

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

Air



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

Lawrence R. Smith

Southwest Research Institute
6220 Culebra Road
San Antonio, Texas 78284

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

EPA Project Officer: Robert J. Garbe
Task Branch Technical Representative: Penny M. Carey

Prepared for

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

September 1981

This report is issued by the Environmental Protection Agency to report technical data of interest to a limited number of readers. Copies are available free of charge to Federal employees, current contractors and grantees, and nonprofit organizations - in limited quantities - from the Library Services Office (MD-33), Research Triangle Park, North Carolina 27711; or, for a fee, from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

This report was furnished to the Environmental Protection Agency by Southwest Research Institute, 6220 Culebra Road, San Antonio, Texas, in fulfillment of Task Specifications 7 and 10 of Contract No. 68-03-2884. The contents of this report are reproduced herein as received from Southwest Research Institute. The opinions, findings, and conclusions expressed are those of the author and not necessarily those of the Environmental Protection Agency. Mention of company or product names is not to be considered as an endorsement by the Environmental Protection Agency.

Publication No. EPA-460/3-81-024

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 Previous Tasks ^a	Eight Low-Mileage Catalyst-Equipped Cars Previous Projects ^b
	As-Rec'd	After Tune-Up		
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

^aData for four 1970 model cars from Tasks 4 and 5 of this contract, EPA Report EPA-460/3-81-020

^bData 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
I. INTRODUCTION	1
A. Project Objective	1
B. Emissions Measurement Procedures	1
C. Vehicles Evaluated	1
D. Vehicle Testing	2
II. GENERAL EQUIPMENT, INSTRUMENTS, PREPARATIONS AND PROCEDURES	3
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
III. ANALYTICAL PROCEDURES FOR UNREGULATED EMISSIONS	17
A. Description of the Analytical Procedures	17
B. Validation and Qualification of the Analytical Procedures	20
C. Accuracy of the Analytical Procedures	21
IV. CAR SELECTION AND TESTING	25
A. Car Selection	25
B. Car Testing	27
C. Regulated and Unregulated Emission Test Results	30
D. I/M Short-Test Procedure Results	30
V. ANALYSES OF THE RESULTS	35
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_x), 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 _x , CO ₂ , Individual HC and N ₂ 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

*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)⁽⁷⁾ and the Highway Fuel Economy Driving Schedule (HFET).⁽⁸⁾ 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.⁽¹⁾ 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 m³/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

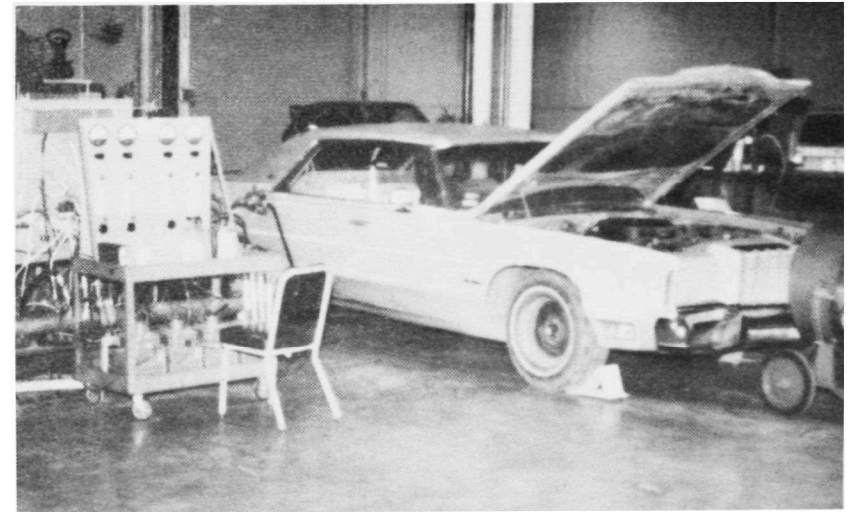
<u>Project Car No.</u>	<u>Year</u>	<u>Make</u>	<u>Model</u>	<u>Body Type</u>	<u>ID or Serial Number</u>
01	1978	Buick	Regal	2-dr	4J47H8H148317
02	1979	Mercury	Marquis	4-dr	9Z62H619190
03	1979	Mercury	Marquis	2-dr	F9Z65H637732F
04	1978	Ford	Granada	2-dr	8W81F129943
05	1978	Volvo	245 DL	4-dr (wagon)	VC24545L1176861
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



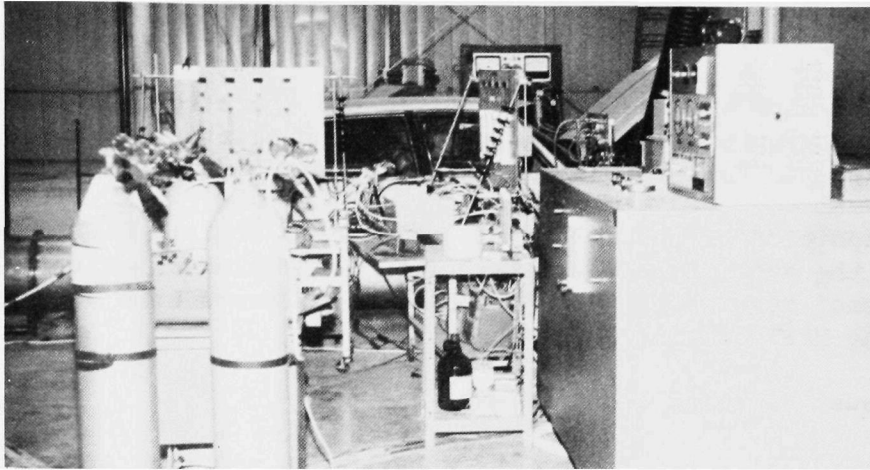
Car 06 - 1978 Oldsmobile Cutlass

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

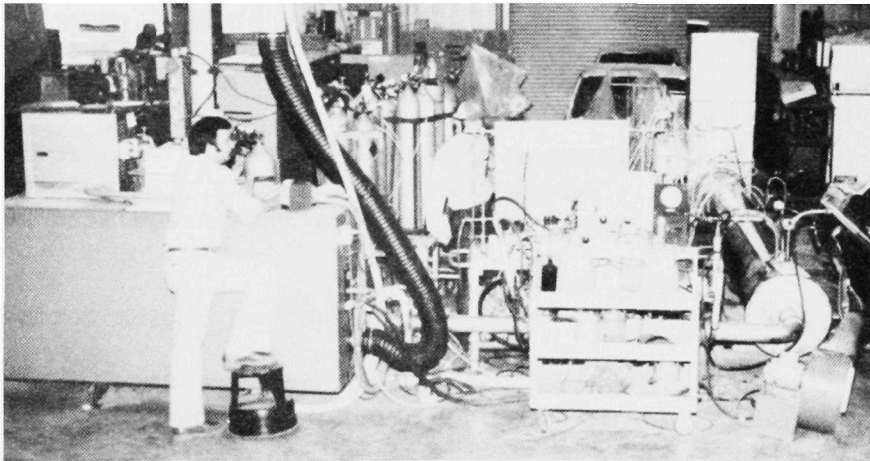
TABLE 2. DESCRIPTION OF CHEVRON UL-CQ26B1 UNLEADED GASOLINE

	<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</u> <u>(% 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

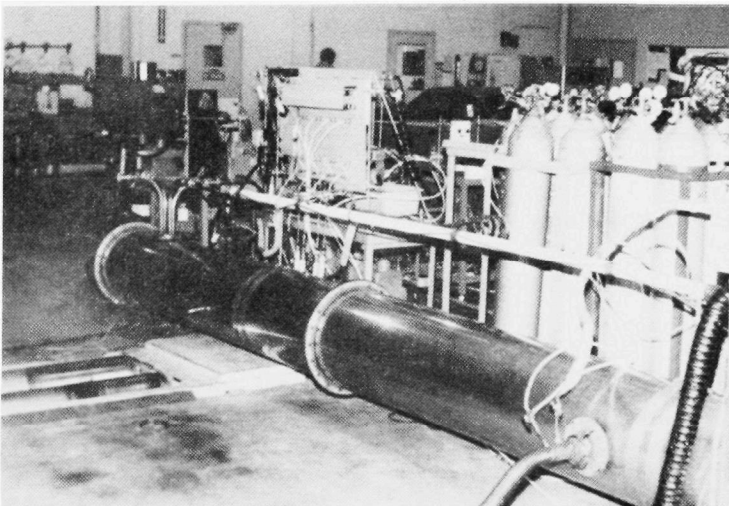
NOTE: These inspection data were provided by the Chevron Research Company.



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.⁽⁷⁾

In addition to the 142 m³/min (5000 cfm) cooling fan placed in front of the automobile, 42 m³/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_x, and CO₂ 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.⁽⁷⁾ 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 ₂	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

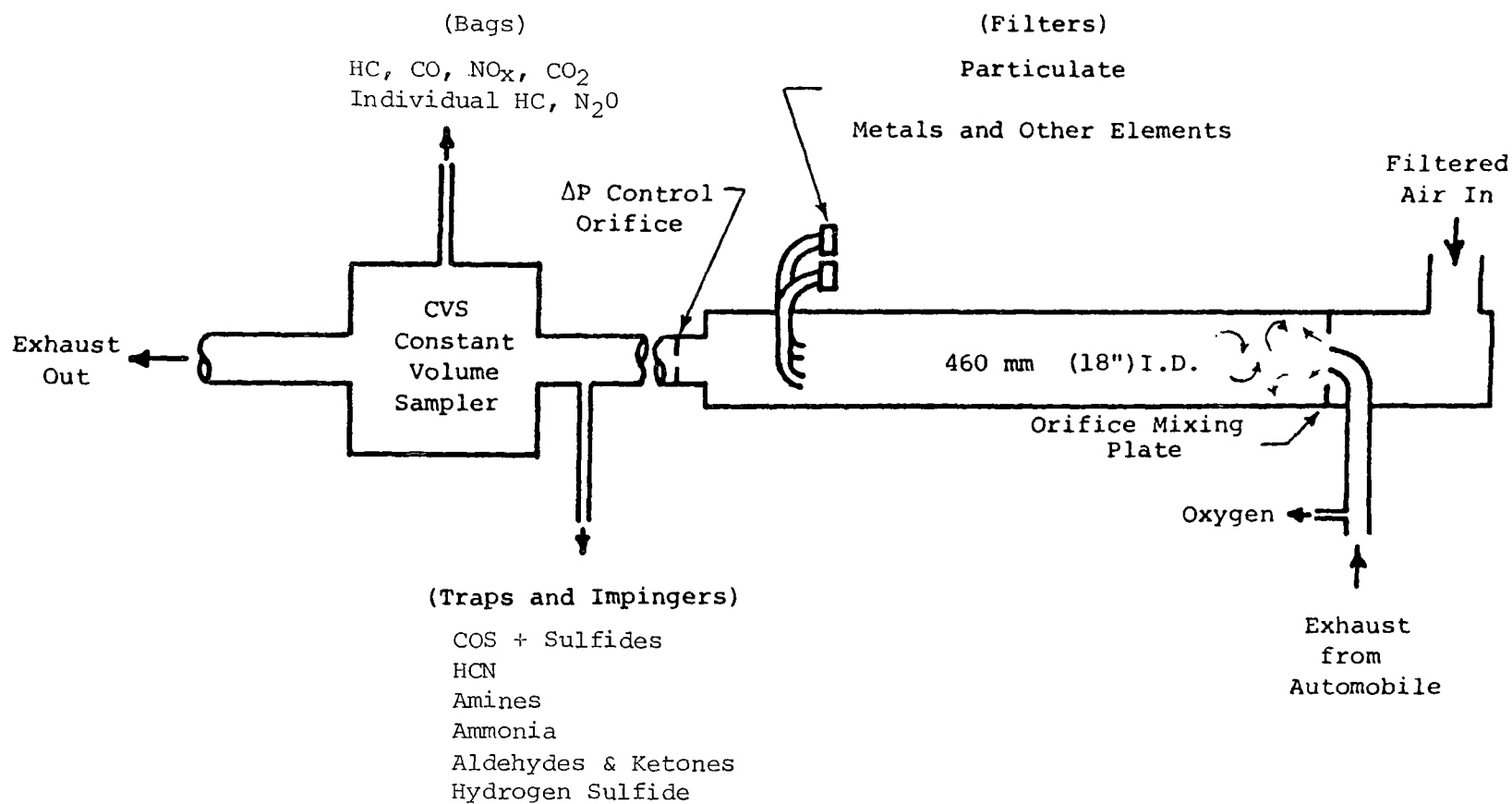


Figure 3. Gasoline engine emissions sampling system.

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⁽⁷⁾
(uses the Urban Dynamometer Driving Schedule)

HFET - Highway Fuel Economy Driving Schedule⁽⁸⁾

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-segement 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	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:

$$3\text{-FTP M/D} \approx \frac{0.43 \times (M1 + M2) + 0.57 \times (M3 + M2)}{D1 + D2}$$

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

$$\frac{\text{MASS}}{\text{DISTANCE}} = \frac{0.43 \times M(1 + 2)}{(D1 + D2)} + \frac{0.57 \times M(3 + 4)}{(D3 + D4)}$$

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

$$4\text{-FTP M/D} \approx \frac{0.43 \times M(1 + 2) + 0.57 \times M(3 + 4)}{D1 + D2}$$

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</u>	
			<u>km/hr</u>	<u>mph</u>
FTP:				
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.

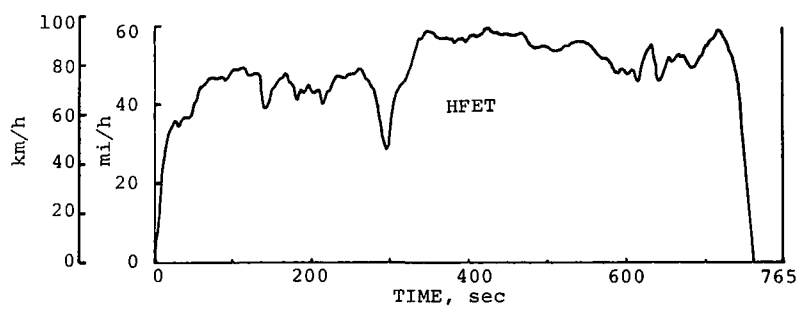
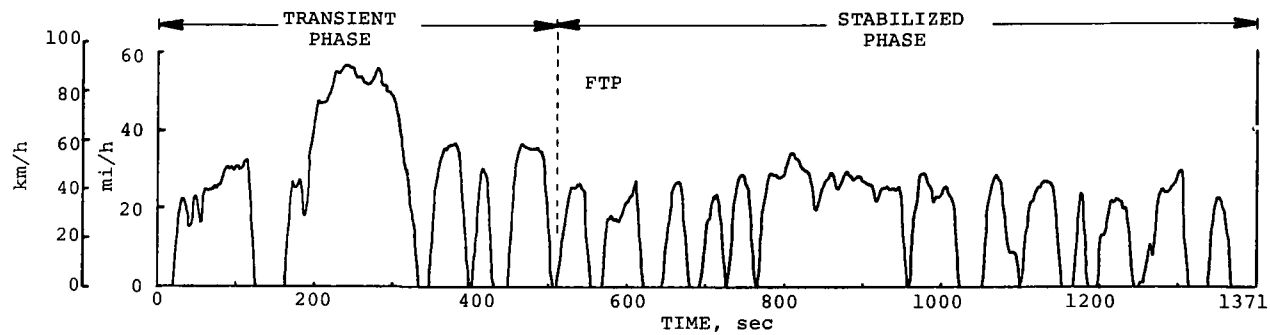


Figure 4. Driving cycle speed vs time traces

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.⁽⁷⁾ 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.⁽⁶⁾

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_4^+ , after collection in dilute H_2SO_4 . 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 (NH ₃)	Impinger	Ion Chromatograph.
Aldehydes & Ketones	Impinger	Dinitrophenylhydrazone derivative. Gas chromatograph with flame ionization detector (GC-FID).
Hydrogen Sulfide (H ₂ S)	Impinger	Methylene blue derivative. Spectrophotometer.
Total Cyanide [Hydrogen Cyanide (HCN) and Cyanogen (C ₂ 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 KH_2PO_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 CN^- standards are used to quantify the results.

Carbonyl and Organic Sulfides - The collection of carbonyl sulfide (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°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 (CH_4), ethane (C_2H_6), ethylene (C_2H_4), acetylene (C_2H_2), propane (C_3H_8), propylene (C_3H_6), benzene (C_6H_6), and toluene (C_7H_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 ^a
Metals and Other Elements	No ^a	No ^a
Particulates	No ^a	No ^a
Nitrous Oxide	Yes	Yes

^aEstablished procedure

TABLE 9. EMISSION PROCEDURAL SAMPLE RATES AND ACCURACY

		Mol. Weight	Sample Flow ℓ/100	μg/m ³ per ppm	Procedural Minimum Detection Values ^a		MDV for FTP mg/km ^b
					ppm	μg/m	
Test Number,	VVT	--	--	--	--	--	--
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 ^C	575	10
Carbon Monoxide		28.01	Bag	1165	2.0 ^C	2330	40
Oxides of Nitrogen		46.01	Bag	1915	0.5 ^C	958	16
<u>Particulates</u>							
Total Particulates		--	14.0	--	--	<50	<1
<u>Compound Group Totals</u>							
Aldehydes & Ketones		--	4.0	--	--	--	≈0.5
Individual Hydrocarbons		--	Bag	--	--	--	≈0.5
Organic Sulfides		--	0.13	--	--	--	≈0.05
Organic Amines		--	4.0	--	--	--	≈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

^aBased on a 23-minute sampling period at the specified flow rate for all impinger, filter and trap collected samples.

^bBased on μg/m³ in the diluted exhaust and typical UDDS (FTP 505 and 867) parameters (1372 seconds, 206 m³ CVS flow, 12.07 km, 0.98 DSFC).

^cBased on the lowest instrument ranges used in this project.

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

				Procedural		
				Minimum		MDV
			$\mu\text{g}/\text{m}^3$	Detection		for
			per	Values ^a		FTP
	Mol.	CRC ^d	ppm	ppm	$\mu\text{g}/\text{m}^3$	mg/km ^b
	Weight	Synonym				
<u>Aldehydes and Ketones</u>						
Formaldehyde	30.03	--	1250	0.01	15	0.2
Acetaldehyde	44.05	--	1830	0.01	20	0.3
Acetone ^e	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 ^f	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

^a & ^bSee initial page of this table.

^dHandbook of Chemistry and Physics, 54th Edition.

^eIncludes Acrolein - 56.07 and Propionaldehyde - 58.08 (CRC - Propenal and Propanal, respectively).

^fIncludes 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 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</u>
	<u>HC</u>	<u>CO</u>	<u>NO_x</u>	<u>ℓ/100 km</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	Description	Emissions, g/km			ℓ/100 km			
		HC	CO	NO _x				
FTP								
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 ^a	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 ^a	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 ^b	19 ^b
12	6.8	0.3	0.8	0.2	130	3	13 ^b	1 ^b
121RBI ^a	9.7	6.6	3.6	5.9	230	170	72 ^b	136 ^b
11	6.5	3.4	4.2	3.2	144	50	34	35

^aRich Best Idle fuel/air mixture setting.

^bThe 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:

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

^aSince the Buick Regal met all tune-up requirements, the two tests conducted were designated as-received tests.

^bCarburetor 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.

^cFirst 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		14% Low	13% High
Ignition Timing						6° Low		4° High
Idle CO%			0.6% High					
Choke		✓						
Parts Replaced								
Plugs					✓	✓		
Air Filter	✓		✓		✓		✓	✓
Plug Wires	✓			✓		✓		
EGR				✓		✓	✓ ^f	
Other	a			b,c,d		e		g,h

^aVacuum lines to temperature switch in the air cleaner reversed

^bLine to EGR was plugged with sawed off top portion of a spark plug; line was connected properly and unbroken otherwise

^cVacuum line from base of carburetor to vacuum canister broken

^dNo. 1 plug loose

^ePCV hose split, replaced

^fEGR port on the intake manifold was plugged with carbon deposits, EGR was functioning but was replaced because of excessive carbon deposits

^gSeveral brittle vacuum lines replaced

^hReplaced 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

Car	Gear	Idle Propane Enrichment, rpm Increase	
		As-Received	After Tune-up
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_x 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_x 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_x emission rates of the cars tested. The hydrocarbon, carbon monoxide, and NO_x 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_x emission

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

<u>FTP</u>								
	<u>HC (g/km)</u>		<u>CO (g/km)</u>		<u>NO_x (g/km)</u>		<u>Fuel Consumption (ℓ/100 km)</u>	
	<u>After</u>		<u>After</u>		<u>After</u>		<u>After</u>	
	<u>As-Rec'd</u>	<u>Tune-up</u>	<u>As-Rec'd</u>	<u>Tune-up</u>	<u>As-Rec'd</u>	<u>Tune-up</u>	<u>As-Rec'd</u>	<u>Tune-up</u>
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^a

	FTP Measured Emissions/FTP Emission Standard ^b					
	HC		CO		NO _x	
	As-Rec'd	After Tune-up	As-Rec'd	After Tune-up	As-Rec'd	After Tune-up
Car 01	1.1	1.1 ^c	1.6	1.6 ^c	0.8	0.8 ^c
Car 02	0.5	0.5 ^c	0.4	0.4	1.2	1.2 ^c
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

^aNumbers greater than one indicate the vehicle emission rate exceeded the Emission Standard.

^bCars 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_x. 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_x.

^cCars 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_x standard.

B. Aldehyde and Ketone Emission Rates

Five individual aldehydes and ketones were evaluated in this project: formaldehyde, acetaldehyde, acetone (includes propionaldehyde and acrolein), methylethylketone and hexanaldehyde. Acetone, methylethylketone 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.(1,2,3,4) 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.(1,2,3,4) 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		
	Form- aldehyde	Acet- aldehyde	Total Aldehydes and Ketones	Form- aldehyde	Acet- aldehyde	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) ^a	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) ^a	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 ^b (As-Received)	5.04 ^c	1.12	6.2	2.43	0.54	3.1
Average All Cars ^b (After Tune-up)	3.49 ^c	0.70	4.2	2.56	0.32	2.9

^aOnly one test point^bData for Cars 1 and 2 used in both averages^cValues 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		After Tune-Up	Oxidation Catalyst ^a	3-Way Catalyst ^b		
	As-Rec'd	After Tune-Up	As-Rec'd		Catalyst ^a	Catalyst ^b	1970 ^c	1977 ^d
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

^a Average for four 1978 oxidation catalyst-equipped cars in unmodified configuration,
EPA Contract 68-03-2499

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

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

^d 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

	Emission Rate, mg/km												
	S	Mg	Cl	Al	Zn	Si	Ca	Fe	P	Br	Mo ^a	W ^a	Sr ^a
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

^a These analyses not conducted for Cars 01-06.

^b 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

	FTP Emission Rates, mg/km	
	Average for 10 Cars <u>As-Received</u>	Average for 10 Cars <u>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

	No. of Cars for which emissions Decreased after <u>Tune-up</u>	No. of Cars for which emissions Increased after <u>Tune-up</u>	No. of Cars for which emissions remained unchanged after <u>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

	FTP Emission Rates in mg/km						
	Car 01	Car 06-1978		Car 08-1978		1978 Malibu	
	1978 Buick	Olds. Cutlass		Monte Carlo		Previous Project	
	Regal	As-Rec'd	After Tune-up	As-Rec'd	After Tune-up	Unmod. ^a	Maximum ^b
<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
<u>Fuel Consumption (ℓ/100 km)</u>							
	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_x

^a 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.

^b 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 02	Car 03		1979 Marquis Previous Projects		
	1979 Marquis	1979 Marquis	After			
	As-Rec'd	As-Rec'd	Tune-up	Unmod. ^a	19,000 miles ^b	Maximum ^c
Regulated Emissions						
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
Particulates						
Total Particulates	17	24	16	4	--	11
Compound Group Totals						
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
Other Compounds						
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_x

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

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

^c 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. ^a	Maximum ^b
<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
<u>FTP Fuel Consumption (ℓ/100 km)</u>				
	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_x.

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

^b 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	After Tune-up	Unmod. ^a	19,000 mi. ^b	Maximum ^c
<u>Regulated Emissions</u>					
Hydrocarbons	380	380	100	150	2,150
Carbon Monoxide	3,680	3,340	2,090	2,340	29,470
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	3
Organic Sulfides	0.1	<0.1	0.3	<0.1	3.2
Organic Amines	0.0	0.0	<0.1	<0.1	<0.1
<u>Other Compounds</u>					
Ammonia	19	31	61	2	318
Cyanide & Cyanogen	0.7	0.9	1.1	2.4	67
Hydrogen Sulfide	0.0	0.0	0.1	0.0	6.6
Nitrous Oxide	106	123	11	22	23
<u>FTP Fuel Consumption (ℓ/100 km)</u>					
	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_x

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

^b 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.

^c 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		Previous Project	
	As-Rec'd	After Tune-up	Unmod. ^a	Maximum ^b
<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_x

^a 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).

^b 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 ^a	As-Rec'd	After Tune-up	Avg. Unmod. ^b	Maximum ^c
<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
<u>Fuel Consumption (l/100 km)</u>						
	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_x.

^aOnly one test point

^bAverage emission rates of four 1978 oxidation catalyst cars tuned to manufacturer's specification, EPA Contract 68-03-2499.

^cMaximum 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					
	As-Rec'd	After Tune-up	Oxid. Cat. 1978 ^b	3-Way Cat. 1978 & 1979 ^b	Non-Catalyst 1970 ^a 1977 ^b	
<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 ^c	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

^aData for four 1970 model cars from Tasks 4 and 5 of this contract

^bData 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

^cLeaded 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_x 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_x . 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).⁽¹⁾ 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^3 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_x 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 ³ (EC) ^a	Threshold Limit Value (TLV in mg/m ³)		Ratio of EC to TLV
				OSHA (9)	R ^b	
<u>Regulated Emissions</u>						
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
<u>Total Particulates</u>	264	10	145	--	--	--
<u>Compound Group Totals</u>						
Aldehydes & Ketones	20	10	11	--	--	--
Organic Sulfides	0.6	03	0.3	--	10	<1
Organic Amines	<0.1	01	<0.1	--	>10	<1
<u>Other Compounds</u>						
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
<u>Average Emissions (as-Received)</u>						
<u>Regulated Emissions</u>						
Hydrocarbons	780	--	570	--	--	--
Carbon Monoxide	9,200	--	6,720	55	--	120
Oxides of Nitrogen	1,340	--	980	9	--	110
<u>Total Particulates</u>	49	--	36	--	--	--
<u>Compound Group Totals</u>						
Aldehydes & Ketones	6	--	4	--	--	--
Organic Sulfides	0.2	--	0.1	--	10	<1
Organic Amines	<0.1	--	<0.1	--	>10	<1
<u>Other Compounds</u>						
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

^aDerived on a wet basis using the following approximate calculations:

mg/m³ = Conversion Factor × mg/km. CF = Distance × Dilution Factor ÷ Volume

^bBased 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

1. Urban, C.M., "Regulated and Unregulated Exhaust Emissions from Malfunctioning Non-Catalyst and Oxidation Catalyst Gasoline Automobiles," Final Report to Environmental Protection Agency under Contract No. 68-03-2499, January 1980.
2. Urban, C.M., "Regulated and Unregulated Exhaust Emissions from Malfunctioning Three-Way Catalyst Gasoline Automobiles," Final Report to Environmental Protection Agency under Contract No. 68-03-2588, January 1980.
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.
4. Smith, L.R., "Characterization of Emissions from Motor Vehicles Designed for Low NO_x Emissions," Final Report to Environmental Protection Agency under Contract No. 68-02-2497, July 1980.
5. Urban, C.M., "Unregulated Exhaust Emissions from Non-Catalyst Baseline Cars Under Malfunction Conditions," Final Report to Environmental Protection Agency under Tasks 4 and 5 of Contract No. 68-03-2884, 1981.
6. Dietzmann, H.E., et al. "Analytical Procedures for Characterizing Unregulated, Pollutant Emissions from Motor Vehicles," Report EPA 600/2-79-017, February 1979.
7. Code of Federal Regulations, Title 40, Chapter 1, Part 85, Subpart H Section applicable to 1979 Model Year Light-Duty Vehicles.
8. Highway Fuel Economy Driving Schedule (Federal Register, Vol. 41, No. 100, May 21, 1976, Appendix I).
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 N₂O

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 $\mu\text{g}/\text{m}^3$:

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

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

B. Calculation of mg/km

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

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

Dry (DFC) and (SFC) was used for all unregulated emissions except: IHC and N₂O

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

C. Metals and Other Elements

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

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

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

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

D. Calculation of Oxygen

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

= % 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)	NOX HUMIDITY CORRECTION FACTOR
RELATIVE HUMIDITY	PCT		ABS. HUMIDITY	GM/KG		

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT	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
 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			3-BAG	(4-BAG)
TEST NUMBER				()
BAROMETER	MM HG			()
HUMIDITY	G/KG			()
TEMPERATURE	DEG C			()
		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
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

		Emission Rate, mg/km (Except at Noted)			
		FTP		HFET	
		As-Received	After Tune-up	As-Received	After Tune-up
Test Number,	VVT	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
Trace Elements		011	012	011	012
Sodium	Na	0.01			
Sulfur	S	0.02	0.03	0.06	0.07
Vanadium	V				
Nickel	Ni				
Cadmium	Cd				
Mercury	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		
Antimony	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

		Emission Rate, mg/km (Except at Noted)			
		FTP		HFET	
		As-Received	After Tune-up	As-Received	After Tune-up
Test Number,	VVT	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
Trace Elements		021	022	021	022
Sodium	Na				
Sulfur	S	0.32	0.41	2.18	4.41
Vanadium	V				
Nickel	Ni				
Cadmium	Cd				
Mercury	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	
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

		Emission Rate, mg/km							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,	VVT	031	032	036	037	031	032	036	037
<u>Trace Elements</u>									
Sodium	Na								
Sulfur	S	0.11	0.12	0.20	0.20	0.20	0.35	0.93	0.85
Vanadium	V								
Nickel	Ni								
Cadmium	Cd								
Mercury	Hg								
Magnesium	Mg			0.01					
Chlorine	Cl	0.04	0.03	0.01		0.01	0.01		
Chromium	Cr								
Copper	Cu								
Tin	Sn								
Lead	Pb								
Aluminum	Al	0.02	0.03	0.18	0.04	0.01		0.01	
Potassium	K								
Manganese	Mn			0.02					
Zinc	Zn								
Antimony	Sb								
Silicon	Si	0.19	0.12	0.08	0.11	0.12	0.01	0.01	0.02
Calcium	Ca	0.02	0.02	0.04	0.03	0.03	0.01		0.01
Iron	Fe	0.50	0.49	1.42	0.47	0.17	0.04	0.10	0.03
Selenium	Se								
Barium	Ba								
Phosphorus	P	0.01	0.01	0.02	0.02				
Titanium	Ti		0.03				0.03		
Cobalt	Co								
Bromine	Br	0.21	0.12	0.08		0.12			
Platinum	Pt								

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

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

		Emission Rate, mg/km (Except at Noted)					
		FTP			HFET		
		As-Received		After Tune-up	As-Received		After Tune-up
Test Number,	VVT	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

		Emission Rate, mg/km			
		FTP		HFET	
		As-Received	After Tune-up	As-Received	After Tune-up
Test Number,	VVT	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				
Mercury	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				

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

		Emission Rate, mg/km (Except at Noted)							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,	VVT	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

		Emission Rate, mg/km							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,	VVT	051	052	056	057	051	052	056	057
<u>Trace Elements</u>									
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								
Mercury	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

		Emission Rate, mg/km (Except at Noted)							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,	VVT	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

		Emission Rate, mg/km							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,	VVT	061	062	068	067	061	062	066	067
<u>Trace Elements</u>									
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		0.10	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

		Emission Rate, mg/km (Except at Noted)							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,	VVT	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		--	--	--	--	--	--	--	--
Methylethylketone		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
Trace Elements									
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	

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	
Test Number,	VVT	081	082	086	087	081	082	086	087
Barometer,	mm Hg	748.5	741.7	745.2	740.2	747.8	743.7	745.2	739.9
Humidity,	g/km	5.1	8.4	10.6	12.2	5.7	9.2	11.4	12.2
Temperature,	°C	25.6	25.6	25.0	25.0	25.6	26.7	26.7	25.0
Total Fuel Sulfur,	mg/km	20.64	20.95	20.55	20.48	13.32	14.07	13.90	13.94
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

		Emission Rate, mg/km (Except at Noted)							
		FTP				HFET			
		As-Received		After Tune-up		As-Received		After Tune-up	
Test Number,	VVT	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	53.12	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								
Aluminum	Al	0.05	0.02	0.01	0.02	0.02	0.01	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

		Emission Rate, mg/km (Except at Noted)					
		FTP			HFET		
		As-Received		After Tune-up	As-Received		After Tune-up
Test Number,	VVT	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
		091	092	096	091	092	096
<u>Trace Elements</u>							
Sodium	Na						
Sulfur	S	0.18	0.34	0.08	2.06	2.55	0.47
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	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

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>									
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

		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

		EMISSION RATE, MG/KM							
		FTP				HFET			
		As Received		After Tune-up		As Received		After Tune-up	
Test Number, VVT		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		
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	
	COLD-UDDS	HOT-UDDS
Total Particulate	60.42	21.69
Ammonia	18.92	3.83
Cyanides & Cyanogen	2.32	1.09
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	6.80	5.18
Acetaldehyde	0.80	0.35
Acetone	0.00	0.00
Isobutyraldehyde	--	--
Methyl ethyl ketone	0.00	0.00
Hexanaldehyde	0.00	0.00
<u>Organic Sulfides</u>		
Carbonyl sulfide	0.03	0.23
Methyl sulfide	0.03	0.10
Ethyl sulfide	0.00	0.01
Methyl disulfide	0.00	0.00
<u>Organic Amines</u>		
Monomethylamine	0.00	0.00
Monoethylamine + dimethylamine	0.02	0.04
Trimethylamine	0.02	0.00
Diethylamine	0.00	0.00
Triethylamine	0.00	0.00

	Test 012 Emissions in mg/km	
	COLD-UDDS	HOT-UDDS
Total Particulate	25.14	23.31
Ammonia	3.12	1.68
Cyanides & Cyanogen	3.70	1.34
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	9.52	13.46
Acetaldehyde	0.35	4.48
Acetone	0.00	0.00
Isobutyraldehyde	--	--
Methyl ethyl ketone	0.00	0.00
Hexanaldehyde	0.00	0.00
<u>Organic Sulfides</u>		
Carbonyl sulfide	0.29	0.05
Methyl sulfide	0.09	0.03
Ethyl sulfide	0.00	0.00
Methyl disulfide	0.00	0.00
<u>Organic Amines</u>		
Monomethylamine	0.04	0.06
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	19.34	4.54	4.22	2.86
Ethylene	25.13	9.93	8.93	4.58
Ethane	2.92	1.25	1.66	0.93
Acetylene	13.61	0.13	0.31	0.00
Propane	0.16	0.00	0.00	0.00
Propylene	10.55	4.69	4.18	2.14
Benzene	13.57	5.67	4.81	3.59
Toluene	22.39	9.69	7.21	3.93
N ₂ O	0.64	0.84	1.33	0.76

	Emissions in ppm			
	COLD-UDDS		HOT-UDDS	
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	15.40	3.53	3.74	2.36
Ethylene	19.96	6.95	6.13	2.62
Ethane	2.73	1.38	1.73	1.07
Acetylene	10.69	0.00	0.35	0.00
Propane	0.17	0.07	0.07	0.08
Propylene	8.39	3.40	2.86	1.18
Benzene	11.64	7.31	3.82	2.70
Toluene	19.08	7.35	4.73	2.23
N ₂ O	0.25	0.81	1.00	0.60

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

	Test 021 Emissions in mg/km	
	COLD-UDDS	HOT-UDDS
Total Particulate	25.26	16.37
Ammonia	8.45	5.38
Cyanides & Cyanogen	0.00	0.01
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	0.00	0.00
Acetaldehyde	1.40	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	0.47	0.75
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

	Test 022 Emissions in mg/km	
	COLD-UDDS	HOT-UDDS
Total Particulate	9.37	16.28
Ammonia	5.46	27.16
Cyanides & Cyanogen	0.27	0.19
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	0.00	0.00
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	0.26	0.24
Methyl sulfide	0.00	0.01
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	14.85	5.29	6.83	6.07
Ethylene	7.39	1.37	3.57	1.24
Ethane	2.01	1.19	1.76	1.44
Acetylene	5.49	0.00	0.00	0.00
Propane	0.16	0.12	0.09	0.03
Propylene	2.51	0.00	0.86	0.00
Benzene	4.53	0.33	1.27	0.30
Toluene	7.47	0.45	2.04	0.12
N ₂ O	2.09	1.32	3.04	1.14

	Emissions in ppm			
	COLD-UDDS		HOT-UDDS	
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	14.16	5.35	5.82	5.03
Ethylene	6.86	0.91	2.74	1.11
Ethane	1.86	1.17	1.62	1.11
Acetylene	4.21	0.00	0.00	0.00
Propane	0.11	0.04	0.04	0.01
Propylene	2.41	0.00	0.76	0.00
Benzene	4.42	0.34	1.13	0.44
Toluene	6.89	0.71	1.61	0.00
N ₂ 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	
	COLD-UDDS	HOT-UDDS
Total Particulate	21.01	32.36
Ammonia	2.85	0.40
Cyanides & Cyanogen	0.17	0.02
Hydrogen Sulfide	0.00	0.00

Aldehydes & Ketones

Formaldehyde	--	--
Acetaldehyde	--	--
Acetone	--	--
Isobutyraldehyde	--	--
Methyl ethyl ketone	--	--
Hexanaldehyde	--	--

Organic Sulfides

Carbonyl sulfide	0.30	1.27
Methyl sulfide	0.09	0.11
Ethyl sulfide	0.00	0.00
Methyl disulfide	0.00	0.00

Organic Amines

Monomethylamine	0.00	0.05
Monoethylamine + dimethylamine	0.00	0.00
Trimethylamine	0.00	0.00
Diethylamine	0.00	0.00
Triethylamine	0.00	0.00

	Test 032 Emissions in mg/km	
	COLD-UDDS	HOT-UDDS
Total Particulate	19.26	20.44
Ammonia	--	--
Cyanides & Cyanogen	0.12	0.01
Hydrogen Sulfide	0.00	0.00

Aldehydes & Ketones

Formaldehyde	4.11	1.95
Acetaldehyde	1.25	0.87
Acetone	0.00	0.00
Isobutyraldehyde	--	--
Methyl ethyl ketone	0.00	0.00
Hexanaldehyde	0.00	0.00

Organic Sulfides

Carbonyl sulfide	0.13	0.16
Methyl sulfide	0.01	0.00
Ethyl sulfide	0.00	0.00
Methyl disulfide	0.00	0.00

Organic Amines

Monomethylamine	0.00	0.00
Monoethylamine + dimethylamine	0.00	0.00
Trimethylamine	0.08	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	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 ₂ O	2.75	1.30	2.19	1.12

	Emissions in ppm			
	COLD-UDDS		HOT-UDDS	
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	12.25	5.64	10.51	7.24
Ethylene	5.05	0.46	3.19	0.17
Ethane	2.11	1.18	1.76	0.87
Acetylene	3.49	0.00	0.00	0.00
Propane	0.07	0.00	0.00	0.00
Propylene	1.68	0.00	0.65	0.00
Benzene	3.99	0.51	1.96	0.42
Toluene	8.11	0.74	3.04	0.44
N ₂ 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	
	COLD-UDDS	HOT-UDDS
Total Particulate	22.67	13.52
Ammonia	4.06	6.43
Cyanides & Cyanogen	0.37	0.00
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	2.19	0.00
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	0.10	0.14
Methyl sulfide	0.00	0.00
Ethyl sulfide	0.00	0.00
Methyl disulfide	0.00	0.00
<u>Organic Amines</u>		
Monomethylamine	0.03	0.00
Monoethylamine + dimethylamine	0.00	0.00
Trimethylamine	0.01	0.00
Diethylamine	0.00	0.00
Triethylamine	0.00	0.00

	Test 037 Emissions in mg/km	
	COLD-UDDS	HOT-UDDS
Total Particulate	18.65	10.90
Ammonia	0.53	1.94
Cyanides & Cyanogen	0.30	0.62
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	1.88	0.21
Acetaldehyde	0.00	0.00
Acetone	0.00	0.00
Isobutyraldehyde	--	--
Methyl ethyl ketone	0.95	2.43
Hexanaldehyde	0.00	0.00
<u>Organic Sulfides</u>		
Carbonyl sulfide	0.07	0.07
Methyl sulfide	0.02	0.05
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	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 ₂ O	3.48	1.58	2.30	0.00

	Emissions in ppm			
	COLD-UDDS		HOT-UDDS	
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	10.04	7.20	10.02	8.52
Ethylene	5.06	0.53	2.69	0.15
Ethane	1.75	1.10	1.64	0.87
Acetylene	4.30	0.00	0.00	0.00
Propane	0.02	0.01	0.00	0.00
Propylene	1.93	0.00	0.55	0.00
Benzene	4.03	0.94	1.49	0.54
Toluene	10.72	0.87	2.66	0.15
N ₂ O	2.99	1.23	2.29	0.79

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

	Test 041			Test 042	
	Emissions in mg/km			Emissions in mg/km	
	COLD-UDDS	HOT-UDDS		COLD-UDDS	HOT-UDDS
Total Particulate	45.75	26.80	Total Particulate	45.68	31.11
Ammonia	4.67	12.69	Ammonia	0.56	1.11
Cyanides & Cyanogen	0.84	0.35	Cyanides & Cyanogen	0.51	0.84
Hydrogen Sulfide	0.00	0.00	Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>			<u>Aldehydes & Ketones</u>		
Formaldehyde	7.73	5.13	Formaldehyde	4.55	4.46
Acetaldehyde	3.34	1.46	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	0.00	0.00	Carbonyl sulfide	0.00	0.00
Methyl sulfide	0.00	0.00	Methyl sulfide	0.00	0.00
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>			<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	16.67	8.88	17.27	8.44	Methane	16.20	9.26	15.87	8.48
Ethylene	19.37	3.06	16.57	2.92	Ethylene	20.61	3.47	14.22	3.33
Ethane	5.21	3.45	4.94	3.32	Ethane	5.54	3.64	4.75	3.41
Acetylene	5.16	0.00	7.39	0.00	Acetylene	3.68	0.00	5.10	0.00
Propane	0.42	0.25	0.28	0.23	Propane	0.34	0.22	0.23	0.12
Propylene	7.92	0.96	5.43	0.90	Propylene	8.48	1.15	5.09	0.92
Benzene	8.67	2.47	7.61	1.80	Benzene	8.90	2.03	6.58	1.39
Toluene	19.13	3.50	15.67	3.04	Toluene	19.16	3.40	13.66	1.90
N ₂ O	0.21	0.10	0.34	0.13	N ₂ 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 & 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
Ethylene	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 ₂ O	0.16	0.07	0.30	0.11

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

Test 051			Test 052		
Emissions in mg/km			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 & Ketones</u>			<u>Aldehydes & 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>				<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 ₂ O	5.24	1.43	6.11	1.62	N ₂ 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	
	COLD-UDDS	HOT-UDDS
Total Particulate	--	4.06
Ammonia	24.53	30.61
Cyanides & Cyanogen	1.01	0.96
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	0.84	0.00
Acetaldehyde	0.66	0.45
Acetone	1.29	3.35
Isobutyraldehyde	--	--
Methyl ethyl ketone	0.00	0.40
Hexanaldehyde	0.00	0.00
<u>Organic Sulfides</u>		
Carbonyl sulfide	0.07	0.03
Methyl sulfide	0.01	0.01
Ethyl sulfide	0.01	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

	Test 057	
	Emissions in mg/km	
	COLD-UDDS	HOT-UDDS
Total Particulate	3.05	1.24
Ammonia	30.72	38.20
Cyanides & Cyanogen	0.72	0.70
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	1.07	0.00
Acetaldehyde	1.53	0.77
Acetone	0.00	0.00
Isobutyraldehyde	--	--
Methyl ethyl ketone	0.00	0.00
Hexanaldehyde	0.00	0.00
<u>Organic Sulfides</u>		
Carbonyl sulfide	0.03	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	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 ₂ O	7.28	1.74	8.26	2.04

	Emissions in ppm			
	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
N ₂ O	7.30	1.59	7.07	1.70

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

Test 061			Test 062		
Emissions in mg/km			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 & Ketones</u>			<u>Aldehydes & 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
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>				<u>Individual Hydrocarbons</u>					
Methane	12.49	3.04	5.00	2.26	Methane	14.06	2.37	3.20	2.01
Ethylene	18.46	3.09	7.23	1.56	Ethylene	19.01	1.68	4.00	0.72
Ethane	2.30	0.99	1.45	0.77	Ethane	2.22	0.68	1.00	0.57
Acetylene	7.80	0.00	0.33	0.00	Acetylene	12.35	0.00	0.07	0.00
Propane	0.17	0.00	0.00	0.00	Propane	0.28	0.00	0.00	0.00
Propylene	8.08	1.41	3.09	0.70	Propylene	8.08	0.83	1.91	0.00
Benzene	9.73	2.80	3.58	1.44	Benzene	10.81	2.25	2.46	0.99
Toluene	19.78	4.21	5.83	2.14	Toluene	22.21	3.64	4.28	1.59
N ₂ O	2.78	4.16	5.94	4.03	N ₂ O	2.64	5.25	6.67	4.11

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

	Test 066	
	Emissions in mg/km	
	COLD-UDDS	HOT-UDDS
Total Particulate	13.53	12.21
Ammonia	10.42	8.39
Cyanides & Cyanogen	2.87	1.41
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	2.21	1.32
Acetaldehyde	2.70	1.19
Acetone	0.00	0.00
Isobutyraldehyde	--	0.00
Methyl ethyl ketone	0.49	0.00
Hexanaldehyde	0.00	0.00
<u>Organic Sulfides</u>		
Carbonyl sulfide	0.04	0.03
Methyl sulfide	0.00	0.03
Ethyl sulfide	0.02	0.01
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

	Test 067	
	Emissions in mg/km	
	COLD-UDDS	HOT-UDDS
Total Particulate	33.94	14.10
Ammonia	4.83	3.95
Cyanides & Cyanogen	2.20	1.72
Hydrogen Sulfide	0.20	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	1.71	0.00
Acetaldehyde	1.32	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	0.00
Methyl sulfide	0.01	0.00
Ethyl sulfide	0.02	0.00
Methyl disulfide	0.01	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	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 ₂ O	1.72	1.00	3.02	0.99

	Emissions in ppm			
	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 ₂ 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	
	COLD-UDDS	HOT-UDDS
Total Particulate	19.07	33.38
Ammonia	5.19	1.65
Cyanides & Cyanogen	1.25	0.17
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	8.69	4.83
Acetaldehyde	3.62	1.93
Acetone	0.00	0.00
Isobutyraldehyde	--	--
Methyl ethyl ketone	0.00	0.00
Hexanaldehyde	0.00	0.00
<u>Organic Sulfides</u>		
Carbonyl sulfide	0.05	0.11
Methyl sulfide	0.00	0.01
Ethyl sulfide	0.04	0.00
Methyl disulfide	0.03	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

	Test 072 Emissions in mg/km	
	COLD-UDDS	HOT-UDDS
Total Particulate	38.02	31.57
Ammonia	1.93	2.22
Cyanides & Cyanogen	1.01	0.59
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	6.54	6.00
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	0.00	0.01
Ethyl sulfide	0.01	0.01
Methyl disulfide	0.01	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	10.70	6.39	6.88	7.22
Ethylene	12.24	2.79	4.95	2.63
Ethane	1.78	0.93	1.22	0.97
Acetylene	4.03	0.32	0.51	0.36
Propane	0.19	0.10	0.13	0.00
Propylene	4.42	0.78	1.52	0.96
Benzene	5.11	1.34	2.14	1.23
Toluene	10.62	2.06	2.76	1.84
N ₂ O	0.19	0.00	0.03	0.04

	Emissions in ppm			
	COLD-UDDS		HOT-UDDS	
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	10.49	7.60	6.94	7.00
Ethylene	13.60	2.75	5.41	2.71
Ethane	1.90	0.93	1.17	0.92
Acetylene	4.39	0.00	0.48	0.28
Propane	0.16	0.00	0.00	0.00
Propylene	5.51	0.86	1.54	0.79
Benzene	6.70	1.54	2.52	1.34
Toluene	14.92	2.46	3.77	1.91
N ₂ O	0.22	0.00	0.08	0.00

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

	Test 076	
	Emissions in mg/km	
	COLD-UDDS	HOT-UDDS
Total Particulate	38.81	28.48
Ammonia	16.00	13.38
Cyanides & Cyanogen	0.12	0.02
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	--	7.15
Acetaldehyde	--	1.70
Acetone	--	0.00
Isobutyraldehyde	--	0.00
Methyl ethyl ketone	--	0.00
Hexanaldehyde	--	0.00
<u>Organic Sulfides</u>		
Carbonyl sulfide	0.01	0.01
Methyl sulfide	0.01	0.01
Ethyl sulfide	0.03	0.01
Methyl disulfide	0.02	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

	Test 078	
	Emissions in mg/km	
	COLD-UDDS	HOT-UDDS
Total Particulate	49.86	38.09
Ammonia	14.23	8.30
Cyanides & Cyanogen	0.54	0.42
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	8.42	7.13
Acetaldehyde	1.11	0.63
Acetone	0.00	0.00
Isobutyraldehyde	--	--
Methyl ethyl ketone	0.00	0.00
Hexanaldehyde	0.00	0.00
<u>Organic Sulfides</u>		
Carbonyl sulfide	0.05	0.02
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	9.93	5.98	6.13	5.85
Ethylene	13.49	2.93	4.80	3.03
Ethane	1.82	0.88	1.04	0.89
Acetylene	3.94	0.28	0.48	0.29
Propane	0.00	0.00	0.00	0.00
Propylene	5.31	0.70	1.44	0.76
Benzene	6.07	1.31	1.95	1.30
Toluene	12.42	2.17	2.95	1.81
N ₂ O	0.22	0.01	0.11	0.10

	Emissions in ppm			
	COLD-UDDS		HOT-UDDS	
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	10.04	3.93	5.88	3.92
Ethylene	13.91	3.07	6.45	3.00
Ethane	1.63	0.66	0.95	0.64
Acetylene	3.32	0.00	0.36	0.13
Propane	0.06	0.02	0.00	0.00
Propylene	5.34	0.78	1.81	0.71
Benzene	6.39	1.29	2.59	1.16
Toluene	12.06	2.21	4.57	1.57
N ₂ O	0.11	0.01	0.05	0.01

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

	Test 081 Emissions in mg/km	
	COLD-UDDS	HOT-UDDS
Total Particulate	25.37	12.22
Ammonia	1.85	3.40
Cyanides & Cyanogen	2.14	0.76
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	4.73	5.63
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	0.04	0.00
Methyl sulfide	0.02	0.01
Ethyl sulfide	0.12	0.00
Methyl disulfide	0.01	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

	Test 082 Emissions in mg/km	
	COLD-UDDS	HOT-UDDS
Total Particulate	30.00	15.85
Ammonia	4.16	15.71
Cyanides & Cyanogen	2.04	0.37
Hydrogen Sulfide	0.00	0.00
<u>Aldehydes & Ketones</u>		
Formaldehyde	6.96	4.19
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	0.03	0.02
Methyl sulfide	0.04	0.00
Ethyl sulfide	0.01	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	4.28	0.31	1.66	0.66
Ethylene	9.53	0.29	2.94	0.20
Ethane	1.17	0.24	0.64	0.26
Acetylene	3.91	0.00	0.00	0.00
Propane	0.00	0.00	0.00	0.00
Propylene	4.52	0.00	0.94	0.00
Benzene	4.77	0.19	1.63	0.00
Toluene	11.24	0.73	3.88	0.15
N ₂ O	2.31	0.89	2.34	0.67

	Emissions in ppm			
	COLD-UDDS		HOT-UDDS	
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	6.11	0.87	2.37	0.59
Ethylene	11.23	0.34	3.19	0.27
Ethane	1.34	0.44	0.75	0.38
Acetylene	4.13	0.00	0.00	0.00
Propane	0.16	0.00	0.00	0.00
Propylene	5.11	0.00	1.04	0.00
Benzene	5.68	0.16	1.52	0.00
Toluene	13.23	0.99	3.05	0.00
N ₂ 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 & Ketones</u>				<u>Aldehydes & Ketones</u>			
Formaldehyde	1.50		3.17	Formaldehyde	0.20		0.00
Acetaldehyde	0.00		1.05	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	0.01		0.06	Carbonyl sulfide	0.02		0.02
Methyl sulfide	0.06		0.04	Methyl sulfide	0.01		0.01
Ethyl sulfide	0.00		0.01	Ethyl sulfide	0.01		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
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>					<u>Individual Hydrocarbons</u>				
Methane	11.75	2.37	4.44	2.07	Methane	13.03	2.60	4.57	2.19
Ethylene	15.44	1.78	7.15	1.40	Ethylene	16.53	1.87	6.67	1.47
Ethane	2.09	0.95	1.42	0.87	Ethane	2.16	1.03	1.45	0.94
Acetylene	9.46	0.00	0.00	0.00	Acetylene	11.43	0.00	0.00	0.00
Propane	0.26	0.00	0.18	0.00	Propane	0.15	0.00	0.00	0.00
Propylene	6.52	0.79	3.09	0.61	Propylene	7.67	0.83	2.96	0.63
Benzene	9.35	2.18	3.71	1.29	Benzene	9.05	1.73	3.77	1.45
Toluene	17.14	2.70	6.68	1.91	Toluene	21.34	2.97	7.68	2.11
N ₂ O	0.98	0.60	1.95	0.62	N ₂ O	0.84	0.84	2.09	0.61

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

	Test 091		Test 092	
	Emissions in mg/km		Emissions in mg/km	
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS
Total Particulate	39.82	38.00	36.90	27.23
Ammonia	4.48	1.40	2.69	1.72
Cyanides & Cyanogen	0.44	0.26	0.33	0.05
Hydrogen Sulfide	0.00	0.00	0.00	0.00
<u>Aldehydes & Ketones</u>				
Formaldehyde	0.00	0.00	3.99	2.93
Acetaldehyde	0.00	0.00	0.00	0.00
Acetone	0.00	0.00	0.00	0.00
Isobutyraldehyde	--	--	--	--
Methyl ethyl ketone	0.00	0.00	0.00	0.00
Hexanaldehyde	0.00	0.00	0.00	0.00
<u>Organic Sulfides</u>				
Carbonyl sulfide	0.00	0.04	0.01	0.02
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 + dimethylamine	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

	Emissions in ppm			
	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 ₂ O	0.32	0.13	0.47	0.15

	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 ₂ O	0.47	0.16	0.60	0.20

C-15

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 & 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 ₂ O	0.34	0.13	0.46	0.01

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

	Test 101		Test 102	
	Emissions in mg/km		Emissions in mg/km	
	COLD-UDDS	HOT-UDDS	COLD-UDDS	HOT-UDDS
Total Particulate	177.09	329.96	160.89	221.48
Ammonia	3.71	2.97	3.08	3.31
Cyanides & Cyanogen	0.92	2.65	0.91	0.70
Hydrogen Sulfide	0.25	0.25	0.42	0.42
<u>Aldehydes & Ketones</u>			<u>Aldehydes & Ketones</u>	
Formaldehyde	19.80	14.91	15.28	4.24
Acetaldehyde	4.10	1.86	1.94	0.00
Acetone	0.00	0.00	0.00	0.00
Isobutyraldehyde	--	--	--	--
Methyl ethyl ketone	0.00	0.00	0.00	0.00
Hexanaldehyde	0.00	0.00	0.00	0.00
<u>Organic Sulfides</u>			<u>Organic Sulfides</u>	
Carbonyl sulfide	0.05	0.02	0.03	0.03
Methyl sulfide	0.00	0.00	0.02	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>			<u>Organic Amines</u>	
Monomethylamine	0.00	0.00	0.00	0.00
Monoethylamine + dimethylamine	0.00	0.00	0.02	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

	Emissions in ppm			
	COLD-UDDS		HOT-UDDS	
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	36.62	24.97	25.74	21.25
Ethylene	38.56	29.41	30.62	27.40
Ethane	4.64	2.80	3.38	2.73
Acetylene	27.84	10.39	20.93	6.57
Propane	0.37	0.00	0.15	0.00
Propylene	18.15	9.08	10.89	8.33
Benzene	23.36	12.91	14.22	11.05
Toluene	58.10	25.55	22.77	20.95
N ₂ O	0.68	0.00	0.58	0.42

	Emissions in ppm			
	COLD-UDDS		HOT-UDDS	
	1	2	3	4
<u>Individual Hydrocarbons</u>				
Methane	45.95	20.20	20.50	11.97
Ethylene	36.97	15.71	21.47	9.04
Ethane	4.33	1.96	2.57	1.61
Acetylene	33.99	0.00	10.14	0.00
Propane	0.44	0.17	0.26	0.00
Propylene	18.23	7.07	10.32	5.03
Benzene	54.45	22.78	41.05	14.91
Toluene	202.84	84.55	157.98	63.27
N ₂ O	0.55	0.58	0.76	0.54

C-18

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

Test 106			Test 107		
Emissions in mg/km			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 & Ketones</u>			<u>Aldehydes & Ketones</u>		
Formaldehyde	12.77	7.67	Formaldehyde	3.89	0.15
Acetaldehyde	0.00	0.61	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	0.01	Carbonyl sulfide	0.03	0.01
Methyl sulfide	0.02	0.02	Methyl sulfide	0.01	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>			<u>Organic Amines</u>		
Monomethylamine	0.00	0.00	Monomethylamine	0.01	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>					<u>Individual Hydrocarbons</u>				
Methane	18.83	4.64	8.07	3.07	Methane	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 ₂ O	0.40	0.29	0.52	0.28	N ₂ 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 NO.01		TEST WEIGHT 1580. KG (3500. LBS)	
VEHICLE MODEL 78 BUICK REGAL		DATE 1/20/81		ACTUAL ROAD LOAD 0.0 KW (10.7 HP)	
ENGINE 5.0 L(305. CID) V-8		BAG CART NO. 1		GASOLINE EN-344-F	
TRANSMISSION A3		DYNO NO. 3		ODOMETER 39222. KM(55440. MILES)	
		CVS NO. 2			
BAROMETER 739.39 MM HG(29.11 IN HG)		DRY BULB TEMP. 21.1 DEG C(70.0 DEG F)		NOX HUMIDITY CORRECTION FACTOR .86	
RELATIVE HUMIDITY 37. PCT		ABS. HUMIDITY 5.9 GM/KG			
BAG RESULTS					
BAG NUMBER					
DESCRIPTION					

FET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

TEST NO. 011FET RUN 1		VEHICLE NO.01	
VEHICLE MODEL 78 BUICK REGAL		DATE 1/20/81	
ENGINE 5.0 L(305, CID) V-8		BAG CART NO. 1	
TRANSMISSION A3		DYNO NO. 3	
		CVS NO. 2	
BAROMETER 739.14 MM HG(29.10 IN HG)		DRY BULB TEMP. 21.1 DEG C(70.0 DEG F)	
RELATIVE HUMIDITY 37, PCT		ABS. HUMIDITY 5.9 GM/KG	
NOX HUMIDITY CORRECTION FACTOR .86			
BAG RESULTS		FET	
TEST CYCLE			
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		61352.	
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		94.0/13/ 95.	
CO BCKGRD METER/RANGE/PPM		2.1/13/ 2.	
CO2 SAMPLE METER/RANGE/PCT		96.4/ 3/ 1.01	
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		45.	
CO CONCENTRATION PPM		89.	
CO2 CONCENTRATION PCT		1.77	
NOX CONCENTRATION PPM		80.2	
HC MASS GRAMS		3.02	
CO MASS GRAMS		11.96	
CO2 MASS GRAMS		3725.8	
NOX MASS GRAMS		15.26	
RUN TIME SECONDS		765.	
DFC, WET (DRY)		.864 (.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		739.1	
HUMIDITY, G/KG		5.9	
TEMPERATURE, DEG C		21.1	
CARBON DIOXIDE, G/KM		225.3	
FUEL CONSUMPTION, L/100KM		9.69	
HYDROCARBONS, G/KM		.18	
CARBON MONOXIDE, G/KM		.72	
OXIDES OF NITROGEN, G/KM		.92	

TABLE D-2. TEST NO. 012 EMISSION RESULTS

FTP VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007TEST NO. 012FTP RUN 1
VEHICLE MODEL 78 BUICK REGAL
ENGINE 5.0 L(305, CID) V-8
TRANSMISSION A3VEHICLE NO.01
DATE 1/22/81
BAG CART NO. 1
DYNO NO. 3
CVS NO. 2TEST WEIGHT 1588, KG (3500, LBS)
ACTUAL ROAD LOAD 8.0 KW (10.7 HP)
GASOLINE EM-344
ODOMETER 87838, KM(54580, MILES)BAROMETER 749.05 MM HG(29.49 IN HG)
RELATIVE HUMIDITY 33, PCTDRY BULB TEMP. 21.1 DEG C(70.0 DEG F)
ABS. HUMIDITY 5.2 GM/KG

NOX HUMIDITY CORRECTION FACTOR .85

BAG RESULTS

BAG NUMBER
DESCRIPTION

	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 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.
HC BCKGRD METER/RANGE/PPM	1.4/ 3/ 14.	14.8/ 2/ 15.	14.1/ 2/ 14.	12.5/ 2/ 13.
CO SAMPLE METER/RANGE/PPM	98.5/ 3/2878.	70.5/11/ 298.	82.0/12/ 195.	47.9/12/ 101.
CO BCKGRD METER/RANGE/PPM	4/ 3/ 9.	2.9/11/ 8.	3.3/12/ 6.	2.7/12/ 5.
CO2 SAMPLE METER/RANGE/PCT	72.2/ 3/ 1.31	49.3/ 3/ .85	67.1/ 3/ 1.21	49.2/ 3/ .85
CO2 BCKGRD METER/RANGE/PCT	3.6/ 3/ .04	3.7/ 3/ .04	3.7/ 3/ .06	4.0/ 3/ .06
NOX SAMPLE METER/RANGE/PPM	55.2/ 2/ 55.	23.0/ 2/ 23.	52.6/ 2/ 53.	26.7/ 2/ 27.
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ 1.	.6/ 2/ 1.	.6/ 2/ 1.	.6/ 2/ 1.
DILUTION FACTOR	8.31	15.04	10.88	15.48
HC CONCENTRATION PPM	246.	69.	59.	31.
CO CONCENTRATION PPM	2767.	282.	183.	93.
CO2 CONCENTRATION PCT	1.26	.80	1.15	.79
NOX CONCENTRATION PPM	54.7	22.4	52.1	26.1
HC MASS GRAMS	10.96	5.27	2.64	2.40
CO MASS GRAMS	249.10	43.62	16.55	14.42
CO2 MASS GRAMS	1784.7	1947.9	1639.9	1929.5
NOX MASS GRAMS	6.84	4.83	6.54	5.61
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	18.19	13.89	12.34	13.40
RUN TIME SECONDS	506.	867.	506.	867.
MEASURED DISTANCE KM	5.83	6.25	5.79	6.24
DFC, WET (DRY)	.914 (.904)		.925 (.915)	
SCF, WET (DRY)	1.000 (.980)		1.000 (.980)	
VOL (SCM)	210.2		210.3	
SAM BLR (SCM)	0.00		0.00	
KM (MEASURED)	12.08		12.03	
FUEL CONSUMPTION L/100KM	15.00		12.89	

COMPOSITE RESULTS

TEST NUMBER 012FTP
BAROMETER MM HG 749.0
HUMIDITY G/KG 5.2
TEMPERATURE DEG C 21.13-BAG (4-BAG)
CARBON DIOXIDE G/KM 302.8 (302.0)
FUEL CONSUMPTION L/100KM 13.94 (13.80)
HYDROCARBONS (THC) G/KM .95 (.82)
CARBON MONOXIDE G/KM 13.27 (11.89)
OXIDES OF NITROGEN G/KM .95 (.99)FET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007TEST NO. 012FET RUN 1
VEHICLE MODEL 78 BUICK REGAL
ENGINE 5.0 L(305, CID) V-8
TRANSMISSION A3VEHICLE NO.01
DATE 1/22/81
BAG CART NO. 1
DYNO NO. 3
CVS NO. 2TEST WEIGHT 1588, KG (3500, LBS)
ACTUAL ROAD LOAD 8.0 KW (10.7 HP)
GASOLINE EM-344
ODOMETER 87862, KM(54595, MILES)BAROMETER 749.05 MM HG(29.49 IN HG)
RELATIVE HUMIDITY 29, PCTDRY BULB TEMP. 22.8 DEG C(73.0 DEG F)
ABS. HUMIDITY 5.1 GM/KG

NOX HUMIDITY CORRECTION FACTOR .84

BAG RESULTS
TEST CYCLE

FET

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)772.2 (30.4)
756.9 (29.8)
42.2 (108.0)
61322.
116.5 (4113.)
55.1/ 2/ 55.
12.0/ 2/ 12.
81.3/13/ 81.
3.1/13/ 3.
93.8/ 3/ 1.76
4.2/ 3/ .06
75.4/ 2/ 75.
.8/ 2/ 1.
7.57
45.
75.
1.70
74.7
3.00
10.14
3629.9
14.03
765.
1.000 (.974)
116.5
0.00
16.42TEST 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-5. 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
DYNO 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)

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 G/KG

NOX HUMIDITY CORRECTION FACTOR .81

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 (SCH)
SAM BLR (SCH)
KM (MEASURED)
FUEL CONSUMPTION L/100KM

	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 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.	69609.	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	12.7/ 3/ 127.	31.5/ 2/ 32.	33.9/ 2/ 34.	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	35.3/ 3/ 832.	22.6/13/ 21.	77.4/12/ 181.	26.5/13/ 24.
CO BCKGRD METER/RANGE/PPM	1/ 3/ 2.	8/13/ 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.	36.2/ 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	504.	868.	506.	865.
MEASURED DISTANCE KM	5.83	6.30	5.86	6.31
DFC, WET (DRY)	.901 (.894)		.909 (.901)	
SCF, WET (DRY)	1.000 (.980)		1.000 (.980)	
VOL (SCH)	210.9		210.6	
SAM BLR (SCH)	0.00		0.00	
KM (MEASURED)	12.13		12.17	
FUEL CONSUMPTION L/100KM	17.36		15.86	

COMPOSITE RESULTS

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

CARBON DIOXIDE G/KM 3-BAG 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
DYNO 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)

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 G/KG

NOX HUMIDITY CORRECTION FACTOR .82

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 (SCH)
SAM BLR (SCH)
KM (MEASURED)

TEST NUMBER, 021FET
BAROMETER, MM HG 755.4
HUMIDITY, G/KG 4.1
TEMPERATURE, DEG C 22.2
CARBON DIOXIDE, G/KM 253.3
FUEL CONSUMPTION, L/100KM 10.85
HYDROCARBONS, G/KM .16
CARBON MONOXIDE, G/KM .28
OXIDES OF NITROGEN, G/KM 1.22

	HFET
BLOWER DIF P MM. H2O(IN. H2O)	787.4 (31.0)
BLOWER INLET P MM. H2O(IN. H2O)	767.1 (30.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.2 (108.0)
BLOWER REVOLUTIONS	61345.
TOT FLOW STD. CU. METRES(SCF)	117.4 (4146.)
HC SAMPLE METER/RANGE/PPM	46.6/ 2/ 47.
HC BCKGRD METER/RANGE/PPM	8.2/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	38.9/13/ 36.
CO BCKGRD METER/RANGE/PPM	7/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	45.5/ 2/ 2.00
CO2 BCKGRD METER/RANGE/PCT	1.5/ 2/ .05
NOX SAMPLE METER/RANGE/PPM	36.7/ 3/ 110.
NOX BCKGRD METER/RANGE/PPM	.2/ 3/ 1.
DILUTION FACTOR	6.68
HC CONCENTRATION PPM	40.
CO CONCENTRATION PPM	34.
CO2 CONCENTRATION PCT	1.95
NOX CONCENTRATION PPM	109.6
HC MASS GRAMS	2.68
CO MASS GRAMS	4.64
CO2 MASS GRAMS	4198.3
NOX MASS GRAMS	20.23
RUN TIME SECONDS	766.
DFC, WET (DRY)	.850 (.844)
SCF, WET (DRY)	1.000 (.774)
VOL (SCH)	117.4
SAM BLR (SCH)	0.00
KM (MEASURED)	16.58

TABLE D-4. TEST NO. 022 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS PROJECT 11-5830-007		TEST WEIGHT 2041. KG (4500. LBS) ACTUAL ROAD LOAD 8.9 KW (12.0 HP) GASOLINE EM-470-F ODOMETER 0. KM (0. MILES)	
TEST NO. 022FTP RUN 1 VEHICLE MODEL 79 MERCURY MARQUIS ENGINE 5.7 L(351. CID) V-8 TRANSMISSION A3	VEHICLE NO.02 DATE 2/ 3/81 BAG CART NO. 1 DYN0 NO. 3 CVS NO. 2		
BAROMETER 753.87 MM HG(29.68 IN HG) RELATIVE HUMIDITY 23. PCT BAG RESULTS	DRY BULB TEMP. 21.1 DEG C(70.0 DEG F) ABS. HUMIDITY 3.5 GM/KG	MOX HUMIDITY CORRECTION FACTOR .81	
BAG NUMBER DESCRIPTION	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT
BLOWER DIF P MM. H2O(IN. H2O)	782.3 (30.8)	774.7 (30.5)	774.7 (30.5)
BLOWER INLET P MM. H2O(IN. H2O)	769.6 (30.3)	764.5 (30.1)	762.0 (30.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.2 (108.0)	42.2 (108.0)	42.2 (108.0)
BLOWER REVOLUTIONS	40562	69607	40562
TOT FLOW STD. CU. METRES(SCF)	77.5 (2736.)	133.1 (4698.)	77.6 (2738.)
HC SAMPLE METER/RANGE/PPM	12.7/ 3/ 127.	33.7/ 2/ 34.	50.7/ 2/ 51.
HC BCKGRD METER/RANGE/PPM	1.1/ 3/ 11.	10.7/ 2/ 11.	10.4/ 2/ 10.
CO SAMPLE METER/RANGE/PPM	36.0/ 3/ 851.	30.1/13/ 28.	63.1/12/ 140.
CO BCKGRD METER/RANGE/PPM	.4/ 3/ 9.	8.7/13/ 8.	1.9/12/ 4.
CO2 SAMPLE METER/RANGE/PCT	89.7/ 3/ 1.67	61.0/ 3/ 1.08	80.2/ 3/ 1.47
CO2 BCKGRD METER/RANGE/PCT	3.7/ 3/ .06	3.2/ 3/ .05	3.5/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	98.1/ 2/ 98.	36.3/ 2/ 36.	74.9/ 2/ 75.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.6/ 2/ 1.	.1/ 2/ 0.
DILUTION FACTOR	7.59	12.31	8.98
HC CONCENTRATION PPM	117.	24.	12.46
CO CONCENTRATION PPM	810.	20.	24.
CO2 CONCENTRATION PCT	1.62	1.04	1.32.
NOX CONCENTRATION PPM	97.7	35.7	1.43
HC MASS GRAMS	5.25	1.83	1.02
CO MASS GRAMS	73.06	3.06	34.7
CO2 MASS GRAMS	2301.6	2528.1	1.82
NOX MASS GRAMS	11.71	7.36	4.16
HC GRAMS/KM	.90	.29	2476.2
CO GRAMS/KM	12.50	.48	7.14
CO2 GRAMS/KM	393.8	400.7	
NOX GRAMS/KM	2.00	1.17	
FUEL CONSUMPTION BY CB L/100KM	17.77	17.18	
RUN TIME SECONDS	505.	868.	506.
MEASURED DISTANCE KM	5.85	6.31	5.86
DFC, WET (DRY)	.900 (.894)		.908 (.902)
SCF, WET (DRY)	1.000 (.981)		1.000 (.981)
VOL (SCM)	210.5		210.6
SAM BLR (SCM)	0.00		0.00
KM (MEASURED)	12.15		12.18
FUEL CONSUMPTION L/100KM	17.46		15.90
COMPOSITE RESULTS		J-BAG (4-BAG)	
TEST NUMBER 022FTP		CARBON DIOXIDE G/KM	384.2 (301.5)
BAROMETER MM HG 753.9		FUEL CONSUMPTION L/100KM	16.68 (16.57)
HUMIDITY G/KG 3.5		HYDROCARBONS (THC) G/KM	.42 (.42)
TEMPERATURE DEG C 21.1		CARBON MONOXIDE G/KM	3.39 (3.44)
		OXIDES OF NITROGEN G/KM	1.44 (1.43)

FET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

TEST NO. 022FET RUN 1 VEHICLE MODEL 79 MERCURY MARQUIS ENGINE 5.7 L(351. CID) V-8 TRANSMISSION A3	VEHICLE NO.02 DATE 2/ 3/81 BAG CART NO. 1 DYN0 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)
BAROMETER 754.13 MM HG(29.69 IN HG) RELATIVE HUMIDITY 20. PCT BAG RESULTS	DRY BULB TEMP. 22.8 DEG C(73.0 DEG F) ABS. HUMIDITY 3.4 GM/KG	MOX HUMIDITY CORRECTION FACTOR .81
TEST CYCLE	FET	
BLOWER DIF P MM. H2O(IN. H2O)	792.5 (31.2)	
BLOWER INLET P MM. H2O(IN. H2O)	769.6 (30.3)	
BLOWER INLET TEMP. DEG. C(DEG. F)	42.2 (108.0)	
BLOWER REVOLUTIONS	61263.	
TOT FLOW STD. CU. METRES(SCF)	117.0 (4133.)	
HC SAMPLE METER/RANGE/PPM	46.8/ 2/ 47.	
HC BCKGRD METER/RANGE/PPM	11.2/ 2/ 11.	
CO SAMPLE METER/RANGE/PPM	42.5/13/ 40.	
CO BCKGRD METER/RANGE/PPM	2.4/13/ 2.	
CO2 SAMPLE METER/RANGE/PCT	45.3/ 2/ 1.99	
CO2 BCKGRD METER/RANGE/PCT	1.7/ 2/ .06	
NOX SAMPLE METER/RANGE/PPM	40.4/ 3/ 121.	
NOX BCKGRD METER/RANGE/PPM	.1/ 3/ 0.	
DILUTION FACTOR	6.71	
HC CONCENTRATION PPM	37.	
CO CONCENTRATION PPM	36.	
CO2 CONCENTRATION PCT	1.94	
NOX CONCENTRATION PPM	120.9	
HC MASS GRAMS	2.52	
CO MASS GRAMS	4.92	
CO2 MASS GRAMS	4148.8	
NOX MASS GRAMS	21.81	
RUN TIME SECONDS	765.	
DFC, WET (DRY)	.851 (.846)	
SCF, WET (DRY)	1.000 (.975)	
VOL (SCM)	117.0	
SAM BLR (SCM)	0.00	
KM (MEASURED)	16.57	
TEST NUMBER, 022FET		
BAROMETER, MM HG 754.1		
HUMIDITY, G/KG 3.4		
TEMPERATURE, DEG C 22.8		
CARBON DIOXIDE, G/KM 250.3		
FUEL CONSUMPTION, L/100KM 10.73		
HYDROCARBONS, G/KM .15		
CARBON MONOXIDE, G/KM .30		
OXIDES OF NITROGEN, G/KM 1.32		

TABLE D-5. TEST NO. 031 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS		PROJECT 11-5830-007		TEST WEIGHT 2041. KG (4500. LBS)	
TEST NO. 031FTP	RUN 1	VEHICLE NO.03	DATE 2/ 9/81	ACTUAL ROAD LOAD	8.9 KW (12.0 HP)
VEHICLE MODEL 79 MERCURY MARQUIS		BAG CART NO. 1		GASOLINE EM-470-F	
ENGINE 5.7 L(351. CID) V-8		DYNO NO. 3		ODOMETER 78476. KM(48763. MILES)	
TRANSMISSION A3		CVS NO. 2			
BAROMETER 737.87 MM HG(29.05 IN HG)		DRY BULB TEMP. 21.1 DEG C(70.0 DEG F)		NOX HUMIDITY CORRECTION FACTOR	.91
RELATIVE HUMIDITY 48. PCT		ABS. HUMIDITY 7.7 GM/KG			
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					
COMPOSITE RESULTS					
TEST NUMBER 031FTP					
BAROMETER MM HG 737.9					
HUMIDITY G/KG 7.7					
TEMPERATURE DEG C 21.1					
CARBON DIOXIDE G/KM					
FUEL CONSUMPTION L/100KM					
HYDROCARBONS (THC) G/KM					
CARBON MONOXIDE G/KM					
OXIDES OF NITROGEN G/KM					

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

TEST NO. 031FET	RUN 1	VEHICLE NO.03	DATE 2/ 9/81	TEST WEIGHT 2041. KG(4500. LBS)
VEHICLE MODEL 79 MERCURY MARQUIS		BAG CART NO. 1		ACTUAL ROAD LOAD 8.9 KW(12.0 HP)
ENGINE 5.7 L(351. CID) V-8		DYNO NO. 3		GASOLINE EM-470-F
TRANSMISSION A3		CVS NO. 2		ODOMETER 78499. KM(48777. MILES)
BAROMETER 736.60 MM HG(29.00 IN HG)		DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)		NOX HUMIDITY CORRECTION FACTOR .93
RELATIVE HUMIDITY 50. PCT		ABS. HUMIDITY 8.6 GM/KG		
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, 031FET				
BAROMETER, MM HG 736.6				
HUMIDITY, G/KG 8.6				
TEMPERATURE, DEG C 22.2				
CARBON DIOXIDE, G/KM 255.8				
FUEL CONSUMPTION, L/100KM 11.02				
HYDROCARBONS, G/KM .15				
CARBON MONOXIDE, G/KM 1.27				
OXIDES OF NITROGEN, G/KM 1.49				

TABLE D-6. TEST NO. 032 EMISSIONS RESULTS

FTP 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
DYNO NO. 3
CVS NO. 2

TEST WEIGHT 2041. KG(4500. LBS)
ACTUAL ROAD LOAD 3.2 KW(12.0 HP)
GASOLINE EM-470-F
ODOMETER 78534. KM(48799. 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
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

	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)	769.6 (30.3)	762.0 (30.0)
BLOWER INLET P MM. H2O(IN. H2O)	735.6 (29.0)	741.7 (29.2)	744.2 (29.3)	749.3 (29.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	34.4 (94.0)	41.7 (107.0)	41.7 (107.0)	42.3 (108.0)
BLOWER REVOLUTIONS	40500.	49477.	40494.	47549.
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.
HC BCKGRD METER/RANGE/PPM	1.7/ 3/ 17.	17.8/ 2/ 18.	15.5/ 2/ 16.	14.4/ 2/ 14.
CO SAMPLE METER/RANGE/PPM	25.8/ 3/ 599.	67.7/13/ 66.	72.1/11/ 308.	76.8/12/ 179.
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	34.0/ 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	1.68	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	2566.7	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	17.98
RUN TIME SECONDS	505.	866.	505.	868.
MEASURED DISTANCE KM	5.86	6.26	5.81	6.25
DFC, WET (DRY)		.896 (.891)		.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

3-BAG (4-BAG)
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 1.09 (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
DYNO 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

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)

	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 (108.0)
BLOWER REVOLUTIONS	41383
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 756.9
HUMIDITY, G/KG 7.5
TEMPERATURE, DEG C 23.9
CARBON DIOXIDE, G/KM 257.9
FUEL CONSUMPTION, L/100KM 11.16

HYDROCARBONS, G/KM .19
CARBON MONOXIDE, G/KM 1.91
OXIDES OF NITROGEN, G/KM 1.62

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
DYNO 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 78397. KM(48839. MILES)

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

DRY BULB TEMP. 20.0 DEG C(68.0 DEG F)
ABS. HUMIDITY 1.9 GM/KG

NOX HUMIDITY CORRECTION FACTOR .78

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

1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
769.6 (30.3)	777.2 (30.6)	774.7 (30.5)	774.7 (30.5)
762.0 (30.0)	767.1 (30.2)	767.1 (30.2)	769.6 (30.3)
42.2 (108.0)	44.4 (112.0)	40.6 (105.0)	40.6 (105.0)
40700.	69414.	40483.	69487.
78.6 (2774.)	133.3 (4708.)	78.3 (2765.)	134.4 (4745.)
10.7/ 3/ 107.	33.6/ 2/ 34.	62.2/ 2/ 52.	28.9/ 2/ 29.
1.0/ 3/ 10.	10.6/ 2/ 11.	10.4/ 2/ 10.	10.3/ 2/ 10.
63.6/11/ 256.	47.9/13/ 45.	64.7/12/ 144.	75.9/13/ 75.
1.7/11/ 5.	5.2/13/ 5.	1.6/12/ 3.	3.3/13/ 3.
87.7/ 3/ 1.53	60.4/ 3/ 1.07	80.7/ 3/ 1.48	51.4/ 3/ 1.09
4.0/ 3/ .06	4.7/ 3/ .07	4.5/ 3/ .07	4.5/ 3/ .07
70.4/ 2/ 90.	24.6/ 2/ 25.	54.0/ 2/ 55.	26.7/ 2/ 27.
.8/ 2/ 1.	.9/ 2/ 1.	.7/ 2/ 1.	.7/ 2/ 1.
8.05	12.42	8.91	12.17
98.	24.	53.	19.
243.	40.	137.	70.
1.58	1.00	1.42	1.03
89.7	23.8	54.2	26.1
4.45	1.83	2.39	1.51
22.22	3.15	12.48	10.75
2267.1	2452.2	2040.0	2527.7
10.45	4.70	6.29	5.19
.77	.29	.42	.24
3.83	.98	2.17	1.77
390.4	392.3	354.0	407.9
1.80	.75	1.09	.84
17.02	16.85	15.31	17.56
507.	065.	505.	868.
5.81	6.25	5.76	6.20
.903 (.877)		.907 (.903)	
1.000 (.984)		1.000 (.984)	
211.9		212.7	
0.00		0.00	
12.06		11.96	
16.73		16.48	

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 16.46 (16.67)
HYDROCARBONS (THC) G/KM .42 (.41)
CARBON MONOXIDE G/KM 1.70 (2.13)
OXIDES OF NITROGEN G/KM 1.06 (1.09)

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

TEST NO. 036FET 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
DYNO 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)

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

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

NOX HUMIDITY CORRECTION FACTOR .77

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, 036FET
BAROMETER, MM HG 761.0
HUMIDITY, G/KG 1.5
TEMPERATURE, DEG C 22.2
CARBON DIOXIDE, G/KM 252.3
FUEL CONSUMPTION, L/100KM 10.81

HYDROCARBONS, G/KM .12
CARBON MONOXIDE, G/KM .36
OXIDES OF NITROGEN, G/KM 1.45

HFET
800.1 (31.5)
792.5 (31.2)
43.9 (111.0)
61313.
117.6 (4153.)
36.0/ 2/ 36.
9.2/ 2/ 9.
49.9/13/ 47.
2.1/13/ 2.
45.0/ 2/ 1.57
1.7/ 2/ .06
46.1/ 3/ 139.
.2/ 3/ 1.
6.77
20.
44.
1.92
137.8
1.21
5.96
4134.7
23.77
765.
.852 (.850)
1.000 (.979)
117.6
0.00
16.39

TABLE D-8. TEST NO. 037 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS		PROJECT 11-5030-007	
TEST NO. 037FTP RUN 1	VEHICLE NO.03	TEST WEIGHT 2041. KG (4500. LBS)	
VEHICLE MODEL 79 MERCURY MARQUIS	DATE 2/12/01	ACTUAL ROAD LOAD 8.9 KW(12.0 HP)	
ENGINE 5.7 L(351. CID) V-8	BAG CART NO. 1	GASOLINE EM-470-F	
TRANSMISSION A3	DYNO NO. 3	ODOMETER 70362. KM(48870. MILES)	
	CVS NO. 2		
BAROMETER 756.67 MM HG(29.79 IN HG)	DRY BULB TEMP. 21.1 DEG C(70.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR .79	
RELATIVE HUMIDITY 16. PCT	ABS. HUMIDITY 2.5 GM/KG		
BAG RESULTS			
BAG NUMBER			
DESCRIPTION	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT
BLOWER DIF P MM. H2O(IN. H2O)	779.8 (30.7)	787.4 (31.0)	787.4 (31.0)
BLOWER INLET P MM. H2O(IN. H2O)	769.6 (30.3)	772.2 (30.4)	777.2 (30.6)
BLOWER INLET TEMP. DEG. C(DEG. F)	41.1 (106.0)	41.1 (106.0)	40.6 (105.0)
BLOWER REVOLUTIONS	40580.	67534.	40513.
TOT FLOW STD. CU. METRES(SCF)	78.0 (2754.)	133.6 (4716.)	77.9 (2749.)
HC SAMPLE METER/RANGE/PPM	11.3/ 3/ 113.	32.5/ 2/ 33.	62.2/ 2/ 62.
HC BCKGRD METER/RANGE/PPM	1.1/ 3/ 11.	12.1/ 2/ 12.	11.6/ 2/ 12.
CO SAMPLE METER/RANGE/PPM	94.8/11/ 435.	69.8/13/ 68.	69.5/12/ 133.
CO BCKGRD METER/RANGE/PPM	2.1/11/ 6.	6.6/13/ 6.	2.2/12/ 4.
CO2 SAMPLE METER/RANGE/PCT	87.8/ 3/ 1.63	60.2/ 3/ 1.07	80.0/ 3/ 1.47
CO2 BCKGRD METER/RANGE/PCT	3.8/ 3/ .06	3.9/ 3/ .06	4.1/ 3/ .06
NOX SAMPLE METER/RANGE/PPM	89.4/ 2/ 89.	25.1/ 2/ 25.	53.9/ 2/ 54.
NOX BCKGRD METER/RANGE/PPM	.7/ 2/ 1.	.9/ 2/ 1.	.8/ 2/ 1.
DILUTION FACTOR	7.93	12.44	8.99
HC CONCENTRATION PPM	103.	21.	52.
CO CONCENTRATION PPM	462.	81.	149.
CO2 CONCENTRATION PCT	1.58	1.01	1.41
NOX CONCENTRATION PPM	88.8	24.3	53.2
HC MASS GRAMS	4.65	1.65	2.33
CO MASS GRAMS	41.92	9.44	13.50
CO2 MASS GRAMS	2257.8	2474.3	2015.5
NOX MASS GRAMS	10.42	4.88	6.23
HC GRAMS/KM	.80	.26	.40
CO GRAMS/KM	7.21	1.52	2.33
CO2 GRAMS/KM	388.44	397.1	347.6
NOX GRAMS/KM	.79	.28	1.07
FUEL CONSUMPTION BY CB L/100KM	17.17	17.09	15.05
RUN TIME SECONDS	505.	867.	503.
MEASURED DISTANCE KM	5.81	6.23	5.80
DFC, WET (DRY)	.903 (.898)		.907 (.902)
SCF, WET (DRY)	1.000 (.983)		1.000 (.983)
VOL (SCH)	211.5		211.5
SAM BLR (SCH)	0.00		0.00
KM (MEASURED)	12.04		12.04
FUEL CONSUMPTION L/100KM	17.13		16.28
COMPOSITE RESULTS			
TEST NUMBER 037FTP		CARBON DIOXIDE G/KM	3-BAG (4-BAG)
BAROMETER MM HG 756.7		FUEL CONSUMPTION L/100KM	381.7 (383.4)
HUMIDITY G/KG 2.5		HYDROCARBONS (THC) G/KM	16.54 (16.64)
TEMPERATURE DEG C 21.1		CARBON MONOXIDE G/KM	.41 (.40)
		OXIDES OF NITROGEN G/KM	2.92 (3.35)
			1.07 (1.07)

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

TEST NO. 037FET RUN 1	VEHICLE NO.03	TEST WEIGHT 2041. KG (4500. LBS)
VEHICLE MODEL 79 MERCURY MARQUIS	DATE 2/12/01	ACTUAL ROAD LOAD 8.9 KW(12.0 HP)
ENGINE 5.7 L(351. CID) V-8	BAG CART NO. 1	GASOLINE EM-470-F
TRANSMISSION A3	DYNO NO. 3	ODOMETER 78686. KM(48893. MILES)
	CVS NO. 2	
BAROMETER 755.90 MM HG(29.76 IN HG)	DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR .78
RELATIVE HUMIDITY 13. PCT	ABS. HUMIDITY 2.4 GM/KG	
0 BAG RESULTS		
TEST CYCLE	HFET	
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	766.	
DFC, WET (DRY)	.855 (.851)	
SCF, WET (DRY)	1.000 (.978)	
VOL (SCH)	117.6	
SAM BLR (SCH)	0.00	
KM (MEASURED)	16.42	
TEST NUMBER, 037FET		
BAROMETER, MM HG 755.9		
HUMIDITY, G/KG 2.4		
TEMPERATURE, DEG C 23.9		
CARBON DIOXIDE, G/KM 246.1		
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 NO. 04	TEST WEIGHT 1814. KG(4000. LBS)	
VEHICLE MODEL 70 FORD GRANADA	DATE 2/24/81	ACTUAL ROAD LOAD 9.8 KW(13.2 HP)	
ENGINE 4.9 L(302, CID) V-8	BAG CART NO. 1 / CVS NO. 2	GASOLINE EM-470-F	
TRANSMISSION A3	DYNO NO. 3	ODOMETER 91705. KM(56983. MILES)	
BAROMETER 743.46 MM HG(29.27 IN HG)	DRY BULB TEMP. 27.8 DEG C(82.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR .90	
RELATIVE HUMIDITY 31. PCT	ABS. HUMIDITY 7.4 GM/KG		
BAG RESULTS			
BAG NUMBER			
DESCRIPTION			
BLOWER DIF P MM. H2O(IN. H2O)	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT
BLOWER INLET P MM. H2O(IN. H2O)	762.0 (30.0)	774.7 (30.5)	762.0 (30.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	762.0 (30.0)	774.7 (30.5)	762.0 (30.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.8 (109.0)	42.8 (109.0)	43.1 (109.5)
BLOWER REVOLUTIONS	40574	69526	40490
TOT FLOW STD. CU. METRES(SCF)	76.4 (2698.)	130.6 (4611.)	76.2 (2689.)
HC SAMPLE METER/RANGE/PPM	20.9/ 3/ 209.	67.6/ 2/ 68.	21.2/ 3/ 212.
HC BCKGRD METER/RANGE/PPM	1.2/ 3/ 12.	12.1/ 2/ 12.	1.1/ 3/ 11.
CO SAMPLE METER/RANGE/PPM	43.6/ 3/ 1049.	70.7/ 12/ 161.	95.2/ 11/ 488.
CO BCKGRD METER/RANGE/PPM	1/ 3/ 2.	6/ 12/ 1.	2/ 11/ 1.
CO2 SAMPLE METER/RANGE/PCT	96.1/ 3/ 1.81	68.8/ 3/ 1.24	86.3/ 3/ 1.60
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.4/ 3/ .04	3.3/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	39.6/ 2/ 40.	11.4/ 2/ 11.	37.2/ 2/ 37.
NOX BCKGRD METER/RANGE/PPM	6/ 2/ 1.	9/ 2/ 1.	3/ 2/ 0.
DILUTION FACTOR	6.95	10.62	8.03
HC CONCENTRATION PPM	199.	57.	202.
CO CONCENTRATION PPM	1000.	159.	468.
CO2 CONCENTRATION PCT	1.77	1.21	1.56
NOX CONCENTRATION PPM	39.1	10.6	36.9
HC MASS GRAMS	8.75	4.27	8.89
CO MASS GRAMS	88.96	23.53	41.50
CO2 MASS GRAMS	2475.3	2085.0	2170.4
NOX MASS GRAMS	5.15	2.38	4.85
HC GRAMS/KM	1.50	.68	1.52
CO GRAMS/KM	15.25	3.74	7.10
CO2 GRAMS/KM	424.4	458.0	371.3
NOX GRAMS/KM	.88	.38	.83
FUEL CONSUMPTION BY CB L/100KM	19.34	19.89	16.53
RUN TIME SECONDS	505.	867.	505.
MEASURED DISTANCE KM	5.83	6.30	5.84
DFC, DRY	.973	.979	.975
DFC, WET (DRY)	.807 (.879)		.896 (.887)
SCF, WET (DRY)	1.000 (.977)		1.000 (.977)
VOL (SCM)	207.0		206.8
SAM BLR (SCM)	0.00		0.00
KM (MEASURED)	12.13		12.25
FUEL CONSUMPTION L/100KM	19.62		17.80
COMPOSITE RESULTS			
TEST NUMBER 041FTP		CARBON DIOXIDE G/KM	427.3 (421.3)
BAROMETER MM HG 743.5		FUEL CONSUMPTION L/100KM	10.05 (13.58)
HUMIDITY G/KG 7.4		HYDROCARBONS (THC) G/KM	1.08 (1.07)
TEMPERATURE DEG C 27.8		CARBON MONOXIDE G/KM	7.04 (6.85)
		OXIDES OF NITROGEN G/KM	.61 (.60)

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

TEST NO. 041FTP RUN 1	VEHICLE NO. 04	TEST WEIGHT 1814. KG(4000. LBS)
VEHICLE MODEL 70 FORD GRANADA	DATE 2/24/81	ACTUAL ROAD LOAD 9.8 KW(13.2 HP)
ENGINE 4.9 L(302, CID) V-8	BAG CART NO. 1	GASOLINE EM-470-F
TRANSMISSION A3	DYNO NO. 3	ODOMETER 91728. KM(56997. MILES)
BAROMETER 743.46 MM HG(29.27 IN HG)	DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR .92
RELATIVE HUMIDITY 42. PCT	ABS. HUMIDITY 8.2 GM/KG	
BAG RESULTS		
TEST CYCLE	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)	42.8 (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/ 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	32.92	
CO2 MASS GRAMS	4702.4	
NOX MASS GRAMS	10.97	
RUN TIME SECONDS	766.	
DFC, WET (DRY)	.828 (.817)	
SCF, WET (DRY)	1.000 (.966)	
VOL (SCM)	115.2	
SAM BLR (SCM)	0.00	
KM (MEASURED)	16.53	
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	ACTUAL ROAD LOAD 9.0 KW (13.2 HP)	
ENGINE 4.9 L (302. CID) V-6	BAG CART NO. 1 / CVS NO. 2	GASOLINE EM-470-F	
TRANSMISSION A3	DYNO NO. 3	ODOMETER 91758. KM(57016. MILES)	
BAROMETER 741.43 MM HG(29.19 IN HG)	DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR 1.00	
RELATIVE HUMIDITY 58. PCT	ABS. HUMIDITY 10.7 GM/KG		
BAG RESULTS			
BAG NUMBER			
DESCRIPTION			
BLOWER DIF P MM. H2O(IN. H2O)	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)	774.7 (30.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)	42.8 (109.0)	42.8 (109.0)
BLOWER REVOLUTIONS	40597.	69600.	40537.
TOT FLOW STD. CU. METRES(SCF)	76.0 (2682.)	130.3 (4603.)	76.0 (2683.)
HC SAMPLE METER/RANGE/PPM	22.0/ 3/ 220.	74.0/ 2/ 75.	19.5/ 3/ 195.
HC BCKGRD METER/RANGE/PPM	1.2/ 3/ 12.	12.8/ 2/ 13.	1.4/ 3/ 14.
CO SAMPLE METER/RANGE/PPM	43.5/ 3/1047.	77.9/12/ 189.	90.5/11/ 445.
CO BCKGRD METER/RANGE/PPM	1.1/ 3/ 2.	6/12/ 1.	7/11/ 2.
CO2 SAMPLE METER/RANGE/PCT	95.0/ 3/ 1.80	68.0/ 3/ 1.24	86.7/ 3/ 1.61
CO2 BCKGRD METER/RANGE/PCT	3.2/ 3/ .05	2.6/ 3/ .04	3.0/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	36.8/ 2/ 37.	7.9/ 2/ 10.	37.5/ 2/ 38.
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ 1.	.5/ 2/ 1.	.8/ 2/ 1.
DILUTION FACTOR	6.78	10.59	3.00
HC CONCENTRATION PPM	210.	63.	183.
CO CONCENTRATION PPM	909.	130.	422.
CO2 CONCENTRATION PCT	1.76	1.20	1.57
NOX CONCENTRATION PPM	36.3	7.4	36.8
HC MASS GRAMS	9.19	4.75	9.01
CO MASS GRAMS	87.43	27.27	37.32
CO2 MASS GRAMS	2444.9	2046.1	2188.4
NOX MASS GRAMS	5.27	2.35	5.35
HC GRAMS/KM	1.56	.74	1.37
CO GRAMS/KM	14.01	4.23	6.40
CO2 GRAMS/KM	414.2	444.1	375.0
NOX GRAMS/KM	0.99	.36	.72
FUEL CONSUMPTION BY CB L/100KM	18.88	19.34	16.62
RUN TIME SECONDS	505.	367.	505.
MEASURED DISTANCE KM	5.90	6.45	5.04
DFC, DRY	.965	.970	.966
DFC, WET (DRY)	.888 (.871)		.895 (.879)
SCF, WET (DRY)	1.000 (.958)		1.000 (.769)
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			
BAROMETER MM HG 741.4		CARBON DIOXIDE G/KM	3-DAG 419.2 (419.2)
HUMIDITY G/KG 10.7		FUEL CONSUMPTION L/100KM	10.51 (10.47)
TEMPERATURE DEG C 23.3		HYDROCARBONS (TIC) G/KM	1.08 (1.06)
		CARBON MONOXIDE G/KM	6.99 (6.47)
		OXIDES OF NITROGEN G/KM	.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 70 FORD GRANADA	DATE 2/25/01	ACTUAL ROAD LOAD 9.8 KW (13.2 HP)
ENGINE 4.9 L (302. CID) V-8	BAG CART NO. 1	GASOLINE EM-470-F
TRANSMISSION A3	DYNO NO. 3	ODOMETER 91781. KM(57030. MILES)
BAROMETER 741.68 MM HG(29.20 IN HG)	DRY BULB TEMP. 20.9 DEG C(69.6 DEG F)	NOX HUMIDITY CORRECTION FACTOR 1.02
RELATIVE HUMIDITY 44. PCT	ABS. HUMIDITY 11.2 GM/KG	
BAG 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	148.	
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 (.765)	
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 20.9		
CARBON DIOXIDE, G/KM 202.8		
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 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 GR/KG	
BAG RESULTS		NOX HUMIDITY CORRECTION FACTOR 1.02	
BAG NUMBER		1	
DESCRIPTION		2	
		3	
		4	
		5	
		6	
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	
		21	
		22	
		23	
		24	
		25	
		26	
		27	
		28	
		29	
		30	
		31	
		32	
		33	
		34	
		35	
		36	
		37	
		38	
		39	
		40	
		41	
		42	
		43	
		44	
		45	
		46	
		47	
		48	
		49	
		50	
		51	
		52	
		53	
		54	
		55	
		56	
		57	
		58	
		59	
		60	
		61	
		62	
		63	
		64	
		65	
		66	
		67	
		68	
		69	
		70	
		71	
		72	
		73	
		74	
		75	
		76	
		77	
		78	
		79	
		80	
		81	
		82	
		83	
		84	
		85	
		86	
		87	
		88	
		89	
		90	
		91	
		92	
		93	
		94	
		95	
		96	
		97	
		98	
		99	
		100	
		101	
		102	
		103	
		104	
		105	
		106	
		107	
		108	
		109	
		110	
		111	
		112	
		113	
		114	
		115	
		116	
		117	
		118	
		119	
		120	
		121	
		122	
		123	
		124	
		125	
		126	
		127	
		128	
		129	
		130	
		131	
		132	
		133	
		134	
		135	
		136	
		137	
		138	
		139	
		140	
		141	
		142	
		143	
		144	
		145	
		146	
		147	
		148	
		149	
		150	
		151	
		152	
		153	
		154	
		155	
		156	
		157	
		158	
		159	
		160	
		161	
		162	
		163	
		164	
		165	
		166	
		167	
		168	
		169	
		170	
		171	
		172	
		173	
		174	
		175	
		176	
		177	
		178	
		179	
		180	
		181	
		182	
		183	
		184	
		185	
		186	
		187	
		188	
		189	
		190	
		191	
		192	
		193	
		194	
		195	
		196	
		197	
		198	
		199	
		200	
		201	
		202	
		203	
		204	
		205	
		206	
		207	
		208	
		209	
		210	
		211	
		212	
		213	
		214	
		215	
		216	
		217	
		218	
		219	
		220	
		221	
		222	
		223	
		224	
		225	
		226	
		227	
		228	
		229	
		230	
		231	
		232	
		233	
		234	
		235	
		236	
		237	
		238	
		239	
		240	
		241	
		242	
		243	
		244	
		245	
		246	
		247	
		248	
		249	
		250	
		251	
		252	
		253	
		254	
		255	
		256	
		257	
		258	
		259	
		260	
		261	
		262	
		263	
		264	
		265	
		266	
		267	
		268	
		269	
		270	
		271	
		272	
		273	
		274	
		275	
		276	
		277	
		278	
		279	
		280	
		281	
		282	
		283	
		284	
		285	
		286	
		287	
		288	
		289	
		290	
		291	
		292	
		293	
		294	
		295	
		296	
		297	
		298	
		299	
		300	
		301	
		302	
		303	
		304	
		305	
		306	
		307	
		308	
		309	
		310	
		311	
		312	
		313	
		314	
		315	
		316	
		317	
		318	
		319	
		320	
		321	
		322	
		323	
		324	
		325	
		326	
		327	
		328	
		329	
		330	
		331	
		332	
		333	
		334	
		335	
		336	
		337	
		338	
		339	
		340	
		341	
		342	
		343	
		344	
		345	
		346	
		347	
		348	
		349	
		350	
		351	
		352	
		353	
		354	
		355	
		356	
		357	
		358	
		359	
		360	
		361	
		362	
		363	
		364	
		365	
		366	
		367	
		368	
		369	
		370	
		371	
		372	
		373	
		374	
		375	
		376	
		377	
		378	
		379	
		380	
		381	
		382	
		383	
		384	
		385	
		386	
		387	
		388	
		389	
		390	
		391	
		392	
		393	
		394	
		395	
		396	
		397	
		398	
		399	
		400	
		401	
		402	
		403	
		404	
		405	
		406	
		407	
		408	
		409	
		410	
		411	
		412	
		413	
		414	
		415	
		416	
		417	
		418	
		419	
		420	
		421	
		422	
		423	
		424	
		425	
		426	
		427	
		428	
		429	
		430	
		431	
		432	
		433	
		434	
		435	
		436	
		437	
		438	
		439	
		440	
		441	
		442	
		443	
		444	
		445	
		446	
		447	
		448	
		449	
		450	
		451	
		452	
		453	
		454	
		455	
		456	
		457	
		458	
		459	
		460	
		461	
		462	
		463	
		464	
		465	
		466	
		467	
		468	
		469	
		470	
		471	
		472	
		473	
		474	
		475	
		476	
		477	
		478	
		479	
		480	
		481	
		482	
		483	
		484	
		485	
		486	
		487	
		488	
		489	
		490	
		491	
		492	
		493	
		494	
		495	
		496	
		497	
		498	
		499	
		500	
		501	
		502	
		503	
		504	
		505	
		506	
		507	
		508	
		509	
		510	
		511	
		512	
		513	
		514	
		515	
		516	
		517	
		518	
		519	
		520	
		521	
		522	
		523	
		524	
		525	
		526	
		527	
		528	
		529	
		530	
		531	
		532	
		533	
		534	
		535	
		536	
		537	
		538	
		539	
		540	
		541	
		542	
		543	
		544	
		545	
		546	
		547	
		548	
		549	
		550	
		551	
		552	

TABLE D-12. TEST NO. 051 EMISSIONS RESULTS

FTP		VEHICLE EMISSIONS RESULTS		PROJECT 11-5330-007	
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
TRANSMISSION M4				DYNO NO. 3	ODOMETER 9494. KM(5899. MILES)
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					
DESCRIPTION		1	2	3	4
		COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
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	67757	40481	67586
TOT FLOW STD. CU. METRES(SCF)		76.0 (2683.)	131.1 (4628.)	76.0 (2685.)	130.6 (4612.)
HC SAMPLE METER/RANGE/PPM		9.6/ 3/ 96.	39.1/ 2/ 39.	49.0/ 2/ 49.	42.6/ 2/ 43.
HC 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		90.4/11/ 445.	65.2/12/ 146.	74.7/12/ 173.	76.3/12/ 178.
CO BCKGRD METER/RANGE/PPM		1.5/11/ 4.	1.1/12/ 2.	.6/12/ 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/ 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	503.	869.	504.	868.
MEASURED DISTANCE	KM	5.81	6.30	5.85	6.23
SCF, DRY		.973	.976	.974	.977
DFC, WET (DRY)			.920 (.906)		.925 (.911)
SCF, WET (DRY)			1.000 (.975)		1.000 (.975)
VOL (SCM)			207.1		206.7
SAM BLR (SCM)			0.00		0.00
KM (MEASURED)			12.11		12.07
FUEL CONSUMPTION L/100KM			13.52		12.83
COMPOSITE RESULTS					
TEST NUMBER	051FTP			3-BAG	(4-BAG)
BAROMETER	MM HG 741.7			301.6	(299.9)
HUMIDITY	G/KG 9.1			13.18	(13.12)
TEMPERATURE	DEG C 23.9			.38	(.40)
				3.77	(4.00)
				.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
TRANSMISSION M4		DYNO NO. 3	ODOMETER 94969. KM(59011. MILES)
BAROMETER 741.93 MM HG(29.21 IN HG)		DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR .98
RELATIVE HUMIDITY 49. PCT		ABS. HUMIDITY 10.0 GM/KG	
0 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)		115.3 (4072.)	
HC SAMPLE METER/RANGE/PPM		73.4/ 2/ 73.	
HC BCKGRD METER/RANGE/PPM		12.1/ 2/ 12.	
CO SAMPLE METER/RANGE/PPM		95.8/12/ 241.	
CO BCKGRD METER/RANGE/PPM		.4/12/ 1.	
CO2 SAMPLE METER/RANGE/PCT		79.1/ 3/ 1.45	
CO2 BCKGRD METER/RANGE/PCT		3.1/ 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	766.	
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

TEST NO. 052FTP RUN 1
VEHICLE MODEL 78 VOLVO 245DL CAL
ENGINE 2.1 L(130. CID) L-4
TRANSMISSION M4

BAROMETER 735.58 MM HG(28.96 IN HG)
RELATIVE HUMIDITY 62. 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
SCF, DRY
DFC, WET (DRY)
SCF, WET (DRY)
VOL (SCM)
SAM BLR (SCM)
KM (MEASURED)
FUEL CONSUMPTION L/100KM

COMPOSITE RESULTS

TEST NUMBER 052FTP
BAROMETER MM HG 735.6
HUMIDITY G/KG 11.5
TEMPERATURE DEG C 23.3

VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

VEHICLE NO.05
DATE 3/ 3/81
BAG CART NO. 1 / CVS NO. 2
DYNO NO. 3

DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)
ABS. HUMIDITY 11.5 GM/KG

TEST WEIGHT 1588. KG(3500. LBS)
ACTUAL ROAD LOAD 9.5 KW(12.8 HP)
GASOLINE EM-470-F
ODOMETER 95003. KM(59032. MILES)

NOX HUMIDITY CORRECTION FACTOR 1.03

	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
754.4 (29.7)	759.5 (29.9)	759.5 (29.9)	754.4 (29.7)	
749.3 (29.5)	746.8 (29.4)	749.3 (29.5)	744.2 (29.3)	
42.8 (109.0)	42.8 (109.0)	42.2 (108.0)	42.2 (108.0)	
40502.	69611.	40500.	69564.	
75.5 (2665.)	129.7 (4580.)	75.5 (2666.)	129.8 (4583.)	
9.4/ 3/ 94.	46.9/ 2/ 47.	49.8/ 2/ 50.	43.9/ 2/ 44.	
1.7/ 3/ 17.	17.4/ 2/ 17.	17.2/ 2/ 17.	17.5/ 2/ 18.	
87.0/11/ 416.	69.4/12/ 155.	64.6/12/ 144.	61.7/12/ 136.	
2.5/11/ 7.	3.2/12/ 6.	2.3/12/ 4.	1.7/12/ 3.	
71.5/ 3/ 1.29	51.6/ 3/ .90	45.4/ 3/ 1.17	49.8/ 3/ .86	
3.4/ 3/ .06	3.3/ 3/ .05	3.2/ 3/ .05	3.0/ 3/ .05	
35.0/ 2/ 35.	7.1/ 2/ 7.	28.5/ 2/ 29.	8.5/ 2/ 9.	
.8/ 2/ 1.	.9/ 2/ 1.	1.3/ 2/ 1.	1.2/ 2/ 1.	
9.97	14.60	11.26	15.21	
79.	31.	34.	28.	
391.	143.	134.	128.	
1.25	.85	1.13	.82	
34.3	6.3	27.3	7.4	
3.42	2.30	1.49	2.06	
34.37	21.66	11.78	19.38	
1720.2	2020.8	1557.3	1949.6	
5.08	1.60	4.05	1.88	
.59	.37	.26	.33	
5.95	3.46	2.05	3.11	
297.7	322.7	270.2	312.6	
.88	.25	.70	.30	
13.19	14.06	11.71	13.59	
504.	867.	505.	867.	
5.78	6.26	5.76	6.24	
.968	.972	.969	.972	
.920 (.901)		.926 (.907)		
1.000 (.970)		1.000 (.971)		
205.2		205.3		
0.00		0.00		
12.04		12.00		
13.64		12.69		

3-BAG (4-BAG)
CARBON DIOXIDE G/KM 303.2 (300.2)
FUEL CONSUMPTION L/100KM 13.23 (13.10)
HYDROCARBONS (THC) G/KM .38 (.37)
CARBON MONOXIDE G/KM 3.59 (3.48)
OXIDES OF NITROGEN G/KM .51 (.52)

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

TEST NO. 052FET RUN 1
VEHICLE MODEL 78 VOLVO 245DL CAL
ENGINE 2.1 L(130. CID) L-4
TRANSMISSION M4

BAROMETER 734.57 MM HG(28.92 IN HG)
RELATIVE HUMIDITY 54. PCT
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, 052FET
BAROMETER, MM HG 734.6
HUMIDITY, G/KG 11.8
TEMPERATURE, DEG C 26.1
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

VEHICLE NO.05
DATE 3/ 3/81
BAG CART NO. 1
DYNO NO. 3
CVS NO. 2

DRY BULB TEMP. 26.1 DEG C(79.0 DEG F)
ABS. HUMIDITY 11.8 GM/KG

TEST WEIGHT 1588. KG(3500. LBS)
ACTUAL ROAD LOAD 9.5 KW(12.8 HP)
GASOLINE EM-470-F
ODOMETER 95027. KM(59047. MILES)

NOX HUMIDITY CORRECTION FACTOR 1.04

	HFET
759.5 (29.9)	759.5 (29.9)
749.3 (29.5)	749.3 (29.5)
40.0 (104.0)	40.0 (104.0)
61278.	61278.
114.5 (4045.)	114.5 (4045.)
69.7/ 2/ 70.	69.7/ 2/ 70.
17.3/ 2/ 17.	17.3/ 2/ 17.
69.5/12/ 155.	69.5/12/ 155.
1.5/12/ 3.	1.5/12/ 3.
78.4/ 3/ 1.44	78.4/ 3/ 1.44
3.3/ 3/ .05	3.3/ 3/ .05
18.4/ 2/ 18.	18.4/ 2/ 18.
1.0/ 2/ 1.	1.0/ 2/ 1.
9.19	9.19
54.	54.
146.	146.
1.39	1.39
17.5	17.5
3.59	3.59
19.40	19.40
2918.3	2918.3
3.98	3.98
765.	765.
.891 (.876)	.891 (.876)
1.000 (.969)	1.000 (.969)
114.5	114.5
0.00	0.00
16.34	16.34

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 24SDL 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	ODGMETER 9508. KM(5908. MILES)	
BAROMETER 731.77 MM HG(28.81 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
DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
BLOWER DIF P MM. H2O(IN. H2O)	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)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.8 (109.0)	41.7 (107.0)	42.8 (109.0)
BLOWER REVOLUTIONS	40442.	67718.	40516.
TOT FLOW STD. CU. METRES(SCF)	74.9 (2646.)	129.4 (4570.)	75.1 (2651.)
HC SAMPLE METER/RANGE/PPM	97.3/ 2/ 97.	47.8/ 2/ 48.	53.6/ 2/ 54.
HC BCKGRD METER/RANGE/PPM	16.7/ 2/ 17.	15.0/ 2/ 15.	12.9/ 2/ 13.
CO SAMPLE METER/RANGE/PPM	82.8/11/ 383.	73.2/12/ 169.	59.4/12/ 130.
CO BCKGRD METER/RANGE/PPM	5/11/ 1.	.6/12/ 1.	.1/12/ 0.
CO2 SAMPLE METER/RANGE/PCT	67.7/ 3/ 1.22	48.6/ 3/ .84	62.9/ 3/ 1.12
CO2 BCKGRD METER/RANGE/PCT	3.4/ 3/ .05	3.2/ 3/ .05	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	37.6/ 2/ 38.	7.7/ 2/ 8.	31.2/ 2/ 31.
NOX BCKGRD METER/RANGE/PPM	.9/ 2/ 1.	1.0/ 2/ 1.	.9/ 2/ 1.
DILUTION FACTOR	10.60	15.56	11.77
HC CONCENTRATION PPM	82.	34.	42.
CO CONCENTRATION PPM	368.	162.	125.
CO2 CONCENTRATION PCT	1.17	.79	1.08
NOX CONCENTRATION PPM	36.8	6.8	30.4
HC MASS GRAMS	3.55	2.52	1.81
CO MASS GRAMS	32.06	24.47	10.94
CO2 MASS GRAMS	1605.6	1882.4	1480.7
NOX MASS GRAMS	5.10	1.62	4.22
HC GRAMS/KM	.61	.40	.31
CO GRAMS/KM	5.52	3.91	1.89
CO2 GRAMS/KM	276.6	301.0	255.8
NOX GRAMS/KM	.88	.26	.73
FUEL CONSUMPTION BY CB L/100KM	12.26	13.16	11.09
RUN TIME	503.	868.	505.
MEASURED DISTANCE	5.80	6.25	5.79
SCF, DRY	.975	.978	.975
DFC, 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		3-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)

MFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

TEST NO. 058FET RUN 1	VEHICLE NO.05	TEST WEIGHT 1588. KG(3500. LBS)
VEHICLE MODEL 78 VOLVO 24SDL 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 EM-470-F
TRANSMISSION M4	DYNO NO. 3	ODGMETER 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	MFET	
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	56.	
CO CONCENTRATION PPM	123.	
CO2 CONCENTRATION PCT	1.43	
NOX CONCENTRATION PPM	22.5	
HC MASS GRAMS	3.75	
CO MASS GRAMS	14.45	
CO2 MASS GRAMS	3013.2	
NOX MASS GRAMS	4.66	
RUN TIME	766.	
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 WEIGHT 1588. KG (3500. LBS)	
TEST NO. 057FTP RUN 1		VEHICLE NO.05		ACTUAL ROAD LOAD 9.5 KW (12.8 HP)	
VEHICLE MODEL 78 VOLVO 245DL CAL		DATE 3/ 5/81		GASOLINE EM-470-F	
ENGINE 2.1 L(130. CID) L-4		BAG CART NO. 1 / CVS NO. 2		ODMETER 95138. KM(59116. MILES)	
TRANSMISSION M4		DYNO NO. 3			
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					
DESCRIPTION					
BLOWER DIF P MM. H20(IN. H20)		1	2	3	4
BLOWER INLET P MM. H20(IN. H20)		COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER INLET TEMP. DEG. C(DEG. F)		749.3 (29.5)	756.9 (29.8)	749.3 (29.5)	756.9 (29.8)
BLOWER REVOLUTIONS		749.3 (29.5)	756.9 (29.8)	749.3 (29.5)	756.9 (29.8)
TOT FLOW STD. CU. METRES(SCF)		42.8 (109.0)	41.1 (106.0)	42.8 (109.0)	41.7 (107.0)
HC SAMPLE METER/RANGE/PPM		40567.	67628.	40515.	69700.
HC BCKGRD METER/RANGE/PPM		76.2 (2691.)	131.0 (4627.)	76.1 (2687.)	131.0 (4627.)
CO SAMPLE METER/RANGE/PPM		86.9/ 2/ 87.	31.3/ 2/ 31.	38.8/ 2/ 39.	28.3/ 2/ 28.
CO BCKGRD METER/RANGE/PPM		8.3/ 2/ 8.	8.5/ 2/ 9.	8.0/ 2/ 8.	7.8/ 2/ 8.
CO2 SAMPLE METER/RANGE/PPM		86.9/11/ 416.	49.4/12/ 104.	52.0/12/ 111.	47.2/12/ 99.
CO2 BCKGRD METER/RANGE/PPM		1.9/11/ 6.	.9/12/ 2.	.1/12/ 0.	.2/12/ 0.
NOX SAMPLE METER/RANGE/PCT		48.6/ 3/ 1.24	48.1/ 3/ .83	63.7/ 3/ 1.14	48.0/ 3/ .83
NOX BCKGRD METER/RANGE/PCT		3.2/ 3/ .05	3.2/ 3/ .05	3.2/ 3/ .05	3.6/ 3/ .06
DILUTION FACTOR		45.7/ 2/ 46.	7.8/ 2/ 8.	38.3/ 2/ 38.	8.7/ 2/ 9.
HC CONCENTRATION PPM		.4/ 2/ 0.	.4/ 2/ 0.	.5/ 2/ 1.	.7/ 2/ 1.
CO CONCENTRATION PPM		10.43	15.88	11.64	15.93
CO2 CONCENTRATION PCT		79.	23.	31.	21.
NOX CONCENTRATION PPM		397.	100.	107.	96.
HC MASS GRAMS		1.19	.78	1.09	.78
CO MASS GRAMS		45.3	7.4	37.8	8.0
CO2 MASS GRAMS		3.49	1.76	1.38	1.59
NOX MASS GRAMS		35.20	15.28	7.50	14.67
HC GRAMS/KM		1662.2	1882.5	1521.5	1864.1
CO GRAMS/KM		5.73	1.61	4.77	1.75
CO2 GRAMS/KM		.60	.28	.24	.25
NOX GRAMS/KM		6.10	2.45	1.63	2.35
FUEL CONSUMPTION BY CB L/100KM		288.1	302.1	261.7	298.5
RUN TIME		.99	.26	.82	.28
MEASURED DISTANCE KM		12.79	13.10	11.31	12.93
SCF, DRY		505.	867.	505.	868.
DFC, WET (DRY)		5.77	6.23	5.81	6.24
SCF, WET (DRY)		.979	.983	.980	.983
VOL (SCH)		.925 (.916)		.929 (.920)	
SAM BLR (SCH)		1.000 (.981)		1.000 (.982)	
KM (MEASURED)		207.2		207.1	
FUEL CONSUMPTION L/100KM		0.00		0.00	
		12.00		12.06	
		12.95		12.15	
COMPOSITE RESULTS				3-BAG	(4-BAG)
TEST NUMBER 057FTP				288.1	(287.1)
BAROMETER MM HG 740.9				12.54	(12.49)
HUMIDITY G/KG 6.0				.34	(.33)
TEMPERATURE DEG C 25.0				2.99	(2.95)
				.57	(.57)
				CARBON DIOXIDE G/KM	
				FUEL CONSUMPTION L/100KM	
				HYDROCARBONS (THC) G/KM	
				CARBON MONOXIDE G/KM	
				OXIDES OF NITROGEN G/KM	

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

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 EM-470-F	
TRANSMISSION M4		DYNO NO. 2		ODMETER 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. H20(IN. H20)		756.7 (29.8)			
BLOWER INLET P MM. H20(IN. H20)		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		766.			
DFC, WET (DRY)		.892 (.882)			
SCF, WET (DRY)		1.000 (.975)			
VOL (SCH)		115.2			
SAM BLR (SCH)		0.00			
KM (MEASURED)		16.35			
TEST NUMBER,		057FET			
BAROMETER, MM HG		741.2			
HUMIDITY, G/KG		7.3			
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			

FTP VEHICLE EMISSIONS RESULTS
PROJECT 11-5030-007

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

D-17

TABLE D-17. TEST NO. 062 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS PROJECT 11-5830-007		VEHICLE NO.06 DATE 3/10/81 BAG CART NO. 1 / CVS NO. 2 DYNO NO. 3		TEST WEIGHT 1588. KG(3500. LBS) ACTUAL ROAD LOAD 8.0 KW(10.7 HP) GASOLINE EM-470-F ODOMETER 76151. KM(47318. MILES)	
TEST NO. 062FTP RUN 1 VEHICLE MODEL 0 OLDS. CUTLASS ENGINE 3.8 L(231. CID) V-6 TRANSMISSION A3		BAROMETER 751.33 MM HG(29.58 IN HG) RELATIVE HUMIDITY 37. PCT BAG RESULTS		DRY BULB TEMP. 23.3 DEG C(74.0 DEG F) ABS. HUMIDITY 6.5 GM/KG NOX HUMIDITY CORRECTION FACTOR .88	
BAG NUMBER DESCRIPTION		1 COLD TRANSIENT		2 STABILIZED	3 HOT TRANSIENT
BLOWER DIF P MM. H2O(IN. H2O)		762.0 (30.0)		767.1 (30.2)	762.0 (30.0)
BLOWER INLET P MM. H2O(IN. H2O)		762.0 (30.0)		767.1 (30.2)	762.0 (30.0)
BLOWER INLET TEMP. DEG. C(DEG. F)		42.8 (109.0)		40.0 (104.0)	42.2 (108.0)
BLOWER REVOLUTIONS		40557.		69674.	40515.
TOT FLOW STD. CU. METRES(SCF)		77.2 (2727.)		133.2 (4705.)	77.2 (2726.)
HC SAMPLE METER/RANGE/PPM		20.3/ 3/ 203.		30.1/ 2/ 30.	45.3/ 2/ 45.
HC BCKGRD METER/RANGE/PPM		1.0/ 3/ 10.		8.9/ 2/ 9.	8.7/ 2/ 9.
CO SAMPLE METER/RANGE/PPM		71.2/ 3/ 1851.		76.4/ 12/ 178.	72.3/ 12/ 229.
CO BCKGRD METER/RANGE/PPM		.3/ 3/ 7.		1.9/ 12/ 4.	.7/ 12/ 1.
CO2 SAMPLE METER/RANGE/PCT		57.5/ 3/ 1.21		44.0/ 3/ .75	62.6/ 3/ 1.11
CO2 BCKGRD METER/RANGE/PCT		3.0/ 3/ .05		3.0/ 3/ .05	3.4/ 3/ .05
NOX SAMPLE METER/RANGE/PPM		44.4/ 3/ 133.		46.4/ 2/ 46.	41.8/ 3/ 125.
NOX BCKGRD METER/RANGE/PPM		.3/ 3/ 1.		.6/ 2/ 1.	.2/ 3/ 1.
DILUTION FACTOR		9.48		17.33	11.74
HC CONCENTRATION PPM		194.		22.	37.
CO CONCENTRATION PPM		1789.		170.	220.
CO2 CONCENTRATION PCT		1.17		.71	1.07
NOX CONCENTRATION PPM		132.4		45.8	124.9
HC MASS GRAMS		8.64		1.67	1.66
CO MASS GRAMS		160.95		26.38	17.80
CO2 MASS GRAMS		1657.5		1730.5	1508.6
NOX MASS GRAMS		17.23		10.29	16.24
HC GRAMS/KM		1.49		.27	.29
CO GRAMS/KM		27.67		4.21	3.41
CO2 GRAMS/KM		205.1		276.4	260.0
NOX GRAMS/KM		2.96		1.64	2.00
FUEL CONSUMPTION BY CB L/100KM		14.23		12.12	11.36
RUN TIME SECONDS		505.		068.	505.
MEASURED DISTANCE KM		5.81		6.26	5.80
SCF, DRY		.977		.931	.978
DFC, WET (DRY)		.925 (.914)			.932 (.921)
SCF, WET (DRY)		1.000 (.980)			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		062FTP		3-BAG (4-BAG)	
TEST NUMBER		062FTP		CARBON DIOXIDE G/KM	
BAROMETER MM HG		751.3		273.7 (272.9)	
HUMIDITY G/KG		6.6		FUEL CONSUMPTION L/100KM	
TEMPERATURE DEG C		23.3		12.35 (12.27)	
				HYDROCARBONS (THC) G/KM	
				8.52 (.49)	
				CARBON MONOXIDE G/KM	
				8.85 (8.33)	
				OXIDES OF NITROGEN G/KM	
				2.23 (2.26)	

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

TEST NO. 062FET RUN 1 VEHICLE MODEL 0 OLDS. CUTLASS ENGINE 3.8 L(231. CID) V-6 TRANSMISSION A3		VEHICLE NO.06 DATE 3/10/81 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 EM-470-F ODOMETER 76175. KM(47333. MILES)	
BAROMETER 751.33 MM HG(29.58 IN HG) RELATIVE HUMIDITY 33. PCT BAG RESULTS		DRY BULB TEMP. 25.0 DEG C(77.0 DEG F) ABS. HUMIDITY 6.5 GM/KG NOX HUMIDITY CORRECTION FACTOR .88			
TEST CYCLE		HFET			
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)		114.6 (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		240.2			
HC MASS GRAMS		1.84			
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		VEHICLE NO.06 DATE 3/11/81 BAG CART NO. 1 / CVS NO. 2 DYNO NO. 3		TEST WEIGHT 1580, KG (3500, LBS) ACTUAL ROAD LOAD 8.0 KW (10.7 HP) GASOLINE EM-470-F ODOMETER 76220, KM (47361, MILES)	
TEST NO. 066FTP RUN 1 VEHICLE MODEL 0 OLDS. CUTLASS ENGINE 3.0 L(231, CID) V-6 TRANSMISSION A3 BAROMETER 749.01 MM HG(29.52 IN HG) RELATIVE HUMIDITY 42. PCT BAG RESULTS BAG NUMBER DESCRIPTION		DRY BULB TEMP. 24.4 DEG C(76.0 DEG F) ABS. HUMIDITY 3.1 GM/KG		NOX HUMIDITY CORRECTION FACTOR .92	
		1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)		762.0 (30.0)	767.1 (30.2)	756.9 (29.0)	767.1 (30.2)
BLOWER INLET P MM. H2O(IN. H2O)		762.0 (30.0)	767.1 (30.2)	756.9 (29.0)	767.1 (30.2)
BLOWER INLET TEMP. DEG. C(DEG. F)		42.0 (109.0)	42.2 (108.0)	43.9 (111.0)	42.8 (109.0)
BLOWER REVOLUTIONS		40652.	69611.	40553.	69538.
TOT FLOW STD. CU. METRES(SCF)		77.2 (2727.)	132.3 (4670.)	76.9 (2717.)	132.0 (4662.)
HC SAMPLE METER/RANGE/PPM		16.2/ 3/ 162.	22.0/ 2/ 22.	52.2/ 2/ 52.	19.9/ 2/ 20.
HC BCKGRD METER/RANGE/PPM		1.0/ 3/ 10.	8.9/ 2/ 9.	8.5/ 2/ 9.	8.2/ 2/ 8.
CO SAMPLE METER/RANGE/PPM		67.4/ 3/ 1730.	73.2/ 12/ 167.	74.2/ 11/ 322.	61.4/ 12/ 135.
CO BCKGRD METER/RANGE/PPM		1.1/ 3/ 2.	.9/ 12/ 2.	.2/ 11/ 1.	.1/ 12/ 0.
CO2 SAMPLE METER/RANGE/PCT		71.9/ 3/ 1.30	47.4/ 3/ .02	64.4/ 3/ 1.15	46.0/ 3/ .79
CO2 BCKGRD METER/RANGE/PCT		3.8/ 3/ .06	3.3/ 3/ .05	3.0/ 3/ .05	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM		44.0/ 2/ 44.	13.4/ 2/ 13.	37.7/ 2/ 38.	14.1/ 2/ 14.
NOX BCKGRD METER/RANGE/PPM		.95/ 2/ 1.	.7/ 2/ 1.	.7/ 2/ 1.	.7/ 2/ 1.
DILUTION FACTOR		9.02	16.03	11.29	16.63
HC CONCENTRATION PPM		153.	14.	44.	12.
CO CONCENTRATION PPM		1669.	162.	310.	131.
CO2 CONCENTRATION PCT		1.25	.77	1.11	.75
NOX CONCENTRATION PPM		43.2	12.7	37.1	13.4
HC MASS GRAMS		6.82	1.04	1.97	.93
CO MASS GRAMS		150.09	24.95	27.76	20.18
CO2 MASS GRAMS		1769.0	1864.3	1562.3	1803.2
NOX MASS GRAMS		5.07	2.96	5.01	3.12
HC GRAMS/KM		1.17	.17	.34	.15
CO GRAMS/KM		25.70	3.77	4.76	3.21
CO2 GRAMS/KM		302.8	296.3	267.8	286.5
NOX GRAMS/KM		1.00	.47	.06	.50
FUEL CONSUMPTION BY CB L/100KM		14.01	12.93	11.79	12.46
RUN TIME SECONDS		506.	868.	506.	868.
MEASURED DISTANCE KM		5.84	6.29	5.84	6.29
SCF, WET (DRY)		.975	.979	.976	.979
DFC, WET (DRY)			.920 (.907)		.929 (.917)
SCF, WET (DRY)			1.000 (.977)		1.000 (.978)
VOL (SCM)			209.5		209.0
SAM BLR (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-BAG (4-BAG)
BAROMETER MM HG 749.8				CARBON DIOXIDE G/KM 289.8	(286.9)
HUMIDITY G/KG 8.1				FUEL CONSUMPTION L/100KM 13.01	(12.87)
TEMPERATURE DEG C 24.4				HYDROCARBONS (THC) G/KM .42	(.41)
				CARBON MONOXIDE G/KM 8.60	(0.46)
				OXIDES OF NITROGEN G/KM .69	(.70)

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 3/11/81	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	DYNO NO. 3	ODOMETER 76244, KM(47376, MILES)
	CVS NO. 2	
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	61343.	
TOT FLOW STD. CU. METRES(SCF)	116.5 (4112.)	
HC SAMPLE METER/RANGE/PPM	34.1/ 2/ 34.	
HC BCKGRD METER/RANGE/PPM	10.8/ 2/ 11.	
CO SAMPLE METER/RANGE/PPM	54.8/12/ 110.	
CO BCKGRD METER/RANGE/PPM	.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	1.37	
NOX CONCENTRATION PPM	56.9	
HC MASS GRAMS	1.56	
CO MASS GRAMS	15.24	
CO2 MASS GRAMS	3503.1	
NOX MASS GRAMS	11.56.	
RUN TIME SECONDS	765.	
DFC, WET (DRY)	.871 (.860)	
SCF, WET (DRY)	1.000 (.972)	
VOL (SCM)	116.5	
SAM BLR (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

FTP VEHICLE EMISSIONS RESULTS		PROJECT 11-5030-007		TEST WEIGHT 1580. KG(3500. LBS)	
TEST NO. 068FTP RUN 1		VEHICLE NO.06		ACTUAL ROAD LOAD 8.0 KW(10.7 HP)	
VEHICLE MODEL 78 OLDS. CUTLASS		DATE 3/13/81		GASOLINE EM-470-F	
ENGINE 3.0 L(231. CID) L-4		BAG CART NO. 1 / CVS NO. 2		ODOMETER 76323. KM(47425. MILES)	
TRANSMISSION A3		DYNO NO. 3			
BAROMETER 746.76 MM HG(29.40 IN HG)		DRY BULD 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					
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)	762.0 (30.0)	767.1 (30.2)
BLOWER INLET P MM. H2O(IN. H2O)		744.2 (29.3)	756.9 (29.0)	762.0 (30.0)	757.1 (30.2)
BLOWER INLET TEMP. DEG. C(DEG. F)		43.9 (111.0)	37.8 (100.0)	42.0 (109.0)	42.8 (109.0)
BLOWER REVOLUTIONS		40577.	69000.	40536.	69697.
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.
HC BCKGRD METER/RANGE/PPM		8.0/ 3/ 0.	8.0/ 2/ 8.	8.4/ 2/ 0.	7.7/ 2/ 8.
CO SAMPLE METER/RANGE/PPM		69.4/ 3/1002.	55.7/12/ 120.	77.7/11/ 348.	60.3/12/ 132.
CO BCKGRD METER/RANGE/PPM		2/ 3/ 5.	5/12/ 1.	2/11/ 1.	4/12/ 1.
CO2 SAMPLE METER/RANGE/PCT		71.5/ 3/ 1.30	44.4/ 3/ .76	64.4/ 3/ 1.15	45.9/ 3/ .79
CO2 BCKGRD METER/RANGE/PCT		2.7/ 3/ .04	2.9/ 3/ .04	3.2/ 3/ .05	3.5/ 3/ .05
NOX SAMPLE METER/RANGE/PPM		46.6/ 2/ 47.	12.0/ 2/ 12.	30.5/ 2/ 39.	13.9/ 2/ 14.
NOX BCKGRD METER/RANGE/PPM		2/ 2/ 0.	4/ 2/ 0.	5/ 2/ 1.	4/ 2/ 0.
DILUTION FACTOR		0.77	17.32	11.27	16.68
HC CONCENTRATION PPM		230.	12.	43.	12.
CO CONCENTRATION PPM		1732.	115.	334.	128.
CO2 CONCENTRATION PCT		1.26	.72	1.11	.74
NOX CONCENTRATION PPM		46.4	11.6	39.0	13.5
HC MASS GRAMS		10.10	.91	1.21	.91
CO MASS GRAMS		154.84	17.33	29.78	19.62
CO2 MASS GRAMS		1771.2	1732.9	1552.6	1777.5
NOX MASS GRAMS		6.11	2.53	5.00	3.05
HC GRAMS/KM		1.75	.14	.33	.14
CO GRAMS/KM		26.64	2.82	5.14	3.13
CO2 GRAMS/KM		304.7	274.0	268.1	203.5
NOX GRAMS/KM		1.05	.42	.86	.49
FUEL CONSUMPTION BY CB L/100KM		15.03	11.91	11.83	12.33
RUN TIME SECONDS		505.	867.	505.	868.
MEASURED DISTANCE KM		5.81	6.32	5.77	6.27
SCF, DRY		.976	.981	.978	.991
DFC, WET (DRY)		.922 (.912)		.929 (.919)	
SCF, WET (DRY)		1.000 (.930)		1.000 (.980)	
VOL (SCM)		208.5		208.2	
SAM DLR (SCM)		0.00		0.00	
KM (MEASURED)		12.14		12.04	
FUEL CONSUMPTION L/100KM		13.40		12.09	
COMPOSITE RESULTS				3-BAG	(4-BAG)
TEST NUMBER	068FTP			270.7	(281.5)
BAROMETER MM HG	746.8			12.53	(12.65)
HUMIDITY G/KG	7.2			.53	(.53)
TEMPERATURE DEG C	25.0			8.36	(8.45)
				.57	(.69)
				CARBON DIOXIDE G/KM	
				FUEL CONSUMPTION L/100KM	
				HYDROCARBONS (THC) G/KM	
				CARBON MONOXIDE G/KM	
				OXIDES OF NITROGEN G/KM	

HFET VEHICLE EMISSIONS RESULTS

PROJECT 11-5030-007		TEST WEIGHT 1580. KG(3500. LBS)	
TEST NO. 067FET RUN 1		VEHICLE NO.06	
VEHICLE MODEL 78 OLDS. CUTLASS		DATE 3/12/81	
ENGINE 3.8 L(231. CID) V-6		BAG CART NO. 1	
TRANSMISSION A3		DYNO NO. 3	
		CVS NO. 2	
BAROMETER 746.76 MM HG(29.40 IN HG)		DRY BULD TEMP. 23.9 DEG C(75.0 DEG F)	
RELATIVE HUMIDITY 41. PCT		ABS. HUMIDITY 7.7 GM/KG	
BAG RESULTS		NOX HUMIDITY CORRECTION FACTOR .91	
TEST CYCLE		HFET	
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		61370.	
TOT FLOW STD. CU. METRES(SCF)		115.9 (4091.)	
HC SAMPLE METER/RANGE/PPM		31.4/ 2/ 31.	
HC BCKGRD METER/RANGE/PPM		7.7/ 2/ 0.	
CO SAMPLE METER/RANGE/PPM		55.9/12/ 121.	
CO BCKGRD METER/RANGE/PPM		4/12/ 1.	
CO2 SAMPLE METER/RANGE/PCT		90.3/ 3/ 1.68	
CO2 BCKGRD METER/RANGE/PCT		3.2/ 3/ .05	
NOX SAMPLE METER/RANGE/PPM		53.5/ 2/ 54.	
NOX BCKGRD METER/RANGE/PPM		3/ 2/ 0.	
DILUTION FACTOR		7.09	
HC CONCENTRATION PPM		25.	
CO CONCENTRATION PPM		115.	
CO2 CONCENTRATION PCT		1.64	
NOX CONCENTRATION PPM		53.2	
HC MASS GRAMS		1.64	
CO MASS GRAMS		15.47	
CO2 MASS GRAMS		3402.8	
NOX MASS GRAMS		10.73	
RUN TIME SECONDS		766.	
DFC, WET (DRY)		.873 (.862)	
SCF, WET (DRY)		1.000 (.971)	
VOL (SCM)		115.9	
SAM DLR (SCM)		0.00	
KM (MEASURED)		12.30	
TEST NUMBER,		067FET	
BAROMETER, MM HG		746.8	
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		.56	

FTP VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

	3-BAG	(4-BAG)
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)

D-21

TABLE D-21. TEST NO. 072 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS
PROJECT 11-5030 007

TEST NO. 072FTP RUN 2
VEHICLE MODEL 70 CHEV.MALIBU CAL
ENGINE 5.0 L(305. CID) V-8
TRANSMISSION A3

VEHICLE NO.07
DATE 3/18/81
BAG CART NO. 1 / CVS NO. 2
DYNO NO. 3

TEST WEIGHT 1588. KG(3500. LBS)
ACTUAL ROAD LOAD 8.0 KW(10.7 HP)
GASOLINE EN 470-F
ODOMETER 60537. KM(37616. MILES)

BAROMETER 726.85 MM HG(29.01 IN HG)
RELATIVE HUMIDITY 27. PCT
BAG RESULTS

DRY BULD TEMP. 23.3 DEG C(74.0 DEG F)
ADS. HUMIDITY 5.0 GN/KG

NOX HUMIDITY CORRECTION FACTOR .84

BAG NUMBER
DESCRIPTION
BLOWER DIF P MM. H20(IN. H20)
BLOWER INLET P MM. H20(IN. H20)
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

	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIF P MM. H20(IN. H20)	774.7 (30.5)	782.3 (30.8)	777.2 (30.6)	787.4 (31.0)
BLOWER INLET P MM. H20(IN. H20)	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)	42.8 (109.0)	43.1 (109.5)	43.3 (110.0)
BLOWER REVOLUTIONS	40543	69609	40481	69527
TOT FLOW STD. CU. METRES(SCF)	75.4 (2662.)	129.4 (4570.)	75.3 (2659.)	129.1 (4558.)
HC SAMPLE METER/RANGE/PPM	12.9/ 3/ 129.	32.0/ 2/ 33.	45.3/ 2/ 45.	32.5/ 2/ 33.
HC BCKGRD METER/RANGE/PPM	1.3/ 3/ 13.	8.5/ 2/ 9.	8.1/ 2/ 8.	8.6/ 2/ 9.
CO SAMPLE METER/RANGE/PPM	50.3/ 3/1231.	91.2/12/ 227.	94.7/11/ 404.	89.3/12/ 219.
CO BCKGRD METER/RANGE/PPM	1.1/ 3/ 1.	12/12/ 0.	1.1/1/ 0.	1.1/2/ 0.
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	2.8/ 3/ .04	3.1/ 3/ .05	2.5/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	43.4/ 2/ 43.	10.6/ 2/ 11.	17.0/ 2/ 17.	10.2/ 2/ 10.
NOX BCKGRD METER/RANGE/PPM	2.2/ 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	1181.	220.	466.	212.
CO2 CONCENTRATION PCT	1.54	1.07	1.39	1.05
NOX CONCENTRATION PPM	43.2	10.2	13.6	9.8
HC MASS GRAMS	5.12	1.07	1.65	1.03
CO MASS GRAMS	101.63	33.12	40.85	31.90
CO2 MASS GRAMS	2132.2	2534.7	1911.2	2476.5
NOX MASS GRAMS	5.25	2.13	2.01	2.04
HC GRAMS/KM	.09	.30	.29	.30
CO GRAMS/KM	10.09	5.36	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	17.72	14.71	17.44
RUN TIME SECONDS	505.	860.	505.	860.
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

CARBON DIOXIDE G/KM 381.1 (377.9)
FUEL CONSUMPTION L/100KM 16.39 (16.75)
HYDROCARBONS (THC) G/KM .42 (.42)
CARBON MONOXIDE G/KM 0.49 (0.41)
OXIDES OF NITROGEN G/KM .46 (.46)

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5030 007

TEST NO. 072FET RUN 2
VEHICLE MODEL 70 CHEV.MALIBU CAL
ENGINE 5.0 L(305. CID) V-8
TRANSMISSION A3

VEHICLE NO.07
DATE 3/18/81
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 60561. KM(37631. MILES)

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

DRY BULD TEMP. 24.4 DEG C(76.0 DEG F)
ADS. HUMIDITY 5.1 GN/KG

NOX HUMIDITY CORRECTION FACTOR .84

TEST CYCLE
BLOWER DIF P MM. H20(IN. H20)
BLOWER INLET P MM. H20(IN. H20)
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)

	HFET
BLOWER DIF P MM. H20(IN. H20)	800.1 (31.5)
BLOWER INLET P MM. H20(IN. H20)	792.5 (31.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	43.3 (110.0)
BLOWER REVOLUTIONS	61323
TOT FLOW STD. CU. METRES(SCF)	113.7 (4014.)
HC SAMPLE METER/RANGE/PPM	34.0/ 2/ 35.
HC BCKGRD METER/RANGE/PPM	7.0/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	82.1/12/ 176.
CO BCKGRD METER/RANGE/PPM	1.1/12/ 0.
CO2 SAMPLE METER/RANGE/PCT	44.0/ 2/ 1.92
CO2 BCKGRD METER/RANGE/PCT	1.2/ 2/ .04
NOX SAMPLE METER/RANGE/PPM	31.0/ 2/ 32.
NOX BCKGRD METER/RANGE/PPM	3/ 2/ 0.
DILUTION FACTOR	6.70
HC CONCENTRATION PPM	29.
CO CONCENTRATION PPM	107.
CO2 CONCENTRATION PCT	1.08
NOX CONCENTRATION PPM	31.5
HC MASS GRAMS	1.39
CO MASS GRAMS	24.67
CO2 MASS GRAMS	3910.3
NOX MASS GRAMS	5.79
RUN TIME SECONDS	765.
DFC, WET (DRY)	.855 (.848)
SCF, WET (DRY)	1.000 (.974)
VOL (SCM)	113.7
SAM DLR (SCM)	0.00
KM (MEASURED)	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
HYDROCARBONS, G/KM .12
CARBON MONOXIDE, G/KM 1.52
OXIDES OF NITROGEN, G/KM .36

TABLE D-22. TEST NO. 076 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

TEST NO. 076FTP RUN 1
VEHICLE MODEL 78 CHEV. MALIBU CAL
ENGINE 5.0 L (305, CID) V-8
TRANSMISSION A3

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

TEST WEIGHT 1588. KG (3500, LBS)
ACTUAL ROAD LOAD 8.0 KW (10.7 HP)
GASOLINE EN-470-F
ODOMETER 60597. KM (37453, MILES)

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

DRY BULB TEMP. 22.0 DEG C (73.0 DEG F)
ABS. HUMIDITY 2.4 GM/KG

NOX HUMIDITY CORRECTION FACTOR .78

BAG NUMBER DESCRIPTION	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIF P MM. H2O (IN. H2O)	787.4 (31.0)	792.5 (31.2)	782.3 (30.8)	787.4 (31.0)
BLOWER INLET P MM. H2O (IN. H2O)	782.3 (30.8)	787.4 (31.0)	774.7 (30.5)	782.3 (30.8)
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	40562	39608	40491	69490
TOT FLOW STD. CU. METRES (SCF)	76.5 (2702.)	131.2 (4633.)	76.5 (2699.)	131.1 (4620.)
HC SAMPLE METER/RANGE/PPM	11.7/ 3/ 117.	32.6/ 2/ 33.	45.3/ 2/ 45.	36.1/ 2/ 36.
HC BCKGRD METER/RANGE/PPM	.8/ 3/ .8.	8.0/ 2/ 9.	10.7/ 2/ 11.	11.0/ 2/ 11.
CO SAMPLE METER/RANGE/PPM	40.3/ 3/ 1102.	64.0/ 12/ 140.	70.5/ 11/ 352.	65.5/ 12/ 147.
CO BCKGRD METER/RANGE/PPM	.1/ 3/ .2.	8/ 12/ 1.	.6/ 11/ 2.	.9/ 12/ 2.
CO2 SAMPLE METER/RANGE/PCT	85.4/ 3/ 1.58	60.4/ 3/ 1.07	76.8/ 3/ 1.40	59.5/ 3/ 1.05
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	3.3/ 3/ .05	3.0/ 3/ .05	3.2/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	39.5/ 2/ 40.	10.7/ 2/ 11.	17.4/ 2/ 17.	11.2/ 2/ 11.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.1/ 2/ 0.	.1/ 2/ 0.	.3/ 2/ 0.
DILUTION FACTOR	7.05	12.31	9.29	12.51
HC CONCENTRATION PPM	110.	25.	36.	26.
CO CONCENTRATION PPM	1138.	143.	339.	141.
CO2 CONCENTRATION PCT	1.54	1.02	1.36	1.01
NOX CONCENTRATION PPM	39.4	10.6	17.3	10.7
HC MASS GRAMS	4.85	1.05	1.58	1.56
CO MASS GRAMS	101.41	21.82	30.17	21.57
CO2 MASS GRAMS	2161.7	2460.9	1907.1	2418.7
NOX MASS GRAMS	4.53	2.09	1.99	2.15
HC GRAMS/KM	.83	.30	.27	.31
CO GRAMS/KM	17.37	3.48	5.17	3.43
CO2 GRAMS/KM	370.2	392.0	326.5	384.9
NOX GRAMS/KM	.78	.33	.34	.34
FUEL CONSUMPTION BY CB L/100KM	17.08	17.05	14.32	16.70
RUN TIME SECONDS	505.	860.	505.	867.
MEASURED DISTANCE KM	5.84	6.24	5.04	6.28
SCF, DRY	.981	.986	.933	.986
DFC, WET (DRY)		.902 (.898)		.910 (.906)
SCF, WET (DRY)		1.000 (.984)		1.000 (.985)
VOL (SCM)		207.7		207.5
SAM DLR (SCM)		0.00		0.00
KM (MEASURED)		12.10		12.12
FUEL CONSUMPTION L/100KM		17.06		15.55

COMPOSITE RESULTS

TEST NUMBER 076FTP
BAROMETER MM HG 747.8
HUMIDITY G/KG 2.4
TEMPERATURE DEG C 22.8

CARBON DIOXIDE G/KM 370.0 (367.8)
FUEL CONSUMPTION L/100KM 16.30 (16.20)
HYDROCARBONS (THC) G/KM .40 (.40)
CARBON MONOXIDE G/KM 6.63 (6.81)
OXIDES OF NITROGEN G/KM .43 (.43)

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-000

TEST NO. 076FET RUN 1
VEHICLE MODEL 78 CHEV. MALIBU CAL
ENGINE 5.0 L (305, CID) V-8
TRANSMISSION A3

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 (37668, MILES)

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

DRY BULB TEMP. 26.7 DEG C (80.0 DEG F)
ABS. HUMIDITY 3.5 GM/KG

NOX HUMIDITY CORRECTION FACTOR .81

0 DAG 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)	43.3 (110.0)
BLOWER REVOLUTIONS	61255
TOT FLOW STD. CU. METRES (SCF)	115.3 (4070.)
HC SAMPLE METER/RANGE/PPM	37.2/ 2/ 37.
HC BCKGRD METER/RANGE/PPM	13.6/ 2/ 14.
CO SAMPLE METER/RANGE/PPM	64.3/ 12/ 149.
CO BCKGRD METER/RANGE/PPM	3/ 12/ 1.
CO2 SAMPLE METER/RANGE/PCT	45.6/ 2/ 2.00
CO2 BCKGRD METER/RANGE/PCT	1.6/ 3/ .02
NOX SAMPLE METER/RANGE/PPM	30.1/ 2/ 30.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.
DILUTION FACTOR	6.63
HC CONCENTRATION PPM	26.
CO CONCENTRATION PPM	142.
CO2 CONCENTRATION PCT	1.98
NOX CONCENTRATION PPM	29.8
HC MASS GRAMS	1.71
CO MASS GRAMS	19.03
CO2 MASS GRAMS	4183.8
NOX MASS GRAMS	5.30
RUN TIME SECONDS	765.
DFC, WET (DRY)	.849 (.845)
SCF, WET (DRY)	1.000 (.978)
VOL (SCM)	115.3
SAM DLR (SCM)	0.00
KM (MEASURED)	16.48

TEST NUMBER, 076FET
BAROMETER, MM HG 747.3
HUMIDITY, G/KG 3.5
TEMPERATURE, DEG C 26.7
CARBON DIOXIDE, G/KM 253.9
FUEL CONSUMPTION, L/100KM 10.93
HYDROCARBONS, G/KM .10
CARBON MONOXIDE, G/KM 1.15
OXIDES OF NITROGEN, G/KM .32

TABLE D-23. TEST NO. 078 EMISSIONS RESULTS

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 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
SCF, DRY
D/C, 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 4/7/01
BAG CART NO. 1 / CVS NO. 2
DYNO NO. 3

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

TEST WEIGHT 1580. KG (3500. LBS)
ACTUAL ROAD LOAD 8.0 KW (10.7 HP)
GASOLINE EM-470-F
ODOMETER 61857. KM (38436. MILES)

NOX HUMIDITY CORRECTION FACTOR .98

	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
787.4 (31.0)	787.4 (31.0)	787.4 (31.0)	787.4 (31.0)	787.4 (31.0)
702.3 (30.8)	702.3 (30.8)	702.3 (30.8)	702.3 (30.8)	702.3 (30.8)
43.3 (110.0)	43.3 (110.0)	43.3 (110.0)	43.3 (110.0)	43.3 (110.0)
40523.	40523.	40493.	40493.	40493.
75.9 (2679.)	130.1 (4594.)	75.8 (2677.)	130.0 (4589.)	130.0 (4589.)
12.6/ 3/ 126.	34.4/ 2/ 34.	64.6/ 2/ 65.	33.3/ 2/ 34.	33.3/ 2/ 34.
1.4/ 3/ 14.	14.1/ 2/ 14.	14.0/ 2/ 14.	15.0/ 2/ 15.	15.0/ 2/ 15.
55.7/ 3/ 1304.	71.5/ 12/ 164.	23.8/ 3/ 550.	74.2/ 12/ 171.	74.2/ 12/ 171.
1.1/ 3/ 2.	1.5/ 12/ 3.	1.1/ 3/ 2.	1.2/ 12/ 2.	1.2/ 12/ 2.
86.0/ 3/ 1.61	59.9/ 3/ 1.06	75.0/ 3/ 1.37	57.7/ 3/ 1.02	57.7/ 3/ 1.02
2.9/ 3/ .04	3.3/ 3/ .05	2.8/ 3/ .04	3.4/ 3/ .05	3.4/ 3/ .05
25.9/ 2/ 27.	11.5/ 2/ 12.	16.1/ 2/ 16.	11.1/ 2/ 11.	11.1/ 2/ 11.
.6/ 2/ 1.	.8/ 2/ 1.	.7/ 2/ 1.	1.2/ 2/ 1.	1.2/ 2/ 1.
7.63	12.41	9.40	12.92	12.92
114.	21.	52.	20.	20.
1318.	155.	525.	163.	163.
1.57	1.01	1.33	.97	.97
26.4	10.8	15.5	10.0	10.0
4.98	1.61	2.28	1.48	1.48
116.37	23.49	46.35	24.72	24.72
2164.4	2416.5	1843.4	2306.3	2306.3
3.73	2.61	2.19	2.42	2.42
.86	.26	.39	.24	.24
20.08	3.76	7.97	3.94	3.94
376.9	387.1	316.8	368.1	368.1
.64	.42	.38	.39	.39
17.55	16.81	14.11	16.01	16.01
505.	867.	505.	867.	867.
5.80	6.24	5.02	6.27	6.27
.969	.974	.972	.975	.975
.901 (.897)		.912 (.897)		
1.000 (.972)		1.000 (.974)		
206.0		205.8		
0.00		0.00		
12.04		12.08		
17.17		15.09		

3-BAG (4-BAG)
CARBON DIOXIDE G/KM 365.7 (360.1)
FUEL CONSUMPTION L/100KM 14.22 (15.77)
HYDROCARBONS (THC) G/KM .42 (.41)
CARBON MONOXIDE G/KM 8.30 (8.35)
OXIDES OF NITROGEN G/KM .45 (.44)

HFET VEHICLE EMISSIONS RESULTS PROJECT 11-5030-010

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 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
D/C, WET (DRY)
SCF, WET (DRY)
VOL (SCM)
SAM BLR (SCM)
KM (MEASURED)

TEST NUMBER, MM HG
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

VEHICLE NO. 07
DATE 4/7/01
BAG CART NO. 1
DYNO 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 61881. KM (38451. MILES)

NOX HUMIDITY CORRECTION FACTOR .99

807.7 (31.8)	807.7 (31.8)
800.1 (31.5)	800.1 (31.5)
43.3 (110.0)	43.3 (110.0)
61287.	61287.
114.3 (4036.)	114.3 (4036.)
53.3/ 2/ 53.	53.3/ 2/ 53.
14.5/ 2/ 15.	14.5/ 2/ 15.
65.5/ 11/ 267.	65.5/ 11/ 267.
5/ 11/ 1.	5/ 11/ 1.
45.8/ 2/ 2.01	45.8/ 2/ 2.01
1.5/ 2/ .05	1.5/ 2/ .05
30.9/ 2/ 31.	30.9/ 2/ 31.
1.1/ 2/ 1.	1.1/ 2/ 1.
6.55	6.55
41.	41.
252.	252.
1.97	1.97
30.0	30.0
2.70	2.70
33.53	33.53
4119.6	4119.6
6.49	6.49
765.	765.
.847 (.835)	.847 (.835)
1.000 (.967)	1.000 (.967)
114.3	114.3
0.00	0.00
16.39	16.39
078FET	078FET
741.9	741.9
10.4	10.4
27.2	27.2
251.3	251.3
10.88	10.88
.16	.16
2.05	2.05
.40	.40

TABLE D-24. TEST NO. 081 EMISSIONS RESULTS

FTF VEHICLE EMISSIONS RESULTS
PROJECT 11 5030-007

TEST NO. 081FTF RUN 1
VEHICLE MODEL 70 MONTE CARLO
ENGINE 3.0 L(231. CID) V-6
TRANSMISSION A3

VEHICLE NO.08
DATE 3/23/91
BAG CART NO. 1 / CVS NO. 2
DYNO NO. 3

TEST WEIGHT 1500. KG(3500. LBS)
ACTUAL ROAD LOAD 0.0 KW(10.7 HP)
GASOLINE EM-470-F
ODOMETER ***** KM(67467. MILES)

BAROMETER 740.54 MM HG(29.47 IN HG)
RELATIVE HUMIDITY 25. FCT

DRY BULB TEMP. 25.4 DEG C(70.0 DEG F)
ABS. HUMIDITY 5.1 GM/KG

NOX HUMIDITY CORRECTION FACTOR .04

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 DCKGRD METER/RANGE/PPM
CO SAMPLE METER/RANGE/PPM
CO DCKGRD METER/RANGE/PPM
CO2 SAMPLE METER/RANGE/PCT
CO2 DCKGRD METER/RANGE/PCT
NOX SAMPLE METER/RANGE/PPM
NOX DCKGRD 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 BLR (SCM)
KM (MEASURED)
FUEL CONSUMPTION L/100KM

	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	762.3 (30.0)	752.5 (31.2)	767.4 (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	40829.	69529.	40475.	67544.
TOT FLOW STD. CU. METRES(SCF)	76.8 (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/ 9.	8.3/ 2/ 8.	8.1/ 2/ 8.
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	48.6/ 3/ .04	63.3/ 3/ 1.13	48.0/ 3/ .03
CO2 DCKGRD METER/RANGE/PCT	3.3/ 3/ .05	3.8/ 3/ .06	3.6/ 3/ .06	3.7/ 3/ .06
NOX SAMPLE METER/RANGE/PPM	38.9/ 3/ 117.	46.4/ 2/ 46.	39.2/ 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.	3.
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	21.53	1.14	7.34	.39
CO2 MASS GRAMS	1739.6	1092.6	1509.7	1864.0
NOX MASS GRAMS	14.43	9.76	14.11	9.37
HC GRAMS/KM	.67	.06	.37	.06
CO GRAMS/KM	12.39	.18	1.27	.06
CO2 GRAMS/KM	301.4	303.1	262.2	300.5
NOX GRAMS/KM	2.50	1.56	2.45	1.51
FUEL CONSUMPTION BY CD L/100KM	13.77	12.96	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 (.915)		.929 (.922)
SCF, WET (DRY)		1.000 (.983)		1.000 (.983)
VOL (SCM)		200.4		207.8
SAM BLR (SCM)		0.00		0.00
KM (MEASURED)		12.01		11.96
FUEL CONSUMPTION L/100KM		13.36		12.11

COMPOSITE RESULTS

TEST NUMBER 081FTF
BAROMETER MM HG 740.5
HUMIDITY G/KG 5.1
TEMPERATURE DEG C 25.6

3-DAG (4 BAG)
CARBON DIOXIDE G/KM 291.6 (290.8)
FUEL CONSUMPTION L/100KM 12.68 (12.65)
HYDROCARBONS (THC) G/KM .27 (.27)
CARBON MONOXIDE G/KM 3.00 (2.97)
OXIDES OF NITROGEN G/KM 2.00 (1.99)

HFCT VEHICLE EMISSIONS RESULTS PROJECT 11 5030-007

TEST NO. 081FET RUN 1
VEHICLE MODEL 70 MONTE CARLO
ENGINE 3.0 L(231. CID) V-6
TRANSMISSION A3

VEHICLE NO.08
DATE 3/23/91
BAG CART NO. 1
DYNO NO. 3
CVS NO. 2

TEST WEIGHT 1500. KG(3500. LBS)
ACTUAL ROAD LOAD 0.0 KW(10.7 HP)
GASOLINE EM-470-F
ODOMETER ***** KM(67402. MILES)

BAROMETER 747.70 MM HG(29.44 IN HG)
RELATIVE HUMIDITY 20. FCT

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

NOX HUMIDITY CORRECTION FACTOR .06

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 DCKGRD METER/RANGE/PPM
CO SAMPLE METER/RANGE/PPM
CO DCKGRD METER/RANGE/PPM
CO2 SAMPLE METER/RANGE/PCT
CO2 DCKGRD METER/RANGE/PCT
NOX SAMPLE METER/RANGE/PPM
NOX DCKGRD 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)

HFCT
000.1 (31.5)
787.4 (31.0)
43.9 (111.0)
61321.
115.4 (4076.)
23.3/ 2/ 23.
7.9/ 2/ 8.
16.8/13/ 15.
.2/13/ 0.
82.5/ 3/ 1.52
3.6/ 3/ .06
67.5/ 3/ 202.
.2/ 3/ 1.
6.78
16.
15.
1.47
202.0
1.08
1.95
3112.4
38.29
765.
698 (.079)
1.000 (.977)
115.4
0.00
16.29

TEST NUMBER,
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

081FET
747.8
5.7
25.6
171.2
8.18
.07
.12
2.35

TABLE D-25. TEST NO. 082 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS PROJECT 11-5830-007		TEST WEIGHT 1588, KG (3500, LBS) ACTUAL ROAD LOAD 8.0 KW (10.7 HP) GASOLINE EM-470-F ODOMETER ***** KM(67529, MILES)	
TEST NO. 082FTP RUN 1	VEHICLE NO.00		
VEHICLE MODEL 78 MONTE CARLO	DATE 3/25/81		
ENGINE 3.8 L(231, CID) V-6	BAG CART NO. 1 / CVS NO. 2		
TRANSMISSION A3	DYNO NO. 3		
BAROMETER 741.60 MM HG(29.20 IN HG)	DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)		
RELATIVE HUMIDITY 40. PCT	ABS. HUMIDITY 8.4 GM/KG	NOX HUMIDITY CORRECTION FACTOR .93	
BAG RESULTS			
BAG NUMBER			
DESCRIPTION			
BLOWER DIF P MM, H2O(IN, H2O)	702.3 (30.0)	707.4 (31.0)	782.3 (30.8)
BLOWER INLET P MM, H2O(IN, H2O)	774.7 (30.5)	777.2 (30.6)	774.7 (30.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.8 (109.0)	42.2 (108.0)	43.3 (110.0)
BLOWER REVOLUTIONS	40566.	69544.	40490.
TOT FLOW STD. CU. METRES(SCF)	76.0 (2683.)	130.3 (4602.)	75.0 (2676.)
HC SAMPLE METER/RANGE/PPM	11.2/ 3/ 112.	16.9/ 2/ 17.	50.2/ 2/ 50.
HC BCKGRD METER/RANGE/PPM	1.2/ 3/ 12.	11.1/ 2/ 11.	11.8/ 2/ 12.
CO SAMPLE METER/RANGE/PPM	35.9/ 3/ 849.	0.2/13/ 7.	57.6/12/ 125.
CO BCKGRD METER/RANGE/PPM	1.1/ 3/ 2.	7/12/ 1.	1/12/ 0.
CO2 SAMPLE METER/RANGE/PCT	71.4/ 3/ 1.30	49.9/ 3/ .07	64.6/ 3/ 1.15
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	3.2/ 3/ .05	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	40.6/ 3/ 122.	46.8/ 2/ 47.	38.2/ 3/ 115.
NOX BCKGRD METER/RANGE/PPM	.3/ 3/ 1.	.7/ 2/ 1.	.1/ 3/ 0.
DILUTION FACTOR	9.61	15.44	11.43
HC CONCENTRATION PPM	101.	7.	39.
CO CONCENTRATION PPM	015.	7.	121.
CO2 CONCENTRATION PCT	1.26	.02	1.11
NOX CONCENTRATION PPM	121.0	46.1	114.3
HC MASS GRAMS	4.44	.49	1.72
CO MASS GRAMS	72.07	1.00	10.64
CO2 MASS GRAMS	1756.3	1955.0	1542.2
NOX MASS GRAMS	16.32	10.68	15.30
HC GRAMS/KM	.76	.08	.29
CO GRAMS/KM	12.35	.14	1.02
CO2 GRAMS/KM	301.0	310.6	263.5
NOX GRAMS/KM	2.80	1.70	2.63
FUEL CONSUMPTION BY CB L/100KM	13.78	13.28	11.41
RUN TIME SECONDS	505.	867.	505.
MEASURED DISTANCE KM	5.84	6.29	5.05
SCF, DRY	.975	.979	.976
D/C, WET (DRY)	.921 (.907)		.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-BAG (4-BAG)
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	(3.14)
		OXIDES OF NITROGEN G/KM 2.13	(2.15)

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

TEST NO. 082FET RUN 1	VEHICLE NO.00	TEST WEIGHT 1588, KG (3500, LBS)
VEHICLE MODEL 78 MONTE CARLO	DATE 3/25/81	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 ***** KM(67544, MILES)
BAROMETER 743.71 MM HG(29.28 IN HG)	DRY BULB TEMP. 26.7 DEG C(80.0 DEG F)	
RELATIVE HUMIDITY 41. PCT	ABS. HUMIDITY 9.2 GM/KG	NOX HUMIDITY CORRECTION FACTOR .95
BAG RESULTS		
TEST CYCLE	HFET	
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)	43.3 (110.0)	
BLOWER REVOLUTIONS	61373.	
TOT FLOW STD. CU. METRES(SCF)	114.9 (4059.)	
HC SAMPLE METER/RANGE/PPM	27.6/ 2/ 28.	
HC BCKGRD METER/RANGE/PPM	13.1/ 2/ 13.	
CO SAMPLE METER/RANGE/PPM	28.1/13/ 26.	
CO BCKGRD METER/RANGE/PPM	.1/13/ 0.	
CO2 SAMPLE METER/RANGE/PCT	84.5/ 3/ 1.56	
CO2 BCKGRD METER/RANGE/PCT	2.0/ 3/ .04	
NOX SAMPLE METER/RANGE/PPM	73.3/ 3/ 220.	
NOX BCKGRD METER/RANGE/PPM	.1/ 3/ 0.	
DILUTION FACTOR	8.54	
HC CONCENTRATION PPM	16.	
CO CONCENTRATION PPM	25.	
CO2 CONCENTRATION PCT	1.53	
NOX CONCENTRATION PPM	219.6	
HC MASS GRAMS	1.06	
CO MASS GRAMS	3.29	
CO2 MASS GRAMS	3210.3	
NOX MASS GRAMS	46.02	
RUN TIME SECONDS	766.	
D/C, WET (DRY)	.883 (.871)	
SCF, WET (DRY)	1.000 (.772)	
VOL (SCM)	114.9	
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 8.31		
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 WEIGHT 1500. KG (3500. LBS) ACTUAL ROAD LOAD 0.0 KW (10.7 HP) GASOLINE EM-470-F ODOMETER ***** KM(67573. MILES)			
TEST NO. 006FTP	RUN 1	VEHICLE MODEL 70 MONTE CARLO	ENGINE 3.0 L(231. CID) V-6	TRANSMISSION A3	BAROMETER 745.24 MM HG(29.34 IN HG)	RELATIVE HUMIDITY 52. PCT	BAG RESULTS
BAG NUMBER				VEHICLE NO.08	DATE 3/26/01	BAG CART NO. 1 / CVS NO. 2	DRY DULB TCMF. 25.0 DEG C(77.0 DEG F)
DESCRIPTION				ADJ. HUMIDITY 10.6 GM/KG	NOX HUMIDITY CORRECTION FACTOR 1.00		
				1	2	3	4
				COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	707.4 (31.0)	707.4 (31.0)	702.3 (30.0)	707.4 (31.0)	702.3 (30.0)	707.4 (31.0)	702.3 (30.0)
BLOWER INLET P MM. H2O(IN. H2O)	702.3 (30.8)	702.3 (30.8)	772.2 (30.4)	702.3 (30.8)	772.2 (30.4)	702.3 (30.8)	772.2 (30.4)
BLOWER INLET TEMP. DEG. C(DEG. F)	43.1 (109.5)	41.7 (107.0)	43.9 (111.0)	43.1 (109.5)	41.7 (107.0)	43.9 (111.0)	43.3 (110.0)
BLOWER REVOLUTIONS	40747.	67530.	40477.	40747.	67530.	40477.	69490.
TOT FLOW STD. CU. METRES(SCF)	76.6 (2705.)	131.1 (4620.)	76.1 (2687.)	76.6 (2705.)	131.1 (4620.)	76.1 (2687.)	130.6 (4611.)
HC SAMPLE METER/RANGE/PPM	16.5/ 3/ 165.	31.4/ 2/ 31.	76.1/ 2/ 76.	16.5/ 3/ 165.	31.4/ 2/ 31.	76.1/ 2/ 76.	30.2/ 2/ 30.
HC BCKGRD METER/RANGE/PPM	1.5/ 3/ 15.	13.0/ 2/ 13.	13.7/ 2/ 14.	1.5/ 3/ 15.	13.0/ 2/ 13.	13.7/ 2/ 14.	16.2/ 2/ 16.
CO SAMPLE METER/RANGE/PPM	62.0/ 3/ 1571.	02.1/ 12/ 196.	91.7/ 11/ 456.	62.0/ 3/ 1571.	02.1/ 12/ 196.	91.7/ 11/ 456.	71.6/ 12/ 164.
CO BCKGRD METER/RANGE/PPM	.1/ 3/ 2.	.9/ 12/ 2.	.5/ 11/ 1.	.1/ 3/ 2.	.9/ 12/ 2.	.5/ 11/ 1.	.4/ 12/ 1.
CO2 SAMPLE METER/RANGE/PCT	66.0/ 3/ 1.20	46.9/ 3/ .81	61.0/ 3/ 1.00	66.0/ 3/ 1.20	46.9/ 3/ .81	61.0/ 3/ 1.00	45.0/ 3/ .79
CO2 BCKGRD METER/RANGE/PCT	3.2/ 3/ .05	2.6/ 3/ .04	2.0/ 3/ .04	3.2/ 3/ .05	2.6/ 3/ .04	2.0/ 3/ .04	3.3/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	44.9/ 2/ 45.	11.3/ 2/ 11.	36.6/ 2/ 37.	44.9/ 2/ 45.	11.3/ 2/ 11.	36.6/ 2/ 37.	10.5/ 2/ 11.
NOX BCKGRD METER/RANGE/PPM	.9/ 2/ 1.	.8/ 2/ 1.	.6/ 2/ 1.	.9/ 2/ 1.	.8/ 2/ 1.	.6/ 2/ 1.	.9/ 2/ 1.
DILUTION FACTOR	9.01	16.15	11.01	9.01	16.15	11.01	16.63
HC CONCENTRATION PPM	152.	19.	64.	152.	19.	64.	15.
CO CONCENTRATION PPM	1506.	180.	438.	1506.	180.	438.	158.
CO2 CONCENTRATION PCT	1.16	.77	1.04	1.16	.77	1.04	.74
NOX CONCENTRATION PPM	44.1	10.7	36.1	44.1	10.7	36.1	9.7
HC MASS GRAMS	6.69	1.45	2.79	6.69	1.45	2.79	1.13
CO MASS GRAMS	134.32	20.64	30.77	134.32	20.64	30.77	24.00
CO2 MASS GRAMS	1620.4	1040.6	1452.8	1620.4	1040.6	1452.8	1767.4
NOX MASS GRAMS	6.44	2.68	5.23	6.44	2.68	5.23	2.40
HC GRAMS/KM	1.15	.23	.40	1.15	.23	.40	.10
CO GRAMS/KM	23.03	4.61	6.63	23.03	4.61	6.63	3.03
CO2 GRAMS/KM	277.8	297.8	240.3	277.8	297.8	240.3	202.3
NOX GRAMS/KM	1.10	.43	.87	1.10	.43	.87	.38
FUEL CONSUMPTION BY CD L/100KM	13.56	13.05	11.11	13.56	13.05	11.11	12.33
RUN TIME SECONDS	508.	067.	505.	508.	067.	505.	068.
MEASURED DISTANCE KM	5.63	6.21	5.85	5.63	6.21	5.85	6.26
SCF, DRY	.972	.976	.973	.972	.976	.973	.976
DFC, WET (DRY)		.923 (.700)			.923 (.700)		.931 (.915)
SCF, WET (DRY)		1.000 (.974)			1.000 (.974)		1.000 (.975)
VOL (SCH)		207.7			207.7		206.7
SAM BLR (SCH)		0.00			0.00		0.00
KM (MEASURED)		12.04			12.04		12.12
FUEL CONSUMPTION L/100KM		13.30			13.30		11.74
COMPOSITE RESULTS				3-BAG (4-BAG)			
TEST NUMBER 006FTP				CARBON DIOXIDE G/KM	280.0	(275.4)	
BAROMETER MM HG 745.2				FUEL CONSUMPTION L/100KM	12.62	(12.41)	
HUMIDITY G/KG 10.6				HYDROCARBONS (THC) G/KM	1.49	(.40)	
TEMPERATURE DEG C 25.0				CARBON MONOXIDE G/KM	9.01	(0.77)	
				OXIDES OF NITROGEN G/KM	.70	(.60)	

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11 5030-007

TEST NO. 006FET	RUN 1	VEHICLE MODEL 70 MONTE CARLO	ENGINE 3.0 L(231. CID) V-6	TRANSMISSION A3	BAROMETER 745.24 MM HG(29.34 IN HG)	RELATIVE HUMIDITY 51. PCT	BAG RESULTS
BAG NUMBER				VEHICLE NO.08	DATE 3/26/01	BAG CART NO. 1	DRY DULB TCMF. 26.7 DEG C(80.0 DEG F)
DESCRIPTION				ADJ. HUMIDITY 11.4 GM/KG	NOX HUMIDITY CORRECTION FACTOR 1.02		
				1	2	3	4
				COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	800.1 (31.5)	707.4 (31.0)	43.9 (111.0)	800.1 (31.5)	707.4 (31.0)	43.9 (111.0)	41277.
BLOWER INLET P MM. H2O(IN. H2O)	707.4 (31.0)	702.3 (30.8)	772.2 (30.4)	707.4 (31.0)	702.3 (30.8)	772.2 (30.4)	702.3 (30.8)
BLOWER INLET TEMP. DEG. C(DEG. F)	43.9 (111.0)	41.7 (107.0)	43.9 (111.0)	43.9 (111.0)	41.7 (107.0)	43.9 (111.0)	43.3 (110.0)
BLOWER REVOLUTIONS	41277.	67530.	40477.	41277.	67530.	40477.	69490.
TOT FLOW STD. CU. METRES(SCF)	114.9 (4050.)	131.1 (4620.)	76.1 (2687.)	114.9 (4050.)	131.1 (4620.)	76.1 (2687.)	130.6 (4611.)
HC SAMPLE METER/RANGE/PPM	47.2/ 2/ 47.	31.4/ 2/ 31.	76.1/ 2/ 76.	47.2/ 2/ 47.	31.4/ 2/ 31.	76.1/ 2/ 76.	30.2/ 2/ 30.
HC BCKGRD METER/RANGE/PPM	12.3/ 2/ 12.	13.0/ 2/ 13.	13.7/ 2/ 14.	12.3/ 2/ 12.	13.0/ 2/ 13.	13.7/ 2/ 14.	16.2/ 2/ 16.
CO SAMPLE METER/RANGE/PPM	77.7/ 12/ 182.	02.1/ 12/ 196.	91.7/ 11/ 456.	77.7/ 12/ 182.	02.1/ 12/ 196.	91.7/ 11/ 456.	71.6/ 12/ 164.
CO BCKGRD METER/RANGE/PPM	.1/ 12/ 0.	.9/ 12/ 2.	.5/ 11/ 1.	.1/ 12/ 0.	.9/ 12/ 2.	.5/ 11/ 1.	.4/ 12/ 1.
CO2 SAMPLE METER/RANGE/PCT	65.9/ 3/ 1.59	46.9/ 3/ .81	61.0/ 3/ 1.00	65.9/ 3/ 1.59	46.9/ 3/ .81	61.0/ 3/ 1.00	45.0/ 3/ .79
CO2 BCKGRD METER/RANGE/PCT	3.2/ 3/ .05	2.6/ 3/ .04	2.0/ 3/ .04	3.2/ 3/ .05	2.6/ 3/ .04	2.0/ 3/ .04	3.3/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	50.8/ 2/ 59.	11.3/ 2/ 11.	36.6/ 2/ 37.	50.8/ 2/ 59.	11.3/ 2/ 11.	36.6/ 2/ 37.	10.5/ 2/ 11.
NOX BCKGRD METER/RANGE/PPM	.9/ 2/ 1.	.8/ 2/ 1.	.6/ 2/ 1.	.9/ 2/ 1.	.8/ 2/ 1.	.6/ 2/ 1.	.9/ 2/ 1.
DILUTION FACTOR	8.20	16.15	11.01	8.20	16.15	11.01	16.63
HC CONCENTRATION PPM	36.	19.	64.	36.	19.	64.	15.
CO CONCENTRATION PPM	173.	180.	438.	173.	180.	438.	158.
CO2 CONCENTRATION PCT	1.55	.77	1.04	1.55	.77	1.04	.74
NOX CONCENTRATION PPM	56.0	10.7	36.1	56.0	10.7	36.1	9.7
HC MASS GRAMS	2.41	1.45	2.79	2.41	1.45	2.79	1.13
CO MASS GRAMS	23.10	20.64	30.77	23.10	20.64	30.77	24.00
CO2 MASS GRAMS	3259.9	1040.6	1452.8	3259.9	1040.6	1452.8	1767.4
NOX MASS GRAMS	13.03	2.68	5.23	13.03	2.68	5.23	2.40
RUN TIME SECONDS	765.	067.	505.	765.	067.	505.	068.
MEASURED DISTANCE KM	.800 (.065)	6.21	5.85	.800 (.065)	6.21	5.85	6.26
SCF, WET (DRY)	1.000 (.969)	.976	.973	1.000 (.969)	.976	.973	.976
DFC, WET (DRY)		.923 (.700)			.923 (.700)		.931 (.915)
SCF, WET (DRY)		1.000 (.974)			1.000 (.974)		1.000 (.975)
VOL (SCH)		207.7			207.7		206.7
SAM BLR (SCH)		0.00			0.00		0.00
KM (MEASURED)		12.04			12.04		12.12
FUEL CONSUMPTION L/100KM		13.30			13.30		11.74
COMPOSITE RESULTS				3-BAG (4-BAG)			
TEST NUMBER 006FET				CARBON DIOXIDE G/KM	280.0	(275.4)	
BAROMETER MM HG 745.2				FUEL CONSUMPTION L/100KM	12.62	(12.41)	
HUMIDITY G/KG 11.4				HYDROCARBONS (THC) G/KM	1.49	(.40)	
TEMPERATURE DEG C 26.7				CARBON MONOXIDE G/KM	9.01	(0.77)	
CARBON DIOXIDE G/KM 197.4				OXIDES OF NITROGEN G/KM	.70	(.60)	
FUEL CONSUMPTION L/100KM 8.54							

TABLE D-27. TEST NO. 087 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS		PROJECT 11-5830-007		TEST WEIGHT 1580. KG (3500. LBS)	
TEST NO. 007FTP RUN 1		VEHICLE NO.08		ACTUAL ROAD LOAD 8.0 KM (10.7 HP)	
VEHICLE MODEL 70 MONTE CARLO		DATE 3/27/01		GASOLINE EM-470-F	
ENGINE 3.0 L(231. CID) V-6		BAG CART NO. 1 / CVS NO. 2		ODOMETER ***** KM(67611. MILES)	
TRANSMISSION A3		DYNO NO. 3			
BAROMETER 740.16 MM HG(29.14 IN HG)		DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)		NOX HUMIDITY CORRECTION FACTOR 1.05	
RELATIVE HUMIDITY 60. PCT		ADS. HUMIDITY 12.2 GM/KG			
BAG RESULTS					
BAG NUMBER					
DESCRIPTION		1	2	3	4
		COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)		782.3 (30.8)	787.4 (31.0)	782.3 (30.8)	787.4 (31.0)
BLOWER INLET P MM. H2O(IN. H2O)		774.7 (30.5)	782.3 (30.8)	774.7 (30.5)	777.2 (30.6)
BLOWER INLET TEMP. DEG. C(DEG. F)		43.1 (109.5)	41.7 (107.0)	42.8 (109.0)	43.3 (110.0)
BLOWER REVOLUTIONS		40536.	69560.	40509.	69473.
TOT FLOW STD. CU. METRES(SCF)		75.7 (2674.)	130.1 (4594.)	75.7 (2673.)	129.6 (4577.)
HC SAMPLE METER/RANGE/PPM		19.0/ 3/ 190.	30.1/ 2/ 30.	80.3/ 2/ 80.	27.2/ 1/ 27.
HC DCKGRD METER/RANGE/PPM		1.2/ 3/ 12.	10.5/ 2/ 11.	10.5/ 2/ 11.	10.2/ 2/ 10.
CO SAMPLE METER/RANGE/PPM		66.2/ 3/ 1700.	82.3/ 12/ 196.	87.5/ 11/ 421.	70.6/ 12/ 161.
CO DCKGRD METER/RANGE/PPM		1.1/ 3/ 2.	5/ 12/ 1.	1/ 11/ 0.	1/ 12/ 0.
CO2 SAMPLE METER/RANGE/PPM		67.0/ 3/ 1.20	46.6/ 3/ .80	61.9/ 3/ 1.10	45.9/ 3/ .77
CO2 DCKGRD METER/RANGE/PCT		2.9/ 3/ .04	2.5/ 3/ .04	3.2/ 3/ .05	3.3/ 3/ .05
NOX SAMPLE METER/RANGE/PPM		44.8/ 2/ 45.	11.3/ 2/ 11.	35.3/ 2/ 35.	10.0/ 2/ 10.
NOX DCKGRD METER/RANGE/PPM		.0/ 2/ 1.	.7/ 2/ 1.	.5/ 2/ 1.	.3/ 2/ 1.
DILUTION FACTOR		9.67	16.26	11.66	16.61
HC CONCENTRATION PPM		179.	71.	71.	18.
CO CONCENTRATION PPM		1626.	189.	403.	155.
CO2 CONCENTRATION PCT		1.16	.77	1.06	.74
NOX CONCENTRATION PPM		44.1	10.6	34.8	9.5
HC MASS GRAMS		7.83	1.52	3.09	1.32
CO MASS GRAMS		143.36	28.57	35.54	23.43
CO2 MASS GRAMS		1612.9	1625.0	1463.5	1759.0
NOX MASS GRAMS		6.71	2.78	5.30	2.40
HC GRAMS/KM		1.35	.24	.53	.21
CO GRAMS/KM		24.66	4.59	6.11	3.76
CO2 GRAMS/KM		277.5	293.3	251.5	262.6
NOX GRAMS/KM		1.15	.45	.91	.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		5.81	6.22	5.82	6.22
SCF, DRY		.970	.973	.971	.973
DFC, WET (DRY)		.923 (.905)		.930 (.912)	
SCF, WET (DRY)		1.000 (.972)		1.000 (.972)	
VOL (SCM)		205.8		205.3	
SAM BLR (SCM)		0.00		0.00	
KM (MEASURED)		12.04		12.04	
FUEL CONSUMPTION L/100KM		13.25		11.80	
COMPOSITE RESULTS					
TEST NUMBER 007FTP				CARBON DIOXIDE G/KM 270.5 (275.3)	
BAROMETER MM HG 740.2				FUEL CONSUMPTION L/100KM 12.58 (12.42)	
HUMIDITY G/KG 12.2				HYDROCARBONS (THC) G/KM .55 (.54)	
TEMPERATURE DEG C 25.0				CARBON MONOXIDE G/KM 9.18 (8.93)	
				OXIDES OF NITROGEN G/KM .72 (.71)	

HNET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-007

TEST NO. 007FCT RUN 1		VEHICLE NO.08		TEST WEIGHT 1580. KG (3500. LBS)	
VEHICLE MODEL 70 MONTE CARLO		DATE 3/27/01		ACTUAL ROAD LOAD 8.0 KM (10.7 HP)	
ENGINE 3.0 L(231. CID) V-6		BAG CART NO. 1		GASOLINE EM-470-F	
TRANSMISSION A3		DYNO NO. 3		ODOMETER ***** KM(67626. MILES)	
		CVS NO. 2			
BAROMETER 739.90 MM HG(29.13 IN HG)		DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)		NOX HUMIDITY CORRECTION FACTOR 1.05	
RELATIVE HUMIDITY 60. PCT		ADS. HUMIDITY 12.2 GM/KG			
BAG RESULTS					
TEST CYCLE		HNET			
BLOWER DIF P MM. H2O(IN. H2O)		787.4 (31.0)			
BLOWER INLET P MM. H2O(IN. H2O)		782.3 (30.8)			
BLOWER INLET TEMP. DEG. C(DEG. F)		43.3 (110.0)			
BLOWER REVOLUTIONS		61277.			
TOT FLOW STD. CU. METRES(SCF)		114.2 (4034.)			
HC SAMPLE METER/RANGE/PPM		38.9/ 2/ 39.			
HC DCKGRD METER/RANGE/PPM		9.6/ 2/ 10.			
CO SAMPLE METER/RANGE/PPM		74.0/ 12/ 171.			
CO DCKGRD METER/RANGE/PPM		2/ 12/ 0.			
CO2 SAMPLE METER/RANGE/PCT		86.0/ 3/ 1.39			
CO2 DCKGRD METER/RANGE/PCT		2.6/ 3/ .04			
NOX SAMPLE METER/RANGE/PPM		56.6/ 2/ 57.			
NOX DCKGRD METER/RANGE/PPM		.9/ 2/ 1.			
DILUTION FACTOR		8.30			
HC CONCENTRATION PPM		30.			
CO CONCENTRATION PPM		162.			
CO2 CONCENTRATION PCT		1.56			
NOX CONCENTRATION PPM		55.6			
HC MASS GRAMS		2.01			
CO MASS GRAMS		21.55			
CO2 MASS GRAMS		3261.7			
NOX MASS GRAMS		12.82			
RUN TIME SECONDS		765.			
DFC, WET (DRY)		.000 (.063)			
SCF, WET (DRY)		1.000 (.966)			
VOL (SCM)		114.2			
SAM BLR (SCM)		0.00			
KM (MEASURED)		16.46			
TEST NUMBER,		007FCT			
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 MODEL 78 FORD FIESTA
ENGINE 1.6 L (98, CID) L-4
TRANSMISSION A3

VEHICLE NO. 09
DATE 3/31/81
BAG CART NO. 1 / CVS NO. 2
DYNQ NO. 3

TEST WEIGHT 907, KG (2000, LBS)
ACTUAL ROAD LOAD 4.0 KW (5.4 HP)
GASOLINE EM-470-F
ODOMETER ***** KM (67981, MILES)

BAROMETER 738.12 MM HG (29.06 IN HG)
RELATIVE HUMIDITY 46. PCT

DRY BULB TEMP. 23.9 DEG C (75.0 DEG F)
ABS. HUMIDITY 12.7 GM/KG

NOX HUMIDITY CORRECTION FACTOR 1.07

BAG RESULTS

BAG NUMBER
DESCRIPTION

	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIF 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)	787.4 (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.	48563.	40507.	49481.
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.
CO BCKGRD METER/RANGE/PPM	1.3/11/ 1.	1.0/13/ 1.	1.3/13/ 1.	1.3/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	47.2/ 3/ .81	32.8/ 3/ .55	40.9/ 3/ .69	32.6/ 3/ .54
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	34.5	86.2	35.7
HC MASS GRAMS	3.78	1.55	2.48	1.31
CO MASS GRAMS	32.43	2.13	5.16	2.20
CO2 MASS GRAMS	1064.8	1175.5	900.4	1182.4
NOX MASS GRAMS	13.55	9.60	13.14	9.57
HC GRAMS/KM	.65	.25	.43	.21
CO GRAMS/KM	5.57	.34	.90	.35
CO2 GRAMS/KM	182.8	186.5	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	6.81	8.18
RUN TIME SECONDS	505.	848.	505.	867.
MEASURED DISTANCE KM	5.83	4.30	5.74	4.21
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		11.96
FUEL CONSUMPTION L/100KM		0.14		7.52

COMPOSITE RESULTS

TEST NUMBER 091FTP
BAROMETER MM HG 738.1
HUMIDITY G/KG 12.7
TEMPERATURE DEG C 23.9

3-BAG (4-BAG)
CARBON DIOXIDE G/KM 177.7 (178.7)
FUEL CONSUMPTION L/100KM 7.74 (7.78)
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 MODEL 78 FORD FIESTA
ENGINE 1.6 L (98, CID) L-4
TRANSMISSION A3

VEHICLE NO. 09
DATE 3/31/81
BAG CART NO. 1
DYNQ NO. 3
CVS NO. 2

TEST WEIGHT 907, KG (2000, LBS)
ACTUAL ROAD LOAD 4.0 KW (5.4 HP)
GASOLINE EM-470-F
ODOMETER ***** KM (67996, MILES)

BAROMETER 739.14 MM HG (29.10 IN HG)
RELATIVE HUMIDITY 60. PCT

DRY BULB TEMP. 25.0 DEG C (77.0 DEG F)
ABS. HUMIDITY 12.2 GM/KG

NOX HUMIDITY CORRECTION FACTOR 1.05

BAG 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 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)

800.1 (31.5)
787.4 (31.0)
41.7 (107.0)
61298.
114.4 (4038.)
46.9/ 2/ 47.
13.7/ 2/ 14.
14.2/13/ 13.
1.0/13/ 1.
55.8/ 3/ .98
3.0/ 3/ .05
49.2/ 3/ 148.
1.4/ 3/ 1.
13.59
34.
12.
1.94
146.5
2.26
1.54
1962.9
33.70
765.
.926 (.909)
1.000 (.972)
114.4
0.00
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 2.06

TABLE D-29. TEST NO. 092 EMISSIONS RESULTS

FTP		VEHICLE EMISSIONS RESULTS		PROJECT 11-5830-010	
TEST NO. 092FTP	RUN 1	VEHICLE NO.09		TEST WEIGHT	907. KG(2000. LBS)
VEHICLE MODEL 78 FORD FIESTA		DATE 4/ 1/81		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	EM-470
TRANSMISSION M4		DYNO NO. 3		ODOMETER	***** KM(68007. MILES)
BAROMETER 745.49 MM HG(29.35 IN HG)		DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)		NOX HUMIDITY CORRECTION FACTOR	.97
RELATIVE HUMIDITY 49. PCT		ABS. HUMIDITY 9.9 GM/KG			
BAG RESULTS					
BAG NUMBER					
DESCRIPTION					
		1	2	3	4
		COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER DIF P MM, H2O(IN, H2O)		792.5 (31.2)	792.5 (31.2)	787.4 (31.0)	792.5 (31.2)
BLOWER INLET P MM, H2O(IN, H2O)		787.4 (31.0)	787.4 (31.0)	782.3 (30.8)	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)
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		88.2/ 2/ 89.	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.	18.	69.	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		12.43	2.50	5.21	2.91
CO2 MASS GRAMS		997.6	1190.2	874.6	1165.3
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)					
SCF, WET (DRY)					
VOL (SCM)					
SAM BLR (SCM)					
KM (MEASURED)					
FUEL CONSUMPTION L/100KM					
					</

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-010

TEST NO. 092FET RUN 1	VEHICLE NO. 09	TEST WEIGHT 907. KG (2000. LBS)	
VEHICLE MODEL 70 FORD FIESTA	DATE 4/ 1/81	ACTUAL ROAD LOAD 4.0 KW (5.4 HP)	
ENGINE 1.6 L (98. CID) L-4	BAG CART NO. 1	GASOLINE EN-470	
TRANSMISSION M4	DYNO NO. 3	ODOMETER ##### KM(68023. MILES)	
BAROMETER 745.49 MM HG(29.35 IN HG)	DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR .98	
RELATIVE HUMIDITY 52. PCT	ABS. HUMIDITY 10.2 GM/KG		
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)	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	9/13/ 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	14.15		
RUN TIME	SECONDS		
DFC, WET (DRY)	.927 (.911)		
SCF, WET (DRY)	1.000 (.974)		
VOL (SCM)	115.0		
SAM BLR (SCM)	0.00		
KM (MEASURED)	16.32		
TEST NUMBER, 092FET			
BAROMETER, MM HG 745.5			
HUMIDITY, G/KG 10.2			
TEMPERATURE, DEG C 24.4			
CARBON DIOXIDE, G/KM 120.0			
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 NO.09	TEST WEIGHT 907. KG(2000. LBS)	
VEHICLE MODEL 78 FORD FIESTA	DATE 4/3/81	ACTUAL ROAD LOAD 4.0 KM(5.4 HP)	
ENGINE 1.6 L(98. CID) L-4	BAG CART NO. 1/ CV5 NO. 2	GASOLINE EM-470	
TRANSMISSION	DYNO NO. 3	ODOMETER ***** KM(60033. MILES)	
BAROMETER 734.06 MM HG(28.90 IN HG)	DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR 1.10	
RELATIVE HUMIDITY 70. PCT	ABS. HUMIDITY 13.6 GM/KG		
BAG RESULTS			
BAG NUMBER			
DESCRIPTION	1	2	3
	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
BLOWER DIF P MM. H2O(IN. H2O)	774.7 (30.5)	787.4 (31.0)	782.3 (30.8)
BLOWER INLET P MM. H2O(IN. H2O)	767.1 (30.2)	782.3 (30.8)	774.7 (30.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.8 (109.0)	42.8 (109.0)	42.8 (109.0)
BLOWER REVOLUTIONS	40532.	69646.	40494.
TOT FLOW STD. CU. METRES(SCF)	75.1 (2653.)	128.8 (4549.)	75.0 (2648.)
HC SAMPLE METER/RANGE/PPM	9.8/ 3/ 96.	29.1/ 2/ 29.	59.5/ 2/ 60.
HC BCKGRD METER/RANGE/PPM	1.2/ 3/ 12.	11.7/ 2/ 12.	11.2/ 2/ 11.
CO SAMPLE METER/RANGE/PPM	79.0/11/ 355.	11.6/13/ 10.	50.9/13/ 48.
CO BCKGRD METER/RANGE/PPM	.3/11/ 1.	.7/13/ 1.	.1/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	44.9/ 3/ .77	32.5/ 3/ .54	39.9/ 3/ .68
CO2 BCKGRD METER/RANGE/PCT	2.4/ 3/ .04	2.8/ 3/ .04	3.2/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	78.2/ 2/ 78.	34.6/ 2/ 35.	82.1/ 2/ 82.
NOX BCKGRD METER/RANGE/PPM	1.2/ 2/ 1.	1.2/ 2/ 1.	1.2/ 2/ 1.
DILUTION FACTOR	16.47	24.62	19.52
HC CONCENTRATION PPM	85.	18.	49.
CO CONCENTRATION PPM	341.	10.	46.
CO2 CONCENTRATION PCT	.74	.50	.63
NOX CONCENTRATION PPM	77.1	33.4	81.0
HC MASS GRAMS	3.67	1.33	2.11
CO MASS GRAMS	29.83	1.43	4.04
CO2 MASS GRAMS	1011.5	1177.9	864.0
NOX MASS GRAMS	12.22	9.10	12.81
HC GRAMS/KM	.63	.21	.36
CO GRAMS/KM	5.15	.23	.70
CO2 GRAMS/KM	174.6	189.3	148.8
NOX GRAMS/KM	2.11	1.46	2.21
FUEL CONSUMPTION BY CB L/100KM	7.88	8.13	6.45
RUN TIME SECONDS	505.	868.	505.
MEASURED DISTANCE KM	5.79	6.22	5.81
SCF, DRY	.970	.972	.971
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	CARBON DIOXIDE	G/KM 175.1 (172.9)
BAROMETER MM HG 734.1		FUEL CONSUMPTION L/100KM	7.61 (7.52)
HUMIDITY G/KG 13.6		HYDROCARBONS (THC)	G/KM .34 (.34)
TEMPERATURE DEG C 23.9		CARBON MONOXIDE	G/KM 1.38 (1.37)
		OXIDES OF NITROGEN	G/KM 1.80 (1.82)

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-010

TEST NO. 096FET RUN 1	VEHICLE NO.09	TEST WEIGHT 907. KG(2000. LBS)	
VEHICLE MODEL 78 FORD FIESTA	DATE 4/3/81	ACTUAL ROAD LOAD 4.0 KM(5.4 HP)	
ENGINE 1.6 L(98. CID) L-4	BAG CART NO. 1	GASOLINE EM-470	
TRANSMISSION	DYNO NO. 3	ODOMETER ***** KM(60071. MILES)	
BAROMETER 733.55 MM HG(28.88 IN HG)	DRY BULB TEMP. 26.1 DEG C(79.0 DEG F)	NOX HUMIDITY CORRECTION FACTOR 1.07	
RELATIVE HUMIDITY 57. PCT	ABS. HUMIDITY 12.6 GM/KG		
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	61300.		
TOT FLOW STD. CU. METRES(SCF)	113.2 (3998.)		
HC SAMPLE METER/RANGE/PPM	35.6/ 2/ 36.		
HC BCKGRD METER/RANGE/PPM	11.7/ 2/ 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/ 3/ 127.		
NOX BCKGRD METER/RANGE/PPM	.3/ 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 .08			
OXIDES OF NITROGEN G/KM 1.77			

FTP VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-010

D-32

TABLE D-32. TEST NO. 102 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-010TEST NO. 102FTP RUN 1
VEHICLE MODEL 78 CHRYSLER N.Y.
ENGINE 6.6 L(400. CID) V-8
TRANSMISSION A3BAROMETER 740.16 MM HG(29.14 IN HG)
RELATIVE HUMIDITY 52. PCT

BAG 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
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 GRAMSHC GRAMS/KM
CO GRAMS/KM
CO2 GRAMS/KM
NOX GRAMS/KM
FUEL CONSUMPTION BY CB L/100KMRUN TIME SECONDS
MEASURED DISTANCE KM
SCF, DRYDFC, WET (DRY)
SCF, WET (DRY)
VOL (SCH)
SAM BLR (SCH)
KM (MEASURED)
FUEL CONSUMPTION L/100KM

COMPOSITE RESULTS

TEST NUMBER 102FTP
BAROMETER MM HG 740.2
HUMIDITY G/KG 13.1
TEMPERATURE DEG C 28.3VEHICLE NO.10
DATE 4/20/81
BAG CART NO. 1 / CVS NO. 2
DYNO NO. 3DRY BULB TEMP. 28.3 DEG C(83.0 DEG F)
ABS. HUMIDITY 13.1 GM/KGTEST WEIGHT 2268. KG(5000. LBS)
ACTUAL ROAD LOAD 8.4 KW(11.3 HP)
GASOLINE EM-470
ODOMETER ***** KM(66045. MILES)

NOX HUMIDITY CORRECTION FACTOR 1.08

	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIF P MM, H2O(IN, H2O)	774.7 (30.5)	777.2 (30.6)	774.7 (30.5)	787.4 (31.0)
BLOWER INLET P MM, H2O(IN, H2O)	767.1 (30.2)	772.2 (30.4)	767.1 (30.2)	782.3 (30.8)
BLOWER INLET TEMP, DEG. C(DEG. F)	43.3 (110.0)	43.3 (110.0)	43.9 (111.0)	43.9 (111.0)
BLOWER REVOLUTIONS	40838.	69537.	40510.	69447.
TOT FLOW STD. CU. METRES(SCF)	76.3 (2695.)	129.9 (4586.)	75.6 (2671.)	129.4 (4569.)
HC SAMPLE METER/RANGE/PPM	19.9/ 4/1990.	81.5/ 3/ 815.	14.4/ 4/1440.	84.2/ 3/ 842.
HC BCKGRD METER/RANGE/PPM	1/ 4/ 10.	1.9/ 3/ 19.	2/ 4/ 20.	1.9/ 3/ 19.
CO SAMPLE METER/RANGE/PPM	64.9/ 2/3400.	30.3/ 3/ 310.	58.2/ 3/1457.	97.6/ 3/2040.
CO BCKGRD METER/RANGE/PPM	1/ 2/ 4.	4/ 3/ 9.	3/ 3/ 7.	3/ 3/ 7.
CO2 SAMPLE METER/RANGE/PCT	94.2/ 3/ 1.77	63.2/ 3/ 1.13	85.0/ 3/ 1.57	65.0/ 3/ 1.16
CO2 BCKGRD METER/RANGE/PCT	3.2/ 3/ .05	2.6/ 3/ .04	2.9/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	33.4/ 3/ 100.	51.3/ 2/ 51.	44.9/ 3/ 135.	61.4/ 2/ 61.
NOX BCKGRD METER/RANGE/PPM	2/ 3/ 1.	4/ 2/ 0.	2/ 3/ 1.	8/ 2/ 1.
DILUTION FACTOR	5.86	10.34	7.22	8.93
HC CONCENTRATION PPM	1982.	798.	1423.	625.
CO CONCENTRATION PPM	3224.	867.	1383.	2722.
CO2 CONCENTRATION PCT	1.73	1.09	1.54	1.13
NOX CONCENTRATION PPM	99.7	50.9	134.2	60.7
HC MASS GRAMS	87.22	59.75	62.05	46.64
CO MASS GRAMS	286.45	131.11	121.76	410.05
CO2 MASS GRAMS	2411.6	2523.9	2126.2	2668.0
NOX MASS GRAMS	15.78	13.71	21.04	16.28
HC GRAMS/KM	15.01	9.57	10.67	7.49
CO GRAMS/KM	49.29	20.99	20.94	45.83
CO2 GRAMS/KM	415.0	415.3	365.7	428.3
NOX GRAMS/KM	2.71	2.20	3.62	2.61
FUEL CONSUMPTION BY CB L/100KM	23.05	20.43	18.46	23.71
RUN TIME SECONDS	509.	868.	506.	867.
MEASURED DISTANCE KM	5.81	6.25	5.81	6.23
SCF, DRY	.967	.973	.968	.972
DFC, WET (DRY)	.876 (.861)		.878 (.863)	
SCF, WET (DRY)	1.000 (.970)		1.000 (.971)	
VOL (SCH)	206.2		205.0	
SAM BLR (SCH)	0.00		0.00	
KM (MEASURED)	12.06		12.04	
FUEL CONSUMPTION L/100KM	21.69		21.17	

	3-BAG	(4-BAG)
CARBON DIOXIDE G/KM	401.6	(405.4)
FUEL CONSUMPTION L/100KM	20.43	(21.40)
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 11-5830-010TEST NO. 102FET RUN 1
VEHICLE MODEL 78 CHRYSLER N.Y.
ENGINE 6.6 L(400. CID) V-8
TRANSMISSION A3BAROMETER 740.16 MM HG(29.14 IN HG)
RELATIVE HUMIDITY 39. PCT

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 GRAMSRUN TIME SECONDS
DFC, WET (DRY)
SCF, WET (DRY)
VOL (SCH)
SAM BLR (SCH)
KM (MEASURED)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 1.83VEHICLE NO.10
DATE 4/20/81
BAG CART NO. 1
DYNO NO. 2
CVS NO. 2DRY BULB TEMP. 30.0 DEG C(86.0 DEG F)
ABS. HUMIDITY 10.8 GM/KGTEST WEIGHT 2268. KG(5000. LBS)
ACTUAL ROAD LOAD 8.4 KW(11.3 HP)
GASOLINE EM-470
ODOMETER ***** KM(66061. MILES)

NOX HUMIDITY CORRECTION FACTOR 1.00

HFET

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(SCF)	113.7 (4014.)
HC SAMPLE METER/RANGE/PPM	98.4/ 3/ 984.
HC BCKGRD METER/RANGE/PPM	2.0/ 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/ 2.38
CO2 BCKGRD METER/RANGE/PCT	1.6/ 2/ .06
NOX SAMPLE METER/RANGE/PPM	46.4/ 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	4850.6
NOX MASS GRAMS	30.16
RUN TIME SECONDS	765.
DFC, WET (DRY)	.813 (.802)
SCF, WET (DRY)	1.000 (.965)
VOL (SCH)	113.7
SAM BLR (SCH)	0.00
KM (MEASURED)	16.47

TABLE D-33, TEST NO. 106 EMISSIONS RESULTS

FTP VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-010

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

VEHICLE NO.10
DATE 4/22/81
BAG CART NO. 1 / CVS NO. 2
DYNO NO. 3

TEST WEIGHT 2268. KG(5000. LBS)
ACTUAL ROAD LOAD 8.4 KW(11.3 HP)
GASOLINE EM-470
ODOMETER ***** KM(66119, MILES)

BAROMETER 737.87 MM HG(29.05 IN HG)
RELATIVE HUMIDITY 53. PCT

DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)
ABS. HUMIDITY 11.2 GM/KG

NOX HUMIDITY CORRECTION FACTOR 1.02

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

1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
772.2 (30.4)	787.4 (31.0)	787.4 (31.0)	792.5 (31.2)
767.1 (30.2)	782.3 (30.8)	782.3 (30.8)	787.4 (31.0)
43.3 (110.0)	43.3 (110.0)	43.3 (110.0)	43.3 (110.0)
40515	69574	40476	69455
75.5 (2645.)	129.3 (4566.)	75.2 (2654.)	129.0 (4555.)
23.1/ 3/ 231.	41.6/ 2/ 62.	10.6/ 3/ 106.	31.3/ 2/ 31.
1.4/ 3/ 14.	12.5/ 2/ 13.	1.2/ 3/ 12.	12.0/ 2/ 12.
81.7/ 3/ 2221.	89.6/ 12/ 220.	91.7/ 12/ 227.	45.8/ 13/ 43.
3/ 3/ 7.	1.7/ 12/ 3.	1.5/ 12/ 3.	2.9/ 13/ 3.
95.7/ 3/ 1.80	65.1/ 3/ 1.16	86.9/ 3/ 1.61	64.3/ 3/ 1.15
3.4/ 3/ .05	3.2/ 3/ .05	3.7/ 3/ .06	3.8/ 3/ .06
80.6/ 2/ 81.	38.9/ 2/ 39.	94.1/ 2/ 94.	41.5/ 2/ 42.
1.0/ 2/ 1.	.9/ 2/ 1.	1.1/ 2/ 1.	1.1/ 2/ 1.
6.60	11.24	8.14	11.59
219.	50.	95.	20.
2100.	208.	214.	39.
1.75	1.12	1.56	1.10
79.8	38.1	93.1	40.5
9.54	5.74	4.14	1.51
184.54	31.37	18.71	5.86
2423.2	2652.3	2153.5	2587.4
11.72	9.59	13.64	10.17
1.63	.59	.71	.24
31.52	4.97	3.20	.93
413.9	420.1	368.3	410.8
2.00	1.52	2.33	1.61
20.00	18.34	16.03	17.63
505.	868.	505.	847.
5.85	6.31	5.85	6.30
.968	.972	.968	.972
.889 (.873)		.900 (.885)	
1.000 (.970)		1.000 (.971)	
204.8		204.2	
0.00		0.00	
12.17		12.14	
19.14		16.86	

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

DEC, 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

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)

HFET VEHICLE EMISSIONS RESULTS PROJECT 11-5830-010

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

VEHICLE NO.10
DATE 4/22/81
BAG CART NO. 1
DYNO NO. 3
CVS NO. 2

TEST WEIGHT 2268. KG(5000. LBS)
ACTUAL ROAD LOAD 8.4 KW(11.3 HP)
GASOLINE EM-470
ODOMETER ***** KM(66124, MILES)

BAROMETER 737.87 MM HG(29.05 IN HG)
RELATIVE HUMIDITY 45. PCT

DRY BULB TEMP. 26.7 DEG C(80.0 DEG F)
ABS. HUMIDITY 10.0 GM/KG

NOX HUMIDITY CORRECTION FACTOR .98

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
DEC, WET (DRY)
SCF, WET (DRY)
VOL (SCM)
SAM BLR (SCM)
KM (MEASURED)

HFET
800.1 (31.5)
792.5 (31.2)
43.3 (110.0)
61282.
113.7 (4015.)
46.0/ 2/ 46.
12.7/ 2/ 13.
82.6/ 13/ 82.
2.5/ 13/ 2.
50.3/ 2/ 2.26
1.7/ 2/ .06
89.5/ 2/ 90.
.8/ 2/ 1.
5.91
35.
75.
2.21
88.8
2.32
9.99
4591.7
18.90
765.
.831 (.819)
1.000 (.965)
113.7
0.00
16.43

TEST NUMBER, 106FET
BAROMETER, MM HG 737.9
HUMIDITY, G/KG 10.0
TEMPERATURE, DEG C 25.7
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

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

TEST NO. 107FTP RUN 1
VEHICLE MODEL 78 CHRYSLER N.Y.
ENGINE 6.6 L(400, CID) V-8
TRANSMISSION A3

BAROMETER 736.60 MM HG(29.00 IN HG)
RELATIVE HUMIDITY 66. 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
SCF: DRY
SCF: WET (DRY)
SCF: WET (WET)
VOL (SCM)
SAM BLR (SCM)
KM (MEASURED)
FUEL CONSUMPTION L/100KM

COMPOSITE RESULTS

TEST NUMBER 107FTP
BAROMETER MM HG 736.6
HUMIDITY G/KG 12.2
TEMPERATURE DEG C 23.3

VEHICLE NO.10
DATE 4/23/81
BAG CART NO. 1 / CVS NO. 2
DYNO NO. 3

DRY BULB TEMP, 23.3 DEG C(74.0 DEG F)
ABS. HUMIDITY 12.2 GM/KG

TEST WEIGHT 2268, KG(5000, LBS)
ACTUAL ROAD LOAD 8.4 KW(11.3 HP)
GASOLINE EM-470
ODOMETER ***** KM(66182, MILES)

NOX HUMIDITY CORRECTION FACTOR 1.05

	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIF P MM, H2O(IN, H2O)	782.3 (30.8)	787.4 (31.0)	782.3 (30.8)	787.4 (31.0)
BLOWER INLET P MM, H2O(IN, H2O)	777.2 (30.6)	782.3 (30.8)	777.2 (30.6)	782.3 (30.8)
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	40553.	69593.	40498.	69532.
TOT FLOW STD, CU. METRES(SCF)	75.3 (2659.)	129.1 (4559.)	75.2 (2655.)	129.0 (4554.)
HC SAMPLE METER/RANGE/PPM	23.5/ 3/ 235.	64.1/ 2/ 64.	92.4/ 2/ 92.	45.2/ 2/ 45.
HC BCKGRD METER/RANGE/PPM	1.4/ 3/ 14.	14.9/ 2/ 15.	14.2/ 2/ 14.	16.6/ 2/ 17.
CO SAMPLE METER/RANGE/PPM	86.2/ 3/ 2386.	86.4/ 12/ 209.	92.9/ 12/ 231.	52.2/ 12/ 111.
CO BCKGRD METER/RANGE/PPM	1.1/ 3/ 2.	1.1/ 12/ 2.	1.8/ 12/ 1.	1.7/ 12/ 1.
CO2 SAMPLE METER/RANGE/PCT	95.5/ 3/ 1.79	63.8/ 3/ 1.14	86.1/ 3/ 1.60	62.9/ 3/ 1.12
CO2 BCKGRD METER/RANGE/PCT	3.7/ 3/ .06	3.0/ 3/ .05	2.8/ 3/ .04	3.3/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	78.2/ 2/ 78.	39.9/ 2/ 40.	32.6/ 3/ 98.	41.5/ 2/ 42.
NOX BCKGRD METER/RANGE/PPM	1.1/ 2/ 1.	1.4/ 2/ 1.	1.3/ 3/ 1.	1.8/ 2/ 1.
DILUTION FACTOR	6.56	11.50	8.23	11.80
HC CONCENTRATION PPM	223.	50.	80.	30.
CO CONCENTRATION PPM	2251.	199.	218.	105.
CO2 CONCENTRATION PCT	1.75	1.10	1.56	1.07
NOX CONCENTRATION PPM	77.3	38.6	77.0	40.8
HC MASS GRAMS	9.69	3.76	3.46	2.23
CO MASS GRAMS	197.34	29.84	19.06	15.83
CO2 MASS GRAMS	2406.4	2592.7	2145.9	2537.5
NOX MASS GRAMS	11.71	10.04	14.69	10.59
HC GRAMS/KM	1.65	.60	.59	.35
CO GRAMS/KM	33.67	4.73	3.24	2.51
CO2 GRAMS/KM	410.5	410.8	365.2	402.1
NOX GRAMS/KM	2.00	1.59	2.50	1.68
FUEL CONSUMPTION BY CB L/100KM	20.00	17.93	15.89	17.38
RUN TIME SECONDS	505.	868.	505.	868.
MEASURED DISTANCE KM	5.86	6.31	5.88	6.31
SCF: DRY	.962	.968	.964	.968
SCF: WET (DRY)	.809 (.870)		.902 (.883)	
SCF: WET (WET)	1.000 (.966)		1.000 (.967)	
VOL (SCM)	204.4		204.2	
SAM BLR (SCM)	0.00		0.00	
KM (MEASURED)	12.17		12.19	
FUEL CONSUMPTION L/100KM	18.93		16.66	

3-BAG (4-BAG)
CARBON DIOXIDE G/KM 398.2 (395.6)
FUEL CONSUMPTION L/100KM 17.80 (17.63)
HYDROCARBONS (THC) G/KM .81 (.74)
CARBON MONOXIDE G/KM 10.31 (9.66)
OXIDES OF NITROGEN G/KM 1.92 (1.95)

HFET VEHICLE EMISSIONS RESULTS
PROJECT 11-5830-010

TEST NO. 107FET RUN 1
VEHICLE MODEL 78 CHRYSLER N.Y.
ENGINE 6.6 L(400, CID) V-8
TRANSMISSION A3

BAROMETER 737.36 MM HG(29.03 IN HG)
RELATIVE HUMIDITY 53. 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
SCF: DRY
SCF: WET (DRY)
SCF: WET (WET)
VOL (SCM)
SAM BLR (SCM)
KM (MEASURED)

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

VEHICLE NO.10
DATE 4/23/81
BAG CART NO. 1
DYNO NO. 3
CVS NO. 2

DRY BULB TEMP, 25.6 DEG C(78.0 DEG F)
ABS. HUMIDITY 11.3 GM/KG

TEST WEIGHT 2268, KG(5000, LBS)
ACTUAL ROAD LOAD 8.4 KW(11.3 HP)
GASOLINE EM-470
ODOMETER ***** KM(66196, MILES)

NOX HUMIDITY CORRECTION FACTOR 1.02

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 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
SCF: DRY
SCF: WET (DRY)
SCF: WET (WET)
VOL (SCM)
SAM BLR (SCM)
KM (MEASURED)

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>	<u>012</u>	
50 mph ^a - 1700 rpm	68	
Idle - Neutral	75	
2500 rpm	67	
Idle - Neutral	69	
Idle - Drive	68	
30 mph ^a - 1100 rpm	83	
Idle - Neutral	85	
<u>CO Emissions Percent</u>		
50 mph ^a	0.01	
Idle - Neutral	0.02	
2500 rpm	0.02	
Idle - Neutral	0.01	
Idle - Drive	0.01	
30 mph ^a	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 Grommet	570	
As Above with Propane	580	
PCV Fresh Air Line Removed	560	
As Above with Propane	570	

^aIn 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 ^a - 1500 rpm	022	73
Idle - Neutral	107	
2500 rpm	67	
Idle - Neutral	81	
Idle - Drive	89	
30 mph ^a - 1050 rpm	91	
Idle - Neutral	86	
<u>CO Emissions Percent</u>		
50 mph ^a	0.00	
Idle - Neutral	0.10	
2500 rpm	0.02	
Idle - Neutral	0.02	
Idle - Drive	0.10	
30 mph ^a	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 Gormmet	610	
As Above with Propane	610	
PCV Fresh Air Line Removed	600	
As Above with Propane	600	

^aIn 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>	<u>032</u>	<u>037</u>
50 mph ^a - 1500 rpm	63	58
Idle - Neutral	315	383
2500 rpm	98	93
Idle - Neutral	164	166
Idle - Drive	107	121
30 mph ^a - 1050 rpm	116	130
Idle - Neutral	130	164
<u>CO Emissions Percent</u>		
50 mph ^a	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 ^a	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

^aIn 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>	<u>041</u>	<u>047</u>
50 mph ^a - 1800 rpm	82	82
Idle - Neutral	109	146
2500 rpm	102	198
Idle - Neutral	100	107
Idle - Drive	93	84
30 mph ^a - 1150 rpm	224	175
Idle - Neutral	84	100
<u>CO Emissions Percent</u>		
50 mph ^a	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 ^a	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

^aIn 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 ^a - 2750 rpm	62	69
Idle - Neutral	98	89
2500 rpm	75	84
Idle - Neutral	91	93
Idle - Drive	93	84
30 mph ^a - 2250 rpm	82	82
Idle - Neutral	98	98
<u>CO Emissions Percent</u>		
50 mph ^a	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 ^a	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 Gormmet		
As Above with Propane		
PCV Fresh Air Line Removed		
As Above with Propane		

^aIn 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>	<u>061</u>	<u>067</u>
50 mph ^a - 2000 rpm	73	62
Idle - Neutral	64	82
2500 rpm	60	64
Idle - Neutral	62	78
Idle - Drive	62	62
30 mph ^a - 1250 rpm	69	60
Idle - Neutral	67	62
<u>CO Emissions Percent</u>		
50 mph ^a	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 ^a	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

^aIn 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>	<u>071</u>	<u>078</u>
50 mph ^a - 1700 rpm	60	67
Idle - Neutral	64	87
2500 rpm	64	152
Idle - Neutral	64	116
Idle - Drive	82	-
30 mph ^a - 1100 rpm	67	84
Idle - Neutral	64	212
<u>CO Emissions Percent</u>		
50 mph ^a	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 ^a	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 Gormmet	630	550
As Above with Propane	640	640
PCV Fresh Air Line Removed	610	560
As Above with Propane	620	625

^aIn 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>	<u>081</u>	<u>086</u>
50 mph ^a - 1800 rpm	64	60
Idle - Neutral	102	91
2500 rpm	56	89
Idle - Neutral	100	93
Idle - Drive	62	58
30 mph ^a - 1150 rpm	58	67
Idle - Neutral	114	125
<u>CO Emissions Percent</u>		
50 mph ^a	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 ^a	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

^aIn 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 ^a - 2625 rpm	109	107
Idle - Neutral	400	476
2500 rpm	102	152
Idle - Neutral	372	332
Idle - Drive	150	389
30 mph ^a - 2300 rpm	221	134
Idle - Neutral	75	107
<u>CO Emissions Percent</u>		
50 mph ^a	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 ^a	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 Gormmet		
As Above with Propane		
PCV Fresh Air Line Removed		
As Above with Propane		

^aIn 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>	<u>102</u>	<u>107</u>
50 mph ^a - 2000 rpm	483+	64
Idle - Neutral	483+	193
2500 rpm	483+	107
Idle - Neutral	483+	84
Idle - Drive	483+	75
30 mph ^a - 1160 rpm	483+	100
Idle - Neutral	483+	84
<u>CO Emissions Percent</u>		
50 mph ^a	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 ^a	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 Gormmet	650	615
As Above with Propane	655	655
PCV Fresh Air Line Removed	645	620
As Above with Propane	650	645

^aIn 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	
Particulates		31.22		17.42	
Total Particulates					
<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 & 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
Test No.	011-012		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^a</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	

^a 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	After Tune-Up
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 & 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	
	Received	Tune-Up	Received	Tune-Up
Test No.	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^a</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	

^aThis 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 & 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^a</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

^aThis 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
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 & 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	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^a</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

^aThis 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 & 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^a</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

^aThis 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 & 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^a</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

^aThis 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 & 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

Test No.	Average Emission Rates, mg/km			
	FTP		HFET	
	Received	Tune-Up	Received	Tune-Up
	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^a</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

^a 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 & 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^a</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

^aThis 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

		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 & 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
Methylethylketone		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
Test No.	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^a</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

^aThis 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 & 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	
				6. PERFORMING ORGANIZATION CODE	
7. AUTHOR(S) Lawrence R. Smith				8. PERFORMING ORGANIZATION REPORT NO.	
9. PERFORMING ORGANIZATION NAME AND ADDRESS Southwest Research Institute 6220 Culebra Road San Antonio, Texas 78284				10. PROGRAM ELEMENT NO.	
				11. CONTRACT/GRANT NO. 68-03-2884	
12. SPONSORING AGENCY NAME AND ADDRESS Environmental Protection Agency Office of Mobile Source Air Pollution Control 2565 Plymouth Road Ann Arbor, Michigan 48105				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 (This Report) Unclassified		21. NO. OF PAGES 190	
		20. SECURITY CLASS (This page) Unclassified		22. PRICE	