTER PROGRAM LDT 1.4-R

3-BAG EPA FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-6068-400

VEHICLE NUMBER	90X	TEST FT-CNG-1	NAT GAS
VEHICLE MODEL	94 FORD TAURUS	DATE 1/25/96 RUN	FUEL DENSITY 5.360 LB/GAL
ENGINE	3.0 L (181 CID)-6	DYNO 3 BAG CART 2	H .229 C .712 O .000 X .059
TRANSMISSION	A-4	ACTUAL ROAD LOAD 6.80 HP (5.07 KW)	
ODOMETER	19805 MILES (31866 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.15 IN HG (740.4 MM HG)	DRY BULB TEMPERATURE 75.0°F (23.9°C)	NOX HUMIDITY C.F. .879
RELATIVE HUMIDITY 34.5 PCT.		

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.7	866.8	505.9
DRY/WET CORRECTION FACTOR, SAMP/BACK	.970/.990	.977/.990	.974/.990
MEASURED DISTANCE MILES (KM)	3.59 (5.78)	3.84 (6.18)	3.62 (5.82)
BLOWER FLOW RATE SCFM (SCHM)	264.7 (7.50)	262.1 (7.42)	260.3 (7.37)
GAS METER FLOW RATE SCFM (SCHM)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2231. (63.2)	3786. (107.2)	2195. (62.2)

HC SAMPLE METER/RANGE/PPM (BAG)	73.4/ 3/ 732.37	24.7/ 3/ 246.45	32.3/ 3/ 322.28
HC BCKGRD METER/RANGE/PPM	.5/ 3/ 4.99	.5/ 3/ 4.99	.6/ 3/ 5.99
CO SAMPLE METER/RANGE/PPM	65.3/ 4/7364.76	98.5/ 2/2938.89	51.5/ 4/4857.09
CO BCKGRD METER/RANGE/PPM	.0/ 4/ .00	.0/ 2/ .00	.0/ 4/ .00
CO2 SAMPLE METER/RANGE/PCT	56.0/ 1/ 1.0291	79.0/ 14/ .6372	87.6/ 14/ .8104
CO2 BCKGRD METER/RANGE/PCT	2.7/ 1/ .0500	13.8/ 14/ .0452	14.0/ 14/ .0460
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	1.4/ 1/ .37	.5/ 1/ .13	.8/ 1/ .21
NOX BCKGRD METER/RANGE/PPM	.4/ 1/ .10	.4/ 1/ .10	.7/ 1/ .18
CH4 SAMPLE PPM (1.160)	551.48	172.35	234.39
CH4 BCKGRD PPM	2.34	2.39	2.62

DILUTION FACTOR	5.41	10.30	7.44
HC CONCENTRATION PPM	728.30	241.95	317.10
CO CONCENTRATION PPM	7061.76	2851.56	4688.23
CO2 CONCENTRATION PCT	.9883	.5964	.7706
NOX CONCENTRATION PPM	.28	.04	.05
CH4 CONCENTRATION PPM	549.57	170.19	232.12
NMHC CONCENTRATION PPM	90.80	44.53	47.84

FIDHC MASS GRAMS	32.260	18.188	13.820
CO MASS GRAMS	519.411	355.956	339.286
CO2 MASS GRAMS	1143.22	1170.75	877.01
NOX MASS GRAMS	.030	.007	.005
CH4 MASS GRAMS	23.148	12.165	9.619
NMHC MASS GRAMS (FID)	3.308	2.753	1.715
FUEL MASS KG	.737	.641	.522
FUEL ECONOMY MPG (L/100KM)	11.85 (19.85)	14.56 (16.15)	16.86 (13.95)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	5.363	CH4 G/MI	3.706
CO G/MI	103.738	NMHC G/MI	.692
NOX G/MI	.003		
FUEL ECONOMY MPG (L/100KM)	14.53 (16.19)		

VEHICLE NUMBER 90X	TEST FT-LPG-1	PROPANE
VEHICLE MODEL 94 FORD TAURUS	DATE 1/18/96 RUN	FUEL DENSITY 5.729 LB/GAL
ENGINE 3.0 L (181 CID)-6	DYNO 3 BAG CART 2	H .183 C .817 O .000 X .000
TRANSMISSION A-4	ACTUAL ROAD LOAD 6.80 HP (5.07 KW)	
ODOMETER 19745 MILES (31769 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.07 IN HG (738.4 MM HG) DRY BULB TEMPERATURE 70.0°F (21.1°C) NOX HUMIDITY C.F. .780
RELATIVE HUMIDITY 13.6 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.7	866.8	505.8
DRY/WET CORRECTION_FACTOR, SAMP/BACK	.985/.997	.988/.997	.986/.997
MEASURED DISTANCE MILES (KM)	3.68 (5.92)	3.85 (6.20)	3.63 (5.84)
BLOWER FLOW RATE SCFM (SCMH)	265.8 (7.53)	267.2 (7.57)	263.9 (7.47)
GAS METER FLOW RATE SCFM (SCMH)	.00 (.00)	.00 (.00)	.00 (.00)
TOTAL FLOW SCF (SCM)	2241. (63.5)	3860. (109.3)	2224. (63.0)

HC SAMPLE METER/RANGE/PPM (BAG)	31.2/ 3/ 311.31	17.4/ 3/ 173.61	22.4/ 3/ 223.50
HC BCKGRD METER/RANGE/PPM	.5/ 3/ 4.99	.6/ 3/ 5.99	.5/ 3/ 4.99
CO SAMPLE METER/RANGE/PPM	57.0/ 4/5796.47	91.1/ 2/2596.80	73.2/ 3/3933.48
CO BCKGRD METER/RANGE/PPM	.0/ 4/ .00	.0/ 2/ .00	.0/ 3/ .00
CO2 SAMPLE METER/RANGE/PCT	48.0/ 1/ .8800	78.7/ 14/ .6319	88.0/ 14/ .8196
CO2 BCKGRD METER/RANGE/PCT	2.3/ 1/ .0426	12.3/ 14/ .0395	12.6/ 14/ .0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.7/ 1/ 2.51	8.7/ 1/ 2.25	7.0/ 1/ 1.82
NOX BCKGRD METER/RANGE/PPM	.3/ 1/ .08	.4/ 1/ .10	.4/ 1/ .10
CH4 SAMPLE PPM (1.160)	37.08	26.39	19.98
CH4 BCKGRD PPM	1.90	1.91	1.89

DILUTION FACTOR	7.88	12.86	9.48
HC CONCENTRATION PPM	306.95	168.09	219.04
CO CONCENTRATION PPM	5651.98	2547.11	3840.98
CO2 CONCENTRATION PCT	.8428	.5955	.7832
NOX CONCENTRATION PPM	2.44	2.16	1.72
CH4 CONCENTRATION PPM	35.42	24.62	18.30
NMHC CONCENTRATION PPM	265.86	139.53	197.82

FIDHC MASS GRAMS	11.901	11.227	8.431
CO MASS GRAMS	417.536	324.162	281.691
CO2 MASS GRAMS	979.16	1191.80	903.35
NOX MASS GRAMS	.231	.352	.162
CH4 MASS GRAMS	1.498	1.795	.768
NMHC MASS GRAMS (FID)	9.728	8.795	7.186
FUEL MASS KG	.558	.580	.458
FUEL ECONOMY MPG (L/100KM)	17.12 (13.74)	17.28 (13.62)	20.59 (11.43)

3-BAG COMPOSITE RESULTS

FIDHC G/MI	2.818	CH4 G/MI	.383
CO G/MI	88.488	NMHC G/MI	2.275
NOX G/MI	.072		
FUEL ECONOMY MPG (L/100KM)	18.08 (13.01)		

REPORT DOCUMENTATION PAGE

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1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE June 1997	3. REPORT TYPE AND DATES COVERED Subcontract report	
4. TITLE AND SUBTITLE Determination of Alternative Fuels Combustion Products: Phase 2 Final Report			5. FUNDING NUMBERS (C) YAW-3-13253-01 (TA) FU703610	
6. AUTHOR(S) Kevin A. Whitney				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Southwest Research Institute 2220 Culebra Road PO Drawer 28510 San Antonio, TX 78228-0501			8. PERFORMING ORGANIZATION REPORT NUMBER DE97050813	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) National Renewable Energy Laboratory 617 Cole Boulevard Golden, CO 80401-3393			10. SPONSORING/MONITORING AGENCY REPORT NUMBER NREL/SR-540-23143	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT National Technical Information Service U.S. Department of Commerce 285 Port Royal Road Springfield, VA 22161			12b. DISTRIBUTION CODE UC-1504	
13. ABSTRACT (Maximum 200 words) This report, which covers the second year of this effort, describes the laboratory work to accomplish four independent tasks (1) speciation of hydrocarbon exhaust emissions from a light-duty vehicle operated over the chassis dynamometer portion of the light-duty FTP after modifications for operation on butane and butane blends; (2) evaluation of NREL's Variable Conductance Vacuum Insulated Catalytic Converter Test Article 4 for the reduction of cold-start FTP exhaust emissions after extended soak periods for a Ford FFV Taurus operating on E85; (3) support of the University of Dayton Research Institute (UDRI) in an attempt to define correlations between engine-out combustion products identified by SwRI during chassis dynamometer testing, and those found during flow tube reactor experiments conducted by UDRI; and (4) characterization of small-diameter particulate matter from a Ford Taurus FFV operating in a simulated fuel-rich failure mode on CNG, LPG, M85, E85, and reformulated gasoline.				
14. SUBJECT TERMS Alternative fuels, transportation fuels, air quality, emissions			15. NUMBER OF PAGES 202	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT	

SN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18
298-102