

United States  
Environmental Protection  
Agency

Office of Mobile Source Air Pollution Control  
Emission Control Technology Division  
2565 Plymouth Road  
Ann Arbor, Michigan 48105

EPA-460/3-81-024  
September 1981

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Air

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# Characterization of Exhaust Emissions from High Mileage Catalyst-Equipped Automobiles

**EPA-460/3-81-024**

# **Characterization of Exhaust Emissions from High Mileage Catalyst-Equipped Automobiles**

by

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Contract No. 68-03-2884  
Task Specifications 7 & 10

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Prepared for

ENVIRONMENTAL PROTECTION AGENCY  
Office of Mobile Source Air Pollution Control  
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2565 Plymouth Road  
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September 1981

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## FOREWORD

These project tasks were initiated by the Control Technology Assessment and Characterization Branch, Environmental Protection Agency, 2565 Plymouth Road, Ann Arbor, Michigan 48105. The engineering and analytical effort on which this report is based was accomplished by the Department of Emissions Research of Southwest Research Institute, 6220 Culebra Road, San Antonio, Texas 78284. These projects, authorized by Task Specifications 7 and 10 under Contract 68-03-2884, were initiated on September 25, 1980 and March 16, 1981 and were completed June 1981.

The project was initially under the supervision of Mr. Charles Urban, Project Leader. Dr. Lawrence Smith, Senior Research Scientist, directed the project beginning March 10, 1981. Mr. Charles Hare was Project Manager and was involved in the initial technical and fiscal negotiations and subsequent major project decisions. The Project Officer throughout the project was Mr. Robert Garbe of the Control Technology Assessment and Characterization Branch, Environmental Protection Agency. The EPA Task Branch Technical Representative was Ms. Penny Carey. Dr. Frank Black and members of his staff, of the Environmental Protection Agency at Research Triangle Park in North Carolina, conducted the elemental analyses.

## ABSTRACT

This report describes the laboratory effort to characterize regulated and unregulated exhaust emissions from ten 1978 and 1979 high mileage catalyst equipped gasoline automobiles which have been driven for approximately 50,000 miles. The ten automobiles were evaluated as-received and after a tune-up to manufacturer's specifications, over the Light-Duty Federal Test Procedure (FTP) and the Highway Fuel Economy Driving Schedule (HFET). Exhaust constituents measured, in addition to the regulated emissions, include: aldehydes, particulates, sulfides, amines, metals, and several additional elements and compounds. Additional evaluations involved the measurement of the regulated emissions over four short-test procedures.

## SUMMARY

The major objective of these project tasks was to evaluate regulated and unregulated exhaust emissions, particularly aldehydes, from 1978 and 1979 catalyst-equipped automobiles that have been driven approximately 50,000 miles. The automobiles were tested as received and after a tune-up to manufacturer's specifications.

The study involved 10 automobiles: seven 1978 model year automobiles equipped with oxidation catalysts, one 1978 model year automobile equipped with a three-way catalyst and two 1979 model year automobiles equipped with three-way catalysts. Engine sizes ranged from a 98 CID, 4 cylinder engine to a 400 CID, 8 cylinder engine.

Unregulated emissions measured included: particulates, metals and other elements, aldehydes, organic sulfides, organic amines, ammonia, cyanides, hydrogen sulfide, and nitrous oxide. A number of the analytical procedures for these compounds were developed in previous projects.

The primary test sequences involved in this project were the light-duty Federal Test Procedure (FTP) and the Highway Fuel Economy Driving Schedule (HFET). In addition, hydrocarbons and carbon monoxide were measured in three short-test procedures. These short-test procedures included: the 50 mph Cruise Test, the 4-Mode Idle Test, and the Loaded 2-Mode Test. The basic requirements specified in the Code of Federal Regulations for certification of light-duty vehicles were followed for the primary test sequences.

A significant data base for the cars evaluated was generated in this project. These data were analyzed to the extent applicable and are presented in several different formats to facilitate their review and usage. The FTP overall averages for the ten cars as-received and after tune-up are summarized and compared to the results from previous related unregulated emission projects on the following page.

In general, the regulated and unregulated exhaust emission rates for the high-mileage catalyst-equipped cars are higher than the emission rates for the low-mileage catalyst-equipped cars, but the rates are considerably lower than the non-catalyst car rates. Aldehyde and ketone high-mileage catalyst-equipped car emission rates are only one tenth the aldehyde and ketone emission rates from the non-catalyst cars. Aldehydes and ketones appear to be reasonably well-controlled in the high-mileage cars.

Emission	Average FTP Emission Rate, mg/km				
	Ten High Mileage Cars-This Project		Four 1970 Model Non-Catalyst Cars	Eight Low-Mileage Catalyst-Equipped Cars	
	As-Rec'd	After Tune-Up	Previous Tasks <sup>a</sup>	Previous Projects <sup>b</sup>	
Hydrocarbons	780	600	1,900		200
Carbon Monoxide	9,200	6,610	17,100		2,525
Oxides of Nitrogen	1,340	1,020	2,600		670
Total Particulates	49	32	99		8
Aldehydes & Ketones	.6	4	37		2
Organic Sulfides	0.2	0.1	0.1		0.4
Organic Amines	<0.1	<0.1	<0.1		<0.1
Ammonia	7	9	4		12
Cyanide & Cyanogen	1	1	3		<1
Hydrogen Sulfide	<0.1	<0.1	<0.1		<0.1
Nitrous Oxide	46	36	--		22

<sup>a</sup>Data for four 1970 model cars from Tasks 4 and 5 of this contract,  
EPA Report EPA-460/3-81-020

<sup>b</sup>Data for eight 1978 and 1979 model catalyst-equipped cars from previous  
contracts, 68-03-2499, 68-03-2588, and 68-03-2697. EPA reports  
EPA-460/3-80-003, -004, and -005.

## TABLE OF CONTENTS

	<u>Page</u>
FOREWORD	iii
ABSTRACT	iv
SUMMARY	v
LIST OF FIGURES	ix
LIST OF TABLES	x
<b>I. INTRODUCTION</b>	<b>1</b>
A. Project Objective	1
B. Emissions Measurement Procedures	1
C. Vehicles Evaluated	1
D. Vehicle Testing	2
<b>II. GENERAL EQUIPMENT, INSTRUMENTS, PREPARATIONS AND PROCEDURES</b>	<b>3</b>
A. Automobiles	3
B. Fuel	3
C. Dynamometer and CVS System	3
D. Exhaust Sampling and Analysis	8
E. Instrumentation for Regulated Emissions and Engine Parameters	8
F. Emissions Test Procedures	10
G. Test Numbering System	13
H. Short-Test Procedures	15
I. Computational Methods	15
<b>III. ANALYTICAL PROCEDURES FOR UNREGULATED EMISSIONS</b>	<b>17</b>
A. Description of the Analytical Procedures	17
B. Validation and Qualification of the Analytical Procedures	20
C. Accuracy of the Analytical Procedures	21
<b>IV. CAR SELECTION AND TESTING</b>	<b>25</b>
A. Car Selection	25
B. Car Testing	27
C. Regulated and Unregulated Emission Test Results	30
D. I/M Short-Test Procedure Results	30
<b>V. ANALYSES OF THE RESULTS</b>	<b>35</b>
A. Regulated Emissions and Fuel Consumption	35
B. Aldehyde and Ketone Emission Rates	39
C. Elemental Analysis Results	39

TABLE OF CONTENTS (Cont'd)

	<u>Page</u>
D. Other Unregulated Emissions	39
E. Comparison of Results with Previous Projects	39
F. Relative Importance of the Emission Rates	51
REFERENCES	53
APPENDICES	
A. GENERAL INFORMATION	
B. INDIVIDUAL TEST RESULT SUMMARY TABLES	
C. FTP INDIVIDUAL SAMPLE RESULTS	
D. COMPUTER PRINTOUTS OF THE TEST RESULTS	
E. SHORT-TEST RESULTS	
F. AVERAGE VALUES FOR FTP AND HFET RESULTS	

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
1	Four of the 1978 Cars Evaluated in this Project	5
2	Views of the Emissions Sampling System	7
3	Gasoline Engine Emissions Sampling System	9
4	Driving Cycle Speed vs Time Traces	14

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1	Automobiles Evaluated	4
2	Description of Chevron UL-CQ26B1 Unleaded Gasoline	6
3	Description of Four-Cycle FTP	11
4	Test Sequence for Each Automobile	12
5	Laboratory Test Sequence	12
6	Summary of Driving Schedule Parameters	13
7	Sampling and Analysis Methodology for Unregulated Emissions	18
8	Procedural Validation and Qualification	22
9	Emission Procedural Sample Rates and Accuracy	23
10	Cars Selected for Testing	26
11	Car 01 Emissions Summary	29
12	Summary of Tune-up Adjustments and Part Replacements (Cars 3-10)	31
13	Summary of I/M Short Test Results	33
14	Summary of the Average Regulated Emissions and Fuel Consumption Data	36
15	Ratio of the After Tune-up Regulated Emissions and Fuel Consumption to the As-Received Regulated Emissions and Fuel Consumption	37
16	Ratio of the As-Received and After Tune-up Regulated Emissions to the 1978 and 1979 Emission Standards	38
17	Average Aldehyde Emission Rates from High Mileage Catalyst Cars	40
18	Comparison of Average FTP Aldehyde Emission Rates to Emission Rates from Previous Projects	41

LIST OF TABLES (Cont'd)

<u>Table</u>		<u>Page</u>
19	Summary of the Average Elemental Analysis Results for the FTP	42
20	Average Unregulated Emissions Data	43
21	Relationship of the As-Received to the After Tune-up FTP Emission Results	43
22	Comparison of Cars, 01, 06, and 08 with Results from Previous Projects	44
23	Comparison of Cars 02 and 03 with Results from Previous Projects	45
24	Comparison of Car 04 with Results from Previous Projects	46
25	Comparison of Car 05 with Results from Previous Projects	47
26	Comparison of Car 07 with Results from Previous Projects	48
27	Comparison of Cars 09 and 10 with Results from Previous Projects	49
28	Comparison with Results from Previous Projects	50
29	Relative Importance of FTP Emission Rates	52

## I. INTRODUCTION

This report describes the effort to characterize regulated and unregulated exhaust emissions from ten high mileage gasoline powered automobiles. The ten automobiles were catalyst equipped 1978 and 1979 models which had been driven for approximately 50,000 miles. This is the sixth project to be completed from among several related projects at SwRI involving the evaluation of a large number of unregulated emissions from gasoline automobiles. The previous projects involved evaluation of non-catalyst, oxidation catalyst and three-way catalyst gasoline automobiles. (1,2,3,4,5)\*

### A. Project Objective

The major objective of this project was to evaluate regulated and unregulated exhaust emissions, particularly aldehydes, from 1978 and 1979 catalyst-equipped automobiles that have been driven 50,000 miles. Emissions evaluated include the three currently regulated emissions (HC, CO, and NO<sub>x</sub>), along with a significant number of currently unregulated compounds (e.g., aldehydes, sulfides, amines, ammonia, cyanide, etc.).

### B. Emissions Measurement Procedures

The compound or groups evaluated, along with the sampling methods used, were as follows:

<u>Sampling Methods</u>	<u>Compounds Evaluated</u>
Bag	HC, CO, NO <sub>x</sub> , CO <sub>2</sub> , Individual HC and N <sub>2</sub> O
Filter	Particulate, metals and other elements
Impinger	Cyanides, aldehydes, hydrogen sulfide, ammonia, and organic amines
Trap	Carbonyl and organic sulfides

The procedures for measuring the unregulated emissions were developed in another project and reported in a widely distributed interim report. (6)

### C. Vehicles Evaluated

Ten 1978 and 1979 model automobiles were evaluated in this project. The automobiles evaluated included a 1978 Buick Regal, two 1979 Mercury

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\*Superscript number in parentheses designate references at the end of the report.

Marquis, a 1978 Ford Granada, a 1978 Volvo 245DL, a 1978 Oldsmobile Cutlass, a 1978 Chevrolet Malibu (California certified), a 1978 Chevrolet Monte Carlo, a 1978 Ford Fiesta, and a 1978 Chrysler New Yorker. These automobiles were all equipped with catalysts and had been driven between 37,600 and 68,000 miles. These cars were either rented locally, tested in previous EPA projects, or owned by Southwest Research Center employees.

#### D. Vehicle Testing

The automobiles involved in this study were tested in duplicate as-received and in duplicate after a tune-up to manufacturer's specifications. The test sequence included the Light-Duty Federal Test Procedure (FTP)<sup>(7)</sup> and the Highway Fuel Economy Driving Schedule (HFET).<sup>(8)</sup> To the extent practical, all specified unregulated exhaust constituents were sampled and analyzed during every test. In addition, HC and CO emissions were measured in each configuration using three short-test procedures.

## II. GENERAL EQUIPMENT, INSTRUMENTS, PREPARATIONS AND PROCEDURES

This section describes the automobiles, the fuel, the facilities, and the general instrumentation and procedures utilized in this project. The overall sampling systems for the unregulated emissions are also discussed.

### A. Automobiles

Ten 1978 and 1979 gasoline-powered automobiles were evaluated in this project. These automobiles are described in Table 1. Several of the cars are shown in Figure 1. The majority of the cars were owned and operated by employees of the Southwest Research Institute or the Southwest Foundation for Research and Education. Three of the cars tested in the project, the two Mercury Marquis and the Ford Granada, were rented from local leasing agencies or car dealers. One car, the 1978 Chevrolet Malibu, was owned by a local citizen and had been tested new in a previous project.<sup>(1)</sup> The odometer mileage on the cars ranged from 37,600 to 68,000 miles.

### B. Fuel

Throughout this project a single batch of Chevron UL-CQ26B1 unleaded gasoline, the type provided to auto manufacturers for emissions durability mileage accumulation tests, was used for all emission testing. This fuel had been used in previous unregulated emission projects involving low mileage catalyst cars. The fuel was used in this project so that the emissions data could be compared with the earlier work without introducing fuel effects. This gasoline is described in Table 2, and has a sulfur level of 0.03% as specified in Advisory Circular No. A/C 26B1. The hydrogen to carbon ratio was 1.89 and the SwRI identification number was EM-470. The fuel had lost some of the light ends during storage (RVP had dropped from 8.9 to 7). To correct this, n-butane was injected into the fuel to bring the RVP back up to the original value (8.9).

### C. Dynamometer and CVS System

A Clayton Model ECE-50 chassis dynamometer with a belt-driven variable-inertia flywheel system, was utilized for all transient testing. This belt-driven inertia system simulates equivalent weight of vehicles from 680 kg (1500 lbs) to 2495 kg (5500 lbs), in 115 kg (250 lb) increments to 1360 kg, and in 225 kg increments above 1360 kg.

The constant volume sampler (CVS) used for these evaluations was SwRI CVS Number 2. This unit has a nominal capacity of 9.2 m<sup>3</sup>/min (325 cfm). A nominal 460 mm (18 inch) diameter by 5 m (16 feet) long dilution tunnel was used between the intake filter and the CVS to enable sampling of particulates.

Partial views of the chassis dynamometer, the dilution tunnel and the intake to the CVS can be seen in Figure 2. Both the dynamometer

TABLE 1. AUTOMOBILES EVALUATED

<u>Project Car No.</u>	<u>Year</u>	<u>Make</u>	<u>Model</u>	<u>Body Type</u>	<u>ID or Serial Number</u>
01	1978	Buick	Regal	2-dr	4J47H8H148317
02	1979	Mercury	Marquis	4-dr	9Z62H619190
03	1979	Mercury	Marquis	2-dr	F9Z65H637732F
04	1978	Ford	Granada	2-dr	8W81F129943
05	1978	Volvo	245 DL	4-dr (wagon)	VC24545L1176861
06	1978	Oldsmobile	Cutlass	4-dr	3J09A8R467078
07	1978	Chevrolet	Malibu	2-dr	1W27U8Z434207
08	1978	Chevrolet	Monte Carlo	2-dr	1Z37A8K484268
09	1978	Ford	Fiesta	2-dr	GCFBTC96187
10	1978	Chrysler	New Yorker	4-dr	CS43N8C149448

<u>Project Car No.</u>	<u>Engine CID/Cyl</u>	<u>Emission Controls</u>			<u>Transmission Type/Gears</u>	<u>Accessories</u>	<u>Odometer Mileage</u>
		<u>Catalyst</u>	<u>Air Pump</u>	<u>EGR</u>			
01	305/8	Oxidation	No	Yes	Automatic/3	PS,PB,AC	54,522
02	351/8	3-way	Yes	Yes	Automatic/3	PS,PB,AC	46,462
03	351/8	3-way	Yes	Yes	Automatic/3	PS,PB,AC,CC	48,766
04	302/8	Oxidation	Yes	Yes	Automatic/3	PS,PB,AC	56,993
05	130/4	3-way	No	No	Manual/4	PS,AC	59,031
06	231/6	Oxidation	No	Yes	Automatic/3	PS,PB,AC,CC	47,278
07	305/8	Oxidation	Yes	Yes	Automatic/3	PS,PB,AC	37,577
08	231/6	Oxidation	No	Yes	Automatic/3	PS,PB,AC	67,460
09	98/4	Oxidation	Yes	Yes	Manual/4	AC	67,963
10	400/8	Oxidation	No	Yes	Automatic/3	PS,PB,AC,CC	66,038

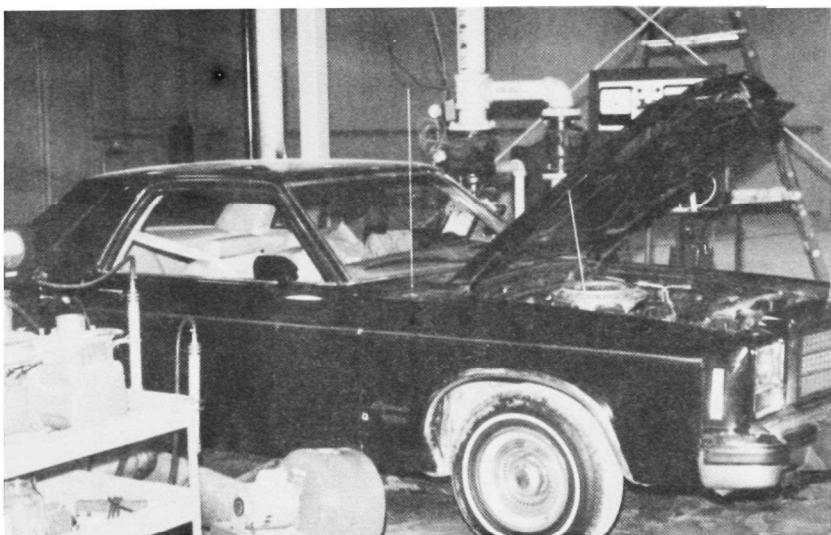
<u>Project Car No.</u>	<u>Chassis Dynamometer Settings</u>			
	<u>Inertia Kilograms</u>	<u>Power Kilowatts</u>	<u>Inertia Pounds</u>	<u>Power Horsepower</u>
01	1590	8.0	3500	10.7
02	2045	8.9	4500	12.0
03	2045	8.9	4500	12.0
04	1810	9.8	4000	13.2
05	1590	9.5	3500	12.8
06	1590	8.0	3500	10.7
07	1590	8.0	3500	10.7
08	1590	8.0	3500	10.7
09	910	4.0	2000	5.4
10	2275	8.4	5000	11.3



Car 05 - 1978 Volvo 245 DL



Car 10 - 1978 Chrysler New Yorker



Car 04 - 1978 Ford Granada



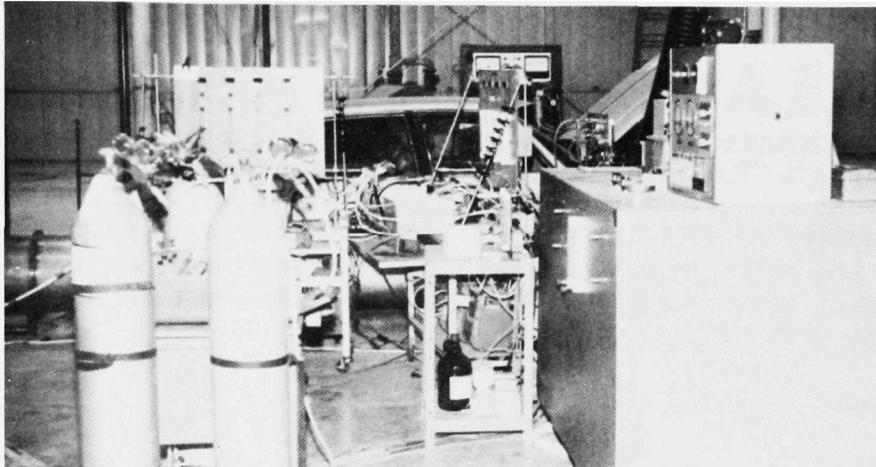
Car 06 - 1978 Oldsmobile Cutlass

Figure 1. Four of the 1978 cars evaluated in this project.

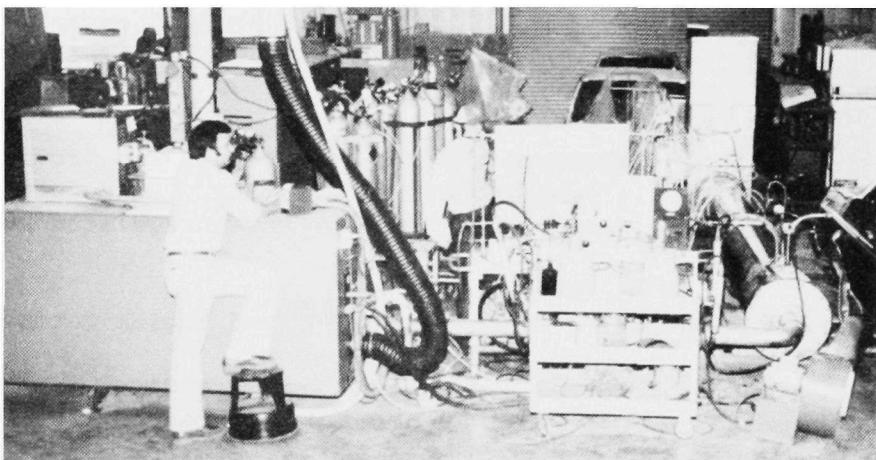
TABLE 2. DESCRIPTION OF CHEVRON UL-CQ26B1 UNLEADED GASOLINE

	<u>Test Method</u>	
Availability Date		April 24, 1978
Tank No.		94
Gallons		801,901
Gravity, °API at 60°F	ASTM D 1298	58.4
Research Octane No.	ASTM D 2699	91.6
Motor Octane No.	ASTM D 2700	83.2
Sensitivity		8.4
Lead, g/Gal.	ASTM D 3237	0.001
Sulfur, Wt %	X-Ray - ASTM D 2622 (Modified)	0.029
Phosphorus, g/Gal.	ASTM D 3221	0.0002
Manganese, g/Gal.	EAM 128-74	0.001
 <u>Gum, mg/100 ml</u>	 ASTM D 381	
Unwashed		85
Washed		0
 Reid Vapor Pressure, psi	ASTM D 323	8.9
 <u>Distillation, °F (% Evaporated)</u>	ASTM D 86	
IBP		97
10%		129
50%		212
90%		328
EP		386
Recovery, %		97.5
Residue, %		1.0
Loss, %		1.5
Acidity of Residue	ASTM D 1093	Pass
 <u>Hydrocarbons, Vol %</u>	 ASTM D 1319	
Aromatics		28
Olefins		8
Sturates		64
 Benzene, Vol %	Chevron Research Technique	2.0
Water and Sediment, Vol %	ASTM D 2709	<0.001
Oxidation Stability, Hr	ASTM D 525	24+
Copper Corrosion	ASTM D 130	1A

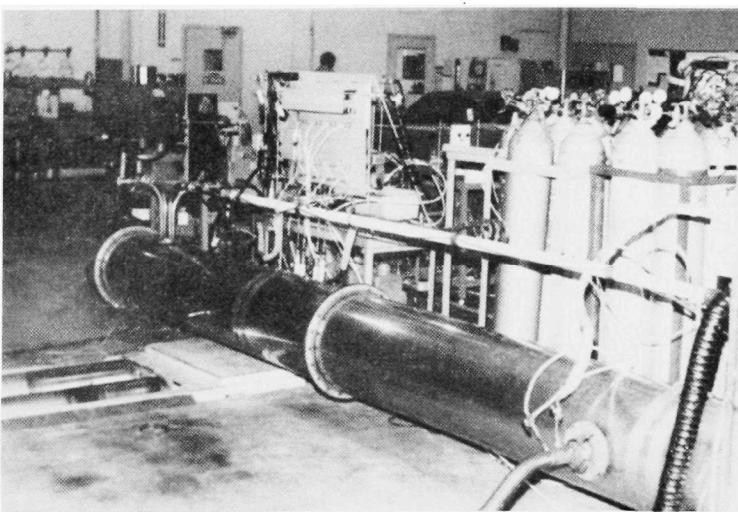
NOTE: These inspection data were provided by the Chevron Research Company.



A. CVS Side of System



B. Entire Sampling System



C. Dynamometer Side of the System

Figure 2. Views of the emissions sampling system.

and the CVS were calibrated, maintained and operated in accordance with the manufacturer's instructions and the appropriate sections of the Code of Federal Regulations applicable to light-duty vehicles.<sup>(7)</sup>

In addition to the 142 m<sup>3</sup>/min (5000 cfm) cooling fan placed in front of the automobile, 42 m<sup>3</sup>/min (1500 cfm) blowers were available to cool each rear wheel. These additional blowers were used only during the HFET driving cycle.

#### D. Exhaust Sampling and Analysis

A pictorial schematic of the exhaust and sampling system is shown in Figure 3. This system is in accordance with the guidelines established in previous unregulated emission projects conducted at SwRI for the EPA. The primary feature of this system is the number of sampling probes and systems required to collect all of the required unregulated emission samples. This is illustrated in the several views of the system shown in Figure 2.

This section has described the dilution tunnel and provided some insight into the overall sampling system assembly. More details on each of the individual sampling systems for the unregulated emissions are given in Section III.

#### E. Instrumentation for Regulated Emissions and Engine Parameters

Bagged samples of the dilute exhaust were evaluated for HC, CO, NO<sub>x</sub>, and CO<sub>2</sub> using SwRI Bag Cart Number 1. This bag cart was designed, calibrated and operated in accordance with the appropriate sections of the Code of Federal Regulations applicable to light-duty vehicles.<sup>(7)</sup> In addition, the vehicle speed and the oxygen level in the undiluted exhaust were continuously recorded. The instrumentation used for these continuously recorded data were as follows:

Parameter Measured	Instrument or Method		
	Type	Make & Model	Ranges Used
O <sub>2</sub>	Polarographic	Beckman 715	5 & 25%
Speed	---Parallel output from the Dynamometer Controls---		

The average oxygen level in the undiluted exhaust was obtained, by integration of the continuous oxygen signal, using an Acromag 1324-LY-1 integrator. The average oxygen level has only a gross relative meaning for most of these evaluations. Often, the oxygen level was relatively high when the exhaust flow was low (e.g., idle and cut-throttle) and relatively low when the exhaust flow was relatively high (e.g., highway speed). The integration of the oxygen in the undiluted exhaust does not compensate for these changes in exhaust flow. It is possible to

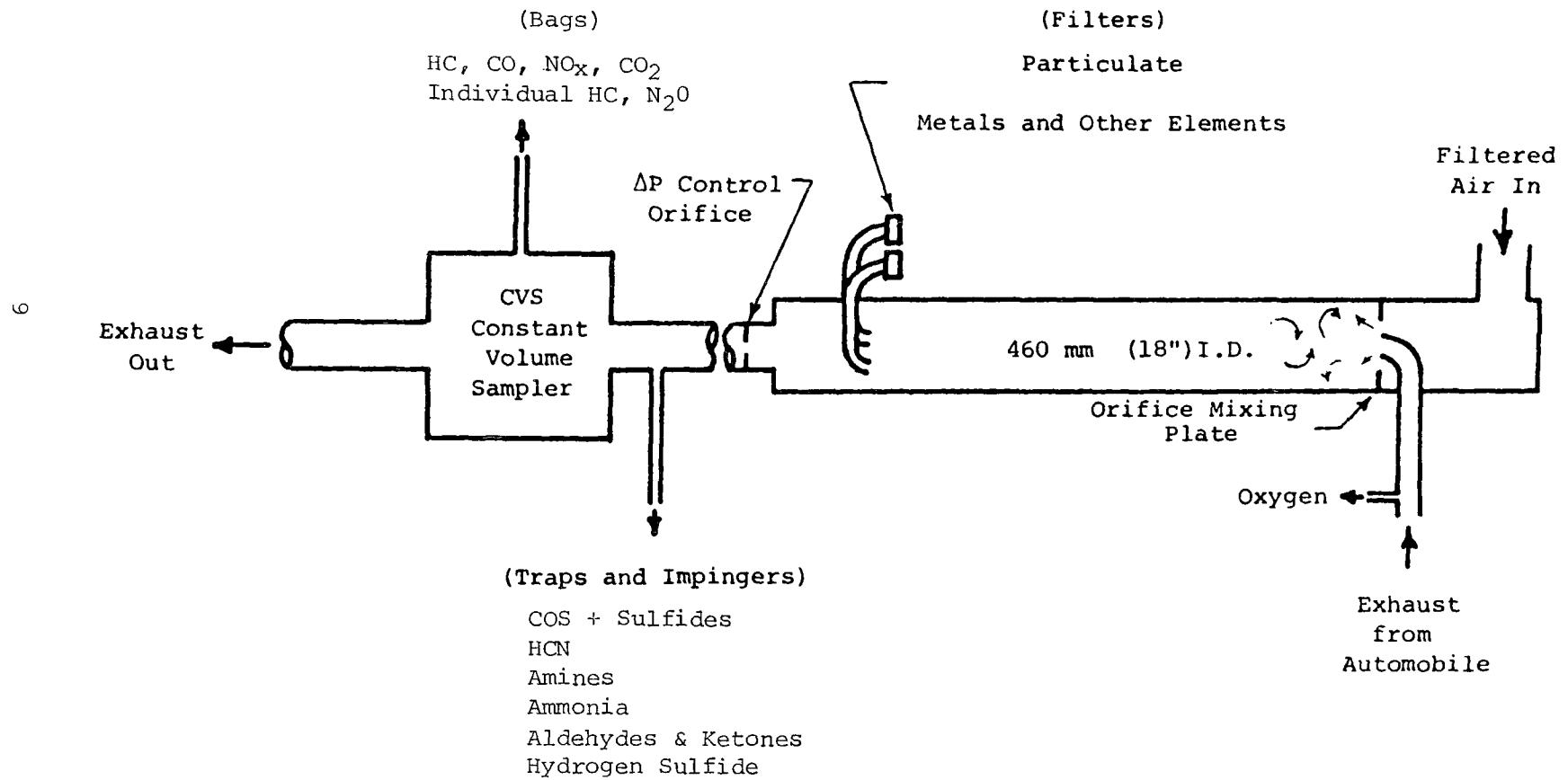


Figure 3. Gasoline engine emissions sampling system.

have a substantial average oxygen level and yet be deficient in oxygen over some portions of the driving cycle.

#### F. Emissions Test Procedures

The primary procedures and driving schedules utilized in this project are defined as follows:

FTP - 1979 Federal Test Procedure<sup>(7)</sup>  
(uses the Urban Dynamometer Driving Schedule)

HFET - Highway Fuel Economy Driving Schedule<sup>(8)</sup>

Each of the two primary procedures and schedules, requiring emissions testing in this project (FTP and HFET), utilized bagged samples for evaluation of regulated emissions and fuel consumption. In addition, evaluation of the regulated emissions were conducted using several short-test procedures. These short-test procedures are discussed in Section II-H.

The HFET is a hot-start, single-segment driving cycle. The FTP, however, involves cold-start and hot-start, multi-cycle with multi-segment operation. In addition, in this project, a four-bag FTP was utilized for most of the unregulated emissions, rather than the three-bag FTP specified in the Federal Test Procedure. Therefore, before proceeding, it is important to clarify the meaning of FTP as used in this project.

FTP - The FTP uses the Urban Dynamometer Driving Schedules (UDDS) which is 1372 seconds in duration. The UDDS, in turn, is divided into two segments; a "transient" phase of 505 seconds and a "stabilized" phase of 867 seconds. The 1975 Federal Test Procedure consists of cold start "transient" and "stabilized" phases, followed by a hot start "transient". In this project, the hot start "transient" was followed by a hot start "stabilized". For the remainder of this discussion, and throughout this report, the four-cycle FTP will be identified as presented in Table 3. Therefore, with the assumption that the changes in distance traveled are negligible, the composite results with the four-cycle FTP relative to results with the three-cycle FTP will differ only as the mass emissions emitted during Cycle 4 differ from those emitted during Cycle 2. For the regulated emissions, the differences during Cycles 2 and 4 were small, and the overall effects of such differences were essentially negligible.

The test sequence followed for each automobile is given in Table 4. The sequence followed in the laboratory for running one set of emissions tests (FTP and HFET) is given in Table 5.

TABLE 3. DESCRIPTION OF FOUR-CYCLE FTP

	Four-Cycle FTP			
	Cold UDDS		Hot UDDS	
Cycle	1	2	3	4
Duration, seconds	505	867	505	867
Regulated Emissions, 3-Bag	X	X		X
Regulated Emissions, 4-Bag	X	X		X
Unregulated Emissions:				
Bag	X	X	X	X
Impinger	---X---		---X---	
Trap	---X---		---X---	

NOTE: X designates a sample taken

A composite value in mass per distance for the three-cycle, three sample FTP regulated emissions is calculated using the following formula:

$$\frac{\text{MASS}}{\text{DISTANCE}} = \frac{0.43 \times (\text{MASS 1} + \text{MASS 2})}{(\text{DIST. 1} + \text{DIST. 2})} + \frac{0.57 \times (\text{MASS 3} + \text{MASS 2})}{(\text{DIST. 3} + \text{DIST. 2})}$$

Since the same driving cycle is involved, Distance 3 is essentially equal to Distance 1, and this equation can be reduced to:

$$3\text{-FTP M/D} \approx \frac{0.43 \times (M_1 + M_2) + 0.57 \times (M_3 + M_2)}{D_1 + D_2}$$

For the four-cycle FTP, two sample, composite values determined in this project, the following formula was used:

$$\frac{\text{MASS}}{\text{DISTANCE}} = \frac{0.43 \times M(1 + 2)}{(D_1 + D_2)} + \frac{0.57 \times M(3 + 4)}{(D_3 + D_4)}$$

Since Distance 3 is equal to Distance 1 and Distance 4 is equal to Distance 2, this equation can be reduced to:

$$4\text{-FTP M/D} \approx \frac{0.43 \times M(1 + 2) + 0.57 \times M(3 + 4)}{D_1 + D_2}$$

TABLE 4. TEST SEQUENCE FOR EACH AUTOMOBILE

<u>Sequence</u>	<u>Operation Performed on Vehicle</u>
Upon receipt	Drain and fill with test fuel, install and leak-check exhaust adapter
1	Run FTP, HFET - Sample and analyze emissions
2	Run FTP, HFET - Sample and analyze emissions
3	Run I/M Short tests
4	Tune up the engine. If any adjustments (other than up to 10% change in idle speed) or parts replacement are required, continue.
5	Run FTP, HFET - Sample and analyze emissions
6	Run FTP, HFET - Sample and analyze emissions
7	Run I/M Short tests
8	Fill with fuel and return to owner

FTP - Federal Test Procedure

HFET - Highway Fuel Economy Driving Schedule

TABLE 5. LABORATORY TEST SEQUENCE

1. Precondition, UDDS
2. Soak 12 to 20 hours
3. FTP - 4 bags for gaseous emissions  
2 filters or impinger samples
4. Engine Off - 10 minutes - Fan Off
5. HFET - 1 bag sample  
1 filter or impinger sample

NOTE: 5000 cfm fan on during all car operation. Additional tire and fuel tank cooling blowers on during all HFET operation.

The parameters of the two primary driving schedules are summarized in Table 6 and these schedules are illustrated in Figure 4. Other driving schedule designations frequently used are as follows:

<u>Driving Schedule Designation Used</u>	<u>Other Common Designations</u>
FTP	LA-4 and UDDS
HFET	FET

TABLE 6. SUMMARY OF DRIVING SCHEDULE PARAMETERS

<u>Schedule</u>	<u>Duration, Seconds</u>	<u>Distance, Kilometers</u>	<u>Average Speed km/hr</u>	<u>mph</u>
<b>FTP:</b>				
505	505	5.8	--	--
867	867	6.2	--	--
UDDS	1372	12.0	31.4	19.5
HFET	765	16.5	77.6	48.2

#### G. Test Numbering System

The numbering system used in this project consists of three digits plus a cycle abbreviation. The designation used for all automobile testing was "VVT," followed by the individual test cycle abbreviation FTP or FET. The meaning of each letter is described as follows:

<u>Code</u>	<u>Description</u>	<u>As Used in This Project</u>
VV	Vehicle designation	01 thru 10
T	Test Series - As Received	1 and 2*
	- After Tune-up	6 and 7**

\*1 and 2 are the initial and repeat test series for the vehicle as received,

\*\*6 and 7 are the initial and repeat test series for the vehicle after tune-up. In one or two special cases, a higher number was used to designate a rerun.

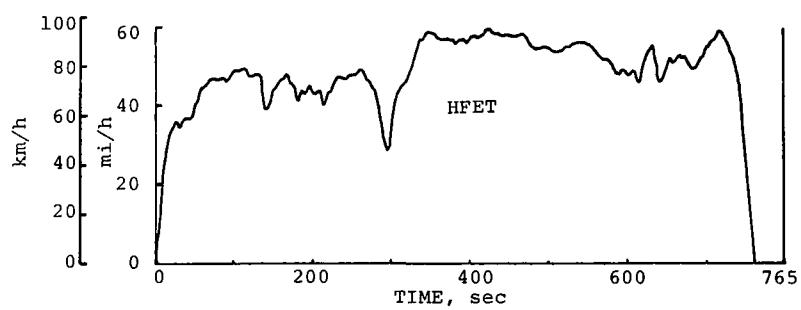
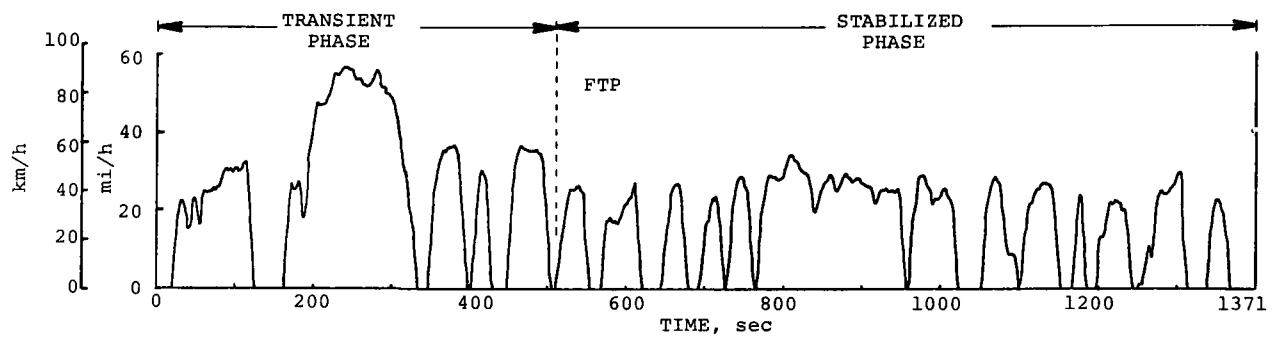


Figure 4. Driving cycle speed vs time traces

## H. Short-Test Procedures

Regulated emissions were also evaluated over several I/M short-test procedures. These procedures are described by the data sheet in Appendix A-1, and are listed as follows:

- 50 mph Cruise Test
- 4-Mode Idle Tests
- Loaded 2-Mode Test
- Propane Gain Checks

All of these short-test procedures were conducted with the engine in a warmed-up operating condition. HC and CO emissions were measured in all, except the propane gain checks. The propane gain checks involved determination of change in engine idle speed as propane was inducted into the intake of the engine.

## I. Computational Methods

The methods used for calculating the unregulated emissions results are given in Appendix A-2. All regulated emissions were calculated using the methods prescribed in the Code of Federal Regulations for Light-Duty Vehicles.<sup>(7)</sup> On the computer printouts for the regulated emissions (Appendix D), all items of potential interest are identified by descriptive headings. Items on the computer sheet identified only by abbreviated headings are used in calculating the unregulated emissions.

### III. ANALYTICAL PROCEDURES FOR UNREGULATED EMISSIONS

The analytical procedures used to measure the unregulated emissions are summarized in this section. Detailed descriptions of most of the procedures, along with discussions of their development, validation, and qualification, are available in Interim Report II, "Analytical Procedures for Characterizing Unregulated Pollutant Emissions From Motor Vehicles," developed in a related EPA Project.<sup>(6)</sup>

#### A. Description of the Analytical Procedures

The unregulated emissions evaluated in this project, along with the methods for sampling and the procedures used in the analyses, are listed in Table 7. Organic amines, aldehydes and ketones, organic sulfides, individual hydrocarbons, and metals and other elements represent groups of compounds. The respective procedures separate and identify a number of individual components within each of these groups. The analytical procedures involved in this project are briefly described as follows:

Organic Amines - The collection of organic amines (monomethylamine, monoethylamine and dimethylamines, trimethylamines, diethylamine, and triethylamine) is accomplished by bubbling CVS-diluted exhaust through glass impingers containing dilute sulfuric acid. The amines are complexed by the acid to form stable sulfate salts which remain in solution. A portion of this solution is then injected into a gas chromatograph equipped with an ascarite loaded pre-column and a nitrogen-phosphorus detector (NPD). External amine standards in dilute sulfuric acid are used to quantify the results.

Ammonia - Ammonia in CVS diluted automotive exhaust is measured in the protonated form, NH<sub>4</sub><sup>+</sup>, after collection in dilute H<sub>2</sub>SO<sub>4</sub>. The acidification is carried out in a glass impinger maintained at ice bath temperature. A sample from the impinger is then analyzed for ammonia in an Ion Chromatograph and the concentration in the exhaust is calculated by comparison to an ammonium sulfate standard solution.

Aldehydes and Ketones - The collection of aldehydes (formaldehyde, acetaldehyde, isobutyraldehyde and hexanaldehyde) and ketones (acetone and methylethylketone) is accomplished by bubbling CVS diluted exhaust through glass impingers containing 2,4-dinitrophenylhydrazine (DNPH) in dilute hydrochloric acid. The aldehydes and ketones (also known as carbonyl compounds) react with the DNPH to form their respective phenylhydrazone derivatives. These derivatives are insoluble or only slightly soluble in the DNPH/HCl solution and are removed by filtration followed by pentane extractions. The filtered precipitate and the pentane extracts are combined and then the pentane is evaporated in a vacuum oven. The remaining dried extract contains the phenylhydrazone derivatives. The extract is dissolved in a quantitative volume of toluene containing a known amount of anthracene as an internal standard. A portion of this dissolved extract is injected into a gas chromatograph and analyzed for several individual aldehydes

TABLE 7. SAMPLING AND ANALYSIS METHODOLOGY FOR UNREGULATED EMISSIONS

<u>Compound</u>	<u>Sampling</u>	<u>Method of Analysis</u>
Organic Amines	Impinger	Gas Chromatograph with ascarite precolumn and nitrogen-phosphorus detector (GC-NPD).
Ammonia ( $\text{NH}_3$ )	Impinger	Ion Chromatograph.
Aldehydes & Ketones	Impinger	Dinitrophenylhydrazone derivative. Gas chromatograph with flame ionization detector (GC-FID).
Hydrogen Sulfide ( $\text{H}_2\text{S}$ )	Impinger	Methylene blue derivative. Spectrophotometer.
Total Cyanide [Hydrogen Cyanide (HCN) and Cyanogen ( $\text{C}_2\text{N}_2$ )]	Impinger	Cyanogen chloride derivative. Gas chromatograph with electron capture detector (GC-ECD).
Carbonyl Sulfide (COS) and Organic Sulfides	Trap	Gas chromatograph with flame photometric detector (GC-FPD).
Individual Hydrocarbons	Bag	Gas chromatograph with flame ionization detector (GC-FID).
Metals and Other Elements	Filter	Weighed using microbalance. Spectral X-ray analysis at RTP.
Particulates	Filter	Weighed using microbalance.
Nitrous Oxide	Bag	Gas chromatograph with electron capture detector (GC-ECD).

and ketones using a flame ionization detector.

Hydrogen Sulfide - The collection of hydrogen sulfide is accomplished by bubbling CVS diluted exhaust through glass impingers containing a buffered zinc acetate solution which traps the sulfide ion as zinc sulfide. The absorbing solution is then treated with N,N-dimethyl-paraphenylene diamine sulfate and ferric ammonium sulfate. Cyclization occurs, forming the highly colored heterocyclic compound methylene blue (3,9-bisdimethyl-aminophenazothionium sulfate). The resulting solution is analyzed with a spectrophotometer at 667 nm in a 1-cm or 4-cm pathlength cell, depending upon the concentration.

Total Cyanide (Hydrogen Cyanide plus Cyanogen) - The collection of total cyanide is accomplished by bubbling CVS-diluted exhaust through glass impingers containing a 1.0 N potassium hydroxide absorbing solution. This solution is maintained at ice bath temperature. An aliquot of the absorbing reagent is then treated with  $\text{KH}_2\text{PO}_4$  and Chloramine-T. A portion of the resulting cyanogen chloride is injected into a gas chromatograph equipped with an electron capture detector (ECD). External  $\text{CN}^-$  standards are used to quantify the results.

Carbonyl and Organic Sulfides - The collection of carbonyl sulfide ( $\text{COS}$ ) and the organic sulfides methyl sulfide (dimethylsulfide,  $(\text{CH}_3)_2\text{S}$ ), ethyl sulfide (diethylsulfide,  $(\text{C}_2\text{H}_5)_2\text{S}$ ) and methyl disulfide (dimethyldisulfide,  $(\text{CH}_3)_2\text{S}_2$ ), is accomplished by passing CVS-diluted exhaust through Tenax GC traps at  $-76^\circ\text{C}$ . At this temperature the traps remove the organic sulfides from the dilute exhaust. The organic sulfides are thermally desorbed from the traps into a gas chromatograph sampling system and injected into a gas chromatograph equipped with a flame photometric detector for analysis. External organic sulfide standards generated from permeation tubes are used to quantify the results.

Individual Hydrocarbons - For measurement of selected individual hydrocarbons, methane ( $\text{CH}_4$ ), ethane ( $\text{C}_2\text{H}_6$ ), ethylene ( $\text{C}_2\text{H}_4$ ), acetylene ( $\text{C}_2\text{H}_2$ ), propane ( $\text{C}_3\text{H}_8$ ), propylene ( $\text{C}_3\text{H}_6$ ), benzene ( $\text{C}_6\text{H}_6$ ), and toluene ( $\text{C}_7\text{H}_8$ ), a sample of CVS-diluted exhaust is collected in a Tedlar bag. This bagged sample is then analyzed for individual hydrocarbons using a gas chromatographic system containing four separate columns and a flame ionization detector. The peak areas are compared to an external calibration blend and the individual hydrocarbon concentrations are obtained using a Hewlett-Packard 3354 computer system.

Metals and Other Elements - The metals are collected as particulate on a 47 mm Fluoropore filter, which is then sent to Research Triangle Park (RTP) for analysis by X-ray spectroscopy. The diluted exhaust sample is taken from within the dilution tunnel. Weight gain on the filter is determined by weighing the filter on a microbalance before and after sampling.

Particulate - The "particulate" is collected on a 47 mm glass fiber filter. The amount of "particulate" collected is determined by weighing the filter on a microbalance before and after sampling.

Nitrous Oxide - For measurement of nitrous oxide, a sample of the CVS-diluted exhaust is collected in a Tedlar bag. This bagged sample is then analyzed for nitrous oxide using a gas chromatograph equipped with an electron capture detector. Calibration blends are used to quantify the results. Gas Chromatograph peak areas are obtained using a Hewlett-Packard 3354 computer system.

#### B. Validation and Qualification of the Analytical Procedures

The analytical procedures used in this project were subjected to a series of validation and qualification experiments in previous projects. Validation experiments included checks for sample stability, sample collection efficiency, detector linearity, interferences, and analysis repeatability. Qualification experiments included the injection of the compound of interest into the tunnel with and without the presence of exhaust and the subsequent recovery of that compound at the procedure sampling point.

Sample stability checks were performed using repeated analyses of the same sample at intervals over a specified period of time and comparing the results to the initial analysis. Organic amines, aldehydes and ketones, ammonia, total cyanide, nitrous oxide and individual hydrocarbon samples were found to be stable for several days. Carbonyl and organic sulfides and the hydrogen sulfide samples were found to be stable for approximately one day.

Sample collection efficiency experiments were performed by passing a known concentration of sample through a series of impingers or traps and analyzing each impinger or trap individually for the compound of interest. All of these procedures used in this project had a collection efficiency of 98% or better. Detector linearity experiments were performed by preparing several samples of various known concentrations and plotting the resulting peak areas versus the concentrations. The procedures had linear response over the range of interest in this project.

To determine interferences from other compounds, for each procedure, known exhaust components were introduced into the sample to determine their effect on the resultant measurements. To determine analysis repeatability, several samples of known concentrations were prepared and a number of complete analyses were performed at each concentration. The results of these tests were then compared to determine analyses repeatability.

The qualification experiments were performed to determine if the compounds of interest could travel the length of the dilution tunnel in the presence of dilute exhaust without significant loss by reaction

with exhaust or the tunnel itself. The compounds were introduced at the same point at which the exhaust enters the tunnel and were sampled at the normal sampling point. Table 8 lists the procedures for which validation and qualification experiments have been performed.

#### C. Accuracy of the Analytical Procedures

A difficult, but very important, endeavor was the determination of procedural accuracy for each analytical method. The primary difficulty involved those procedures in which the exhaust compounds are trapped or absorbed, an extraction or subsequent reaction is performed, and then a portion of the extraction is analyzed. After much consideration, in previous unregulated emission projects, the decision was reached to initially define the accuracy in terms of a "minimum detection value" (MDV). The MDV, as used in this report, is defined as the value above which it can be said that the compound has been detected in the exhaust (i.e., at a measured value equal to the MDV, the accuracy is equal to plus or minus the MDV). Determination of accuracy over the entire range of each procedure was beyond the scope of these projects.

For compounds collected by bag samples, the MDV was determined from the instrument detection limits only, and is independent of the sampling rate and duration. For compounds which are concentrated in impingers or traps, the MDV is dependent on the instrument detection limit, chemical workup, sampling rate and sampling duration. The MDV's listed in Table 9 were derived using the listed sampling rate and a 23-minute sampling period.

TABLE 8. PROCEDURAL VALIDATION AND QUALIFICATION

<u>Compound or Compound Group</u>	<u>Validation Conducted</u>	<u>Qualification Conducted</u>
Organic Amines	Yes	Yes (significant tunnel losses)
Ammonia	Yes	Yes (significant tunnel losses)
Aldehydes & Ketones	Yes	Yes
Hydrogen Sulfide	Yes	Yes
Total Cyanide	Yes	Yes
Carbonyl Sulfide and Organic Sulfides	Yes	Yes (significant tunnel losses)
Individual Hydrocarbons	Yes	No <sup>a</sup>
Metals and Other Elements	No <sup>a</sup>	No <sup>a</sup>
Particulates	No <sup>a</sup>	No <sup>a</sup>
Nitrous Oxide	Yes	Yes

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<sup>a</sup>Established procedure

TABLE 9. EMISSION PROCEDURAL SAMPLE RATES AND ACCURACY

	VVT	Sample Flow l/100	$\mu\text{g}/\text{m}^3$ per ppm	Procedural Minimum Detection Values <sup>a</sup> ppm	$\mu\text{g}/\text{m}$	MDV for FTP $\text{mg}/\text{km}^b$
Mol. Weight						
Test Number,	--	--	--	--	--	--
Barometer, mm HG	--	--	--	--	--	--
Humidity, g/kg	--	--	--	--	--	--
Temperature °C	--	--	--	--	--	--
Total Fuel Sulfur, mg/km	--	--	--	--	--	--
Avg. Exh. Oxygen	32.00	--	--	--	--	--
Catalyst Avg. Temp., °C	--	--	--	--	--	--
Catalyst Max. Temp., °C	--	--	--	--	--	--
Carbon Dioxide, g/km	44.01	Bag	--	--	--	--
Fuel Cons., l/100 km	--	--	--	--	--	--
<u>Regulated Emissions</u>						
Hydrocarbons (THC)	11.88	Bag	575	1.0 <sup>c</sup>	575	10
Carbon Monoxide	28.01	Bag	1165	2.0 <sup>c</sup>	2330	40
Oxides of Nitrogen	46.01	Bag	1915	0.5 <sup>c</sup>	958	16
<u>Particulates</u>						
Total Particulates	--	14.0	--	--	<50	<1
<u>Compound Group Totals</u>						
Aldehydes & Ketones	--	4.0	--	--	--	$\approx 0.5$
Individual Hydrocarbons	--	Bag	--	--	--	$\approx 0.5$
Organic Sulfides	--	0.13	--	--	--	$\approx 0.05$
Organic Amines	--	4.0	--	--	--	$\approx 0.1$
<u>Other Compounds</u>						
Ammonia	17.03	4.0	710	0.01	7	0.1
Cyanide & Cyanogen	26.02	4.0	1080	0.01	11	0.2
Hydrogen Sulfide	34.08	4.0	1415	0.01	14	0.2
Nitrous Oxide	44.02	Bag	1830	0.01	18	0.3

<sup>a</sup>Based on a 23-minute sampling period at the specified flow rate for all impinger, filter and trap collected samples.

<sup>b</sup>Based on  $\mu\text{g}/\text{m}^3$  in the diluted exhaust and typical UDDS (FTP 505 and 867) parameters (1372 seconds, 206  $\text{m}^3$  CVS flow, 12.07 km, 0.98 DSFC).

<sup>c</sup>Based on the lowest instrument ranges used in this project.

TABLE 9 (Cont'd.). EMISSION PROCEDURAL SAMPLE RATES AND ACCURACY

	<u>Mol.</u> <u>Weight</u>	<u>CRC<sup>d</sup></u> <u>Synonym</u>	<u>µg/m<sup>3</sup></u> per ppm	Procedural Minimum Detection Values <sup>a</sup>		MDV for FTP mg/kmb
				<u>ppm</u>	<u>µg/m<sup>3</sup></u>	
<u>Aldehydes and Ketones</u>						
Formaldehyde	30.03	--	1250	0.01	15	0.2
Acetaldehyde	44.05	--	1830	0.01	20	0.3
Acetone <sup>e</sup>	58.08	2-Propanone	2415	0.01	25	0.4
Methylethylketone	72.12	2-Butanone	3000	0.01	30	0.5
Hexanaldehyde	100.16	Hexanal	4165	0.01	40	0.7
<u>Individual Hydrocarbons</u>						
Methane	16.04	--	665	0.05	30	0.5
Ethylene	28.05	Ethene	1165	0.03	30	0.5
Ethane	30.07	--	1250	0.03	30	0.5
Acetylene	26.04	Ethyne	1085	0.03	30	0.5
Propane	44.11	--	1835	0.02	30	0.5
Propylene	42.08	Propene	1750	0.02	30	0.5
Benzene	78.12	--	3245	0.02	30	0.5
Toluene	92.15	--	3830	0.02	30	0.5
<u>Organic Sulfides</u>						
Carbonyl Sulfide	60.08	--	2500	0.001	3	0.04
Methyl Sulfide	62.13	Dimethyl	2585	0.001	3	0.04
Ethyl Sulfide	90.19	Diethyl	3750	0.001	4	0.06
Methyl Disulfide	94.20	Dimethyl	3915	0.001	4	0.06
<u>Organic Amines</u>						
Monomethylamine	31.06	Amino-Methane	1290	0.002	3	0.05
Monoethylamine <sup>f</sup>	45.09	Amino-Ethane	1875	0.002	4	0.05
Trimethylamine	59.11	--	2460	0.002	5	0.08
Diethylamine	73.14	--	3040	0.002	6	0.10
Triethylamine	101.19	--	4205	0.002	8	0.14

<sup>a</sup> & <sup>b</sup>See initial page of this table.<sup>d</sup>Handbook of Chemistry and Physics, 54th Edition.<sup>e</sup>Includes Acrolein - 56.07 and Propionaldehyde - 58.08 (CRC - Propenal and Propanal, respectively).<sup>f</sup>Includes Dimethylamine - 45.09.

#### IV. CAR SELECTION AND TESTING

Regulated and unregulated exhaust emissions were measured for ten high mileage catalyst equipped cars. The cars were tested as-received and after a tune-up to the manufacturers specifications. This section describes the selection and evaluation of the cars and presents the test results.

##### A. Car Selection

The cars tested in this program (Table 10) were either rented locally, tested in previous EPA projects, or were owned by Southwest Research Center (SwRI or SFRE) employees. The criteria for car selection were established in the project "Scope of Work" as follows:

- Vehicles should have an odometer reading of about 50,000 miles.
- Vehicles should be selected, if possible from engine and catalyst configurations evaluated at low mileage in previous EPA projects (EPA Report Nos. 460/3-80-003, -004, -005).

The cars that were evaluated in the previous EPA projects came equipped with pelleted and monolithic oxidation catalysts, three-way catalysts and three-way plus oxidation catalysts. These cars are listed below:

<u>Car</u>	<u>Engine CID/Cyl</u>	<u>Catalyst</u>
1978 Chevrolet Malibu	305/8	Oxi (Pelleted)
1978 Chevrolet Malibu (Calf. Cert.)	305/8	Oxi (Pelleted)
1978 Ford Granada	302/8	Oxi (Monolith)
1978 Ford Mustang	302/8	Oxi (Monolith)
1978 Ford Pinto (Calf. Cert.)	140/4	3-way + Oxi
1978 Pontiac Sunbird	151/4	3-way
1978 Saab 99	121/4	3-way
1979 Mercury Marquis	351/8	3-way + Oxi

Considerable effort was expended during the project to locate the cars previously tested in the malfunction projects. All of the cars located had considerably less than 50,000 miles on the odometer, including the California certified Chevrolet Malibu. However, since the Malibu was California certified with an air pump and was evaluated in a previous malfunction project, it was selected by the EPA Project Officer for inclusion in this project although it only had 37,600 miles on the odometer.

TABLE 10. CARS SELECTED FOR TESTING

<u>Car No.</u>	<u>Car</u>	<u>Engine CID/Cyl</u>	<u>Catalyst</u>	<u>Mileage</u>	<u>Comment</u>
01	1978 Buick Regal	305/8	oxidation	54,500	SFRE Employee Owned
02	1979 Mercury Marquis	351/8	3-Way	46,500	Rented Locally
03	1979 Mercury Marquis	351/8	3-Way	48,800	Rented Locally
04	1978 Ford Granada	302/8	oxidation	57,000	Rented Locally
05	1978 Volvo 245 DL	130/4	3-Way	59,000	SwRI Employee Owned
06	1978 Oldsmobile Cutlass	231/6	oxidation	47,300	SwRI Employee Owned
07	1978 Chevrolet Malibu	305/8	oxidation	37,600	Calif. Cert., Tested Previously in Contract 68-03-2499
08	1978 Chev. Monte Carlo	321/6	oxidation	67,500	SwRI Employee Owned
09	1978 Ford Fiesta	98/4	oxidation	68,000	SwRI Employee Owned
10	1978 Chrysler New Yorker	400/8	oxidation	66,000	SFRE Employee Owned

The majority of the cars tested in the program were owned by Southwest Research Center employees. A memorandum was sent to each of the over two thousand Southwest Research Center (SwRI and SFRE) employees to determine the availability of staff-owned cars for use in the project. A copy of the memorandum is included in Appendix A-3. Out of a total of thirty-nine replies, twenty-five were selected for further consideration. Six of the SwRI and SFRE employee-owned cars were selected for testing. The remaining three cars tested in the program, two Mercury Marquis and a Ford Granada, were rented from local leasing agencies or car dealers. Three of the these nine cars had slightly less than 50,000 miles on the odometer.

An effort was also made to obtain cars from California. Contacts primarily included rental agencies and car dealerships. Rental agencies generally no longer had any 1978 (or 1979) model year cars. The car dealerships and other contacts expressed complete lack of interest. It became apparent that the effort required to obtain cars from California would greatly exceed the proposed scope of the project. In addition, with the inclusion of the California Chevrolet Malibu with an air pump, and the Mercury Marquis and the Volvo with three-way catalysts, most types of emissions systems that were on the previously tested California cars were available for testing in this project.

Before a candidate car was selected for testing in the project, the following items were checked:

- Condition of engine - If any extensive maintenance was required, the car was not selected.
- Use of only unleaded fuel - Information from owner and from a tailpipe check using Plumbtesmo lead-sensitive paper. If a positive lead test was obtained, the car was not selected for testing.

In addition to meeting all of the specified requirements, the approval of the EPA Project Officer was obtained prior to final acceptance of each car.

#### B. Car Testing

Initially, the cars were to be tested in duplicate after draining the as-received fuel and performing any necessary maintenance or adjustments. However, after testing the 1978 Buick Regal, the number and sequence of the tests performed on each car was altered. The Buick Regal was in exceptionally good condition and the engine was well maintained. Except for a little higher than specified idle speed, the engine met all normal tune-up requirements. The FTP HC and CO emissions for this car, however, were relatively high as shown by the following test results:

<u>Test</u>	<u>Emissions, g/km</u>			<u>Fuel l/100 km</u>
	<u>HC</u>	<u>CO</u>	<u>NO<sub>x</sub></u>	
011 FTP	1.16	15.8	0.93	14.0
012 FTP	0.95	13.3	0.95	13.9
011 FET	0.18	0.7	0.92	9.7
012 FET	0.18	0.6	0.85	9.5

In Table 11, the average of the FTP emissions results for the Regal are compared to the standards and the results from previous studies. The FTP emissions values on the Regal appear to be more in line with those values previously obtained on the noncatalyst Pacer, than those on the Malibu.

These results raised a number of questions which were discussed with the EPA Project Officer. Some of the primary factors were as follows:

- The car, as received, met all of the manufacturer's in-service, tune-up requirements, except for idle speed. Idle speed was a little high; apparently to achieve better idle quality.
- The idle-mixture adjusting screws were set maximum-rich, within the limit of the stops. This also was apparently done to improve idle quality. (At the specified idle speed and the new car idle mixture settings, the idle quality was somewhat undesirably rough).
- This idle-mixture setting was within the manufacturer's specifications and is probably representative of dealer inservice settings, based on the deterioration of idle quality at leaner mixture setting.

In accordance with instructions from the EPA Project Officer, all subsequent cars (Cars 2 through 10) were tested using the following test plan:

1. Duplicate tests on cars as-received.
2. Tune-up the engine (Scope of the tune-up is described in Appendix A-4).
3. If any adjustments (other than an up to 10% change in idle speed) or parts replacement are required, run an additional set of duplicate tests.

TABLE 11. CAR 01 EMISSIONS SUMMARY

Car FTP	Description	Emissions, g/km			$\ell/100 \text{ km}$
		HC	CO	NO <sub>x</sub>	
01	1978 Buick Regal	1.06	14.6	0.94	14.0
12	1978 Chevrolet Malibu	0.31	5.5	0.75	13.7
--	1978 Standards (or Cert.)	0.93	9.3	1.24	(13.8)
11	1978 AMC Pacer	0.73	11.1	1.21	--
121RBI <sup>a</sup>	1978 Chevrolet Malibu	1.08	26.0	0.57	14.7

HFET

01 Avg.	1978 Buick Regal	0.18	0.67	0.89	9.6
12 Avg.	1978 Chevrolet Malibu	0.03	0.49	1.02	9.5
121RBI <sup>a</sup>	1978 Chevrolet Malibu	0.10	1.98	1.11	9.8

Car	HC Emissions, grams				CO Emissions, grams			
	Bag 1	Bag 2	Bag 3	Bag 4	Bag 1	Bag 2	Bag 3	Bag 4
01	11.7	6.0	3.0	2.9	260	54	19 <sup>b</sup>	19 <sup>b</sup>
12	6.8	0.3	0.8	0.2	130	3	13 <sup>b</sup>	1 <sup>b</sup>
121RBI <sup>a</sup>	9.7	6.6	3.6	5.9	230	170	72 <sup>b</sup>	136 <sup>b</sup>
11	6.5	3.4	4.2	3.2	144	50	34	35

<sup>a</sup>Rich Best Idle fuel/air mixture setting.<sup>b</sup>The relationship of these Bag 3 and Bag 4 CO results show that idle mixture setting was not the cause of the relatively high CO emissions in the FTP with Car 01.

The number of tests performed in the project is summarized as follows:

Car	As Received		After Tune-up	
	Tests		Tests	
01	2 <sup>a</sup>			
02	2			
03	2		2	
04	2		1 <sup>b</sup>	
05	2		2	
06	2		2	
07	2		2	
08	2		2	
09	2		1 <sup>c</sup>	
10	2		2	

<sup>a</sup>Since the Buick Regal met all tune-up requirements, the two tests conducted were designated as-received tests.

<sup>b</sup>Carburetor was out of adjustment during second test. The test was not repeated as the first test after tune-up gave emissions similar to the as-received tests.

<sup>c</sup>First run after tune-up very similar to as-received emission rates, therefore test not repeated.

The tune-up adjustments and part replacements that were performed on Cars 03 through 10 are summarized in Table 12. Car 02, a 1979 Mercury Marquis did not require any significant adjustments or part replacements during tune-ups. The most common adjustment required was idle rpm. Part replacements included plugs, plug wires, air filters, EGR valves, a rotor, a distributor cap, and miscellaneous vacuum lines.

#### C. Regulated and Unregulated Emission Test Results

Summaries of the test results are included in Appendix B. Individual sample data for the FTP evaluations are included in Appendix C and the computer printouts for the regulated emissions are included in Appendix D. The analyses and discussion of these test results are included in Section V of this report. All FTP unregulated emissions data are based on appropriately weighted four-cycle FTP results. In the data tables, a double dash (--) has been used when no test data were available. This occurs for unregulated emissions when valid test data could not be obtained due to instrument malfunction or loss of the sample.

#### D. I/M Short-Test Procedure Results

Each car was evaluated over four short-tests after each set of as-received and after tune-up tests. Three of the short-tests involved

TABLE 12. SUMMARY OF TUNEUP ADJUSTMENTS AND PART REPLACEMENTS (CARS 3 - 10)

Car No.	03	04	05	06	07	08	09	10
Adjustment Required								
Idle RPM	8% High	12% High	17% High	13% High	26% High	6° Low	14% Low	13% High 4° High
Ignition Timing								
Idle CO%			0.6% High					
Choke		✓						
Parts Replaced								
Plugs					✓	✓		
Air Filter	✓			✓	✓	✓	✓	
Plug Wires	✓			✓		✓	✓	
EGR				✓		✓	✓ <sup>f</sup>	
Other	a			b,c,d		e		g,h

<sup>a</sup>Vacuum lines to temperature switch in the air cleaner reversed<sup>b</sup>Line to EGR was plugged with sawed off top portion of a spark plug; line was connected properly and unbroken otherwise<sup>c</sup>Vacuum line from base of carburetor to vacuum canister broken<sup>d</sup>No. 1 plug loose<sup>e</sup>PCV hose split, replaced<sup>f</sup>EGR port on the intake manifold was plugged with carbon deposits, EGR was functioning but was replaced because of excessive carbon deposits<sup>g</sup>Several brittle vacuum lines replaced<sup>h</sup>Replaced rotor and distributor cap

measurement of HC and CO under steady state operating conditions. The other short test involved determination of maximum engine speed at idle with propane injection into the intake of the engine. The HC and CO emissions analyzers used are in a Beckman cart which was initially designed for and used in nine-mode heavy-duty engine evaluations. HC was measured as ppm Hexane.

The results of the short-test evaluations are reported in Appendix E and are summarized in Table 13. The larger increase in engine rpm, with propane enrichment after tune-up, reflects the fact that most of the cars were running slightly rich as received. Car 08, however, was adjusted extremely lean as received. With the exception of Car 10, the HC and CO values did not change significantly after tune-up. There was a significant decrease in idle CO and all HC values after the tune-up of Car 10.

TABLE 13. SUMMARY OF I/M SHORT TEST RESULTS

	Undiluted Exhaust Emissions			
	HC Emissions, ppm Hexane		CO Emissions, Percent	
	As-Received	After Tune-up	As-Received	After Tune-up
<u>Car 01</u>				
Idle	74		0.01	
2500 rpm	67		0.02	
30 mph	83		0.03	
50 mph	68		0.01	
<u>Car 02</u>				
Idle	90		0.06	
2500 rpm	67		0.02	
30 mph	91		0.01	
50 mph	73		0.00	
<u>Car 03</u>				
Idle	179	209	0.86	0.78
2500 rpm	98	93	0.27	0.26
30 mph	116	130	0.29	0.36
50 mph	63	58	0.01	0.00
<u>Car 04</u>				
Idle	97	109	0.02	0.00
2500 rpm	102	198	0.05	0.01
30 mph	221	175	0.02	0.01
50 mph	82	82	0.01	0.01
<u>Car 05</u>				
Idle	95	91	0.18	0.07
2500 rpm	75	84	0.17	0.07
30 mph	82	82	0.07	0.05
50 mph	62	69	0.02	0.01
<u>Car 06</u>				
Idle	64	71	0.01	0.01
2500 rpm	60	64	0.07	0.01
30 mph	69	60	0.01	0.01
50 mph	73	62	0.05	0.01
<u>Car 07</u>				
Idle	69	138	0.06	0.03
2500 rpm	64	152	0.02	0.03
30 mph	67	84	0.09	0.02
50 mph	60	67	0.01	0.03

TABLE 13 (Cont'd). SUMMARY OF I/M SHORT TEST RESULTS

	Undiluted Exhaust Emissions			
	HC Emissions, ppm Hexane		CO Emissions, Percent	
	As-Received	After Tune-up	As-Received	After Tune-up
<u>Car 08</u>				
Idle	95	92	0.04	0.02
2500 rpm	56	89	0.01	0.48
30 mph	58	67	0.00	0.01
50 mph	64	60	0.00	0.02
<u>Car 09</u>				
Idle	249	326	0.56	0.42
2500 rpm	102	152	0.03	0.10
30 mph	221	134	0.03	0.06
50 mph	109	107	0.00	0.00
<u>Car 10</u>				
Idle	483+	109	0.69	0.07
2500 rpm	483+	107	0.16	0.03
30 mph	483+	100	0.14	0.17
50 mph	483+	64	0.02	0.02
Idle Propane Enrichment, rpm Increase				
<u>Car</u>	<u>Gear</u>	<u>As-Received</u>	<u>After Tune-up</u>	
01	Neutral	60		
02	Neutral	40		
03	Neutral	10	10	
04	Neutral	210	300	
05	Neutral	200	240	
06	Neutral	130	230	
07	Neutral	20	170	
08	Neutral	630	280	
09	Neutral	15	40	
10	Neutral	0	90	
01	Drive	10		
02	Drive	0		
03	Drive	0	0	
04	Drive	30	50	
05	Drive	NA	NA	
06	Drive	20	55	
07	Drive	0	65	
08	Drive	130	35	
09	Drive	NA	NA	
10	Drive	0	20	

## V. ANALYSES OF THE RESULTS

This section reports the analyses performed on the emissions data generated in the project. The analyses involved averaging and reformatting to enable making various comparisons of the data. Due to the very limited number of data points for each emission at each specific condition, advanced statistical analyses were judged to be inapplicable. In addition to presenting the data in formats that enable ready review and comparison, these results are also compared with results obtained in several previous related projects.

### A Regulated Emissions and Fuel Consumption

The initial analyses of the data involved averaging the results for the duplicate as-received and for the duplicate after tune-up tests. These averages are given in Appendix F. A summary of the average regulated emissions and fuel consumption data is presented in Table 14.

Comparisons of the after tune-up emissions and fuel consumption with the corresponding as-received emissions and fuel consumption, for cars 03 through 10, are presented in Table 15. Cars 01 and 02 required little or no tune-up, therefore the as-received and after tune-up emissions and fuel consumption were essentially identical. Numbers less than one in Table 15 indicate a decrease in emissions and fuel consumption after tune-up. As shown in Table 15, cars 06, 08, and 10 gave the most significant changes in regulated emissions. Cars 06 and 08 had malfunctioning EGR valves which apparently caused high NO<sub>x</sub> emission rates. Car 08 was also running extremely lean as-received. After replacement of the EGR valve, both cars had an approximate 70 percent decrease in the NO<sub>x</sub> emission rates. In car 08, the hydrocarbon and carbon monoxide emission rates increased after tune-up; but the as-received emission rates were much lower than those for car 06 which had identical emission control devices and engine size. Both cars had similar emission rates after tune-up. Car 10 was running rich as-received and required a rotor and distributor cap replacement. Car 10, as-received, also had the highest hydrocarbon, carbon monoxide, and NO<sub>x</sub> emission rates of the cars tested. The hydrocarbon, carbon monoxide, and NO<sub>x</sub> emission rates were all lower after tune-up. Car tune-ups resulted in decreases in FTP carbon monoxide emission rates and fuel consumption for several of the ten cars.

Nine of the ten cars tested as-received in the program had one or more regulated emissions which exceeded the emission standards they were designed to meet. After tune-up, seven of the cars still had one or more emissions which exceeded the emission standards. The ratios of the as-received and after tune-up regulated emissions to the emission standards are presented in Table 16. This table indicates which cars had emission rates that exceeded the emission standards. As-received, five cars exceeded the hydrocarbon emission standard, three exceeded the carbon monoxide emission standard, and five exceeded the NO<sub>x</sub> emission

TABLE 14. SUMMARY OF THE AVERAGE REGULATED EMISSIONS AND FUEL CONSUMPTION DATA

	<u>FTP</u>							
	HC (g/km)		CO (g/km)		NO <sub>X</sub> (g/km)		Fuel Consumption (l/100 km)	
	As-Rec'd	After Tune-up	As-Rec'd	After Tune-up	As-Rec'd	After Tune-up	As-Rec'd	After Tune-up
Car 01	1.06		14.55		0.94		13.95	
Car 02	0.43		3.48		1.43		16.64	
Car 03	0.43	0.42	3.68	2.41	1.03	1.07	17.25	16.50
Car 04	1.08	1.12*	7.02	5.61*	0.62	0.67*	18.68	18.32*
Car 05	0.38	0.38	3.64	3.34	0.50	0.55	13.21	12.48
Car 06	0.54	0.48	9.11	8.52	2.16	0.68	12.42	12.77
Car 07	0.40	0.41	8.22	7.57	0.45	0.44	16.83	16.26
Car 08	0.28	0.52	3.07	9.10	2.09	0.71	12.78	12.60
Car 09	0.40	0.34*	1.60	1.38*	1.86	1.80*	7.73	7.61*
Car 10	2.84*	0.83	37.60*	10.15	2.28*	1.88	19.32*	17.93
<u>HFET</u>								
Car 01	0.18		0.67		0.89		9.60	
Car 02	0.16		0.29		1.27		10.79	
Car 03	0.17	0.11	1.59	0.40	1.56	1.43	11.09	10.68
Car 04	0.54	0.68*	2.47	1.79*	0.68	0.77*	12.35	12.36*
Car 05	0.24	0.24	1.54	1.17	0.29	0.30	7.82	7.81
Car 06	0.12	0.10	0.86	0.94	2.93	0.68	8.91	9.24
Car 07	0.11	0.13	1.45	1.60	0.37	0.36	10.60	10.91
Car 08	0.07	0.14	0.16	1.36	2.57	0.79	8.41	8.55
Car 09	0.14	0.10*	0.11	0.08*	2.08	1.77*	5.15	5.02*
Car 10	0.38*	0.15	2.33*	0.67	1.49*	1.23	12.25*	11.97

\*Only one test point

TABLE 15. RATIO OF THE AFTER TUNE-UP REGULATED EMISSIONS  
AND FUEL CONSUMPTION TO THE AS-RECEIVED REGULATED  
EMISSIONS AND FUEL CONSUMPTION\*

	FTP (After Tune-up/As Received)			
	<u>Hydrocarbons</u>	<u>Carbon Monoxide</u>	<u>Oxides of Nitrogen</u>	<u>Fuel Consumption</u>
Car 03	0.98	0.65	1.04	0.96
Car 04	1.04	0.80	1.08	0.98
Car 05	1.00	0.92	1.10	0.94
Car 06	0.83	0.94	0.31	1.03
Car 07	1.03	0.92	0.98	0.97
Car 08	1.86	2.96	0.34	0.99
Car 09	0.85	0.86	0.97	0.98
Car 10	0.29	0.27	0.82	0.93

	HFET (After Tune-up/As Received)			
Car 03	0.65	0.25	0.92	0.96
Car 04	1.26	0.72	1.13	1.00
Car 05	1.00	0.76	1.03	1.00
Car 06	0.83	1.09	0.23	1.04
Car 07	1.18	1.10	0.97	1.03
Car 08	2.00	8.50	0.31	1.02
Car 09	0.71	0.73	0.85	0.97
Car 10	0.39	0.29	0.83	0.98

\*Numbers less than one indicate an improvement in emissions and fuel economy after car tune-up. Cars 1 and 2 required little or no tune-up, therefore emissions were not evaluated after tune-up.

TABLE 16. RATIO OF THE AS-RECEIVED AND AFTER TUNE-UP  
REGULATED EMISSIONS TO THE 1978 AND 1979  
EMISSION STANDARDS<sup>a</sup>

	FTP Measured Emissions/FTP Emission Standard <sup>b</sup>					
	HC		CO		NO <sub>x</sub>	
	As-Rec'd	After	As-Rec'd	After	As-Rec'd	After
Car 01	1.1	1.1 <sup>c</sup>	1.6	1.6 <sup>c</sup>	0.8	0.8 <sup>c</sup>
Car 02	0.5	0.5 <sup>c</sup>	0.4	0.4	1.2	1.2 <sup>c</sup>
Car 03	0.5	0.5	0.4	0.3	0.8	0.9
Car 04	1.2	1.2	0.8	0.6	0.5	0.5
Car 05	1.5	1.5	0.7	0.6	0.5	0.6
Car 06	0.6	0.5	1.0	0.9	1.7	0.7
Car 07	1.5	1.6	1.5	1.4	0.5	0.5
Car 08	0.3	0.6	0.3	1.0	1.7	0.6
Car 09	0.4	0.4	0.2	0.1	1.5	1.5
Car 10	3.1	0.9	4.0	1.1	1.8	1.5

<sup>a</sup>Numbers greater than one indicate the vehicle emission rate exceeded the Emission Standard.

<sup>b</sup>Cars 01, 02, 03, 04, 06, 08, 09 and 10 compared to 1978/1979 Federal Emission Standards of 0.93 g/km HC, 9.32 g/km CO, and 1.24 g/km NO<sub>x</sub>. Cars 05 and 07 compared to 1978 California Emission Standards of 0.25 g/km HC, 5.59 g/km CO, and 0.93 g/km NO<sub>x</sub>.

<sup>c</sup>Cars 01 and 02 required little or no tune-up; therefore the after tune-up emission rates are equal to the as-received emission rates.

standard. After tune-up, four cars exceeded the hydrocarbon emission standard, three exceeded the carbon monoxide standard, and three exceeded the NO<sub>x</sub> standard.

#### B. Aldehyde and Ketone Emission Rates

Five individual aldehydes and ketones were evaluated in this project: formaldehyde, acetaldehyde, acetone (includes propionaldehyde and acrolein), methyl ethyl ketone and hexanaldehyde. Acetone, methyl ethyl ketone and hexanaldehyde were detected only in small quantities, and randomly, in the exhaust of the ten high mileage cars. Only formaldehyde and acetaldehyde were consistently found in the exhaust. The formaldehyde, acetaldehyde, and total aldehyde rates are summarized in Table 17. The as-received and after tune-up averages for all ten cars indicate a small decrease in aldehydes after tune-up. The high mileage cars have aldehyde emission rates higher than those for corresponding new cars, but they are still well below the emission rates for non-catalyst cars. These comparisons are shown in Table 18.

#### C. Elemental Analysis Results

A summary of the elemental analysis results, for the FTP, is presented in Table 19. The emission rates are relatively low and are within the range encountered in previous projects involving oxidation and three-way catalyst cars.<sup>(1,2,3,4)</sup> There is no apparent relationship between the as-received and after tune-up emission rates.

#### D. Other Unregulated Emissions

The remainder of the unregulated emissions measured in this project are averaged and summarized in Table 20. The average emission rates (10 cars) for particulates, total organic sulfides and nitrous oxide decreased after tune-up, while the others remained unchanged or increased. Table 21 lists the number of cars which had emission rates decrease, increase, or remain unchanged after car tune-up. The emission rates decreased for five or more cars only in the case of particulates, organic sulfides, and nitrous oxide.

#### E. Comparison of Results with Previous Projects

In Tables 22 through 27, the emission rates of the ten 1978 and 1979 high mileage cars have been compared to the emission rates of equivalent or similar, but generally low mileage, cars tested in previous projects.<sup>(1,2,3,4)</sup> In Table 27, the emission rates for Cars 09 and 10 are compared to the average emission rates for four 1978 oxidation catalyst cars; since similar cars had not been tested in previous projects. To provide an overall comparison, the emission rates of the ten cars have been averaged and compared to the average emission rates of previously tested non-catalyst, oxidation catalyst, and three-way catalyst cars. These results are given in Table 28. In general, the average emission rates for the high mileage cars are higher, both as-

TABLE 17. AVERAGE ALDEHYDE EMISSION RATES FROM HIGH MILEAGE CATALYST CARS

	Average Emission Rate (mg/km)					
	FTP			HFET		
	<u>Form-</u> <u>aldehyde</u>	<u>Acet-</u> <u>aldehyde</u>	Total Aldehydes and Ketones	<u>Form-</u> <u>aldehyde</u>	<u>Acet-</u> <u>aldehyde</u>	Total Aldehydes and Ketones
Car 01	8.83	1.62	10.5	3.73	0.93	5.0
Car 02	0.00	0.30	0.3	2.14	0.00	2.2
Car 03 (As-Received)	2.88	1.03	3.9	0.00	0.00	0.0
Car 03 (After Tune-up)	0.94	0.00	0.9	3.24	0.00	3.3
Car 04 (as-Received)	5.38	1.14	6.5	3.59	1.14	4.8
Car 04 (After Tune-up) <sup>a</sup>	7.37	1.68	9.1	4.53	0.25	4.8
Car 05 (As-Received)	1.75	0.85	2.6	0.50	0.17	0.7
Car 05 (After Tune-up)	0.41	0.82	1.3	0.02	0.13	0.2
Car 06 (As-Received)	1.13	2.14	3.6	0.10	0.70	1.1
Car 06 (After Tune-up)	1.22	1.21	2.6	0.60	0.41	1.0
Car 07 (As-Received)	6.36	1.33	7.7	4.57	0.75	5.3
Car 07 (After Tune-up)	7.68	0.84	8.5	6.61	1.03	7.7
Car 08 (As-Received)	5.31	0.00	5.3	2.32	0.00	3.3
Car 08 (After Tune-up)	1.27	0.30	1.6	0.60	0.00	0.6
Car 09 (As-Received)	1.70	0.00	1.7	0.90	0.00	0.9
Car 09 (After Tune-up)	1.34	0.00	1.3	2.45	0.00	2.4
Car 10 (As-Received) <sup>a</sup>	17.01	2.82	19.8	6.44	1.66	8.1
Car 10 (After Tune-up)	5.81	0.18	6.0	1.68	0.40	2.1
Average All Cars <sup>b</sup> (As-Received)	5.04 <sup>c</sup>	1.12	6.2	2.43	0.54	3.1
Average All Cars <sup>b</sup> (After Tune-up)	3.49 <sup>c</sup>	0.70	4.2	2.56	0.32	2.9

<sup>a</sup>Only one test point<sup>b</sup>Data for Cars 1 and 2 used in both averages<sup>c</sup>Values of 3.7 and 3.2 when data for Car 10 omitted

TABLE 18. COMPARISON OF AVERAGE FTP ALDEHYDE EMISSION RATES  
TO EMISSION RATES FROM PREVIOUS PROJECTS

	Emission Rates, mg/km								
	High Mileage Cars				Low Mileage Cars				Non-Catalyst Cars
	Oxidation Catalyst		3-Way Catalyst		Oxidation Catalyst <sup>a</sup>	3-Way Catalyst <sup>b</sup>			
	As-Rec'd	After Tune-Up	As-Rec'd	After Tune-Up					1970 <sup>c</sup> 1977 <sup>b</sup>
Formaldehyde	7	5	2	<1	2	1			32 10
Acetaldehyde	1	1	1	<1	<1	<1			4 2
Total Adlehydes	8	6	2	1	2	1			37 13

<sup>a</sup>Average for four 1978 oxidation catalyst-equipped cars in unmodified configuration,  
EPA Contract 68-03-2499

<sup>b</sup>Average for four 1978 and 1979 three-way catalyst-equipped cars in unmodified  
configuration, EPA Contracts 68-03-2588 and 68-03-2692

<sup>c</sup>Average for four 1970 non-catalyst cars, in unmodified configuration,  
EPA Contract 69-03-2884, Tasks 4 and 5

<sup>d</sup>Value from one 1977 non-catalyst car in unmodified configuration,  
EPA Contract 68-03-2499

TABLE 19. SUMMARY OF THE AVERAGE ELEMENTAL ANALYSES RESULTS FOR THE FTP

42

	Emission Rate, mg/km												
	S	Mg	Cl	Al	Zn	Si	Ca	Fe	P	Br	Mo <sup>a</sup>	Wa	Sr <sup>a</sup>
Car 01	0.03	0.01	0.01	0.01	0.02	0.02	0.04	0.12	0.02	0.00	--	--	--
Car 02	0.37	0.00	0.01	0.01	0.00	0.11	0.02	0.20	0.00	0.00	--	--	--
Car 03 (As-Received)	0.12	0.00	0.04	0.03	0.00	0.16	0.02	0.50	0.01	0.17	--	--	--
Car 03 (After Tune-up)	0.20	0.01	0.01	0.11	0.00	0.10	0.04	0.95	0.02	0.04	--	--	--
Car 04 (As-Received)	0.07	0.00	0.02	0.01	0.02	0.92	0.06	0.54	0.02	0.12	--	--	--
Car 04 (After Tune-up)	0.13	0.02	0.01	0.01	0.07	0.16	0.04	0.43	0.05	0.13	--	--	--
Car 05 (As-Received)	0.05	0.01	0.05	0.02	0.00	0.04	0.12	0.50	0.02	0.21	--	--	--
Car 05 (After Tune-up)	0.04	0.01	0.01	0.00	0.00	0.02	0.09	0.21	0.02	0.20	--	--	--
Car 06 (As-Received)	0.04	0.01	0.00	0.03	0.01	0.01	0.04	0.37	0.03	0.09	--	--	--
Car 06 (After Tune-up)	0.04	0.02	0.01	0.03	0.02	0.03	0.17	0.20	0.02	0.06	--	--	--
Car 07 (As-Received)	0.10	0.02	0.02	0.03	0.03	0.09	0.22	0.32	0.02	0.00	0.27	0.00	0.16
Car 07 (After Tune-up)	0.10	0.01	0.01	0.02	0.01	0.01	0.08	0.10	0.01	0.00	0.28	0.00	0.19
Car 08 (As-Received)	0.06	0.01	0.01	0.04	0.01	0.02	0.06	0.49	0.01	0.00	0.17	0.02	0.12
Car 08 (After Tune-up)	0.03	0.01	0.01	0.02	0.01	0.01	0.05	0.09	0.00	0.00	0.23	0.03	0.14
Car 09 (As-Received)	0.26	0.00	0.00	0.01	0.01	0.02	0.06	0.05	0.00	0.00	0.25	0.00	0.15
Car 09 (After Tune-up)	0.08	0.00	0.01	0.01	0.04	0.00	0.08	0.19	0.02	0.00	0.18	0.05	0.16
Car 10 (As-Received)	1.28	0.37	0.46	0.21	1.95	0.40	1.93	9.23	1.20	0.02	0.51	0.13	0.30
Car 10 (After Tune-up)	0.28	0.12	0.08	0.02	0.20	0.06	0.53	0.49	0.26	0.00	0.28	0.04	0.16

<sup>a</sup>These analyses not conducted for Cars 01-06.<sup>b</sup>Car 10, as received, also had appreciable emission rates for lead (0.99 mg/km), sodium (0.28 mg/km), and manganese (0.29 mg/km).

S-Sulfur	Cl-Chlorine	Zn-Zinc	Ca-Calcium	P-Phosphorus	Mo-Molybdenum	Sr-Strontium
Mg-Magnesium	Al-Aluminum	Si-Silicon	Fe-Iron	Br-Bromine	W-Tungsten	

Note: With exception of lead, sodium and manganese emission rates for Car 10, compounds not included in this table had rates less than 0.05 mg/km and were found in exhaust of only four or less cars.

TABLE 20. AVERAGE UNREGULATED EMISSIONS DATA

	<u>FTP Emission Rates, mg/km</u>	
	<u>Average for 10 Cars As-Received</u>	<u>Average for 10 Cars After Tune-up</u>
<u>Total Particulates</u>	49	32
<u>Compound Group Totals</u>		
Organic Sulfides	0.2	0.1
Organic Amines	0.01	0.01
<u>Other Compounds</u>		
Ammonia	7	9
Cyanide and Cyanogen	1	1
Hydrogen Sulfide	0.03	0.03
Nitrous Oxide	46	36

TABLE 21. RELATIONSHIP OF THE AS-RECEIVED TO THE  
AFTER TUNE-UP FTP EMISSION RESULTS

	<u>No. of Cars for which emissions Decreased after Tune-up</u>	<u>No. of Cars for which emissions Increased after Tune-up</u>	<u>No. of Cars for which emissions remained unchanged after Tune-up*</u>
<u>Total Particulates</u>	5	3	2
<u>Compound Group Totals</u>			
Organic Sulfides	5	1	4
Organic Amines	1	0	9
<u>Other Compounds</u>			
Ammonia	4	4	2
Cyanide and Cyanogen	3	5	2
Hydrogen Sulfide	0	3	7
Nitrous Oxide	6	2	2

\*Since Cars 1 and 2 required little or no tune-up, the as-received emissions and after tune-up emissions are assumed to be unchanged.

TABLE 22. COMPARISON OF CARS, 01, 06, AND 08 WITH RESULTS FROM PREVIOUS PROJECTS

	Car 01 1978 Buick Regal	FTP Emission Rates in mg/km					
		Car 06-1978 Olds. Cutlass After		Car 08-1978 Monte Carlo After		1978 Malibu Previous Project	
		As-Rec'd	Tune-up	As-Rec'd	Tune-up	Unmod. <sup>a</sup>	Maximum <sup>b</sup>
<u>Regulated Emissions</u>							
Hydrocarbons	1,060	540	475	275	520	310	1,780
Carbon Monoxide	14,550	9,110	8,520	3,070	9,095	5,540	26,020
Oxides of Nitrogen	940	2,155	680	2,090	710	750	1,110
<u>Particulates</u>							
Total Particulates	31	19	18	20	38	6	9
<u>Compound Group Totals</u>							
Aldehydes & Ketones	10	4	3	5	2	2	5
Organic Sulfides	0.2	<0.1	<0.1	0.1	0.1	0.5	1.2
Organic Amines	<0.1	0.0	0.0	0.0	0.0	<0.1	0.1
<u>Other Compounds</u>							
Ammonia	6	14	7	7	4	3	18
Cyanide & Cyanogen	2	6	2	1	2	1	3
Hydrogen Sulfide	0.0	0.0	<0.1	0.0	<0.1	0.0	0.1
Nitrous Oxide	26	145	43	39	32	41	57
Fuel Consumption (l/100 km)							
	14.0	12.4	12.8	12.8	12.6	13.7	14.7

Note: 1978 Federal Emission Standards in mg/km were: 932; 9,323; and 1,243 for HC, CO & NO<sub>x</sub>

<sup>a</sup>Average emission rates (4 FTP's) for a 1978 Chevrolet Malibu with a 305 CID engine and w/o an air pump in unmodified configuration, EPA Contract 68-03-2499.

<sup>b</sup>Maximum emission rates for a 1978 Chevrolet Malibu with a 305 CID engine and w/o an air pump in modified or malfunction configuration, EPA Contract 68-03-2499.

TABLE 23. COMPARISON OF CARS 02 AND 03 WITH RESULTS FROM PREVIOUS PROJECTS

	FTP Emission Rates in mg/km					
	Car 03		1979 Marquis		Previous Projects	
	Car 02 1979 Marquis As-Rec'd	As-Rec'd	After Tune-up	1979 Marquis Unmod. <sup>a</sup>	19,000 miles <sup>b</sup>	Maximum <sup>c</sup>
<u>Regulated Emissions</u>						
Hydrocarbons	430	420	420	130	230	1,800
Carbon Monoxide	3,475	3,680	2,410	1,630	1,340	52,410
Oxides of Nitrogen	1,430	1,030	1,065	830	1,010	2,510
<u>Particulates</u>						
Total Particulates	17	24	16	4	--	11
<u>Compound Group Totals</u>						
Aldehydes & Ketones	<1	4	2	3	5	3
Organic Sulfides	0.4	0.6	0.1	0.2	<0.1	0.6
Organic Amines	0.0	<0.1	<0.1	0.0	<0.1	<0.1
<u>Other Compounds</u>						
Ammonia	12	1	3	5	2	253
Cyanide & Cyanogen	0.1	0.1	0.3	0.3	0.9	112
Hydrogen Sulfide	0.0	0.0	0.0	0.0	0.0	1
Nitrous Oxide	59	53	49	24	37	88
FTP Fuel Consumption (l/100 km)						
	16.6	17.3	16.5	15.8	15.5	18.5

Note: 1979 Emission Standards in mg/km were:  
 930; 9,322 and 1,243 for HC, CO and NO<sub>x</sub>

<sup>a</sup>Average emission rates (4 FTPs) for a 1979 Mercury Marquis in unmodified configuration,  
 EPA Contract 68-03-2692

<sup>b</sup>Average emission rates (6 FTP's, 2 each for 3 fuels) for a 1979 Mercuey Marquis at 19,000 miles,  
 EPA Contract 68-02-2497

<sup>c</sup>Maximum emission rate for a 1979 Mercury Marquis in unmodified or malfunction configuration,  
 EPA Contract 68-03-2692

TABLE 24. COMPARISON OF CAR 04 WITH RESULTS FROM PREVIOUS PROJECTS

FTP Emission Rates in mg/km				
Car 04-		1978 Granada		
1978 Granada		Previous Project		
As-Rec'd	After Tune-up	Unmod. <sup>a</sup>	Maximum <sup>b</sup>	
<u>Regulated Emissions</u>				
Hydrocarbons	1,080	1,120	300	2,260
Carbon Monoxide	7,020	5,610	1,500	50,620
Oxides of Nitrogen	620	670	1,200	4,130
<u>Particulates</u>				
Total Particulates	36	44	8	18
<u>Compound Group Totals</u>				
Aldehydes & Ketones	7	9	3	10
Organic Sulfides	0.0	0.0	0.1	0.8
Organic Amines	0.0	0.0	<0.1	0.1
<u>Other Compounds</u>				
Ammonia	5	3	2	21
Cyanide & Cyanogen	0.6	1.0	0.2	1.5
Hydrogen Sulfide	0.0	0.0	0.0	0.7
Nitrous Oxide	7	6	21	60
FTP Fuel Consumption (l/100 km)				
	18.7	18.3	15.2	17.2

Note: 1978 Emission Standards in mg/km were: 930; 9,322; and 1,243 for HC, CO and NO<sub>x</sub>.

<sup>a</sup>Average emission rates (4 FTP's) for a 1978 Ford Granada in unmodified configuration, EPA Contract 68-03-2499.

<sup>b</sup>Maximum emission rate for a 1978 Ford Granada in unmodified or malfunction configuration, EPA Contract 68-03-2499.

TABLE 25. COMPARISON OF CAR 05 WITH RESULTS FROM  
PREVIOUS PROJECTS

FTP Emission Rates in mg/km					
	Car 05-1978 Volvo	1978 Saab	Previous Projects		
	As-Rec'd	Tune-up	After	Unmod. <sup>a</sup>	19,000 mi. <sup>b</sup>
<u>Regulated Emissions</u>					
Hydrocarbons	380	380		100	150
Carbon Monoxide	3,680	3,340		2,090	2,340
Oxides of Nitrogen	500	545		110	670
					220
<u>Particulates</u>					
Total Particulates	8	2		5	-
					17
<u>Compound Group Totals</u>					
Aldehydes & Ketones	3	1		< 1	2
Organic Sulfides	0.1	<0.1		0.3	<0.1
Organic Amines	0.0	0.0		<0.1	<0.1
<u>Other Compounds</u>					
Ammonia	19	31		61	2
Cyanide & Cyanogen	0.7	0.9		1.1	2.4
Hydrogen Sulfide	0.0	0.0		0.1	0.0
Nitrous Oxide	106	123		11	22
					23
FTP Fuel Consumption (l/100 km)					
	13.2	12.5		10.8	11.3
					13.0

Note: 1978 California Emission Standards in mg/km were 255; 5594; and 932 for HC, CO and NO<sub>x</sub>

<sup>a</sup>Average emission rates (4 FTP's) for a 1978 Saab 99 in unmodified configuration, EPA Contract 68-03-2588.

<sup>b</sup>Average emission rates (6 FTP's, 2 each for 3 fuels) for a 1978 Saab 99 at 19,000 miles, EPA Contract 68-02-2497.

<sup>c</sup>Maximum emission rates for a 1978 Saab 99 in unmodified or malfunction configuration, EPA Contract 68-03-2588.

TABLE 26. COMPARISON OF CAR 07 WITH RESULTS  
FROM PREVIOUS PROJECTS

	FTP Emission Rates in mg/km			
	Car 07-		Car 07	
	1978 Malibu	After	Previous Project	
	As-Rec'd	Tune-up	Unmod. <sup>a</sup>	Maximum <sup>b</sup>
<u>Regulated Emissions</u>				
Hydrocarbons	400	410	185	1,240
Carbon Monoxide	8,215	7,565	2,158	52,930
Oxides of Nitrogen	450	440	425	1,395
<u>Particulates</u>				
Total Particulates	31	38	3	15
<u>Compound Group Totals</u>				
Aldheydes & Ketones	8	9	1	12
Organic Sulfides	0.1	<0.1	0.2	0.4
Organic Amines	0.0	0.0	<0.1	<0.1
<u>Other Compounds</u>				
Ammonia	3	13	5	12
Cyanide & Cyanogen	0.7	0.3	0.1	1.6
Hydrogen Sulfide	0.0	0.0	0.0	0.1
Nitrous Oxide	2	3	5	10
<u>Fuel Consumption (l/100 km)</u>				
	16.8	16.3	17.4	19.0

Note: 1978 California Emission Standards in mg/km were 255; 5594; and 932 for HC, CO, and NO<sub>x</sub>

<sup>a</sup>Average emission rates (4 FTP's) for Car 07 in unmodified configuration, EPA Contract 68-03-2499 (Car 07 was known as Car 13 in Contract 68-03-2499).

<sup>b</sup>Maximum emission rates for Car 07 in unmodified or malfunction configuration, EPA Contract 68-03-2499 (Car 07 was known as Car 13 in Contract 68-03-2499).

TABLE 27. COMPARISON OF CARS 9 AND 10 WITH RESULTS FROM PREVIOUS PROJECTS

	FTP Emission Rates in mg/km					
	Car 09-1978 Fiesta		Car 10-1978 New Yorker		Four 1978 Oxid. Catalyst Cars, Previous Projects	
	As-Rec'd	After Tune-up <sup>a</sup>	As-Rec'd	After Tune-up	Avg. Unmod. <sup>b</sup>	Maximum <sup>c</sup>
	<u>Regulated Emissions</u>					
Hydrocarbons						
	395	340	2,840	825	275	2,255
Carbon Monoxide						
	1,595	1,380	37,600	10,145	3,145	52,930
Oxides of Nitrogen						
	1,860	1,800	2,280	1,880	860	4,150
<u>Particulates</u>						
Total Particulates						
	35	33	264	83	6	18
<u>Compound Group Totals</u>						
Aldehydes & Ketones						
	2	1	20	6	3	12
Organic Sulfides						
	<0.1	<0.1	<0.1	<0.1	0.3	1.0
Organic Amines						
	0.0	0.0	0.0	0.0	<0.1	0.1
<u>Other Compounds</u>						
Ammonia						
	2	2	3	4	3	57
Cyanide & Cyanogen						
	0.2	0.4	1.9	0.2	0.4	6
Hydrogen Sulfide						
	0.0	0.0	0.3	0.3	<0.1	0.7
Nitrous Oxide						
	9	7	13	13	26	60
Fuel Consumption (l/100 km)						
	7.7	7.6	19.9	17.9		

Note: 1978 Federal Emission Standards in mg/km were: 932; 9323; and 1243 for HC, CO and NO<sub>x</sub>.

<sup>a</sup>Only one test point

<sup>b</sup>Average emission rates of four 1978 oxidation catalyst cars tuned to manufacturer's specification, EPA Contract 68-03-2499.

<sup>c</sup>Maximum emission rate in unmodified or malfunction configuration for four 1978 oxidation catalyst cars, EPA Contract 68-03-2499.

TABLE 28. COMPARISON WITH RESULTS FROM PREVIOUS PROJECTS

	Average FTP Emission Rates, mg/km					
	High Mileage Cars		Oxid. Cat.	3-Way Cat.	Non-Catalyst	
	As-Rec'd	Tune-up	1978 <sup>b</sup>	1978 & 1979 <sup>b</sup>	1970 <sup>a</sup>	1977 <sup>b</sup>
<u>Regulated Emission</u>						
Hydrocarbons	780	600	280	120	1,900	730
Carbon Monoxide	9,200	6,610	3,150	1,900	17,100	11,100
Oxides of Nitrogen	1,340	1,020	860	480	2,600	1,210
<u>Total Particulates</u>	49	32	6	9	99 <sup>c</sup>	31
<u>Compound Group Totals</u>						
Aldehydes & Ketones	6	4	3	1	37	13
Organic Sulfides	<1	<1	<1	<1	<1	<1
Organic Amines	<1	<1	<1	<1	<1	<1
<u>Other Compounds</u>						
Ammonia	7	9	3	21	4	3
Cyanide & Cyanogen	1	1	<1	<1	3	2
Hydrogen Sulfide	<1	<1	<1	<1	<1	<1
Nitrous Oxide	46	36	26	17	--	3

<sup>a</sup>Data for four 1970 model cars from Tasks 4 and 5 of this contract

<sup>b</sup>Data for one 1977 non-catalyst, four oxidation catalyst, and four 3-way catalyst cars are from previous contracts, 68-03-2499, 68-03-2588, and 68-03-2697

<sup>c</sup>Leaded fuel used in the 1970 cars and unleaded fuel in all others

received and after tune-up, than the rates for the low mileage oxidation and three-way catalyst cars. However, the rates for the high mileage cars are lower than the rates for non-catalyst cars. Compared to the low mileage catalyst equipped cars, the high mileage cars produced particulate emission rates five times higher; hydrocarbon, carbon monoxide and aldehyde emission rates three times higher; and NO<sub>x</sub> and nitrous oxide emission rates two times higher.

#### F. Relative Importance of the Emission Rates

There are established automotive source emission standards for HC, CO, and NO<sub>x</sub>. Such standards can be utilized in a comparative analysis of the emission results for those compounds. For other compounds evaluated, however, attempted analysis of relative importance requires the application of some other available criteria. The criteria utilized in the previous projects were the Threshold Limit Values (TLV).<sup>(1)</sup> In brief, the criteria and procedure are described as follows:

The maximum emission rates (MER) are converted to an equivalent maximum emission concentration (MEC) in the undiluted exhaust. This MEC is then compared to the TLV. The TLV is the limit established by OSHA for exposure by a worker in any eight-hour work shift. The conversion from an emission rate in g/km to mg/m<sup>3</sup> was determined by the total volume of the undiluted exhaust and the total distance driven for each test. The volume of undiluted exhaust differs for each car, generally as a function of the fuel consumption rate.

The maximum emission rates are summarized and compared to the TLV in Table 29. This table also includes the overall average emission rates for the ten cars as received. These values are intended to provide some idea of the relative importance, based on toxicity, for some of the compounds evaluated. It should be emphasized, however, that definite conclusions are currently inappropriate for any compounds, except possibly those for which automotive source emission standards have been established. It should be recognized that the hazard level of a compound may change based on new findings in health effects research. This is especially a factor when a compound is changed from a toxic concern to a carcinogenic concern, such as is apparently occurring with formaldehyde.

On the basis of comparisons of the maximum and the overall average emissions rates to the threshold limit values, the currently regulated CO and NO<sub>x</sub> emissions appeared to be the most significant. Next in significance appeared to be formaldehyde; again, this significance is based on the toxicological properties of formaldehyde rather than its potential carcinogenicity.

TABLE 29. RELATIVE IMPORTANCE OF FTP EMISSION RATES

Maximum Emissions						
Emission Rate (ER) in mg/km	Car No.	Equivalent ER in Undiluted Exhaust in mg/m <sup>3</sup> (EC) <sup>a</sup>	Threshold Limit Value (TLV in mg/m <sup>3</sup> ) OSHA (9)	Rb	Ratio of EC to TLV	
<b>Regulated Emissions</b>						
Hydrocarbons	2,840	10	1,600	--	--	--
Carbon Monoxide	37,600	10	20,700	55	--	375
Oxides of Nitrogen	2,280	10	1,300	9	--	145
<b>Total Particulates</b>	264	10	145	--	--	--
<b>Compound Group Totals</b>						
Aldehydes & Ketones	20	10	11	--	--	--
Organic Sulfides	0.6	03	0.3	--	10	<1
Organic Amines	<0.1	01	<0.1	--	>10	<1
<b>Other Compounds</b>						
Ammonia	31	05	23	35	--	1
Cyanide & Cyanogen	6	06	5	--	5	1
Hydrogen Sulfide	0.3	10	0.1	--	10	<1
Nitrous Oxide	145	06	123	--	--	--
Formaldehyde	17	10	9	4	--	2
Average Emissions (as-Received)						
<b>Regulated Emissions</b>						
Hydrocarbons	780	--	570	--	--	--
Carbon Monoxide	9,200	--	6,720	55	--	120
Oxides of Nitrogen	1,340	--	980	9	--	110
<b>Total Particulates</b>	49	--	36	--	--	--
<b>Compound Group Totals</b>						
Aldehydes & Ketones	6	--	4	--	--	--
Organic Sulfides	0.2	--	0.1	--	10	<1
Organic Amines	<0.1	--	<0.1	--	>10	<1
<b>Other Compounds</b>						
Ammonia	7	--	5	35	--	<1
Cyanide & Cyanogen	1	--	0.7	--	5	<1
Hydrogen Sulfide	<0.1	--	<0.1	--	10	<1
Nitrous Oxide	46	--	34	--	--	--
Formaldehyde	5	--	4	4	--	1

<sup>a</sup>Derived on a wet basis using the following approximate calculations:  
 $\text{mg/m}^3 = \text{Conversion Factor} \times \text{mg/km}$ . CF = Distance × Dilution Factor ÷ Volume

<sup>b</sup>Based on values for some similar or related compounds as set by OSHA (9) or recommended by the 1968 American Conference of Governmental Industrial Hygienists (10)

#### LIST OF REFERENCES

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3. Urban, C.M., "Regulated and Unregulated Exhaust Emissions from a Malfunctioning Three-Way Catalyst Gasoline Automobiles" Final Report to Environmental Protection Agency under Contract No. 68-03-2692, January 1980.
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7. Code of Federal Regulations, Title 40, Chapter 1, Part 85, Subpart H Section applicable to 1979 Model Year Light-Duty Vehicles.
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9. U.S. HEW "Registry of Toxic Effect of Chemical Substances," 1976 and 1978 Editions.
10. Proceedings of the 1968 American Conference of Governmental Industrial Hygienists as reported in the Fifth Edition of the "Matheson Gas Data Book."

## APPENDICES

- A - GENERAL INFORMATION
- B - INDIVIDUAL TEST RESULT SUMMARY TABLES
- C - FTP INDIVIDUAL SAMPLE RESULTS
- D - COMPUTER PRINTOUTS OF THE TEST RESULTS
- E - SHORT-TEST RESULTS
- F - AVERAGE VALUES FOR FTP AND HFET RESULTS

## APPENDIX A

### GENERAL INFORMATION

- A-1 - I/M Short Test Procedures
- A-2 - Calculations for Unregulated Emissions
- A-3 - Memorandum to SwRC Employees
- A-4 - Tune-Up Check List

APPENDIX A-1. I/M SHORT TEST PROCEDURES

NOTE: All tests are to be run with the hood open and the cooling fan on.

1. Warm-up to normal operating condition

If engine is cold - run UDDS  
If engine is warm - run 505

2. Run 50 MPH in Drive or 3rd gear (FTP Inertia and HP Setting)

Minute 1 - check and adjust load  
Minute 2 - stabilize  
Minute 3 - measure HC and CO

3. Idle 6 minutes and then measure HC and CO in the 4-Mode Idle Test  
(30 seconds per mode)

- (a) Idle in Neutral
- (b) 2500 RPM in Neutral
- (c) Idle in Neutral
- (d) Idle in Drive (or with clutch in)

4. Run 30 MPH (3 minutes total) and set dynamometer at 9.0 actual HP  
with minimum inertia - Idle 6 minutes and then measure HC and CO in  
the loaded 2-Mode Test (30 seconds per mode)

- (a) 30 mph (Drive or 3rd Gear)
- (b) Idle in Neutral

5. Make a preliminary check of propane enrichment - Adjust propane flow  
rate until the engine speed peaks out (and starts to decrease)

Run 30 mph for two minutes

Idle in Neutral w/o propane for two minutes

Record RPM in each of the following conditions (each mode should take  
about 30 seconds):

- a. PCV system in place w/o propane
- b. PCV system in place with propane
- c. PCV valve removed from grommet w/o propane
- d. PCV valve removed from grommet with propane
- e. PCV fresh air line opened prior to PCV filter w/o propane
- f. PCV fresh air line opened prior to PCV filter with propane

NOTE: "a" and "b" will be repeated if initial checks show such to be  
worthwhile. Repeat the two minutes at 30 mph and at idle, and  
"a" through "f" in Drive, in cars with an automatic transmission.

## APPENDIX A-2. CALCULATIONS FOR UNREGULATED EMISSIONS

This appendices documents the calculational methods used for the unregulated emissions. All values not defined (i.e., CVS FLOW, VOL, etc.) are obtained from the computer printouts for the regulated emissions. Example printout is included as Table 1.

### A. Individual Hydrocarbons and N<sub>2</sub>O

1. For FTP Evaluations only, convert 2-Bag UDDS to Equivalent 1-Bag UDDS

$$\text{PPM 12} = \frac{\text{PPM}_1 \times \text{CVS FLOW}_1 + \text{PPM}_2 \times \text{CVS FLOW}_2}{\text{CVS FLOW}_1 + \text{CVS FLOW}_2}$$

$$\text{PPM 34} = \frac{\text{PPM}_3 \times \text{CVS FLOW}_3 + \text{PPM}_4 \times \text{CVS FLOW}_4}{\text{CVS FLOW}_3 + \text{PPM FLOW}_4}$$

2. Convert PPM to  $\mu\text{g}/\text{m}^3$ :

$$\mu\text{g}/\text{m}^3 = 35.32 \times \text{DENSITY} \times \text{PPM}$$

<u>Density, g/ft<sup>3</sup></u>			
Methane CH <sub>4</sub>	- 18.86	Propane C <sub>3</sub> H <sub>8</sub>	- 17.29
Ethylene C <sub>2</sub> H <sub>4</sub>	- 16.50	Propylene C <sub>3</sub> H <sub>6</sub>	- 16.50
Ethane C <sub>2</sub> H <sub>6</sub>	- 17.68	Benzene C <sub>6</sub> H <sub>6</sub>	- 15.33
Acetylene C <sub>2</sub> H <sub>2</sub>	- 15.33	Toluene C <sub>7</sub> H <sub>8</sub>	- 15.49
NH <sub>3</sub>	- 20.05	N <sub>2</sub> O	- 51.82

### B. Calculation of mg/km

$$\text{mg/km} = [(\text{EXH} \times \text{SCF} - \text{BG} \times \text{DFC}) \times \text{VOL} : \text{KM}] \div 1000$$

Calculations were performed using a Hewlett-Packard HP-65 Programmable Calculator

Dry (DFC) and (SFC) was used for all unregulated emissions except: IHC and N<sub>2</sub>O

DFC and SFC are obtained from the computer print-out for regulated emissions. (See Tables 1 and 2.)

### C. Metals and Other Elements

$$\text{COMPONENT WEIGHT ON FILTER} = \mu\text{g/cm}^2 \quad \text{EFF. FILTER AREA}$$

$$\text{EFF. FILTER AREA} = 14.3 \text{ cm}^2$$

$$\text{COMPONENT } \mu\text{g}/\text{m}^3 = \text{C.W.O.F.} \div \text{TOTAL WT.} \times (\mu\text{g}/\text{m}^3 \text{ for Total Wt.})$$

APPENDIX A-2 (Cont'd). CALCULATIONS FOR UNREGULATED EMISSIONS

D. Calculation of Oxygen

$$\text{Average} = \frac{\text{INTEGRATOR COUNTS}}{6.994 \times \text{SECONDS}} \times \text{FULL SCALE VALUE}$$
$$= \% \text{ for Oxygen}$$

E. Calculation for 4-FTP

$$\text{Composite 4-FTP} = 0.43 \times (\text{Value for 1&2}) + 0.57 \times (\text{Value for 3&4})$$

APPENDIX A-2 (Cont'd). CALCULATIONS FOR UNREGULATED EMISSIONS  
 TABLE 1.. COMPUTER PRINTOUT NOMENCLATURE FOR FOUR-BAG FTP  
 FTP VEHICLE EMISSIONS RESULTS  
 PROJECT

TEST NO.	RUN	VEHICLE NO.	TEST WEIGHT	KG (	LBS)
VEHICLE MODEL		DATE	ACTUAL ROAD LOAD	KW (	HP)
ENGINE L (	CID)	BAG CART NO. / CVS NO.	DIESEL		
TRANSMISSION		DYNO NO.	ODOMETER	KM (	MILES)
BAROMETER	MM HG (	IN HG)	DRY BULB TEMP.	DEG C (	DEG F)
RELATIVE HUMIDITY	PCT		ABS. HUMIDITY	GM/KG	NOX HUMIDITY CORRECTION FACTOR
BAG RESULTS					
BAG NUMBER			1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT
DESCRIPTION					4 STABILIZED
BLOWER DIF P MM, H2O(IN, H2O)					
BLOWER INLET P MM, H2O(IN, H2O)					
BLOWER INLET TEMP, DEG. C(DEG. F)					
BLOWER REVOLUTIONS					
TOT FLOW STD, CU. METRES(SCF)					
HC SAMPLE METER/RANGE/PPM					
HC BCKGRD METER/RANGE/PPM					
CO SAMPLE METER/RANGE/PPM					
CO BCKGRD METER/RANGE/PPM					
CO2 SAMPLE METER/RANGE/PCT					
CO2 BCKGRD METER/RANGE/PCT					
NOX SAMPLE METER/RANGE/PPM					
NOX BCKGRD METER/RANGE/PPM					
DILUTION FACTOR					
A-5 HC CONCENTRATION PPM					
CO CONCENTRATION PPM					
CO2 CONCENTRATION PCT					
NOX CONCENTRATION PPM					
HC MASS GRAMS					
CO MASS GRAMS					
CO2 MASS GRAMS					
NOX MASS GRAMS					
PARTICULATE MASS GRAMS					
HC GRAMS/KM					
CO GRAMS/KM					
CO2 GRAMS/KM					
NOX GRAMS/KM					
FUEL CONSUMPTION BY CB L/100KM					
RUN TIME	SECONDS				
MEASURED DISTANCE	KM				
SCF, DRY					
DFC, WET (DRY)					
SCF, WET (DRY)					
VOL (SCM)					
SAM BLR (SCM)					
KM (MEASURED)					
FUEL CONSUMPTION L/100KM					

COMPOSITE RESULTS

TEST NUMBER	
BAROMETER	MM HG
HUMIDITY	G/KG
TEMPERATURE	DEG C

	3-BAG	(4-BAG)
CARBON DIOXIDE	G/KM	( )
FUEL CONSUMPTION	L/100KM	( )
HYDROCARBONS (THC)	G/KM	( )
CARBON MONOXIDE	G/KM	( )
OXIDES OF NITROGEN	G/KM	( )
PARTICULATES	G/KM	( )

APPENDIX A-2 (CONT'D). CALCULATION FOR UNREGULATED EMISSIONS  
TABLE 2. DEFINITION OF COMPUTER PRINTOUT NOMENCLATURE

FOR FOUR-BAG AND SINGLE-BAG

REGULATED EMISSIONS

The following are primarily excerpts taken from the computer program:

AVG. EXH. OXYGEN: Direct printout of an input

CATALYST AVG. AND MAX. TEMPS.: Input converted to °C and printed-out

C DFC = DILUTION FACTOR CORRECTION DFC = FOR WET SAMPLES DFCD = FOR DRY

$$DF(J) = 13.4 / (YC2(2,J) + ((YH(2,J) + CC(2,J)) / 10000.))$$
$$DFC(J) = 1 - 1/DF(J)$$

C CALCULATE DFC, VOL. KM FOR BAGS 1+2 AND 3+4

C DF = TOTAL CVS FLOW / EXHAUST FLOW = AIR + EXH / EXH

C DFC = 1 - 1/DF = 1 - EXH/(AIR+EXH) = AIR/(AIR+EXH)

$$DFC12 = (DFC(1)*VMIX(1) + DFC(2)*VMIX(2)) / (VMIX(1) + VMIX(2))$$

$$DFC34 = (DFC(3)*VMIX(3) + DFC(4)*VMIX(4)) / (VMIX(3) + VMIX(4))$$

$$IF(RH.LT.20) RH = 20$$

$$DFCD12 = DFC12 * (1.0 - 0.000323*(RH - 20))$$

$$DFCD34 = DFC34 * (1.0 - 0.000323*(RH - 20))$$

C SCF = SAMPLE CORRECTION FACTOR FOR WATER REMOVAL SCF = FOR WET SCFD=DRY

$$SCF12 = 1.000$$

$$SCF34 = 1.000$$

$$SCFD12 = (SCFD(1)*VMIX(1)+SCFD(2)*VMIX(2)) / (VMIX(1) + VMIX(2))$$

$$SCFD34 = (SCFD(3)*VMIX(3)+SCFD(4)*VMIX(4)) / (VMIX(3) + VMIX(4))$$

TOTAL FUEL SULFUR:

C TFS = TOTAL FUEL SULFUR IN MG/KM

C TFS = L/100KM \* PCT \* G/ML \* 1000ML/L \* 0.01G/GPCT \* 1000MG/G

$$TFS = CBFM * FSWPCT * FPPG * 100.$$

C CALCULATE 4-BAG EMISSIONS AND FUEL CONSUMPTION

C 4-BAG = 0.43\*(BAG1+BAG2)/(MILES1+MILES2)+0.57\*(BAG3+BAG4)/(MILES3+MILES4)

$$DISTA=MILES(1) + MILES(2)$$

$$DISTB=MILES(2) + MILES(3)$$

$$DISTC=MILES(3) + MILES(4)$$

$$HCWM4 = 0.43*((HCM(1)+HCM(2)) / DISTA) + 0.57*((HCM(3)+HCM(4)) / DISTC)$$

$$COWM4 = 0.43*((COM(1)+COM(2)) / DISTA) + 0.57*((COM(3)+COM(4)) / DISTC)$$

$$CO2WM4= 0.43*((CO2M(1)+CO2M(2))/DISTA) + 0.57*((CO2M(3)+CO2M(4)) / DISTC)$$

$$NOXWM4= 0.43*((NOXM(1)+NOXM(2))/DISTA) + 0.57*((NOXM(3)+NOXM(4)) / DISTC)$$

$$CBFE4 = 2421. / (.866*HCWM4 + .429*COWM4 + .273*CO2WM4)$$

APPENDIX A-3  
DEPARTMENT OF EMISSIONS RESEARCH

MEMORANDUM

TO: SwRI and SFRE Staff

SUBJECT: Exhaust emissions and fuel economy tests on employee-owned cars.

DATE: December 10, 1980

Do you own a 1978 or later model car that has been driven over 50,000 miles using only unleaded gasoline? If so, would you be willing to allow it to be used in an exhaust emission survey to be conducted at the Department of Emissions Research starting in January 1981? The test will require approximately five (5) days.

If your car is selected and used, you will be given \$50.00 for the use of your car and will be furnished a car for transportation. In addition, your car will be tuned to factory specifications and the fuel tank will be filled upon its return to you. The emissions and fuel economy (mpg) results for your car will be furnished to you as soon as possible after testing has been completed.

If you are willing to participate, please fill in the form and return it to Orville Davis at Building 87. If you have any questions contact Orville Davis at extension 2661.

-----  
Yes, I would like to participate in the exhaust emissions survey to be conducted at the Department of Emissions Research.

My car has \_\_\_\_\_ actual miles on the odometer and, to the best of my knowledge, only unleaded fuel has been used.

Year \_\_\_\_\_ Make \_\_\_\_\_ Model \_\_\_\_\_

Name \_\_\_\_\_ Dept. \_\_\_\_\_ Telephone extension \_\_\_\_\_

## APPENDIX A-4. TUNE-UP CHECK LIST

### ALL CARS

- All items listed on the Vehicle Emission Control Information sticker
- Check for air flow from air pump - Check if flow solenoids function
- Visual and shake test of PCV
- Air Cleaner and Spark Plug visual check
- EGR Actuation Test - Free to actuate and vacuum to
- Check for lead in tailpipe
- Visual appearance of Catalyst Exterior
- Choke setting and whether it fully opens
- Propane RPM Gain Check
- Fluid levels, oil leaks, manifold heat riser, battery charge, visual appearance of hoses and vacuum lines
- Road test by a knowledgeable driver

### MERCURY MARQUIS

- EEC Diagnostic test by a local dealer

### CARS OTHER THAN MARQUIS

- Ignition timing (including check of advance with speed and vacuum)
- Idle mixture adjustment, as necessary

### CARS FAILING TO MEET ANY OF THE ABOVE

- Compression check
- Parts replacement as necessary

**APPENDIX B**

**INDIVIDUAL TEST RESULT SUMMARY TABLES**

TABLE B-1. SUMMARY OF EMISSION RESULTS CAR 01 - 1978 BUICK REGAL

		Emission Rate, mg/km (Except as Noted)					
		FTP		HFET		As-Received	After Tune-up
		As-Received	After Tune-up	As-Received	After Tune-up		
Test Number,	VVT	011	012	011	012		
Barometer,	mm Hg	739.4	749.0	739.1	749.0		
Humidity,	g/km	5.9	5.2	5.9	5.1		
Temperature,	°C	21.1	21.1	21.1	22.8		
Total Fuel Sulfur,	mg/km	22.73	22.69	15.78	15.47		
Avg. Exh. Oxygen,	%	0.64	0.57	0.95	0.74		
Catalyst Avg. Temp.,	°C	--	--	--	--		
Catalyst Max. Temp.,	°C	--	--	--	--		
Carbon Dioxide,	g/km	298.5	302.8	225.3	221.1		
Fuel Cons.,	l/100 km	13.96	13.94	9.69	9.50		
<u>Regulated Emissions</u>							
Hydrocarbons, (THC),	g/km	1.16	0.95	0.18	0.18		
Carbon Monoxide,	g/km	15.83	13.27	0.72	0.62		
Oxides of Nitrogen,	g/km	0.93	0.95	0.92	0.85		
<u>Particulates</u>							
Total Particulates		38.34	24.10	23.78	11.06		
<u>Compound Group Totals</u>							
Aldehydes & Ketones		6.4	14.5	2.1	8.0		
Individual Hydrocarbons		399.2	322.6	67.6	84.2		
Organic Sulfides		0.22	0.21	0.01	0.01		
Organic Amines		0.04	0.05	0.01	0.03		
<u>Other Compounds</u>							
Ammonia		10.32	2.30	2.47	2.41		
Cyanide & Cyanogen		1.62	2.35	0.96	0.90		
Hydrogen Sulfide		0.00	0.00	0.00	0.00		
Nitrous Oxide		29.02	23.78	7.24	12.31		

Note: No significant changes were made  
during the tune-up.

TABLE B-1. (Cont'd). SUMMARY OF EMISSION RESULTS CAR 01 - BUICK REGAL

	VVT	Emission Rate, mg/km (Except at Noted)					
		FTP		HFET			
		As-Received	After Tune-up	As-Received	After Tune-up		
Test Number,		011	012			011	012
<u>Aldehydes and Ketones</u>							
Formaldehyde		5.88	11.77			2.05	5.40
Acetaldehyde		0.54	2.70			0.00	1.85
Acetone		0.00	0.00			0.00	0.75
Isobutyraldehyde		--	--			--	--
Methylethylketone		0.00	0.00			0.00	0.00
Hexanaldehyde		0.00	0.00			0.00	0.00
Aldehydes and Ketones		6.4	14.5			2.1	8.0
Total as % of THC, %		0.6	1.5			1.2	4.4
<u>Individual Hydrocarbons</u>							
Methane		74.23	62.39			24.39	22.57
Ethylene		101.43	74.03			7.90	22.20
Ethane		16.20	17.06			8.68	9.03
Acetylene		20.78	16.62			0.00	1.04
Propane		0.37	1.17			0.00	0.29
Propylene		45.62	33.30			8.37	9.30
Benzene		55.31	52.84			9.32	9.53
Toluene		85.27	65.18			8.92	10.20
Toluene Individual HC		399.2	322.6			67.6	84.2
Total as % of THC, %		34.4	34.0			37.5	46.8
<u>Organic Sulfides</u>							
Carbonyl Sulfide		0.14	0.15			0.00	0.00
Methyl Sulfide		0.07	0.06			0.01	0.01
Ethyl Sulfide		0.01	0.00			0.00	0.00
Methyl Disulfide		0.00	0.00			0.00	0.00
<u>Organic Amines</u>							
Monomethylamine		0.00	0.05			0.01	0.01
Monoethylamine		0.03	0.00			0.00	0.02
Trimethylamine		0.01	0.00			0.00	0.00
Diethylamine		0.00	0.00			0.00	0.00
Triethylamine		0.00	0.00			0.00	0.00

TABLE B-1 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 01 - BUICK REGAL

Test Number,	VVT	Emission Rate, mg/km					
		FTP		HFET		As-Received	After Tune-up
		As-Received	After Tune-up	As-Received	After Tune-up		
011	012			011	012		
<u>Trace Elements</u>							
Sodium	Na		0.01				
Sulfur	S		0.02	0.03		0.06	0.07
Vanadium	V						
Nickel	Ni						
Cadmium	Cd						
Mecury	Hg						
Magnesium	Mg		0.01			0.01	0.01
Chlorine	Cl		0.01	0.01		0.01	0.02
Chromium	Cr						
Copper	Cu						
Tin	Sn						
Lead	Pb						
Aluminum	Al		0.02			0.01	0.01
Potassium	K						
Manganese	Mn						
Zinc	Zn		0.02	0.01			
Antimimony	Sb						
Silicon	Si		0.02	0.01		0.06	0.03
Calcium	Ca		0.04	0.03		0.02	0.02
Iron	Fe		0.05	0.19		0.05	0.08
Selenium	Se						
Barium	Ba						
Phosphorus	P		0.01	0.02		0.01	0.01
Titanium	Ti						
Cobalt	Co						
Bromine	Br						
Platinum	Pt						

TABLE B-2. SUMMARY OF EMISSION RESULTS CAR 02 - 1979 MERCURY MARQUIS

		Emission Rate, mg/km (Except as Noted)					
		FTP		HFET			
		As-Received	After Tune-up	As-Received	After Tune-up		
Test Number,	VVT	021	022	021	022		
Barometer,	mm Hg	155.1	753.9	755.4	754.1		
Humidity,	g/km	3.7	3.5	4.1	3.4		
Temperature,	°C	19.4	21.1	22.2	22.8		
Total Fuel Sulfur,	mg/km	27.01	27.16	17.66	17.47		
Avg. Exh. Oxygen,	%	5.10	5.35	4.62	4.67		
Catalyst Avg. Temp.,	°C	--	--	--	--		
Catalyst Max. Temp.,	°C	--	--	--	--		
Carbon Dioxide,	g/km	381.8	384.2	253.3	250.3		
Fuel Cons.,	l/100 km	16.59	16.68	10.85	10.73		
<u>Regulated Emissions</u>							
Hydrocarbons, (THC),	g/km	0.44	0.42	0.16	0.15		
Carbon Monoxide,	g/km	3.56	3.39	0.28	0.30		
Oxides of Nitrogen,	g/km	1.42	1.44	1.22	1.32		
<u>Particulates</u>							
Total Particulates		20.19	13.31	27.67	49.05		
<u>Compound Group Totals</u>							
Aldehydes & Ketones		0.6	0.0	0.0	4.3		
Individual Hydrocarbons		175.1	159.0	67.4	61.2		
Organic Sulfides		0.63	0.26	0.08	0.00		
Organic Amines		0.00	0.00	0.00	0.00		
<u>Other Compounds</u>							
Ammonia		6.70	17.83	10.22	2.08		
Cyanide & Cyanogen		0.01	0.22	0.24	0.14		
Hydrogen Sulfide		0.00	0.00	0.00	0.00		
Nitrous Oxide		56.22	60.87	35.32	37.09		

TABLE B-2 (Cont'd.). SUMMARY OF EMISSIONS RESULTS CAR 02 - 1979 MERCURY MARQUIS

	VVT	Emission Rate, mg/km (Except at Noted)					
		FTP		HFET		As-Received	After Tune-up
		As-Received	After Tune-up	As-Received	After Tune-up		
Test Number,	021      022			021      022			
<u>Aldehydes and Ketones</u>							
Formaldehyde	0.00      0.00			0.00      4.27			
Acetaldehyde	0.60      0.00			0.00      0.00			
Acetone	0.00      0.00			0.00      0.00			
Isobutyraldehyde	--      --			--      --			
Methylethylketone	0.00      0.00			0.00      0.00			
Hexanaldehyde	0.00      0.00			0.00      0.00			
Aldehydes and Ketones	0.6      0.00			0.00      4.3			
Total as % of THC, %	0.1      0.00			0.00      2.8			
<u>Individual Hydrocarbons</u>							
Methane	88.44      82.27			37.73      33.92			
Ethylene	27.72      23.43			11.68      10.26			
Ethane	15.85      14.62			10.19      9.51			
Acetylene	8.18      6.25			0.00      0.00			
Propane	1.07      0.63			0.53      0.49			
Propylene	5.85      5.44			1.69      1.65			
Benzene	11.13      11.04			3.26      2.94			
Toluene	16.87      15.31			2.36      2.47			
Toluene Individual HC	175.1      159.0			6.74      61.2			
Total as % of THC, %	39.8      37.9			42.2      40.8			
<u>Organic Sulfides</u>							
Carbonyl Sulfide	0.63      0.25			0.08      0.00			
Methyl Sulfide	0.00      0.01			0.00      0.00			
Ethyl Sulfide	0.00      0.00			0.00      0.00			
Methyl Disulfide	0.00      0.00			0.00      0.00			
<u>Organic Amines</u>							
Monomethylamine	0.00      0.00			0.00      0.00			
Monoethylamine	0.00      0.00			0.00      0.00			
Trimethylamine	0.00      0.00			0.00      0.00			
Diethylamine	0.00      0.00			0.00      0.00			
Triethylamine	0.00      0.00			0.00      0.00			

TABLE B-2 (Cont'd). SUMMARY OF EMISSIONS RESULTS CAR 02 - 1979 MERCURY MARQUIS

Test Number,	VVT	Emission Rate, mg/km					
		FTP		HFET		As-Received	After Tune-up
		As-Received	After Tune-up	As-Received	After Tune-up		
		021	022	021	022		
<u>Trace Elements</u>							
Sodium	Na						
Sulfur	S	0.32	0.41	2.18	4.41		
Vanadium	V						
Nickel	Ni						
Cadmium	Cd						
Mecury	Hg						
Magnesium	Mg						
Chlorine	Cl	0.01	0.01				
Chromium	Cr						
Copper	Cu						
Tin	Sn						
Lead	Pb						
Aluminum	Al	0.01	0.01	0.01	0.01		
Potassium	K	-					
Manganese	Mn						
Zinc	Zn						
Antimony	Sb						
Silicon	Si	0.13	0.08	0.02	0.04		
Calcium	Ca	0.02	0.02		0.01		
Iron	Fe	0.17	0.23	0.03	0.06		
Selenium	Se						
Barium	Ba						
Phosphorus	P						
Titanium	Ti						
Cobalt	Co						
Bromine	Br						
Platinum	Pt						

TABLE B-3. SUMMARY OF EMISSION RESULTS CAR 03 - 1979 MERCURY MARQUIS

		Emission Rate, mg/km (Except as Noted)							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,	VVT	031	032	036	037	031	032	036	037
Barometer,	mm Hg	737.9	731.0	760.2	756.7	736.6	756.9	761.0	755.9
Humidity,	g/km	7.7	8.1	1.9	2.5	8.6	7.5	1.5	2.4
Temperature,	°C	21.1	20.6	20.0	21.1	22.2	23.9	22.2	23.9
Total Fuel Sulfur,	mg/km	28.34	27.82	26.80	26.93	17.94	18.17	17.60	17.18
Avg. Exh. Oxygen,	%	4.59	4.30	5.39	5.19	4.25	4.15	4.93	4.95
Catalyst Avg. Temp.,	°C	--	--	--	--	--	--	--	--
Catalyst Max. Temp.,	°C	--	--	--	--	--	--	--	--
Carbon Dioxide,	g/km	400.7	393.4	381.4	381.7	255.8	257.9	252.3	246.1
Fuel Cons.,	l/100 km	17.41	17.09	16.46	16.54	11.02	11.16	10.81	10.55
<u>Regulated Emissions</u>									
Hydrocarbons, (THC),	g/km	0.45	0.38	0.42	0.41	0.15	0.18	0.12	0.10
Carbon Monoxide,	g/km	3.66	3.70	1.90	2.92	1.27	1.91	0.36	0.44
Oxides of Nitrogen,	g/km	0.98	1.08	1.06	1.07	1.49	1.62	1.45	1.41
<u>Particulates</u>									
Total Particulates		27.48	19.93	17.45	14.23	25.24	17.77	8.07	14.05
<u>Compound Group Totals</u>									
Aldehydes & Ketones		--	3.9	0.9	2.7	--	0.0	3.3	3.2
Individual Hydrocarbons		155.8	171.0	168.9	185.4	59.8	73.7	52.7	52.7
Organic Sulfides		0.95	0.15	0.12	0.11	0.25	0.06	0.13	0.02
Organic Amines		0.03	0.03	0.01	0.00	0.00	0.00	0.00	0.00
<u>Other Compounds</u>									
Ammonia		1.45	--	5.41	1.33	1.00	5.62	4.01	2.82
Cyanide & Cyanogen		0.08	0.06	0.16	0.48	0.66	0.10	0.00	0.05
Hydrogen Sulfide		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nitrous Oxide		52.46	54.36	46.19	52.01	57.52	77.71	63.38	58.69

TABLE B-3 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 03 - 1979 MERCURY MARQUIS

		Emission Rate, mg/km (Except at Noted)							
		FTP		HFET					
		As-Received	After Tune-up	As-Received	After Tune-up	As-Received	After Tune-up	As-Received	After Tune-up
Test Number,	VVT	031	032	036	037	031	032	036	037
<u>Aldehydes and Ketones</u>									
Formaldehyde		--	2.88	0.94	0.93	--	0.00	3.25	3.22
Acetaldehyde		--	1.03	0.00	0.00	--	0.00	0.00	0.00
Acetone		--	0.00	0.00	0.00	--	0.00	0.00	0.00
Isobutyraldehyde		--	--	--	--	--	--	--	--
Methylethylketone		--	0.00	0.00	0.00	--	0.00	0.00	0.00
Hexanaldehyde		--	0.00	0.00	0.00	--	0.00	0.00	0.00
Aldehydes and Ketones		--	3.9	0.9	0.9	--	0.0	3.3	3.2
Total as % of THC, %		--	1.0	0.2	6.2	--	0.0	2.8	3.2
<u>Individual Hydrocarbons</u>									
Methane		76.72	97.43	95.04	106.65	33.10	37.07	36.92	38.63
Ethylene		15.57	16.55	15.84	16.19	7.26	11.17	3.53	3.01
Ethane		11.06	14.21	14.99	13.72	8.67	8.66	7.92	7.29
Acetylene		9.13	5.13	4.05	6.50	0.00	0.00	0.00	0.00
Propane		0.16	0.14	2.05	0.28	0.00	0.00	0.00	0.00
Propylene		4.34	3.98	4.11	4.29	1.38	2.61	0.00	0.00
Benzene		14.18	12.27	9.64	13.33	4.20	5.90	2.10	1.98
Toluene		24.60	21.25	23.18	24.46	5.15	8.26	2.20	1.76
Toluene Individual HC		155.8	171.0	168.9	185.4	59.8	73.7	52.7	52.7
Total as % of THC, %		34.6	45.0	40.2	45.2	39.9	40.9	43.9	52.7
<u>Organic Sulfides</u>									
Carbonyl Sulfide		0.85	0.15	0.12	0.07	0.21	0.05	0.11	0.01
Methyl Sulfide		0.10	0.00	0.00	0.04	0.04	0.01	0.02	0.01
Ethyl Sulfide		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Methyl Disulfide		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>Organic Amines</u>									
Monomethylamine		0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Monoethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trimethylamine		0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Diethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Triethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE B-3 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 03 - 1979 MERCURY MARQUIS

TABLE B-4. SUMMARY OF EMISSION RESULTS CAR 04 - 1978 FORD GRANADA

		Emission Rate, mg/km (Except as Noted)					
		FTP			HFET		
		As-Received	After	Tune-up	As-Received	After	Tune-up
Test Number,	VVT	041	042	046	041	042	046
Barometer,	mm Hg	743.5	741.4	742.2	743.5	741.7	742.2
Humidity,	g/km	7.4	10.7	11.4	8.2	11.2	12.2
Temperature,	°C	27.8	23.3	25.0	24.4	28.9	26.7
Total Fuel Sulfur, mg/km		30.69	30.13	29.83	20.09	20.11	20.12
Avg. Exh. Oxygen, %		--	--	8.06	--	--	8.44
Catalyst Avg. Temp., °C		--	--	--	--	--	--
Catalyst Max. Temp., °C		--	--	--	--	--	--
Carbon Dioxide, g/km		427.3	419.2	416.8	284.5	282.8	284.8
Fuel Cons., l/100 km		18.85	18.51	18.32	12.34	12.35	12.36
<u>Regulated Emissions</u>							
Hydrocarbons, (THC), g/km		1.08	1.08	1.12	0.49	0.59	0.65
Carbon Monoxide, g/km		7.04	6.99	5.61	1.99	2.95	1.79
Oxides of Nitrogen, g/km		0.61	0.62	0.67	0.66	0.70	0.77
<u>Particulates</u>							
Total Particulates		34.95	37.38	44.31	34.25	25.58	27.95
<u>Compound Group Totals</u>							
Aldehydes & Ketones		8.5	4.5	9.1	5.9	3.6	4.8
Individual Hydrocarbons		433.2	409.2	431.6	218.5	258.3	251.3
Organic Sulfides		0.00	0.00	0.00	0.00	0.00	0.00
Organic Amines		0.00	0.00	0.00	0.00	0.00	0.00
<u>Other Compounds</u>							
Ammonia		9.24	0.87	3.38	3.46	1.76	3.91
Cyanide & Cyanogen		0.56	0.70	0.98	0.22	1.31	0.99
Hydrogen Sulfide		0.00	0.00	0.00	0.00	0.00	0.00
Nitrous Oxide		6.82	7.74	6.10	8.13	8.37	8.43

B-11

TABLE B-4 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 04 - 1978 FORD GRANADA

	VVT	Emission Rate, mg/km (Except at Noted)					
		FTP			HFET		
		As-Received	After Tune-up		As-Received	After Tune-up	
Test Number,		041	042	046	041	042	046
<u>Aldehydes and Ketones</u>							
Formaldehyde		6.25	4.50	7.37	3.86	3.31	4.53
Acetaldehyde		2.27	0.00	1.68	2.04	0.24	0.25
Acetone		0.00	0.00	0.00	0.00	0.00	0.00
Isobutyraldehyde		--	--	--	--	--	--
Methylethylketone		0.00	0.00	0.00	0.00	0.00	0.00
Hexanaldehyde		0.00	0.00	0.00	0.00	0.00	0.00
Aldehydes and Ketones		8.5	4.5	9.1	5.9	3.6	4.8
Total as % of THC, %		0.8	0.4	0.8	1.2	0.6	0.7
<u>Individual Hydrocarbons</u>							
Methane		135.76	131.64	121.63	70.26	82.03	76.32
Ethylene		83.57	82.29	85.20	47.25	53.79	51.61
Ethane		42.47	43.04	42.30	26.47	26.24	25.91
Acetylene		21.74	15.12	45.56	5.17	13.31	9.09
Propane		2.86	2.23	0.95	1.45	1.19	0.44
Propylene		29.54	29.95	28.27	17.34	19.16	17.73
Benzene		39.47	35.10	33.34	18.19	22.91	22.48
Toluene		77.77	69.85	74.39	32.33	39.63	47.70
Toluene Individual HC		433.2	409.2	431.6	218.5	258.3	251.3
Total as % of THC, %		40.1	37.9	38.5	44.6	43.8	38.7
<u>Organic Sulfides</u>							
Carbonyl Sulfide		0.00	0.00	0.00	0.00	0.00	0.00
Methyl Sulfide		0.00	0.00	0.00	0.00	0.00	0.00
Ethyl Sulfide		0.00	0.00	0.00	0.00	0.00	0.00
Methyl Disulfide		0.00	0.00	0.00	0.00	0.00	0.00
<u>Organic Amines</u>							
Monomethylamine		0.00	0.00	0.00	0.00	0.00	0.00
Monoethylamine		0.00	0.00	0.00	0.00	0.00	0.00
Trimethylamine		0.00	0.00	0.00	0.00	0.00	0.00
Diethylamine		0.00	0.00	0.00	0.00	0.00	0.00
Triethylamine		0.00	0.00	0.00	0.00	0.00	0.00

TABLE B-4 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 04 - 1978 FORD GRANADA

Test Number,	VVT	Emission Rate, mg/km			
		FTP		HFET	
		As-Received	After Tune-up	As-Received	After Tune-up
		041	046	041	046
<u>Trace Elements</u>					
Sodium	Na		0.01		
Sulfur	S	0.07	0.13	0.09	0.16
Vanadium	V				
Nickel	Ni				
Cadmium	Cd				
Mecury	Hg				
Magnesium	Mg		0.02	0.01	0.01
Chlorine	Cl	0.02	0.01	0.02	0.01
Chromium	Cr				
Copper	Cu				
Tin	Sn				
Lead	Pb				
Aluminum	Al	0.01	0.01	0.01	
Potassium	K				
Manganese	Mn				
Zinc	Zn	0.02	0.07		0.04
Antimony	Sb				
Silicon	Si	0.92	0.16	1.17	0.79
Calcium	Ca	0.06	0.04	0.05	0.03
Iron	Fe	0.54	0.43	0.31	0.29
Selenium	Se				
Barium	Ba				
Phosphorus	P	0.02	0.05	0.01	0.03
Titanium	Ti			0.03	0.01
Cobalt	Co				
Bromine	Br	0.12	0.13		0.11
Platinum	Pt				

B-13

TABLE B-5. SUMMARY OF EMISSION RESULTS CAR 05 - 1978 VOLVO 245DL

		Emission Rate, mg/km (Except as Noted)							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,	VVT	051	052	056	057	051	052	058	057
Barometer,	mm Hg	741.7	735.6	731.8	740.9	741.9	734.6	740.9	741.3
Humidity,	g/km	9.1	11.5	9.7	6.0	10.0	11.8	8.9	7.3
Temperature,	°C	23.9	23.3	26.1	25.0	25.0	26.1	24.4	25.0
Total Fuel Sulfur,	mg/km	21.46	21.54	20.20	20.42	12.88	12.58	12.86	12.55
Avg. Exh. Oxygen,	%	0.51	0.47	1.35	0.50	0.19	0.14	0.16	0.17
Catalyst Avg. Temp.,	°C	--	--	--	--	--	--	--	--
Catalyst Max. Temp.,	°C	--	--	--	--	--	--	--	--
Carbon Dioxide,	g/km	301.6	303.2	283.6	288.1	181.5	178.6	182.9	177.7
Fuel Cons.,	l/100 km	13.18	13.23	12.41	12.54	7.91	7.73	7.90	7.71
<u>Regulated Emissions</u>									
Hydrocarbons, (THC),	g/km	0.38	0.38	0.42	0.34	0.25	0.22	0.23	0.24
Carbon Monoxide,	g/km	3.77	3.59	3.69	2.98	1.88	1.19	1.00	1.34
Oxides of Nitrogen,	g/km	0.49	0.51	0.52	0.57	0.34	0.24	0.28	0.32
<u>Particulates</u>									
Total Particulates		6.63	10.12	--	2.02	--	2.14	3.34	2.12
<u>Compound Group Totals</u>									
Aldehydes & Ketones		3.9	1.3	1.1	1.5	1.0	0.3	0.3	0.0
Individual Hydrocarbons		207.8	194.0	204.7	160.9	134.2	113.7	122.4	124.8
Organic Sulfides		0.17	0.05	0.06	0.02	0.02	0.01	0.03	0.05
Organic Amines		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>Other Compounds</u>									
Ammonia		18.25	19.82	28.00	34.98	2.66	10.34	20.71	20.95
Cyanide & Cyanogen		0.59	0.85	0.98	0.71	0.43	0.62	0.46	0.43
Hydrogen Sulfide		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nitrous Oxide		97.45	114.77	128.34	116.98	95.93	87.13	116.75	115.95

TABLE B-5 (Cont'd.). SUMMARY OF EMISSION RESULTS CAR 05 - 1978 VOLVO 245DL

	VVT	Emission Rate, mg/km (Except at Noted)							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,		051	052	056	057	051	052	056	057
<u>Aldehydes and Ketones</u>									
Formaldehyde		3.26	0.24	0.36	0.46	1.00	0.00	0.04	0.00
Acetaldehyde		0.62	1.07	0.54	1.10	0.00	0.34	0.25	0.00
Acetone		--	--	--	0.00	--	0.00	0.00	0.00
Isobutyraldehyde		--	--	--	--	--	--	--	--
Methylethylketone		0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00
Hexanaldehyde		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aldehydes and Ketones		3.9	1.3	1.1	1.5	1.0	0.3	0.3	0.0
Total as % of THC, %		1.0	0.3	0.3	0.4	0.4	0.1	0.1	0.0
<u>Individual Hydrocarbons</u>									
Methane		55.01	54.21	53.83	50.90	28.22	26.76	28.12	27.37
Ethylene		44.91	39.88	42.00	28.77	35.09	27.80	29.93	31.21
Ethane		13.28	12.40	12.82	11.52	8.61	7.79	8.90	8.40
Acetylene		4.18	3.41	2.45	3.42	0.00	0.00	0.00	0.00
Propane		1.15	0.88	0.89	0.27	0.00	0.27	0.30	0.43
Propylene		18.20	17.68	18.22	12.41	18.00	14.21	16.05	16.92
Benzene		31.01	30.08	28.98	23.45	17.90	16.24	16.12	16.06
Toluene		40.09	35.46	45.49	30.17	26.36	20.61	22.98	24.36
Toluene Individual HC		207.8	194.0	204.7	160.9	134.2	113.7	122.4	124.8
Total as % of THC, %		54.7	51.1	48.7	47.3	53.7	51.7	53.2	52.0
<u>Organic Sulfides</u>									
Carbonyl Sulfide		0.13	0.05	0.05	0.02	0.01	0.00	0.02	0.04
Methyl Sulfide		0.02	0.00	0.01	0.00	0.01	0.01	0.01	0.01
Ethyl Sulfide		0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Methyl Disulfide		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>Organic Amines</u>									
Monomethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monoethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trimethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Triethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE B-5 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 05 - 1978 VOLVO 245DL

Test Number,	VVT	Emission Rate, mg/km							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
051	052	056	057	051	052	056	057		
<b>Trace Elements</b>									
Sodium	Na								
Sulfur	S	0.06	0.04	0.04	0.04	0.02	0.02	0.04	0.02
Vanadium	V								
Nickel	Ni								
Cadmium	Cd								
Mecury	Hg								
Magnesium	Mg	0.01	0.01	0.01	0.01			0.01	0.01
Chlorine	Cl	0.05	0.04	0.01	0.01	0.01	0.01	0.20	0.01
Chromium	Cr			0.03					
Copper	Cu								
Tin	Sn								
Lead	Pb								
Aluminum	Al	0.02	0.01						
Potassium	K								
Manganese	Mn								
Zinc	Zn								
Antimony	Sb								
Silicon	Si	0.03	0.04	0.01	0.02			0.01	
Calcium	Ca	0.10	0.13	0.07	0.10	0.02	0.01	0.08	0.03
Iron	Fe	0.66	0.33	0.15	0.26	0.08	0.08	0.25	0.08
Selenium	Se								
Barium	Ba								
Phosphorus	P	0.02	0.02	0.01	0.02	0.01		0.01	0.01
Titanium	Ti							0.01	
Cobalt	Co								
Bromine	Br	0.20	0.22	0.19	0.20	0.09	0.12	0.22	0.10
Platinum	Pt								

TABLE B-6. SUMMARY OF EMISSION RESULTS CAR 06 - 1978 OLDSMOBILE CUTLASS

		Emission Rate, mg/km (Except as Noted)							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,	VVT	061	062	066	068	061	062	066	067
Barometer,	mm Hg	752.1	751.3	749.8	746.8	752.3	751.3	750.1	746.8
Humidity,	g/km	6.1	6.6	8.1	7.2	7.5	6.5	7.8	7.7
Temperature,	°C	24.4	23.3	24.4	25.0	25.6	25.0	25.0	23.9
Total Fuel Sulfur,	mg/km	20.33	20.11	21.18	20.40	14.41	14.60	15.11	14.98
Avg. Exh. Oxygen,	%	0.98	--	1.27	1.38	0.87	--	0.82	0.76
Catalyst Avg. Temp.,	°C	--	--	--	--	--	--	--	--
Catalyst Max. Temp.,	°C	--	--	--	--	--	--	--	--
Carbon Dioxide,	g/km	276.2	273.7	289.8	278.7	205.6	208.4	215.7	213.6
Fuel Cons.,	l/100 km	12.49	12.35	13.01	12.53	8.85	8.97	9.28	9.20
<u>Regulated Emissions</u>									
Hydrocarbons, (THC),	g/km	0.56	0.52	0.42	0.53	0.12	0.11	0.10	0.10
Carbon Monoxide,	g/km	9.37	8.85	8.68	8.36	0.83	0.89	0.92	0.95
Oxides of Nitrogen,	g/km	2.08	2.23	0.69	0.67	2.88	2.97	0.70	0.66
<u>Particulates</u>									
Total Particulates		18.33	20.22	12.78	22.63	11.74	11.70	11.12	12.76
<u>Compound Group Totals</u>									
Aldehydes & Ketones		3.1	4.0	3.8	1.3	1.6	0.5	1.6	0.4
Individual Hydrocarbons		262.7	212.9	218.5	234.0	54.8	56.7	56.6	49.1
Organic Sulfides		0.06	0.04	0.06	0.02	0.04	0.01	0.02	0.01
Organic Amines		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>Other Compounds</u>									
Ammonia		16.43	10.59	9.26	4.33	6.27	14.12	4.07	2.73
Cyanide & Cyanogen		6.08	5.45	2.04	1.93	2.41	1.83	0.06	0.72
Hydrogen Sulfide		0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00
Nitrous Oxide		138.27	151.75	49.86	35.52	87.63	95.69	27.91	21.35

TABLE B-6 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 06 - 1978 OLDSMOBILE CUTLASS

	VVT	Emission Rate, mg/km (Except at Noted)							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,		061	062	066	068	061	062	066	067
<u>Aldehydes and Ketones</u>									
Formaldehyde		0.94	1.32	1.70	0.74	0.19	0.00	0.75	0.44
Acetaldehyde		1.92	2.36	1.84	0.57	0.88	0.51	0.81	0.00
Acetone		0.00	0.00	0.00	0.00	0.51	0.00	0.00	0.00
Isobutyraldehyde		--	--	--	--	--	--	--	--
Methylethylketone		0.22	0.27	0.21	0.00	0.00	0.00	0.00	0.00
Hexanaldehyde		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aldehydes and Ketones		3.1	4.0	3.8	1.3	1.6	0.5	1.6	0.4
Total as % of THC, %		0.6	0.8	0.9	0.2	1.3	0.5	1.6	0.4
<u>Individual Hydrocarbons</u>									
Methane		56.66	51.75	59.73	51.68	21.84	23.80	25.30	19.51
Ethylene		59.74	30.50	44.38	43.92	10.56	10.68	10.82	8.74
Ethane		13.31	6.06	12.88	11.23	5.08	4.67	5.28	4.57
Acetylene		12.37	17.78	14.46	20.87	0.00	0.00	0.00	0.00
Propane		0.28	0.46	2.83	0.82	0.00	0.00	1.25	0.25
Propylene		26.20	19.31	16.83	17.47	3.65	3.77	2.66	2.98
Benzene		33.96	30.12	26.00	28.64	5.37	5.39	5.42	5.04
Toluene		60.17	56.91	41.39	59.34	8.34	8.36	5.83	8.01
Toluene Individual HC		262.7	212.9	218.5	234.0	54.8	56.7	56.6	49.1
Total as % of THC, %		46.9	40.9	52.0	44.2	45.7	51.6	56.6	49.1
<u>Organic Sulfides</u>									
Carbonyl Sulfide		0.06	0.03	0.03	0.01	0.04	0.01	0.01	0.01
Methyl Sulfide		0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.00
Ethyl Sulfide		0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Methyl Disulfide		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>Organic Amines</u>									
Monomethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monoethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trimethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Triethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE B-6 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 06 - 1978 OLDSMOBILE CUTLASS

Test Number,	VVT	Emission Rate, mg/km							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
061	062	068	067	061	062	066	067		
<b>Trace Elements</b>									
Sodium	Na								
Sulfur	S	0.04	0.04	0.04	0.04	0.02	0.02	0.03	0.03
Vanadium	V	0.01							
Nickel	Ni								
Cadmium	Cd								
Mecury	Hg								
Magnesium	Mg	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01
Chlorine	Cl				0.01			0.01	0.19
Chromium	Cr								
Copper	Cu								
Tin	Sn								
Lead	Pb								
Aluminum	Al	0.03	0.03	0.03	0.03	0.01			
Potassium	K								
Manganese	Mn	0.05	0.02						
Zinc	Zn	0.02		0.02	0.01				
Antimony	Sb								
Silicon	Si	0.01	0.01		0.05	0.01		0.01	0.02
Calcium	Ca	0.06	0.02	0.04	0.30	0.03			
Iron	Fe	0.23	0.51	0.21	0.18	0.07	0.18	0.11	0.10
Selenium	Se								
Barium	Ba								
Phosphorus	P	0.03	0.03	0.02	0.02	0.01	0.01	0.01	0.01
Titanium	Ti								
Cobalt	Co								
Bromine	Br	0.07	0.10		0.13			0.12	0.29
Platinum	Pt								

TABLE B-7. SUMMARY OF EMISSION RESULTS CAR 07 - 1978 CHEVROLET MALIBU, CALIFORNIA

		Emission Rate, mg/km (Except as Noted)							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,	VVT	071	072	076	078	071	072	076	078
Barometer,	mm Hg	747.3	736.9	747.8	742.7	747.5	737.1	747.3	741.9
Humidity,	g/km	6.2	5.0	2.4	10.0	5.7	5.1	3.5	10.4
Temperature,	°C	24.4	23.3	22.8	25.0	25.6	24.4	26.7	27.2
Total Fuel Sulfur,	mg/km	27.29	27.50	26.54	26.41	17.58	16.93	17.79	17.71
Avg. Exh. Oxygen,	%	--	4.18	4.77	5.48	--	4.98	4.97	5.01
Catalyst Avg. Temp.,	°C	--	--	--	--	--	--	--	--
Catalyst Max. Temp.,	°C	--	--	--	--	--	--	--	--
Carbon Dioxide,	g/km	379.0	381.1	370.0	365.7	250.5	240.9	253.9	251.3
Fuel Cons.,	l/100 km	16.76	16.89	16.30	16.22	10.80	10.40	10.93	10.88
<u>Regulated Emissions</u>									
Hydrocarbons, (THC),	g/km	0.38	0.42	0.40	0.42	0.10	0.12	0.10	0.16
Carbon Monoxide,	g/km	7.95	8.48	6.83	8.30	1.38	1.52	1.15	2.05
Oxides of Nitrogen,	g/km	0.44	0.46	0.43	0.45	0.38	0.36	0.32	0.40
<u>Particulates</u>									
Total Particulates		27.23	34.34	32.92	43.15	17.94	22.93	20.54	29.33
<u>Compound Group Totals</u>									
Aldehydes & Ketones		9.2	6.2	--	8.5	5.7	4.9	7.3	8.0
Individual Hydrocarbons		224.7	243.9	220.3	210.1	64.3	68.0	63.7	83.3
Organic Sulfides		0.12	0.03	0.05	0.03	0.10	0.04	0.01	0.02
Organic Amines		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>Other Compounds</u>									
Ammonia		3.17	2.10	14.51	10.85	2.63	6.44	1.70	5.88
Cyanide & Cyanogen		0.63	0.77	0.06	0.47	0.09	0.35	0.13	0.21
Hydrogen Sulfide		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nitrous Oxide		2.83	1.94	4.50	2.40	2.63	1.93	2.78	2.20

TABLE B-7 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 07 - 1978 CHEVROLET MALIBU, CALIFORNIA

Test Number, VVT		Emission Rate, mg/km (Except at Noted)							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
071	072	076	078	071	072	076	078		
<u>Aldehydes and Ketones</u>									
Formaldehyde	6.49	6.23	--	7.68	4.25	4.89	6.09	7.13	
Acetaldehyde	2.66	0.00	--	0.84	1.49	0.00	1.25	0.82	
Acetone	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	
Isobutyraldehyde	--	--	--	--	--	--	--	--	
Methyl ethyl ketone	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	
Hexanaldehyde	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	
Aldehydes and Ketones	9.2	6.2	--	8.5	5.7	4.9	7.3	8.0	
Total as % of THC, %	2.4	1.5	--	2.0	5.7	4.1	7.3	5.0	
<u>Individual Hydrocarbons</u>									
Methane	88.14	90.39	77.74	62.92	19.54	19.28	19.24	22.72	
Ethylene	46.82	50.08	50.27	54.43	22.79	25.25	22.55	29.79	
Ethane	12.18	12.11	11.46	9.39	3.81	3.80	3.23	3.33	
Acetylene	8.98	8.33	8.42	6.99	1.44	0.00	1.52	1.81	
Propane	0.88	0.27	0.00	0.25	0.00	0.00	0.00	0.00	
Propylene	15.78	17.15	16.07	16.89	5.20	5.78	4.69	6.83	
Benzene	19.21	23.13	20.37	21.52	5.93	6.21	5.49	8.16	
Toluene	32.72	42.40	35.94	37.75	5.61	7.72	7.00	10.61	
Toluene Individual HC	224.7	243.9	220.3	210.1	64.3	68.0	63.7	83.3	
Total as % of THC, %	59.1	58.1	55.1	50.0	64.3	56.7	63.7	52.1	
<u>Organic Sulfides</u>									
Carbonyl Sulfide	0.08	0.01	0.01	0.03	0.07	0.03	0.00	0.01	
Methyl Sulfide	0.01	0.01	0.01	0.00	0.03	0.01	0.00	0.01	
Ethyl Sulfide	0.02	0.01	0.02	0.00	0.00	0.00	0.01	0.00	
Methyl Disulfide	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	
<u>Organic Amines</u>									
Monomethylamine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Monoethylamine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Trimethylamine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Diethylamine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Triethylamine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

TABLE B-7 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 07 - 1978 CHEVROLET MALIBU, CALIFORNIA

Test Number, VVT		EMISSION RATE, MG/KM							
		FTP				HFET			
		As Received		After Tune-up		As Received		After Tune-up	
071	072	076	078	071	072	076	078		
<u>Trace Elements</u>									
Sodium	Na		0.06						
Sulfur	S	0.07	0.12	0.11	0.08	0.14	0.20	0.69	0.37
Vanadium	V	0.01							
Cadmium	Cd								
Magnesium	Mg	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Chlorine	Cl	0.01	0.02		0.01	0.01	0.01		0.01
Chromium	Cr								
Copper	Cu	0.01							
Tin	Sn								
Lead	Pb								
Aluminum	Al	0.02	0.03	0.02	0.01	0.01	0.01	0.01	
Potassium	K		0.03		0.01				
Manganese	Mn								
Zinc	Zn	0.02	0.03	0.01		0.02			
Antimony	Sb								
Silicon	Si	0.02	0.15	0.01	0.01		0.01	0.05	
Calcium	Ca	0.11	0.32	0.08	0.07	0.04	0.06	0.04	0.03
Iron	Fe	0.27	0.37	0.08	0.11	0.09	0.03		0.03
Barium	Ba								
Phosphorus	P	0.01	0.03	0.01	0.01	0.01	0.01		0.01
Titanium	Ti		0.02						
Bronine	Br								
Arsenic	As	0.02	0.04						
Molybdenum	Mo	0.29	0.25	0.31	0.24	0.25	0.28	0.15	
Tungsten	W					0.07			
Strontium	Sr	0.18	0.14	0.21	0.17	0.17	0.16	0.07	

B-22

Note: Nickel, mercury, selenium, cobalt and platinum were analyzed for, but not detected.

TABLE B-8. SUMMARY OF EMISSION RESULTS CAR 08 - 1978 MONTE CARLO

		Emission Rate, mg/km (Except as Noted)							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
		081	082	086	087	081	082	086	087
B-23	VVT	748.5	741.7	745.2	740.2	747.8	743.7	745.2	739.9
Barometer,	mm Hg	5.1	8.4	10.6	12.2	5.7	9.2	11.4	12.2
Humidity,	g/km	25.6	25.6	25.0	25.0	25.6	26.7	26.7	25.0
Temperature,	°C	20.64	20.95	20.55	20.48	13.32	14.07	13.90	13.94
Total Fuel Sulfur,	mg/km								
Avg. Exh. Oxygen,	%	2.86	2.99	1.35	--	2.57	2.59	0.85	--
Catalyst Avg. Temp.,	°C	--	--	--	--	--	--	--	--
Catalyst Max. Temp.,	°C	--	--	--	--	--	--	--	--
Carbon Dioxide,	g/km	291.6	295.7	280.0	278.5	191.2	194.2	197.4	198.1
Fuel Cons.,	l/100 km	12.68	12.87	12.62	12.58	8.18	8.64	8.54	8.56
<u>Regulated Emissions</u>									
Hydrocarbons, (THC),	g/km	0.27	0.28	0.49	0.55	0.07	0.06	0.15	0.12
Carbon Monoxide,	g/km	3.00	3.14	9.01	9.18	0.12	0.20	1.40	1.31
Oxides of Nitrogen,	g/km	2.00	2.18	0.70	0.72	2.35	2.78	0.79	0.78
<u>Particulates</u>									
Total Particulates		17.87	21.93	37.36	37.95	9.64	14.93	18.31	14.26
<u>Compound Group Totals</u>									
Aldehydes & Ketones		5.2	5.4	3.1	0.1	2.3	4.2	0.4	0.8
Individual Hydrocarbons		101.0	112.8	231.8	247.8	20.2	23.7	64.3	60.3
Organic Sulfides		0.08	0.04	0.10	0.04	0.03	0.01	0.02	0.00
Organic Amines		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>Other Compounds</u>									
Ammonia		2.73	10.74	3.44	4.42	2.77	3.69	3.91	3.53
Cyanide & Cyanogen		1.35	1.09	1.97	2.21	0.34	0.06	0.40	0.47
Hydrogen Sulfide		0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
Nitrous Oxide		43.39	34.32	30.66	32.89	19.79	17.96	26.68	29.56

TABLE B-8 (Cont'd.). SUMMARY OF EMISSION RESULTS CAR 08 - 1978 MONTE CARLO

Test Number, VVT	Emission Rate, mg/km (Except at Noted)							
	FTP				HFET			
	As-Received		After Tune-up		As-Received		After Tune-up	
081	082	086	087	081	082	086	087	
<u>Aldehydes and Ketones</u>								
Formaldehyde	5.24	5.38	2.45	0.09	1.36	3.27	0.36	0.84
Acetaldehyde	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.00
Acetone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Isobutyraldehyde	--	--	--	--	--	--	--	--
Methylethylketone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexanaldehyde	0.00	0.00	0.00	0.00	0.92	0.92	0.00	0.00
Aldehydes and Ketones	5.2	5.4	3.1	0.1	2.3	4.2	0.4	0.8
Total as % of THC, %	1.9	1.9	0.6	0.0	3.3	7.0	0.3	0.7
<u>Individual Hydrocarbons</u>								
Methane	18.70	23.99	50.01	53122	6.83	7.85	20.63	21.72
Ethylene	23.07	26.12	49.43	50.30	5.78	6.20	14.27	11.56
Ethane	6.35	6.70	13.06	13.51	2.22	2.21	5.29	5.68
Acetylene	5.82	6.02	14.02	16.71	0.00	0.00	0.00	0.00
Propane	0.00	0.27	0.87	0.27	0.00	0.00	0.00	0.00
Propylene	9.28	10.14	21.15	22.79	0.00	0.00	5.67	4.77
Benzene	10.81	11.60	30.83	29.75	1.84	2.30	6.97	6.87
Toluene	27.01	27.91	52.39	61.25	3.53	5.10	11.46	9.68
Toluene Individual HC	101.0	112.8	231.8	247.8	20.2	23.7	64.3	60.3
Total as % of THC, %	37.4	40.3	47.3	45.1	28.9	39.5	42.9	50.3
<u>Organic Sulfides</u>								
Carbonyl Sulfide	0.02	0.02	0.04	0.02	0.03	0.01	0.02	0.00
Methyl Sulfide	0.01	0.02	0.05	0.01	0.00	0.00	0.00	0.00
Ethyl Sulfide	0.05	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Methyl Disulfide	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>Organic Amines</u>								
Monomethylamine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monoethylamine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trimethylamine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diethylamine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Triethylamine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE B-8 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 08 - 1978 MONTE CARLO

Test Number, VVT		EMISSION RATE, MG/KM							
		FTP				HFET			
		As Received		After Tune-up		As Received		After Tune-up	
081	082	086	087	081	082	086	087		
<u>Trace Elements</u>									
Sodium	Na								
Sulfur	S	0.07	0.04	0.02	0.03	0.08	0.31	0.05	0.03
Vanadium	V			0.01					0.01
Cadmium	Cd							0.04	
Magnesium	Mg	0.01	0.01		0.01	0.01		0.01	0.01
Chlorine	Cl	0.01	0.01	0.01	0.01	0.0.		0.01	
Chromium	Cr								
Copper	Cu	0.01		0.01					0.02
Tin	Sn								
Lead	Pb								
B-25	Aluminum	Al	0.05	0.02	0.01	0.02	0.02	0.01	0.01
	Potassium	K					0.06		
Manganese	Mn							0.02	
Zinc	Zn	0.02			0.01			0.02	
Antimony	Sb								
Silicon	Si	0.02	0.02	0.01	0.01	0.01		0.01	
Calcium	Ca	0.06	0.05	0.03	0.06	0.12	0.02	0.04	0.03
Iron	Fe	0.82	0.16	0.08	0.10	0.23	0.05	0.11	0.03
Barium	Ba							0.01	
Phosphorus	P	0.01				0.01		0.01	
Titanium	Ti					0.01		0.01	
Bronine	Br								
Arsenic	As	0.02							
Molybdenum	Mo	0.15	0.18	0.18	0.27	0.11			0.29
Tungsten	W	0.04			0.05				0.06
Strontium	Sr	0.12	0.12	0.14	0.13	0.06		0.07	0.17

Note: Nickel, mercury, selenium, cobalt and platinum were analyzed for, but not detected

TABLE B-9. SUMMARY OF EMISSION RESULTS CAR 09 - 1978 FORD FIESTA

		Emission Rate, mg/km (Except as Noted)					
		FTP		HFET			
		As-Received	After Tune-up	As-Received	After Tune-up		
Test Number,	VVT	091	092	096	091	092	096
Barometer,	mm Hg	738.1	745.5	734.1	739.1	745.5	733.6
Humidity,	g/km	12.7	9.9	13.6	12.2	10.2	12.6
Temperature,	°C	23.9	25.0	23.9	25.0	24.4	26.1
Total Fuel Sulfur,	mg/km	12.60	12.57	12.39	8.37	8.38	8.17
Avg. Exh. Oxygen,	%	7.54	7.44	7.43	6.78	7.00	7.07
Catalyst Avg. Temp.,	°C	--	--	--	--	--	--
Catalyst Max. Temp.,	°C	--	--	--	--	--	--
Carbon Dioxide,	g/km	177.7	177.0	175.1	119.9	120.0	117.2
Fuel Cons.,	l/100 km	7.74	7.72	7.61	5.14	5.15	5.02
<u>Regulated Emissions</u>							
Hydrocarbons, (THC),	g/km	0.38	0.41	0.34	0.14	0.14	0.10
Carbon Monoxide,	g/km	1.57	1.62	1.38	0.09	0.12	0.08
Oxides of Nitrogen,	g/km	1.91	1.81	1.80	2.06	2.09	1.77
<u>Particulates</u>							
Total Particulates		38.78	31.39	33.42	25.19	33.72	19.86
<u>Compound Group Totals</u>							
Aldehydes & Ketones		0.0	3.4	1.3	0.0	1.8	2.4
Individual Hydrocarbons		92.4	106.6	104.9	29.7	31.0	--
Organic Sulfides		0.03	0.02	0.01	0.00	0.00	0.00
Organic Amines		0.00	0.00	0.00	0.00	0.00	0.00
<u>Other Compounds</u>							
Ammonia		2.72	2.14	2.19	0.77	1.97	2.49
Cyanide & Cyanogen		0.24	0.17	0.35	0.29	0.21	0.31
Hydrogen Sulfide		0.00	0.00	0.00	0.00	0.00	0.00
Nitrous Oxide		8.08	10.69	6.54	5.38	8.18	5.64

TABLE B-9 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 09 - 1978 FORD FIESTA

	VVT	Emission Rate, mg/km (Except at Noted)					
		FTP			HFET		
		As-Received	After Tune-up		As-Received	After	Tune-up
Test Number,		091	092	096	091	092	096
<u>Aldehydes and Ketones</u>							
Formaldehyde		0.00	3.39	1.34	0.00	1.80	2.45
Acetaldehyde		0.00	0.00	0.00	0.00	0.00	0.00
Acetone		0.00	0.00	0.00	0.00	0.00	0.00
Isobutyraldehyde		--	--	--	--	--	--
Methylethylketone		0.00	0.00	0.00	0.00	0.00	0.00
Hexanaldehyde		0.00	0.00	0.00	0.00	0.00	0.00
Aldehydes and Ketones		0.0	3.4	1.3	0.0	1.8	2.4
Total as % of THC, %		0.0	0.8	0.4	0.0	1.3	2.4
<u>Individual Hydrocarbons</u>							
Methane		22.69	26.43	32.90	7.15	5.18	--
Ethylene		24.65	24.86	25.00	14.94	14.46	--
Ethane		9.38	10.21	10.27	4.09	4.14	--
Acetylene		5.83	7.73	4.95	0.00	0.00	--
Propane		1.04	0.00	0.00	0.03	0.00	--
Propylene		4.56	5.57	4.44	1.42	2.26	--
Benzene		6.86	8.78	6.13	2.08	2.10	--
Toluene		17.41	23.05	21.25	0.00	2.89	--
Toluene Individual HC		92.4	106.6	104.9	29.7	31.0	--
Total as % of THC, %		24.3	26.0	30.9	21.2	22.1	--
<u>Organic Sulfides</u>							
Carbonyl Sulfide		0.02	0.02	0.01	0.00	0.00	0.00
Methyl Sulfide		0.01	0.00	0.00	0.00	0.00	0.00
Ethyl Sulfide		0.00	0.00	0.00	0.00	0.00	0.00
Methyl Disulfide		0.00	0.00	0.00	0.00	0.00	0.00
<u>Organic Amines</u>							
Monomethylamine		0.00	0.00	0.00	0.00	0.00	0.00
Monoethylamine		0.00	0.00	0.00	0.00	0.00	0.00
Trimethylamine		0.00	0.00	0.00	0.00	0.00	0.00
Diethylamine		0.00	0.00	0.00	0.00	0.00	0.00
Triethylamine		0.00	0.00	0.00	0.00	0.00	0.00

TABLE B-9 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 09 - 1978 FORD FIESTA

Test Number, VVT		EMISSION RATE, MG/KM					
		FTP		HFET		As Received	After Tune-up
		As Received	After Tune-up	As Received	After Tune-up		
<u>Trace Elements</u>							
Sodium	Na						
Sulfur	S	0.18	0.34	0.08		2.06	2.55
Vanadium	V		0.01	0.01		0.01	
Cadmium	Cd						
Magnesium	Mg						
Chlorine	Cl			0.01			0.01
Chromium	Cr						
Copper	Cu						
Tin	Sn						
Lead	Pb						
Aluminum	Al		0.01	0.01		0.01	
Potassium	K						0.01
Manganese	Mn						
Zinc	Zn		0.01	0.04		0.02	
Antimony	Sb						
Silicon	Si	0.01	0.02			0.01	0.01
Calcium	Ca	0.06	0.06	0.08		0.02	0.03
Iron	Fe	0.08	0.02	0.19			0.03
Barium	Ba						
Phosphorus	P			0.02			
Titanium	Ti						
Bronine	Br						
Arsenic	As						
Molybdenum	Mo	0.21	0.29	0.18		0.11	0.23
Tungsten	W			0.05			
Strontium	Sr	0.13	0.17	0.16		0.08	0.15
						0.07	

B-28

Note: Nickel, mercury, selenium, cobalt and platinum were analyzed for, but not detected.

TABLE B-10. SUMMARY OF EMISSION RESULTS CAR 10 - 1978 CHRYSLER NEW YORKER

		Emission Rate, mg/km (Except as Noted)							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,	VVT	101	102	106	107	101	102	106	107
Barometer,	mm Hg	744.7	740.2	737.9	736.6	744.7	740.2	737.9	737.4
Humidity,	g/km	12.6	13.1	11.2	12.2	11.8	10.8	10.0	11.3
Temperature,	°C	25.6	28.3	25.6	23.3	31.1	30.0	26.7	25.6
Total Fuel Sulfur,	mg/km	31.45	33.26	29.39	28.98	19.94	21.60	19.52	19.44
Avg. Exh. Oxygen,	%	--	1.59	1.40	1.11	--	3.82	1.85	1.70
Catalyst Avg. Temp.,	°C	--	--	--	--	--	--	--	--
Catalyst Max. Temp.,	°C	--	--	--	--	--	--	--	--
Carbon Dioxide,	g/km	384.6	401.6	404.6	398.2	282.1	294.6	279.5	278.2
Fuel Cons.,	l/100 km	19.32	20.43	18.05	17.80	12.25	13.27	11.99	11.94
<u>Regulated Emissions</u>									
B-29	Hydrocarbons, (THC), g/km	2.84	11.00	0.84	0.81	0.38	3.85	0.14	0.15
	Carbon Monoxide, g/km	37.60	26.84	9.98	10.31	2.33	2.64	0.61	0.72
	Oxides of Nitrogen, g/km	2.28	2.69	1.84	1.92	1.49	1.83	1.15	1.31
<u>Particulates</u>									
Total Particulates		264.23	195.43	84.49	82.32	71.46	112.49	60.92	62.86
<u>Compound Group Totals</u>									
Aldehydes & Ketones		19.8	9.8	10.2	1.8	8.1	34.7	4.2	0.0
Individual Hydrocarbons		1262.1	1929.9	555.7	385.5	290.2	772.9	67.6	74.8
Organic Sulfides		0.03	0.05	0.02	0.03	0.01	0.02	0.05	0.01
Organic Amines		0.00	0.01	0.00	0.00	0.00	0.05	0.00	0.00
<u>Other Compounds</u>									
Ammonia		3.29	1.30	3.21	5.39	1.77	0.98	3.71	0.84
Cyanide & Cyanogen		1.91	0.79	0.27	0.19	0.12	0.19	0.10	0.14
Hydrogen Sulfide		0.25	0.42	0.39	0.15	0.13	0.00	0.00	0.11
Nitrous Oxide		12.94	20.26	12.29	13.57	13.01	11.20	7.78	9.28

TABLE B-10 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 10 - 1978 CHRYSLER NEW YORKER

	VVT	Emission Rate, mg/km (Except at Noted)							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,	VVT	101	102	106	107	101	102	106	107
<u>Aldehydes and Ketones</u>									
Formaldehyde		17.01	8.99	9.86	1.76	6.44	33.81	3.36	0.00
Acetaldehyde		2.82	0.83	0.35	0.00	1.66	0.91	0.79	0.00
Acetone		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Isobutyraldehyde		--	--	--	--	--	--	--	--
Methylethylketone		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexanaldehyde		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aldehydes and Ketones		19.8	9.8	10.2	1.8	8.1	34.7	4.2	0.0
Total as % of THC, %		0.7	0.1	1.2	0.2	2.1	0.9	3.0	0.0
<u>Individual Hydrocarbons</u>									
Methane		293.46	248.53	83.07	88.38	74.68	50.28	16.93	21.48
Ethylene		301.62	178.22	254.75	89.48	70.75	160.66	15.57	18.86
Ethane		33.92	24.92	20.10	19.41	13.19	13.15	4.15	4.64
Acetylene		129.05	69.73	29.06	23.03	24.00	6.39	3.11	4.70
Propane		0.98	1.81	0.00	5.54	0.00	0.00	0.00	0.00
Propylene		105.46	87.47	38.25	39.34	27.60	151.84	7.02	5.86
Benzene		130.88	266.97	42.08	41.98	31.01	98.32	7.27	7.16
Toluene		266.75	1052.27	88.34	78.29	48.94	292.25	13.55	12.06
Toluene Individual HC		1262.1	1929.9	555.7	385.5	290.2	772.9	67.6	74.8
Total as % of THC, %		44.4	17.5	66.2	47.6	76.4	20.1	48.3	49.9
<u>Organic Sulfides</u>									
Carbonyl Sulfide		0.03	0.03	0.02	0.02	0.01	0.01	0.02	0.00
Methyl Sulfide		0.00	0.02	0.02	0.02	0.00	0.01	0.03	0.01
Ethyl Sulfide		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Methyl Disulfide		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>Organic Amines</u>									
Monomethylamine		0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00
Monoethylamine		0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Trimethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Triethylamine		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE B-10 (Cont'd). SUMMARY OF EMISSION RESULTS CAR 10 - 1978 CHRYSLER NEW YORKER

Test Number, VVT		EMISSION RATE, MG/KM							
		FTP				HFET			
		As Received		After Tune-up		As Received		After Tune-up	
101	102	106	107	101	102	106	107		
<u>Trace Elements</u>									
Sodium	Na	0.25	0.26	0.10		0.04	0.14	0.06	
Sulfur	S	1.06	1.50	0.29	0.27	0.70	0.86	1.31	1.44
Vanadium	V	0.02	0.01	0.01	0.01		0.01	0.01	
Cadmium	Cd	0.01	0.01						
Magnesium	Mg	0.34	0.40	0.11	0.12	0.08	0.17	0.03	0.06
Chlorine	Cl	0.41	0.50	0.08	0.08	0.19	0.52	0.05	0.09
Chromium	Cr								
Copper	Cu	0.03	0.04	0.01					
Tin	Sn	0.03	0.03				0.01		
B-31	Lead	Pb	0.80	1.18		0.09	0.12	0.47	
Aluminum	Al	0.13	0.29	0.01	0.02	0.03	0.15	0.01	0.01
Potassium	K	0.01	0.01						
Manganese	Mn	0.16	0.41			0.06	0.20		
Zinc	Zn	1.75	2.14	0.15	0.25	0.29	0.79	0.07	0.18
Antimony	Sb	0.01	0.01						
Silicon	Si	0.35	0.45	0.05	0.06	0.172	2.57	0.40	0.49
Calcium	Ca	1.80	2.06	0.45	0.60	0.39	0.89	0.18	0.28
Iron	Fe	8.57	9.88	0.48	0.39	1.81	6.65	0.28	0.47
Barium	Ba	0.01	0.01				0.01		
Phosphorus	P	1.13	1.27	0.22	0.30	0.24	0.50	0.07	0.17
Titanium	Ti	0.01	0.01				0.01		
Bromine	Br		0.03				0.06	0.06	
Arsenic	As	0.02					0.07		
Molybdenum	Mo	0.52	0.49	0.17	0.38	0.13	0.28	0.43	0.15
Tungsten	W	0.13	0.12		0.07			0.06	
Strontium	Sr	0.32	0.28	0.12	0.20	0.14	0.18	0.21	0.09

Note: Nickel, mercury, selenium, cobalt and platinum were analyzed for, but not detected.

**APPENDIX C**  
**FTP INDIVIDUAL SAMPLE RESULTS**

TABLE C-1. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 01 AS-RECEIVED

	Test 011 Emissions in mg/km				Test 012 Emissions in mg/km				
	COLD-UDDS		HOT-UDDS		COLD-UDDS		HOT-UDDS		
Total Particulate	60.42		21.69		Total Particulate	25.14		23.31	
Ammonia	18.92		3.83		Ammonia	3.12		1.68	
Cyanides & Cyanogen	2.32		1.09		Cyanides & Cyanogen	3.70		1.34	
Hydrogen Sulfide	0.00		0.00		Hydrogen Sulfide	0.00		0.00	
<u>Aldehydes &amp; Ketones</u>									
Formaldehyde	6.80		5.18		Aldehydes & Ketones				
Acetaldehyde	0.80		0.35		Formaldehyde	9.52		13.46	
Acetone	0.00		0.00		Acetaldehyde	0.35		4.48	
Isobutyraldehyde	--		--		Acetone	0.00		0.00	
Methyl ethyl ketone	0.00		0.00		Isobutyraldehyde	--		--	
Hexanaldehyde	0.00		0.00		Methyl ethyl ketone	0.00		0.00	
<u>Organic Sulfides</u>									
Carbonyl sulfide	0.03		0.23		Organic Sulfides				
Methyl sulfide	0.03		0.10		Carbonyl sulfide	0.29		0.05	
Ethyl sulfide	0.00		0.01		Methyl sulfide	0.09		0.03	
Methyl disulfide	0.00		0.00		Ethyl sulfide	0.00		0.00	
<u>Organic Amines</u>									
Monomethylamine	0.00		0.00		Organic Amines				
Monoethylamine + dimethylamine	0.02		0.04		Monomethylamine	0.04		0.06	
Trimethylamine	0.02		0.00		Monoethylamine + dimethylamine	0.00		0.00	
Diethylamine	0.00		0.00		Trimethylamine	0.00		0.00	
Triethylamine	0.00		0.00		Diethylamine	0.00		0.00	
<u>Individual Hydrocarbons</u>									
Emissions in ppm									
	COLD-UDDS		HOT-UDDS			COLD-UDDS		HOT-UDDS	
	1	2	3	4		1	2	3	4
Methane	19.34	4.54	4.22	2.86	Individual Hydrocarbons	15.40	3.53	3.74	2.36
Ethylene	25.13	9.93	8.93	4.58	Ethylene	19.96	6.95	6.13	2.62
Ethane	2.92	1.25	1.66	0.93	Ethane	2.73	1.38	1.73	1.07
Acetylene	13.61	0.13	0.31	0.00	Acetylene	10.69	0.00	0.35	0.00
Propane	0.16	0.00	0.00	0.00	Propane	0.17	0.07	0.07	0.08
Propylene	10.55	4.69	4.18	2.14	Propylene	8.39	3.40	2.86	1.18
Benzene	13.57	5.67	4.81	3.59	Benzene	11.64	7.31	3.82	2.70
Toluene	22.39	9.69	7.21	3.93	Toluene	19.08	7.35	4.73	2.23
N <sub>2</sub> O	0.64	0.84	1.33	0.76	N <sub>2</sub> O	0.25	0.81	1.00	0.60

C-2

TABLE C-2. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 02 AS-RECEIVED

	Test 021 Emissions in mg/km		Test 022 Emissions in mg/km						
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS					
Total Particulate	25.26	16.37	Total Particulate	9.37	16.28				
Ammonia	8.45	5.38	Ammonia	5.46	27.16				
Cyanides & Cyanogen	0.00	0.01	Cyanides & Cyanogen	0.27	0.19				
Hydrogen Sulfide	0.00	0.00	Hydrogen Sulfide	0.00	0.00				
<u>Aldehydes &amp; Ketones</u>									
Formaldehyde	0.00	0.00	Formaldehyde	0.00	0.00				
Acetaldehyde	1.40	0.00	Acetaldehyde	0.00	0.00				
Acetone	0.00	0.00	Acetone	0.00	0.00				
Isobutyraldehyde	--	--	Isobutyraldehyde	--	--				
Methyl ethyl ketone	0.00	0.00	Methyl ethyl ketone	0.00	0.00				
Hexanaldehyde	0.00	0.00	Hexanaldehyde	0.00	0.00				
<u>Organic Sulfides</u>									
Carbonyl sulfide	0.47	0.75	Carbonyl sulfide	0.26	0.24				
Methyl sulfide	0.01	0.00	Methyl sulfide	0.00	0.01				
Ethyl sulfide	0.00	0.00	Ethyl sulfide	0.00	0.00				
Methyl disulfide	0.00	0.00	Methyl disulfide	0.00	0.00				
<u>Organic Amines</u>									
Monomethylamine	0.00	0.00	Monomethylamine	0.00	0.00				
Monoethylamine + dimethylamine	0.00	0.00	Monoethylamine + dimethylamine	0.00	0.00				
Trimethylamine	0.00	0.00	Trimethylamine	0.00	0.00				
Diethylamine	0.00	0.00	Diethylamine	0.00	0.00				
Triethylamine	0.00	0.00	Triethylamine	0.00	0.00				
Emissions in ppm									
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS					
	1	2	3	4					
<u>Individual Hydrocarbons</u>									
Methane	14.85	5.29	6.83	6.07	Methane	14.16	5.35	5.82	5.03
Ethylene	7.39	1.37	3.57	1.24	Ethylene	6.86	0.91	2.74	1.11
Ethane	2.01	1.19	1.76	1.44	Ethane	1.86	1.17	1.62	1.11
Acetylene	5.49	0.00	0.00	0.00	Acetylene	4.21	0.00	0.00	0.00
Propane	0.16	0.12	0.09	0.03	Propane	0.11	0.04	0.04	0.01
Propylene	2.51	0.00	0.86	0.00	Propylene	2.41	0.00	0.76	0.00
Benzene	4.53	0.33	1.27	0.30	Benzene	4.42	0.34	1.13	0.44
Toluene	7.47	0.45	2.04	0.12	Toluene	6.89	0.71	1.61	0.00
N <sub>2</sub> O	2.09	1.32	3.04	1.14	N <sub>2</sub> O	2.24	1.31	3.31	1.43

TABLE C-3. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 03 AS-RECEIVED

	Test 031 Emissions in mg/km		Test 032 Emissions in mg/km	
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS
Total Particulate	21.01	32.36	Total Particulate	19.26
Ammonia	2.85	0.40	Ammonia	--
Cyanides & Cyanogen	0.17	0.02	Cyanides & Cyanogen	0.12
Hydrogen Sulfide	0.00	0.00	Hydrogen Sulfide	0.00
<u>Aldehydes &amp; Ketones</u>				
Formaldehyde	--	--	Formaldehyde	4.11
Acetaldehyde	--	--	Acetaldehyde	1.25
Acetone	--	--	Acetone	0.00
Isobutyraldehyde	--	--	Isobutyraldehyde	--
Methyl ethyl ketone	--	--	Methyl ethyl ketone	0.00
Hexanaldehyde	--	--	Hexanaldehyde	0.00
<u>Organic Sulfides</u>				
Carbonyl sulfide	0.30	1.27	Carbonyl sulfide	0.13
Methyl sulfide	0.09	0.11	Methyl sulfide	0.01
Ethyl sulfide	0.00	0.00	Ethyl sulfide	0.00
Methyl disulfide	0.00	0.00	Methyl disulfide	0.00
<u>Organic Amines</u>				
Monomethylamine	0.00	0.05	Monomethylamine	0.00
Monoethylamine + dimethylamine	0.00	0.00	Monoethylamine + dimethylamine	0.00
Trimethylamine	0.00	0.00	Trimethylamine	0.08
Diethylamine	0.00	0.00	Diethylamine	0.00
Triethylamine	0.00	0.00	Triethylamine	0.00
<u>Individual Hydrocarbons</u>				
Emissions in ppm				
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS
	1	2	3	4
Methane	11.95	3.95	6.90	4.74
Ethylene	6.00	0.72	2.27	0.00
Ethane	2.25	1.32	1.86	0.00
Acetylene	4.97	0.00	0.00	0.82
Propane	0.10	0.00	0.00	0.00
Propylene	2.00	0.00	0.57	0.00
Benzene	4.54	1.10	1.49	0.52
Toluene	9.71	1.40	2.99	0.23
N <sub>2</sub> O	2.75	1.30	2.19	1.12
		N <sub>2</sub> O		
			3.26	1.25
			2.48	0.93

TABLE C-4. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 03 AFTER TUNEUP

	Test 036 Emissions in mg/km		Test 037 Emissions in mg/km	
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS
Total Particulate	22.67	13.52	Total Particulate	18.65
Ammonia	4.06	6.43	Ammonia	0.53
Cyanides & Cyanogen	0.37	0.00	Cyanides & Cyanogen	0.30
Hydrogen Sulfide	0.00	0.00	Hydrogen Sulfide	0.00
<u>Aldehydes &amp; Ketones</u>				
Formaldehyde	2.19	0.00	Aldehydes & Ketones	
Acetaldehyde	0.00	0.00	Formaldehyde	1.88
Acetone	0.00	0.00	Acetaldehyde	0.00
Isobutyraldehyde	--	--	Acetone	0.00
Methyl ethyl ketone	0.00	0.00	Isobutyraldehyde	--
Hexanaldehyde	0.00	0.00	Methyl ethyl ketone	0.95
Organic Sulfides			Hexanaldehyde	0.00
Carbonyl sulfide	0.10	0.14	Organic Sulfides	
Methyl sulfide	0.00	0.00	Carbonyl sulfide	0.07
Ethyl sulfide	0.00	0.00	Methyl sulfide	0.02
Methyl disulfide	0.00	0.00	Ethyl sulfide	0.00
Methyl disulfide	0.00	0.00	Methyl disulfide	0.00
<u>Organic Amines</u>				
Monomethylamine	0.03	0.00	Organic Amines	
Monoethylamine + dimethylamine	0.00	0.00	Monomethylamine	0.00
Trimethylamine	0.01	0.00	Monoethylamine + dimethylamine	0.00
Diethylamine	0.00	0.00	Trimethylamine	0.00
Triethylamine	0.00	0.00	Diethylamine	0.00
Triethylamine	0.00	0.00	Triethylamine	0.00
<u>Emissions in ppm</u>				
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	7.13	6.28	10.06	7.70
Ethylene	4.33	0.59	2.84	0.22
Ethane	1.75	1.22	1.71	1.05
Acetylene	2.68	0.00	0.00	0.00
Propane	0.23	0.16	0.17	0.20
Propylene	1.87	0.00	0.49	0.00
Benzene	3.43	0.38	1.37	0.20
Toluene	9.45	0.81	2.72	0.30
N <sub>2</sub> O	3.48	1.58	2.30	0.00
	N <sub>2</sub> O			
			2.99	1.23
			2.29	0.79

TABLE C-5. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 04 AS-RECEIVED

	Test 041 Emissions in mg/km		Test 042 Emissions in mg/km	
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS
Total Particulate	45.75	26.80	Total Particulate	45.68
Ammonia	4.67	12.69	Ammonia	0.56
Cyanides & Cyanogen	0.84	0.35	Cyanides & Cyanogen	0.51
Hydrogen Sulfide	0.00	0.00	Hydrogen Sulfide	0.00
<u>Alddehydes &amp; Ketones</u>				
Formaldehyde	7.73	5.13	Formaldehyde	4.55
Acetaldehyde	3.34	1.46	Acetaldehyde	0.00
Acetone	0.00	0.00	Acetone	0.00
Isobutyraldehyde	--	--	Isobutyraldehyde	--
Methyl ethyl ketone	0.00	0.00	Methyl ethyl ketone	0.00
Hexanaldehyde	0.00	0.00	Hexanaldehyde	0.00
<u>Organic Sulfides</u>				
Carbonyl sulfide	0.00	0.00	Carbonyl sulfide	0.00
Methyl sulfide	0.00	0.00	Methyl sulfide	0.00
Ethyl sulfide	0.00	0.00	Ethyl sulfide	0.00
Methyl disulfide	0.00	0.00	Methyl disulfide	0.00
<u>Organic Amines</u>				
Monomethylamine	0.00	0.00	Monomethylamine	0.00
Monoethylamine + dimethylamine	0.00	0.00	Monoethylamine + dimethylamine	0.00
Trimethylamine	0.00	0.00	Trimethylamine	0.00
Diethylamine	0.00	0.00	Diethylamine	0.00
Triethylamine	0.00	0.00	Triethylamine	0.00
<u>Emissions in ppm</u>				
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	16.67	8.88	17.27	8.44
Ethylene	19.37	3.06	16.57	2.92
Ethane	5.21	3.45	4.94	3.32
Acetylene	5.16	0.00	7.39	0.00
Propane	0.42	0.25	0.28	0.23
Propylene	7.92	0.96	5.43	0.90
Benzene	8.67	2.47	7.61	1.80
Toluene	19.13	3.50	15.67	3.04
N <sub>2</sub> O	0.21	0.10	0.34	0.13
			N <sub>2</sub> O	
<u>Individual Hydrocarbons</u>				
Methane	16.20	9.26	15.87	8.48
Ethylene	20.61	3.47	14.22	3.33
Ethane	5.54	3.64	4.75	3.41
Acetylene	3.68	0.00	5.10	0.00
Propane	0.34	0.22	0.23	0.12
Propylene	8.48	1.15	5.09	0.92
Benzene	8.90	2.03	6.58	1.39
Toluene	19.16	3.40	13.66	1.90
N <sub>2</sub> O	0.16	0.10	0.47	0.16

TABLE C-6. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSION RESULTS  
CAR 04 AFTER TUNEUP

	Test 046	
	Emissions in mg/km	
	COLD-UDDS	HOT-UDDS
Total Particulate	42.49	45.68
Ammonia	3.35	3.40
Cyanides & Cyanogen	1.32	0.73
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes &amp; Ketones</u>		
Formaldehyde	7.14	7.54
Acetaldehyde	1.96	1.46
Acetone	0.00	0.00
Isobutyraldehyde	--	--
Methyl ethyl ketone	0.00	0.00
Hexanaldehyde	0.00	0.00
<u>Organic Sulfides</u>		
Carbonyl sulfide	0.00	0.00
Methyl sulfide	0.00	0.00
Ethyl sulfide	0.00	0.00
Methyl disulfide	0.00	0.00
<u>Organic Amines</u>		
Monomethylamine	0.01	0.00
Monoethylamine + dimethylamine	0.00	0.00
Trimethylamine	0.00	0.00
Diethylamine	0.00	0.00
Triethylamine	0.00	0.00

	Emissions in ppm			
	COLD-UDDS		HOT-UDDS	
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	27.31	6.35	10.30	5.80
Ethylenne	22.67	4.00	11.97	3.56
Ethane	5.64	3.59	4.32	3.19
Acetylene	28.95	0.00	1.37	0.00
Propane	0.21	0.07	0.04	0.00
Propylene	8.97	1.06	3.82	0.85
Benzene	11.16	1.71	4.19	1.27
Toluene	26.10	4.18	9.08	2.49
N <sub>2</sub> O	0.16	0.07	0.30	0.11

TABLE C-7. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 05 AS-RECEIVED

	Test 051 Emissions in mg/km			Test 052 Emissions in mg/km	
	COLD-UDDS	HOT-UDDS		COLD-UDDS	HOT-UDDS
Total Particulate	10.33	3.83	Total Particulate	9.87	10.31
Ammonia	13.77	21.63	Ammonia	18.76	20.62
Cyanides & Cyanogen	0.48	0.67	Cyanides & Cyanogen	0.91	0.80
Hydrogen Sulfide	0.00	0.00	Hydrogen Sulfide	0.00	0.00
<u>Aldehydes &amp; Ketones</u>			<u>Aldehydes &amp; Ketones</u>		
Formaldehyde	5.74	1.39	Formaldehyde	0.55	0.00
Acetaldehyde	0.69	0.57	Acetaldehyde	1.80	0.52
Acetone	12.24	7.15	Acetone	6.95	0.00
Isobutyraldehyde	--	--	Isobutyraldehyde	--	--
Methyl ethyl ketone	0.00	0.00	Methyl ethyl ketone	0.00	0.00
Hexanaldehyde	0.00	0.00	Hexanaldehyde	0.00	0.00
<u>Organic Sulfides</u>			<u>Organic Sulfides</u>		
Carbonyl sulfide	0.27	0.02	Carbonyl sulfide	0.09	0.02
Methyl sulfide	0.04	0.01	Methyl sulfide	0.01	0.00
Ethyl sulfide	0.04	0.00	Ethyl sulfide	0.01	0.00
Methyl disulfide	0.01	0.00	Methyl disulfide	0.00	0.00
<u>Organic Amines</u>			<u>Organic Amines</u>		
Monomethylamine	0.00	0.00	Monomethylamine	0.00	0.00
Monoethylamine + dimethylamine	0.00	0.00	Monoethylamine + dimethylamine	0.00	0.00
Trimethylamine	0.00	0.00	Trimethylamine	0.00	0.00
Diethylamine	0.00	0.00	Diethylamine	0.00	0.00
Triethylamine	0.00	0.00	Triethylamine	0.00	0.00

	Emissions in ppm					Emissions in ppm			
	COLD-UDDS		HOT-UDDS			COLD-UDDS		HOT-UDDS	
	1	2	3	4		1	2	3	4
<u>Individual Hydrocarbons</u>									
Methane	7.44	3.74	5.06	3.79	Methane	7.47	3.77	4.89	3.61
Ethylene	6.90	3.60	3.81	4.54	Ethylene	7.30	3.66	3.35	3.15
Ethane	1.77	1.03	1.35	1.12	Ethane	1.71	1.02	1.23	0.97
Acetylene	2.87	0.00	0.00	0.00	Acetylene	2.33	0.00	0.00	0.00
Propane	0.19	0.00	0.11	0.15	Propane	0.11	0.04	0.00	0.04
Propylene	3.22	1.41	1.46	1.75	Propylene	3.47	1.60	1.39	1.38
Benzene	4.96	2.91	3.00	3.17	Benzene	5.01	3.21	2.84	2.74
Toluene	8.20	3.27	3.82	3.60	Toluene	8.09	3.68	3.02	2.37
N <sub>2</sub> O	5.24	1.43	6.11	1.62	N <sub>2</sub> O	6.24	1.31	8.41	1.47

TABLE C-8. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 05 AFTER TUNEUP

	Test 056 Emissions in mg/km		Test 057 Emissions in mg/km		
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS	
Total Particulate	--	4.06	Total Particulate	3.05	1.24
Ammonia	24.53	30.61	Ammonia	30.72	38.20
Cyanides & Cyanogen	1.01	0.96	Cyanides & Cyanogen	0.72	0.70
Hydrogen Sulfide	0.00	0.00	Hydrogen Sulfide	0.00	0.00
<u>Aldehydes &amp; Ketones</u>					
Formaldehyde	0.84	0.00	Aldehydes & Ketones	1.07	0.00
Acetaldehyde	0.66	0.45	Formaldehyde	1.53	0.77
Acetone	1.29	3.35	Acetaldehyde	0.00	0.00
Isobutyraldehyde	--	--	Acetone	--	--
Methyl ethyl ketone	0.00	0.40	Isobutyraldehyde	0.00	0.00
Hexanaldehyde	0.00	0.00	Methyl ethyl ketone	0.00	0.00
Hexanaldehyde	0.00	0.00	Hexanaldehyde	0.00	0.00
<u>Organic Sulfides</u>					
Carbonyl sulfide	0.07	0.03	Organic Sulfides	0.03	0.01
Methyl sulfide	0.01	0.01	Carbonyl sulfide	0.01	0.00
Ethyl sulfide	0.01	0.00	Methyl sulfide	0.00	0.00
Methyl disulfide	0.00	0.00	Ethyl sulfide	0.00	0.00
Methyl disulfide	0.00	0.00	Methyl disulfide	0.00	0.00
<u>Organic Amines</u>					
Monomethylamine	0.00	0.00	Organic Amines	0.00	0.00
Monoethylamine + dimethylamine	0.00	0.00	Monomethylamine	0.00	0.00
Trimethylamine	0.00	0.00	Monoethylamine + dimethylamine	0.00	0.00
Diethylamine	0.00	0.00	Trimethylamine	0.00	0.00
Triethylamine	0.00	0.00	Diethylamine	0.00	0.00
Triethylamine	0.00	0.00	Triethylamine	0.00	0.00
 <u>Emissions in ppm</u>					
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS	
	1	2	3	4	
<u>Individual Hydrocarbons</u>					
Methane	6.89	4.11	5.10	3.65	
Ethylene	6.54	4.23	3.34	3.80	
Ethane	1.63	1.09	1.27	1.08	
Acetylene	1.68	0.00	0.00	0.00	
Propane	0.73	0.00	0.00	0.00	
Propylene	3.20	1.72	1.42	1.59	
Benzene	4.48	3.16	2.69	2.82	
Toluene	9.02	4.81	3.78	3.83	
N <sub>2</sub> O	7.28	1.74	8.26	2.04	
			N <sub>2</sub> O		
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS	
	1	2	3	4	
<u>Individual Hydrocarbons</u>					
Methane	7.03	3.47	4.77	3.35	
Ethylene	6.22	2.33	2.43	2.24	
Ethane	1.64	0.92	1.19	0.88	
Acetylene	2.31	0.00	0.00	0.00	
Propane	0.17	0.00	0.00	0.00	
Propylene	2.93	0.96	1.00	0.84	
Benzene	4.39	2.33	2.25	1.98	
Toluene	8.27	2.49	2.74	1.77	
	7.30	1.59	7.07	1.70	

TABLE C-9. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 06 AS-RECEIVED

	Test 061 Emissions in mg/km			Test 062 Emissions in mg/km				
	COLD-UDDS	HOT-UDDS		COLD-UDDS	HOT-UDDS			
Total Particulate	21.68	15.80	Total Particulate	25.61	16.15			
Ammonia	17.50	15.62	Ammonia	12.59	9.08			
Cyanides & Cyanogen	6.71	5.60	Cyanides & Cyanogen	7.29	4.07			
Hydrogen Sulfide	0.00	0.00	Hydrogen Sulfide	0.00	0.00			
<u>Aldehydes &amp; Ketones</u>			<u>Aldehydes &amp; Ketones</u>					
Formaldehyde	1.63	0.42	Formaldehyde	1.83	0.93			
Acetaldehyde	2.66	1.36	Acetaldehyde	3.43	1.56			
Acetone	0.00	0.00	Acetone	0.00	0.00			
Isobutyraldehyde	--	--	Isobutyraldehyde	--	--			
Methyl ethyl ketone	0.51	0.00	Methyl ethyl ketone	0.63	0.00			
Hexanaldehyde	0.00	0.00	Hexanaldehyde	0.00	0.00			
<u>Organic Sulfides</u>			<u>Organic Sulfides</u>					
Carbonyl sulfide	0.01	0.09	Carbonyl sulfide	0.05	0.01			
Methyl sulfide	0.00	0.00	Methyl sulfide	0.00	0.00			
Ethyl sulfide	0.00	0.00	Ethyl sulfide	0.02	0.01			
Methyl disulfide	0.00	0.00	Methyl disulfide	0.00	0.00			
<u>Organic Amines</u>			<u>Organic Amines</u>					
Monomethylamine	0.00	0.00	Monomethylamine	0.00	0.00			
Monoethyldiamine + dimethylamine	0.00	0.00	Monoethyldiamine + dimethylamine	0.00	0.00			
Trimethylamine	0.00	0.00	Trimethylamine	0.00	0.00			
Diethylamine	0.00	0.00	Diethylamine	0.00	0.00			
Triethylamine	0.00	0.00	Triethylamine	0.00	0.00			
 <u>Emissions in ppm</u>								
	COLD-UDDS	HOT-UDDS		COLD-UDDS	HOT-UDDS			
	1	2	3	4	1	2	3	4
<u>Individual Hydrocarbons</u>				<u>Individual Hydrocarbons</u>				
Methane	12.49	3.04	5.00	Methane	14.06	2.37	3.20	2.01
Ethylene	18.46	3.09	7.23	Ethylene	19.01	1.68	4.00	0.72
Ethane	2.30	0.99	1.45	Ethane	2.22	0.68	1.00	0.57
Acetylene	7.80	0.00	0.33	Acetylene	12.35	0.00	0.07	0.00
Propane	0.17	0.00	0.00	Propane	0.28	0.00	0.00	0.00
Propylene	8.08	1.41	3.09	Propylene	8.08	0.83	1.91	0.00
Benzene	9.73	2.80	3.58	Benzene	10.81	2.25	2.46	0.99
Toluene	19.78	4.21	5.83	Toluene	22.21	3.64	4.28	1.59
N <sub>2</sub> O	2.78	4.16	5.94	N <sub>2</sub> O	2.64	5.25	6.67	4.11

TABLE C-10. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 06 AFTER TUNEUP

	Test 066		Test 067	
	Emissions in mg/km		Emissions in mg/km	
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS
Total Particulate	13.53	12.21	Total Particulate	33.94
Ammonia	10.42	8.39	Ammonia	4.83
Cyanides & Cyanogen	2.87	1.41	Cyanides & Cyanogen	2.20
Hydrogen Sulfide	0.00	0.00	Hydrogen Sulfide	0.20
<u>Aldehydes &amp; Ketones</u>				
Formaldehyde	2.21	1.32	Formaldehyde	1.71
Acetaldehyde	2.70	1.19	Acetaldehyde	1.32
Acetone	0.00	0.00	Acetone	0.00
Isobutyraldehyde	--	0.00	Isobutyraldehyde	--
Methyl ethyl ketone	0.49	0.00	Methyl ethyl ketone	0.00
Hexanaldehyde	0.00	0.00	Hexanaldehyde	0.00
<u>Organic Sulfides</u>				
Carbonyl sulfide	0.04	0.03	Carbonyl sulfide	0.02
Methyl sulfide	0.00	0.03	Methyl sulfide	0.01
Ethyl sulfide	0.02	0.01	Ethyl sulfide	0.02
Methyl disulfide	0.00	0.00	Methyl disulfide	0.01
<u>Organic Amines</u>				
Monomethylamine	0.00	0.00	Monomethylamine	0.00
Monoethylamine + dimethylamine	0.00	0.00	Monoethylamine + dimethylamine	0.00
Trimethylamine	0.00	0.00	Trimethylamine	0.00
Diethylamine	0.00	0.00	Diethylamine	0.00
Triethylamine	0.00	0.00	Triethylamine	0.00
<u>Emissions in ppm</u>				
	COLD-UDDS		HOT-UDDS	
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	12.87	2.90	5.89	2.60
Ethylene	15.58	1.17	5.63	1.21
Ethane	2.20	0.79	1.42	0.93
Acetylene	9.35	0.00	0.30	0.00
Propane	0.30	0.20	0.30	0.28
Propylene	6.50	0.27	2.03	0.36
Benzene	8.72	1.48	2.87	1.10
Toluene	16.36	2.06	4.39	0.87
N <sub>2</sub> O	1.72	1.00	3.02	0.99
	<u>Emissions in ppm</u>		<u>Emissions in ppm</u>	
	COLD-UDDS		HOT-UDDS	
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	16.47	2.80	3.57	0.34
Ethylene	16.85	1.00	4.97	1.09
Ethane	2.17	0.70	1.23	0.69
Acetylene	14.16	0.00	0.00	0.00
Propane	0.41	0.00	0.02	0.01
Propylene	6.88	0.39	2.01	0.35
Benzene	11.02	1.28	2.81	1.09
Toluene	25.63	2.11	4.68	1.92
N <sub>2</sub> O	1.26	0.79	2.00	0.74

TABLE C-11. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 07 AS-RECEIVED

	Test 071 Emissions in mg/km			Test 072 Emissions in mg/km	
	COLD-UDDS	HOT-UDDS		COLD-UDDS	HOT-UDDS
Total Particulate	19.07	33.38	Total Particulate	38.02	31.57
Ammonia	5.19	1.65	Ammonia	1.93	2.22
Cyanides & Cyanogen	1.25	0.17	Cyanides & Cyanogen	1.01	0.59
Hydrogen Sulfide	0.00	0.00	Hydrogen Sulfide	0.00	0.00
<u>Aldehydes &amp; Ketones</u>			<u>Aldehydes &amp; Ketones</u>		
Formaldehyde	8.69	4.83	Formaldehyde	6.54	6.00
Acetaldehyde	3.62	1.93	Acetaldehyde	0.00	0.00
Acetone	0.00	0.00	Acetone	0.00	0.00
Isobutyraldehyde	--	--	Isobutyraldehyde	--	--
Methyl ethyl ketone	0.00	0.00	Methyl ethyl ketone	0.00	0.00
Hexanaldehyde	0.00	0.00	Hexanaldehyde	0.00	0.00
<u>Organic Sulfides</u>			<u>Organic Sulfides</u>		
Carbonyl sulfide	0.05	0.11	Carbonyl sulfide	0.02	0.01
Methyl sulfide	0.00	0.01	Methyl sulfide	0.00	0.01
Ethyl sulfide	0.04	0.00	Ethyl sulfide	0.01	0.01
Methyl disulfide	0.03	0.00	Methyl disulfide	0.01	0.00
<u>Organic Amines</u>			<u>Organic Amines</u>		
Monomethylamine	0.00	0.00	Monomethylamine	0.00	0.00
Monoethylamine + dimethylamine	0.00	0.00	Monoethylamine + dimethylamine	0.00	0.00
Trimethylamine	0.00	0.00	Trimethylamine	0.00	0.00
Diethylamine	0.00	0.00	Diethylamine	0.00	0.00
Triethylamine	0.00	0.00	Triethylamine	0.00	0.00

C-12

	Emissions in ppm					Emissions in ppm			
	COLD-UDDS		HOT-UDDS			COLD-UDDS		HOT-UDDS	
	1	2	3	4		1	2	3	4
<u>Individual Hydrocarbons</u>									
Methane	10.70	6.39	6.88	7.22	Individual Hydrocarbons	10.49	7.60	6.94	7.00
Ethylene	12.24	2.79	4.95	2.63	Ethylene	13.60	2.75	5.41	2.71
Ethane	1.78	0.93	1.22	0.97	Ethane	1.90	0.93	1.17	0.92
Acetylene	4.03	0.32	0.51	0.36	Acetylene	4.39	0.00	0.48	0.28
Propane	0.19	0.10	0.13	0.00	Propane	0.16	0.00	0.00	0.00
Propylene	4.42	0.78	1.52	0.96	Propylene	5.51	0.86	1.54	0.79
Benzene	5.11	1.34	2.14	1.23	Benzene	6.70	1.54	2.52	1.34
Toluene	10.62	2.06	2.76	1.84	Toluene	14.92	2.46	3.77	1.91
N <sub>2</sub> O	0.19	0.00	0.03	0.04	N <sub>2</sub> O	0.22	0.00	0.08	0.00

TABLE C-12. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 07 AFTER TUNEUP

Test 076				Test 078				
Emissions in mg/km				Emissions in mg/km				
	COLD-UDDS	HOT-UDDS		COLD-UDDS	HOT-UDDS			
Total Particulate	38.81	28.48		Total Particulate	49.86	38.09		
Ammonia	16.00	13.38		Ammonia	14.23	8.30		
Cyanides & Cyanogen	0.12	0.02		Cyanides & Cyanogen	0.54	0.42		
Hydrogen Sulfide	0.00	0.00		Hydrogen Sulfide	0.00	0.00		
<u>Aldehydes &amp; Ketones</u>								
Formaldehyde	--	7.15		Aldehydes & Ketones	8.42	7.13		
Acetaldehyde	--	1.70		Formaldehyde	1.11	0.63		
Acetone	--	0.00		Acetaldehyde	0.00	0.00		
Isobutyraldehyde	--	0.00		Acetone	--	--		
Methyl ethyl ketone	--	0.00		Isobutyraldehyde	0.00	0.00		
Hexanaldehyde	--	0.00		Methyl ethyl ketone	0.00	0.00		
<u>Organic Sulfides</u>								
Carbonyl sulfide	0.01	0.01		Organic Sulfides	0.05	0.02		
Methyl sulfide	0.01	0.01		Carbonyl sulfide	0.01	0.00		
Ethyl sulfide	0.03	0.01		Methyl sulfide	0.00	0.00		
Methyl disulfide	0.02	0.00		Ethyl sulfide	0.00	0.00		
<u>Organic Amines</u>								
Monomethylamine	0.00	0.00		Organic Amines	0.00	0.00		
Monoethylamine + dimethylamine	0.00	0.00		Monomethylamine	0.00	0.00		
Trimethylamine	0.00	0.00		Monoethylamine + dimethylamine	0.00	0.00		
Diethylamine	0.00	0.00		Trimethylamine	0.00	0.00		
Triethylamine	0.00	0.00		Diethylamine	0.00	0.00		
<u>Emissions in ppm</u>								
	COLD-UDDS	HOT-UDDS			COLD-UDDS	HOT-UDDS		
	1	2	3	4	1	2	3	
<u>Individual Hydrocarbons</u>								
Methane	9.93	5.98	6.13	5.85	Individual Hydrocarbons	10.04	5.88	3.92
Ethylene	13.49	2.93	4.80	3.03	Ethane	13.91	6.45	3.00
Ethane	1.82	0.88	1.04	0.89	Acetylene	1.63	0.95	0.64
Acetylene	3.94	0.28	0.48	0.29	Acetylene	3.32	0.36	0.13
Propane	0.00	0.00	0.00	0.00	Propane	0.06	0.02	0.00
Propylene	5.31	0.70	1.44	0.76	Propylene	5.34	1.81	0.71
Benzene	6.07	1.31	1.95	1.30	Benzene	6.39	2.59	1.16
Toluene	12.42	2.17	2.95	1.81	Toluene	12.06	4.57	1.57
N <sub>2</sub> O	0.22	0.01	0.11	0.10	N <sub>2</sub> O	0.11	0.05	0.01

TABLE C-13. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 08 AS-RECEIVED

	Test 081 Emissions in mg/km			Test 082 Emissions in mg/km					
	COLD-UDDS	HOT-UDDS		COLD-UDDS	HOT-UDDS				
Total Particulate	25.37	12.22	Total Particulate	30.00	15.85				
Ammonia	1.85	3.40	Ammonia	4.16	15.71				
Cyanides & Cyanogen	2.14	0.76	Cyanides & Cyanogen	2.04	0.37				
Hydrogen Sulfide	0.00	0.00	Hydrogen Sulfide	0.00	0.00				
<u>Aldehydes &amp; Ketones</u>			<u>Aldehydes &amp; Ketones</u>						
Formaldehyde	4.73	5.63	Formaldehyde	6.96	4.19				
Acetaldehyde	0.00	0.00	Acetaldehyde	0.00	0.00				
Acetone	0.00	0.00	Acetone	0.00	0.00				
Isobutyraldehyde	--	--	Isobutyraldehyde	--	--				
Methyl ethyl ketone	0.00	0.00	Methyl ethyl ketone	0.00	0.00				
Hexanaldehyde	0.00	0.00	Hexanaldehyde	0.00	0.00				
<u>Organic Sulfides</u>			<u>Organic Sulfides</u>						
Carbonyl sulfide	0.04	0.00	Carbonyl sulfide	0.03	0.02				
Methyl sulfide	0.02	0.01	Methyl sulfide	0.04	0.00				
Ethyl sulfide	0.12	0.00	Ethyl sulfide	0.01	0.00				
Methyl disulfide	0.01	0.00	Methyl disulfide	0.00	0.00				
<u>Organic Amines</u>			<u>Organic Amines</u>						
Monomethylamine	0.00	0.00	Monomethylamine	0.00	0.00				
Monoethylamine + dimethylamine	0.00	0.00	Monoethylamine + dimethylamine	0.00	0.00				
Trimethylamine	0.00	0.00	Trimethylamine	0.00	0.00				
Diethylamine	0.00	0.00	Diethylamine	0.00	0.00				
Triethylamine	0.00	0.00	Triethylamine	0.00	0.00				
 <u>Emissions in ppm</u>									
	COLD-UDDS	HOT-UDDS		COLD-UDDS	HOT-UDDS				
	1	2	3	4	1	2	3	4	
<u>Individual Hydrocarbons</u>				<u>Individual Hydrocarbons</u>					
Methane	4.28	0.31	1.66	0.66	Methane	6.11	0.87	2.37	0.59
Ethylene	9.53	0.29	2.94	0.20	Ethylene	11.23	0.34	3.19	0.27
Ethane	1.17	0.24	0.64	0.26	Ethane	1.34	0.44	0.75	0.38
Acetylene	3.91	0.00	0.00	0.00	Acetylene	4.13	0.00	0.00	0.00
Propane	0.00	0.00	0.00	0.00	Propane	0.16	0.00	0.00	0.00
Propylene	4.52	0.00	0.94	0.00	Propylene	5.11	0.00	1.04	0.00
Benzene	4.77	0.19	1.63	0.00	Benzene	5.68	0.16	1.52	0.00
Toluene	11.24	0.73	3.88	0.15	Toluene	13.23	0.99	3.05	0.00
N <sub>2</sub> O	2.31	0.89	2.34	0.67	N <sub>2</sub> O	1.47	0.75	2.08	0.55

TABLE C-14. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 08 AFTER TUNEUP

Test 086				Test 087				
	Emissions in mg/km				Emissions in mg/km			
	COLD-UDDS	HOT-UDDS			COLD-UDDS	HOT-UDDS		
Total Particulate	49.39		28.28	Total Particulate	50.03		28.83	
Ammonia	3.28		3.56	Ammonia	4.52		4.34	
Cyanides & Cyanogen	2.20		1.80	Cyanides & Cyanogen	2.68		1.86	
Hydrogen Sulfide	0.00		0.00	Hydrogen Sulfide	0.10		0.00	
<u>Aldehydes &amp; Ketones</u>								
Formaldehyde	1.50		3.17	Aldehydes & Ketones				
Acetaldehyde	0.00		1.05	Formaldehyde	0.20		0.00	
Acetone	0.00		0.00	Acetaldehyde	0.00		0.00	
Isobutyraldehyde	--		--	Acetone	0.00		0.00	
Methyl ethyl ketone	0.00		0.00	Isobutyraldehyde	--		--	
Hexanaldehyde	0.00		0.00	Methyl ethyl ketone	0.00		0.00	
Hexanaldehyde	0.00		0.00	Hexanaldehyde	0.00		0.00	
<u>Organic Sulfides</u>								
Carbonyl sulfide	0.01		0.06	Organic Sulfides				
Methyl sulfide	0.06		0.04	Carbonyl sulfide	0.02		0.02	
Ethyl sulfide	0.00		0.01	Methyl sulfide	0.01		0.01	
Methyl disulfide	0.00		0.00	Ethyl sulfide	0.01		0.01	
Methyl disulfide	0.00		0.00	Methyl disulfide	0.00		0.00	
<u>Organic Amines</u>								
Monomethylamine	0.00		0.00	Organic Amines				
Monoethylamine + dimethylamine	0.00		0.00	Monomethylamine	0.00		0.00	
Trimethylamine	0.00		0.00	Monoethylamine + dimethylamine	0.00		0.00	
Diethylamine	0.00		0.00	Trimethylamine	0.00		0.00	
Triethylamine	0.00		0.00	Diethylamine	0.00		0.00	
Triethylamine	0.00		0.00	Triethylamine	0.00		0.00	
<u>Emissions in ppm</u>								
	COLD-UDDS	HOT-UDDS			COLD-UDDS	HOT-UDDS		
	1	2	3	4	1	2	3	
<u>Individual Hydrocarbons</u>								
Methane	11.75	2.37	4.44	2.07	Individual Hydrocarbons			
Ethylene	15.44	1.78	7.15	1.40	Methane	13.03	2.60	4.57
Ethane	2.09	0.95	1.42	0.87	Ethylene	16.53	1.87	6.67
Acetylene	9.46	0.00	0.00	0.00	Ethane	2.16	1.03	1.45
Propane	0.26	0.00	0.18	0.00	Acetylene	11.43	0.00	0.00
Propylene	6.52	0.79	3.09	0.61	Propane	0.15	0.00	0.00
Benzene	9.35	2.18	3.71	1.29	Propylene	7.67	0.83	2.96
Toluene	17.14	2.70	6.68	1.91	Benzene	9.05	1.73	3.77
N <sub>2</sub> O	0.98	0.60	1.95	0.62	Toluene	21.34	2.97	7.68
					N <sub>2</sub> O	0.84	0.84	2.09
								0.61

TABLE C-15. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 09 AS-RECEIVED

	Test 091 Emissions in mg/km		Test 092 Emissions in mg/km	
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS
Total Particulate	39.82	38.00	Total Particulate	36.90
Ammonia	4.48	1.40	Ammonia	2.69
Cyanides & Cyanogen	0.44	0.26	Cyanides & Cyanogen	0.33
Hydrogen Sulfide	0.00	0.00	Hydrogen Sulfide	0.00
<u>Aldehydes &amp; Ketones</u>				
Formaldehyde	0.00	0.00	Formaldehyde	3.99
Acetaldehyde	0.00	0.00	Acetaldehyde	0.00
Acetone	0.00	0.00	Acetone	0.00
Isobutyraldehyde	--	--	Isobutyraldehyde	--
Methyl ethyl ketone	0.00	0.00	Methyl ethyl ketone	0.00
Hexanaldehyde	0.00	0.00	Hexanaldehyde	0.00
<u>Organic Sulfides</u>				
Carbonyl sulfide	0.00	0.04	Carbonyl sulfide	0.01
Methyl sulfide	0.00	0.01	Methyl sulfide	0.00
Ethyl sulfide	0.00	0.00	Ethyl sulfide	0.00
Methyl disulfide	0.00	0.00	Methyl disulfide	0.00
<u>Organic Amines</u>				
Monomethylamine	0.00	0.00	Monomethylamine	0.00
Monoethylamine + dimethylamine	0.00	0.00	Monoethylamine + dimethylamine	0.00
Trimethylamine	0.00	0.00	Trimethylamine	0.00
Diethylamine	0.00	0.00	Diethylamine	0.00
Triethylamine	0.00	0.00	Triethylamine	0.00
<u>Emissions in ppm</u>				
	COLD-UDDS	HOT-UDDS		
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	5.22	1.10	1.64	1.02
Ethylene	5.67	1.32	3.86	1.17
Ethane	1.15	0.76	1.03	0.76
Acetylene	4.03	0.00	0.00	0.00
Propane	0.12	0.08	0.14	0.07
Propylene	1.67	0.00	0.92	0.00
Benzene	2.67	0.00	1.10	0.25
Toluene	7.65	0.48	2.54	0.00
N <sub>2</sub> O	0.32	0.13	0.47	0.15
			N <sub>2</sub> O	
	Emissions in ppm		Emissions in ppm	
	COLD-UDDS	HOT-UDDS		
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	6.19	1.38	1.74	1.18
Ethylene	5.52	1.15	4.25	1.07
Ethane	1.19	0.88	1.08	0.81
Acetylene	5.22	0.00	0.00	0.00
Propane	0.00	0.00	0.00	0.00
Propylene	1.78	0.00	1.28	0.00
Benzene	2.91	0.35	1.45	0.21
Toluene	8.83	0.76	3.93	0.00
			N <sub>2</sub> O	
	Emissions in ppm		Emissions in ppm	
	COLD-UDDS	HOT-UDDS		
	1	2	3	4

TABLE C-16. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 09 AFTER TUNEUP

	Test 096 Emissions in mg/km			
	COLD-UDDS	HOT-UDDS		
Total Particulate	37.38	30.44		
Ammonia	2.87	1.67		
Cyanides & Cyanogen	0.48	0.26		
Hydrogen Sulfide	0.00	0.00		
<u>Aldehydes &amp; Ketones</u>				
Formaldehyde	1.12	1.51		
Acetaldehyde	0.00	0.00		
Acetone	0.00	0.00		
Isobutyraldehyde	--	--		
Methyl ethyl ketone	0.00	0.00		
Hexanaldehyde	0.00	0.00		
<u>Organic Sulfides</u>				
Carbonyl sulfide	0.02	0.01		
Methyl sulfide	0.01	0.00		
Ethyl sulfide	0.00	0.00		
Methyl disulfide	0.00	0.00		
<u>Organic Amines</u>				
Monomethylamine	0.00	0.00		
Monoethylamine + dimethylamine	0.00	0.00		
Trimethylamine	0.00	0.00		
Diethylamine	0.00	0.00		
Triethylamine	0.00	0.00		
Emissions in ppm				
	COLD-UDDS	HOT-UDDS		
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	5.57	2.28	2.36	2.28
Ethylene	6.04	1.27	3.67	1.27
Ethane	1.30	0.86	1.04	0.86
Acetylene	3.40	0.00	0.00	0.00
Propane	0.22	0.00	0.00	0.00
Propylene	1.89	0.00	0.71	0.00
Benzene	2.66	0.00	1.17	0.00
Toluene	7.98	0.60	3.06	0.60
N <sub>2</sub> O	0.34	0.13	0.46	0.01

TABLE C-17. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 10 AS-RECEIVED

	Test 101 Emissions in mg/km		Test 102 Emissions in mg/km						
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS					
Total Particulate	177.09	329.96	Total Particulate	160.89	221.48				
Ammonia	3.71	2.97	Ammonia	3.08	3.31				
Cyanides & Cyanogen	0.92	2.65	Cyanides & Cyanogen	0.91	0.70				
Hydrogen Sulfide	0.25	0.25	Hydrogen Sulfide	0.42	0.42				
<u>Aldehydes &amp; Ketones</u>									
Formaldehyde	19.80	14.91	Aldehydes & Ketones						
Acetaldehyde	4.10	1.86	Formaldehyde	15.28	4.24				
Acetone	0.00	0.00	Acetaldehyde	1.94	0.00				
Isobutyraldehyde	--	--	Acetone	0.00	0.00				
Methyl ethyl ketone	0.00	0.00	Isobutyraldehyde	--	--				
Hexanaldehyde	0.00	0.00	Methyl ethyl ketone	0.00	0.00				
Hexanaldehyde			Hexanaldehyde	0.00	0.00				
<u>Organic Sulfides</u>									
Carbonyl sulfide	0.05	0.02	Organic Sulfides						
Methyl sulfide	0.00	0.00	Carbonyl sulfide	0.03	0.03				
Ethyl sulfide	0.00	0.00	Methyl sulfide	0.02	0.02				
Methyl disulfide	0.00	0.00	Ethyl sulfide	0.00	0.00				
Methyl disulfide			Methyl disulfide	0.00	0.00				
<u>Organic Amines</u>									
Monomethylamine	0.00	0.00	Organic Amines						
Monoethylamine + dimethylamine	0.00	0.00	Monomethylamine	0.00	0.00				
Trimethylamine	0.00	0.00	Monoethylamine + dimethylamine	0.02	0.00				
Diethylamine	0.00	0.00	Trimethylamine	0.00	0.00				
Triethylamine	0.00	0.00	Diethylamine	0.00	0.00				
Triethylamine			Triethylamine	0.00	0.00				
<u>Emissions in ppm</u>									
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS					
	1	2	3	4					
<u>Individual Hydrocarbons</u>									
Methane	36.62	24.97	25.74	21.25	Individual Hydrocarbons				
Ethylene	38.56	29.41	30.62	27.40	Methane	45.95	20.20	20.50	11.97
Ethane	4.64	2.80	3.38	2.73	Ethylene	36.97	15.71	21.47	9.04
Acetylene	27.84	10.39	20.93	6.57	Ethane	4.33	1.96	2.57	1.61
Propane	0.37	0.00	0.15	0.00	Acetylene	33.99	0.00	10.14	0.00
Propylene	18.15	9.08	10.89	8.33	Propane	0.44	0.17	0.26	0.00
Benzene	23.36	12.91	14.22	11.05	Propylene	18.23	7.07	10.32	5.03
Toluene	58.10	25.55	22.77	20.95	Benzene	54.45	22.78	41.05	14.91
N <sub>2</sub> O	0.68	0.00	0.58	0.42	Toluene	202.84	84.55	157.98	63.27
					N <sub>2</sub> O	0.55	0.58	0.76	0.54

TABLE C-18. FTP INDIVIDUAL SAMPLE UNREGULATED EMISSIONS RESULTS  
CAR 10 AFTER TUNEUP

	Test 106 Emissions in mg/km		Test 107 Emissions in mg/km						
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS					
Total Particulate	77.35	89.88	Total Particulate	86.99	78.80				
Ammonia	0.94	2.39	Ammonia	5.55	2.32				
Cyanides & Cyanogen	0.01	0.46	Cyanides & Cyanogen	0.26	0.13				
Hydrogen Sulfide	0.24	0.51	Hydrogen Sulfide	0.22	0.10				
<u>Aldehydes &amp; Ketones</u>									
Formaldehyde	12.77	7.67	Aldehydes & Ketones	3.89	0.15				
Acetaldehyde	0.00	0.61	Formaldehyde	0.00	0.00				
Acetone	0.00	0.00	Acetaldehyde	0.00	0.00				
Isobutyraldehyde	--	--	Acetone	--	--				
Methyl ethyl ketone	0.00	0.00	Isobutyraldehyde	0.00	0.00				
Hexanaldehyde	0.00	0.00	Methyl ethyl ketone	0.00	0.00				
<u>Organic Sulfides</u>									
Carbonyl sulfide	0.04	0.01	Organic Sulfides	0.03	0.01				
Methyl sulfide	0.02	0.02	Carbonyl sulfide	0.01	0.01				
Ethyl sulfide	0.00	0.00	Methyl sulfide	0.00	0.00				
Methyl disulfide	0.00	0.00	Ethyl sulfide	0.00	0.00				
<u>Organic Amines</u>									
Monomethylamine	0.00	0.00	Organic Amines	0.01	0.00				
Monoethylamine + dimethylamine	0.00	0.00	Monomethylamine	0.00	0.00				
Trimethylamine	0.00	0.00	Monoethylamine + dimethylamine	0.00	0.00				
Diethylamine	0.00	0.00	Trimethylamine	0.00	0.00				
Triethylamine	0.00	0.00	Diethylamine	0.00	0.00				
<u>Individual Hydrocarbons</u>									
	Emissions in ppm		Emissions in ppm						
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS					
	1	2	3	4					
Methane	18.83	4.64	8.07	3.07	Individual Hydrocarbons	21.00	5.56	6.79	3.82
Ethylene	27.43	5.88	12.03	1.43	Ethylene	28.75	5.58	9.95	2.75
Ethane	3.70	1.74	1.80	1.32	Ethane	3.55	1.73	1.69	1.30
Acetylene	13.41	0.00	5.09	0.00	Acetylene	12.43	0.00	2.70	0.00
Propane	0.00	0.00	0.00	0.00	Propane	0.00	0.00	0.00	1.51
Propylene	12.67	2.89	5.27	0.00	Propylene	12.15	2.79	4.14	1.31
Benzene	12.71	3.58	5.93	1.07	Benzene	13.16	3.37	4.84	1.67
Toluene	26.49	7.64	11.15	2.73	Toluene	26.01	7.01	8.17	2.19
N <sub>2</sub> O	0.40	0.29	0.52	0.28	N <sub>2</sub> O	0.45	0.29	0.75	0.25

APPENDIX D

COMPUTER PRINTOUTS OF THE  
REGULATED EMISSIONS TEST RESULTS

TABLE D-1. TEST NO. 011 EMISSION RESULTS

FTP VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

TEST NO. 011FTP RUN 1  
VEHICLE MODEL '78 BUICK REGAL  
ENGINE 5.0 L(305. CID) V-8  
TRANSMISSION A3

BAROMETER 739.39 MM HG(29.11 IN HG)  
RELATIVE HUMIDITY 37. FCT

## BAG RESULTS

BAG NUMBER	DESCRIPTION	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	749.3 (29.5)	762.0 (30.0)	749.3 (29.5)	759.5 (29.9)	
BLOWER INLET P MM. H2O(IN. H2O)	736.6 (29.0)	749.3 (29.5)	736.6 (29.0)	744.2 (29.3)	
BLOWER INLET TEMP. DEG. C(DEG. F)	41.7 (107.0)	39.4 (103.0)	41.7 (107.0)	40.1 (104.0)	
BLOWER REVOLUTIONS	40526.	69598.	40555.	69566.	
TOT FLOW STD. CU. METRES(SCF)	76.2 (2691.)	131.2 (4632.)	76.3 (2693.)	131.1 (4628.)	
HC SAMPLE METER/RANGE/PPM	29.3 / 3/ 293.	10.1 / 3/ 101.	88.4 / 2/ 89.	56.0 / 2/ 56.	
HC BCKGRD METER/RANGE/PPM	1.2 / 3/ 12.	1.3 / 3/ 13.	11.3 / 2/ 11.	11.3 / 2/ 11.	
CO SAMPLE METER/RANGE/PPM	62.0 / 2/ 3190.	39.3 / 11/ 436.	97.5 / 12/ 247.	72.0 / 12/ 167.	
CO BCKGRD METER/RANGE/PPM	.2 / 2/ 8.	3.1 / 11/ 9.	2.2 / 12/ 4.	4.7 / 12/ 3.	
CO2 SAMPLE METER/RANGE/PCT	71.9 / 3/ 1.30	49.5 / 3/ .86	67.8 / 3/ 1.22	49.2 / 3/ .85	
CO2 BCKGRD METER/RANGE/PCT	3.5 / 3/ .05	3.0 / 3/ .06	2.0 / 3/ .04	2.5 / 3/ .04	
NOX SAMPLE METER/RANGE/PPM	50.6 / 2/ 51.	22.7 / 2/ 23.	53.1 / 2/ 53.	26.7 / 2/ 27.	
NOX BCKGRD METER/RANGE/PPM	.4 / 2/ 0.	.7 / 2/ 1.	.8 / 2/ 1.	.6 / 2/ 1.	
DILUTION FACTOR	8.17	14.73	10.70	15.34	
HC CONCENTRATION PPM	282.	89.	76.	43.	
CO CONCENTRATION PPM	3065.	415.	235.	160.	
CO2 CONCENTRATION PCT	1.26	.80	1.10	.81	
NOX CONCENTRATION PPM	50.2	22.0	52.4	26.0	
HC MASS GRAMS	12.41	6.72	3.44	3.43	
CO MASS GRAMS	271.97	63.35	20.03	24.36	
CO2 MASS GRAMS	1752.2	1920.9	1640.4	1944.2	
NOX MASS GRAMS	6.32	4.77	6.59	5.61	
HC GRAMS/KM	2.12	1.07	.59	.54	
CO GRAMS/KM	46.39	10.09	3.56	3.85	
CO2 GRAMS/KM	298.9	307.3	201.7	307.0	
NOX GRAMS/KM	1.08	.76	1.13	.89	
FUEL CONSUMPTION BY CB L/100KM	16.16	13.74	12.34	13.44	
RUN TIME SECONDS	504.	867.	505.	869.	
MEASURED DISTANCE KM	5.86	8.28	5.85	8.33	
DFC, WET (DRY)	.912 (.901)		.924 (.913)		
SCF, WET (DRY)	1.000 (.979)		1.000 (.979)		
VOL (SCM)	207.4		207.3		
SAM BLR (SCM)	0.00		0.00		
KM (MEASURED)	12.14		12.18		
FUEL CONSUMPTION L/100KM	15.01		12.91		

## COMPOSITE RESULTS

TEST NUMBER 011FTP  
BAROMETER MM HG 739.4  
HUMIDITY G/KG 5.9  
TEMPERATURE DEG C 21.1

	3-BAG	(4-BAG)
CARBON DIOXIDE G/KM	290.5	(293.5)
FUEL CONSUMPTION L/100KM	13.76	(13.81)
HYDROCARBONS (THC) G/KM	1.16	(1.00)
CARBON MONOXIDE G/KM	15.83	(13.77)
OXIDES OF NITROGEN G/KM	.73	(.76)

FET	VEHICLE EMISSIONS RESULTS	TEST WEIGHT 1588. KG( 3500. LBS)
	PROJECT 11-5830-007	ACTUAL ROAD LOAD 8.0 KW( 10.7 HP)
		GASOLINE EN-344-F
		ODOMETER 39246. KM(55455. MILES)
TEST NO. 011FET RUN 1		
VEHICLE MODEL '78 BUICK REGAL		
ENGINE 5.0 L(305. CID) V-8		
TRANSMISSION A3		
BAROMETER 739.14 MM HG(29.10 IN HG)		
RELATIVE HUMIDITY 37. FCT		
BAG RESULTS		
TEST CYCLE	FET	NOX HUMIDITY CORRECTION FACTOR .86
BLOWER DIF P MM. H2O(IN. H2O)	759.5 (29.7)	
BLOWER INLET P MM. H2O(IN. H2O)	744.2 (29.3)	
BLOWER INLET TEMP. DEG. C(DEG. F)	41.1 (106.0)	
BLOWER REVOLUTIONS	41352	
TOT FLOW STD. CU. METRES(SCF)	115.3 / 4071.)	
HC SAMPLE METER/RANGE/PPM	54.3 / 2/ 54.	
HC BCKGRD METER/RANGE/PPM	10.3 / 2/ 10.	
CO SAMPLE METER/RANGE/PPM	94.0 / 12/ 95.	
CO BCKGRD METER/RANGE/PPM	2.1 / 13/ 2.	
CO2 SAMPLE METER/RANGE/PCT	96.4 / 3/ 1.61	
CO2 BCKGRD METER/RANGE/PCT	3.6 / 3/ .06	
NOX SAMPLE METER/RANGE/PPM	80.8 / 2/ 81.	
NOX BCKGRD METER/RANGE/PPM	.7 / 2/ 1.	
DILUTION FACTOR	7.33	
HC CONCENTRATION PPM	43.	
CO CONCENTRATION PPM	89.	
CO2 CONCENTRATION PCT	1.77	
NOX CONCENTRATION PPM	89.2	
HC MASS GRAMS	3.02	
CO MASS GRAMS	11.96	
CO2 MASS GRAMS	3725.8	
NOX MASS GRAMS	15.24	
RUN TIME SECONDS	765.	
DFC, WET (DRY)	.844 (.853)	
SCF, WET (DRY)	1.000 (.971)	
VOL (SCM)	115.3	
SAM BLR (SCM)	0.00	
KM (MEASURED)	16.54	
TEST NUMBER	011FET	
BAROMETER	MM HG	
HUMIDITY	G/KG	
TEMPERATURE	DEG C	
CARBON DIOXIDE	G/KM	
FUEL CONSUMPTION	L/100KM	
HYDROCARBONS	G/KM	
CARBON MONOXIDE	G/KM	
OXIDES OF NITROGEN	G/KM	

TABLE D-2. TEST NO. 012 EMISSION RESULTS

FTP VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

TEST NO.	012FTP	RUN	1	VEHICLE NO.01	TEST WEIGHT	1588. KG( 3500. LBS)
VEHICLE MODEL	78 BUICK REGAL	DATE	1/22/81	ACTUAL ROAD LOAD	8.0 KW( 10.7 HP)	
ENGINE 5.0 L(305. CID) V-8		BAG CART NO.	1	GASOLINE	EN-344	
TRANSMISSION A3		DYNO NO.	3	ODOMETER	87838. KM(54580. MILES)	
CVS NO.	2					
BAROMETER	749.05 MM HG(29.49 IN HG)	DRY BULB TEMP.	21.1 DEG C(70.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR	.85	
RELATIVE HUMIDITY	33. PCT	ABS. HUMIDITY	5.2 GM/KG			
BAG RESULTS						
BAG NUMBER		1	2	3	4	
DESCRIPTION		COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED	
BLOWER DIF P MM. H2O(IN. H2O)	759.5 (29.9)	764.5 (30.1)	767.1 (30.2)	764.5 (30.1)		
BLOWER INLET P MM. H2O(IN. H2O)	741.7 (29.2)	759.5 (29.9)	754.4 (29.7)	754.4 (29.7)		
BLOWER INLET TEMP. DEG. C(DEG. F)	42.2 (108.0)	39.4 (103.0)	38.3 (101.0)	40.0 (104.0)		
BLOWER REVOLUTIONS	40620.	69585.	40547.	69521.		
TOT FLOW STD. CU. METRES(SCF)	77.3 ( 2731.)	132.9 ( 4692.)	77.6 ( 2741.)	132.7 ( 4685.)		
HC SAMPLE METER/RANGE/PPM	25.8/ 3/ 258.	82.6/ 2/ 83.	71.8/ 2/ 72.	43.1/ 2/ 43.		
CO SAMPLE METER/RANGE/PPM	1.4/ 3/ 14.	14.8/ 2/ 15.	14.1/ 2/ 14.	12.5/ 2/ 13.		
CO2 SAMPLE METER/RANGE/PPM	98.5/ 3/ 2878.	70.5/11/ 298.	82.0/12/ 195.	47.9/12/ 101.		
CO2 CONCENTRATION PCT	.4/ 3/ .9.	2.9/11/ .8.	3.3/12/ .6.	2.7/12/ .5.		
CO2 BCKGRD METER/RANGE/PCT	72.2/ 3/ 1.31	49.3/ 3/ .85	67.1/ 3/ 1.21	49.2/ 3/ .85		
NOX SAMPLE METER/RANGE/PPM	3.6/ 3/ .06	3.7/ 3/ .06	3.7/ 3/ .06	4.0/ 3/ .06		
NOX BCKGRD METER/RANGE/PPM	55.2/ 2/ .55.	23.0/ 2/ .23.	52.6/ 2/ .53.	26.7/ 2/ .27.		
DILUTION FACTOR	.6/ 2/ 1.	.6/ 2/ 1.	.6/ 2/ 1.	.6/ 2/ 1.		
HC CONCENTRATION PPM	8.31	15.04	10.88	15.49		
CO CONCENTRATION PPM	246.	.69	.59	.31		
CO2 CONCENTRATION PCT	2767.	282.	183.	.93		
NOX CONCENTRATION PPM	1.26	.80	1.15	.79		
HC MASS GRAMS	54.7	22.4	52.1	26.1		
CO MASS GRAMS	10.96	5.27	2.64	2.40		
CO2 MASS GRAMS	249.10	43.62	16.55	14.42		
NOX MASS GRAMS	1784.7	1947.9	1639.9	1929.5		
HC GRAMS/KM	1.88	.84	.46	.38		
CO GRAMS/KM	42.75	6.98	2.86	2.31		
CO2 GRAMS/KM	306.3	311.7	283.2	309.1		
NOX GRAMS/KM	1.17	.77	1.13	.90		
FUEL CONSUMPTION BY CB L/100KM	16.19	13.89	12.34	13.40		
RUN TIME	SECONDS					
MEASURED DISTANCE	KM	506.	867.	506.	867.	
DFC, WET (DRY)		5.83	6.25	5.79	6.24	
SCF, WET (DRY)		.914 ( .904)		.925 ( .915)		
VOL (SCM)		1.000 ( .980)		1.000 ( .980)		
SAM BLR (SCM)		210.2		210.3		
KM (MEASURED)		0.00		0.00		
FUEL CONSUMPTION L/100KM		12.08		12.03		
		15.00		12.89		
COMPOSITE RESULTS						
TEST NUMBER	012FTP				3-BAG (4-BAG)	
BAROMETER	MM HG	749.0			302.8 ( 302.0)	
HUMIDITY	G/KG	5.2			13.94 ( 13.80)	
TEMPERATURE	DEG C	21.1			.95 ( .82)	
				CARBON DIOXIDE G/KM	13.27 ( 11.89)	
				FUEL CONSUMPTION L/100KM	.95 ( .99)	
				HYDROCARBONS (THC) G/KM		
				CARBON MONOXIDE G/KM		
				OXIDES OF NITROGEN G/KM		

TEST NO.	012FET	RUN	1	VEHICLE NO.01	TEST WEIGHT	1588. KG( 3500. LBS)
VEHICLE MODEL	78 BUICK REGAL	DATE	1/22/81	ACTUAL ROAD LOAD	8.0 KW( 10.7 HP)	
ENGINE 5.0 L(305. CID) V-8		BAG CART NO.	1	GASOLINE	EN-344	
TRANSMISSION A3		DYNO NO.	3	ODOMETER	87862. KM(54580. MILES)	
CVS NO.	2					
BAROMETER	749.05 MM HG(29.49 IN HG)	DRY BULB TEMP.	22.8 DEG C(73.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR	.84	
RELATIVE HUMIDITY	29. PCT	ABS. HUMIDITY	5.1 GM/KG			
BAG RESULTS						
TEST CYCLE		FET				
BLOWER DIF P MM. H2O(IN. H2O)	772.2 (30.4)					
BLOWER INLET P MM. H2O(IN. H2O)	756.9 (29.8)					
BLOWER INLET TEMP. DEG. C(DEG. F)	42.2 (108.0)					
BLOWER REVOLUTIONS	61322.					
TOT FLOW STD. CU. METRES(SCF)	116.5 ( 4113.)					
HC SAMPLE METER/RANGE/PPM	55.1/ 2/ 55.					
HC BCKGRD METER/RANGE/PPM	12.0/ 2/ 12.					
CO SAMPLE METER/RANGE/PPM	81.3/13/ 81.					
CO BCKGRD METER/RANGE/PPM	3.1/13/ 3.					
CO2 SAMPLE METER/RANGE/PCT	93.8/ 3/ 1.76					
CO2 BCKGRD METER/RANGE/PCT	4.2/ 3/ .06					
NOX SAMPLE METER/RANGE/PPM	75.4/ 2/ 75.					
NOX BCKGRD METER/RANGE/PPM	.8/ 2/ 1.					
DILUTION FACTOR	7.57					
HC CONCENTRATION PPM	45.					
CO CONCENTRATION PPM	75.					
CO2 CONCENTRATION PCT	1.70					
NOX CONCENTRATION PPM	74.7					
HC MASS GRAMS	3.00					
CO MASS GRAMS	10.14					
CO2 MASS GRAMS	3629.9					
NOX MASS GRAMS	14.03					
RUN TIME	SECONDS	765.				
DFC, WET (DRY)		.868 ( .860)				
SCF, WET (DRY)		1.000 ( .974)				
VOL (SCM)		116.5				
SAM BLR (SCM)		0.00				
KM (MEASURED)		16.42				
TEST NUMBER	012FET					
BAROMETER	MM HG	749.0				
HUMIDITY	G/KG	5.1				
TEMPERATURE	DEG C	22.8				
CARBON DIOXIDE	G/KM	221.1				
FUEL CONSUMPTION	L/100KM	9.50				
HYDROCARBONS	G/KM	.18				
CARBON MONOXIDE	G/KM	.62				
OXIDES OF NITROGEN	G/KM	.85				

**TABLE D-3. TEST NO. 021 EMISSIONS RESULTS**  
 FTP VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5830-007

TEST NO. 021FTP RUN 1  
 VEHICLE MODEL 79 MERCURY MARQUIS  
 ENGINE 5.7 L(351, CID) V-8  
 TRANSMISSION A3

VEHICLE NO.02  
 DATE 2/2/81  
 BAG CART NO. 1  
 DYNNO. 3  
 CVS NO. 2

TEST WEIGHT 2041. KG( 4500. LBS)  
 ACTUAL ROAD LOAD 8.9 KM( 12.0 HP)  
 GASOLINE EM-470-F  
 ODOMETER 0. KM( 0. MILES)

BAROMETER 755.14 MM HG(29.73 IN HG)  
 RELATIVE HUMIDITY 26. PCT

DRY BULB TEMP. 19.4 DEG C(67.0 DEG F)  
 ABS. HUMIDITY 3.7 GM/KG

NOX HUMIDITY CORRECTION FACTOR .81

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	774.7 (30.5)	769.6 (30.3)	769.6 (30.3)	767.1 (30.2)
BLOWER INLET P MM. H2O(IN. H2O)	767.1 (30.2)	762.0 (30.0)	762.0 (30.0)	762.0 (30.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.2 (108.0)	42.2 (108.0)	42.2 (108.0)	42.2 (108.0)
BLOWER REVOLUTIONS	40510	49609	40560	69346
TOT FLOW STD. CU. METRES(SCF)	77.6 ( 2739.)	133.4 ( 4709.)	77.7 ( 2744.)	132.9 ( 4691.)
HC SAMPLE METER/RANGE/PPM	12.77/ 3/ 127.	31.5/ 2/ 32.	53.9/ 2/ 54.	32.0/ 2/ 32.
HC BCKGRD METER/RANGE/PPM	8/ 3/ 8.	7.6/ 2/ 8.	8.5/ 2/ 9.	8.4/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	35.5/ 3/ 839.	22.4/ 13/ 21.	77.4/ 12/ 181.	26.5/ 13/ 24.
CO BCKGRD METER/RANGE/PPM	1/ 3/ 2.	8/ 13/ 1.	1.1/ 12/ 0.	.5/ 13/ 0.
CO2 SAMPLE METER/RANGE/PCT	98.5/ 3/ 1.65	60.5/ 3/ 1.07	79.4/ 3/ 1.46	59.9/ 3/ 1.06
CO2 BCKGRD METER/RANGE/PCT	3.2/ 3/ .05	3.1/ 3/ .05	3.4/ 3/ .05	3.2/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	97.3/ 2/ 97.	34.9/ 2/ 35.	74.2/ 2/ 74.	33.2/ 2/ 36.
NOX BCKGRD METER/RANGE/PPM	2/ 2/ 0.	4/ 2/ 0.	4/ 2/ 0.	.5/ 2/ 1.
DILUTION FACTOR	7.70	12.43	9.05	12.56
HC CONCENTRATION PPM	120.	25.	46.	24.
CO CONCENTRATION PPM	803.	19.	174.	23.
CO2 CONCENTRATION PCT	1.60	1.03	1.41	1.02
NOX CONCENTRATION PPM	97.1	34.5	73.8	35.7
HC MASS GRAMS	5.37	1.88	2.08	1.86
CO MASS GRAMS	72.52	3.01	15.77	3.58
CO2 MASS GRAMS	2277.9	2513.1	2007.3	2471.1
NOX MASS GRAMS	11.71	7.16	8.92	7.38
HC GRAMS/KM	.92	.30	.35	.29
CO GRAMS/KM	12.44	.48	2.69	.57
CO2 GRAMS/KM	390.7	399.0	342.6	391.8
NOX GRAMS/KM	2.01	1.14	1.52	1.17
FUEL CONSUMPTION BY CB L/100KM	17.64	17.10	14.85	16.80
RUN TIME	SECONDS			
MEASURED DISTANCE	KM	504.	868.	865.
DFC, WET (DRY)	5.83	6.30	5.86	6.31
SCF, WET (DRY)		.901 ( .894)	.909 ( .901)	
VOL (SCM)		1.000 ( .980)	1.000 ( .980)	
SAM BLR (SCM)		210.9	210.6	
KM (MEASURED)		0.00	0.00	
FUEL CONSUMPTION L/100KM		12.13	12.17	
		17.36	15.86	

COMPOSITE RESULTS

TEST NUMBER 021FTP  
 BAROMETER MM HG 755.1  
 HUMIDITY G/KG 3.7  
 TEMPERATURE DEG C 19.4

3-BAG (4-BAG)  
 CARBON DIOXIDE G/KM 301.8 ( 379.7)  
 FUEL CONSUMPTION L/100KM 16.59 ( 16.50)  
 HYDROCARBONS (THC) G/KM .44 ( .44)  
 CARBON MONOXIDE G/KM 3.56 ( 3.58)  
 OXIDES OF NITROGEN G/KM 1.42 ( 1.43)

HFET VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5830-007

TEST NO. 021FET RUN 1  
 VEHICLE MODEL 79 MERCURY MARQUIS  
 ENGINE 5.7 L(351, CID) V-8  
 TRANSMISSION A3

VEHICLE NO.02  
 DATE 2/2/81  
 BAG CART NO. 1  
 DYNNO. 3  
 CVS NO. 2

TEST WEIGHT 2041. KG( 4500. LBS)  
 ACTUAL ROAD LOAD 8.9 KM( 12.0 HP)  
 GASOLINE EM-470-F  
 ODOMETER 0. KM( 0. MILES)

BAROMETER 755.40 MM HG(29.74 IN HG)  
 RELATIVE HUMIDITY 25. PCT

DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)  
 ABS. HUMIDITY 4.1 GM/KG

NOX HUMIDITY CORRECTION FACTOR .82

0 BAG RESULTS

TEST CYCLE

	HFET	VEHICLE EMISSIONS RESULTS	
TEST NUMBER	021FET	PROJECT 11-5830-007	
BAROMETER	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUMPTION,	L/100KM		
HYDROCARBONS,	G/KM		
CARBON MONOXIDE,	G/KM		
OXIDES OF NITROGEN,	G/KM		
TEST NUMBER,	021FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG		
TEMPERATURE,	DEG C		
CARBON DIOXIDE,	G/KM		
FUEL CONSUM			

**TABLE D-4. TEST NO. 022 EMISSIONS RESULTS**  
 FTP VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5830-007

TEST NO. 022FTP RUN 1  
 VEHICLE MODEL '79 MERCURY MARQUIS  
 ENGINE 5.7 L(351. CID) V-8  
 TRANSMISSION A3

BAROMETER 753.87 MM HG(29.68 IN HG)  
 RELATIVE HUMIDITY 23. PCT  
 BAG RESULTS

BAG NUMBER  
 DESCRIPTION

BLOWER DIF P MM. H2O(IN. H2O)  
 BLOWER INLET P MM. H2O(IN. H2O)  
 BLOWER INLET TEMP. DEG. C(DEG. F)  
 BLOWER REVOLUTIONS  
 TOT FLOW STD. CU. METRES(SCF)  
 HC SAMPLE METER/RANGE/PPM  
 HC BCKGRD METER/RANGE/PPM  
 CO SAMPLE METER/RANGE/PPM  
 CO BCKGRD METER/RANGE/PPM  
 CO2 SAMPLE METER/RANGE/PCT  
 CO2 BCKGRD METER/RANGE/PCT  
 NOX SAMPLE METER/RANGE/PPM  
 NOX BCKGRD METER/RANGE/PPM

DILUTION FACTOR

HC CONCENTRATION PPM

CO CONCENTRATION PPM

CO2 CONCENTRATION PCT

NOX CONCENTRATION PPM

HC MASS GRAMS

CO MASS GRAMS

CO2 MASS GRAMS

NOX MASS GRAMS

HC GRAMS/KM

CO GRAMS/KM

CO2 GRAMS/KM

NOX GRAMS/KM

FUEL CONSUMPTION BY CB L/100KM

RUN TIME SECONDS

MEASURED DISTANCE KM

DFC, WET (DRY)

SCF, WET (DRY)

VOL (SCM)

SAM BLR (SCM)

KM (MEASURED)

FUEL CONSUMPTION L/100KM

VEHICLE NO.02  
 DATE 2/ 3/81  
 BAG CART NO. 1  
 DYN NO. 3  
 CVS NO. 2

TEST WEIGHT 2041. KG( 4500. LBS)  
 ACTUAL ROAD LOAD 8.9 KW( 12.0 HP)  
 GASOLINE EM-470-F  
 ODOMETER 0. KM( 0. MILES)

DRY BULB TEMP. 21.1 DEG C(70.0 DEG F)  
 ABS. HUMIDITY 3.5 GM/KG

NDX HUMIDITY CORRECTION FACTOR .81

	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
792.3 (30.8)	774.7 (30.5)	774.7 (30.5)	772.2 (30.4)	772.2 (30.4)
769.6 (30.3)	764.5 (30.1)	762.0 (30.0)	762.0 (30.0)	762.0 (30.0)
42.2 (108.0)	42.2 (108.0)	42.2 (108.0)	42.2 (108.0)	42.2 (108.0)
40542	69607	40562	49559	49559
77.5 (2734.)	133.1 ( 4698.)	77.6 ( 2738.)	133.0 ( 4697.)	133.0 ( 4697.)
12.7/ 3/ 127.	33.7/ 2/ 34.	50.7/ 2/ 51.	33.3/ 2/ 33.	33.3/ 2/ 33.
1.1/ 3/ 11.	10.7/ 2/ 11.	10.1/ 2/ 10.	10.4/ 2/ 10.	10.4/ 2/ 10.
36.0/ 3/ 851.	30.1/ 13/ 28.	63.1/ 12/ 140.	33.5/ 13/ 31.	33.5/ 13/ 31.
.4/ 3/ 9.	8.7/ 13/ 8.	1.9/ 12/ 4.	3.9/ 13/ 4.	3.9/ 13/ 4.
89.7/ 3/ 1.67	61.0/ 3/ 1.08	80.2/ 3/ 1.47	60.3/ 3/ 1.07	60.3/ 3/ 1.07
3.7/ 3/ .06	3.2/ 3/ .05	3.5/ 3/ .05	3.7/ 3/ .06	3.7/ 3/ .06
98.1/ 2/ 98.	36.3/ 2/ 35.	74.9/ 2/ 75.	34.8/ 2/ 35.	34.8/ 2/ 35.
.5/ 2/ 1.	.6/ 2/ 1.	.1/ 2/ 0.	.1/ 2/ 0.	.1/ 2/ 0.
7.59	12.31	8.78	12.46	12.46
117.	24.	42.	24.	24.
810.	20.	132.	27.	27.
1.62	1.04	1.43	1.02	1.02
97.7	35.7	74.8	34.7	34.7
5.25	1.83	1.87	1.82	1.82
73.06	3.06	11.70	4.16	4.16
2301.6	2528.1	2025.0	2476.2	2476.2
11.71	7.36	8.78	7.14	7.14
.90	.29	.32	.29	.29
12.50	.48	2.03	.66	.66
373.8	400.7	345.6	391.7	391.7
2.00	1.17	1.53	1.13	1.13
17.77	17.18	14.93	16.80	16.80
505.	868.	506.	868.	868.
5.85	6.31	5.86	6.32	6.32
,900 ( ,894)		,908 ( ,902)		
1.000 ( ,981)		1.000 ( ,981)		
210.5		210.6		
0.00		0.00		
12.15		12.18		
17.46		15.90		

**COMPOSITE RESULTS**

TEST NUMBER 022FTP  
 BAROMETER MM HG 753.9  
 HUMIDITY G/KG 3.5  
 TEMPERATURE DEG C 21.1

CARBON DIOXIDE G/KM 384.2 ( 301.5)  
 FUEL CONSUMPTION L/100KM 16.68 ( 16.57)  
 HYDROCARBONS (THC) G/KM .42 ( .42)  
 CARBON MONOXIDE G/KM 3.39 ( 3.44)  
 OXIDES OF NITROGEN G/KM 1.44 ( 1.43)

TEST NO. 022FET RUN 1  
 VEHICLE MODEL '79 MERCURY MARQUIS  
 ENGINE 5.7 L(351. CID) V-8  
 TRANSMISSION A3

BAROMETER 754.13 MM HG(29.69 IN HG)  
 RELATIVE HUMIDITY 20. PCT

0 BAG RESULTS

TEST CYCLE

BLOWER DIF P MM. H2O(IN. H2O)  
 BLOWER INLET P MM. H2O(IN. H2O)  
 BLOWER INLET TEMP. DEG. C(DEG. F)  
 BLOWER REVOLUTIONS  
 TOT FLOW STD. CU. METRES(SCF)

HC SAMPLE METER/RANGE/PPM

HC BCKGRD METER/RANGE/PPM

CO SAMPLE METER/RANGE/PPM

CO BCKGRD METER/RANGE/PPM

CO2 SAMPLE METER/RANGE/PCT

CO2 BCKGRD METER/RANGE/PCT

NOX SAMPLE METER/RANGE/PPM

NOX BCKGRD METER/RANGE/PPM

DILUTION FACTOR

HC CONCENTRATION PPM

CO CONCENTRATION PPM

CO2 CONCENTRATION PCT

NOX CONCENTRATION PPM

HC MASS GRAMS

CO MASS GRAMS

CO2 MASS GRAMS

NOX MASS GRAMS

RUN TIME SECONDS

DFC, WET (DRY)

SCF, WET (DRY)

VOL (SCM)

SAM BLR (SCM)

KM (MEASURED)

FUEL CONSUMPTION L/100KM

VEHICLE NO.02  
 DATE 2/ 3/81  
 BAG CART NO. 1  
 DYN NO. 3  
 CVS NO. 2

TEST WEIGHT 2041. KG( 4500. LBS)  
 ACTUAL ROAD LOAD 8.9 KW( 12.0 HP)  
 GASOLINE EM-470-F  
 ODOMETER 0. KM( 0. MILES)

DRY BULB TEMP. 22.8 DEG C(73.0 DEG F)  
 ABS. HUMIDITY 3.4 GM/KG

NDX HUMIDITY CORRECTION FACTOR .81

FET

	FET
792.5 (31.2)	
769.6 (30.3)	
42.2 (108.0)	
61283	
117.0 ( 4133.)	
44.8/ 2/ 47.	
11.2/ 13/ 11.	
42.5/ 13/ 40.	
5.4/ 13/ 1.	
45.3/ 13/ 1.99	
1.1/ 2/ 1.06	
40.4/ 3/ 121.	
.1/ 3/ 0.	
6.71	
.37	
.38	
1.94	
120.9	
2.52	
4.92	
4148.8	
21.81	
.735	
.851 ( .846)	
1.000 ( .975)	
117.0	
0.00	
16.57	
022FET	
754.1	
3.4	
22.8	
250.3	
10.73	
.15	
.30	
1.32	

TABLE D-5. TEST NO. 031 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

TEST NO. 031FTP RUN 1  
VEHICLE MODEL 79 MERCURY MARQUIS  
ENGINE 5.7 L(351. CID) V-8  
TRANSMISSION A3

VEHICLE NO.03  
DATE 2/ 9/81  
BAG CART NO. 1  
DYN NO. 3  
CVS NO. 2

TEST WEIGHT 2041. KG( 4500. LBS)  
ACTUAL ROAD LOAD 8.9 KW( 12.0 HP)  
GASOLINE EH-470-F  
ODOMETER 78478. KM(48763. MILES)

BAROMETER 737.67 MM HG(29.05 IN HG)  
RELATIVE HUMIDITY 48. PCT  
BAG RESULTS

DRY BULB TEMP. 21.1 DEG C(70.0 DEG F)  
ABS. HUMIDITY 7.7 GM/KG

NOX HUMIDITY CORRECTION FACTOR .91

BAG NUMBER  
DESCRIPTION  
BLOWER DIF P MM. H2O(IN. H2O)  
BLOWER INLET P MM. H2O(IN. H2O)  
BLOWER INLET TEMP. DEG. C(DEG. F)  
BLOWER REVOLUTIONS  
TOT FLOW STD. CU. METRES(SCF)  
HC SAMPLE METER/RANGE/PPM  
HC BCKGRD METER/RANGE/PPM  
CO SAMPLE METER/RANGE/PPM  
CO BCKGRD METER/RANGE/PPM  
C02 SAMPLE METER/RANGE/PCT  
C02 BCKGRD METER/RANGE/PCT  
NOX SAMPLE METER/RANGE/PPM  
NOX BCKGRD METER/RANGE/PPM

	<sup>1</sup> COLD TRANSIENT	<sup>2</sup> STABILIZED	<sup>3</sup> HOT TRANSIENT	<sup>4</sup> STABILIZED
762.0 (30.0)	762.0 (30.0)	762.0 (30.0)	762.0 (30.0)	
754.4 (29.7)	754.4 (29.7)	754.4 (29.7)	754.4 (29.7)	
42.8 (109.0)	42.2 (108.0)	42.2 (108.0)	42.2 (108.0)	
40598.	69550.	40554.	69510.	
75.8 ( 2678.)	130.0 ( 4592.)	75.8 ( 2678.)	130.0 ( 4589.)	
12.0/ 3/ 128.	43.1/ 2/ 43.	64.5/ 2/ 65.	33.0/ 2/ 33.	
1.5/ 3/ 15.	18.6/ 2/ 19.	14.9/ 2/ 15.	13.2/ 2/ 13.	
27.8/ 3/ 647.	80.3/13/ 80.	95.4/12/ 240.	74.3/12/ 172.	
.6/ 3/ 14.	12.9/15/ 12.	2.5/12/ 5.	2.0/12/ 4.	
92.1/ 3/ 1.72	65.2/ 3/ 1.17	84.7/ 3/ 1.57	65.3/ 3/ 1.17	
3.2/ 3/ .05	3.8/ 3/ .06	4.3/ 3/ .07	3.6/ 3/ .06	
68.7/ 2/ 69.	21.4/ 2/ 21.	43.0/ 2/ 43.	23.0/ 2/ 23.	
.5/ 2/ 1.	.5/ 2/ 1.	.5/ 2/ 1.	.6/ 2/ 1.	
7.46	11.37	6.39	11.27	
115.	26.	51.	21.	
604.	65.	225.	162.	
1.68	1.11	1.51	1.12	
68.3	20.9	42.6	22.5	
5.03	1.96	2.25	1.57	
53.34	9.99	19.84	24.49	
2332.4	2651.8	2095.7	2661.9	
9.02	4.75	5.62	5.08	
HC GRAMS/KM	.87	.31	.38	.25
CO GRAMS/KM	9.23	1.59	3.40	3.89
C02 GRAMS/KM	403.6	421.7	358.7	422.3
NOX GRAMS/KM	1.56	.75	.96	.81
FUEL CONSUMPTION BY CB L/100KM	17.96	18.15	15.59	18.32

RUN TIME SECONDS  
MEASURED DISTANCE KM  
DFC, WET (DRY)  
SCF, WET (DRY)  
VOL (SCM)  
SAM BLR (SCM)  
KM (MEASURED)  
FUEL CONSUMPTION L/100KM

	505.	867.	505.	866.
	5.78	6.29	5.84	6.30
.895 ( .881)			.900 ( .886)	
1.000 ( .972)			1.000 ( .972)	
205.9			205.8	
0.00			0.00	
12.07			12.15	
18.06			17.01	

## COMPOSITE RESULTS

TEST NUMBER 031FTP  
BAROMETER MM HG 737.9  
HUMIDITY G/KG 7.7  
TEMPERATURE DEG C 21.1

	3-BAG	(4-BAG)
CARBON DIOXIDE G/KM	400.7	( 400.9)
FUEL CONSUMPTION L/100KM	17.41	( 17.46)
HYDROCARBONS (THC) G/KM	.45	( .43)
CARBON MONOXIDE G/KM	3.66	( 4.34)
OXIDES OF NITROGEN G/KM	.98	( .99)

HFET VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

TEST NO. 031FET RUN 1  
VEHICLE MODEL 79 MERCURY MARQUIS  
ENGINE 5.7 L(351. CID) V-8  
TRANSMISSION A3

VEHICLE NO.03,  
DATE 2/ 9/81  
BAG CART NO. 1  
DYN NO. 3  
CVS NO. 2

TEST WEIGHT 2041. KG( 4500. LBS)  
ACTUAL ROAD LOAD 8.9 KW( 12.0 HP)  
GASOLINE EH-470-F  
ODOMETER 78499. KM(48777. MILES)

BAROMETER 736.60 MM HG(29.00 IN HG)  
RELATIVE HUMIDITY 50. PCT  
0 BAG RESULTS

DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)  
ABS. HUMIDITY 8.6 GM/KG

NOX HUMIDITY CORRECTION FACTOR .93

## TEST CYCLE

BLOWER DIF P MM. H2O(IN. H2O)  
BLOWER INLET P MM. H2O(IN. H2O)  
BLOWER INLET TEMP. DEG. C(DEG. F)  
BLOWER REVOLUTIONS  
TOT FLOW STD. CU. METRES(SCF)  
HC SAMPLE METER/RANGE/PPM  
HC BCKGRD METER/RANGE/PPM  
CO SAMPLE METER/RANGE/PPM  
CO BCKGRD METER/RANGE/PPM  
C02 SAMPLE METER/RANGE/PCT  
C02 BCKGRD METER/RANGE/PCT  
NOX SAMPLE METER/RANGE/PPM  
NOX BCKGRD METER/RANGE/PPM

	774.7 (30.5)
	764.5 (30.1)
	42.8 (109.0)
	61374.
TOT FLOW STD. CU. METRES(SCF)	114.2 ( 4034.)
HC SAMPLE METER/RANGE/PPM	47.9/ 2/ 48.
HC BCKGRD METER/RANGE/PPM	12.9/ 2/ 13.
CO SAMPLE METER/RANGE/PPM	73.0/12/ 168.
CO BCKGRD METER/RANGE/PPM	1.3/12/ 2.
C02 SAMPLE METER/RANGE/PCT	46.6/ 2/ 2.06
C02 BCKGRD METER/RANGE/PCT	1.6/ 2/ .06
NOX SAMPLE METER/RANGE/PPM	40.0/ 3/ 120.
NOX BCKGRD METER/RANGE/PPM	1./ 3/ 0.
DILUTION FACTOR	6.45
HC CONCENTRATION PPM	37.
CO CONCENTRATION PPM	157.
C02 CONCENTRATION PCT	2.01
NOX CONCENTRATION PPM	119.7
HC MASS GRAMS	2.44
CO MASS GRAMS	20.82
C02 MASS GRAMS	4200.2
NOX MASS GRAMS	24.43
RUN TIME SECONDS	765.
DFC, WET (DRY)	.845 ( .831)
SCF, WET (DRY)	1.000 ( .965)
VOL (SCM)	114.2
SAM BLR (SCM)	0.00
KM (MEASURED)	16.42

TEST NUMBER,  
BAROMETER, MM HG  
HUMIDITY, G/KG  
TEMPERATURE, DEG C  
CARBON DIOXIDE, G/KM  
FUEL CONSUMPTION, L/100KM

	031FET
	736.6
	8.6
	22.2
CARBON DIOXIDE, G/KM	255.8
FUEL CONSUMPTION, L/100KM	11.02

HYDROCARBONS, G/KM  
CARBON MONOXIDE, G/KM  
OXIDES OF NITROGEN, G/KM

	.15
	1.27
	1.49

TABLE D-6, TEST NO. 032 EMISSIONS RESULTS

FET VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

TEST NO. 032FTP RUN 1  
VEHICLE MODEL 79 MERCURY MARQUIS  
ENGINE 5.7 L(351, CID) V-8  
TRANSMISSION A3

VEHICLE NO.03  
DATE 2/10/81  
BAG CART NO. 1  
DYNNO NO. 3  
CVS NO. 2

TEST WEIGHT 2041. KG( 4500. LBS)  
ACTUAL ROAD LOAD 8.9 KW( 12.0 HP)  
GASOLINE EM-470-F  
ODOMETER 78559. KM(48814. MILES)

BAROMETER 731.01 MM HG(28.78 IN HG)  
RELATIVE HUMIDITY 52. PCT

DRY BULB TEMP. 20.6 DEG C(69.0 DEG F)  
ABS. HUMIDITY 8.1 GM/KG

NOX HUMIDITY CORRECTION FACTOR .92

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	749.3 (29.5)	762.0 (30.0)	769.6 (30.3)	762.0 (30.0)
BLOWER INLET P MM. H2O(IN. H2O)	735.0 (29.0)	741.7 (29.2)	744.2 (29.3)	749.3 (29.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	34.1 (94.0)	41.1 (107.0)	41.7 (107.0)	42.2 (108.0)
BLOWER REVOLUTIONS	40500.	69477.	40494.	67549.
TOT FLOW STD. CU. METRES(SCF)	76.3 (2695.)	128.9 (4551.)	75.1 (2651.)	128.8 (4547.)
HC SAMPLE METER/RANGE/PPM	11.1/ 3/ 111.	36.3/ 2/ 36.	64.7/ 2/ 65.	29.9/ 2/ 30.
CO BCKGRD METER/RANGE/PPM	1.7/ 3/ 17.	17.8/ 3/ 18.	15.5/ 2/ 16.	14.4/ 2/ 14.
CO SAMPLE METER/RANGE/PPM	25.8/ 3/ 599.	67.1/ 3/ 66.	72.1/ 11/ 308.	76.8/ 12/ 177.
CO BCKGRD METER/RANGE/PPM	.4/ 3/ 9.	5.1/ 13/ 5.	1.1/ 11/ 3.	2.1/ 12/ 4.
CO2 SAMPLE METER/RANGE/PCT	92.4/ 3/ 1.73	63.7/ 3/ 1.14	84.0/ 3/ 1.55	64.7/ 3/ 1.16
CO2 BCKGRD METER/RANGE/PCT	3.7/ 3/ .06	3.5/ 3/ .05	3.6/ 3/ .06	4.2/ 3/ .06
NOX SAMPLE METER/RANGE/PPM	73.0/ 2/ 73.	24.6/ 2/ 25.	48.3/ 2/ 48.	24.3/ 2/ 24.
NOX BCKGRD METER/RANGE/PPM	1.0/ 2/ 1.	1.1/ 2/ 1.	1.2/ 2/ 1.	1.5/ 2/ 2.
DILUTION FACTOR	7.46	11.68	8.43	11.38
HC CONCENTRATION PPM	96.	20.	51.	17.
CO CONCENTRATION PPM	561.	59.	291.	169.
CO2 CONCENTRATION PCT	1.69	1.09	1.50	1.10
NOX CONCENTRATION PPM	72.1	23.6	47.2	22.9
HC MASS GRAMS	4.24	1.49	2.21	1.24
CO MASS GRAMS	49.84	8.85	25.44	25.30
CO2 MASS GRAMS	2346.4	256.7	2067.5	2588.9
NOX MASS GRAMS	9.69	5.35	6.24	5.20
HC GRAMS/KM	.72	.24	.38	.20
CO GRAMS/KM	8.51	1.41	4.38	4.05
CO2 GRAMS/KM	400.7	410.3	356.1	414.3
NOX GRAMS/KM	1.65	.86	1.08	.83
FUEL CONSUMPTION BY CB L/100KM	17.77	17.64	15.55	17.90
RUN TIME SECONDS	505.	866.	505.	866.
MEASURED DISTANCE KM	5.86	6.26	5.81	6.25
DFC, WET (DRY)	.896 ( .881)		.901 ( .886)	
SCF, WET (DRY)	1.000 ( .971)		1.000 ( .971)	
VOL (SCM)	205.2		203.8	
SAM BLR (SCM)	0.00		0.00	
KM (MEASURED)	12.11		12.05	
FUEL CONSUMPTION L/100KM	17.70		16.81	

COMPOSITE RESULTS

TEST NUMBER 032FTP  
BAROMETER MM HG 731.0  
HUMIDITY G/KG 8.1  
TEMPERATURE DEG C 20.6

CARBON DIOXIDE G/KM 393.4 ( 394.6)  
FUEL CONSUMPTION L/100KM 17.09 ( 17.19)  
HYDROCARBONS (THC) G/KM .38 ( .37)  
CARBON MONOXIDE G/KM 3.70 ( 4.48)  
OXIDES OF NITROGEN G/KM 1.08 ( 1.08)

FET VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

TEST NO. 032FET RUN 1  
VEHICLE MODEL 79 MERCURY MARQUIS  
ENGINE 5.7 L(351, CID) V-8  
TRANSMISSION A3

VEHICLE NO.03  
DATE 2/10/81  
BAG CART NO. 1  
DYNNO NO. 3  
CVS NO. 2

TEST WEIGHT 2041. KG( 4500. LBS)  
ACTUAL ROAD LOAD 8.9 KW( 12.0 HP)  
GASOLINE EM-470-F  
ODOMETER 78559. KM(48814. MILES)

BAROMETER 756.92 MM HG(29.80 IN HG)  
RELATIVE HUMIDITY 41. PCT

DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)  
ABS. HUMIDITY 7.5 GM/KG

NOX HUMIDITY CORRECTION FACTOR .91

BAG RESULTS

TEST CYCLE

	FET
BLOWER DIF P MM. H2O(IN. H2O)	769.6 (30.3)
BLOWER INLET P MM. H2O(IN. H2O)	762.0 (30.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.2 (106.0)
BLOWER REVOLUTIONS	61383.
TOT FLOW STD. CU. METRES(SCF)	117.9 (4163.)
HC SAMPLE METER/RANGE/PPM	54.6/ 2/ 55.
HC BCKGRD METER/RANGE/PPM	13.8/ 2/ 14.
CO SAMPLE METER/RANGE/PPM	97.2/ 12/ 246.
CO BCKGRD METER/RANGE/PPM	1.8/ 12/ 3.
CO2 SAMPLE METER/RANGE/PCT	46.0/ 2/ 2.02
CO2 BCKGRD METER/RANGE/PCT	1.5/ 2/ .05
NOX SAMPLE METER/RANGE/PPM	44.3/ 3/ 133.
NOX BCKGRD METER/RANGE/PPM	5/ 3/ 2.
DILUTION FACTOR	6.53
HC CONCENTRATION PPM	43.
CO CONCENTRATION PPM	230.
CO2 CONCENTRATION PCT	1.98
NOX CONCENTRATION PPM	131.6
HC MASS GRAMS	2.92
CO MASS GRAMS	31.62
CO2 MASS GRAMS	4272.6
NOX MASS GRAMS	26.87
RUN TIME SECONDS	766.
DFC, WET (DRY)	.847 ( .836)
SCF, WET (DRY)	1.000 ( .968)
VOL (SCM)	117.9
SAM BLR (SCM)	0.00
KM (MEASURED)	16.56
TEST NUMBER	032FET
BAROMETER,	MM HG
HUMIDITY,	G/KG
TEMPERATURE,	DEG C
CARBON DIOXIDE,	G/KM
FUEL CONSUMPTION,	L/100KM
HYDROCARBONS,	G/KM
CARBON MONOXIDE,	G/KM
OXIDES OF NITROGEN,	G/KM

TABLE D-7. TEST NO. 036 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

TEST NO. 036FTP RUN 1  
VEHICLE MODEL '79 MERCURY MARQUIS  
ENGINE 5.7 L(351, CID) V-8  
TRANSMISSION A3

VEHICLE NO.03  
DATE 2/11/81  
BAG CART NO. 1  
DYNNO NO. 3  
CVS NO. 2

TEST WEIGHT 2041. KG( 4500. LBS)  
ACTUAL ROAD LOAD 8.9 KW( 12.0 HP)  
GASOLINE EM-470-F  
ODOMETER 78597. KM(48838. MILES)

BAROMETER 760.22 MM HG(29.93 IN HG)  
RELATIVE HUMIDITY 13. PCT

## BAG RESULTS

BAG NUMBER	1
DESCRIPTION	COLD TRANSIENT
BLOWER DIF P MM. H2O(IN, H2O)	769.6 ( 30.3)
BLOWER INLET P MM. H2O(IN, H2O)	762.0 (30.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.2 (108.0)
BLOWER REVOLUTIONS	40700.
TOT FLOW STD. CU. METRES(SCF)	78.6 ( 2724.)
HC SAMPLE METER/RANGE/PPM	10.7/ 3/ 107.
HC BCKGRD METER/RANGE/PPM	1.0/ 3/ 10.
CO SAMPLE METER/RANGE/PPM	43.6/ 11/ 256.
CO BCKGRD METER/RANGE/PPM	1.7/ 11/ 5.
CO2 SAMPLE METER/RANGE/PCT	87.7/ 3/ 1.63
CO2 BCKGRD METER/RANGE/PCT	4.0/ 3/ .06
NOX SAMPLE METER/RANGE/PPM	70.4/ 2/ 90.
NOX BCKGRD METER/RANGE/PPM	.8/ 2/ 1.
DILUTION FACTOR	8.05
HC CONCENTRATION PPM	.98
CO CONCENTRATION PPM	243.
CO2 CONCENTRATION PCT	1.58
NOX CONCENTRATION PPM	89.7
HC MASS GRAMS	4.45
CO MASS GRAMS	22.22
CO2 MASS GRAMS	2247.1
NOX MASS GRAMS	10.45

HC GRAMS/KM	.77
CO GRAMS/KM	3.83
CO2 GRAMS/KM	390.4
NOX GRAMS/KM	1.80
FUEL CONSUMPTION BY CB L/100KM	17.02
RUN TIME SECONDS	507.
MEASURED DISTANCE KM	5.81
DFC, WET (DRY)	.903 ( .899)
SCF, WET (DRY)	1.000 ( .984)
VOL (SCM)	211.9
SAM BLR (SCM)	0.00
KM (MEASURED)	12.06
FUEL CONSUMPTION L/100KM	16.93

## COMPOSITE RESULTS

TEST NUMBER 036FTP  
BAROMETER MM HG 760.2  
HUMIDITY G/KG 1.9  
TEMPERATURE DEG C 20.0

CARBON DIOXIDE	G/KM	381.4	( 386.0)
FUEL CONSUMPTION	L/100KM	14.46	( 15.67)
HYDROCARBONS (THC)	G/KM	.42	( .41)
CARBON MONOXIDE	G/KM	1.70	( 2.13)
OXIDES OF NITROGEN	G/KM	1.06	( 1.09)

BAROMETER 760.98 MM HG(29.96 IN HG)  
RELATIVE HUMIDITY 9. PCT

## BAG RESULTS

TEST CYCLE	HFET
BLOWER DIF P MM. H2O(IN, H2O)	800.1 (31.5)
BLOWER INLET P MM. H2O(IN, H2O)	792.5 (31.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	43.9 (111.0)
BLOWER REVOLUTIONS	61313.
TOT FLOW STD. CU. METRES(SCF)	117.6 ( 4153.)
HC SAMPLE METER/RANGE/PPM	36.0/ 2/ 36.
HC BCKGRD METER/RANGE/PPM	9.2/ 2/ 9.
CO SAMPLE METER/RANGE/PPM	49.9/ 13/ 47.
CO BCKGRD METER/RANGE/PPM	2.1/ 13/ 2.
CO2 SAMPLE METER/RANGE/PCT	45.0/ 2/ 1.97
CO2 BCKGRD METER/RANGE/PCT	1.7/ 2/ .06
NOX SAMPLE METER/RANGE/PPM	46.1/ 3/ 138.
NOX BCKGRD METER/RANGE/PPM	.2/ 3/ 1.
DILUTION FACTOR	6.77
HC CONCENTRATION PPM	.28
CO CONCENTRATION PPM	.44
CO2 CONCENTRATION PCT	1.92
NOX CONCENTRATION PPM	137.6
HC MASS GRAMS	1.71
CO MASS GRAMS	5.96
CO2 MASS GRAMS	4134.7
NOX MASS GRAMS	23.77
RUN TIME SECONDS	765.
DFC, WET (DRY)	.852 ( .850)
SCF, WET (DRY)	1.000 ( .979)
VOL (SCM)	117.6
SAM BLR (SCM)	0.00
KM (MEASURED)	16.39

TEST NUMBER,	036FET
BAROMETER,	MM HG
HUMIDITY,	G/KG
TEMPERATURE,	DEG C
CARBON DIOXIDE,	G/KM
FUEL CONSUMPTION,	L/100KM

HYDROCARBONS,	G/KM
CARBON MONOXIDE,	G/KM
OXIDES OF NITROGEN,	G/KM

HFET VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

VEHICLE NO.03  
DATE 2/11/81  
BAG CART NO. 1  
DYNNO NO. 3  
CVS NO. 2

TEST WEIGHT 2041. KG( 4500. LBS)  
ACTUAL ROAD LOAD 8.9 KW( 12.0 HP)  
GASOLINE EM-470-F  
ODOMETER 78620. KM(48852. MILES)

DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)  
ABS. HUMIDITY 1.5 GM/KG NOX HUMIDITY CORRECTION FACTOR .77

## HFET

TEST NO. 036FET RUN 1	VEHICLE NO.03
VEHICLE MODEL '79 MERCURY MARQUIS	DATE 2/11/81
ENGINE 5.7 L(351, CID) V-8	BAG CART NO. 1
TRANSMISSION A3	DYNNO NO. 3
CVS NO. 2	CVS NO. 2
BAROMETER 760.98 MM HG(29.96 IN HG)	DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)
RELATIVE HUMIDITY 9. PCT	ABS. HUMIDITY 1.5 GM/KG
BAG RESULTS	NOX HUMIDITY CORRECTION FACTOR .77
TEST CYCLE	HFET
BLOWER DIF P MM. H2O(IN, H2O)	800.1 (31.5)
BLOWER INLET P MM. H2O(IN, H2O)	792.5 (31.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	43.9 (111.0)
BLOWER REVOLUTIONS	61313.
TOT FLOW STD. CU. METRES(SCF)	117.6 ( 4153.)
HC SAMPLE METER/RANGE/PPM	36.0/ 2/ 36.
HC BCKGRD METER/RANGE/PPM	9.2/ 2/ 9.
CO SAMPLE METER/RANGE/PPM	49.9/ 13/ 47.
CO BCKGRD METER/RANGE/PPM	2.1/ 13/ 2.
CO2 SAMPLE METER/RANGE/PCT	45.0/ 2/ 1.97
CO2 BCKGRD METER/RANGE/PCT	1.7/ 2/ .06
NOX SAMPLE METER/RANGE/PPM	46.1/ 3/ 138.
NOX BCKGRD METER/RANGE/PPM	.2/ 3/ 1.
DILUTION FACTOR	6.77
HC CONCENTRATION PPM	.28
CO CONCENTRATION PPM	.44
CO2 CONCENTRATION PCT	1.92
NOX CONCENTRATION PPM	137.6
HC MASS GRAMS	1.71
CO MASS GRAMS	5.96
CO2 MASS GRAMS	4134.7
NOX MASS GRAMS	23.77
RUN TIME SECONDS	765.
DFC, WET (DRY)	.852 ( .850)
SCF, WET (DRY)	1.000 ( .979)
VOL (SCM)	117.6
SAM BLR (SCM)	0.00
KM (MEASURED)	16.39

TEST NUMBER,	036FET
BAROMETER,	MM HG
HUMIDITY,	G/KG
TEMPERATURE,	DEG C
CARBON DIOXIDE,	G/KM
FUEL CONSUMPTION,	L/100KM

HYDROCARBONS,	G/KM
CARBON MONOXIDE,	G/KM
OXIDES OF NITROGEN,	G/KM

**TABLE D-8. TEST NO. 037 EMISSIONS RESULTS**  
 FTP VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5030-007

TEST NO. 037FTP RUN 1  
 VEHICLE MODEL 79 MERCURY MARQUIS  
 ENGINE 5.7 L(351. CID) V-8  
 TRANSMISSION A3

BAROMETER 756.67 MM HG(29.77 IN HG)  
 RELATIVE HUMIDITY 16. PCT  
 BAG RESULTS

BAG NUMBER	1
DESCRIPTION	
BLOWER DIF P MM. H2O(IN. H2O)	779.8 (30.7)
BLOWER INLET P MM. H2O(IN. H2O)	769.6 (30.3)
BLOWER INLET TEMP. DEG. C(DEG. F)	41.1 (106.0)
BLOWER REVOLUTIONS	40500
TOT FLOW STD. CU. METRES(SCF)	78.0 (2754.4)
HC SAMPLE METER/RANGE/PPM	11.3/ 3/ 113.
HC BCKGRD METER/RANGE/PPM	11.1/ 3/ 11.
CO SAMPLE METER/RANGE/PPM	94.8/11/ 495.
CO BCKGRD METER/RANGE/PPM	2.1/11/ .6
CO2 SAMPLE METER/RANGE/PCT	87.8/ 3/ 1.63
CO2 BCKGRD METER/RANGE/PCT	3.8/ 3/ .06
NOX SAMPLE METER/RANGE/PPM	89.4/ 2/ 89.
NOX BCKGRD METER/RANGE/PPM	.77/ 2/ 1.
DILUTION FACTOR	7.93
HC CONCENTRATION PPM	103.
CO CONCENTRATION PPM	462.
CO2 CONCENTRATION PCT	1.58
NOX CONCENTRATION PPM	68.8
HC MASS GRAMS	4.65
CO MASS GRAMS	41.92
CO2 MASS GRAMS	2257.8
NOX MASS GRAMS	10.42
HC GRAMS/KM	.80
CO GRAMS/KM	7.21
CO2 GRAMS/KM	388.4
NOX GRAMS/KM	1.79
FUEL CONSUMPTION BY CB L/100KM	17.17
RUN TIME	SECONDS
MEASURED DISTANCE KM	505.
DFC, WET (DRY)	.903 ( .898)
SCF, WET (DRY)	1.000 ( .983)
VOL (SCM)	211.5
SAM BLR (SCM)	0.00
KM (MEASURED)	12.04
FUEL CONSUMPTION L/100KM	17.13

COMPOSITE RESULTS

TEST NUMBER 037FTP  
 BAROMETER MM HG 756.7  
 HUMIDITY G/KG 2.5  
 TEMPERATURE DEG C 21.1

VEHICLE NO.03  
 DATE 2/13/81  
 BAG CART NO. 1  
 DYNNO NO. 3  
 CVS NO. 2

TEST WEIGHT 2041. KG( 4500. LBS)  
 ACTUAL ROAD LOAD 8.9 KW( 12.0 HP)  
 GASOLINE EM-470-F  
 ODOMETER 78882. KM(48870. MILES)

DRY BULB TEMP. 21.1 DEG C(70.0 DEG F)  
 ABS. HUMIDITY 2.5 GM/KG

NOX HUMIDITY CORRECTION FACTOR .79

	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	787.4 (31.0)	787.4 (31.0)	787.4 (31.0)	787.4 (31.0)
BLOWER INLET P MM. H2O(IN. H2O)	772.2 (30.4)	772.2 (30.4)	774.7 (30.5)	774.7 (30.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	41.1 (106.0)	41.1 (106.0)	40.8 (105.0)	40.8 (105.0)
BLOWER REVOLUTIONS	62534.	62534.	65132.	65132.
TOT FLOW STD. CU. METRES(SCF)	137.6 (4716.)	137.6 (4716.)	77.9 (2749.)	133.6 (4718.)
HC SAMPLE METER/RANGE/PPM	32.5/ 2/ 33.	32.5/ 2/ 33.	32.2/ 2/ 32.	28.1/ 2/ 28.
HC BCKGRD METER/RANGE/PPM	12.1/ 2/ 12.	12.1/ 2/ 12.	11.6/ 2/ 12.	10.5/ 2/ 11.
CO SAMPLE METER/RANGE/PPM	69.8/13/ 68.	69.8/13/ 68.	69.5/12/ 153.	58.7/12/ 128.
CO BCKGRD METER/RANGE/PPM	6.6/13/ .6	6.6/13/ .6	2.2/12/ .4	2.2/12/ .4
CO2 SAMPLE METER/RANGE/PCT	60.2/ 3/ 1.07	60.2/ 3/ 1.07	60.0/ 3/ 1.47	51.3/ 3/ 1.09
CO2 BCKGRD METER/RANGE/PCT	3.9/ 3/ .06	3.9/ 3/ .06	4.1/ 3/ .06	4.3/ 3/ .07
NOX SAMPLE METER/RANGE/PPM	25.1/ 2/ .25	25.1/ 2/ .25	53.7/ 2/ 54.	25.3/ 2/ 25.
NOX BCKGRD METER/RANGE/PPM	.87/ 2/ 1.	.87/ 2/ 1.	.87/ 2/ 1.	.97/ 2/ 1.
DILUTION FACTOR	12.44	12.44	8.99	12.14
HC CONCENTRATION PPM	21.	21.	52.	18.
CO CONCENTRATION PPM	51.	51.	149.	121.
CO2 CONCENTRATION PCT	1.01	1.01	1.41	1.03
NOX CONCENTRATION PPM	24.3	24.3	53.2	24.5
HC MASS GRAMS	1.65	1.65	2.33	1.42
CO MASS GRAMS	9.44	9.44	13.50	10.02
CO2 MASS GRAMS	2474.3	2474.3	2015.5	2515.2
NOX MASS GRAMS	4.88	4.88	6.23	4.92
HC GRAMS/KM	.26	.26	.40	.23
CO GRAMS/KM	1.52	1.52	2.33	3.01
CO2 GRAMS/KM	397.1	397.1	347.6	402.8
NOX GRAMS/KM	.78	.78	1.07	.79
FUEL CONSUMPTION BY CB L/100KM	17.09	17.09	15.05	17.43
RUN TIME	SECONDS			
MEASURED DISTANCE KM	503.	503.	868.	868.
DFC, WET (DRY)	5.81	6.23	5.80	6.24
SCF, WET (DRY)	.903 ( .898)	.907 ( .902)		
VOL (SCM)	1.000 ( .983)	1.000 ( .983)		
SAM BLR (SCM)	211.5	211.5		
KM (MEASURED)	0.00	0.00		
FUEL CONSUMPTION L/100KM	12.04	12.04		
	17.13	17.13		

CARBON DIOXIDE	G/KM	301.7	( 303.4)
FUEL CONSUMPTION	L/100KM	16.54	( 16.64)
HYDROCARBONS (THC)	G/KM	.41	( .40)
CARBON MONOXIDE	G/KM	2.92	( 3.33)
OXIDES OF NITROGEN	G/KM	1.07	( 1.07)

HFET VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5030-007

TEST NO. 037FET RUN 1  
 VEHICLE MODEL 79 MERCURY MARQUIS  
 ENGINE 5.7 L(351. CID) V-8  
 TRANSMISSION A3

BAROMETER 755.90 MM HG(29.76 IN HG)  
 RELATIVE HUMIDITY 13. PCT

0 BAG RESULTS

TEST CYCLE	
BLOWER DIF P MM. H2O(IN. H2O)	787.4 (31.0)
BLOWER INLET P MM. H2O(IN. H2O)	774.7 (30.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	41.1 (106.0)
BLOWER REVOLUTIONS	61322.
TOT FLOW STD. CU. METRES(SCF)	117.3 (4153.)
HC SAMPLE METER/RANGE/PPM	34.2/ 2/ 34.
HC BCKGRD METER/RANGE/PPM	11.0/ 2/ 11.
CO SAMPLE METER/RANGE/PPM	59.9/13/ 57.
CO BCKGRD METER/RANGE/PPM	3.0/13/ .3
CO2 SAMPLE METER/RANGE/PCT	44.4/ 2/ 1.94
CO2 BCKGRD METER/RANGE/PCT	2.1/ 2/ .07
NOX SAMPLE METER/RANGE/PPM	44.0/ 3/ 132.
NOX BCKGRD METER/RANGE/PPM	.2/ 3/ 1.
DILUTION FACTOR	6.88
HC CONCENTRATION PPM	25.
CO CONCENTRATION PPM	53.
CO2 CONCENTRATION PCT	1.08
NOX CONCENTRATION PPM	131.5
HC MASS GRAMS	1.68
CO MASS GRAMS	7.21
CO2 MASS GRAMS	4040.6
NOX MASS GRAMS	23.20
RUN TIME	SECONDS
DFC, WET (DRY)	.855 ( .851)
SCF, WET (DRY)	1.000 ( .978)
VOL (SCM)	117.6
SAM BLR (SCM)	0.00
KM (MEASURED)	16.42

TEST WEIGHT 2041. KG( 4500. LBS)  
 ACTUAL ROAD LOAD 8.9 KW( 12.0 HP)  
 GASOLINE EM-470-F  
 ODOMETER 78886. KM(48893. MILES)

DRY BULB TEMP. 23.7 DEG C(75.0 DEG F)  
 ABS. HUMIDITY 2.4 GM/KG

HFET

NOX HUMIDITY CORRECTION FACTOR .78

TEST NUMBER 037FET  
 BAROMETER MM HG 755.9  
 HUMIDITY G/KG 2.4  
 TEMPERATURE DEG C 23.8  
 CARBON DIOXIDE G/KM 24.1  
 FUEL CONSUMPTION L/100KM 10.55

HYDROCARBONS G/KM .10  
 CARBON MONOXIDE G/KM .44  
 OXIDES OF NITROGEN G/KM 1.41

TABLE D-9. TEST NO. 041 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

TEST NO. 041FTP RUN 1  
VEHICLE MODEL 78 FORD GRANADA  
ENGINE 4.9 L(302 CID) V-8  
TRANSMISSION A3

BAROMETER 743.46 MM HG(29.27 IN HG)  
RELATIVE HUMIDITY 31. PCT

## BAG RESULTS

BAG NUMBER	1
DESCRIPTION	
BLOWER DIF P MM, H2O(IN, H2O)	762.0 (30.0)
BLOWER INLET P MM, H2O(IN, H2O)	762.0 (30.0)
BLOWER INLET TEMP, DEG. C(DEG. F)	42.8 (109.0)
BLOWER REVOLUTIONS	40524.
TOT FLOW STD. CU. METRES(SCF)	76.4 ( 2698.)
HC SAMPLE METER/RANGE/PPM	20.9/ 3/ 209.
HC BCKGRD METER/RANGE/PPM	1.2/ 3/ 12.
CO SAMPLE METER/RANGE/PPM	43.6/ 3/ 1049.
CO BCKGRD METER/RANGE/PPM	1.3/ 3/ 2.
CO2 SAMPLE METER/RANGE/PCT	96.1/ 3/ 1.81
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	39.6/ 2/ 40.
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ 1.

DILUTION FACTOR	6.95
HC CONCENTRATION PPM	199.
CO CONCENTRATION PPM	1000.
CO2 CONCENTRATION PCT	1.77
NOX CONCENTRATION PPM	39.1
HC MASS GRAMS	8.75
CO MASS GRAMS	88.96
CO2 MASS GRAMS	2475.3
NOX MASS GRAMS	5.15

HC GRAMS/KM	1.50
CO GRAMS/KM	15.25
CO2 GRAMS/KM	424.4
NOX GRAMS/KM	.88
FUEL CONSUMPTION BY CB L/100KM	19.34

RUN TIME	SECONDS	505.
MEASURED DISTANCE	KM	5.83
DFC, DRY		.773
DFC, WET (DRY)		.887 ( .879)
SCF, WET (DRY)		1.000 ( .977)
VOL (SCM)		207.0
SAM BLR (SCM)		0.00
KM (MEASURED)		12.13
FUEL CONSUMPTION L/100KM		19.62

## COMPOSITE RESULTS

TEST NUMBER	041FTP
BAROMETER	MM HG 743.5
HUMIDITY	G/KG 7.4
TEMPERATURE	DEG C 27.8

VEHICLE NO.04	TEST WEIGHT 1814. KG( 4000. LBS)
DATE 2/24/81	ACTUAL ROAD LOAD 9.8 KW( 13.2 HP)
BAG CART NO. 1	GASOLINE EM-470-F
DYNO NO. 3	ODOMETER 91705. KM(36983. MILES)
CVS NO. 2	

DRY BULB TEMP. 27.8 DEG C(82.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR .90
ABS. HUMIDITY 7.4 GM/KG	

	1	2	3	4
	COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER DIF P MM, H2O(IN, H2O)	774.7 (30.5)	762.0 (30.0)	774.7 (30.5)	774.7 (30.5)
BLOWER INLET P MM, H2O(IN, H2O)	774.7 (30.5)	752.0 (30.0)	774.7 (30.5)	774.7 (30.5)
BLOWER INLET TEMP, DEG. C(DEG. F)	42.8 (109.0)	42.8 (109.0)	43.1 (109.5)	42.8 (109.0)
BLOWER REVOLUTIONS	69526.	40490.	69531.	40490.
TOT FLOW STD. CU. METRES(SCF)	130.6 ( 4611.)	76.2 ( 2689.)	130.6 ( 4612.)	130.6 ( 4612.)
HC SAMPLE METER/RANGE/PPM	67.6/ 2/ 68.	21.2/ 3/ 212.	64.4/ 2/ 64.	64.4/ 2/ 64.
HC BCKGRD METER/RANGE/PPM	1.1/ 3/ 11.	1.1/ 3/ 11.	11.3/ 2/ 11.	11.3/ 2/ 11.
CO SAMPLE METER/RANGE/PPM	70.7/12/ 161.	95.2/11/ 488.	62.0/12/ 137.	62.0/12/ 137.
CO BCKGRD METER/RANGE/PPM	.6/12/ 1.	.2/11/ 1.	.3/12/ 1.	.3/12/ 1.
CO2 SAMPLE METER/RANGE/PCT	68.3/ 3/ 1.24	86.3/ 3/ 1.60	67.4/ 3/ 1.21	67.4/ 3/ 1.21
CO2 BCKGRD METER/RANGE/PCT	2.4/ 3/ .04	3.3/ 3/ .05	3.1/ 3/ .05	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	11.4/ 2/ 11.	37.2/ 2/ 37.	10.9/ 2/ 11.	10.9/ 2/ 11.
NOX BCKGRD METER/RANGE/PPM	.9/2/ 1.	.3/ 2/ 0.	.4/ 2/ 0.	.4/ 2/ 0.
DILUTION FACTOR	10.62	9.03	10.88	10.88
HC CONCENTRATION PPM	57.	202.	54.	54.
CO CONCENTRATION PPM	155.	468.	132.	132.
CO2 CONCENTRATION PCT	1.21	1.56	1.17	1.17
NOX CONCENTRATION PPM	10.6	36.9	10.5	10.5
HC MASS GRAMS	4.27	8.89	4.08	4.08
CO MASS GRAMS	23.53	41.50	20.05	20.05
CO2 MASS GRAMS	2065.0	2170.4	2793.6	2793.6
NOX MASS GRAMS	2.38	4.85	2.37	2.37
HC GRAMS/KM	.68	1.52	.64	.64
CO GRAMS/KM	3.74	7.10	3.14	3.14
CO2 GRAMS/KM	458.0	371.3	437.3	437.3
NOX GRAMS/KM	.38	.83	.37	.37
FUEL CONSUMPTION BY CB L/100KM	19.89	16.53	18.96	18.96
RUN TIME	SECONDS	505.	505.	868.
MEASURED DISTANCE	KM	5.83	5.84	6.39
DFC, DRY		.979	.975	.979
DFC, WET (DRY)		.886 ( .887)	1.000 ( .977)	1.000 ( .977)
SCF, WET (DRY)		1.000 ( .977)	1.000 ( .977)	1.000 ( .977)
VOL (SCM)		207.0	206.8	206.8
SAM BLR (SCM)		0.00	0.00	0.00
KM (MEASURED)		12.13	12.23	12.23
FUEL CONSUMPTION L/100KM		19.62	17.80	17.80

CARBON DIOXIDE G/KM	427.3	( 421.3)
FUEL CONSUMPTION L/100KM	10.05	( 19.53)
HYDROCARBONS (THC) G/KM	1.08	( 1.07)
CARBON MONOXIDE G/KM	7.04	( 6.95)
OXIDES OF NITROGEN G/KM	.61	( .60)

HFET VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

TEST NO. 041FTP RUN 1  
VEHICLE MODEL 78 FORD GRANADA  
ENGINE 4.9 L(302 CID) V-8  
TRANSMISSION A3

BAROMETER 743.46 MM HG(29.27 IN HG)  
RELATIVE HUMIDITY 42. PCT

## 0 BAG RESULTS

## TEST CYCLE

BLOWER DIF P MM, H2O(IN, H2O)	774.7 (30.5)
BLOWER INLET P MM, H2O(IN, H2O)	774.7 (30.5)
BLOWER INLET TEMP, DEG. C(DEG. F)	42.0 (109.0)
BLOWER REVOLUTIONS	61352.
TOT FLOW STD. CU. METRES(SCF)	115.2 ( 4069.)
HC SAMPLE METER/RANGE/PPM	13.2/ 3/ 132.
HC BCKGRD METER/RANGE/PPM	1.1/ 3/ 11.
CO SAMPLE METER/RANGE/PPM	64.3/11/ 260.
CO BCKGRD METER/RANGE/PPM	1.1/11/ 0.
CO2 SAMPLE METER/RANGE/PCT	50.4/ 2/ 2.26
CO2 BCKGRD METER/RANGE/PCT	1.1/ 2/ .04
NOX SAMPLE METER/RANGE/PPM	55.0/ 2/ 55.
NOX BCKGRD METER/RANGE/PPM	1.1/ 2/ 1.

DILUTION FACTOR	5.83
HC CONCENTRATION PPM	123.
CO CONCENTRATION PPM	245.
CO2 CONCENTRATION PCT	2.23
NOX CONCENTRATION PPM	54.1
HC MASS GRAMS	8.17
CO MASS GRAMS	32.52
CO2 MASS GRAMS	4702.4
NOX MASS GRAMS	10.59

RUN TIME	SECONDS	766.
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VEHICLE NO.04	TEST WEIGHT 1814. KG( 4000. LBS)
DATE 2/24/81	ACTUAL ROAD LOAD 9.8 KW( 13.2 HP)
BAG CART NO. 1	GASOLINE EM-470-F
DYNO NO. 3	ODOMETER 91728. KM(36997. MILES)
CVS NO. 2	

DRY BULD TEMP. 24.4 DEG C(76.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR .92
ABS. HUMIDITY 8.2 GM/KG	

	HFET	
BLOWER DIF P MM, H2O(IN, H2O)	774.7 (30.5)	
BLOWER INLET P MM, H2O(IN, H2O)	774.7 (30.5)	
BLOWER INLET TEMP, DEG. C(DEG. F)	42.0 (109.0)	
BLOWER REVOLUTIONS	61352.	
TOT FLOW STD. CU. METRES(SCF)	115.2 ( 4069.)	
HC SAMPLE METER/RANGE/PPM	13.2/ 3/ 132.	
HC BCKGRD METER/RANGE/PPM	1.1/ 3/ 11.	
CO SAMPLE METER/RANGE/PPM	64.3/11/ 260.	
CO BCKGRD METER/RANGE/PPM	1.1/11/ 0.	
CO2 SAMPLE METER/RANGE/PCT	50.4/ 2/ 2.26	
CO2 BCKGRD METER/RANGE/PCT	1.1/ 2/ .04	
NOX SAMPLE METER/RANGE/PPM	55.0/ 2/ 55.	
NOX BCKGRD METER/RANGE/PPM	1.1/ 2/ 1.	
DILUTION FACTOR	5.83	
HC CONCENTRATION PPM	123.	
CO CONCENTRATION PPM	245.	
CO2 CONCENTRATION PCT	2.23	
NOX CONCENTRATION PPM	54.1	
HC MASS GRAMS	8.17	
CO MASS GRAMS	32.52	
CO2 MASS GRAMS	4702.4	
NOX MASS GRAMS	10.59	
RUN TIME	SECONDS	766.
MEASURED DISTANCE	KM	1.828 ( .817)
DFC, DRY		1.000 ( .964)
SCF, WET (DRY)		1.000 ( .964)
VOL (SCM)		115.2
SAM BLR (SCM)		0.00
KM (MEASURED)		16.53
FUEL CONSUMPTION	L/100KM	12.34

TEST NUMBER,	041FTP
BAROMETER,	MM HG 743.5
HUMIDITY,	G/KG 8.2
TEMPERATURE,	DEG C 24.4
CARBON DIOXIDE,	G/KM 284.5
FUEL CONSUMPTION,	L/100KM 12.34
HYDROCARBONS,	G/KM .49
CARBON MONOXIDE,	G/KM 1.99
OXIDES OF NITROGEN,	G/KM .66

**TABLE D-10. TEST NO. 042 EMISSIONS RESULTS**  
 FTP VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5830-007

TEST NO.	042FTP	RUN	2	VEHICLE NO.04	TEST WEIGHT	1814. KG( 4000. LBS)
VEHICLE MODEL	78 FORD GRANADA	DATE	2/25/01	BAG CART NO.	ACTUAL ROAD LOAD	9.8 KW( 13.2 HP)
ENGINE 4.9 L(302. CID) V-8				1	GASOLINE	EN-470-F
TRANSMISSION A3		DYNO NO.	3		ODOMETER	91738. KM(57016. MILES)
BAROMETER	741.43 MM HG(29.19 IN HG)	DRY BULB TEMP.	23.3 DEG C(74.0 DEG F)	ADS. HUMIDITY	10.7 GM/KG	NOX HUMIDITY CORRECTION FACTOR
RELATIVE HUMIDITY	58. PCT					1.00
BAG RESULTS						
BAG NUMBER		1	COLD TRANSIENT	2	STABILIZED	3
DESCRIPTION					HOT TRANSIENT	4
BLOWER DIF P MM. H2O(IN. H2O)	774.7 (30.5)	774.7 (30.5)	762.0 (30.0)	774.7 (30.5)	774.7 (30.5)	774.7 (30.5)
BLOWER INLET P MM. H2O(IN. H2O)	774.7 (30.5)	774.7 (30.5)	762.0 (30.0)	774.7 (30.5)	774.7 (30.5)	774.7 (30.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)	42.8 (109.0)	43.3 (110.0)	42.8 (109.0)	42.8 (109.0)	42.8 (109.0)
BLOWER REVOLUTIONS	40597	69400	40537	69533		
TOT FLOW STD. CU. METRES(SCF)	76.0 ( 2602.)	130.3 ( 4603.)	72.0 ( 2683.)	130.2 ( 4598.)		
HC SAMPLE METER/RANGE/PPM	22.0/ 3/ 220.	74.0/ 2/ 75.	19.5/ 3/ 195.	87.1/ 2/ 87.		
HC BCKGRD METER/RANGE/PPM	22.2/ 3/ 12.	12.0/ 2/ 13.	1.4/ 3/ 14.	14.6/ 2/ 15.		
CO SAMPLE METER/RANGE/PPM	43.5/ 3/ 104.	77.7/ 12/ 107.	90.5/ 11/ 443.	51.4/ 12/ 109.		
CO BCKGRD METER/RANGE/PPM	.1/ 3/ 2.	.6/ 12/ 1.	.7/ 11/ 2.	1.0/ 12/ 2.		
CO2 SAMPLE METER/RANGE/PCT	95.0/ 3/ 1.80	68.0/ 3/ 1.24	66.7/ 3/ 1.61	68.0/ 3/ 1.22		
CO2 BCKGRD METER/RANGE/PCT	3.2/ 3/ .05	2.0/ 3/ .04	3.0/ 3/ .05	3.0/ 3/ .05		
NOX SAMPLE METER/RANGE/PPM	36.8/ 2/ 37.	9.9/ 2/ 10.	37.5/ 2/ 38.	12.7/ 2/ 13.		
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ 1.	.5/ 2/ 1.	.8/ 2/ 1.	.0/ 2/ 1.		
DILUTION FACTOR	6.98	10.59	8.00	10.30		
HC CONCENTRATION PPM	210.	63.	163.	56.		
CO CONCENTRATION PPM	909.	180.	422.	103.		
CO2 CONCENTRATION PCT	1.76	1.20	1.57	1.18		
NOX CONCENTRATION PPM	36.3	9.4	36.8	12.0		
HC MASS GRAMS	9.19	4.75	8.01	4.19		
CO MASS GRAMS	87.43	27.27	37.32	15.63		
CO2 MASS GRAMS	2444.9	2046.1	2188.4	2817.0		
NOX MASS GRAMS	5.27	2.35	5.35	2.98		
HC GRAMS/KM	1.56	.74	1.37	.66		
CO GRAMS/KM	14.01	4.23	6.40	2.47		
CO2 GRAMS/KM	414.2	444.1	375.0	444.6		
NOX GRAMS/KM	.09	.36	.72	.47		
FUEL CONSUMPTION BY CB L/100KM	18.88	19.34	16.62	19.23		
RUN TIME	SECONDS	505.	367.	505.	867.	
MEASURED DISTANCE	KM	5.90	6.45	5.84	6.34	
DFC, DRY		.935	.970	.936	.970	
DFC, WET (DRY)		.808 ( .871)		.895 ( .879)		
SCF, WET (DRY)		1.000 ( .958)		1.000 ( .969)		
VOL (SCM)		206.3		206.2		
SAM BLR (SCM)		0.00		0.00		
KM (MEASURED)		12.36		12.17		
FUEL CONSUMPTION L/100KM		19.12		17.98		
COMPOSITE RESULTS						
TEST NUMBER	042FTP				3-DAG	(4-BAG)
BAROMETER	MM HG	741.4		CARBON DIOXIDE	419.2	( 419.2)
HUMIDITY	G/KG	10.7		FUEL CONSUMPTION	10.51	( 10.47)
TEMPERATURE	DEG C	23.3		HYDROCARBONS (THC)	1.08	( 1.06)
				CARBON MONOXIDE	6.99	( 6.47)
				OXIDES OF NITROGEN	.62	( .66)

HFET VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5830-007

TEST NO.	042FET	RUN	2	VEHICLE NO.04	TEST WEIGHT	1814. KG( 4000. LBS)
VEHICLE MODEL	78 FORD GRANADA	DATE	2/25/01	BAG CART NO.	ACTUAL ROAD LOAD	9.8 KW( 13.2 HP)
ENGINE 4.9 L(302. CID) V-8				1	GASOLINE	EN-470-F
TRANSMISSION A3		DYNO NO.	3		ODOMETER	91731. KM(57030. MILES)
BAROMETER	741.63 MM HG(29.20 IN HG)	DRY BULB TEMP.	20.9 DEG C(74.0 DEG F)	ADS. HUMIDITY	11.2 GM/KG	NOX HUMIDITY CORRECTION FACTOR
RELATIVE HUMIDITY	44. PCT					1.02
DAG RESULTS						
TEST CYCLE				HFET		
BLOWER DIF P MM. H2O(IN. H2O)	787.4 (31.0)					
BLOWER INLET P MM. H2O(IN. H2O)	787.4 (31.0)					
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)					
BLOWER REVOLUTIONS	61297.					
TOT FLOW STD. CU. METRES(SCF)	114.5 ( 4043.)					
HC SAMPLE METER/RANGE/PPM	16.0/ 3/ 160.					
HC BCKGRD METER/RANGE/PPM	1.5/ 3/ 15.					
CO SAMPLE METER/RANGE/PPM	83.7/ 11/ 390.					
CO BCKGRD METER/RANGE/PPM	.8/ 11/ 2.					
CO2 SAMPLE METER/RANGE/PCT	50.6/ 2/ 2.27					
CO2 BCKGRD METER/RANGE/PCT	1.4/ 2/ .05					
NOX SAMPLE METER/RANGE/PPM	52.4/ 2/ 52.					
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.					
DILUTION FACTOR	5.76					
HC CONCENTRATION PPM	149.					
CO CONCENTRATION PPM	366.					
CO2 CONCENTRATION PCT	2.23					
NOX CONCENTRATION PPM	52.2					
HC MASS GRAMS	7.75					
CO MASS GRAMS	48.75					
CO2 MASS GRAMS	4677.2					
NOX MASS GRAMS	11.62					
RUN TIME	SECONDS	765.				
DFC, WET (DRY)		.827 ( .815)				
SCF, WET (DRY)		1.000 ( .955)				
VOL (SCM)		114.5				
SAM BLR (SCM)		0.00				
KM (MEASURED)		16.54				
TEST NUMBER,		042FET				
BAROMETER,	MM HG	741.7				
HUMIDITY,	G/KG	11.2				
TEMPERATURE,	DEG C	28.9				
CARBON DIOXIDE,	G/KM	302.8				
FUEL CONSUMPTION,	L/100KM	12.35				
HYDROCARBONS,	G/KM	.59				
CARBON MONOXIDE,	G/KM	-2.95				
OXIDES OF NITROGEN,	G/KM	.70				

TABLE D-11. TEST NO. 046 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS PROJECT 11-5030-007		TEST WEIGHT 1814. KG( 4000. LBS) ACTUAL ROAD LOAD 7.8 KW( 13.2 HP) GASOLINE EM-470-F ODOMETER 91007. KM(57046. MILES)	
TEST NO. 046FTP RUN 1	VEHICLE NO.04		
VEHICLE MODEL 78 FORD GRANADA	DATE 2/26/01		
ENGINE 4.9 L(302. CID) V-8	BAG CART NO. 1 / CVS NO. 2		
TRANSMISSION A3	DYNO NO. 3		
BAROMETER 742.19 MM HG(29.22 IN HG)	DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)		
RELATIVE HUMIDITY 56. PCT	ABS. HUMIDITY 11.4 GM/KG	NOX HUMIDITY CORRECTION FACTOR 1.02	
BAG RESULTS			
BAG NUMBER	1	2	3
DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
BLOWER DIF P MM. H2O(IN. H2O)	762.0 (30.0)	774.7 (30.5)	774.7 (30.5)
BLOWER INLET P MM. H2O(IN. H2O)	732.0 (30.0)	774.7 (30.5)	774.7 (30.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	41.1 (106.0)	42.2 (108.0)	43.3 (110.0)
BLOWER REVOLUTIONS	40534.	39634.	40554.
TOT FLOW STD. CU. METRES(SCF)	76.4 ( 2697.)	130.7 ( 4615.)	76.0 ( 2682.)
HC SAMPLE METER/RANGE/PPM	29.0/ 3/ 298.	30.0/ 2/ 300.	13.4/ 3/ 134.
CO BCKGRD METER/RANGE/PPM	1.5/ 3/ 15.	14.5/ 3/ 15.	1.4/ 3/ 14.
CO SAMPLE METER/RANGE/PPM	54.9/ 3/ 1361.	67.0/ 13/ 65.	84.3/ 13/ 203.
CO BCKGRD METER/RANGE/PPM	2.2/ 3/ 5.	6.6/ 13/ 6.	2.7/ 12/ 5.
CO2 SAMPLE METER/RANGE/PCT	95.5/ 3/ 1.79	66.5/ 3/ 1.20	95.1/ 3/ 1.58
CO2 BCKGRD METER/RANGE/PCT	3.4/ 3/ .05	3.8/ 3/ .06	3.6/ 3/ .06
NOX SAMPLE METER/RANGE/PPM	35.1/ 2/ 38.	10.6/ 2/ 11.	37.4/ 2/ 37.
NOX BCKGRD METER/RANGE/PPM	1.0/ 2/ 1.	.9/ 2/ 1.	.7/ 2/ 1.
DILUTION FACTOR	6.86	11.08	8.33
HC CONCENTRATION PPM	285.	67.	122.
CO CONCENTRATION PPM	1288.	57.	108.
CO2 CONCENTRATION PCT	1.75	1.14	1.33
NOX CONCENTRATION PPM	35.2	9.8	30.6
HC MASS GRAMS	12.56	5.03	5.33
CO MASS GRAMS	114.33	8.88	14.87
CO2 MASS GRAMS	2445.9	273.5	2123.9
NOX MASS GRAMS	5.27	2.50	5.74
HC GRAMS/KM	2.16	.81	.92
CO GRAMS/KM	19.70	4.40	2.03
CO2 GRAMS/KM	421.4	441.1	367.7
NOX GRAMS/KM	.71	.40	.99
FUEL CONSUMPTION BY CB L/100KM	19.60	19.03	16.01
RUN TIME SECONDS	505.	867.	505.
MEASURED DISTANCE KM	5.80	6.20	5.70
DFC, DRY	.765	.771	.767
DFC, WET (DRY)	.889 ( .873)	.901 ( .884)	.901 ( .884)
SCF, WET (DRY)	1,000 ( .957)	1,000 ( .770)	1,000 ( .770)
VOL (SCM)	207.1	206.2	206.2
SAM BLR (SCM)	0.00	0.00	0.00
KM (MEASURED)	12.00	12.02	12.02
FUEL CONSUMPTION L/100KM	19.31	17.16	17.16
COMPOSITE RESULTS			3-DAG (4-DAG)
TEST NUMBER	046FTP	CARBON DIOXIDE G/KM	416.8 ( 411.5)
BAROMETER MM HG	742.2	FUEL CONSUMPTION L/100KM	18.33 ( 18.00)
HUMIDITY G/KG	11.4	HYDROCARBONS (THC) G/KM	1.12 ( 1.09)
TEMPERATURE DEG C	25.0	CARBON MONOXIDE G/KM	5.61 ( 5.55)
		OXIDES OF NITROGEN G/KM	.67 ( .70)

FET VEHICLE EMISSIONS RESULTS PROJECT 11-5030-007		TEST WEIGHT 1814. KG( 4000. LBS) ACTUAL ROAD LOAD 7.8 KW( 13.2 HP) GASOLINE EM-470-F ODOMETER 91029. KM(57060. MILES)	
TEST NO. 046FET RUN 1	VEHICLE NO.04		
VEHICLE MODEL 78 FORD GRANADA	DATE 2/26/01		
ENGINE 4.9 L(302. CID) V-8	BAG CART NO. 1		
TRANSMISSION A3	DYNO NO. 3		
BAROMETER 742.19 MM HG(29.22 IN HG)	CVS NO. 2		
RELATIVE HUMIDITY 54. PCT	DRY BULB TEMP. 26.7 DEG C(80.0 DEG F)		
0 BAG RESULTS	ABS. HUMIDITY 12.2 GM/KG	NOX HUMIDITY CORRECTION FACTOR 1.05	
TEST CYCLE	FET		
BLOWER DIF P MM. H2O(IN. H2O)	787.4 (31.0)		
BLOWER INLET P MM. H2O(IN. H2O)	787.4 (31.0)		
BLOWER INLET TEMP. DEG. C(DEG. F)	43.6 (110.5)		
BLOWER REVOLUTIONS	61315.		
TOT FLOW STD. CU. METRES(SCF)	114.6 ( 4046.)		
HC SAMPLE METER/RANGE/PPM	17.3/ 3/ 173.		
HC BCKGRD METER/RANGE/PPM	1.6/ 3/ 16.		
CO SAMPLE METER/RANGE/PPM	94.1/ 13/ 235.		
CO BCKGRD METER/RANGE/PPM	1.1/ 12/ 1.		
CO2 SAMPLE METER/RANGE/PCT	50.5/ 2/ 2.27		
CO2 BCKGRD METER/RANGE/PCT	1.0/ 2/ 2.27		
NOX SAMPLE METER/RANGE/PPM	54.5/ 2/ 55.		
NOX BCKGRD METER/RANGE/PPM	1.7/ 2/ 1.		
DILUTION FACTOR	5.81		
HC CONCENTRATION PPM	150.		
CO CONCENTRATION PPM	210.		
CO2 CONCENTRATION PCT	2.21		
NOX CONCENTRATION PPM	54.3		
HC MASS GRAMS	10.55		
CO MASS GRAMS	29.11		
CO2 MASS GRAMS	4643.5		
NOX MASS GRAMS	12.51		
RUN TIME SECONDS	765.		
DFC, WET (DRY)	.820 ( .013)		
SCF, WET (DRY)	1,000 ( .962)		
VOL (SCM)	114.6		
SAM BLR (SCM)	0.00		
KM (MEASURED)	16.31		
FUEL CONSUMPTION L/100KM	12.36		
TEST NUMBER	046FET		
BAROMETER, MM HG	742.2		
HUMIDITY, G/KG	12.3		
TEMPERATURE, DEG C	26.7		
CARBON DIOXIDE, G/KM	204.8		
FUEL CONSUMPTION, L/100KM	12.36		
HYDROCARBONS, G/KM	.65		
CARBON MONOXIDE, G/KM	1.79		
OXIDES OF NITROGEN, G/KM	.77		

**TABLE D-12. TEST NO. 051 EMISSIONS RESULTS**  
 FTP VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5830-007

TEST NO.	051FTP RUN 1	VEHICLE NO.05	TEST WEIGHT 1588. KG( 3500. LBS)	
VEHICLE MODEL	78 VOLVO 245DL CAL	DATE 3/ 2/81	ACTUAL ROAD LOAD 9.5 KW( 12.8 HP)	
ENGINE 2.1 L(130. CID) L-4	BAG CART NO. 1 / CVS NO. 2	GASOLINE EM-470-F	ODOMETER 9494. KM( 5899. MILES)	
TRANSMISSION M4	DYNO NO. 3			
BAROMETER 741.68 MM HG(29.20 IN HG)	DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)			
RELATIVE HUMIDITY 48. PCT	ABS. HUMIDITY 9.1 GM/KG	NOX HUMIDITY CORRECTION FACTOR .95		
BAG RESULTS				
BAG NUMBER	1	2	3	
DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT	
BLOWER DIF P MM. H2O(IN. H2O)	749.3 (29.5)	762.0 (30.0)	749.3 (29.5)	762.0 (30.0)
BLOWER INLET P MM. H2O(IN. H2O)	749.3 (29.5)	762.0 (30.0)	749.3 (29.5)	762.0 (30.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.8 (109.0)	42.2 (108.0)	43.3 (110.0)	42.8 (109.0)
BLOWER REVOLUTIONS	40408	6757	40481	67586
TOT FLOW STD. CU. METRES(SCF)	76.0 2683.1	131.1 4628.1	76.0 2685.1	130.8 4612.1
HC SAMPLE METER/RANGE/PPM	9.4/ 3/ .96	39.1/ 2/ .39	49.0/ 2/ .49	42.6/ 2/ .43
CO BCKGRD METER/RANGE/PPM	1.4/ 3/ .14	13.0/ 2/ .13	11.6/ 2/ .12	11.5/ 2/ .12
CO SAMPLE METER/RANGE/PPM	9.0/ 11/ .445	65.2/ 12/ .146	74.7/ 12/ .173	76.3/ 12/ .176
CO BCKGRD METER/RANGE/PPM	1.5/ 11/ .15	1.1/ 12/ .2	1.8/ 12/ .1	1.4/ 12/ .1
CO2 SAMPLE METER/RANGE/PCT	70.7/ 3/ 1.28	51.9/ 3/ .90	66.0/ 3/ 1.18	50.0/ 3/ .87
CO2 BCKGRD METER/RANGE/PCT	4.1/ 3/ .06	4.2/ 3/ .06	3.3/ 3/ .05	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	35.4/ 2/ .35	6.5/ 2/ .7	30.6/ 2/ .31	8.2/ 2/ .8
NOX BCKGRD METER/RANGE/PPM	4.4/ 2/ .0	.3/ 2/ 0	.9/ 2/ .1	.9/ 2/ .1
DILUTION FACTOR	10.07	14.54	11.12	15.08
HC CONCENTRATION PPM	83.	27.	38.	32.
CO CONCENTRATION PPM	423.	139.	165.	171.
CO2 CONCENTRATION PCT	1.22	.84	1.14	.82
NOX CONCENTRATION PPM	35.0	6.2	29.8	7.4
HC MASS GRAMS	3.65	2.04	1.69	2.40
CO MASS GRAMS	37.45	21.21	14.64	26.05
CO2 MASS GRAMS	1699.7	2024.7	1583.2	1967.5
NOX MASS GRAMS	4.83	1.48	4.11	1.74
HC GRAMS/KM	.63	.32	.29	.39
CO GRAMS/KM	6.44	3.37	2.50	4.19
CO2 GRAMS/KM	292.5	321.6	270.7	316.1
NOX GRAMS/KM	.83	.24	.70	.28
FUEL CONSUMPTION BY CB L/100KM	13.00	14.00	11.76	13.82
RUN TIME	SECONDS			
MEASURED DISTANCE	KM			
SCF, DRY				
DFC, WET (DRY)	.920 (.906)			
SCF, WET (DRY)	1.000 (.975)			
VOL (SCM)	207.1			
SAM BLR (SCM)	0.00			
KM (MEASURED)	12.11			
FUEL CONSUMPTION L/100KM	13.52			
COMPOSITE RESULTS				
TEST NUMBER	051FTP			
BAROMETER MM HG	741.7	CARBON DIOXIDE G/KM	301.6 ( 299.9)	(4-BAG)
HUMIDITY G/KG	9.1	FUEL CONSUMPTION L/100KM	13.18 ( 13.12)	
TEMPERATURE DEG C	23.9	HYDROCARBONS (THC) G/KM	.38 ( .40)	
		CARBON MONOXIDE G/KM	3.77 ( 4.00)	
		OXIDES OF NITROGEN G/KM	.49 ( .50)	

HFET VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5830-007

TEST NO.	051FET RUN 1	VEHICLE NO.05	TEST WEIGHT 1588. KG( 3500. LBS)
VEHICLE MODEL	78 VOLVO 245DL CAL	DATE 3/ 2/81	ACTUAL ROAD LOAD 9.5 KW( 12.8 HP)
ENGINE 2.1 L(130. CID) L-4	BAG CART NO. 1	GASOLINE EM-470-F	ODOMETER 94969. KM(59011. MILES)
TRANSMISSION M4	CVS NO. 2		
BAROMETER 741.93 MM HG(29.21 IN HG)	DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)		
RELATIVE HUMIDITY 49. PCT	ABS. HUMIDITY 10.0 GM/KG	NOX HUMIDITY CORRECTION FACTOR .98	
BAG RESULTS			
TEST CYCLE			
BLOWER DIF P MM. H2O(IN. H2O)	756.9 (29.8)		
BLOWER INLET P MM. H2O(IN. H2O)	756.9 (29.8)		
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)		
BLOWER REVOLUTIONS	61429		
TOT FLOW STD. CU. METRES(SCF)	115.3 (4072.1)		
HC SAMPLE METER/RANGE/PPM	73.4/ 2/ .73		
CO BCKGRD METER/RANGE/PPM	12.1/ 2/ .12		
CO SAMPLE METER/RANGE/PPM	95.8/ 12/ .241		
CO BCKGRD METER/RANGE/PPM	4.4/ 12/ .1		
CO2 SAMPLE METER/RANGE/PCT	79.1/ 3/ 1.45		
CO2 BCKGRD METER/RANGE/PCT	4.1/ 3/ .05		
NOX SAMPLE METER/RANGE/PPM	27.1/ 2/ .27		
NOX BCKGRD METER/RANGE/PPM	1.2/ 2/ 1.		
DILUTION FACTOR	9.05		
HC CONCENTRATION PPM	.63		
CO CONCENTRATION PPM	230.		
CO2 CONCENTRATION PCT	1.41		
NOX CONCENTRATION PPM	26.0		
HC MASS GRAMS	4.16		
CO MASS GRAMS	30.86		
CO2 MASS GRAMS	2974.3		
NOX MASS GRAMS	5.60		
RUN TIME	SECONDS		
DFC, WET (DRY)	.889 (.875)		
SCF, WET (DRY)	1.000 (.971)		
VOL (SCM)	115.3		
SAM BLR (SCM)	0.00		
KM (MEASURED)	16.39		
TEST NUMBER	051FET		
BAROMETER, MM HG	741.9		
HUMIDITY, G/KG	10.0		
TEMPERATURE, DEG C	25.0		
CARBON DIOXIDE, G/KM	181.5		
FUEL CONSUMPTION, L/100KM	7.91		
HYDROCARBONS, G/KM	.25		
CARBON MONOXIDE, G/KM	1.88		
OXIDES OF NITROGEN, G/KM	.34		

**TABLE D-13. TEST NO. 052 EMISSIONS RESULTS**  
 FTP VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5830-007

TEST NO.	052FTP	RUN	1	VEHICLE NO.05	TEST WEIGHT 1588. KG( 3500. LBS)
VEHICLE MODEL	78 VOLVO 245DL CAL	DATE	3/3/81	ACTUAL ROAD LOAD	9.5 KW( 12.8 HP)
ENGINE 2.1 L(130. CID)	L-4	BAG CART NO.	1 / CVS NO.	GASOLINE EN-470-F	
TRANSMISSION M4		DYNO NO.	3	ODOMETER 95003. KM(59032. MILES)	
BAROMETER	735.58 MM HG(28.96 IN HG)	DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)		NOX HUMIDITY CORRECTION FACTOR	1.03
RELATIVE HUMIDITY	62. PCT	ABS. HUMIDITY 11.5 GM/KG			
BAG RESULTS					
BAG NUMBER		1	2	3	4
DESCRIPTION		COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	754.4 (29.7)	759.5 (29.9)	759.5 (29.9)	754.4 (29.7)	
BLOWER INLET P MM. H2O(IN. H2O)	749.3 (29.5)	746.8 (29.4)	749.3 (29.5)	744.2 (29.3)	
BLOWER INLET TEMP. DEG. C(DEG. F)	42.8 (109.0)	42.8 (109.0)	42.2 (108.0)	42.2 (108.0)	
BLOWER REVOLUTIONS	40502.	69611.	40500.	69564.	
TOT FLOW STD. CU. METRES(SCF)	75.5 (2665.)	129.7 (4580.)	75.5 (2666.)	129.8 (4583.)	
HC SAMPLE METER/RANGE/PPM	9.4/ 3/ 94.	46.9/ 2/ 47.	49.6/ 2/ 50.	43.9/ 2/ 44.	
HC BCKGRD METER/RANGE/PPM	1.7/ 3/ 17.	17.4/ 2/ 17.	17.2/ 2/ 17.	17.5/ 2/ 18.	
CO SAMPLE METER/RANGE/PPM	87.0/11/ 416.	69.4/12/ 155.	64.6/12/ 144.	61.7/12/ 136.	
CO BCKGRD METER/RANGE/PPM	2.5/11/ 7.	3.2/12/ 6.	2.3/12/ 4.	1.7/12/ 3.	
CO2 SAMPLE METER/RANGE/PCT	71.5/ 3/ 1.29	51.5/ 3/ .90	65.4/ 3/ 1.17	49.8/ 3/ .86	
CO2 BCKGRD METER/RANGE/PCT	3.6/ 3/ .06	3.3/ 3/ .05	3.2/ 3/ .05	3.0/ 3/ .05	
NOX SAMPLE METER/RANGE/PPM	35.0/ 2/ 35.	7.1/ 2/ 7.	28.5/ 2/ 29.	8.5/ 2/ 9.	
NOX BCKGRD METER/RANGE/PPM	.8/ 2/ 1.	.9/ 2/ 1.	1.3/ 2/ 1.	1.2/ 2/ 1.	
DILUTION FACTOR	9.97	14.60	11.26	15.21	
HC CONCENTRATION PPM	79.	31.	34.	28.	
CO CONCENTRATION PPM	391.	143.	134.	128.	
CO2 CONCENTRATION PCT	1.25	.85	1.13	.82	
NOX CONCENTRATION PPM	34.3	6.3	27.3	7.4	
HC MASS GRAMS	3.42	2.30	1.49	2.06	
CO MASS GRAMS	34.37	21.66	11.78	17.39	
CO2 MASS GRAMS	1720.2	2020.8	1557.3	1749.4	
NOX MASS GRAMS	5.08	1.60	4.05	1.08	
HC GRAMS/KM	.59	.37	.26	.33	
CO GRAMS/KM	5.95	3.46	2.05	3.11	
CO2 GRAMS/KM	297.7	322.7	270.2	312.6	
NOX GRAMS/KM	.88	.25	.70	.30	
FUEL CONSUMPTION BY CB L/100KM	13.19	14.06	11.71	13.59	
RUN TIME	SECONDS	504.	862.	505.	867.
MEASURED DISTANCE	KM	5.78	6.26	5.76	6.24
SCF, DRY		.968	.972	.969	.972
DFC, WET (DRY)		.920 ( .901)		.926 ( .907)	
SCF, WET (DRY)		1.000 ( .970)		1.000 ( .971)	
VOL (SCM)		205.2		205.3	
SAM BLR (SCM)		0.00		0.00	
KM (MEASURED)		12.04		12.00	
FUEL CONSUMPTION L/100KM		13.64		12.69	
COMPOSITE RESULTS					
TEST NUMBER	052FTP			3-BAG	( 4-BAG)
BAROMETER	MM HG	735.6		303.2	( 300.2)
HUMIDITY	G/KG	11.5		13.23	( 13.10)
TEMPERATURE	DEG C	23.3		.38	( .37)
				CARBON MONOXIDE G/KM	( 3.48)
				OXIDES OF NITROGEN G/KM	( .51)
					( .52)

HFET VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5830-007

TEST NO.	052FET	RUN	1	VEHICLE NO.05	TEST WEIGHT 1588. KG( 3500. LBS)
VEHICLE MODEL	78 VOLVO 245DL CAL	DATE	3/3/81	ACTUAL ROAD LOAD	9.5 KW( 12.8 HP)
ENGINE 2.1 L(130. CID)	L-4	BAG CART NO.	1	GASOLINE EN-470-F	
TRANSMISSION M4		DYNO NO.	3	ODOMETER 95027. KM(59047. MILES)	
BAROMETER	734.57 MM HG(28.92 IN HG)	DRY BULB TEMP. 26.1 DEG C(79.0 DEG F)		NOX HUMIDITY CORRECTION FACTOR	1.04
RELATIVE HUMIDITY	54. PCT	ABS. HUMIDITY 11.8 GM/KG			
0 BAG RESULTS					
TEST CYCLE					
BLOWER DIF P MM. H2O(IN. H2O)	759.5 (29.9)				
BLOWER INLET P MM. H2O(IN. H2O)	749.3 (29.5)				
BLOWER INLET TEMP. DEG. C(DEG. F)	40.0 (104.0)				
BLOWER REVOLUTIONS	61278.				
TOT FLOW STD. CU. METRES(SCF)	114.5 (4045.)				
HC SAMPLE METER/RANGE/PPM	69.7/ 2/ 70.				
HC BCKGRD METER/RANGE/PPM	17.3/ 2/ 17.				
CO SAMPLE METER/RANGE/PPM	68.5/12/ 155.				
CO BCKGRD METER/RANGE/PPM	1.5/12/ 1.				
CO2 SAMPLE METER/RANGE/PCT	78.4/ 3/ 1.44				
CO2 BCKGRD METER/RANGE/PCT	3.3/ 3/ .05				
NOX SAMPLE METER/RANGE/PPM	18.4/ 2/ 18.				
NOX BCKGRD METER/RANGE/PPM	1.0/ 2/ 1.				
DILUTION FACTOR	9.19				
HC CONCENTRATION PPM	54.				
CO CONCENTRATION PPM	146.				
CO2 CONCENTRATION PCT	1.39				
NOX CONCENTRATION PPM	17.5				
HC MASS GRAMS	3.59				
CO MASS GRAMS	19.40				
CO2 MASS GRAMS	2919.3				
NOX MASS GRAMS	3.98				
RUN TIME	SECONDS	735.			
DFC, WET (DRY)		.891 ( .876)			
SCF, WET (DRY)		1.000 ( .969)			
VOL (SCM)		114.5			
SAM BLR (SCM)		0.00			
KM (MEASURED)		16.34			
TEST NUMBER	052FET				
BAROMETER	MM HG	734.6			
HUMIDITY	G/KG	11.8			
TEMPERATURE	DEG C	24.1			
CARBON DIOXIDE	G/KM	178.6			
FUEL CONSUMPTION	L/100KM	7.73			
HYDROCARBONS	G/KM	.22			
CARBON MONOXIDE	G/KM	1.19			
OXIDES OF NITROGEN	G/KM	.24			

**TABLE D-14. TEST NO. 056 EMISSIONS RESULTS**  
 FTP VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5830-007

TEST NO.	056FTP	RUN	1	VEHICLE NO.05	TEST WEIGHT	1588. KG( 3500. LBS)
VEHICLE MODEL	78 VOLVO 245DL CAL	DATE	3/ 4/81	ACTUAL ROAD LOAD	9.5 KW( 12.8 HP)	
ENGINE 2.1 L(130. CID) L-4	BAG CART NO.	1 / CVS NO.	2	GASOLINE	EM-470-F	
TRANSMISSION M4	DYNO NO.	3		ODOMETER	9508. KM( 5908. MILES)	
BAROMETER	731.77 MM HG(29.81 IN HG)	DRY BULB TEMP.	26.1 DEG C(79.0 DEG F)	NOX HUMIDITY	CORRECTION FACTOR	.97
RELATIVE HUMIDITY	44. PCT	ABS. HUMIDITY	9.7 GM/KG			
BAG RESULTS						
BAG NUMBER		1	2	3	4	
DESCRIPTION		COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED	
BLOWER DIF P MM. H2O(IN. H2O)	749.3 (29.5)	749.3 (29.5)	749.3 (29.5)	749.3 (29.5)	749.3 (29.5)	
BLOWER INLET P MM. H2O(IN. H2O)	749.3 (29.5)	749.3 (29.5)	749.3 (29.5)	749.3 (29.5)	749.3 (29.5)	
BLOWER INLET TEMP. DEG. C(DEG. F)	42.8 (109.0)	41.7 (107.0)	42.8 (109.0)	42.8 (109.0)	42.8 (109.0)	
BLOWER REVOLUTIONS	40442.	67718.	40516.	49607.		
TOT FLOW STD. CU. METRES(SCF)	74.9 ( 2646.)	129.4 ( 4570.)	75.1 ( 2651.)	129.0 ( 4554.)		
HC SAMPLE METER/RANGE/PPM	97.3/ 2/ 97.	47.8/ 2/ 48.	53.6/ 2/ 54.	43.6/ 2/ 44.		
HC BCKGRD METER/RANGE/PPM	16.7/ 2/ 17.	15.0/ 2/ 15.	12.9/ 2/ 13.	11.7/ 2/ 12.		
CO SAMPLE METER/RANGE/PPM	82.8/11/ 383.	73.2/12/ 169.	59.4/12/ 130.	64.5/12/ 144.		
CO BCKGRD METER/RANGE/PPM	.5/11/ 1.	.6/12/ 1.	1/12/ 0.	2/12/ 0.		
CO2 SAMPLE METER/RANGE/PCT	67.7/ 3/ 1.22	48.6/ 3/ .84	62.9/ 3/ 1.12	47.2/ 3/ .81		
CO2 BCKGRD METER/RANGE/PCT	3.4/ 3/ .05	3.2/ 3/ .05	3.1/ 3/ .05	3.1/ 3/ .05		
NOX SAMPLE METER/RANGE/PPM	37.6/ 2/ 38.	7.7/ 2/ 8.	31.2/ 2/ 31.	7.4/ 2/ 7.		
NOX BCKGRD METER/RANGE/PPM	.9/ 2/ 1.	1.0/ 2/ 1.	.9/ 2/ 1.	.7/ 2/ 1.		
DILUTION FACTOR	10.60	15.56	11.77	16.11		
HC CONCENTRATION PPM	82	34.	42.	33.		
CO CONCENTRATION PPM	368	162.	125.	139.		
CO2 CONCENTRATION PCT	1.7	.79	1.08	.77		
NOX CONCENTRATION PPM	36.8	6.8	30.4	6.7		
HC MASS GRAMS	3.35	2.52	1.81	2.43		
CO MASS GRAMS	32.06	24.47	19.74	26.98		
CO2 MASS GRAMS	1605.6	1882.4	1480.7	1815.5		
NOX MASS GRAMS	5.10	1.62	4.22	1.61		
HC GRAMS/KM	.61	.40	.31	.39		
CO GRAMS/KM	5.52	3.91	1.89	3.33		
CO2 GRAMS/KM	276.6	301.0	255.8	291.3		
NOX GRAMS/KM	.88	.26	.73	.26		
FUEL CONSUMPTION BY CB L/100KM	12.26	13.16	11.09	12.71		
RUN TIME	SECONDS	503.	868.	505.	868.	
MEASURED DISTANCE	KM	5.80	8.25	5.79	6.23	
SCF, DRY		.975	.978	.975	.978	
(FC, WET (DRY)		.925 ( .912)		.930 ( .916)		
SCF, WET (DRY)		1.000 ( .977)		1.000 ( .977)		
VOL (SCM)		204.4		204.0		
SAM BLR (SCM)		0.00		0.00		
KM (MEASURED)		12.06		12.02		
FUEL CONSUMPTION L/100KM		12.73		11.93		
COMPOSITE RESULTS						
TEST NUMBER	056FTP				J-BAG	(4-BAG)
BAROMETER	MM HG	731.8		CARBON DIOXIDE	G/KM	283.6 ( 280.7)
HUMIDITY	G/KG	9.7		FUEL CONSUMPTION	L/100KM	12.41 ( 12.27)
TEMPERATURE	DEG C	26.1		HYDROCARBONS (THC)	G/KM	.42 ( .42)
				CARBON MONOXIDE	G/KM	3.69 ( 3.52)
				OXIDES OF NITROGEN	G/KM	.52 ( .52)

TEST NO.	058FET	RUN	1	VEHICLE NO.05	TEST WEIGHT	1588. KG( 3500. LBS)
VEHICLE MODEL	78 VOLVO 245DL CAL	DATE	3/ 4/81	ACTUAL ROAD LOAD	9.5 KW( 12.8 HP)	
ENGINE 2.1 L(130. CID) L-4	BAG CART NO.	1		GASOLINE	EM-470-F	
TRANSMISSION M4	DYNO NO.	2		ODOMETER	95178. KM(59141. MILES)	
BAROMETER	740.92 MM HG(29.17 IN HG)	DRY BULB TEMP.	24.4 DEG C(76.0 DEG F)	NOX HUMIDITY	CORRECTION FACTOR	.94
RELATIVE HUMIDITY	45. PCT	ABS. HUMIDITY	8.9 GM/KG			
0 BAG RESULTS						
TEST CYCLE						
BLOWER DIF P MM. H2O(IN. H2O)	756.9 (29.8)					
BLOWER INLET P MM. H2O(IN. H2O)	756.9 (29.8)					
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)					
BLOWER REVOLUTIONS	61390.					
TOT FLOW STD. CU. METRES(SCF)	115.1 ( 4063.)					
HC SAMPLE METER/RANGE/PPM	63.6/ 2/ 64.					
HC BCKGRD METER/RANGE/PPM	8.0/ 2/ 8.					
CO SAMPLE METER/RANGE/PPM	58.9/12/ 129.					
CO BCKGRD METER/RANGE/PPM	.2/12/ 0.					
CO2 SAMPLE METER/RANGE/PCT	80.4/ 3/ 1.48					
CO2 BCKGRD METER/RANGE/PCT	3.5/ 3/ .05					
NOX SAMPLE METER/RANGE/PPM	23.1/ 2/ 23.					
NOX BCKGRD METER/RANGE/PPM	.7/ 2/ 1.					
DILUTION FACTOR	8.95					
HC CONCENTRATION PPM	S6					
CO CONCENTRATION PPM	123					
CO2 CONCENTRATION PCT	1.43					
NOX CONCENTRATION PPM	22.5					
HC MASS GRAMS	3.75					
CO MASS GRAMS	16.45					
CO2 MASS GRAMS	3013.2					
NOX MASS GRAMS	4.66					
RUN TIME	SECONDS	765.				
DFC, WET (DRY)		.888 ( .875)				
SCF, WET (DRY)		1.000 ( .972)				
VOL (SCM)		115.1				
SAM BLR (SCM)		0.00				
KM (MEASURED)		16.47				
TEST NUMBER,		058FET				
BAROMETER,	MM HG	740.9				
HUMIDITY,	G/KG	8.9				
TEMPERATURE,	DEG C	24.4				
CARBON DIOXIDE,	G/KM	182.9				
FUEL CONSUMPTION,	L/100KM	7.90				
HYDROCARBONS,	G/KM	.23				
CARBON MONOXIDE,	G/KM	1.00				
OXIDES OF NITROGEN,	G/KM	.28				

**TABLE D-15. TEST NO. 057 EMISSIONS RESULTS**  
 FTP VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5830-007

TEST NO. 057FTP RUN 1	VEHICLE NO.05	TEST WEIGHT 1588. KG( 3500. LBS)
VEHICLE MODEL 78 VOLVO 245DL CAL	DATE 3/ 5/81	ACTUAL ROAD LOAD 9.5 KW( 12.8 HP)
ENGINE 2.1 L(130. CID) L-4	BAG CART NO. 1 / CVS NO. 2	GASOLINE EN-470-F
TRANSMISSION M4	DYNO NO. 3	ODOMETER 95138. KM(59116. MILES)
BAROMETER 740.92 MM HG(29.17 IN HG)	DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR .87
RELATIVE HUMIDITY 30. PCT	ABS. HUMIDITY 6.0 GM/KG	
BAG RESULTS		
BAG NUMBER	1	2
DESCRIPTION	COLD TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	749.3 (29.5)	756.9 (29.8)
BLOWER INLET P MM. H2O(IN. H2O)	749.3 (29.5)	756.9 (29.8)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.8 (109.0)	41.1 (106.0)
BLOWER REVOLUTIONS	40567.	69628.
TOT FLOW STD. CU. METRES(SCF)	76.2 ( 2691.)	131.0 ( 4627.)
HC SAMPLE METER/RANGE/PPM	86.9/ 2/ 87.	31.3/ 2/ 31.
HC BCKGRD METER/RANGE/PPM	8.3/ 2/ 8.	8.5/ 2/ 9.
CO SAMPLE METER/RANGE/PPM	86.9/ 11/ 416.	49.4/ 12/ 104.
CO BCKGRD METER/RANGE/PPM	1.9/ 11/ 6.	.9/ 12/ 2.
CO2 SAMPLE METER/RANGE/PCT	48.6/ 3/ 1.24	48.1/ 3/ .83
CO2 BCKGRD METER/RANGE/PCT	3.2/ 3/ .05	3.2/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	45.7/ 2/ 46.	7.8/ 2/ 8.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.4/ 2/ 0.
DILUTION FACTOR	10.43	15.88
HC CONCENTRATION PPM	.79.	.23.
CO CONCENTRATION PPM	.397.	100.
CO2 CONCENTRATION PCT	1.19	.78
NOX CONCENTRATION PPM	45.3	7.4
HC MASS GRAMS	3.49	1.76
CO MASS GRAMS	35.20	15.28
CO2 MASS GRAMS	1662.2	1882.5
NOX MASS GRAMS	5.73	1.61
HC GRAMS/KM	.60	.28
CO GRAMS/KM	6.10	2.45
CO2 GRAMS/KM	288.1	302.1
NOX GRAMS/KM	.99	.26
FUEL CONSUMPTION BY CB L/100KM	12.79	13.10
RUN TIME SECONDS	505.	867.
MEASURED DISTANCE KM	5.77	6.23
SCF, DRY	.979	.983
DFC, WET (DRY)	.925 (.916)	.929 (.920)
SCF, WET (DRY)	1.000 (.981)	1.000 (.982)
VOL (SCM)	207.2	207.1
SAM BLR (SCM)	0.00	0.00
KM (MEASURED)	12.00	12.06
FUEL CONSUMPTION L/100KM	12.95	12.15
COMPOSITE RESULTS		
TEST NUMBER 057FTP		3-BAG (4-BAG)
BAROMETER MM HG 740.9	CARBON DIOXIDE G/KM	286.1 ( 287.1)
HUMIDITY G/KG 6.0	FUEL CONSUMPTION L/100KM	12.54 ( 12.49)
TEMPERATURE DEG C 25.0	HYDROCARBONS (THC) G/KM	.34 ( .33)
	CARBON MONOXIDE G/KM	2.98 ( 2.95)
	OXIDES OF NITROGEN G/KM	.57 ( .57)

TEST NO. 057FET RUN 1	VEHICLE NO.05	TEST WEIGHT 1588. KG( 3500. LBS)
VEHICLE MODEL 78 VOLVO 245DL CAL	DATE 3/ 5/81	ACTUAL ROAD LOAD 9.5 KW( 12.8 HP)
ENGINE 2.1 L(130. CID) L-4	BAG CART NO. 1	GASOLINE EN-470-F
TRANSMISSION M4	CVS NO. 2	ODOMETER 95162. KM(59131. MILES)
BAROMETER 741.17 MM HG(29.18 IN HG)	DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR .90
RELATIVE HUMIDITY 36. PCT	ABS. HUMIDITY 7.3 GM/KG	
BAG RESULTS		
TEST CYCLE	HFET	
BLOWER DIF P MM. H2O(IN. H2O)	756.9 (29.8)	
BLOWER INLET P MM. H2O(IN. H2O)	756.9 (29.8)	
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)	
BLOWER REVOLUTIONS	61429.	
TOT FLOW STD. CU. METRES(SCF)	115.2 ( 4067.)	
HC SAMPLE METER/RANGE/PPM	65.8/ 2/ 66.	
HC BCKGRD METER/RANGE/PPM	8.0/ 2/ 8.	
CO SAMPLE METER/RANGE/PPM	73.8/ 12/ 170.	
CO BCKGRD METER/RANGE/PPM	.3/ 12/ 1.	
CO2 SAMPLE METER/RANGE/PCT	77.6/ 3/ 1.42	
CO2 BCKGRD METER/RANGE/PCT	3.1/ 3/ .05	
NOX SAMPLE METER/RANGE/PPM	27.2/ 2/ 27.	
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ 1.	
DILUTION FACTOR	9.29	
HC CONCENTRATION PPM	.59.	
CO CONCENTRATION PPM	.163.	
CO2 CONCENTRATION PCT	1.38	
NOX CONCENTRATION PPM	26.7	
HC MASS GRAMS	3.90	
CO MASS GRAMS	21.88	
CO2 MASS GRAMS	2905.2	
NOX MASS GRAMS	5.28	
RUN TIME SECONDS	766.	
DFC, WET (DRY)	.892 (.882)	
SCF, WET (DRY)	1.000 (.975)	
VOL (SCM)	115.2	
SAM BLR (SCM)	0.00	
KM (MEASURED)	16.35	
TEST NUMBER 057FET		
BAROMETER, MM HG 741.2		
HUMIDITY, G/KG .3		
TEMPERATURE, DEG C 25.0		
CARBON DIOXIDE, G/KM 177.7		
FUEL CONSUMPTION, L/100KM 7.71		
HYDROCARBONS, G/KM .24		
CARBON MONOXIDE, G/KM 1.34		
OXIDES OF NITROGEN, G/KM .32		

**TABLE D-16. TEST NO. 061 EMISSIONS RESULTS**  
 FTP VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5030-007

TEST NO. 061FTP RUN 1	VEHICLE MODEL 0 OLDS. CUTLASS	TEST WEIGHT 1588. KG( 3500. LBS)
ENGINE 3.8 L(231. CID) V-6	BAG CART NO. 1 / CVS NO. 2	ACTUAL ROAD LOAD 8.0 KW( 10.7 HP)
TRANSMISSION A3	DYNO NO. 3	GASOLINE EN-470-F
BAROMETER 752.09 MM HG(29.61 IN HG)	DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)	ODOMETER 76098. KM(47285. MILES)
RELATIVE HUMIDITY 32. PCT	ABS. HUMIDITY 6.1 GM/KG	NOX HUMIDITY CORRECTION FACTOR .87
BAG RESULTS		
BAG NUMBER	1	2
DESCRIPTION	COLD TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	762.0 (30.0)	767.1 (30.2)
BLOWER INLET P MM. H2O(IN. H2O)	762.0 (30.0)	767.1 (30.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.2 (108.0)	40.6 (105.0)
BLOWER REVOLUTIONS	69644	40516
TOT FLOW STD. CU. METRES(SCF)	77.4 (2734.)	133.2 (4703.)
HC SAMPLE METER/RANGE/PPM	17.6/ 3/ 176.	36.6/ 2/ 37.
HC BCKGRD METER/RANGE/PPM	1.1/ 3/ 11.	9.9/ 2/ 10.
CO SAMPLE METER/RANGE/PPM	68.0/ 3/ 1719.	89.5/ 2/ 219.
CO BCKGRD METER/RANGE/PPM	3.4/ 3/ 7.	1.0/ 1/ 2.
CO2 SAMPLE METER/RANGE/PCT	62.3/ 3/ 1.22	48.8/ 3/ .77
CO2 BCKGRD METER/RANGE/PCT	3.1/ 3/ .05	3.2/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	42.9/ 3/ 127.	44.4/ 2/ 44.
NOX BCKGRD METER/RANGE/PPM	.1/ 3/ 0.	.5/ 2/ 1.
DILUTION FACTOR	9.58	16.91
HC CONCENTRATION PPM	166.	27.
CO CONCENTRATION PPM	1635.	201.
CO2 CONCENTRATION PCT	1.17	1.04
NOX CONCENTRATION PPM	129.4	43.9
HC MASS GRAMS	129.42	32.10
CO MASS GRAMS	142.24	32.93
CO2 MASS GRAMS	1662.9	1759.8
NOX MASS GRAMS	16.52	9.72
HC GRAMS/KM	1.28	.34
CO GRAMS/KM	25.79	5.21
CO2 GRAMS/KM	287.4	282.8
NOX GRAMS/KM	2.86	1.56
FUEL CONSUMPTION BY CB L/100KM	14.17	12.47
RUN TIME SECONDS	505.	868.
MEASURED DISTANCE KM	5.79	6.22
SCF DRY	.978	.783
DFC, WET (DRY)	.924 (.915)	.923 (.923)
SCF, WET (DRY)	1.000 (.981)	1.000 (.982)
VOL (SCM)	210.6	210.1
SAM BLR (SCM)	0.00	0.00
KM (MEASURED)	12.01	11.94
FUEL CONSUMPTION L/100KM	13.29	11.65
COMPOSITE RESULTS		
TEST NUMBER 061FTP		3-DAG (4-BAG)
BAROMETER MM HG 752.1	CARBON DIOXIDE G/KM 276.2 ( 274.0)	
HUMIDITY G/KG 6.1	FUEL CONSUMPTION L/100KM 12.49 ( 12.35)	
TEMPERATURE DEG C 24.4	HYDROCARBONS (THC) G/KM .56 ( .53)	
	CARBON MONOXIDE G/KM 9.37 ( 8.79)	
	OXIDES OF NITROGEN G/KM 2.08 ( 2.07)	

HFET VEHICLE EMISSIONS RESULTS	PROJECT 11-5030-007
TEST NO. 061FET RUN 1	
VEHICLE MODEL 0 OLDS.CUTL ASS	TEST WEIGHT 1588. KG( 3500. LBS)
ENGINE 3.8 L(231. CID) V-6	ACTUAL ROAD LOAD 8.0 KW( 10.7 HP)
TRANSMISSION A3	GASOLINE EN-470-F
BAROMETER 752.35 MM HG(29.62 IN HG)	ODOMETER 76122. KM(47300. MILES)
RELATIVE HUMIDITY 37. PCT	
0 BAG RESULTS	
TEST CYCLE	
BLOWER DIF P MM. H2O(IN. H2O)	767.1 (30.2)
BLOWER INLET P MM. H2O(IN. H2O)	767.1 (30.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)
BLOWER REVOLUTIONS	61350.
TOT FLOW STD. CU. METRES(SCF)	116.8 ( 4123.)
HC SAMPLE METER/RANGE/PPM	36.1/ 2/ 36.
HC BCKGRD METER/RANGE/PPM	8.3/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	49.4/ 12/ 104.
CO BCKGRD METER/RANGE/PPM	3.1/ 12/ 1.
CO2 SAMPLE METER/RANGE/PCT	86.5/ 3/ 1.60
CO2 BCKGRD METER/RANGE/PCT	3.2/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	77.3/ 3/ 232.
NOX BCKGRD METER/RANGE/PPM	.2/ 3/ 1.
DILUTION FACTOR	8.28
HC CONCENTRATION PPM	29.
CO CONCENTRATION PPM	99.
CO2 CONCENTRATION PCT	1.56
NOX CONCENTRATION PPM	231.4
HC MASS GRAMS	1.24
CO MASS GRAMS	13.52
CO2 MASS GRAMS	3339.2
NOX MASS GRAMS	46.78
RUN TIME SECONDS	765.
DFC, WET (DRY)	.879 (.869)
SCF, WET (DRY)	1.000 (.973)
VOL (SCM)	116.8
SAM BLR (SCM)	0.00
KM (MEASURED)	16.24
TEST NUMBER, 061FET	
BAROMETER, MM HG 752.3	
HUMIDITY, G/KG 7.5	
TEMPERATURE, DEG C 25.6	
CARBON DIOXIDE, G/KM 203.6	
FUEL CONSUMPTION, L/100KM 8.85	
HYDROCARBONS, G/KM .12	
CARBON MONOXIDE, G/KM .83	
OXIDES OF NITROGEN, G/KM 2.98	

**TABLE D-17. TEST NO. 062 EMISSIONS RESULTS**  
 FTF VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5830-007

TEST NO. 062FTP RUN 1	VEHICLE NO.06	TEST WEIGHT 1588. KG( 3500. LBS)
VEHICLE MODEL 0 OLDS. CUTLASS	DATE 3/10/81	ACTUAL ROAD LOAD 8.0 KW( 10.7 HP)
ENGINE 3.8 L(231. CID) V-6	BAG CART NO. 1	GASOLINE EM-470-F
TRANSMISSION A3	DYNO NO. 3	ODOMETER 76151. KM(47318. MILES)
BAROMETER 751.33 MM HG(29.58 IN HG)	DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR .88
RELATIVE HUMIDITY 37. PCT	ABS. HUMIDITY 6.6 GM/KG	
BAG RESULTS		
BAG NUMBER	1	2
DESCRIPTION	COLD TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	762.0 (30.0)	767.1 (30.2)
BLOWER INLET P MM. H2O(IN. H2O)	762.0 (30.0)	767.1 (30.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.8 (109.0)	40.0 (104.0)
BLOWER REVOLUTIONS	40557.	69674.
TOT FLOW STD. CU. METRES(SCF)	77.2 ( 272. )	133.2 ( 4705. )
HC SAMPLE METER/RANGE/PPM	20.3/ 3/ 203.	30.1/ 2/ 30.
HC BCKGRD METER/RANGE/PPM	1.0/ 3/ 10.	8.9/ 2/ 9.
CO SAMPLE METER/RANGE/PPM	71.2/ 3/ 1851.	76.4/ 12/ 178.
CO BCKGRD METER/RANGE/PPM	3/ 3/ 7.	1.9/ 12/ 4.
CO2 SAMPLE METER/RANGE/PCT	57.5/ 3/ 1.21	44.0/ 3/ .75
CO2 BCKGRD METER/RANGE/PCT	3.0/ 3/ .05	3.0/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	44.4/ 3/ 133.	46.4/ 2/ 45.
NOX BCKGRD METER/RANGE/PPM	3/ 3/ 1.	.6/ 2/ 1.
DILUTION FACTOR	9.48	17.33
HC CONCENTRATION PPM	194.	22.
CO CONCENTRATION PPM	1789.	170.
CO2 CONCENTRATION PCT	1.17	.71
NOX CONCENTRATION PPM	132.4	45.8
HC MASS GRAMS	8.64	1.67
CO MASS GRAMS	160.35	26.39
CO2 MASS GRAMS	1657.5	1730.5
NOX MASS GRAMS	17.23	10.29
HC GRAMS/KM	1.49	.27
CO GRAMS/KM	27.67	4.21
CO2 GRAMS/KM	205.1	276.4
NOX GRAMS/KM	2.96	1.64
FUEL CONSUMPTION BY CB L/100KM	14.23	12.12
RUN TIME SECONDS	505.	868.
MEASURED DISTANCE KM	5.81	6.26
SCF, DRY	.977	.901
DFC, WET (DRY)	.925 ( .914)	.932 ( .921)
SCF, WET (DRY)	1.000 ( .900)	1.000 ( .980)
VOL (SCM)	210.5	210.0
SAM BLR (SCM)	0.00	0.00
KM (MEASURED)	12.07	12.04
FUEL CONSUMPTION L/100KM	13.13	11.62
COMPOSITE RESULTS		
TEST NUMBER 062FTP		3-BAG ( 4-BAG )
BAROMETER MM HG 751.3	CARBON DIOXIDE G/KM 273.7	( 272.9 )
HUMIDITY G/KG 6.6	FUEL CONSUMPTION L/100KM 12.35	( 12.27 )
TEMPERATURE DEG C 23.3	HYDROCARBONS (THC) G/KM .52	( .49 )
	CARBON MONOXIDE G/KM 8.65	( 8.33 )
	OXIDES OF NITROGEN G/KM 2.23	( 2.26 )

TEST NO. 062FET RUN 1	VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007	
VEHICLE MODEL 0 OLDS. CUTLASS	VEHICLE NO.06
ENGINE 3.8 L(231. CID) V-6	DATE 3/10/81
TRANSMISSION A3	BAG CART NO. 1
BAROMETER 751.33 MM HG(29.58 IN HG)	DYNO NO. 2
RELATIVE HUMIDITY 33. PCT	CVS NO. 2
0 BAG RESULTS	DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)
TEST CYCLE	ABS. HUMIDITY 6.5 GM/KG
BLOWER DIF P MM. H2O(IN. H2O)	767.1 (30.2)
BLOWER INLET P MM. H2O(IN. H2O)	767.1 (30.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)
BLOWER REVOLUTIONS	61361.
TOT FLOW STD. CU. METRES(SCF)	116.6 ( 4118. )
HC SAMPLE METER/RANGE/PPM	34.5/ 2/ 35.
HC BCKGRD METER/RANGE/PPM	8.2/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	52.6/ 12/ 112.
CO BCKGRD METER/RANGE/PPM	4.12/ 1.
CO2 SAMPLE METER/RANGE/PCT	88.6/ 3/ 1.65
CO2 BCKGRD METER/RANGE/PCT	3.3/ 3/ .06
NOX SAMPLE METER/RANGE/PPM	83.0/ 3/ 249.
NOX BCKGRD METER/RANGE/PPM	3/ 3/ 1.
DILUTION FACTOR	8.06
HC CONCENTRATION PPM	27.
CO CONCENTRATION PPM	107.
CO2 CONCENTRATION PCT	1.60
NOX CONCENTRATION PPM	246.2
HC MASS GRAMS	1.04
CO MASS GRAMS	14.53
CO2 MASS GRAMS	3417.4
NOX MASS GRAMS	48.64
RUN TIME SECONDS	765.
DFC, WET (DRY)	.876 ( .867)
SCF, WET (DRY)	1.000 ( .974)
VOL (SCM)	116.6
SAM BLR (SCM)	0.00
KM (MEASURED)	16.40
TEST NUMBER 062FET	
BAROMETER, MM HG 751.3	
HUMIDITY, G/KG 6.5	
TEMPERATURE, DEG C 25.0	
CARBON DIOXIDE, G/KM 208.4	
FUEL CONSUMPTION, L/100KM 8.97	
HYDROCARBONS, G/KM .11	
CARBON MONOXIDE, G/KM .89	
OXIDES OF NITROGEN, G/KM 2.97	

TABLE D-18. TEST NO. 066 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

TEST NO.	066FTP RUN 1	VEHICLE NO.06	TEST WEIGHT 1580. KG( 3500. LBS)
VEHICLE MODEL	0 OLDS. CUTLASS	DATE 3/11/01	ACTUAL ROAD LOAD 8.0 KW( 10.7 HP)
ENGINE 3.0 L(231. CID) V-6		BAG CART NO. 1 / CVS NO. 2	GASOLINE EM-470-F
TRANSMISSION A3		DYNO NO. 3	ODOMETER 76220. KM(47361. MILES)
BAROMETER 749.01 MM HG(29.52 IN HG)	DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)		
RELATIVE HUMIDITY 42. PCT	ABS. HUMIDITY 3.1 GM/KG	NOX HUMIDITY CORRECTION FACTOR .92	
BAG RESULTS			
BAG NUMBER	1	2	3
DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
BLOWER DIF P MM. H2O(IN. H2O)	762.0 (30.0)	767.1 (30.2)	756.9 (29.0)
BLOWER INLET P MM. H2O(IN. H2O)	762.0 (30.0)	767.1 (30.2)	756.7 (29.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.0 (109.0)	42.2 (108.0)	43.9 (111.0)
BLOWER REVOLUTIONS	40652.	69611.	40555.
TOT FLOW STD. CU. METRES(SCF)	77.2 ( 272. )	132.3 ( 4670. )	74.9 ( 2717. )
HC SAMPLE METER/RANGE/PPM	16.2/ 3/ 152.	22.0/ 2/ 22.	52.2/ 2/ 52.
HC DCKGRD METER/RANGE/PPM	1.0/ 3/ 10.	8.5/ 2/ 9.	8.5/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	67.4/ 3/ 1730.	71.2/ 12/ 169.	74.2/ 11/ 322.
CO DCKGRD METER/RANGE/PPM	1.1/ 3/ 2.	9.9/ 2/ 2.	2.2/ 1/ 1.
CO2 SAMPLE METER/RANGE/PCT	71.9/ 3/ 1.30	47.4/ 3/ .02	64.4/ 3/ 1.15
CO2 BCKGRD METER/RANGE/PCT	3.8/ 3/ .06	3.3/ 3/ .05	3.0/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	44.0/ 2/ 44.	13.4/ 2/ 13.	37.7/ 2/ 33.
NOX BCKGRD METER/RANGE/PPM	9.2/ 1.	.7/ 2/ 1.	14.1/ 2/ 14.
DILUTION FACTOR	9.02	16.03	7.2/ 1.
HC CONCENTRATION PPM	153.	14.	16.63
CO CONCENTRATION PPM	1639.	162.	131.
CO2 CONCENTRATION PCT	1.25	.77	.75
NOX CONCENTRATION PPM	43.2	12.7	13.4
HC MASS GRAMS	6.82	1.04	1.97
CO MASS GRAMS	150.09	24.95	27.76
CO2 MASS GRAMS	1769.0	1864.3	1562.3
NOX MASS GRAMS	5.87	2.96	5.01
HC GRAMS/KM	1.17	.17	.15
CO GRAMS/KM	25.70	3.97	3.21
CO2 GRAMS/KM	302.8	296.3	266.5
NOX GRAMS/KM	1.00	.47	.50
FUEL CONSUMPTION BY CB L/100KM	14.81	12.93	11.79
RUN TIME	SECONDS	506.	506.
MEASURED DISTANCE	KM	5.84	5.84
SCF. I/M		.975	.975
DFC, WET (DRY)		.920 ( .907)	.925 ( .917)
SCF, WET (DRY)		1.000 ( .977)	1.000 ( .978)
VOL (SCM)		209.5	209.0
SAM DLR (SCM)		0.00	0.00
KM (MEASURED)		12.13	12.13
FUEL CONSUMPTION L/100KM		13.04	12.14
COMPOSITE RESULTS			
TEST NUMBER	066FTP		3-PAG (4-PAG)
BAROMETER	MM HG 749.8	CARBON DIOXIDE G/KM	289.8 ( 286.9)
HUMIDITY	G/KG 9.1	FUEL CONSUMPTION L/100KM	13.01 ( 12.87)
TEMPERATURE	DEG C 24.4	HYDROCARBONS (THC) G/KM	.42 ( .41)

HFET VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

TEST NO.	066FET RUN 1	VEHICLE NO.06	TEST WEIGHT 1580. KG( 3500. LBS)
VEHICLE MODEL	0 OLDS. CUTLASS	DATE 3/11/01	ACTUAL ROAD LOAD 8.0 KW( 10.7 HP)
ENGINE 3.0 L(231. CID) V-6		BAG CART NO. 1	GASOLINE EM-470-F
TRANSMISSION A3		CVS NO. 2	ODOMETER 76244. KM(47376. MILES)
BAROMETER 750.06 MM HG(29.53 IN HG)	DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)		
RELATIVE HUMIDITY 39. PCT	ABS. HUMIDITY 7.0 GM/KG	NOX HUMIDITY CORRECTION FACTOR .91	
0 BAG RESULTS			
TEST CYCLE		HFET	
BLOWER DIF P MM. H2O(IN. H2O)	762.0 (30.0)		
BLOWER INLET P MM. H2O(IN. H2O)	762.0 (30.0)		
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)		
BLOWER REVOLUTIONS	61347.		
TOT FLOW STD. CU. METRES(SCF)	116.5 ( 4112. )		
HC SAMPLE METER/RANGE/PPM	34.1/ 2/ 34.		
HC DCKGRD METER/RANGE/PPM	10.0/ 2/ 11.		
CO SAMPLE METER/RANGE/PPM	54.8/ 12/ 116.		
CO DCKGRD METER/RANGE/PPM	1.1/ 12/ 0.		
CO2 SAMPLE METER/RANGE/PCT	91.7/ 3/ 1.71		
CO2 BCKGRD METER/RANGE/PCT	3.2/ 3/ .05		
NOX SAMPLE METER/RANGE/PPM	57.5/ 2/ 58.		
NOX BCKGRD METER/RANGE/PPM	.7/ 2/ 1.		
DILUTION FACTOR	7.75		
HC CONCENTRATION PPM	25.		
CO CONCENTRATION PPM	112.		
CO2 CONCENTRATION PCT	1.57		
NOX CONCENTRATION PPM	56.9		
HC MASS GRAMS	1.36		
CO MASS GRAMS	15.24		
CO2 MASS GRAMS	3503.1		
NOX MASS GRAMS	11.56.		
RUN TIME	SECONDS		
DFC, WET (DRY)	.871 ( .860)		
SCF, WET (DRY)	1.000 ( .972)		
VOL (SCM)	116.5		
SAM DLR (SCM)	0.00		
KM (MEASURED)	16.52		
TEST NUMBER	066FET		
BAROMETER	MM HG 750.1		
HUMIDITY	G/KG 7.8		
TEMPERATURE	DEG C 25.0		
CARBON DIOXIDE	G/KM 215.7		
FUEL CONSUMPTION	L/100KM 9.28		
HYDROCARBONS	G/KM .10		
CARBON MONOXIDE	G/KM .92		
OXIDES OF NITROGEN	G/KM .70		

**TABLE D-19. TEST NO. 068 EMISSIONS RESULTS**  
 FTC VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5330-007

TEST NO.	068FTP	RUN	1	VEHICLE NO.06	TEST WEIGHT	1580. KG( 3500. LBS)
VEHICLE MODEL	78 OLDS. CUTLASS	DATE	3/13/81	ACTUAL ROAD LOAD	0.0 KW( 10.7 HP)	
ENGINE 3.0 (L231. CID) L-6		BAG CART NO.	1 / CVS NO.	GASOLINE EH-470-F		
TRANSMISSION A3		DYNO NO.	3	ODOMETER 76323. KM(47425. MILES)		
BAROMETER 746.76 MM HG(29.40 IN HG)		DRY BLD TEMP.	25.0 DEG C(77.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR	.70	
RELATIVE HUMIDITY 36. PCT		ABS. HUMIDITY	7.2 GM/KG			
BAG RESULTS		COLD TRANSIENT	2	HOT TRANSIENT	4	
BAG NUMBER		STABILIZED		STABILIZED		
DESCRIPTION						
BLOWER DIFF P MM. H2O(IN. H2O)	749.3 (29.5)	762.0 (30.0)	762.0 (30.0)	767.1 (30.2)		
BLOWER INLET P MM. H2O(IN. H2O)	744.2 (29.3)	756.9 (29.8)	752.0 (30.0)	757.1 (30.2)		
BLOWER INLET TEMP. DEG. C(DEG. F)	43.9 (111.0)	37.0 (100.0)	42.0 (109.0)	42.0 (109.0)		
BLOWER REVOLUTIONS	40577.	69000.	40536.	39897.		
TOT FLOW STD. CU. METRES(SCF)	76.8 (2711.)	131.8 (4652.)	76.7 (2707.)	131.5 (4644.)		
HC SAMPLE METER/RANGE/PPM	23.7/ 3/ 237.	19.5/ 2/ 20.	50.0/ 2/ 51.	19.2/ 2/ 19.		
CO SAMPLE METER/RANGE/PPM	.8/ 3/ 0.	8.0/ 2/ 8.	8.4/ 2/ 8.	7.7/ 2/ 0.		
CO2 SAMPLE METER/RANGE/PPM	.2/ 3/ 5.	.5/ 2/ 1.	.2/ 1/ 1.	.4/ 2/ 1.		
CO2 SAMPLE METER/RANGE/PCT	71.5/ 3/ 1.30	44.4/ 3/ .76	64.4/ 3/ 1.15	45.7/ 3/ .79		
CO2 DCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.5/ 3/ .04	3.2/ 3/ .05	3.5/ 3/ .05		
NOX SAMPLE METER/RANGE/PPM	46.6/ 2/ 47.	12.0/ 2/ 12.	38.5/ 2/ 39.	13.9/ 2/ 14.		
NOX DCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.4/ 2/ 0.	.5/ 2/ 1.	.4/ 2/ 0.		
DILUTION FACTOR	.97	17.32	11.27	16.68		
HC CONCENTRATION PPM	230.	12.	43.	12.		
CO CONCENTRATION PPM	1732.	113.	334.	128.		
CO2 CONCENTRATION PCT	1.26	.72	1.11	.74		
NOX CONCENTRATION PPM	45.4	11.6	39.0	13.5		
HC MASS GRAMS	10.10	.91	1.91	.91		
CO MASS GRAMS	154.94	17.93	29.78	19.32		
CO2 MASS GRAMS	1771.2	1732.7	1552.6	1777.5		
NOX MASS GRAMS	6.11	2.63	5.00	3.05		
HC GRAMS/KM	1.75	.14	.33	.14		
CO GRAMS/KM	26.64	2.02	5.14	3.13		
CO2 GRAMS/KM	304.7	274.0	260.1	263.5		
NOX GRAMS/KM	1.05	.42	.96	.49		
FUEL CONSUMPTION BY CB L/100KM	15.03	11.91	11.83	12.33		
RUN TIME	SECONDS					
MEASURED DISTANCE	KM	505.	867.	505.	868.	
SCF, DRY		5.01	6.32	5.79	6.27	
DFC, WET (DRY)		.976	.981	.978	.981	
SCF, WET (DRY)		1.000 (.930)	1.000 (.980)	1.000 (.980)		
VOL (SCM)		200.5	200.2			
SAM DLR (SCM)		0.00	0.00			
KM (MEASURED)		12.14	12.06			
FUEL CONSUMPTION L/100KM		13.40	12.09			
COMPOSITE RESULTS						
TEST NUMBER	068FTP				3-BAG (4-BAG)	
BAROMETER	MM HG	746.0				
HUMIDITY	G/KG	7.2				
TEMPERATURE	DEG C	25.0				
			CARBON DIOXIDE G/KM 270.7 ( 201.5)			
			FUEL CONSUMPTION L/100KM 12.53 ( 12.65)			
			HYDROCARBONS (THC) G/KM .53 ( .53)			
			CARBON MONOXIDE G/KM 8.36 ( 8.45)			
			OXIDES OF NITROGEN G/KM .37 ( .37)			

HFET	VEHICLE EMISSIONS RESULTS				
	PROJECT 11-5330-007				
TEST NO.	067FET	RUN	1		
VEHICLE MODEL	78 OLDS. CUTLASS	VEHICLE NO.06	TEST WEIGHT	1580. KG( 3500. LBS)	
ENGINE 3.8 L(L231. CID) V-6		DATE	3/12/81	ACTUAL ROAD LOAD	0.0 KW( 10.7 HP)
TRANSMISSION A3		BAG CART NO.	1	GASOLINE EH-470-F	
BAROMETER 746.76 MM HG(29.40 IN HG)		DYNO NO.	3	ODOMETER 76296. KM(47400. MILES)	
RELATIVE HUMIDITY 41. PCT		DRY BLD TEMP.	23.9 DEG C(75.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR	.91
0 DAG RESULTS		ABS. HUMIDITY	7.7 GM/KG		
TEST CYCLE		HFET			
BLOWER DIFF P MM. H2O(IN. H2O)	767.1 (30.2)				
BLOWER INLET P MM. H2O(IN. H2O)	747.1 (30.2)				
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)				
BLOWER REVOLUTIONS	41370.				
TOT FLOW STD. CU. METRES(SCF)	115.9 (4091.)				
HC SAMPLE METER/RANGE/PPM	31.4/ 2/ 31.				
HC DCKGRD METER/RANGE/PPM	7.7/ 2/ 0.				
CO SAMPLE METER/RANGE/PPM	55.9/ 12/ 121.				
CO DCKGRD METER/RANGE/PPM	4.4/ 12/ 1.				
CO2 SAMPLE METER/RANGE/PCT	90.3/ 3/ 1.68				
CO2 DCKGRD METER/RANGE/PCT	3.2/ 3/ .05				
NOX SAMPLE METER/RANGE/PPM	53.5/ 2/ 54.				
NOX DCKGRD METER/RANGE/PPM	.3/ 2/ 0.				
DILUTION FACTOR	7.09				
HC CONCENTRATION PPM	25.				
CO CONCENTRATION PPM	115.				
CO2 CONCENTRATION PCT	1.54				
NOX CONCENTRATION PPM	53.2				
HC MASS GRAMS	1.14				
CO MASS GRAMS	15.47				
CO2 MASS GRAMS	3402.8				
NOX MASS GRAMS	10.73				
RUN TIME	SECONDS				
DFC, WET (DRY)		746.			
SCF, WET (DRY)		.673 (.862)			
VOL (SCM)		1.000 (.971)			
SAM DLR (SCM)		115.9			
KM (MEASURED)		0.00			
FUEL CONSUMPTION	L/100KM	14.30			
TEST NUMBER,		067FET			
BAROMETER,	MM HG	744.0			
HUMIDITY,	G/KG	7.7			
TEMPERATURE,	DEG C	23.9			
CARBON DIOXIDE,	G/KM	213.6			
FUEL CONSUMPTION,	L/100KM	9.20			
HYDROCARBONS,	G/KM	.10			
CARBON MONOXIDE,	G/KM	.95			
OXIDES OF NITROGEN,	G/KM	.36			

TABLE D-20. TEST NO. 071 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

TEST NO. 071FTP RUN 1  
VEHICLE MODEL '78 CHEV. MALIBU CAL  
ENGINE 5.0 L(305. CID) V-8  
TRANSMISSION A3

BAROMETER 747.27 MM HG(29.42 IN HG)  
RELATIVE HUMIDITY 32. PCT  
BAG RESULTS

BAG NUMBER  
DESCRIPTION

BLOWER DIFF P MM, H2O(IN, H2O)  
BLOWER INLET P MM, H2O(IN, H2O)  
BLOWER INLET TEMP, DEG. C(DEG. F)  
BLOWER REVOLUTIONS  
TOT FLOW STD. CU. METRES(SCF)  
HC SAMPLE METER/RANGE/PPM  
HC BCKGRD METER/RANGE/PPM  
CO SAMPLE METER/RANGE/PPM  
CO BCKGRD METER/RANGE/PPM  
CO2 SAMPLE METER/RANGE/PCT  
CO2 BCKGRD METER/RANGE/PCT  
NOX SAMPLE METER/RANGE/PPM  
NOX BCKGRD METER/RANGE/PPM

DILUTION FACTOR

HC CONCENTRATION PPM

CO CONCENTRATION PPM

CO2 CONCENTRATION PCT

NOX CONCENTRATION PPM

HC MASS GRAMS

CO MASS GRAMS

CO2 MASS GRAMS

NOX MASS GRAMS

HC GRAMS/KM

CO GRAMS/KM

CO2 GRAMS/KM

NOX GRAMS/KM

FUEL CONSUMPTION BY CD L/100KM

RUN TIME SECONDS

MEASURED DISTANCE KM

SCF, DRY

DFC, WET (DRY)

SCF, WET (DRY)

VOL (SCM)

SAM DLR (SCM)

KM (MEASURED)

FUEL CONSUMPTION L/100KM

COMPOSITE RESULTS

TEST NUMBER 071FTP

BAROMETER MM HG 747.3

HUMIDITY G/KG 6.2

TEMPERATURE DEG C 24.4

VEHICLE NO.07  
DATE 3/16/01  
BAG CART NO. 1 / CVS NO. 2  
DYNO NO. 3

DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)  
ABS. HUMIDITY 6.2 GM/KG

TEST WEIGHT 1500. KG( 3500. LBS)  
ACTUAL ROAD LOAD 8.0 KW( 10.7 HP)  
GASOLINE EN-470-F  
ODOMETER 60473. KM(37576. MILES)

NOX HUMIDITY CORRECTION FACTOR .87

	<sup>1</sup> COLD TRANSIENT	<sup>2</sup> STABILIZED	<sup>3</sup> HOT TRANSIENT	<sup>4</sup> STABILIZED
767.1 (30.2)	774.7 (30.5)	767.1 (30.2)	774.7 (30.5)	774.7 (30.5)
767.1 (30.2)	774.7 (30.5)	767.1 (30.2)	774.7 (30.5)	774.7 (30.5)
42.2 (108.0)	42.8 (109.0)	42.8 (109.0)	42.8 (109.0)	42.8 (109.0)
40565.	679563.	40515.	59547.	59547.
76.8 ( 2712.)	131.4 ( 4640.)	76.8 ( 2705.)	131.4 ( 4639.)	131.4 ( 4639.)
10.7/ 3/ 109.	32.5/ 2/ 33.	44.7/ 2/ 45.	34.4/ 2/ 34.	34.4/ 2/ 34.
1.0/ 3/ 10.	9.2/ 2/ 9.	9.7/ 2/ 10.	10.4/ 2/ 10.	10.4/ 2/ 10.
53.1/ 3/ 1310.	75.4/ 12/ 176.	92.5/ 11/ 444.	86.3/ 12/ 207.	86.3/ 12/ 207.
1/ 3/ 2.	1/ 4/ 1/ 3.	6/ 11/ 2.	1/ 3/ 12/ 2.	1/ 3/ 12/ 2.
83.5/ 3/ 1.54	62.0/ 3/ 1.12	73.0/ 3/ 1.44	62.1/ 3/ 1.10	62.1/ 3/ 1.10
3.5/ 3/ .06	3.4/ 3/ .05	2.9/ 3/ .04	2.6/ 3/ .04	2.6/ 3/ .04
38.6/ 2/ 37.	10.1/ 2/ 10.	16.2/ 2/ 16.	9.7/ 2/ 10.	9.7/ 2/ 10.
.5/ 2/ 1.	.5/ 2/ 1.	.7/ 2/ 1.	.7/ 2/ 1.	.7/ 2/ 1.
7.98	11.76	8.77	11.87	11.87
100.	24.	36.	23.	23.
1253.	168.	444.	200.	200.
1.49	1.07	1.41	1.07	1.07
38.2	9.6	15.6	9.1	9.1
4.44	1.62	1.59	1.88	1.88
112.25	29.65	39.34	30.33	30.33
2095.0	257.0	1971.4	2569.8	2569.8
4.88	2.11	1.79	1.98	1.98
HC GRAMS/KM	.76	.27	.30	.30
CO GRAMS/KM	19.26	4.07	4.87	4.87
CO2 GRAMS/KM	359.5	409.0	336.9	400.6
NOX GRAMS/KM	.84	.33	.31	.31
16.74	17.77	14.07	17.81	17.81
505.	867.	505.	867.	867.
5.83	6.30	5.85	6.29	6.29
.975	.979	.976	.979	.979
.900 ( .891)	.906 ( .896)			
1.000 ( .978)	1.000 ( .978)			
208.2	208.0			
0.00	0.00			
12.13	12.14			
17.27	16.39			

CARBON DIOXIDE G/KM	379.0	( 378.8)
FUEL CONSUMPTION L/100KM	16.76	( 16.77)
HYDROCARBONS (THC) G/KM	.38	( .39)
CARBON MONOXIDE G/KM	7.75	( 0.19)
OXIDES OF NITROGEN G/KM	.44	( .43)

HFET VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

TEST NO. 071FET RUN 1  
VEHICLE MODEL '78 CHEV. MALIBU CAL  
ENGINE 5.0 L(305. CID) V-8  
TRANSMISSION A3

BAROMETER 747.52 MM HG(29.43 IN HG)  
RELATIVE HUMIDITY 28. PCT  
0 DAG RESULTS

TEST CYCLE

BLOWER DIFF P MM, H2O(IN, H2O)  
BLOWER INLET P MM, H2O(IN, H2O)  
BLOWER INLET TEMP, DEG. C(DEG. F)

BLOWER REVOLUTIONS

TOT FLOW STD. CU. METRES(SCF)

HC SAMPLE METER/RANGE/PPM

HC BCKGRD METER/RANGE/PPM

CO SAMPLE METER/RANGE/PPM

CO BCKGRD METER/RANGE/PPM

CO2 SAMPLE METER/RANGE/PCT

CO2 BCKGRD METER/RANGE/PCT

NOX SAMPLE METER/RANGE/PPM

NOX BCKGRD METER/RANGE/PPM

DILUTION FACTOR

HC CONCENTRATION PPM

CO CONCENTRATION PPM

CO2 CONCENTRATION PCT

NOX CONCENTRATION PPM

HC MASS GRAMS

CO MASS GRAMS

CO2 MASS GRAMS

NOX MASS GRAMS

RUN TIME SECONDS

DFC, WET (DRY)

SCF, WET (DRY)

VOL (SCM)

SAM DLR (SCM)

KM (MEASURED)

FUEL CONSUMPTION L/100KM

TEST NUMBER 071FET

BAROMETER MM HG 747.5

HUMIDITY G/KG 3.7

TEMPERATURE DEG C 25.6

CARBON DIOXIDE G/KM 250.5

FUEL CONSUMPTION L/100KM 10.80

HYDROCARBONS G/KM .10

CARBON MONOXIDE G/KM 1.38

OXIDES OF NITROGEN G/KM .38

VEHICLE NO.07  
DATE 3/16/01  
BAG CART NO. 1 / CVS NO. 2  
DYNO NO. 3

DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)  
ABS. HUMIDITY 5.7 GM/KG

TEST WEIGHT 1588. KG( 3500. LBS)  
ACTUAL ROAD LOAD 8.0 KW( 10.7 HP)  
GASOLINE EN-470-F  
ODOMETER 60498. KM(37592. MILES)

NOX HUMIDITY CORRECTION FACTOR .86

	NFT			
207.4 (31.0)				
207.4 (31.0)				
43.3 (110.0)				
61392.				
115.7 ( 4085.)				
32.0/ 2/ 32.				
10.9/ 2/ 11.				
76.4/ 12/ 178.				
1.8/ 12/ 1.				
45.3/ 2/ 1.99				
1.3/ 2/ .05				
33.2/ 2/ 33.				
.1/ 2/ 0.				
6.67				
24.				
168.				
1.95				
33.1				
1.57				
22.60				
4127.1				
6.29				
766.				
.050 ( .843)				
1.000 ( .973)				
115.7				
0.00				
16.40				
071FET				
747.5				
3.7				
25.6				
250.5				
10.80				
.10				
1.38				
.38				

TABLE D-21. TEST NO. 072 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS  
PROJECT 11-SC30 007

TEST NO. 072FTP RUN 2  
VEHICLE MODEL '78 CHEV. MALIBU CAL  
ENGINE 5.0 L(305. CID) V-8  
TRANSMISSION A3

BAROMETER 736.85 MM HG(29.01 IN HG)  
RELATIVE HUMIDITY 27. PCT  
DAG RESULTS

BAG NUMBER  
DESCRIPTION

BLOWER DIF P MM. H2O(IN. H2O)  
BLOWER INLET P MM. H2O(IN. H2O)  
BLOWER INLET TEMP. DEG. C(DEG. F)  
BLOWER REVOLUTIONS  
TOT FLOW STD. CU. METRES(SCF)  
HC SAMPLE METER/RANGE/PPM  
CO SAMPLE METER/RANGE/PPM  
CO CO BCKGRD METER/RANGE/PPM  
CO2 SAMPLE METER/RANGE/PCT  
CO2 BCKGRD METER/RANGE/PCT  
NOX SAMPLE METER/RANGE/PPM  
NOX BCKGRD METER/RANGE/PPM  
DILUTION FACTOR  
HC CONCENTRATION PPM  
CO CONCENTRATION PPM  
CO2 CONCENTRATION PCT  
NOX CONCENTRATION PPM  
HC MASS GRAMS  
CO MASS GRAMS  
CO2 MASS GRAMS  
NOX MASS GRAMS

	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	774.7 (30.5)	782.3 (30.8)	777.2 (30.6)	787.4 (31.0)
BLOWER INLET P MM. H2O(IN. H2O)	767.1 (30.2)	774.7 (30.5)	767.1 (30.2)	777.2 (30.6)
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)	42.0 (109.0)	43.1 (107.5)	43.3 (110.0)
BLOWER REVOLUTIONS	40543.	69609.	40481.	67527.
TOT FLOW STD. CU. METRES(SCF)	75.4 ( 2662.)	129.4 ( 4570.)	75.3 ( 2657.)	129.1 ( 4550.)
HC SAMPLE METER/RANGE/PPM	12.9/ 3/ 129.	32.0/ 2/ 33.	45.3/ 2/ 45.	32.5/ 2/ 33.
CO SAMPLE METER/RANGE/PPM	1.3/ 3/ 13.	8.5/ 2/ 9.	8.1/ 2/ 8.	8.6/ 2/ 9.
CO BCKGRD METER/RANGE/PPM	50.3/ 3/ 1231.	91.7/ 12/ 227.	94.7/ 11/ 484.	89.3/ 12/ 219.
CO2 SAMPLE METER/RANGE/PCT	85.2/ 3/ 1.58	62.3/ 3/ 1.11	70.0/ 3/ 1.43	61.0/ 3/ 1.08
CO2 BCKGRD METER/RANGE/PCT	2.5/ 3/ .04	2.0/ 3/ .04	3.1/ 3/ .05	2.5/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	43.4/ 2/ 43.	10.4/ 2/ 11.	17.0/ 2/ 17.	10.2/ 2/ 10.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.4/ 2/ 0.	.5/ 2/ 1.	.4/ 2/ 0.
DILUTION FACTOR	7.04	11.02	9.06	12.10
HC CONCENTRATION PPM	110.	25.	38.	25.
CO CONCENTRATION PPM	1101.	220.	466.	212.
CO2 CONCENTRATION PCT	1.54	1.07	1.39	1.05
NOX CONCENTRATION PPM	43.2	10.2	16.6	9.8
HC MASS GRAMS	5.12	1.07	1.65	1.03
CO MASS GRAMS	103.69	33.12	40.85	31.90
CO2 MASS GRAMS	2132.2	2524.7	1911.2	2476.5
NOX MASS GRAMS	5.25	2.13	2.01	2.04

HC GRAMS/KM  
CO GRAMS/KM  
CO2 GRAMS/KM  
NOX GRAMS/KM  
FUEL CONSUMPTION BY CD L/100KM  
RUN TIME SECONDS  
MEASURED DISTANCE KM  
SCF, DRY  
DFC, WET (DRY)  
SCF, WET (DRY)  
VOL (SCM)  
SAM DLR (SCM)  
KM (MEASURED)  
FUEL CONSUMPTION L/100KM

	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
HC GRAMS/KM	.09	.30	.29	.30
CO GRAMS/KM	10.09	5.35	7.11	5.15
CO2 GRAMS/KM	371.9	410.5	332.6	399.6
NOX GRAMS/KM	.92	.35	.35	.33
FUEL CONSUMPTION BY CD L/100KM	17.21	17.92	14.71	17.44
RUN TIME SECONDS	505.	860.	505.	868.
MEASURED DISTANCE KM	5.73	6.17	5.75	6.20
SCF, DRY	.977	.931	.978	.981
DFC, WET (DRY)	.900 ( .892)	.907 ( .899)		
SCF, WET (DRY)	1.000 ( .979)	1.000 ( .980)		
VOL (SCM)		204.8		204.4
SAM DLR (SCM)		0.00		0.00
KM (MEASURED)		11.91		11.94
FUEL CONSUMPTION L/100KM		17.58		16.13

## COMPOSITE RESULTS

TEST NUMBER 072FTP  
BAROMETER MM HG 736.9  
HUMIDITY G/KG 5.0  
TEMPERATURE DEG C 23.3

	3-BAG	(4-BAG)
CARBON DIOXIDE G/KM	361.1	( 377.9)
FUEL CONSUMPTION L/100KM	16.39	( 16.75)
HYDROCARBONS (THC) G/KM	.42	( .42)
CARBON MONOXIDE G/KM	0.43	( 0.41)
OXIDES OF NITROGEN G/KM	.46	( .46)

NFET VEHICLE EMISSIONS RESULTS  
PROJECT 11-5030 007

TEST NO. 072FET RUN 2  
VEHICLE MODEL '78 CHEV. MALIBU CAL  
ENGINE 5.0 L(305. CID) V-8  
TRANSMISSION A3

BAROMETER 737.11 MM HG(29.02 IN HG)  
RELATIVE HUMIDITY 26. PCT

DAG RESULTS

TEST CYCLE

BLOWER DIF P MM. H2O(IN. H2O)  
BLOWER INLET P MM. H2O(IN. H2O)  
BLOWER INLET TEMP. DEG. C(DEG. F)  
BLOWER REVOLUTIONS  
TOT FLOW STD. CU. METRES(SCF)  
HC SAMPLE METER/RANGE/PPM  
CO SAMPLE METER/RANGE/PPM  
CO BCKGRD METER/RANGE/PPM  
CO2 SAMPLE METER/RANGE/PCT  
CO2 BCKGRD METER/RANGE/PCT  
NOX SAMPLE METER/RANGE/PPM  
NOX BCKGRD METER/RANGE/PPM  
DILUTION FACTOR

	TEST WEIGHT 1500. KG( 3500. LBS)
DATE 3/10/81	ACTUAL ROAD LOAD 8.0 KW( 10.7 HP)
BAG CART NO. 1	GASOLINE EX-470-F
DYNO NO. 3	ODOMETER 60581. KM(37631. MILES)
CVS NO. 2	

DRY BLDW TEMP. 24.4 DEG C(76.0 DEG F)

ADS. HUMIDITY 5.1 GM/KG NOX HUMIDITY CORRECTION FACTOR .04

NFET

800.1 (31.5)  
792.5 (31.2)  
43.3 (110.0)  
61323.  
113.7 (4014.)  
34.0/ 2/ 35.  
7.0/ 2/ .  
82.1/ 12/ 196.  
1.15/ 2/ .  
44.0/ 2/ 1.72  
1.2/ 2/ .04  
31.6/ 2/ 32.  
.3/ 2/ .0.

RUN TIME SECONDS

6.70  
29.  
10.  
1.08  
31.5  
1.09  
24.69  
3910.3  
5.79  
765.  
.055 ( .040)  
1.000 ( .974)  
113.7  
0.00  
16.27

TEST NUMBER 072FET  
BAROMETER MM HG 737.1  
HUMIDITY G/KG 5.1  
TEMPERATURE DEG C 24.4  
CARBON DIOXIDE G/KM 240.7  
FUEL CONSUMPTION L/100KM 10.40

0.12  
1.52  
.36

TABLE D-22. TEST NO. 076 EMISSIONS RESULTS

FTR VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-007

TEST NO. 076FTP RUN 1  
VEHICLE MODEL '70 CHEV.MALIBU CAL  
ENGINE 5.0 L(305, CID) V-8  
TRANSMISSION A3

BAROMETER 747.70 MM HG(29.44 IN HG)  
RELATIVE HUMIDITY 14. PCT  
DAG RESULTS

BAG NUMBER  
DESCRIPTION

BLOWER DIFF MM. H2O(IN. H2O)  
BLOWER INLET P MM. H2O(IN. H2O)

BLOWER INLET TEMP. DEG. C(DEG. F)

BLOWER REVOLUTIONS

TOT FLOW STD. CU. METRES(SCF)

HC SAMPLE METER/RANGE/PPM

HC BCKGRD METER/RANGE/PPM

CO SAMPLE METER/RANGE/PPM

CO BCKGRD METER/RANGE/PPM

CO2 SAMPLE METER/RANGE/PCT

CO2 BCKGRD METER/RANGE/PCT

NOX SAMPLE METER/RANGE/PPM

NOX BCKGRD METER/RANGE/PPM

DILUTION FACTOR

HC CONCENTRATION PPM

CO CONCENTRATION PPM

CO2 CONCENTRATION PCT

NOX CONCENTRATION PPM

HC MASS GRAMS

CO MASS GRAMS

CO2 MASS GRAMS

NOX MASS GRAMS

HC GRAMS/KM

CO GRAMS/KM

CO2 GRAMS/KM

NOX GRAMS/KM

FUEL CONSUMPTION L/100KM

RUN TIME SECONDS

MEASURED DISTANCE KM

SCF, DRY

DFC, WET (DRY)

SCF, WET (DRY)

VOL (SCM)

SAM DLR (SCM)

KM (MEASURED)

FUEL CONSUMPTION L/100KM

COMPOSITE RESULTS

TEST NUMBER 076FTP

BAROMETER MM HG 747.8

HUMIDITY G/KG 2.4

TEMPERATURE DEG C 22.8

VEHICLE NO.07  
DATE 3/19/01  
BAG CART NO. 1 / CVS NO. 2  
DYNO NO. 3

DRY BLD TEMP. 22.8 DEG C(73.0 DEG F)  
ABS. HUMIDITY 2.4 GH/KG

TEST WEIGHT 1500. KG( 3500. LBS)  
ACTUAL ROAD LOAD 8.0 KW( 10.7 HP)  
GASOLINE EN-470-F  
ODOMETER 60597. KM(37653. MILES)

NOX HUMIDITY CORRECTION FACTOR .78

	<sup>1</sup> COLD TRANSIENT	<sup>2</sup> STABILIZED	<sup>3</sup> HOT TRANSIENT	<sup>4</sup> STABILIZED
787.4 (31.0)	792.5 (31.2)	782.3 (30.0)	707.4 (31.0)	
702.3 (30.0)	707.4 (31.0)	774.7 (30.5)	702.3 (30.0)	
43.3 (110.0)	43.3 (110.0)	43.3 (110.0)	43.3 (110.0)	
40562.0	32608.	40491.	69490.	
76.5 (2702.)	131.0 (4632.)	76.5 (2699.)	131.1 (4620.)	
11.7/ 3/ 117.	32.6/ 2/ 33.	45.3/ 2/ 45.	36.1/ 2/ 36.	
8.8/ 3/ 8.	8.8/ 2/ 9.	10.7/ 2/ 11.	11.0/ 2/ 11.	
40.5/ 3/ 1182.	44.0/ 3/ 148.	70.3/ 11/ 352.	65.5/ 12/ 147.	
1.3/ 3/ 1.	0.8/ 2/ 1.	.4/ 11/ 2.	.5/ 12/ 2.	
85.4/ 3/ 1.58	60.4/ 3/ 1.07	76.0/ 3/ 1.40	59.5/ 3/ 1.05	
2.9/ 3/ .04	3.3/ 3/ .05	3.0/ 3/ .05	3.2/ 3/ .05	
39.3/ 2/ 40.	10.7/ 2/ 11.	17.4/ 2/ 17.	11.2/ 2/ 11.	
.1/ 2/ 0.	.1/ 2/ 0.	.1/ 2/ 0.	.1/ 2/ 0.	
7.05	12.31	9.27	12.51	
110.	25.	38.	26.	
1138.	143.	339.	141.	
1.34	1.02	1.38	1.01	
39.4	10.8	17.3	10.9	
4.85	1.05	1.58	1.56	
101.41	21.02	30.17	21.57	
2161.9	2460.9	1907.1	2418.7	
4.53	2.09	1.99	2.15	
.03	.30	.27	.31	
17.37	3.48	3.17	3.43	
370.2	393.0	326.5	384.9	
.70	.33	.34	.34	
17.08	17.05	14.32	16.70	
505.	860.	505.	867.	
5.04	6.26	5.04	6.28	
.901	.986	.903	.906	
.902 (.098)	.910 (.906)			
1.000 (.984)	1.000 (.985)			
207.7	207.5			
0.00	0.00			
12.10	12.12			
17.06	15.55			

CARBON DIOXIDE G/KM	3-BAG (4-BAG)
FUEL CONSUMPTION L/100KM	370.0 (367.6)
HYDROCARBONS (THC) G/KM	16.30 (16.20)
CARBON MONOXIDE G/KM	.40 (.40)
OXIDES OF NITROGEN G/KM	6.02 (6.81)
	.43 (.43)

TEST NO. 076FET RUN 1  
VEHICLE MODEL '70 CHEV.MALIBU CAL  
ENGINE 5.0 L(305, CID) V-8  
TRANSMISSION A3

BAROMETER 747.27 MM HG(29.42 IN HG)  
RELATIVE HUMIDITY 16. PCT

DAG RESULTS

TEST CYCLE

BLOWER DIFF MM. H2O(IN. H2O)

BLOWER INLET P MM. H2O(IN. H2O)

BLOWER INLET TEMP. DEG. C(DEG. F)

BLOWER REVOLUTIONS

TOT FLOW STD. CU. METRES(SCF)

HC SAMPLE METER/RANGE/PPM

HC BCKGRD METER/RANGE/PPM

CO SAMPLE METER/RANGE/PPM

CO BCKGRD METER/RANGE/PPM

CO2 SAMPLE METER/RANGE/PCT

CO2 BCKGRD METER/RANGE/PCT

NOX SAMPLE METER/RANGE/PPM

NOX BCKGRD METER/RANGE/PPM

DILUTION FACTOR

HC CONCENTRATION PPM

CO CONCENTRATION PPM

CO2 CONCENTRATION PCT

NOX CONCENTRATION PPM

HC MASS GRAMS

CO MASS GRAMS

CO2 MASS GRAMS

NOX MASS GRAMS

RUN TIME SECONDS

DFC, WET (DRY)

SCF, WET (DRY)

VOL (SCM)

SAM DLR (SCM)

KM (MEASURED)

FUEL CONSUMPTION L/100KM

TEST NUMBER 076FET

BAROMETER MM HG 747.3

HUMIDITY 3.5

TEMPERATURE DEG C 26.7

CARBON DIOXIDE G/KM

FUEL CONSUMPTION L/100KM

HYDROCARBONS G/KM

CARBON MONOXIDE G/KM

OXIDES OF NITROGEN G/KM

FTR VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-000

VEHICLE NO.07  
DATE 3/19/01  
BAG CART NO. 1  
DYNO NO. 3  
CVS NO. 2

TEST WEIGHT 1588. KG( 3500. LBS)  
ACTUAL ROAD LOAD 8.0 KW( 10.7 HP)  
GASOLINE EN-470-F  
ODOMETER 60621. KM(37660. MILES)

DRY BLD TEMP. 26.7 DEG C(30.0 DEG F)  
ABS. HUMIDITY 3.5 GH/KG

NOX HUMIDITY CORRECTION FACTOR .81

HFET TEST CYCLE

800.1 (31.5)

792.5 (31.2)

43.3 (110.0)

61255.

115.3 ( 4070.)

37.2/ 2/ 37.

13.6/ 2/ 14.

66.3/ 12/ 147.

.3/ 12/ 1.

45.6/ 2/ 2.00

1.6/ 3/ .02

30.1/ 2/ 30.

.4/ 2/ 0.

6.43

26.

142.

1.98

29.8

1.71

19.03

4103.8

5.30

765.

.847 (.045)

1.000 (.976)

115.3

0.00

16.48

076FET

747.3

3.5

26.7

253.9

10.93

.10

1.15

.32

**TABLE D-23. TEST NO. 078 EMISSIONS RESULTS**  
 FTR VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5030-010

TEST NO. 078FTP RUN 1  
 VEHICLE MODEL '78 CHEV. MALIBU CAL  
 ENGINE 5.0 L(305. CID) V-8  
 TRANSMISSION A3

BAROMETER 742.70 MM HG(29.24 IN HG)  
 RELATIVE HUMIDITY 49. PCT  
 BAG RESULTS

BAG NUMBER  
 DESCRIPTION

BLOWER DIFF P MM. H2O(IN. H2O)  
 BLOWER INLET P MM. H2O(IN. H2O)  
 BLOWER INLET TEMP. DEG. C(DEG. F)

BLOWER REVOLUTIONS

TDT FLOW STD. CU. METRES(SCF)

HC SAMPLE METER/RANGE/PPM

CO BCKGRD METER/RANGE/PPM

CO SAMPLE METER/RANGE/PPM

CO BCKGRD METER/RANGE/PPM

CO2 SAMPLE METER/RANGE/PCT

CO2 BCKGRD METER/RANGE/PCT

NOX SAMPLE METER/RANGE/PPM

NOX BCKGRD METER/RANGE/PPM

DILUTION FACTOR

HC CONCENTRATION PPM

CO CONCENTRATION PPM

CO2 CONCENTRATION PCT

NOX CONCENTRATION PPM

HC MASS GRAMS

CO MASS GRAMS

CO2 MASS GRAMS

NOX MASS GRAMS

HC GRAMS/KM

CO GRAMS/KM

CO2 GRAMS/KM

NOX GRAMS/KM

FUEL CONSUMPTION BY CB L/100KM

RUN TIME SECONDS

MEASURED DISTANCE KM

SCF, DRY

DFC, WET (DRY)

SCF, WET (DRY)

VOL (SCM)

SAM BLR (SCM)

KM (MEASURED)

FUEL CONSUMPTION L/100KM

COMPOSITE RESULTS

TEST NUMBER 078FTP

BAROMETER MM HG 742.7

HUMIDITY G/KG 10.0

TEMPERATURE DEG C 25.0

VEHICLE NO.07  
 DATE 4/ 7/81  
 BAG CART NO. 1 CVS NO. 2  
 DYN NO. 3

DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)  
 ABS. HUMIDITY 10.0 GM/KG

TEST WEIGHT 1588. KG( 3500. LBS)  
 ACTUAL ROAD LOAD 8.0 KW( 10.7 HP)  
 GASOLINE EM-470-F  
 ODOMETER 61091. KM(30433. MILES)

NOX HUMIDITY CORRECTION FACTOR .98

	<sup>1</sup> COLD TRANSIENT	<sup>2</sup> STABILIZED	<sup>3</sup> HOT TRANSIENT	<sup>4</sup> STABILIZED
BLOWER DIFF P MM. H2O(IN. H2O)	787.4 (31.0)	792.5 (31.2)	787.4 (31.0)	792.5 (31.2)
BLOWER INLET P MM. H2O(IN. H2O)	702.3 (30.8)	787.4 (31.0)	702.3 (30.8)	787.4 (31.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)	43.3 (110.0)	43.3 (110.0)	43.3 (110.0)
BLOWER REVOLUTIONS	40523.	39548.	40493.	69474.
TDT FLOW STD. CU. METRES(SCF)	75.9 (2679.)	130.1 (4594.)	75.8 (2677.)	130.0 (4589.)
HC SAMPLE METER/RANGE/PPM	12.6/ 3/ 126.	34.4/ 2/ 34.	64.6/ 2/ 65.	33.4/ 2/ 34.
CO BCKGRD METER/RANGE/PPM	1.4/ 3/ 14.	14.0/ 2/ 14.	15.0/ 2/ 15.	15.0/ 2/ 15.
CO SAMPLE METER/RANGE/PPM	55.7/ 3/ 1384.	71.5/ 12/ 154.	23.0/ 3/ 550.	74.2/ 12/ 171.
CO BCKGRD METER/RANGE/PPM	.1/ 3/ 2.	1.5/ 12/ 3.	.1/ 3/ 2.	1.2/ 12/ 2.
CO2 SAMPLE METER/RANGE/PCT	86.0/ 3/ 1.61	59.9/ 3/ 1.06	75.0/ 3/ 1.37	57.7/ 3/ 1.02
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	3.3/ 3/ .05	2.8/ 3/ .04	3.4/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	25.9/ 2/ 27.	11.5/ 2/ 12.	16.1/ 2/ 18.	11.1/ 2/ 11.
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ 1.	.8/ 2/ 1.	.7/ 2/ 1.	1.2/ 2/ 1.
DILUTION FACTOR	7.33	12.41	9.40	12.92
HC CONCENTRATION PPM	114.	21.	52.	20.
CO CONCENTRATION PPM	1318.	155.	525.	163.
CO2 CONCENTRATION PCT	1.57	1.01	1.33	.97
NOX CONCENTRATION PPM	26.4	10.8	15.5	10.0
HC MASS GRAMS	4.98	1.61	2.28	1.48
CO MASS GRAMS	115.37	23.49	46.35	24.72
CO2 MASS GRAMS	2104.4	2416.5	1843.4	2306.3
NOX MASS GRAMS	3.73	2.61	2.19	2.42
HC GRAMS/KM	.86	.26	.39	.24
CO GRAMS/KM	20.08	3.76	7.97	3.94
CO2 GRAMS/KM	376.9	387.1	316.9	368.1
NOX GRAMS/KM	.64	.42	.38	.39
FUEL CONSUMPTION BY CB L/100KM	17.55	16.81	14.11	16.01
RUN TIME SECONDS	505.	867.	505.	867.
MEASURED DISTANCE KM	5.80	6.24	5.02	6.27
SCF, DRY	.969	.974	.972	.975
DFC, WET (DRY)	.901 ( .887)	1.000 ( .972)	.912 ( .897)	1.000 ( .974)
SCF, WET (DRY)		206.0		205.8
VOL (SCM)		0.00		0.00
SAM BLR (SCM)		12.04		12.08
KM (MEASURED)		17.17		15.09
FUEL CONSUMPTION L/100KM				

CARBON DIOXIDE G/KM	365.7	( 360.1)
FUEL CONSUMPTION L/100KM	16.22	( 15.97)
HYDROCARBONS (THC) G/KM	.42	( .41)
CARBON MONOXIDE G/KM	8.30	( 8.35)
OXIDES OF NITROGEN G/KM	.45	( .44)

TEST NO. 078FET RUN 1

VEHICLE MODEL '78 CHEV. MALIBU CAL  
 ENGINE 5.0 L(305. CID) V-8  
 TRANSMISSION A3

BAROMETER 741.93 MM HG(29.21 IN HG)

RELATIVE HUMIDITY 45. PCT

BAG RESULTS

TEST CYCLE

BLOWER DIFF P MM. H2O(IN. H2O)

BLOWER INLET P MM. H2O(IN. H2O)

BLOWER INLET TEMP. DEG. C(DEG. F)

BLOWER REVOLUTIONS

TDT FLOW STD. CU. METRES(SCF)

HC SAMPLE METER/RANGE/PPM

CO BCKGRD METER/RANGE/PPM

CO SAMPLE METER/RANGE/PPM

CO BCKGRD METER/RANGE/PPM

CO2 SAMPLE METER/RANGE/PCT

CO2 BCKGRD METER/RANGE/PCT

NOX SAMPLE METER/RANGE/PPM

NOX BCKGRD METER/RANGE/PPM

DILUTION FACTOR

HC CONCENTRATION PPM

CO CONCENTRATION PPM

CO2 CONCENTRATION PCT

NOX CONCENTRATION PPM

HC MASS GRAMS

CO MASS GRAMS

CO2 MASS GRAMS

NOX MASS GRAMS

RUN TIME SECONDS

DFC, WET (DRY)

SCF, WET (DRY)

VOL (SCM)

SAM BLR (SCM)

KM (MEASURED)

FUEL CONSUMPTION L/100KM

VEHICLE NO.07  
 DATE 4/ 7/81  
 BAG CART NO. 1  
 DYN NO. 3  
 CVS NO. 2

DRY BULB TEMP. 27.2 DEG C(81.0 DEG F)  
 ABS. HUMIDITY 10.4 GM/KG

TEST WEIGHT 1588. KG( 3500. LBS)  
 ACTUAL ROAD LOAD 8.0 KW( 10.7 HP)  
 GASOLINE EM-470-F  
 ODOMETER 61091. KM(30451. MILES)

NOX HUMIDITY CORRECTION FACTOR .99

HFET

VEHICLE EMISSIONS RESULTS

PROJECT 11-5030-010

TEST NUMBER 078FET

BAROMETER MM HG 741.9

HUMIDITY G/KG 10.4

TEMPERATURE DEG C 27.2

CARBON DIOXIDE G/KM 251.3

FUEL CONSUMPTION L/100KM 10.88

HYDROCARBONS G/KM .16

CARBON MONOXIDE G/KM 2.05

OXIDES OF NITROGEN G/KM .40

TABLE D-24. TEST NO. 081 EMISSIONS RESULTS  
FTP VEHICLE EMISSIONS RESULTS  
PROJECT 11 5030-00

TEST NO.	001FTP	RUN	1	VEHICLE NO.00	TEST WEIGHT 1500. KG( 3500. LBS)
VEHICLE MODEL	70 MONTE CARLO	DATE	3/23/01	ACTUAL ROAD LOAD 0.0 KW( 10.7 HP)	
ENGINE 3.0 L(231. CID) V-6		BAG CART NO.	1 / CVS NO.	GASOLINE LM-470-F	
TRANSMISSION A3		DYNO NO.	3	ODOMETER ***** KM(67467. MILES)	
DAROMETER 740.54 MM HG(29.47 IN HG)		DRY BLD TEMP. 25.6 DEG C(70.0 DEG F)			
RELATIVE HUMIDITY 25. PCT		ABS. HUMIDITY 5.1 GM/KG		NOX HUMIDITY CORRECTION FACTOR .04	
DAG RESULTS					
BAG NUMBER		1	2	3	4
DESCRIPTION		COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	702.3 (30.0)	782.5 (31.2)	787.4 (31.0)	792.5 (31.2)	
BLOWER INLET P MM. H2O(IN. H2O)	774.7 (30.5)	707.4 (31.0)	777.2 (30.6)	787.4 (31.0)	
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)	41.7 (107.0)	43.3 (110.0)	43.1 (109.5)	
BLOWER REVOLUTIONS	40629.	40529.	40475.	40544.	
TOT FLOW STD. CU. METRES(SCF)	76.0 (2712.)	131.6 (4646.)	76.5 (2700.)	131.3 (4636.)	
HC SAMPLE METER/RANGE/PPM	9.4/ 3/ 94.	12.9/ 2/ 13.	55.4/ 2/ 55.	12.4/ 2/ 12.	
HC DCKGRD METER/RANGE/PPM	.0/ 3/ 0.	0.0/ 2/ 0.	8.3/ 2/ 0.	8.1/ 2/ 0.	
CO SAMPLE METER/RANGE/PPM	35.2/ 3/ 031.	0.9/13/ 8.	05.2/13/ 05.	3.0/13/ 3.	
CO DCKGRD METER/RANGE/PPM	.2/ 3/ 5.	.5/13/ 0.	1/13/ 0.	1/13/ 0.	
CO2 SAMPLE METER/RANGE/PCT	70.9/ 3/ 1.28	40.6/ 3/ .84	63.3/ 3/ 1.13	40.0/ 3/ .03	
CO2 DCKGRD METER/RANGE/PCT	3.3/ 3/ .05	3.0/ 3/ .06	3.6/ 3/ .06	3.7/ 3/ .06	
NOX SAMPLE METER/RANGE/PPM	38.9/ 3/ 117.	46.4/ 2/ 46.	30.2/ 3/ 115.	44.7/ 2/ 45.	
NOX DCKGRD METER/RANGE/PPM	.1/ 3/ 0.	.5/ 2/ 1.	.1/ 3/ 0.	.5/ 2/ 1.	
DILUTION FACTOR	9.76	15.91	11.73	16.14	
HC CONCENTRATION PPM	87.	5.	48.	5.	
CO CONCENTRATION PPM	000.	7.	82.	7.	
CO2 CONCENTRATION PCT	1.24	.79	1.08	.78	
NOX CONCENTRATION PPM	116.4	45.9	114.3	44.2	
HC MASS GRAMS	3.04	.35	2.11	.36	
CO MASS GRAMS	71.53	1.14	7.34	.39	
CO2 MASS GRAMS	1739.6	1072.4	1509.7	1364.0	
NOX MASS GRAMS	14.43	.76	14.11	.937	
HC GRAMS/KM	.67	.06	.37	.06	
CO GRAMS/KM	12.39	.18	1.27	.06	
CO2 GRAMS/KM	301.4	203.1	262.2	300.5	
NOX GRAMS/KM	2.50	1.56	2.45	1.51	
FUEL CONSUMPTION L/100KM	13.72	12.95	11.32	12.04	
RUN TIME	SECONDS	506.	867.	505.	860.
MEASURED DISTANCE	KM	5.77	6.24	5.76	6.20
SCF, DRY		.900	.904	.902	.904
DFC, WET (DRY)		.923 (.925)		.923 (.922)	
SCF, WET (DRY)		1.000 (.903)		1.000 (.983)	
VOL (SCM)		200.4		207.3	
SAM DLR (SCM)		0.00		0.00	
KM (MEASURED)		12.01		11.96	
FUEL CONSUMPTION L/100KM		13.36		12.11	
COMPOSITE RESULTS					
TEST NUMBER	001FTP				
DAROMETER	MM HG 740.5				
HUMIDITY	G/KG 5.1				
TEMPERATURE	DEG C 25.6				
DAG RESULTS					
TEST CYCLE					
BAG NUMBER					
DESCRIPTION					
BLOWER DIF P MM. H2O(IN. H2O)	800.1 (31.5)				
BLOWER INLET P MM. H2O(IN. H2O)	787.4 (31.0)				
BLOWER INLET TEMP. DEG. C(DEG. F)	43.9 (111.0)				
BLOWER REVOLUTIONS	41321.				
TOT FLOW STD. CU. METRES(SCF)	115.4 (4076.)				
HC SAMPLE METER/RANGE/PPM	23.5/ 2/ 23.				
HC DCKGRD METER/RANGE/PPM	7.9/ 2/ 0.				
CO SAMPLE METER/RANGE/PPM	16.8/13/ 15.				
CO DCKGRD METER/RANGE/PPM	2.7/13/ 0.				
CO2 SAMPLE METER/RANGE/PCT	82.5/ 3/ 1.52				
CO2 DCKGRD METER/RANGE/PCT	3.6/ 3/ .06				
NOX SAMPLE METER/RANGE/PPM	87.5/ 3/ 203.				
NOX DCKGRD METER/RANGE/PPM	.2/ 3/ 1.				
DILUTION FACTOR	0.78				
HC CONCENTRATION PPM	16.				
CO CONCENTRATION PPM	15.				
CO2 CONCENTRATION PCT	1.47				
NOX CONCENTRATION PPM	202.0				
HC MASS GRAMS	1.08				
CO MASS GRAMS	1.95				
CO2 MASS GRAMS	3112.4				
NOX MASS GRAMS	38.29				
RUN TIME	SECONDS	765.			
DFC, WET (DRY)		.866 (.870)			
SCF, WET (DRY)		1.000 (.977)			
VOL (SCM)		115.4			
SAM DLR (SCM)		0.00			
KM (MEASURED)		16.20			
TEST NUMBER	001FET				
BAROMETER,	MM HG	747.0			
HUMIDITY,	G/KG	5.7			
TEMPERATURE,	DEG C	25.6			
CARBON DIOXIDE,	G/KM	191.2			
FUEL CONSUMPTION,	L/100KM	8.18			
HYDROCARBONS,	G/KM	.07			
CARBON MONOXIDE,	G/KM	.12			
OXIDES OF NITROGEN,	G/KM	2.35			

TEST NO.	001FET	RUN	1	VEHICLE NO.00	TEST WEIGHT 1500. KG( 3500. LBS)
VEHICLE MODEL	70 MONTE CARLO	DATE	3/23/01	ACTUAL ROAD LOAD 0.0 KW( 10.7 HP)	
ENGINE 3.0 L(231. CID) V-6		BAG CART NO.	1	GASOLINE LM-470-F	
TRANSMISSION A3		DYNO NO.	3	ODOMETER ***** KM(67402. MILES)	
DAROMETER 747.70 MM HG(29.44 IN HG)		DRY BLD TEMP. 25.6 DEG C(70.0 DEG F)			
RELATIVE HUMIDITY 28. PCT		ABS. HUMIDITY 5.7 GM/KG		NOX HUMIDITY CORRECTION FACTOR .04	
DAG RESULTS					
TEST CYCLE					
BAG NUMBER					
DESCRIPTION					
BLOWER DIF P MM. H2O(IN. H2O)	800.1 (31.5)				
BLOWER INLET P MM. H2O(IN. H2O)	787.4 (31.0)				
BLOWER INLET TEMP. DEG. C(DEG. F)	43.9 (111.0)				
BLOWER REVOLUTIONS	41321.				
TOT FLOW STD. CU. METRES(SCF)	115.4 (4076.)				
HC SAMPLE METER/RANGE/PPM	23.5/ 2/ 23.				
HC DCKGRD METER/RANGE/PPM	7.9/ 2/ 0.				
CO SAMPLE METER/RANGE/PPM	16.8/13/ 15.				
CO DCKGRD METER/RANGE/PPM	2.7/13/ 0.				
CO2 SAMPLE METER/RANGE/PCT	82.5/ 3/ 1.52				
CO2 DCKGRD METER/RANGE/PCT	3.6/ 3/ .06				
NOX SAMPLE METER/RANGE/PPM	87.5/ 3/ 203.				
NOX DCKGRD METER/RANGE/PPM	.2/ 3/ 1.				
DILUTION FACTOR	0.78				
HC CONCENTRATION PPM	16.				
CO CONCENTRATION PPM	15.				
CO2 CONCENTRATION PCT	1.47				
NOX CONCENTRATION PPM	202.0				
HC MASS GRAMS	1.08				
CO MASS GRAMS	1.95				
CO2 MASS GRAMS	3112.4				
NOX MASS GRAMS	38.29				
RUN TIME	SECONDS	765.			
DFC, WET (DRY)		.866 (.870)			
SCF, WET (DRY)		1.000 (.977)			
VOL (SCM)		115.4			
SAM DLR (SCM)		0.00			
KM (MEASURED)		16.20			
TEST NUMBER	001FET				
BAROMETER,	MM HG	747.0			
HUMIDITY,	G/KG	5.7			
TEMPERATURE,	DEG C	25.6			
CARBON DIOXIDE,	G/KM	191.2			
FUEL CONSUMPTION,	L/100KM	8.18			
HYDROCARBONS,	G/KM	.07			
CARBON MONOXIDE,	G/KM	.12			
OXIDES OF NITROGEN,	G/KM	2.35			

**TABLE D-25. TEST NO. 082 EMISSIONS RESULTS**  
 FTP VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5030-007

TEST NO.	082FTP	RUN	1	VEHICLE NO.00	TEST WEIGHT	1580. KG( 3500. LBS)
VEHICLE MODEL	70 MONTE CARLO	DATE	3/25/81	ACTUAL ROAD LOAD	0.0 KW( 10.7 HP)	
ENGINE 3.8 L(231. CID) V-6	BAG CART NO.	1	GASOLINE EM-470-F	ODOMETER	***** KM(67529. MILES)	
TRANSMISSION A3	DYNO NO.	3				
BAROMETER 741.60 MM HG(29.20 IN HG)	DRY BULB TEMP.	25.6 DEG C(70.0 DEG F)				
RELATIVE HUMIDITY 40. PCT	ADS. HUMIDITY	8.4 GM/KG	NOX HUMIDITY CORRECTION FACTOR	.93		
BAG RESULTS						
BAG NUMBER						
DESCRIPTION						
BLOWER DIF P MM. H2O(IN. H2O)	COLD TRANSIENT	1	HOT TRANSIENT	3		
BLOWER INLET P MM. H2O(IN. H2O)	STABILIZED	2	STABILIZED	4		
BLOWER INLET TEMP. DEG. C(DEG. F)						
BLOWER REVOLUTIONS						
TOT FLOW STD. CU. METRES(SCF)	702.3 (30.0)	707.4 (31.0)	702.3 (30.0)	707.4 (31.0)		
HC SAMPLE METER/RANGE/PPM	774.7 (30.5)	777.2 (30.6)	774.7 (30.5)	777.2 (30.6)		
HC DCKGRD METER/RANGE/PPM	42.0 (109.0)	42.2 (100.0)	43.3 (110.0)	43.3 (110.0)		
CO SAMPLE METER/RANGE/PPM	40566.	69544.	40490.	67522.		
CO DCKGRD METER/RANGE/PPM						
CO2 SAMPLE METER/RANGE/PCT	71.0/ 3/ 1.30	49.9/ 3/ .07	64.6/ 3/ 1.15	48.4/ 3/ .04		
CO2 DCKGRD METER/RANGE/PCT	2.0/ 3/ .04	3.2/ 3/ .05	3.1/ 3/ .05	3.2/ 3/ .05		
NOX SAMPLE METER/RANGE/PPM	40.6/ 3/ 1.22.	46.0/ 3/ .47	38.2/ 3/ 1.15.	44.1/ 2/ .44.		
NOX DCKGRD METER/RANGE/PPM	.3/ 3/ 1.	.7/ 2/ 1.	.1/ 3/ 0.	.6/ 2/ 1.		
DILUTION FACTOR	9.61	15.44	11.43	15.78		
HC CONCENTRATION PPM	101.	7.	39.	6.		
CO CONCENTRATION PPM	015.	7.	121.	7.		
CO2 CONCENTRATION PCT	1.26	.02	1.11	.75		
NOX CONCENTRATION PPM	121.0	46.1	114.3	43.3		
HC MASS GRAMS	4.44	.49	1.72	.43		
CO MASS GRAMS	72.07	1.00	10.64	1.05		
CO2 MASS GRAMS	1756.3	1955.0	1542.2	1881.6		
NOX MASS GRAMS	16.32	10.68	15.39	10.05		
HC GRAMS/KM	.76	.00	.29	.07		
CO GRAMS/KM	12.35	.14	1.02	.17		
CO2 GRAMS/KM	301.0	310.6	263.5	297.9		
NOX GRAMS/KM	2.00	1.70	2.63	1.59		
FUEL CONSUMPTION BY CD L/100KM	13.78	13.23	11.41	12.74		
RUN TIME	SECONDS	505.	867.	505.	860.	
MEASURED DISTANCE	KM	5.04	6.29	5.05	6.32	
SCF, DRY		.975	.979	.976	.977	
DFC, WET (DRY)		.921 (.909)		.920 (.916)		
SCF, WET (DRY)		1.000 (.970)		1.000 (.978)		
VOL (SCM)		206.3		205.8		
SAM DLR (SCM)		0.00		0.00		
KM (MEASURED)		12.13		12.17		
FUEL CONSUMPTION L/100KM		13.52		12.10		
COMPOSITE RESULTS						
TEST NUMBER	082FTP				3-DAG	(4-DAG)
BAROMETER	MM HG	741.7			CARBON DIOXIDE G/KM	295.7 (292.0)
HUMIDITY	G/KG	8.4			FUEL CONSUMPTION L/100KM	12.07 (12.71)
TEMPERATURE	DEG C	25.6			HYDROCARBONS (THC) G/KM	.28 (.20)
					CARBON MONOXIDE G/KM	3.14 (.314)
					OXIDES OF NITROGEN G/KM	2.18 (2.15)

HFET VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5030-007

TEST NO.	082FET	RUN	1	VEHICLE NO.00	TEST WEIGHT	1580. KG( 3500. LBS)
VEHICLE MODEL	70 MONTE CARLO	DATE	3/25/81	ACTUAL ROAD LOAD	0.0 KW( 10.7 HP)	
ENGINE 3.8 L(231. CID) V-6	BAG CART NO.	1	GASOLINE EM-470-F	ODOMETER	***** KM(67544. MILES)	
TRANSMISSION A3	DYNO NO.	2				
BAROMETER 743.71 MM HG(29.20 IN HG)	DRY BULB TEMP.	26.7 DEG C(80.0 DEG F)				
RELATIVE HUMIDITY 41. PCT	ADS. HUMIDITY	9.2 GM/KG	NOX HUMIDITY CORRECTION FACTOR	.95		
0 BAG RESULTS						
TEST CYCLE						
BLOWER DIF P MM. H2O(IN. H2O)						
BLOWER INLET P MM. H2O(IN. H2O)						
BLOWER INLET TEMP. DEG. C(DEG. F)						
BLOWER REVOLUTIONS						
TOT FLOW STD. CU. METRES(SCF)	800.1 (31.5)					
HC SAMPLE METER/RANGE/PPM	787.4 (31.0)					
HC DCKGRD METER/RANGE/PPM	43.3 (110.0)					
CO SAMPLE METER/RANGE/PPM	61373.					
CO DCKGRD METER/RANGE/PPM	114.7 (.4052.)					
CO2 SAMPLE METER/RANGE/PCT	27.6/ 2/ 20.					
CO2 DCKGRD METER/RANGE/PPM	13.1/ 2/ 13.					
NOX SAMPLE METER/RANGE/PPM	28.1/ 1/ 26.					
NOX DCKGRD METER/RANGE/PCT	1/ 1/ 0.					
NOX SAMPLE METER/RANGE/PPM	84.5/ 3/ 1.56					
NOX DCKGRD METER/RANGE/PPM	2.0/ 3/ .04					
DILUTION FACTOR	73.3/ 3/ 220.					
HC CONCENTRATION PPM	1/ 3/ 0.					
CO CONCENTRATION PPM	8.54					
CO2 CONCENTRATION PCT	15.					
NOX CONCENTRATION PPM	45.					
HC MASS GRAMS	1.53					
CO MASS GRAMS	210.6					
CO2 MASS GRAMS	1.04					
NOX MASS GRAMS	3.29					
RUN TIME	SECONDS	768.				
DFC, WET (DRY)		.883 (.871)				
SCF, WET (DRY)		1.000 (.972)				
VOL (SCM)		114.7				
SAM DLR (SCM)		0.00				
KM (MEASURED)		16.53				
TEST NUMBER	082FET					
BAROMETER,	MM HG	743.7				
HUMIDITY,	G/KG	9.2				
TEMPERATURE,	DEG C	26.7				
CARBON DIOXIDE,	G/KM	194.2				
FUEL CONSUMPTION,	L/100KM	0.31				
HYDROCARBONS,	G/KM	.06				
CARBON MONOXIDE,	G/KM	.20				
OXIDES OF NITROGEN,	G/KM	2.70				

TABLE D -26. TEST NO. 086 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS  
PROJECT 11-5030-007

TEST NO. 006FTP RUN 1	VEHICLE NO.08	TEST WEIGHT 1500. KG(3500. LBS)
VEHICLE MODEL 70 MONTE CARLO	DATE 3/26/01	ACTUAL ROAD LOAD 0.0 KW(10.7 HP)
ENGINE 3.8 L(231. CID) V-6	BAG CART NO. 1 / CVS NO. 2	GASOLINE EM-470-F
TRANSMISSION A3	DYNO NO. 3	ODOMETER ***** KM(67573. MILES)
DAROMETER 745.24 MM HG(29.34 IN HG)	DRY DULD TEMP. 25.0 DEG C(77.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR 1.00
RELATIVE HUMIDITY 52. PCT	ADS. HUMIDITY 10.6 GM/KG	
BAG RESULTS		
BAG NUMBER	1	2
DESCRIPTION	COLD TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	707.4 (31.0)	707.4 (31.0)
BLOWER INLET P MM. H2O(IN. H2O)	702.3 (30.0)	702.3 (30.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	43.1 (109.5)	41.7 (107.0)
BLOWER REVOLUTIONS	40747.	40730.
TOT FLOW STD. CU. METRES(SCF)	76.6 ( 2705.)	131. ( 4620.)
HC SAMPLE METER/RANGE/PPM	16.5/ 3/ 163.	31.4/ 2/ 31.
HC DCKGRD METER/RANGE/PPM	1.5/ 3/ 15.	13.0/ 2/ 13.
CO SAMPLE METER/RANGE/PPM	62.0/ 3/ 1571.	02.1/ 12/ 196.
CO DCKGRD METER/RANGE/PPM	1.1/ 3/ 2.	.9/ 12/ 2.
CO2 SAMPLE METER/RANGE/PCT	66.0/ 3/ 1.20	46.9/ 3/ .81
CO2 DCKGRD METER/RANGE/PCT	3.2/ 3/ .05	2.6/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	44.9/ 2/ 45.	11.3/ 2/ 11.
NOX DCKGRD METER/RANGE/PPM	.9/ 2/ 1.	.6/ 2/ 1.
DILUTION FACTOR	9.01	16.15
HC CONCENTRATION PPM	152.	19.
CO CONCENTRATION PPM	1506.	100.
CO2 CONCENTRATION PCT	1.16	.77
NOX CONCENTRATION PPM	44.1	10.7
HC MASS GRAMS	6.69	1.45
CO MASS GRAMS	134.32	20.34
CO2 MASS GRAMS	1620.4	1040.6
NOX MASS GRAMS	6.44	2.48
HC GRAMS/KM	1.15	.23
CO GRAMS/KM	23.03	4.61
CO2 GRAMS/KM	277.8	297.0
NOX GRAMS/KM	1.10	.43
FUEL CONSUMPTION BY CD L/100KM	13.56	13.05
RUN TIME SECONDS	508.	867.
MEASURED DISTANCE KM	5.63	6.21
SCF, DRY	.972	.976
DFC, WET (DRY)	.923 ( .200)	
SCF, WET (DRY)	1.000 ( .974)	1.000 ( .975)
VOL (SCM)	207.7	206.7
SAM DLR (SCM)	0.00	0.00
KM (MEASURED)	12.04	12.12
FUEL CONSUMPTION L/100KM	13.30	11.74
COMPOSITE RESULTS		
TEST NUMBER 006FTP		3-DAG (4-DAG)
DAROMETER MM HG 745.2	CARBON DIOXIDE G/KM	280.0 ( 275.4)
HUMIDITY G/A/C 10.6	FULL CONSUMPTION L/100KM	12.62 ( 12.41)
TEMPERATURE DEG C 25.0	HYDROCARBONS (THC) G/KM	.49 ( .40)
	CARBON MONOXIDE G/KM	9.01 ( 8.77)
	OXIDES OF NITROGEN G/KM	.70 ( .66)

HFET VEHICLE EMISSIONS RESULTS  
PROJECT 11 5030-007

TEST NO. 006FET RUN 1	VEHICLE NO.08	TEST WEIGHT 1500. KG(3500. LBS)
VEHICLE MODEL 70 MONTE CARLO	DATE 3/26/01	ACTUAL ROAD LOAD 0.0 KW(10.7 HP)
ENGINE 3.8 L(231. CID) V-6	BAG CART NO. 1	GASOLINE EM-470-F
TRANSMISSION A3	DYNO NO. 3	ODOMETER ***** KM(67500. MILES)
DAROMETER 745.24 MM HG(29.34 IN HG)	DRY DULD TEMP. 26.7 DEG C(80.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR 1.02
RELATIVE HUMIDITY 51. PCT	ADS. HUMIDITY 11.4 GM/KG	
0 BAG RESULTS		
TEST CYCLE		
BLOWER DIF P MM. H2O(IN. H2O)	800.1 (31.5)	
BLOWER INLET P MM. H2O(IN. H2O)	707.4 (31.0)	
BLOWER INLET TEMP. DEG. C(DEG. F)	43.9 (111.0)	
BLOWER REVOLUTIONS	61279.	
TOT FLOW STD. CU. METRES(SCF)	114.9 ( 4050.)	
HC SAMPLE METER/RANGE/PPM	47.2/ 2/ 47.	
HC DCKGRD METER/RANGE/PPM	12.3/ 2/ 12.	
CO SAMPLE METER/RANGE/PPM	77.7/ 12/ 182.	
CO DCKGRD METER/RANGE/PPM	.1/ 12/ 0.	
CO2 SAMPLE METER/RANGE/PCT	85.9/ 3/ 1.59	
CO2 DCKGRD METER/RANGE/PCT	3.2/ 3/ .05	
NOX SAMPLE METER/RANGE/PPM	50.0/ 2/ 59.	
NOX DCKGRD METER/RANGE/PPM	.9/ 2/ 1.	
DILUTION FACTOR	8.30	
HC CONCENTRATION PPM	36.	
CO CONCENTRATION PPM	173.	
CO2 CONCENTRATION PCT	1.55	
NOX CONCENTRATION PPM	50.0	
HC MASS GRAMS	2.41	
CO MASS GRAMS	23.10	
CO2 MASS GRAMS	3259.2	
NOX MASS GRAMS	13.03	
RUN TIME SECONDS	765.	
DFC, WET (DRY)	.800 ( .065)	
SCF, WET (DRY)	1.000 ( .969)	
VOL (SCM)	114.9	
SAM DLR (SCM)	0.00	
KM (MEASURED)	16.52	
TEST NUMBER 006FET		
DAROMETER, MM HG 745.2		
HUMIDITY, G/KG 11.4		
TEMPERATURE, DEG C 26.7		
CARBON DIOXIDE, G/KM 197.4		
FUEL CONSUMPTION, L/100KM 8.54		
HYDROCARBONS, G/KM .15		
CARBON MONOXIDE, G/KM 1.40		
OXIDES OF NITROGEN, G/KM .79		

TABLE D-27. TEST NO. 087 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS PROJECT 11-5830-007				
TEST NO. 007FTP RUN 1 VEHICLE MODEL 70 MONTE CARLO ENGINE 3.0 L(231. CID) V-6 TRANSMISSION A3	VEHICLE NO.00 DATE 3/27/81 BAG CART NO. 1 / CVS NO. 2 DYN NO. 3	TEST WEIGHT 1500. KG( 3500. LBS) ACTUAL ROAD LOAD 8.0 KW( 10.7 HP) GASOLINE EM-470-F ODOMETER ##### KM(67611. MILES)		
BAROMETER 740.16 MM HG(29.14 IN HG) RELATIVE HUMIDITY 60. PCT	DRY DULD TEMP. 25.0 DEG C(77.0 DEG F) ABS. HUMIDITY 12.2 GM/KG	NOX HUMIDITY CORRECTION FACTOR 1.05		
DAG RESULTS				
BAG NUMBER DESCRIPTION	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIF P MM. H2O(IN. H2O) BLOWER INLET P MM. H2O(IN. H2O) BLOWER INLET TEMP. DEG. C(DEG. F) BLOWER REVOLUTIONS TOT FLOW STD. CU. METRES(SCF) HC SAMPLE METER/RANGE/PPM HC DCKGRD METER/RANGE/PPM CO SAMPLE METER/RANGE/PPM CO2 SAMPLE METER/RANGE/PCT CO2 DCKGRD METER/RANGE/PCT NOX SAMPLE METER/RANGE/PPM NOX DCKGRD METER/RANGE/PPM	782.3 (30.0) 774.7 (30.5) 43.1 (109.5) 40536. 75.0 (2674.) 19.0/ 3/ 190. 1.2/ 3/ 12. 66.2/ 3/ 1700. 67.0/ 3/ 1.20 2.7/ 3/ .04 44.0/ 2/ 45. .0/ 2/ 1.	787.4 (31.0) 782.3 (30.8) 41.7 (107.0) 69560. 130.1 (4524.) 30.1/ 2/ 30. 10.5/ 2/ 11. 02.3/ 12/ 196. 46.4/ 3/ .00 2.5/ 3/ .04 11.5/ 2/ 11. .7/ 2/ 1.	702.3 (30.0) 774.7 (30.5) 42.8 (109.0) 40509. 75.7 (2673.) 80.3/ 2/ 00. 10.5/ 2/ 11. 07.5/ 11/ 421. 61.9/ 3/ 1.10 3.2/ 3/ .05 35.3/ 2/ 35. .5/ 2/ 1.	707.4 (31.0) 777.2 (30.6) 43.3 (110.0) 69473. 129.6 (4577.) 27.2/ 2/ 27. 10.2/ 2/ 10. 70.6/ 12/ 161. .1/ 12/ .0. 45.9/ 3/ .79 3.3/ 3/ .05 10.0/ 2/ 10. .5/ 2/ 1. 16.61 18. 155. .74 9.5 1.32 23.43 1759.0 2.40
DILUTION FACTOR HC CONCENTRATION PPM CO CONCENTRATION PPM CO2 CONCENTRATION PCT NOX CONCENTRATION PPM HC MASS GRAMS CO MASS GRAMS CO2 MASS GRAMS NOX MASS GRAMS	1.37 129. 1424. 1.16 44.1 7.03 143.36 1612.9 6.71	20. 109. .77 10.6 1.52 28.57 1025.0 2.78	.71. 403. 1.06 34.8 3.09 35.54 1463.5 5.30	.21 155. .74 9.5 1.32 23.43 1759.0 2.40
HC GRAMS/KM CO GRAMS/KM CO2 GRAMS/KM NOX GRAMS/KM	1.35 24.65 277.5 1.15	.24 4.59 293.3 .45	.53 6.11 251.5 .91	.21 3.76 282.6 .40
FUEL CONSUMPTION BY CD L/100KM	13.60	12.06	11.22	12.34
RUN TIME SECONDS	505.	867.	505.	867.
MEASURED DISTANCE KM	5.01	6.22	5.02	6.22
SCF, DRY	.970	.973	.971	.973
DFC, WET (DRY) SCF, WET (DRY) VOL (SCM) SAM DLR (SCM) KM (MEASURED)	.923 (.905) 1.000 (.972) 205.8 0.00 12.04	1.000 (.972) 205.3 0.00 12.04	.930 (.912) 1.000 (.972) 205.3 0.00 12.04	
FUEL CONSUMPTION L/100KM	13.25			11.80
COMPOSITE RESULTS				
TEST NUMBER 007FTP BAROMETER MM HG 740.2 HUMIDITY G/KG 12.2 TEMPERATURE DEG C 25.0	CARBON DIOXIDE G/KM FUEL CONSUMPTION L/100KM HYDROCARBONS (THC) G/KM CARBON MONOXIDE G/KM OXIDES OF NITROGEN G/KM	3-DAG 12.58 .55 .18 .72	(4-DAG) ( 12.42) ( .54) ( 0.93) ( .71)	

HFET VEHICLE EMISSIONS RESULTS PROJECT 11-5830-007			
TEST NO. 007FET RUN 1 VEHICLE MODEL 70 MONTE CARLO ENGINE 3.0 L(231. CID) V-6 TRANSMISSION A3	VEHICLE NO.00 DATE 3/27/81 BAG CART NO. 1 DYN NO. 3 CVS NO. 2	TEST WEIGHT 1500. KG( 3500. LBS) ACTUAL ROAD LOAD 8.0 KW( 10.7 HP) GASOLINE EM-470-F ODOMETER ##### KM(67626. MILES)	
DAROMETER 739.90 MM HG(29.13 IN HG) RELATIVE HUMIDITY 60. PCT	DRY DULD TEMP. 25.0 DEG C(77.0 DEG F) ABS. HUMIDITY 12.2 GM/KG	NOX HUMIDITY CORRECTION FACTOR 1.05	
DAG RESULTS			
TEST CYCLE	HFET		
BLOWER DIF P MM. H2O(IN. H2O) BLOWER INLET P MM. H2O(IN. H2O) BLOWER INLET TEMP. DEG. C(DEG. F) BLOWER REVOLUTIONS TOT FLOW STD. CU. METRES(SCF) HC SAMPLE METER/RANGE/PPM HC DCKGRD METER/RANGE/PPM CO SAMPLE METER/RANGE/PPM CO2 DCKGRD METER/RANGE/PPM CO2 SAMPLE METER/RANGE/PCT NOX SAMPLE METER/RANGE/PPM NOX DCKGRD METER/RANGE/PPM	787.4 (31.0) 782.3 (30.8) 43.3 (110.0) 61277. 114.2 (.4034.) 38.97 2/ 32. 9.6/ 2/ 10. 74.0/ 12/ 171. .2/ 12/ .0. 86.0/ 3/ 1.59 2.6/ 3/ .04 54.6/ 2/ 57. .9/ 2/ 1.		
DILUTION FACTOR HC CONCENTRATION PPM CO CONCENTRATION PPM CO2 CONCENTRATION PCT NOX CONCENTRATION PPM HC MASS GRAMS CO MASS GRAMS CO2 MASS GRAMS NOX MASS GRAMS	8.30 30. 162. 1.56 55.8 2.01 21.55 3261.7 12.92		
RUN TIME SECONDS	765.		
DFC, WET (DRY) SCF, WET (DRY) VOL (SCM) SAM DLR (SCM) KM (MEASURED)	.800 (.863) 1.000 (.926) 114.2 0.00 16.46		
TEST NUMBER 007FET BAROMETER MM HG 739.9 HUMIDITY G/KG 12.2 TEMPERATURE DEG C 25.0 CARBON DIOXIDE G/KM 198.1 FUEL CONSUMPTION L/100KM 8.56	HYDROCARBONS G/KM .12 CARBON MONOXIDE G/KM 1.31 OXIDES OF NITROGEN G/KM .78		

TABLE D-28. TEST NO. 091 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS PROJECT 11-5830-010					
TEST NO. 091FTP RUN 1		VEHICLE NO.09		TEST WEIGHT 907. KG( 2000. LBS)	
VEHICLE MODEL MM 78 FORD FIESTA		DATE 3/31/81		ACTUAL ROAD LOAD 4.0 KW( 5.4 HP)	
ENGINE 1.6 L( 98. CID) L-4		BAG CART NO. 1 / CVS NO. 2		GASOLINE EH-470-F	
TRANSMISSION A3		DYNO NO. 3		ODOMETER ***** KM(67981. MILES)	
BAROMETER 738.12 MM HG(29.06 IN HG)		DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)		NOX HUMIDITY CORRECTION FACTOR 1.07	
RELATIVE HUMIDITY 66. PCT		ABS. HUMIDITY 12.7 GM/KG			
BAG RESULTS					
BAG NUMBER	DESCRIPTION	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIFF. P MM. H2O(IN. H2O)	774.7 (30.5)	800.1 (31.5)	800.1 (31.5)	787.4 (31.0)	
BLOWER INLET P MM. H2O(IN. H2O)	767.1 (30.2)	797.4 (31.0)	797.4 (31.0)	764.5 (30.1)	
BLOWER INLET TEMP. DEG. C(DEG. F)	43.9 (111.0)	38.9 (102.0)	41.1 (106.0)	37.0 (100.0)	
BLOWER REVOLUTIONS	.40551.	.68563.	.40507.	.69481	
TOT FLOW STD. CU. METRES(SCF)	75.5 ( 2666.)	128.3 ( 4531.)	75.5 ( 2667.)	130.8 ( 4619.)	
HC SAMPLE METER/RANGE/PPM	9.9/ 3/ .99	32.7/ 2/ .33	69.6/ 2/ .70	31.0/ 2/ .31	
HC BCKGRD METER/RANGE/PPM	1.3/ 3/ 13.	12.2/ 2/ 12.	13.3/ 2/ 13.	14.2/ 2/ 14.	
CO SAMPLE METER/RANGE/PPM	82.9/ 11/ 384.	17.2/ 13/ 16.	64.2/ 13/ 62.	17.7/ 13/ 16.	
CO2 SAMPLE METER/RANGE/PCT	.4/ 11/ .1.	1.0/ 13/ .1.	1.3/ 13/ .1.	1.3/ 13/ .1.	
CO2 BCKGRD METER/RANGE/PCT	3.0/ 3/ .05	3.1/ 3/ .05	3.0/ 3/ .05	3.3/ 3/ .05	
NOX SAMPLE METER/RANGE/PPM	88.4/ 2/ .88	37.3/ 2/ .37	86.9/ 2/ .87	36.8/ 2/ .37	
NOX BCKGRD METER/RANGE/PPM	.8/ 2/ .1.	.8/ 2/ .1.	.7/ 2/ .1.	1.1/ 2/ .1.	
DILUTION FACTOR	15.58	24.34	18.94	24.50	
HC CONCENTRATION PPM	.87.	.21.	.57.	.17.	
CO CONCENTRATION PPM	.369.	.14.	.59.	.14.	
CO2 CONCENTRATION PCT	.77	.50	.65	.49	
NOX CONCENTRATION PPM	.87.7	.36.5	.86.2	.35.7	
HC MASS GRAMS	3.78	1.55	2.49	1.31	
CO MASS GRAMS	32.43	2.13	5.16	2.20	
CO2 MASS GRAMS	1064.8	1175.3	900.4	1182.4	
NOX MASS GRAMS	13.55	9.80	13.14	9.37	
HC GRAMS/KM	.65	.25	.43	.21	
CO GRAMS/KM	5.57	.34	.90	.35	
CO2 GRAMS/KM	182.8	18.5	156.7	190.3	
NOX GRAMS/KM	2.33	1.52	2.32	1.54	
FUEL CONSUMPTION BY CB L/100KM	8.26	8.02	6.61	8.18	
RUN TIME	SECONDS	505.	868.	505.	867.
MEASURED DISTANCE	KM	5.83	6.30	5.74	6.21
SCF, DRY		.971	.974	.972	.974
DFC, WET (DRY)		.950 ( .930)		.955 ( .934)	
SCF, WET (DRY)		1.000 ( .973)		1.000 ( .973)	
VOL (SCM)		203.8		206.3	
SAM BLR (SCM)		0.00		0.00	
KM (MEASURED)		12.13		11.94	
FUEL CONSUMPTION L/100KM		0.14		0.14	
COMPOSITE RESULTS					
TEST NUMBER	091FTP				
TEST NUMBER	091FTP				
BAROMETER	MM HG	738.1		CARBON DIOXIDE G/KM	177.7 ( 178.7)
HUMIDITY	G/KG	12.7		FUEL CONSUMPTION L/100KM	7.74 ( 7.78)
TEMPERATURE	DEG C	23.9		HYDROCARBONS (THC) G/KM	.38 ( .37)
				CARBON MONOXIDE G/KM	1.57 ( 1.58)
				OXIDES OF NITROGEN G/KM	1.91 ( 1.91)

HFET VEHICLE EMISSIONS RESULTS PROJECT 11-5830-010										
TEST NO. 091FET RUN 1		VEHICLE NO.09		TEST WEIGHT 907. KG( 2000. LBS)						
VEHICLE MODEL MM 78 FORD FIESTA		DATE 3/31/81		ACTUAL ROAD LOAD 4.0 KW( 5.4 HP)						
ENGINE 1.6 L( 98. CID) L-4		BAG CART NO. 1 / CVS NO. 2		GASOLINE EH-470-F						
TRANSMISSION A3		DYNO NO. 3		ODOMETER ***** KM(67996. MILES)						
BAROMETER 739.14 MM HG(29.10 IN HG)		DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)		NOX HUMIDITY CORRECTION FACTOR 1.05						
RELATIVE HUMIDITY 60. PCT		ABS. HUMIDITY 12.2 GM/KG								
BAG RESULTS										
TEST CYCLE	HFET									
BLOWER DIFF P MM. H2O(IN. H2O)	800.1 (31.5)									
BLOWER INLET P MM. H2O(IN. H2O)	787.4 (31.0)									
BLOWER INLET TEMP. DEG. C(DEG. F)	41.7 (107.0)									
BLOWER REVOLUTIONS	.61298.									
TOT FLOW STD. CU. METRES(SCF)	114.4 ( 4038.)									
HC SAMPLE METER/RANGE/PPM	46.9/ 2/ .47.									
HC BCKGRD METER/RANGE/PPM	13.7/ 2/ 14.									
CO SAMPLE METER/RANGE/PPM	14.2/ 13/ 13.									
CO2 SAMPLE METER/RANGE/PPM	1.0/ 13/ .1.									
CO2 BCKGRD METER/RANGE/PCT	55.8/ 3/ .98									
NOX SAMPLE METER/RANGE/PPM	3.0/ 3/ .05									
NOX BCKGRD METER/RANGE/PPM	49.2/ 3/ 148.									
DILUTION FACTOR	.4/ 3/ 1.									
HC CONCENTRATION PPM	.13.59									
CO CONCENTRATION PPM	.34.									
CO2 CONCENTRATION PCT	.12.									
NOX CONCENTRATION PPM	.94									
HC MASS GRAMS	146.5									
CO MASS GRAMS	2.26									
CO2 MASS GRAMS	1.54									
NOX MASS GRAMS	1962.9									
RUN TIME	SECONDS	33.70								
DFC, WET (DRY)	765.									
SCF, WET (DRY)	.926 ( .909)									
VOL (SCM)	1.000 ( .972)									
SAM BLR (SCM)	114.4									
KM (MEASURED)	0.00									
FUEL CONSUMPTION	16.38									
TEST NUMBER	091FET									
BAROMETER	MM HG	739.1								
HUMIDITY	G/KG	12.2								
TEMPERATURE	DEG C	25.0								
CARBON DIOXIDE	G/KM	119.9								
FUEL CONSUMPTION	L/100KM	5.14								
HYDROCARBONS	G/KM	.14								
CARBON MONOXIDE	G/KM	.09								
OXIDES OF NITROGEN	G/KM	2.08								

TABLE D-29. TEST NO. 092 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS PROJECT 11-5830-010		TEST WEIGHT 907. KG( 2000. LBS) ACTUAL ROAD LOAD 4.0 KW( 5.4 HP) GASOLINE EM-470 ODOMETER ***** KM(68007. MILES)			
TEST NO. 092FTP RUN 1 VEHICLE MODEL 78 FORD FIESTA ENGINE 1.6 L( 98. CID) L-4 TRANSMISSION M4 BAROMETER 745.49 MM HG(29.35 IN HG) RELATIVE HUMIDITY 49. PCT BAG RESULTS BAG NUMBER DESCRIPTION		DRY BULB TEMP. 25.0 DEG C(77.0 DEG F) ABS. HUMIDITY 9.9 GM/KG		NOX HUMIDITY CORRECTION FACTOR .97	
		COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER DIF P MM. H20(IN. H20)	792.5 (31.2)	792.5 (31.2)	797.4 (31.0)	792.5 (31.2)	792.5 (31.2)
BLOWER INLET P MM. H20(IN. H20)	787.4 (31.0)	787.4 (31.0)	782.3 (30.8)	787.4 (31.0)	787.4 (31.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)	42.8 (109.0)	43.1 (109.5)	42.8 (109.0)	42.8 (109.0)
BLOWER REVOLUTIONS	40563.	69393.	40502.	69502.	
TOT FLOW STD. CU. METRES(SCF)	76.2 ( 2691.)	130.5 ( 4607.)	76.2 ( 2690.)	130.7 ( 4614.)	
HC SAMPLE METER/RANGE/PPM	11.0/ 3/ 110.	31.9/ 2/ 32.	81.8/ 2/ 82.	28.9/ 2/ 29.	
HC BCKGRD METER/RANGE/PPM	1.5/ 3/ 15.	14.4/ 2/ 14.	13.3/ 2/ 13.	12.6/ 2/ 13.	
CO SAMPLE METER/RANGE/PPM	82.5/11/ 381.	21.6/13/ 20.	63.8/13/ 61.	22.5/13/ 21.	
CO BCKGRD METER/RANGE/PPM	1.4/11/ 4.	3.2/13/ 3.	1.2/13/ 1.	1.0/13/ 1.	
CO2 SAMPLE METER/RANGE/PCT	44.6/ 3/ .76	32.6/ 3/ .54	39.7/ 3/ .67	31.9/ 3/ .53	
CO2 BCKGRD METER/RANGE/PCT	3.4/ 3/ .05	3.0/ 3/ .05	3.1/ 3/ .05	2.9/ 3/ .04	
NOX SAMPLE METER/RANGE/PPM	68.2/ 2/ 88.	38.7/ 2/ 39.	89.4/ 2/ 89.	37.7/ 2/ 38.	
NOX BCKGRD METER/RANGE/PPM	1.2/ 2/ 1.	1.1/ 2/ 1.	1.0/ 2/ 1.	1.0/ 2/ 1.	
DILUTION FACTOR	16.50	24.48	19.52	25.07	
HC CONCENTRATION PPM	.96.	10.	.67.	.17.	
CO CONCENTRATION PPM	366.	16.	59.	.19.	
CO2 CONCENTRATION PCT	.72	.50	.63	.49	
NOX CONCENTRATION PPM	87.1	37.6	88.5	36.7	
HC MASS GRAMS	4.21	1.36	3.04	1.27	
CO MASS GRAMS	32.43	2.50	5.21	2.91	
CO2 MASS GRAMS	99.76	119.2	87.4	115.3	
NOX MASS GRAMS	12.36	9.15	12.55	8.95	
HC GRAMS/KM	.73	.22	.53	.21	
CO GRAMS/KM	5.63	.40	.90	.47	
CO2 GRAMS/KM	173.3	191.9	151.8	188.8	
NOX GRAMS/KM	2.15	1.48	2.18	1.45	
FUEL CONSUMPTION BY CB L/100KM	7.87	8.25	6.61	8.12	
RUN TIME SECONDS	505.	865.	505.	868.	
MEASURED DISTANCE KM	5.76	6.20	5.76	6.17	
SCF, DRY	.977	.979	.978	.979	
DFC, WET (DRY)	1.952 ( .937)		1.956 ( .941)		
SCF, WET (DRY)	1.000 ( .978)		1.000 ( .979)		
VOL (SCM)	206.7		206.9		
SAM BLR (SCM)	0.00		0.00		
KM (MEASURED)	11.96		11.93		
FUEL CONSUMPTION L/100KM	8.07		7.39		
COMPOSITE RESULTS		3-BAG (4-BAG)			
TEST NUMBER	092FTP	CARBON DIOXIDE G/KM	177.0	( 176.1)	
BAROMETER MM HG	745.5	FUEL CONSUMPTION L/100KM	7.72	( 7.68)	
HUMIDITY G/KG	9.9	HYDROCARBONS (THC) G/KM	.41	( .41)	
TEMPERATURE DEG C	25.0	CARBON MONOXIDE G/KM	1.62	( 1.64)	
OXIDES OF NITROGEN G/KM		OXIDES OF NITROGEN G/KM	1.81	( 1.80)	
HFET VEHICLE EMISSIONS RESULTS PROJECT 11-5830-010					
TEST NO. 092FET RUN 1 VEHICLE MODEL 78 FORD FIESTA ENGINE 1.6 L( 98. CID) L-4 TRANSMISSION M4 BAROMETER 745.49 MM HG(29.35 IN HG) RELATIVE HUMIDITY 52. PCT BAG RESULTS TEST CYCLE		VEHICLE NO.09 DATE 4/ 1/81 BAG CART NO. 1 BYNO NO. 3 CVS NO. 2	TEST WEIGHT 907. KG( 2000. LBS) ACTUAL ROAD LOAD 4.0 KW( 5.4 HP) GASOLINE EM-470 ODOMETER ***** KM(68023. MILES)		
		DRY BULB TEMP. 24.4 DEG C(76.0 DEG F) ABS. HUMIDITY 10.2 GM/KG		NOX HUMIDITY CORRECTION FACTOR .98	
		HFET			
BLOWER DIF P MM. H20(IN. H20)	792.5 (31.2)				
BLOWER INLET P MM. H20(IN. H20)	787.4 (31.0)				
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)				
BLOWER REVOLUTIONS	61227.				
TOT FLOW STD. CU. METRES(SCF)	115.0 ( 4061.)				
HC SAMPLE METER/RANGE/PPM	44.6/ 2/ 45.				
HC BCKGRD METER/RANGE/PPM	10.6/ 2/ 11.				
CO SAMPLE METER/RANGE/PPM	17.1/13/ 16.				
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.				
CO2 SAMPLE METER/RANGE/PCT	55.5/ 3/ .97				
CO2 BCKGRD METER/RANGE/PCT	3.1/ 3/ .05				
NOX SAMPLE METER/RANGE/PPM	53.0/ 3/ 159.				
NOX BCKGRD METER/RANGE/PPM	.3/ 3/ 1.				
DILUTION FACTOR	13.47				
HC CONCENTRATION PPM	35.				
CO CONCENTRATION PPM	14.				
CO2 CONCENTRATION PCT	.93				
NOX CONCENTRATION PPM	158.2				
HC MASS GRAMS	2.31				
CO MASS GRAMS	1.91				
CO2 MASS GRAMS	1958.4				
NOX MASS GRAMS	34.15				
RUN TIME SECONDS	765.				
DFC, WET (DRY)	1.977 ( .971)				
SCF, WET (DRY)	1.000 ( .974)				
VOL (SCM)	115.				
SAM BLR (SCM)	0.00				
KM (MEASURED)	16.32				
FUEL CONSUMPTION L/100KM	5.15				
HYDROCARBONS, G/KM	.14				
CARBON MONOXIDE, G/KM	.12				
OXIDES OF NITROGEN, G/KM	2.09				

TABLE D-30. TEST NO. 096 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS PROJECT 11-5830-010					
TEST NO. 096FTP RUN 1	VEHICLE MODEL 78 FORD FIESTA	VEHICLE NO.09	TEST WEIGHT 907. KG( 2000. LBS)		
ENGINE 1.6 L( 98. CID) L-4	TRANSMISSION	DATE 4/ 3/81	ACTUAL ROAD LOAD 4.0 KW( 5.4 HP)		
BAG CART NO. 1 / CVS NO. 2	DYNO NO. 3	GASOLINE EN-470	ODOMETER ***** KM(60035, MILES)		
BAROMETER 734.06 MM HG(28.90 IN HG)	RELATIVE HUMIDITY 70. PCT	DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR 1.10		
BAG RESULTS		ABS. HUMIDITY 13.6 GH/KG			
BAG NUMBER	DESCRIPTION	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	774.7 (30.5)	767.4 (31.0)	782.3 (30.8)	787.4 (31.0)	
BLOWER INLET P MM. H2O(IN. H2O)	767.1 (30.2)	702.3 (30.8)	774.7 (30.5)	782.3 (30.8)	
BLOWER INLET TEMP. DEG. C(DEG. F)	42.8 (109.0)	42.8 (109.0)	42.8 (109.0)	42.8 (109.0)	
BLOWER REVOLUTIONS	40532.	69646.	40494.	69555.	
TOT FLOW STD. CU. METRES(SCFM)	75.1 (2653.)	128.8 (4549.)	75.0 (2648.)	128.7 (4543.)	
HC SAMPLE METER/RANGE/PPM	9.6 / 96.	29.1 / 29.	59.5 / 260.	27.3 / 27.	
HC BCKGRD METER/RANGE/PPM	1.2 / 3.	11.7 / 12.	11.2 / 11.	11.1 / 11.	
CO SAMPLE METER/RANGE/PPM	79.0/11. / 355.	11.6/13. / 10.	50.9/13. / 48.	10.2/13. / 9.	
CO BCKGRD METER/RANGE/PPM	.3/11. / .77	.32/3. / .54	.39.9/3. / .68	.31.0/3. / .51	
CO2 SAMPLE METER/RANGE/PCT	2.1 / .04	2.8 / .04	3.2 / .05	2.4 / .04	
CO2 BCKGRD METER/RANGE/PCT	78.2/2. / 78.	34.6 / 25.	82.1 / 22.	35.4 / 25.	
NOX SAMPLE METER/RANGE/PPM	1.2 / 2.	1.	1.2 / 2.	1.	
NOX BCKGRD METER/RANGE/PPM	1.2 / 2.	1.	1.2 / 2.	1.	
DILUTION FACTOR	18.47	24.62	19.52	25.91	
HC CONCENTRATION PPM	85.	18.	49.	17.	
CO CONCENTRATION PPM	34.	10.	46.	9.	
CO2 CONCENTRATION PCT	.34.	.50	.63	.48	
NOX CONCENTRATION PPM	77.1	33.4	81.0	34.6	
HC MASS GRAMS	3.67	1.33	2.11	1.23	
CO MASS GRAMS	29.03	1.13	4.14	1.32	
CO2 MASS GRAMS	1011.5	1177.9	864.0	1126.6	
NOX MASS GRAMS	12.22	9.10	12.81	9.40	
HC GRAMS/KM	.63	.21	.36	.20	
CO GRAMS/KM	5.15	.23	.70	.21	
CO2 GRAMS/KM	174.6	189.3	149.8	181.7	
NOX GRAMS/KM	2.11	1.46	2.21	1.52	
FUEL CONSUMPTION BY CB L/100KM	7.88	8.13	6.45	7.80	
RUN TIME SECONDS	505.	868.	505.	868.	
MEASURED DISTANCE KM	5.79	6.22	5.81	6.20	
SCF DRY	.970	.972	.971	.973	
DFC WET (DRY)	.952 (.930)		.957 (.935)		
SCF WET (DRY)	1.000 (.972)		1.000 (.972)		
VOL (SCM)	204.0		203.6		
SAM DLR (SCM)	0.00		0.00		
KM (MEASURED)	12.01		12.01		
FUEL CONSUMPTION L/100KM	8.01		7.14		
COMPOSITE RESULTS					
TEST NUMBER 096FTP					
BAROMETER MM HG 734.1					
HUMIDITY G/KG 13.6					
TEMPERATURE DEG C 23.9					
CARBON DIOXIDE G/KM 175.1 ( 172.9)					
FUEL CONSUMPTION L/100KM 7.61 ( 7.52)					
HYDROCARBONS (THC) G/KM .34 ( .34)					
CARBON MONOXIDE G/KM 1.38 ( 1.37)					
OXIDES OF NITROGEN G/KM 1.80 ( 1.02)					

HFET VEHICLE EMISSIONS RESULTS PROJECT 11-5830-010					
TEST NO. 096FET RUN 1	VEHICLE MODEL 78 FORD FIESTA	VEHICLE NO.09	TEST WEIGHT 907. KG( 2000. LBS)		
ENGINE 1.6 L( 98. CID) L-4	TRANSMISSION	DATE 4/ 3/81	ACTUAL ROAD LOAD 4.0 KW( 5.4 HP)		
BAG CART NO. 1 / CVS NO. 2	DYNO NO. 3	GASOLINE EN-470	ODOMETER ***** KM(60071. MILES)		
BAROMETER 733.55 MM HG(28.88 IN HG)	RELATIVE HUMIDITY 57. PCT	DRY BULB TEMP. 26.1 DEG C(79.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR 1.07		
BAG RESULTS	TEST CYCLE	HFET			
BLOWER DIF P MM. H2O(IN. H2O)	792.5 (31.2)				
BLOWER INLET P MM. H2O(IN. H2O)	787.4 (31.0)				
BLOWER INLET TEMP. DEG. C(DEG. F)	42.8 (109.0)				
BLOWER REVOLUTIONS	41300.				
TOT FLOW STD. CU. METRES(SCFM)	113.2 (3998.)				
HC SAMPLE METER/RANGE/PPM	35.6 / 36.				
HC BCKGRD METER/RANGE/PPM	11.7 / 12.				
CO SAMPLE METER/RANGE/PPM	11.0/13. / 10.				
CO BCKGRD METER/RANGE/PPM	.1/13. / 0.				
CO2 SAMPLE METER/RANGE/PCT	55.0/3. / .96				
CO2 BCKGRD METER/RANGE/PCT	2.5/3. / .04				
NOX SAMPLE METER/RANGE/PPM	42.3 / 32.				
NOX BCKGRD METER/RANGE/PPM	.3 / 1.				
DILUTION FACTOR	13.83				
HC CONCENTRATION PPM	25.				
CO CONCENTRATION PPM	9.				
CO2 CONCENTRATION PCT	.93				
NOX CONCENTRATION PPM	126.1				
HC MASS GRAMS	1.62				
CO MASS GRAMS	1.25				
CO2 MASS GRAMS	1925.3				
NOX MASS GRAMS	29.11				
RUN TIME SECONDS	765.				
DFC WET (DRY)	.920 (.911)				
SCF WET (DRY)	1.000 (.973)				
VOL (SCM)	113.2				
SAM DLR (SCM)	0.00				
KM (MEASURED)	16.43				
TEST NUMBER 096FET					
BAROMETER MM HG 733.6					
HUMIDITY G/KG 12.6					
TEMPERATURE DEG C 26.1					
CARBON DIOXIDE G/KM 117.2					
FUEL CONSUMPTION L/100KM 5.02					
HYDROCARBONS G/KM .10					
CARBON MONOXIDE G/KM .98					
OXIDES OF NITROGEN G/KM 1.77					

**TABLE D-31. TEST NO. 101 EMISSIONS RESULTS**  
 FTP VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5830-010

TEST NO.	101FTP RUN 1	VEHICLE NO. 10	TEST WEIGHT 2268. KG( 5000. LBS)
VEHICLE MODEL	78 CHRYSLER N.Y.	DATE 4/17/81	ACTUAL ROAD LOAD 8.4 KW( 11.3 HP)
ENGINE 6.6 L(400. CID) V-8		BAG CART NO. 1	GASOLINE EH-470-F
TRANSMISSION A3		DYNO NO. 3	ODOMETER 10623. KM( 6601. MILES)
BAROMETER 744.73 MM HG(29.32 IN HG)		DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR 1.07
RELATIVE HUMIDITY 40. PCT		ABS. HUMIDITY 12.6 GM/KG	
BAG RESULTS			
BAG NUMBER		COLD TRANSIENT	HOT TRANSIENT
DESCRIPTION		1	2
BLOWER DIF P MM. H2O(IN. H2O)	787.4 (31.0)	792.5 (31.2)	774.7 (30.5)
BLOWER INLET P MM. H2O(IN. H2O)	782.3 (30.8)	787.4 (31.0)	767.1 (30.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.2 (108.0)	42.8 (109.0)	43.3 (110.0)
BLOWER REVOLUTIONS	40549.	69568.	40505.
TOT FLOW STD. CU. METRES(SCF)	76.3 (2694.)	130.7 (4614.)	76.2 (2691.)
HC SAMPLE METER/RANGE/PPM	59.5/ 3/ 595.	24.9/ 3/ 249.	24.9/ 3/ 249.
HC BCKGRD METER/RANGE/PPM	1.9/ 3/ 19.	1.8/ 3/ 18.	1.7/ 3/ 17.
CO SAMPLE METER/RANGE/PPM	64.5/ 2/ 3371.	70.2/ 3/ 1828.	56.0/ 3/ 1393.
CO BCKGRD METER/RANGE/PPM	.1/ 2/ 4.	.1/ 3/ 2.	.1/ 3/ 2.
CO2 SAMPLE METER/RANGE/PCT	95.6/ 3/ 1.80	59.1/ 3/ 1.05	03.3/ 3/ 1.54
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.6/ 3/ .04	3.4/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	32.9/ 3/ 99.	43.0/ 2/ 43.	37.0/ 3/ 111.
NOX BCKGRD METER/RANGE/PPM	.1/ 3/ 0.	.9/ 2/ 1.	.4/ 2/ 0.
DILUTION FACTOR	6.16	10.76	7.90
HC CONCENTRATION PPM	579.	233.	234.
CO CONCENTRATION PPM	3186.	1754.	1323.
CO2 CONCENTRATION PCT	97.6	1.01	1.49
NOX CONCENTRATION PPM	98.2	42.5	110.7
HC MASS GRAMS	25.47	17.53	10.29
CO MASS GRAMS	285.95	266.79	117.38
CO2 MASS GRAMS	2458.3	2413.8	2082.9
NOX MASS GRAMS	15.32	11.24	17.22
HC GRAMS/KM	4.38	2.79	1.76
CO GRAMS/KM	48.70	42.42	20.12
CO2 GRAMS/KM	423.1	383.8	357.0
NOX GRAMS/KM	2.64	1.79	2.95
FUEL CONSUMPTION BY CB L/100KM	21.92	19.60	16.83
RUN TIME	SECONDS	505.	848.
MEASURED DISTANCE	KM	5.81	6.29
SCF, DRY		.964	.971
DFC, WET (DRY)		1.881 ( .864)	.896 ( .879)
SCF, WET (DRY)		1.000 ( .960)	1.000 ( .969)
VOL (SCM)		207.0	206.7
SAN BLR (SCM)		0.00	0.00
KM (MEASURED)		12.10	12.16
FUEL CONSUMPTION L/100KM		20.72	17.95
COMPOSITE RESULTS			
TEST NUMBER	101FTP	3-BAG	(4-BAG)
BAROMETER	MM HG 744.7	CARBON DIOXIDE G/KM	384.32 ( 382.73)
HUMIDITY	G/KG 12.6	FUEL CONSUMPTION L/100KM	12.10 ( 12.14)
TEMPERATURE	DEG C 25.6	HYDROCARBONS (THC) G/KM	2.84 ( 2.69)
		CARBON MONOXIDE G/KM	37.60 ( 36.37)
		OXIDES OF NITROGEN G/KM	2.28 ( 2.30)

HFET VEHICLE EMISSIONS RESULTS  
 PROJECT 11-5830-010

TEST NO.	101FET RUN 1	VEHICLE NO. 10	TEST WEIGHT 2268. KG( 5000. LBS)
VEHICLE MODEL	78 CHRYSLER N.Y.	DATE 4/17/81	ACTUAL ROAD LOAD 8.4 KW( 11.3 HP)
ENGINE 6.6 L(400. CID) V-8		BAG CART NO. 1	GASOLINE EH-470-F
TRANSMISSION A3		DYNO NO. 3	ODOMETER ***** KM(66028. MILES)
BAROMETER 744.73 MM HG(29.32 IN HG)		DRY BULB TEMP. 31.1 DEG C(88.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR 1.04
RELATIVE HUMIDITY 41. PCT		ABS. HUMIDITY 11.0 GM/KG	
0 BAG RESULTS			
TEST CYCLE		HFET	
BLOWER DIF P MM. H2O(IN. H2O)	812.8 (32.0)		
BLOWER INLET P MM. H2O(IN. H2O)	800.1 (31.5)		
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)		
BLOWER REVOLUTIONS	61284.		
TOT FLOW STD. CU. METRES(SCF)	114.7 (4052.)		
HC SAMPLE METER/RANGE/PPM	10.6/ 3/ 106.		
HC BCKGRD METER/RANGE/PPM	1.2/ 3/ 12.		
CO SAMPLE METER/RANGE/PPM	72.3/ 11/ 309.		
CO BCKGRD METER/RANGE/PPM	.3/ 11/ 1.		
CO2 SAMPLE METER/RANGE/PCT	50.7/ 2/ 2.26		
CO2 BCKGRD METER/RANGE/PCT	1.4/ 2/ .05		
NOX SAMPLE METER/RANGE/PPM	36.6/ 3/ 110.		
NOX BCKGRD METER/RANGE/PPM	.1/ 3/ 0.		
DILUTION FACTOR	5.78		
HC CONCENTRATION PPM	96.		
CO CONCENTRATION PPM	291.		
CO2 CONCENTRATION PCT	2.24		
NOX CONCENTRATION PPM	109.6		
HC MASS GRAMS	6.36		
CO MASS GRAMS	38.89		
CO2 MASS GRAMS	4698.3		
NOX MASS GRAMS	24.89		
RUN TIME	SECONDS	765.	
DFC, WET (DRY)		.827 ( .016)	
SCF, WET (DRY)		1.000 ( .966)	
VOL (SCM)		114.7	
SAN BLR (SCM)		0.00	
KM (MEASURED)		16.65	
TEST NUMBER	101FET		
BAROMETER,	MM HG		
HUMIDITY,	G/KG	744.7	
TEMPERATURE,	DEG C	11.0	
CARBON DIOXIDE,	G/KM	31.1	
FUEL CONSUMPTION,	L/100KM	282.1	
		12.25	
HYDROCARBONS,	G/KM	.38	
CARBON MONOXIDE,	G/KM	2.33	
OXIDES OF NITROGEN,	G/KM	1.49	

TABLE D-32. TEST NO. 102 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-010

TEST NO. 102FTP RUN 1	VEHICLE NO.10	TEST WEIGHT 2268. KG( 5000. LBS)
VEHICLE MODEL 78 CHRYSLER N.Y.	DATE 4/20/81	ACTUAL ROAD LOAD 8.4 KW( 11.3 HP)
ENGINE 6.6 L(400. CID) V-8	BAG CART NO. 1 / CVS NO. 2	GASOLINE EH-470
TRANSMISSION A3	DYNO NO. 3	ODOMETER ***** KM(66045. MILES)
BAROMETER 740.16 MM HG(29.14 IN HG)	DRY BULB TEMP. 20.3 DEG C(63.0 DEG F)	
RELATIVE HUMIDITY 52. PCT	ABS. HUMIDITY 13.1 GM/KG	NOX HUMIDITY CORRECTION FACTOR 1.08
0 BAG RESULTS		
BAG NUMBER	1 COLD TRANSIENT	2 STABILIZED
DESCRIPTION	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIF P MM, H2O(IN, H2O)	724.7 (30.5)	777.2 (30.6)
BLOWER INLET P MM, H2O(IN, H2O)	767.1 (30.2)	772.2 (30.4)
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)	43.3 (110.0)
BLOWER REVOLUTIONS	40838	69537
TOT FLOW STD. CU. METRES(SCFM)	76.3 (.2695.)	129.9 (.4586.)
HC SAMPLE METER/RANGE/PPM	19.97 (4/1990)	81.5 (3/ 815)
HC BCKGRD METER/RANGE/PPM	.1/ 4/ 10.	1.9/ 3/ 19.
CO SAMPLE METER/RANGE/PPM	64.9/ 2/ 3400.	30.3/ 3/ 910.
CO BCKGRD METER/RANGE/PPM	.1/ 2/ 4.	.4/ 3/ .9.
CO2 SAMPLE METER/RANGE/PCT	94.2/ 3/ 1.77	63.2/ 3/ 1.13
CO2 BCKGRD METER/RANGE/PCT	3.2/ 3/ .05	2.6/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	33.4/ 3/ 100.	51.3/ 2/ 51.
NOX BCKGRD METER/RANGE/PPM	.2/ 3/ 1.	.4/ 2/ 0.
DILUTION FACTOR	5.86	10.34
HC CONCENTRATION PPM		7.22
CO CONCENTRATION PPM	1982.	798.
CO2 CONCENTRATION PCT	3224.	867.
NOX CONCENTRATION PPM	1.73	1.09
HC MASS GRAMS	99.7	50.9
CO MASS GRAMS	87.22	59.75
CO2 MASS GRAMS	286.45	131.11
NOX MASS GRAMS	2411.6	2593.9
	15.78	13.71
HC GRAMS/KM	15.01	9.57
CO GRAMS/KM	49.29	20.99
CO2 GRAMS/KM	415.0	415.3
NOX GRAMS/KM	2.71	2.20
FUEL CONSUMPTION BY CB L/100KM	23.05	20.43
RUN TIME SECONDS	509.	868.
MEASURED DISTANCE KM	5.81	6.25
SCF, DRY	.967	.973
DFC, WET (DRY)	.874 (.061)	.878 (.063)
SCF, WET (DRY)	1.000 (.970)	1.000 (.971)
VOL (SCM)	206.2	205.0
SAM BLR (SCM)	0.00	0.00
KM (MEASURED)	12.04	12.04
FUEL CONSUMPTION L/100KM	21.69	21.17
COMPOSITE RESULTS		
TEST NUMBER 102FTP		3-BAG (4-BAG)
BAROMETER MM HG 740.2	CARBON DIOXIDE G/KM 401.6 ( 405.4)	
HUMIDITY G/KG 13.1	FUEL CONSUMPTION L/100KM 20.43 ( 21.40)	
TEMPERATURE DEG C 28.3	HYDROCARBONS (THC) G/KM 11.00 ( 10.39)	
	CARBON MONOXIDE G/KM 26.84 ( 40.06)	
	OXIDES OF NITROGEN G/KM 2.69 ( 2.82)	

HFET VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-010

TEST NO. 102FET RUN 1	VEHICLE NO.10	TEST WEIGHT 2268. KG( 5000. LBS)
VEHICLE MODEL 78 CHRYSLER N.Y.	DATE 4/20/81	ACTUAL ROAD LOAD 8.4 KW( 11.3 HP)
ENGINE 6.6 L(400. CID) V-8	BAG CART NO. 1	GASOLINE EH-470
TRANSMISSION A3	DYNO NO. 3	ODOMETER ***** KM(66061. MILES)
BAROMETER 740.16 MM HG(29.14 IN HG)	DRY BULB TEMP. 30.0 DEG C(63.0 DEG F)	
RELATIVE HUMIDITY 39. PCT	ABS. HUMIDITY 10.8 GM/KG	NOX HUMIDITY CORRECTION FACTOR 1.00
0 BAG RESULTS		
TEST CYCLE		
BLOWER DIF P MM, H2O(IN, H2O)	812.8 (32.0)	
BLOWER INLET P MM, H2O(IN, H2O)	807.7 (31.8)	
BLOWER INLET TEMP. DEG. C(DEG. F)	43.9 (111.0)	
BLOWER REVOLUTIONS	61236.	
TOT FLOW STD. CU. METRES(SCFM)	113.4 (.4012.)	
HC SAMPLE METER/RANGE/PPM	98.6 (3/ 904)	
HC BCKGRD METER/RANGE/PPM	.1/ 0/ 3/ 20.	
CO SAMPLE METER/RANGE/PPM	78.7/ 11/ 353.	
CO BCKGRD METER/RANGE/PPM	.1/ 7/ 11/ .5.	
CO2 SAMPLE METER/RANGE/PCT	52.5/ 2/ 2.9	
CO2 BCKGRD METER/RANGE/PCT	1.6/ 2/ .06	
NOX SAMPLE METER/RANGE/PPM	48.4/ 3/ 139.	
NOX BCKGRD METER/RANGE/PPM	.3/ 3/ 1.	
DILUTION FACTOR	5.34	
HC CONCENTRATION PPM	968.	
CO CONCENTRATION PPM	328.	
CO2 CONCENTRATION PCT	2.33	
NOX CONCENTRATION PPM	138.5	
HC MASS GRAMS	63.43	
CO MASS GRAMS	43.45	
CO2 MASS GRAMS	4850.4	
NOX MASS GRAMS	30.16	
RUN TIME SECONDS	765.	
DFC, WET (DRY)	.813 (.082)	
SCF, WET (DRY)	1.000 (.965)	
VOL (SCM)	113.7	
SAM BLR (SCM)	0.00	
KM (MEASURED)	16.47	
TEST NUMBER 102FET		
BAROMETER, MM HG 740.2		
HUMIDITY, G/KG 10.8		
TEMPERATURE, DEG C 30.0		
CARBON DIOXIDE, G/KM 294.6		
FUEL CONSUMPTION, L/100KM 13.27		
HYDROCARBONS, G/KM 3.85		
CARBON MONOXIDE, G/KM 2.64		
OXIDES OF NITROGEN, G/KM 1.83		

## TABLE D-33. TEST NO. 106 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-010TEST NO. 106FTP RUN 1  
VEHICLE MODEL 78 CHRYSLER N.Y.  
ENGINE 6.6 L(400 CID) V-8  
TRANSMISSION A3BAROMETER 737.87 MM HG(29.05 IN HG)  
RELATIVE HUMIDITY 53. PCTBAG RESULTS  
BAG NUMBER  
DESCRIPTIONBLOWER DIF P MM, H2O(IN, H2O)  
BLOWER INLET P MM, H2O(IN, H2O)  
BLOWER INLET TEMP. DEG. C(DEG. F)  
BLOWER REVOLUTIONS

TOT FLOW STD. CU METRES(SCF)

HC SAMPLE METER/RANGE/PPM

CO BCKGRD METER/RANGE/PPM

CO SAMPLE METER/RANGE/PPM

CO2 SAMPLE METER/RANGE/PCT

CO2 BCKGRD METER/RANGE/PCT

NOX SAMPLE METER/RANGE/PPM

NOX BCKGRD METER/RANGE/PPM

DILUTION FACTOR

HC CONCENTRATION PPM

CO CONCENTRATION PPM

CO2 CONCENTRATION PCT

NOX CONCENTRATION PPM

HC MASS GRAMS

CO MASS GRAMS

CO2 MASS GRAMS

NOX MASS GRAMS

HC GRAMS/KM

CO GRAMS/KM

CO2 GRAMS/KM

NOX GRAMS/KM

FUEL CONSUMPTION BY CB L/100KM

RUN TIME SECONDS

MEASURED DISTANCE KM

SCF DRY

DFC, WET (DRY)

SCF, WET (DRY)

VOL (SCM)

SAM BLR (SCM)

KM (MEASURED)

FUEL CONSUMPTION L/100KM

## COMPOSITE RESULTS

TEST NUMBER 106FTP

BAROMETER MM HG 737.9

HUMIDITY G/KG 11.2

TEMPERATURE DEG C 25.6

VEHICLE NO.10  
DATE 4/22/81  
BAG CART NO. 1 / CVS NO. 2  
DYNO NO. 3TEST WEIGHT 2268. KG( 5000. LBS)  
ACTUAL ROAD LOAD 8.4 KW( 11.3 HP)  
GASOLINE EH-470  
ODOMETER \*\*\*\*\* KM(66119. MILES)DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)  
ABS. HUMIDITY 11.2 GM/KG

NOX HUMIDITY CORRECTION FACTOR 1.02

1 COLD TRANSIENT 2 STABILIZED 3 HOT TRANSIENT 4 STABILIZED

1.1 772.2 (30.4) 787.4 (31.0) 787.4 (31.0) 792.5 (31.2)

1.2 767.1 (30.2) 782.3 (30.8) 782.3 (30.8) 787.4 (31.0)

1.3 43.3 (110.0) 43.3 (110.0) 43.3 (110.0) 43.3 (110.0)

1.4 40515. 69574. 40476. 69455.

1.5 75.5 (2465.) 129.3 (4566.) 75.2 (2656.) 129.0 (4555.)

1.6 25.1/ 3/ 231. 61.6/ 2/ 62. 10.6/ 3/ 106. 31.3/ 2/ 31.

1.7 1.4/ 3/ 14. 12.5/ 2/ 13. 1.2/ 3/ 12. 12.0/ 2/ 12.

1.8 81.7/ 3/ 2221. 89.6/ 12/ 220. 91.7/ 12/ 227. 45.8/ 13/ 43.

1.9 1.3/ 3/ 7. 1.7/ 12/ 3. 1.5/ 12/ 3. 2.9/ 13/ 3.

1.10 95.7/ 3/ 1.80. 65.1/ 3/ 1.16. 66.9/ 3/ 1.61. 64.3/ 3/ 1.15.

1.11 3.4/ 3/ .05. 3.2/ 3/ .05. 3.7/ 3/ .06. 3.8/ 3/ .06.

1.12 80.6/ 2/ 81. 38.9/ 2/ 39. 94.1/ 2/ 94. 41.5/ 2/ 42.

1.13 1.0/ 2/ 1. .9/ 2/ 1. 1.1/ 2/ 1. 1.1/ 2/ 1.

1.14 6.60. 11.24. 8.14. 11.59

1.15 219. 50. 75. 20.

1.16 2100. 208. 214. 39.

1.17 1.75. 1.12. 1.56. 1.10.

1.18 79.8. 38.1. 93.1. 40.5.

1.19 9.54. 3.74. 4.14. 1.51.

1.20 184.54. 31.37. 18.71. 5.86.

1.21 2423.2. 2652.3. 2153.5. 2587.4

1.22 11.72. 9.59. 13.64. 10.17.

1.23 1.63. .59. .71. .24.

1.24 31.52. 4.97. 3.20. .93.

1.25 415.9. 420.1. 368.3. 410.8.

1.26 2.00. 1.52. 2.33. 1.61.

1.27 20.00. 18.34. 16.03. 17.63.

1.28 505. 868. 505. 847.

1.29 5.85. 6.31. 5.85. 6.30.

1.30 9.66. .972. .968. .972.

1.31 .888 ( .873). 1.000 ( .970). 1.000 ( .971). 1.000 ( .885).

1.32 1.000 ( .970). 204.8. 204.2.

1.33 0.00. 0.00.

1.34 12.17. 12.14.

1.35 19.14. 16.86.

CARBON DIOXIDE G/KM 404.6 ( 401.9)  
FUEL CONSUMPTION L/100KM 18.05 ( 17.84)  
HYDROCARBONS (THC) G/KM .84 ( .73)  
CARBON MONOXIDE G/KM 9.90 ( 8.78)  
OXIDES OF NITROGEN G/KM 1.84 ( 1.87)

3-BAG (4-BAG)

TEST NO. 106FET RUN 1  
VEHICLE MODEL 78 CHRYSLER N.Y.  
ENGINE 6.6 L(400 CID) V-8  
TRANSMISSION A3

BAROMETER 737.87 MM HG(29.05 IN HG)

RELATIVE HUMIDITY 45. PCT

0 BAG RESULTS  
TEST CYCLE

BLOWER DIF P MM, H2O(IN, H2O)

BLOWER INLET P MM, H2O(IN, H2O)

BLOWER INLET TEMP. DEG. C(DEG. F)

BLOWER REVOLUTIONS

TOT FLOW STD. CU METRES(SCF)

HC SAMPLE METER/RANGE/PPM

HC BCKGRD METER/RANGE/PPM

CO SAMPLE METER/RANGE/PPM

CO BCKGRD METER/RANGE/PPM

CO2 SAMPLE METER/RANGE/PCT

CO2 BCKGRD METER/RANGE/PCT

NOX SAMPLE METER/RANGE/PPM

NOX BCKGRD METER/RANGE/PPM

DILUTION FACTOR

HC CONCENTRATION PPM

CO CONCENTRATION PPM

CO2 CONCENTRATION PCT

NOX CONCENTRATION PPM

HC MASS GRAMS

CO MASS GRAMS

CO2 MASS GRAMS

NOX MASS GRAMS

RUN TIME SECONDS

DFC, WET (DRY)

SCF, WET (DRY)

VOL (SCM)

SAM BLR (SCM)

KM (MEASURED)

TEST NUMBER, 106FET

BAROMETER, MM HG 737.9

HUMIDITY, G/KG 10.0

TEMPERATURE, DEG C 26.7

CARBON DIOXIDE, G/KM 279.5

FUEL CONSUMPTION, L/100KM 11.99

HYDROCARBONS, G/KM .14

CARBON MONOXIDE, G/KM .61

OXIDES OF NITROGEN, G/KM 1.15

HFET VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-010VEHICLE NO.10  
DATE 4/22/81  
BAG CART NO. 1  
DYNO NO. 3  
CVS NO. 2TEST WEIGHT 2268. KG( 5000. LBS)  
ACTUAL ROAD LOAD 8.4 KW( 11.3 HP)  
GASOLINE EH-470  
ODOMETER \*\*\*\*\* KM(66124. MILES)DRY BULB TEMP. 26.7 DEG C(80.0 DEG F)  
ABS. HUMIDITY 10.0 GM/KG

NOX HUMIDITY CORRECTION FACTOR .98

1 COLD TRANSIENT 2 STABILIZED 3 HOT TRANSIENT 4 STABILIZED

1.1 800.1 (31.5) 792.5 (31.2) 792.5 (31.2) 792.5 (31.2)

1.2 43.3 (110.0) 43.3 (110.0) 43.3 (110.0) 43.3 (110.0)

1.3 61292. 61292. 61292. 61292.

1.4 113.7 (4015.) 46.0/ 2/ 46. 113.7 (4015.) 46.0/ 2/ 46.

1.5 12.7/ 2/ 13. 12.7/ 2/ 13. 12.7/ 2/ 13. 12.7/ 2/ 13.

1.6 82.6/ 13/ 82. 82.6/ 13/ 82. 82.6/ 13/ 82. 82.6/ 13/ 82.

1.7 56.9/ 13/ 56. 56.9/ 13/ 56. 56.9/ 13/ 56. 56.9/ 13/ 56.

1.8 1.7/ 2/ 2.26. 1.7/ 2/ 2.26. 1.7/ 2/ 2.26. 1.7/ 2/ 2.26.

1.9 89.5/ 2/ 90. 89.5/ 2/ 90. 89.5/ 2/ 90. 89.5/ 2/ 90.

1.10 .8/ 2/ 1. .8/ 2/ 1. .8/ 2/ 1. .8/ 2/ 1.

1.11 35. 75. 75. 75.

1.12 2.21. 88.8. 88.8. 88.8.

1.13 2.32. 2.32. 2.32. 2.32.

1.14 9.99. 4591.7. 4591.7. 4591.7.

1.15 18.90. 765. 765. 765.

1.16 .831 ( .819). 1.000 ( .965). 1.000 ( .965). 1.000 ( .965).

1.17 113.7. 113.7. 113.7. 113.7.

1.18 0.00. 0.00. 0.00. 0.00.

1.19 16.43. 16.43. 16.43. 16.43.

1.20 106FET

1.21 737.9

1.22 10.0

1.23 26.7

1.24 279.5

1.25 11.99

1.26 .14

1.27 .61

1.28 1.15

TABLE D-34. TEST NO. 107 EMISSIONS RESULTS  
FTP VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-010

TEST NO.	107FTP	RUN	1	VEHICLE NO.	10	TEST WEIGHT	2268. KG( 5000. LBS)
VEHICLE MODEL	78 CHRYSLER N.Y.	DATE	4/23/81	BAG CART NO.	1	ACTUAL ROAD LOAD	8.4 KW( 11.3 HP)
ENGINE 6.6 L(400. CID) V-8				DYNO NO.	3	GASOLINE	EM-470
TRANSMISSION A3				CVS NO.	2	ODOMETER	***** KM(66182. MILES)
BAROMETER	736.60 MM HG(29.00 IN HG)	DRY BULB TEMP.	23.3 DEG C(74.0 DEG F)				
RELATIVE HUMIDITY	66. PCT	ABS. HUMIDITY	12.2 GM/KG				
DAG RESULTS						NOX HUMIDITY CORRECTION FACTOR	1.05
BAG NUMBER							
DESCRIPTION							
BLOWER DIF P MM, H2O(IN, H2O)	782.3 (30.8)	COLD TRANSIENT	1	STABILIZED	2	HOT TRANSIENT	3
BLOWER INLET P MM, H2O(IN, H2O)	777.2 (30.6)						
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)						
BLOWER REVOLUTIONS	40555.						
TOT FLOW STD. CU. METRES(SCF)	75.3 (12459.)						
HC SAMPLE METER/RANGE/PPM	23.5/ 3/ 235.						
HC BCKGRD METER/RANGE/PPM	1.4/ 3/ 14.						
CO SAMPLE METER/RANGE/PPM	86.4/ 3/ 2384.						
CO BCKGRD METER/RANGE/PPM	1.1/ 3/ 2.						
CO2 SAMPLE METER/RANGE/PCT	95.5/ 3/ 1.79						
CO2 BCKGRD METER/RANGE/PCT	3.7/ 3/ .06						
NOX SAMPLE METER/RANGE/PPM	78.2/ 2/ 78.						
NOX BCKGRD METER/RANGE/PPM	1.1/ 2/ 1.						
DILUTION FACTOR	6.56						
HC CONCENTRATION PPM	223.						
CO CONCENTRATION PPM	2251.						
CO2 CONCENTRATION PCT	1.75						
NOX CONCENTRATION PPM	77.3						
HC MASS GRAMS	9.69						
CO MASS GRAMS	197.34						
CO2 MASS GRAMS	2406.4						
NOX MASS GRAMS	11.71						
HC GRAMS/KM	1.65						
CO GRAMS/KM	33.67						
CO2 GRAMS/KM	410.5						
NOX GRAMS/KM	2.00						
FUEL CONSUMPTION BY CB L/100KM	20.00						
RUN TIME	SECONDS	505.	868.	505.	868.		
MEASURED DISTANCE	KM	5.86	6.31	5.88	6.31		
SCF, DRY		.962	.968	.964	.968		
DFC, WET (DRY)		.809 ( .870)					
SCF, WET (DRY)		1.000 ( .966)					
VOL (SCM)			204.4				
SAM BLR (SCM)			0.00				
KM (MEASURED)			12.17				
FUEL CONSUMPTION L/100KM			18.93				
COMPOSITE RESULTS						3-BAG	(4-BAG)
TEST NUMBER	107FTP					CARBON DIOXIDE	6/KM
BAROMETER	MM HG	736.6				398.2	( 395.6)
HUMIDITY	G/KG	12.2				FUEL CONSUMPTION	L/100KM
TEMPERATURE	DEG C	23.3				.81	( .74)
						CARBON MONOXIDE	6/KM
						10.31	( 9.66)
						OXIDES OF NITROGEN	6/KM
						1.92	( 1.95)

HFET VEHICLE EMISSIONS RESULTS  
PROJECT 11-5830-010

TEST NO.	107FET	RUN	1	VEHICLE NO.	10	TEST WEIGHT	2268. KG( 5000. LBS)
VEHICLE MODEL	78 CHRYSLER N.Y.	DATE	4/23/81	BAG CART NO.	1	ACTUAL ROAD LOAD	8.4 KW( 11.3 HP)
ENGINE 6.6 L(400. CID) V-8				DYNO NO.	3	GASOLINE	EM-470
TRANSMISSION A3				CVS NO.	2	ODOMETER	***** KM(66196. MILES)
BAROMETER	737.36 MM HG(29.03 IN HG)	DRY BULB TEMP.	25.6 DEG C(78.0 DEG F)				
RELATIVE HUMIDITY	53. PCT	ABS. HUMIDITY	11.3 GM/KG				
DAG RESULTS						NOX HUMIDITY CORRECTION FACTOR	1.02
TEST CYCLE							
BLOWER DIF P MM, H2O(IN, H2O)	807.7 (31.8)						
BLOWER INLET P MM, H2O(IN, H2O)	800.1 (31.5)						
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)						
BLOWER REVOLUTIONS	61296.						
TOT FLOW STD. CU. METRES(SCF)	113.5 (4009.)						
HC SAMPLE METER/RANGE/PPM	50.0/ 2/ 51.						
HC BCKGRD METER/RANGE/PPM	13.4/ 2/ 13.						
CO SAMPLE METER/RANGE/PPM	95.6/ 3/ 97.						
CO BCKGRD METER/RANGE/PPM	1.3/ 3/ 1.						
CO2 SAMPLE METER/RANGE/PCT	50.2/ 2/ 2.5						
CO2 BCKGRD METER/RANGE/PCT	1.5/ 2/ .05						
NOX SAMPLE METER/RANGE/PPM	32.7/ 3/ 98.						
NOX BCKGRD METER/RANGE/PPM	.3/ 3/ 1.						
DILUTION FACTOR	5.92						
HC CONCENTRATION PPM	38.						
CO CONCENTRATION PPM	90.						
CO2 CONCENTRATION PCT	2.21						
NOX CONCENTRATION PPM	97.4						
HC MASS GRAMS	2.49						
CO MASS GRAMS	11.92						
CO2 MASS GRAMS	4585.0						
NOX MASS GRAMS	21.52						
RUN TIME	SECONDS	766.					
DFC, WET (DRY)		.831 ( .817)					
SCF, WET (DRY)		1.000 ( .962)					
VOL (SCM)		113.5					
SAM BLR (SCM)		0.00					
KM (MEASURED)		16.48					
TEST NUMBER	107FET						
BAROMETER,	MM HG	737.4					
HUMIDITY,	G/KG	11.3					
TEMPERATURE,	DEG C	25.6					
CARBON DIOXIDE,	G/KM	278.2					
FUEL CONSUMPTION,	L/100KM	11.94					
HYDROCARBONS,	G/KM	.15					
CARBON MONOXIDE,	G/KM	.72					
OXIDES OF NITROGEN,	G/KM	1.31					

APPENDIX E  
I/M SHORT TEST RESULTS

TABLE E-1. CAR 01 I/M SHORT TEST RESULTS  
1978 BUICK REGAL

	<u>Car As-Received</u>	<u>Car Tuned-Up</u>
<u>HC, Emissions, rpm Hexane</u>		
50 mph <sup>a</sup> - 1700 rpm	012	68
Idle - Neutral	75	
2500 rpm	67	
Idle - Neutral	69	
Idle - Drive	68	
30 mph <sup>a</sup> - 1100 rpm	83	
Idle - Neutral	85	
<u>CO Emissions Percent</u>		
50 mph <sup>a</sup>	0.01	
Idle - Neutral	0.02	
2500 rpm	0.02	
Idle - Neutral	0.01	
Idle - Drive	0.01	
30 mph <sup>a</sup>	0.03	
Idle - Neutral	0.01	
<u>Propane Enrichment, rpm</u>		
<u>In Neutral</u>		
PCV in Place	760	
As Above with Propane	820	
PCV Valve Removed from Grommet	750	
As Above with Propane	840	
PCV Fresh Air Line Removed	750	
As Above with Propane	820	
<u>In Drive</u>		
PCV in Place	560	
As Above with Propane	570	
PCV Valve Removed from Gormmet	570	
As Above with Propane	580	
PCV Fresh Air Line Removed	560	
As Above with Propane	570	

<sup>a</sup>In Drive

TABLE E-2. CAR 02 I/M SHORT TEST RESULTS  
1979 MERCURY MARQUIS

	<u>Car As-Received</u>	<u>Car Tuned-Up</u>
<u>HC, Emissions, rpm Hexane</u>		
50 mph <sup>a</sup> - 1500 rpm	022 73	
Idle - Neutral	107	
2500 rpm	67	
Idle - Neutral	81	
Idle - Drive	89	
30 mph <sup>a</sup> - 1050 rpm	91	
Idle - Neutral	86	
<u>CO Emissions Percent</u>		
50 mph <sup>a</sup>	0.00	
Idle - Neutral	0.10	
2500 rpm	0.02	
Idle - Neutral	0.02	
Idle - Drive	0.10	
30 mph <sup>a</sup>	0.01	
Idle - Neutral	0.02	
<u>Propane Enrichment, rpm</u>		
<u>In Neutral</u>		
PCV in Place	880	
As Above with Propane	920	
PCV Valve Removed from Grommet	890	
As Above with Propane	940	
PCV Fresh Air Line Removed	870	
As Above with Propane	920	
<u>In Drive</u>		
PCV in Place	600	
As Above with Propane	600	
PCV Valve Removed from Grommet	610	
As Above with Propane	610	
PCV Fresh Air Line Removed	600	
As Above with Propane	600	

<sup>a</sup>In Drive

TABLE E-3. CAR 03 I/M SHORT TEST RESULTS  
1979 MERCURY MARQUIS

	<u>Car As-Received</u>	<u>Car Tuned-Up</u>
<u>HC, Emissions, rpm Hexane</u>		
50 mph <sup>a</sup> - 1500 rpm	032 63	037 58
Idle - Neutral	315	383
2500 rpm	98	93
Idle - Neutral	164	166
Idle - Drive	107	121
30 mph <sup>a</sup> - 1050 rpm	116	130
Idle - Neutral	130	164
<u>CO Emissions Percent</u>		
50 mph <sup>a</sup>	0.01	0.00
Idle - Neutral	2.46	2.31
2500 rpm	0.27	0.26
Idle - Neutral	0.43	0.32
Idle - Drive	0.29	0.26
30 mph <sup>a</sup>	0.29	0.36
Idle - Neutral	0.24	0.21
<u>Propane Enrichment, rpm</u>		
<u>In Neutral</u>		
PCV in Place	1050	975
As Above with Propane	1060	985
PCV Valve Removed from Grommet	1070	970
As Above with Propane	1080	1050
PCV Fresh Air Line Removed	1050	960
As Above with Propane	1060	980
<u>In Drive</u>		
PCV in Place	640	620
As Above with Propane	640	620
PCV Valve Removed from Grommet	650	630
As Above with Propane	650	630
PCV Fresh Air Line Removed	640	620
As Above with Propane	640	620

<sup>a</sup>In Drive

TABLE E-4. CAR 04 I/M SHORT TEST RESULTS  
1978 FORD GRANADA

	<u>Car As-Received</u>	<u>Car Tuned-Up</u>
<u>HC, Emissions, rpm Hexane</u>		
50 mph <sup>a</sup> - 1800 rpm	041 82	047 82
Idle - Neutral	109	146
2500 rpm	102	198
Idle - Neutral	100	107
Idle - Drive	93	84
30 mph <sup>a</sup> - 1150 rpm	224	175
Idle - Neutral	84	100
<u>CO Emissions Percent</u>		
50 mph <sup>a</sup>	0.01	0.01
Idle - Neutral	0.04	0.00
2500 rpm	0.05	0.01
Idle - Neutral	0.01	0.01
Idle - Drive	0.01	0.00
30 mph <sup>a</sup>	0.02	0.01
Idle - Neutral	0.01	0.00
<u>Propane Enrichment, rpm</u>		
<u>In Neutral</u>		
PCV in Place	1050	800
As Above with Propane	1260	1100
PCV Valve Removed from Grommet	1055	765
As Above with Propane	1280	1160
PCV Fresh Air Line Removed	1070	800
As Above with Propane	1280	1100
<u>In Drive</u>		
PCV in Place	680	610
As Above with Propane	710	660
PCV Valve Removed from Grommet	680	570
As Above with Propane	710	675
PCV Fresh Air Line Removed	685	610
As Above with Propane	710	660

<sup>a</sup> In Drive

TABLE E-5. CAR 05 I/M SHORT TEST RESULTS  
1978 VOLVO 245DL CAL.

	<u>Car As-Received</u>	<u>Car Tuned-Up</u>
<u>HC, Emissions, rpm Hexane</u>	<u>052</u>	<u>056</u>
50 mph <sup>a</sup> - 2750 rpm	62	69
Idle - Neutral	98	89
2500 rpm	75	84
Idle - Neutral	91	93
Idle - Drive	93	84
30 mph <sup>a</sup> - 2250 rpm	82	82
Idle - Neutral	98	98
<u>CO Emissions Percent</u>		
50 mph <sup>a</sup>	0.02	0.01
Idle - Neutral	0.18	0.06
2500 rpm	0.17	0.07
Idle - Neutral	0.15	0.10
Idle - Drive	0.19	0.07
30 mph <sup>a</sup>	0.07	0.05
Idle - Neutral	0.18	0.06
<u>Propane Enrichment, rpm</u>		
<u>In Neutral</u>		
PCV in Place	1080	900
As Above with Propane	1280	1140
PCV Valve Removed from Grommet	1130	940
As Above with Propane	1300	1160
PCV Fresh Air Line Removed	1100	890
As Above with Propane	1300	1135
<u>In Drive</u>		
PCV in Place		
As Above with Propane		
PCV Valve Removed from Grommet		
As Above with Propane		
PCV Fresh Air Line Removed		
As Above with Propane		

<sup>a</sup> In Drive

TABLE E-6. CAR 06 I/M SHORT TEST RESULTS  
1978 OLDSMOBILE CUTLASS

	<u>Car As-Received</u>	<u>Car Tuned-Up</u>
<u>HC, Emissions, rpm Hexane</u>		
50 mph <sup>a</sup> - 2000 rpm	061 73	067 62
Idle - Neutral	64	82
2500 rpm	60	64
Idle - Neutral	62	78
Idle - Drive	62	62
30 mph <sup>a</sup> - 1250 rpm	69	60
Idle - Neutral	67	62
<u>CO Emissions Percent</u>		
50 mph <sup>a</sup>	0.05	0.01
Idle - Neutral	0.01	0.00
2500 rpm	0.07	0.01
Idle - Neutral	0.01	0.01
Idle - Drive	0.01	0.00
30 mph <sup>a</sup>	0.01	0.01
Idle - Neutral	0.02	0.01
<u>Propane Enrichment, rpm</u>		
<u>In Neutral</u>		
PCV in Place	910	900
As Above with Propane	1040	1130
PCV Valve Removed from Grommet	910	910
As Above with Propane	1030	1140
PCV Fresh Air Line Removed	880	880
As Above with Propane	1090	1190
<u>In Drive</u>		
PCV in Place	640	640
As Above with Propane	660	695
PCV Valve Removed from Grommet	640	650
As Above with Propane	660	700
PCV Fresh Air Line Removed	625	620
As Above with Propane	680	710

<sup>a</sup>In Drive

TABLE E-7. CAR 07 I/M SHORT TEST RESULTS  
1978 CHEVROLET MALIBU CAL.

	<u>Car As-Received</u>	<u>Car Tuned-Up</u>
<u>HC, Emissions, rpm Hexane</u>		
50 mph <sup>a</sup> - 1700 rpm	071 60	078 67
Idle - Neutral	64	87
2500 rpm	64	152
Idle - Neutral	64	116
Idle - Drive	82	-
30 mph <sup>a</sup> - 1100 rpm	67	84
Idle - Neutral	64	212
<u>CO Emissions Percent</u>		
50 mph <sup>a</sup>	0.01	0.03
Idle - Neutral	0.05	0.04
2500 rpm	0.02	0.03
Idle - Neutral	0.06	0.03
Idle - Drive	0.09	-
30 mph <sup>a</sup>	0.09	0.02
Idle - Neutral	0.05	0.03
<u>Propane Enrichment, rpm</u>		
<u>In Neutral</u>		
PCV in Place	980	640
As Above with Propane	1000	810
PCV Valve Removed from Grommet	975	630
As Above with Propane	1010	850
PCV Fresh Air Line Removed	950	650
As Above with Propane	980	810
<u>In Drive</u>		
PCV in Place	630	560
As Above with Propane	630	625
PCV Valve Removed from Grommet	630	550
As Above with Propane	640	640
PCV Fresh Air Line Removed	610	560
As Above with Propane	620	625

<sup>a</sup>In Drive

TABLE E-8. CAR 08 I/M SHORT TEST RESULTS  
1978 MONTE CARLO

	<u>Car As-Received</u>	<u>Car Tuned-Up</u>
<u>HC, Emissions, rpm Hexane</u>	081	086
50 mph <sup>a</sup> - 1800 rpm	64	60
Idle - Neutral	102	91
2500 rpm	56	89
Idle - Neutral	100	93
Idle - Drive	62	58
30 mph <sup>a</sup> - 1150 rpm	58	67
Idle - Neutral	114	125
<u>CO Emissions Percent</u>		
50 mph <sup>a</sup>	0.00	0.02
Idle - Neutral	0.08	0.01
2500 rpm	0.01	0.48
Idle - Neutral	0.05	0.01
Idle - Drive	0.01	0.04
30 mph <sup>a</sup>	0.00	0.01
Idle - Neutral	0.01	0.01
<u>Propane Enrichment, rpm</u>		
<u>In Neutral</u>		
PCV in Place	970	870
As Above with Propane	1600	1150
PCV Valve Removed from Grommet	1000	855
As Above with Propane	1550	1170
PCV Fresh Air Line Removed	980	890
As Above with Propane	1550	1145
<u>In Drive</u>		
PCV in Place	670	640
As Above with Propane	800	675
PCV Valve Removed from Grommet	630	620
As Above with Propane	810	685
PCV Fresh Air Line Removed	680	630
As Above with Propane	800	675

<sup>a</sup>In Drive

TABLE E-9. CAR 09 I/M SHORT TEST RESULTS  
1978 FORD FIESTA

	<u>Car As-Received</u>	<u>Car Tuned-Up</u>
<u>HC, Emissions, rpm Hexane</u>	<u>092</u>	<u>096</u>
50 mph <sup>a</sup> - 2625 rpm	109	107
Idle - Neutral	400	476
2500 rpm	102	152
Idle - Neutral	372	332
Idle - Drive	150	389
30 mph <sup>a</sup> - 2300 rpm	221	134
Idle - Neutral	75	107
<u>CO Emissions Percent</u>		
50 mph <sup>a</sup>	0.00	0.00
Idle - Neutral	1.94	1.33
2500 rpm	0.03	0.10
Idle - Neutral	0.19	0.19
Idle - Drive	0.09	0.14
30 mph <sup>a</sup>	0.03	0.06
Idle - Neutral	0.02	0.02
<u>Propane Enrichment, rpm</u>		
<u>In Neutral</u>		
PCV in Place	975	830
As Above with Propane	980	870
PCV Valve Removed from Grommet	950	830
As Above with Propane	1040	940
PCV Fresh Air Line Removed	930	820
As Above with Propane	960	860
<u>In Drive</u>		
PCV in Place		
As Above with Propane		
PCV Valve Removed from Grommet		
As Above with Propane		
PCV Fresh Air Line Removed		
As Above with Propane		

<sup>a</sup>In Drive

TABLE E-10. CAR 10 I/M SHORT TEST RESULTS  
1978 CHRYSLER NEW YORKER

	<u>Car As-Received</u>	<u>Car Tuned-Up</u>
<u>HC, Emissions, rpm Hexane</u>		
50 mph <sup>a</sup> - 2000 rpm	102 483+	107 64
Idle - Neutral	483+	193
2500 rpm	483+	107
Idle - Neutral	483+	84
Idle - Drive	483+	75
30 mph <sup>a</sup> - 1160 rpm	483+	100
Idle - Neutral	483+	84
<u>CO Emissions Percent</u>		
50 mph <sup>a</sup>	0.02	0.02
Idle - Neutral	1.24	0.08
2500 rpm	0.16	0.03
Idle - Neutral	0.59	0.08
Idle - Drive	0.46	0.04
30 mph <sup>a</sup>	0.14	0.17
Idle - Neutral	0.47	0.08
<u>Propane Enrichment, rpm</u>		
<u>In Neutral</u>		
PCV in Place	815	755
As Above with Propane	815	845
PCV Valve Removed from Grommet	820	760
As Above with Propane	850	850
PCV Fresh Air Line Removed	815	765
As Above with Propane	820	825
<u>In Drive</u>		
PCV in Place	650	620
As Above with Propane	650	640
PCV Valve Removed from Grommet	650	615
As Above with Propane	655	655
PCV Fresh Air Line Removed	645	620
As Above with Propane	650	645

<sup>a</sup>In Drive

APPENDIX F

AVERAGE VALUES FOR FTP AND HFET RESULTS

TABLE F-1. CAR 01 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

	Average Emission Rate, mg/km (Except at Noted)			
	FTP		HFET	
	As- Received	After Tune-Up	As- Received	After Tune-Up
Test No.	VVT	011-012	011-012	
Barometer,	mm Hg	744.2	744.1	
Humidity,	g/kg	5.6	5.5	
Temperature,	°C	21.1	22.0	
Total Fuel Sulfur, mg/km		22.71	15.63	
Avg. Exh. Oxygen, %		0.61	0.85	
Carbon Dioxide, g/km		300.7	223.2	
Fuel Cons., l/100 km		13.95	9.60	
<u>Regulated Emissions</u>				
Hydrocarbons (THC), g/km		1.06	0.18	
Carbon Monoxide, g/km		14.55	0.67	
Oxides of Nitrogen, g/km		0.94	0.89	
<u>Particulates</u>				
Total Particulates		31.22	17.42	
<u>Compound Group Totals</u>				
Aldehydes & Ketones		10.5	5.1	
Individual Hydrocarbons		360.9	75.9	
Organic Sulfides		0.22	0.01	
Organic Amines		0.05	0.02	
<u>Other Compounds</u>				
Ammonia		6.31	2.44	
Cyanide & Cyanogen		1.99	0.93	
Hydrogen Sulfide		0.00	0.00	
Nitrous Oxide		26.40	9.78	
<u>Aldehydes &amp; Ketones</u>				
Formaldehyde		8.83	3.73	
Acetaldehyde		1.62	0.93	
Acetone		0.00	0.38	
Methylethylketone		0.00	0.00	
Hexanaldehyde		0.00	0.00	

TABLE F-1 (Cont'd). CAR 01 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

Test No.	Average Emission Rates, mg/km			
	FTP		HFET	
	Received	Tune-Up	Received	Tune-Up
011-012				
<u>Individual Hydrocarbons</u>				
Methane	68.31		23.48	
Ethylene	87.73		15.05	
Ethane	16.63		8.86	
Acetylene	18.70		0.52	
Propane	0.75		0.15	
Propylene	39.46		8.84	
Benzene	54.08		9.43	
Toluene	75.23		9.56	
<u>Organic Sulfides</u>				
Carbonyl Sulfide	0.15		0.00	
Methyl Sulfide	0.07		0.01	
Ethyl Sulfide	0.01		0.00	
Methyl Disulfide	0.00		0.00	
<u>Organic Amines</u>				
Monomethylamine	0.03		0.01	
Monoethylamine	0.02		0.01	
Trimethylamine	0.01		0.00	
Diethylamine	0.00		0.00	
Triethylamine	0.00		0.00	
<u>Trace Elements<sup>a</sup></u>				
Sodium	0.01		0.00	
Sulfur	0.03		0.07	
Vanadium	0.00		0.00	
Magnesium	0.01		0.01	
Chlorine	0.01		0.02	
Aluminum	0.01		0.01	
Manganese	0.00		0.00	
Zinc	0.02		0.00	
Silicon	0.02		0.05	
Calcium	0.04		0.02	
Iron	0.12		0.07	
Phosphorus	0.02		0.01	
Titanium	0.00		0.00	
Bromine	0.00		0.00	

<sup>a</sup>This table excludes all elements having measured values consistently below 0.01 mg/km.

TABLE F-2. CAR 02 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

Average Emission Rate, mg/km (Except at Noted)			
	FTP	HFET	
	As- Received	After Tune-Up	As- Received
Test No.	VVT	021-022	021-022
Barometer, mm Hg		754.5	754.8
Humidity, g/kg		3.6	3.8
Temperature, °C		20.3	22.5
Total Fuel Sulfur, mg/km		27.09	17.57
Avg. Exh. Oxygen, %		5.23	4.65
Carbon Dioxide, g/km		383.0	251.8
Fuel Cons., l/100 km		16.64	10.79
<u>Regulated Emissions</u>			
Hydrocarbons (THC), g/km		0.43	0.16
Carbon Monoxide, g/km		3.48	0.29
Oxides of Nitrogen, g/km		1.43	1.27
<u>Particulates</u>			
Total Particulates		16.75	38.36
<u>Compound Group Totals</u>			
Aldehydes & Ketones		0.3	2.2
Individual Hydrocarbons		167.1	64.3
Organic Sulfides		0.45	0.04
Organic Amines		0.00	0.00
<u>Other Compounds</u>			
Ammonia		12.27	6.15
Cyanide & Cyanogen		0.12	0.19
Hydrogen Sulfide		0.00	0.00
Nitrous Oxide		58.55	36.21
<u>Aldehydes &amp; Ketones</u>			
Formaldehyde		0.00	2.14
Acetaldehyde		0.30	0.00
Acetone		0.00	0.00
Methylethylketone		0.00	0.00
Hexanaldehyde		0.00	0.00

TABLE F-2 (Cont'd.). CAR 02 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

Test No.	Average Emission Rates, mg/km			
	FTP		HFET	
	<u>Received</u>	<u>Tune-Up</u>	<u>Received</u>	<u>Tune-Up</u>
021-022			021-022	
<u>Individual Hydrocarbons</u>				
Methane	85.36		35.83	
Ethylene	25.58		10.97	
Ethane	15.24		9.85	
Acetylene	7.22		0.00	
Propane	0.85		0.51	
Propylene	5.65		1.67	
Benzene	11.09		3.10	
Toluene	16.09		2.42	
<u>Organic Sulfides</u>				
Carbonyl Sulfide	0.44		0.04	
Methyl Sulfide	0.01		0.00	
Ethyl Sulfide	0.00		0.00	
Methyl Disulfide	0.00		0.00	
<u>Organic Amines</u>				
Monomethylamine	0.00		0.00	
Monoethylamine	0.00		0.00	
Trimethylamine	0.00		0.00	
Diethylamine	0.00		0.00	
Triethylamine	0.00		0.00	
<u>Trace Elements<sup>a</sup></u>				
Sodium	0.00		0.00	
Sulfur	0.37		3.30	
Vanadium	0.00		0.00	
Magnesium	0.00		0.00	
Chlorine	0.01		0.00	
Aluminum	0.01		0.01	
Manganese	0.00		0.00	
Zinc	0.00		0.00	
Silicon	0.11		0.03	
Calcium	0.02		0.01	
Iron	0.20		0.05	
Phosphorus	0.00		0.00	
Titanium	0.00		0.00	
Bromine	0.00		0.00	

<sup>a</sup>This table excludes all elements having measured values consistently below 0.01 mg/km.

TABLE F-3. CAR 03 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

		Average Emission Rate, mg/km (Except at Noted)			
		FTP		HFET	
		As- Received	After Tune-Up	As- Received	After Tune-Up
Test No.	VVT	031-032	036-037	031-032	036-037
Barometer,	mm Hg	734.5	758.5	746.8	758.5
Humidity,	g/kg	7.9	2.2	8.1	2.0
Temperature,	°C	20.9	20.6	23.1	23.1
Total Fuel Sulfur,	mg/km	28.08	26.87	18.06	17.39
Avg. Exh. Oxygen,	%	4.45	5.29	4.20	4.94
Carbon Dioxide,	g/km	397.1	381.6	256.9	249.2
Fuel Cons.,	l/100 km	17.25	16.50	11.09	10.68
<u>Regulated Emissions</u>					
Hydrocarbons (THC),	g/km	0.42	0.42	0.17	0.11
Carbon Monoxide,	g/km	3.68	2.41	1.59	0.40
Oxides of Nitrogen,	g/km	1.03	1.07	1.56	1.43
<u>Particulates</u>					
Total Particulates		23.71	15.84	21.51	11.06
<u>Compound Group Totals</u>					
Aldehydes & Ketones		3.9	1.8	0.0	3.3
Individual Hydrocarbons		163.4	177.2	66.8	52.7
Organic Sulfides		0.55	0.12	0.16	0.08
Organic Amines		0.03	0.01	0.00	0.00
<u>Other Compounds</u>					
Ammonia		1.45	3.37	3.31	3.42
Cyanide & Cyanogen		0.07	0.32	0.38	0.03
Hydrogen Sulfide		0.00	0.00	0.00	0.00
Nitrous Oxide		53.41	49.10	67.62	61.04
<u>Aldehydes &amp; Ketones</u>					
Formaldehyde		2.88	0.94	0.00	3.24
Acetaldehyde		1.03	0.00	0.00	0.00
Acetone		0.00	0.00	0.00	0.00
Methylethylketone		0.00	0.00	0.00	0.00
Hexanaldehyde		0.00	0.00	0.00	0.00

TABLE F-3 (Cont'd.). CAR 03 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

Test No.	Average Emission Rates, mg/km			
	FTP		HFET	
	Received	Tune-Up	Received	Tune-Up
031-032	036-037		031-032	036-037
<u>Individual Hydrocarbons</u>				
Methane	87.08	100.85	35.09	37.78
Ethylene	16.06	16.02	9.22	3.27
Ethane	12.64	14.36	8.67	7.61
Acetylene	7.13	5.28	0.00	0.00
Propane	0.15	1.17	0.00	0.00
Propylene	4.16	4.20	2.00	0.00
Benzene	13.23	11.49	5.05	2.04
Toluene	22.93	23.82	6.71	1.98
<u>Organic Sulfides</u>				
Carbonyl Sulfide	0.50	0.10	0.13	0.06
Methyl Sulfide	0.05	0.02	0.03	0.02
Ethyl Sulfide	0.00	0.00	0.00	0.00
Methyl Disulfide	0.00	0.00	0.00	0.00
<u>Organic Amines</u>				
Monomethylamine	0.02	0.01	0.00	0.00
Monoethylamine	0.00	0.00	0.00	0.00
Trimethylamine	0.02	0.00	0.00	0.00
Diethylamine	0.00	0.00	0.00	0.00
Triethylamine	0.00	0.00	0.00	0.00
<u>Trace Elements<sup>a</sup></u>				
Sodium	0.00	0.00	0.00	0.00
Sulfur	0.12	0.20	0.28	0.89
Vanadium	0.00	0.00	0.00	0.00
Magnesium	0.00	0.01	0.00	0.00
Chlorine	0.04	0.01	0.01	0.00
Aluminum	0.03	0.11	0.01	0.01
Manganese	0.00	0.01	0.00	0.00
Zinc	0.00	0.00	0.00	0.00
Silicon	0.16	0.10	0.07	0.02
Calcium	0.02	0.04	0.02	0.01
Iron	0.50	0.95	0.11	0.07
Phosphorus	0.01	0.02	0.00	0.00
Titanium	0.02	0.00	0.02	0.00
Bromine	0.17	0.04	0.06	0.00

<sup>a</sup>This table excludes all elements having measured values consistently below 0.01 mg/km.

TABLE F-4. CAR 04 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

		Average Emission Rate, mg/km (Except at Noted)			
		FTP		HFET	
		As- Received	After Tune-Up	As- Received	After Tune-Up
Test No.	VVT	041-042	046	041-042	046
Barometer, mm Hg	742.5	742.2	742.6	742.2	742.2
Humidity, g/kg	9.1	11.4	9.7	12.2	
Temperature, °C	25.6	25.0	26.7	26.7	
Total Fuel Sulfur, mg/km	30.41	29.83	20.10	20.12	
Avg. Exh. Oxygen, %	--	8.06	--	8.44	
Carbon Dioxide, g/km	423.3	416.8	283.7	284.8	
Fuel Cons., l/100 km	18.68	18.32	12.35	12.36	
<u>Regulated Emissions</u>					
Hydrocarbons (THC), g/km	1.08	1.12	0.54	0.65	
Carbon Monoxide, g/km	7.02	5.61	2.47	1.79	
Oxides of Nitrogen, g/km	0.62	0.67	0.68	0.77	
<u>Particulates</u>					
Total Particulates	36.17	44.31	29.92	27.95	
<u>Compound Group Totals</u>					
Aldehydes & Ketones	6.5	9.1	4.8	4.8	
Individual Hydrocarbons	421.2	431.6	238.4	251.3	
Organic Sulfides	0.00	0.00	0.00	0.00	
Organic Amines	0.00	0.00	0.00	0.00	
<u>Other Compounds</u>					
Ammonia	5.06	3.38	2.61	3.91	
Cyanide & Cyanogen	0.63	0.98	0.77	0.99	
Hydrogen Sulfide	0.00	0.00	0.00	0.00	
Nitrous Oxide	7.28	6.10	8.25	8.43	
<u>Aldehydes &amp; Ketones</u>					
Formaldehyde	5.38	7.37	3.59	4.53	
Acetaldehyde	1.14	1.68	1.14	0.25	
Acetone	0.00	0.00	0.00	0.00	
Methylethylketone	0.00	0.00	0.00	0.00	
Hexanaldehyde	0.00	0.00	0.00	0.00	

TABLE F-4 (Cont'd). CAR 04 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

Test No.	Average Emission Rates, mg/km			
	FTP		HFET	
	Received	Tune-Up	Received	Tune-Up
041-042	046	046	041-042	046
<u>Individual Hydrocarbons</u>				
Methane	133.70	121.63	76.15	76.32
Ethylene	82.93	85.20	50.52	51.61
Ethane	42.76	42.30	26.36	25.91
Acetylene	18.43	45.56	9.24	9.09
Propane	2.55	0.95	1.32	0.44
Propylene	29.75	28.27	18.25	17.73
Benzene	37.29	33.34	20.55	22.48
Toluene	73.81	74.39	35.98	47.70
<u>Organic Sulfides</u>				
Carbonyl Sulfide	0.00	0.00	0.00	0.00
Methyl Sulfide	0.00	0.00	0.00	0.00
Ethyl Sulfide	0.00	0.00	0.00	0.00
Methyl Disulfide	0.00	0.00	0.00	0.00
<u>Organic Amines</u>				
Monomethylamine	0.00	0.00	0.00	0.00
Monoethylamine	0.00	0.00	0.00	0.00
Trimethylamine	0.00	0.00	0.00	0.00
Diethylamine	0.00	0.00	0.00	0.00
Triethylamine	0.00	0.00	0.00	0.00
<u>Trace Elements<sup>a</sup></u>				
Sodium	0.00	0.01	0.00	0.00
Sulfur	0.07	0.13	0.09	0.16
Vanadium	0.00	0.00	0.00	0.00
Magnesium	0.00	0.02	0.01	0.01
Chlorine	0.02	0.01	0.02	0.01
Aluminum	0.01	0.01	0.01	0.00
Manganese	0.00	0.00	0.00	0.00
Zinc	0.02	0.07	0.00	0.04
Silicon	0.92	0.16	1.17	0.79
Calcium	0.06	0.04	0.05	0.03
Iron	0.54	0.43	0.31	0.21
Phosphorus	0.02	0.05	0.01	0.03
Titanium	0.00	0.00	0.03	0.01
Bromine	0.12	0.13	0.00	0.11

<sup>a</sup>This table excludes all elements having measured values consistently below 0.01 mg/km.

TABLE F-5. CAR 05 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

		Average Emission Rate, mg/km (Except at Noted)			
		FTP		HFET	
		As- Received	After Tune-Up	As- Received	After Tune-Up
Test No.	VVT	051-052	056-057	051-052	056-058
Barometer, mm Hg		738.7	736.4	738.3	741.1
Humidity, g/kg		10.3	7.9	10.9	8.1
Temperature, °C		23.6	25.6	25.6	24.7
Total Fuel Sulfur, mg/km		21.50	20.31	12.73	12.71
Avg. Exh. Oxygen, %		0.49	0.93	0.17	0.17
Carbon Dioxide, g/km		302.4	285.9	180.1	180.3
Fuel Cons., l/100 km		13.21	12.48	7.82	7.81
<u>Regulated Emissions</u>					
Hydrocarbons (THC), g/km		0.38	0.38	0.24	0.24
Carbon Monoxide, g/km		3.68	3.34	1.54	1.17
Oxides of Nitrogen, g/km		0.50	0.55	0.29	0.30
<u>Particulates</u>					
Total Particulates		8.38	2.02	2.14	2.73
<u>Compound Group Totals</u>					
Aldehydes & Ketones		2.6	1.3	0.7	0.2
Individual Hydrocarbons		200.9	182.8	124.0	123.6
Organic Sulfides		0.11	0.04	0.02	0.04
Organic Amines		0.00	0.00	0.00	0.00
<u>Other Compounds</u>					
Ammonia		19.04	31.49	6.50	20.83
Cyanide & Cyanogen		0.72	0.85	0.53	0.45
Hydrogen Sulfide		0.00	0.00	0.00	0.00
Nitrous Oxide		106.11	122.66	91.53	116.35
<u>Aldehydes &amp; Ketones</u>					
Formaldehyde		1.75	0.41	0.50	0.02
Acetaldehyde		0.85	0.82	0.17	0.13
Acetone		--	0.00	0.00	0.00
Methylethylketone		0.00	0.12	0.00	0.00
Hexanaldehyde		0.00	0.00	0.00	0.00

TABLE F-5 (Cont'd.). CAR 05 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

Test No.	Average Emission Rates, mg/km			
	FTP		HFET	
	Received	Tune-Up	Received	Tune-Up
051-052	056-057		051-052	056-058
<u>Individual Hydrocarbons</u>				
Methane	54.61	52.37	27.49	27.75
Ethylene	42.40	35.39	31.45	30.57
Ethane	12.84	12.17	8.20	8.65
Acetylene	3.80	2.94	0.00	0.00
Propane	1.02	0.58	0.14	0.37
Propylene	17.94	15.32	16.11	16.49
Benzene	30.55	26.22	17.07	16.09
Toluene	37.78	37.83	23.49	23.67
<u>Organic Sulfides</u>				
Carbonyl Sulfide	0.09	0.04	0.01	0.03
Methyl Sulfide	0.01	0.01	0.01	0.01
Ethyl Sulfide	0.01	0.00	0.00	0.00
Methyl Disulfide	0.00	0.00	0.00	0.00
<u>Organic Amines</u>				
Monomethylamine	0.00	0.00	0.00	0.00
Monoethylamine	0.00	0.00	0.00	0.00
Trimethylamine	0.00	0.00	0.00	0.00
Diethylamine	0.00	0.00	0.00	0.00
Triethylamine	0.00	0.00	0.00	0.00
<u>Trace Elements<sup>a</sup></u>				
Sodium	0.00	0.00	0.00	0.00
Sulfur	0.05	0.04	0.02	0.03
Vanadium	0.00	0.00	0.00	0.00
Magnesium	0.01	0.01	0.00	0.01
Chlorine	0.05	0.01	0.01	0.01
Aluminum	0.02	0.00	0.00	0.00
Manganese	0.00	0.00	0.00	0.00
Zinc	0.00	0.00	0.00	0.00
Silicon	0.04	0.02	0.00	0.01
Calcium	0.12	0.09	0.02	0.06
Iron	0.50	0.21	0.08	0.17
Phosphorus	0.02	0.02	0.01	0.01
Titanium	0.00	0.00	0.11	0.01
Bromine	0.21	0.20	0.00	0.16

<sup>a</sup>This table excludes all elements having measured values consistently below 0.01 mg/km.

TABLE F-6. CAR 06 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

		Average Emission Rate, mg/km (Except at Noted)			
		FTP		HFET	
		As- Received	After Tune-Up	As- Received	After Tune-Up
Test No.	VVT	061-062	066-068	061-062	066-067
Barometer, mm Hg		751.7	748.3	751.8	738.5
Humidity, g/kg		6.4	7.7	7.0	7.8
Temperature, °C		23.9	24.7	25.3	24.5
Total Fuel Sulfur, mg/km		20.22	20.79	14.51	15.05
Avg. Exh. Oxygen, %		0.98	1.33	0.87	0.79
Carbon Dioxide, g/km		275.0	284.3	207.0	214.7
Fuel Cons., l/100 km		12.42	12.77	8.91	9.24
<u>Regulated Emissions</u>					
Hydrocarbons (THC), g/km		0.54	0.48	0.12	0.10
Carbon Monoxide, g/km		9.11	8.52	0.86	0.94
Oxides of Nitrogen, g/km		2.16	0.68	2.93	0.68
<u>Particulates</u>					
Total Particulates		19.28	17.71	11.72	11.44
<u>Compound Group Totals</u>					
Aldehydes & Ketones		3.6	2.6	1.1	1.0
Individual Hydrocarbons		237.8	226.3	55.8	52.9
Organic Sulfides		0.05	0.04	0.03	0.02
Organic Amines		0.00	0.00	0.00	0.00
<u>Other Compounds</u>					
Ammonia		13.51	6.80	10.20	3.40
Cyanide & Cyanogen		5.77	1.99	2.12	0.39
Hydrogen Sulfide		0.00	0.05	0.00	0.00
Nitrous Oxide		145.01	42.69	91.66	24.63
<u>Aldehydes &amp; Ketones</u>					
Formaldehyde		1.13	1.22	0.10	0.60
Acetaldehyde		2.14	1.21	0.70	0.41
Acetone		0.00	0.00	0.26	0.00
Methylethylketone		0.25	0.11	0.00	0.00
Hexanaldehyde		0.00	0.00	0.00	0.00

TABLE F-6 (Cont'd.). CAR 06 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

Test No.	Average Emission Rates, mg/km			
	FTP		HFET	
	Received	Tune-Up	Received	Tune-Up
061-062	066-068		061-062	066-067
<u>Individual Hydrocarbons</u>				
Methane	54.21	55.71	22.82	22.41
Ethylene	45.12	44.15	10.62	9.78
Ethane	9.69	12.06	4.88	4.93
Acetylene	15.08	17.67	0.00	0.00
Propane	0.37	1.83	0.00	0.75
Propylene	22.76	17.15	3.71	2.82
Benzene	32.04	27.32	5.38	5.23
Toluene	58.54	50.37	8.35	6.92
<u>Organic Sulfides</u>				
Carbonyl Sulfide	0.05	0.02	0.03	0.01
Methyl Sulfide	0.00	0.01	0.00	0.01
Ethyl Sulfide	0.01	0.01	0.00	0.00
Methyl Disulfide	0.00	0.00	0.00	0.00
<u>Organic Amines</u>				
Monomethylamine	0.00	0.00	0.00	0.00
Monoethylamine	0.00	0.00	0.00	0.00
Trimethylamine	0.00	0.00	0.00	0.00
Diethylamine	0.00	0.00	0.00	0.00
Triethylamine	0.00	0.00	0.00	0.00
<u>Trace Elements<sup>a</sup></u>				
Sodium	0.00	0.00	0.00	0.00
Sulfur	0.04	0.04	0.02	0.03
Vanadium	0.01	0.00	0.00	0.00
Magnesium	0.01	0.02	0.01	0.01
Chlorine	0.00	0.01	0.00	0.10
Aluminum	0.03	0.03	0.01	0.00
Manganese	0.04	0.00	0.00	0.00
Zinc	0.01	0.02	0.00	0.00
Silicon	0.01	0.03	0.01	0.02
Calcium	0.04	0.17	0.02	0.00
Iron	0.37	0.20	0.13	0.11
Phosphorus	0.03	0.02	0.01	0.01
Titanium	0.00	0.00	0.00	0.00
Bromine	0.09	0.06	0.05	0.21

<sup>a</sup>This table excludes all elements having measured values consistently below 0.01 mg/km.

TABLE F-7. CAR 07 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

		Average Emission Rate, mg/km (Except at Noted)			
		FTP		HFET	
		As- Received	After Tune-Up	As- Received	After Tune-Up
Test No.	VVT	071-072	076-078	071-072	076-078
Barometer,	mm Hg	742.1	745.3	742.3	744.6
Humidity,	g/kg	5.6	6.2	5.4	7.0
Temperature,	°C	23.9	23.9	25.0	27.0
Total Fuel Sulfur, mg/km		27.40	26.48	17.26	17.75
Avg. Exh. Oxygen, %		4.18	5.13	4.98	4.99
Carbon Dioxide, g/km		380.1	367.9	245.7	252.6
Fuel Cons., l/100 km		16.83	16.26	10.60	10.91
<u>Regulated Emissions</u>					
Hydrocarbons (THC), g/km		0.40	0.41	0.11	0.13
Carbon Monoxide, g/km		8.22	7.57	1.45	1.60
Oxides of Nitrogen, g/km		0.45	0.44	0.37	0.36
<u>Particulates</u>					
Total Particulates		30.79	38.04	20.44	24.94
<u>Compound Group Totals</u>					
Aldehydes & Ketones		7.7	8.5	5.3	7.7
Individual Hydrocarbons		234.3	215.2	66.2	73.5
Organic Sulfides		0.08	0.04	0.07	0.02
Organic Amines		0.00	0.00	0.00	0.00
<u>Other Compounds</u>					
Ammonia		2.64	12.68	4.54	3.79
Cyanide & Cyanogen		0.70	0.27	0.22	0.17
Hydrogen Sulfide		0.00	0.00	0.00	0.00
Nitrous Oxide		2.39	3.45	2.28	2.49
<u>Aldehydes &amp; Ketones</u>					
Formaldehyde		6.36	7.68	4.57	6.61
Acetaldehyde		1.33	0.84	0.75	1.03
Acetone		0.00	0.00	0.00	0.00
Methylethylketone		0.00	0.00	0.00	0.00
Hexanaldehyde		0.00	0.00	0.00	0.00

TABLE F-7 (Cont'd). CAR 07 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

	Average Emission Rates, mg/km			
	FTP		HFET	
	Received	Tune-Up	Received	Tune-Up
Test No.	071-072	076-078	071-072	076-078
<u>Individual Hydrocarbons</u>				
Methane	89.27	70.33	19.41	20.98
Ethylene	48.45	52.35	24.02	26.17
Ethane	12.15	10.43	3.81	3.28
Acetylene	8.66	7.71	0.72	1.67
Propane	0.58	0.13	0.00	0.00
Propylene	16.47	16.48	5.49	5.76
Benzene	21.17	20.95	6.07	6.83
Toluene	37.56	36.85	6.67	8.81
<u>Organic Sulfides</u>				
Carbonyl Sulfide	0.05	0.02	0.05	0.01
Methyl Sulfide	0.01	0.01	0.02	0.01
Ethyl Sulfide	0.02	0.01	0.00	0.01
Methyl Disulfide	0.01	0.01	0.00	0.00
<u>Organic Amines</u>				
Monomethylamine	0.00	0.00	0.00	0.00
Monoethylamine	0.00	0.00	0.00	0.00
Trimethylamine	0.00	0.00	0.00	0.00
Diethylamine	0.00	0.00	0.00	0.00
Triethylamine	0.00	0.00	0.00	0.00
<u>Trace Elements<sup>a</sup></u>				
Sodium	0.03	0.00	0.00	0.00
Sulfur	0.10	0.10	0.17	0.53
Magnesium	0.02	0.01	0.01	0.01
Chlorine	0.02	0.01	0.01	0.01
Aluminum	0.03	0.02	0.01	0.01
Zinc	0.03	0.01	0.01	0.00
Silicon	0.09	0.01	0.01	0.03
Calcium	0.22	0.08	0.05	0.04
Iron	0.32	0.10	0.06	0.02
Phosphorus	0.02	0.01	0.01	0.01
Arsenic	0.04	0.00	0.00	0.00
Molybdenum	0.27	0.28	0.27	0.08
Tungsten	0.00	0.00	0.04	0.00
Strontium	0.16	0.19	0.17	0.04

<sup>a</sup>This table excludes all elements having measured values consistently below 0.01 mg/km.

TABLE F-8. CAR 08 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

		Average Emission Rate, mg/km (Except at Noted)			
		FTP		HFET	
		As- Received	After Tune-Up	As- Received	After Tune-Up
Test No.	VVT	081-082	086-087	081-082	086-087
Barometer,	mm Hg	745.1	742.7	745.7	742.6
Humidity,	g/kg	6.8	11.4	7.5	11.8
Temperature,	°C	25.6	25.0	26.2	25.9
Total Fuel Sulfur,	mg/km	20.80	20.52	13.70	13.92
Avg. Exh. Oxygen,	%	2.93	1.35	2.58	0.85
Carbon Dioxide,	g/km	293.7	279.3	192.7	197.8
Fuel Cons.,	l/100 km	12.78	12.60	8.41	8.55
<u>Regulated Emissions</u>					
Hydrocarbons (THC),	g/km	0.28	0.52	0.07	0.14
Carbon Monoxide,	g/km	3.07	9.10	0.16	1.36
Oxides of Nitrogen,	g/km	2.09	0.71	2.57	0.79
<u>Particulates</u>					
Total Particulates		19.90	37.66	12.29	16.29
<u>Compound Group Totals</u>					
Aldehydes & Ketones		5.3	1.6	3.3	0.6
Individual Hydrocarbons		106.9	239.8	22.0	62.3
Organic Sulfides		0.06	0.07	0.02	0.01
Organic Amines		0.00	0.00	0.00	0.00
<u>Other Compounds</u>					
Ammonia		6.74	3.93	3.23	3.72
Cyanide & Cyanogen		1.22	2.09	0.20	0.44
Hydrogen Sulfide		0.00	0.02	0.00	0.00
Nitrous Oxide		38.86	31.78	18.88	28.12
<u>Aldehydes &amp; Ketones</u>					
Formaldehyde		5.31	1.27	2.32	0.60
Acetaldehyde		0.00	0.30	0.00	0.00
Acetone		0.00	0.00	0.00	0.00
Methylethylketone		0.00	0.00	0.00	0.00
Hexanaldehyde		0.00	0.00	0.92	0.00

TABLE F-8 (Cont'd). CAR 08 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

Test No.	Average Emission Rates, mg/km			
	FTP		HFET	
	Received	Tune-Up	Received	Tune-Up
081-082	086-087		081-082	086-087
<u>Individual Hydrocarbons</u>				
Methane	21.35	51.62	7.34	21.18
Ethylene	24.60	49.87	5.99	12.92
Ethane	6.53	13.29	2.22	5.49
Acetylene	5.92	15.37	0.00	0.00
Propane	0.14	0.57	0.00	0.00
Propylene	9.71	21.97	0.00	5.22
Benzene	11.21	30.29	2.07	6.92
Toluene	27.46	56.82	4.32	10.57
<u>Organic Sulfides</u>				
Carbonyl Sulfide	0.02	0.03	0.02	0.01
Methyl Sulfide	0.02	0.03	0.00	0.00
Ethyl Sulfide	0.03	0.01	0.00	0.00
Methyl Disulfide	0.00	0.00	0.00	0.00
<u>Organic Amines</u>				
Monomethylamine	0.00	0.00	0.00	0.00
Monoethylamine	0.00	0.00	0.00	0.00
Trimethylamine	0.00	0.00	0.00	0.00
Diethylamine	0.00	0.00	0.00	0.00
Triethylamine	0.00	0.00	0.00	0.00
<u>Trace Elements<sup>a</sup></u>				
Sulfur	0.06	0.03	0.20	0.04
Magnesium	0.01	0.01	0.01	0.01
Chlorine	0.01	0.01	0.01	0.01
Aluminum	0.04	0.02	0.02	0.01
Potassium	0.00	0.00	0.03	0.00
Zinc	0.01	0.01	0.00	0.01
Silicon	0.02	0.01	0.01	0.01
Calcium	0.06	0.04	0.07	0.04
Iron	0.49	0.09	0.14	0.07
Phosphorus	0.01	0.00	0.01	0.01
Arsenic	0.02	0.00	0.00	0.00
Molybdenum	0.17	0.23	0.06	0.15
Tungsten	0.02	0.03	0.00	0.03
Strontium	0.12	0.14	0.03	0.12

<sup>a</sup>This table excludes elements having measured values consistently below 0.01 mg/km

TABLE F-9. CAR 09 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

	VVT	Average Emission Rate, mg/km (Except at Noted)			
		FTP		HFET	
		As- Received	After Tune-Up	As- Received	After Tune-Up
Test No.	VVT	091-092	096	091-092	096
Barometer, mm Hg	741.8	734.1	742.3	733.6	
Humidity, g/kg	11.3	13.6	11.2	12.6	
Temperature, °C	24.5	23.9	24.7	26.1	
Total Fuel Sulfur, mg/km	12.59	12.39	8.38	8.17	
Avg. Exh. Oxygen, %	7.49	7.43	6.89	7.07	
Carbon Dioxide, g/km	177.4	175.1	120.0	117.2	
Fuel Cons., l/100 km	7.73	7.61	5.15	5.02	
<u>Regulated Emissions</u>					
Hydrocarbons (THC), g/km	0.40	0.34	0.14	0.10	
Carbon Monoxide, g/km	1.60	1.38	0.11	0.08	
Oxides of Nitrogen, g/km	1.86	1.80	2.08	1.77	
<u>Particulates</u>					
Total Particulates	35.09	33.42	29.46	19.86	
<u>Compound Group Totals</u>					
Aldehydes & Ketones	1.7	1.3	0.9	2.4	
Individual Hydrocarbons	99.5	104.9	30.4	--	
Organic Sulfides	0.03	0.01	0.00	0.00	
Organic Amines	0.00	0.00	0.00	0.00	
<u>Other Compounds</u>					
Ammonia	2.43	2.19	1.37	2.49	
Cyanide & Cyanogen	0.21	0.35	0.25	0.31	
Hydrogen Sulfide	0.00	0.00	0.00	0.00	
Nitrous Oxide	9.39	6.54	7.28	5.64	
<u>Aldehydes &amp; Ketones</u>					
Formaldehyde	1.70	1.34	0.90	2.45	
Acetaldehyde	0.00	0.00	0.00	0.00	
Acetone	0.00	0.00	0.00	0.00	
Methyl ethyl ketone	0.00	0.00	0.00	0.00	
Hexanaldehyde	0.00	0.00	0.00	0.00	

TABLE F-9 (Cont'd). CAR 09 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

Test No.	Average Emission Rates, mg/km			
	FTP		HFET	
	Received	Tune-Up	Received	Tune-Up
091-092	096		091-092	096
<u>Individual Hydrocarbons</u>				
Methane	24.56	32.90	6.17	--
Ethylene	24.76	25.00	14.70	--
Ethane	9.80	10.27	4.11	--
Acetylene	6.78	4.95	0.00	--
Propane	0.52	0.00	0.02	--
Propylene	5.07	4.44	1.84	--
Benzene	7.82	6.13	2.09	--
Toluene	20.23	21.25	1.45	--
<u>Organic Sulfides</u>				
Carbonyl Sulfide	0.02	0.01	0.00	0.00
Methyl Sulfide	0.01	0.00	0.00	0.00
Ethyl Sulfide	0.00	0.00	0.00	0.00
Methyl Disulfide	0.00	0.00	0.00	0.00
<u>Organic Amines</u>				
Monomethylamine	0.00	0.00	0.00	0.00
Monoethylamine	0.00	0.00	0.00	0.00
Trimethylamine	0.00	0.00	0.00	0.00
Diethylamine	0.00	0.00	0.00	0.00
Triethylamine	0.00	0.00	0.00	0.00
<u>Trace Elements<sup>a</sup></u>				
Sulfur	0.26	0.08	2.31	0.47
Vanadium	0.01	0.01	0.01	0.00
Chlorine	0.00	0.01	0.00	0.01
Aluminum	0.01	0.01	0.01	0.00
Potassium	0.00	0.00	0.00	0.01
Zinc	0.01	0.04	0.01	0.00
Silicon	0.02	0.00	0.01	0.00
Calcium	0.06	0.08	0.03	0.03
Iron	0.05	0.19	0.00	0.03
Phosphorus	0.00	0.02	0.00	0.00
Arsenic	0.00	0.00	0.00	0.00
Molybdenum	0.25	0.18	0.17	0.00
Tungsten	0.00	0.05	0.00	0.00
Strontium	0.15	0.16	0.12	0.07

<sup>a</sup>This table excludes all elements having measured values consistently below 0.01 mg/km.

TABLE F-10. CAR 10 AVERAGE FTP AND HFET RESULTS  
FOR THE AS RECEIVED AND AFTER TUNE-UP TESTS

		Average Emission Rate, mg/km (Except at Noted)			
		FTP		HFET	
		As- Received	After Tune-Up	As- Received	After Tune-Up
Test No.	VVT	101	106-107	101	106-107
Barometer,	mm Hg	744.7	737.3	744.7	737.7
Humidity,	g/kg	12.6	11.7	11.8	10.7
Temperature,	°C	25.6	24.5	31.1	26.2
Total Fuel Sulfur, mg/km		31.45	29.19	19.94	19.48
Avg. Exh. Oxygen, %		--	1.26	--	1.78
Carbon Dioxide, g/km		384.6	401.4	282.1	278.9
Fuel Cons., l/100 km		19.32	17.93	12.25	11.97
<u>Regulated Emissions</u>					
Hydrocarbons (THC), g/km		2.84	0.83	0.38	0.15
Carbon Monoxide, g/km		37.60	10.15	2.33	0.67
Oxides of Nitrogen, g/km		2.28	1.88	1.49	1.23
<u>Particulates</u>					
Total Particulates		264.23	83.41	71.46	61.89
<u>Compound Group Totals</u>					
Aldehydes & Ketones		19.8	6.0	8.1	2.1
Individual Hydrocarbons		1262.1	470.6	290.2	71.2
Organic Sulfides		0.03	0.03	0.01	0.03
Organic Amines		0.00	0.00	0.00	0.00
<u>Other Compounds</u>					
Ammonia		3.29	4.30	1.77	2.28
Cyanide & Cyanogen		1.91	0.23	0.12	0.12
Hydrogen Sulfide		0.25	0.27	0.13	0.06
Nitrous Oxide		12.94	12.93	13.01	8.53
<u>Aldehydes &amp; Ketones</u>					
Formaldehyde		17.01	5.81	6.44	1.68
Acetaldehyde		2.82	0.18	1.66	0.40
Acetone		0.00	0.00	0.00	0.00
Methylethylketone		0.00	0.00	0.00	0.00
Hexanaldehyde		0.00	0.00	0.00	0.00

**TECHNICAL REPORT DATA**  
*(Please read Instructions on the reverse before completing)*

1. REPORT NO. EPA-460/3-81-024	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE  CHARACTERIZATION OF EXHAUST EMISSIONS FROM HIGH MILEAGE CATALYST-EQUIPPED AUTOMOBILES		5. REPORT DATE September 1981
7. AUTHOR(S) Lawrence R. Smith		6. PERFORMING ORGANIZATION CODE
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Southwest Research Institute 6220 Culebra Road San Antonio, Texas 78284		8. PERFORMING ORGANIZATION REPORT NO.
12. SPONSORING AGENCY NAME AND ADDRESS  Environmental Protection Agency Office of Mobile Source Air Pollution Control 2565 Plymouth Road Ann Arbor, Michigan 48105		10. PROGRAM ELEMENT NO.  11. CONTRACT/GRANT NO. 68-03-2884
13. TYPE OF REPORT AND PERIOD COVERED Final Report (9/80 - 6/81)		
14. SPONSORING AGENCY CODE		
15. SUPPLEMENTARY NOTES		
16. ABSTRACT  This report describes the laboratory effort to characterize regulated and unregulated exhaust emissions from ten 1978 and 1979 high mileage catalyst equipped gasoline automobiles which have been driven for approximately 50,000 miles. The ten automobiles were evaluated as-received and after a tune-up to manufacturer's specifications, over the Light-Duty Federal Test Procedure (FTP) and the Highway Fuel Economy Driving Schedule (HFET). Exhaust constituents measured, in addition to the regulated emissions, include: aldehydes, particulates, sulfides, amines, metals, and several additional elements and compounds. Additional evaluations involved the measurement of the regulated emissions over four short-test procedures.		
17. KEY WORDS AND DOCUMENT ANALYSIS		
a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pollution Exhaust Emissions Gasoline Engines Motor Vehicles Catalytic Converters	Emissions Characterization Emission Test Procedures Light-Duty Vehicles	
18. DISTRIBUTION STATEMENT Release Unlimited	19. SECURITY CLASS ( <i>This Report</i> ) Unclassified	21. NO. OF PAGES 190
	20. SECURITY CLASS ( <i>This page</i> ) Unclassified	22. PRICE