

FINAL REPORT

I/M NEW TECHNOLOGY VEHICLE TESTING SUPPORT CONTRACT

EPA Contract No. 68-03-3222

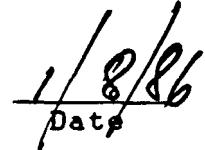
Task Assignment 1-1

October 1985

EG&G AUTOMOTIVE RESEARCH, INC.
VIRGINIA TESTING LABORATORY
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Date
1/8/86

TASK ASSIGNMENT #1

FINAL REPORT

October 1985

EPA Contract 68-03-3222

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FINAL REPORT
WORK ASSIGNMENT #1, CONTRACT #68-03-3222
MARYLAND NEW TECHNOLOGY TESTING

Introduction

The purpose of Work Assignment #1 was to determine the causes of high in-use emissions for 1981 and newer passenger car vehicles. Specifically, the Virginia Testing Laboratory (VTL) of EG&G Automotive Research Inc. was to procure 100 1981 or newer vehicles (but no 1983 or 1984 model year Chrysler vehicles equipped with 2.2 liter fuel injected engines and automatic transmissions). The VTL subjected each vehicle to an initial idle screening and inspection and, based on the results, to an FTP and various short cycle tests. The vehicle then received corrective maintenance, reinspection at a Maryland I/M Station, and a second sequence of tests. Of the 91 cars tested in this program, 88 passed the Maryland standard of 1.2 percent CO and 220 ppm HC after the first series of repairs, two (2) cars required a second set of repairs (i.e., new catalysts) to pass, and time ran out before the one (1) remaining car could be repaired to pass.

Procurement

The VTL procured vehicles that failed the Maryland I/M idle emissions standards of 1.2% CO or 220 ppm HC at stations #7 and #8. I/M station personnel gave the drivers of all failing 1981 and newer vehicles a letter stating the purpose of the program and inviting them to call the lab if they wished to participate. At the same time, the Maryland Division of Motor Vehicles forwarded lists of I/M failures at stations #7 and #8 to the VTL. At first, these lists were sent via Purolator Courier Service. Shortly after procurement began the VTL suggested that the lists be sent via certified mail, in the interest of efficiency. The Project Officer agreed, and this method of shipment was used to the end of the work assignment.

The next step in the procurement process was contacting the owners. Procurement clerks used various directories to determine owner telephone numbers; if no number was found, a letter was mailed. If VTL personnel were unable, within two weeks, to contact the owners, their names were dropped from the list of eligible candidates.

After contacting the vehicle owners, procurement clerks asked pertinent questions regarding the vehicles and gave the vehicle owners further information on the selection process. Vehicles were eliminated from the program if, prior to delivery to the VTL, they were repaired following the initial inspection failure, were granted a waiver, or were reinspected. The owners were told that they would be called at a later date regarding final eligibility.

Random procurement was ensured by the use of a random number generator in a Hewlett-Packard 9825A computer. Whenever an excess of eligible candidates existed, a computer generated list of random numbers was used as the basis for selecting among them. If any selected candidate declined to participate, the next candidate dictated by the random number list was provided with the opportunity to participate.

On each Monday during the course of the task the list of cooperative vehicle owners, identified the week before, was compiled. By using the random number generator program the vehicles from that list were selected to fill the upcoming week's available test slots. Thus, depending on the number of cooperative owners and the number of available test slots, all the candidates from that week could be selected or only a small percentage.

Once the car was brought to the VTL it was subjected to an initial idle screening test. Any vehicle with emissions less than or equal to 0.7% CO and 120 ppm HC that exhibited no overt mechanical problem which might be the cause of high idle emissions was rejected for testing.

The idle test was performed on a fully warmed-up car, using an EPA-75 Sun machine. An electronic span of the instrument was performed by the mechanic. Then, prior to insertion of the tailpipe probe, a span using CO and HC gas cylinders was performed by the mechanic. The tailpipe probe was then inserted and the engine speed was increased to 2500 ± 300 rpm. Readings were taken when the strip chart stabilized or at 30 seconds, whichever occurred first. The engine was then allowed to idle and readings were taken in a similar manner. The electronic and gas cylinder spans were repeated following the exhaust readings.

Each potential participant was offered the following incentives to take part in the program:

- The use of a late model, fully fueled, and insured loaner vehicle during the time the participant's vehicle was being tested.
- A full tank of gasoline in the participant's vehicle when returned to the owner.

- \$100.00 in cash or check.
- Free repair and documentation of a passing inspection at a Maryland I/M Station (In one case a waiver was obtained because there was not sufficient time remaining on the work assignment to complete the repairs).
- \$20.00 in cash or check for each delivery or pick-up of the test vehicle by the owner.*

Those participants whose vehicles passed the idle screening or were rejected for other reasons (driveability problems or other defects which would make testing difficult) received a \$25.00 incentive and a full tank of gas. In instances where a first test had been completed, the vehicle owners received the full \$100.00 plus a waiver for their car.

The number of acceptable vehicles procured was 91; the number of vehicles rejected after delivery to the lab was 68. Table 3 summarizes the rejections. In addition, five cars were rejected after a single valid FTP was performed; Table 4 summarizes these rejections.

Vehicle Testing

On each vehicle accepted for testing, the VTL performed no more than three sequences of testing; most vehicles received two tests. Each test sequence consisted of the Federal Test Procedure (FTP) for exhaust emissions only. In addition, two short cycle tests were performed, the Four Mode Idle Test (reference: CFR 40, July 1, 1985, 85.2213) and the Engine Restart Idle Test (reference: CFR 40, July 1, 1985, 85.2210).

The Four Mode Idle Test procedure follows a 505 second precondition cycle and a soak time of one to six minutes. The vehicle is placed in neutral, a tachometer is connected to the engine, and the tailpipe probe is inserted. After an initial zero and span of the instrument, the raw exhaust is analyzed with the engine idling. The DVM and meter readings are taken when the trace stabilizes or at thirty seconds, whichever comes first. The engine speed is then increased to 2500 ± 300 rpm, and meter readings are taken as in the first mode. In the third mode the engine speed is returned to idle, and DVM and meter readings are likewise taken. If the vehicle has an automatic transmission it

* NOTE: The \$20.00 incentive was dropped in March of 1985, because the number of willing participants was high and because most of the owners found it more convenient to drop their vehicle off. Also, many owners wanted to observe the operation of the lab.

is placed in drive, and DVM and meter readings are taken as in the other modes. The engine speed is recorded for all phases.

The Engine Restart Idle Test usually follows the Four Mode Idle Test, and, in such cases the instrument span and zero are performed at the end of this second test. In any case, a span and zero are performed following the last raw exhaust test.

The Engine Restart Idle Test follows the Four Mode Idle Test or a 505 second precondition cycle after a soak time of one to six minutes. During this test, the vehicle is placed in neutral, a tachometer is connected to the engine, and the tailpipe probe is inserted. The engine is turned off and then immediately re-started, using the appropriate hot-start procedure. DVM and meter readings are taken when stabilized or at 30 seconds, whichever comes first. The vehicle speed is then increased to 2500 ± 300 rpm, and DVM and meter readings are taken as during the first phase. The instrument is then zeroed and spanned.

Table 1 lists the composite FTP emissions, the emissions from the second idle of the Four Mode Idle Test, and the emissions from the idle mode of the Restart Idle Test. Note that "EMISSIONS" in the odometer column indicates that the service flag was up on the car's odometer.

Maintenance

Maintenance involved, first, a non-altering and complete inspection of the vehicle's emission components. The findings of this inspection were recorded on coded data sheets. The purpose of this inspection was to identify the causes of excess emissions in the test vehicle. The second maintenance sequence was an attempt at actual repair of the vehicle. The mechanics performed repairs systematically, the primary goal being to reduce idle HC and CO emissions. These repairs were performed after the first sequence of testing. In five cases, however, defects which would have made testing difficult or impossible were corrected before the first sequence of testing. To prevent contamination of laboratory air, the mufflers and exhaust pipes were replaced on vehicles IM6/0045, IM7/0143, and IM8/0184; the muffler alone was replaced on IM8/0140. The ignition module and idle mixture limiting device were replaced in vehicle IM6/0054 to alleviate stalling problems.

With the approval of the Project Officer, VTL performed third sequence tests on cars with emissions greater than 0.82 g/mile HC or 6.8 g/mile CO (or 14.0 g/mile CO for the 7.0 g/mile standard) based on the combined results of phase 2 and phase 3 of the FTP (i.e., a hot LA-4), or whenever significant emission control problems remained after testing. The maintenance for the third sequence of testing followed the same course as that for

second sequence tests. Table #2 shows the labor hours required for repairs, costs of parts (broken down between 3-way system parts and other parts), and provides a brief description of repairs and adjustments performed for the corresponding sequence of testing.

Table of Vehicle Identification Information

and

Results of the FTP, 4 Mode Idle Test, and Restart Idle Test

TABLE XI

VEHICLE #	VIN	M. YEAR	MAKE	MODEL	DISPL/ODOMETER	TEST DATE	SEQ#	HC	CO	NOX	CO2	CH4	P T ?			4 MODE IDLE TEST			RESTART IDLE TEST		
													HC	CO	NO	CO2	HC	CO	NO	CO2	
IM5/0002	1G1AB697BY282316	1981	CHEVROLET	CHEVETTE	98 41337	105-Mar-85	1	1 0.0500	12.5400	0.3830	1330.10	10.1050	55.0	0.09	0.00	12.3510	35.0	0.0500	0.00	12.1470	
						14-Mar-85	2	1 0.8490	11.8880	0.3690	1345.80	0.0940	20.0	0.04	5.00	132.7800	10.00	0.0200	40.00	13.4390	
IM5/0005	1G1AT69K6BB430716	1981	CHEVROLET	MALIBU	229 15833	14-Mar-85	1	1 6.2720	165.6310	0.4300	1307.10	10.5680	140.0	12.00	0.00	2.2400	138.00	1.9500	0.00	2.1960	
						15923 105-Apr-85	2	1 1.4560	10.9820	1.7440	1442.30	10.1040	25.0	0.05	10.00	14.6800	50.00	0.1000	20.00	14.6800	
IM5/0006	1G1AB694BY108803	1981	CHEVROLET	CHEVETTE	98 62280	122-Mar-85	1	1 3.6790	74.4820	0.5530	1256.10	10.3450	285.0	7.95	2.00	10.1870	280.00	7.6000	1.00	10.2440	
						62350 03-Apr-85	2	1 0.4180	3.1610	1.7870	1324.80	0.0510	10.0	0.02	74.00	14.6500	10.00	0.0200	81.00	14.5170	
IM5/0009	1G3AE6955BW195424	1981	OLDSMOBILE	OMEGA	191 57472	123-Apr-85	1	1 0.3210	3.6020	13.3090	1389.30	0.0390	10.0	10.02	31.00	8.7350	20.00	0.0500	52.00	14.7910	
						57529 30-Apr-85	2	1 0.2570	2.1090	13.1690	1397.90	0.0360	10.0	10.02	38.00	8.8310	11.00	0.0200	32.00	8.8310	
IM5/0012	1G1AB693BA165731	1981	CHEVROLET	CHEVETTE	98 87515	01-May-85	1	1 0.8380	9.0180	0.9720	1303.90	0.0740	300.0	10.08	3.00	13.0980	265.00	0.0800	1.00	12.9090	
						87578 09-May-85	2	1 0.4180	8.1060	0.4890	1322.90	0.0640	8.0	0.04	3.00	13.5000	8.00	0.0400	5.00	13.5430	
IM5/0013	1G1AB0893BY335428	1981	CHEVROLET	CHEVETTE	98 54981	03-May-85	1	1 1.6640	51.8850	0.3560	1314.20	10.1310	130.0	11.60	13.00	13.5640	140.00	11.2500	35.00	13.8640	
						55057 22-May-85	2	1 1.0690	33.2630	0.2270	1316.50	10.1010	5.0	10.04	76.00	13.9280	5.00	0.0400	71.00	13.8630	
						55080 29-May-85	3	1 0.2410	5.5650	0.4010	1353.30	0.0500	5.0	0.02	82.00	14.1000	9.00	0.0200	54.00	13.0780	
IM5/0015	1G3AR472BM528943	1981	OLDSMOBILE	CUTLASS	231 66645	124-May-85	1	1 0.6100	12.2370	0.7040	1442.60	0.0700	70.0	10.65	36.00	13.4790	10.00	10.7500	22.00	13.5210	
						66703 30-May-85	2	1 0.4990	10.5910	0.8110	1448.50	0.0650	35.0	10.60	26.00	13.4150	70.00	10.6000	14.00	13.3310	
IM5/0018	1G6AD6993B9233286	1981	CADILLAC	DEVILLE	366 44374	129-May-85	1	1 3.3210	121.1340	0.7690	1576.00	0.1310	100.0	12.50	59.00	13.2250	70.00	12.5000	134.00	13.4360	
						44483 20-Jun-85	2	1 0.7700	24.5640	0.8670	1715.40	0.1450	11.0	10.04	50.00	14.1410	12.00	0.0400	54.00	14.1200	
						44515 28-Jun-85	3	1 0.8710	27.7100	0.9730	1687.80	0.1370	18.0	10.02	94.00	13.9690	12.00	0.0200	54.00	14.1850	
IM5/0019	1G1AW69K2BD504936	1981	CHEVROLET	MALIBU	229 69096	130-May-85	1	1 5.2250	144.8990	0.2040	1333.70	10.7850	440.0	17.60	2.00	10.3470	440.00	16.9000	1.00	10.6320	
						69159 05-Jun-85	2	1 0.3210	5.1400	0.5970	1435.30	0.0610	10.0	0.05	4.00	14.8000	7.00	0.0500	103.00	14.7560	
IM5/0022	1G1AT27K9BB442841	1981	CHEVROLET	MALIBU	229 62529	04-Jun-85	1	1 2.4500	21.5450	1.9870	1441.60	10.1620	250.0	10.80	16.00	14.3390	330.00	0.5000	24.00	14.3170	
						62589 11-Jun-85	2	1 2.6570	20.2570	1.5950	1447.50	M/A	50.0	10.05	52.00	14.7780	60.00	0.0500	66.00	14.5580	
						62614 20-Jun-85	3	1 2.6950	22.1650	1.5630	1441.10	10.1630	220.0	10.40	9.00	14.6640	190.00	10.2000	4.00	14.7740	
IM5/0023	1G2AJ37A9B2530538	1981	PONTIAC	GRAND PRIX	231 55702	04-Jun-85	1	1 3.0550	34.6710	2.4100	1417.50	10.1570	480.0	11.70	60.00	12.9110	380.00	11.7000	54.00	13.4150	
						55763 12-Jun-85	2	1 2.7430	26.9020	2.4840	1416.60	10.1140	325.0	10.70	66.00	13.2040	380.00	10.8000	65.00	13.3310	
IM5/0027	1G1AB692BY160639	1981	CHEVROLET	CHEVETTE	98 58287	18-Jun-85	1	1 0.3910	6.1580	0.9970	1306.40	0.0580	50.0	10.10	2.00	12.6860	20.00	10.0800	1.00	13.8190	
						58347 21-Jun-85	2	1 0.3720	5.0230	0.9010	1310.00	0.0530	5.0	10.02	16.00	13.6700	5.00	0.0300	17.00	13.6700	
IM5/0028	1G1AB690BA245343	1981	CHEVROLET	CHEVETTE	98 EMISSION	20-Jun-85	1	1 1.5560	20.9950	0.2960	1325.30	0.0970	220.0	10.20	2.00	14.7960	185.00	10.4000	4.00	14.7300	
						EMISSION	26-Jun-85	2 0.3760	5.8840	0.3230	1344.50	0.0600	5.0	10.03	127.00	13.6490	5.00	0.0300	97.00	13.5850	
IM5/0029	1G2AJ37A9B1731236	1981	PONTIAC	BONNEVILLE	231 71004	27-Jun-85	1	1 9.6850	1209.7470	10.7840	1313.60	11.1360	450.0	18.40	21.00	9.2840	495.00	18.6000	22.00	8.6260	
						71120 11-Jul-85	2	1 4.3450	29.2620	12.5430	1447.40	10.1320	600.0	11.40	51.00	12.8920	500.00	11.4000	48.00	13.2890	
						71146 12-Jul-85	3	1 0.7600	10.9210	1475.00	10.1090	50.0	10.15	2.00	14.5110	28.00	10.1200	0.00	14.5330		
IM5/0030	1G1AN69B8BJ272142	1981	CHEVROLET	CAPRICE	305 58861	27-Jun-85	1	1 0.5510	12.4180	0.5190	1536.70	10.0850	30.0	10.48	1.00	14.7520	50.00	11.1000	2.00	14.3580	
						58922 03-Jul-85	2	1 0.2740	7.3230	0.6980	1548.10	0.0520	5.0	10.03	59.00	13.4580	5.00	0.0300	50.00	13.1840	
IM5/0033	1G4AC6915B7145739	1981	BUICK	SKYLARK	171 54758	127-Jun-85	1	1 0.5410	10.1930	0.6470	1419.10	10.1460	30.0	10.65	34.00	13.9480	45.00	10.7500	35.00	13.8620	

TABLE #1

VEHICLE #	VIN	M. YEAR	MAKE	MODEL	DISPL ODOMETER	TEST DATE	SEQ	F T P				4 MODE IDLE TEST			RESTART IDLE TEST						
								HC	CO	NOX	CO2	CH4	HC	CO	NO	CO2	HC	CO	NO	CO2	
								54820 03-Jul-85 2	10.3480	4.5430 0.6520	412.60 0.0920	15.0 0.03	18.00 12.7890	11.00 0.0300	31.00 12.9340						
IM5/0037	1G1AB6891B4211032	1981	CHEVROLET	CHEVETTE	98	44978 03-Jul-85 1	10.7600 10.6770	0.4530 311.30	0.0770 200.0 0.20	1.00 >14.796	90.00 0.0700	1.00 >14.769									
								45037 10-Jul-85 2	10.6180 11.4170	0.3330 313.90	0.8200 10.0 0.04	4.00 >14.796	5.00 0.0300	0.00 >14.796							
IM5/0038	1G1AB6899BY2611144	1981	CHEVROLET	CHEVETTE	98	27353 09-Jul-85 1	11.4410 33.7660	0.0973 308.10	0.1070 300.0	3.00 46.00	13.0170 260.00	14.6000 17.00	14.2500								
								27444 18-Jul-85 2	+0.8380 14.5600	0.10930 340.20	0.0740 35.0 0.05	143.00 14.1000	90.00 1.1000	49.00 14.4480							
IM5/0040	1G1AJ0897BY269436	1981	CHEVROLET	CHEVETTE	98	44024 05-Jul-85 1	10.2490 5.2270	0.5600 328.10	0.0440 5.0 0.03	60.00 >14.716	8.00 0.0400	68.00 14.7520									
								44085 11-Jul-85 2	+0.3010 5.3520	0.5800 310.20	0.0520 20.0 0.04	0.00 >14.7960	18.00 0.0200	0.00 14.7960							
IM5/0041	1G2AF35A5BB102993	1981	PONTIAC	LE MANS	231	41085 10-Jul-85 1	11.5340 20.5300	0.0636 478.90	0.1290 50.0 0.60	19.00 >14.2930	60.00 1.0000	13.00 14.1850									
								41157 25-Jul-85 2	+0.8310 14.6630	0.6730 474.40	0.0920 20.0 0.28	5.00 >14.6020	10.00 0.2000	1.00 14.6680							
IM5/0044	1G1AB6897BY332843	1981	CHEVROLET	CHEVETTE	98	EMISSION 30-Jul-85 1	0.6200 9.8000	0.8330 349.20	0.1080 250.0	3.30 6.00	12.9740 235.00	3.2300 9.00	12.9110								
								EMISSION 01-Aug-85 2	+0.3190 5.4120	0.7070 363.30	0.0530 8.0 0.04	98.00 >13.7340	15.00 0.0400	91.00 13.5850							
IM5/0048	1G1AL6934BJ166750	1981	CHEVROLET	IMPALA	267	38767 08-Aug-85 1	11.6940 40.5010	0.0840 415.20	0.2400 245.0	2.90 16.00	12.7240 40.00	0.5500 8.00	14.6020								
								38826 20-Aug-85 2	+0.4270 9.2350	0.2950 488.20	0.0880 15.0 0.10	2.00 >14.8050	30.00 0.2000	1.00 14.8050							
IM5/0049	1G1AP87K3BL162642	1981	CHEVROLET	CAMARO	229	48505 21-Aug-85 1	11.2020 20.3160	0.4160 442.30	0.1130 35.0 0.08	9.00 >14.8050	255.00 0.6000	2.00 14.3200									
								48584 28-Aug-85 2	+0.7040 12.5940	0.4740 452.60	0.0780 155.0 0.15	0.00 >14.8050	200.00 0.5000	0.00 14.4520							
IM5/0052	1G1A23750BB458163	1981	CHEVROLET	MONTE CARLO	267	99119 27-Aug-85 1	15.8620 57.1550	0.8980 432.50	0.3850 910.0	2.20 29.00	9.2800 250.00	2.1000 27.00	9.1350								
								99219 21-Sep-85 2	+4.7360 31.2970	1.1240 474.40	0.1420 1420.0	1.230 49.00	>11.8080 1370.00	2.4000 49.00	11.7080						
IM6/0001	JN1PB045XB9240310	1981	DATSUM		210 91	57300 26-Feb-85 1	0.7760 12.4490	0.6480 296.60	0.1880 700.0	16.20 7.00	10.0730 650.00	16.7500 7.00	9.9610								
								57366 07-Mar-85 2	+0.3680 4.2200	0.8630 301.00	0.0840 30.0 0.02	42.00 9.0270	30.00 0.0400	45.00 8.9560							
IM6/0004	1P3BL18BD274830	1981	PLYMOUTH	HORIZON	135	67765 08-Mar-85 1	12.2360 48.3090	1.1840 280.70	0.2520 150.0	3.40 5.00	5.2930 150.00	3.4000 5.00	5.3220								
								67825 21-Mar-85 2	+0.7650 8.3060	1.2200 357.20	0.2360 40.0 0.04	32.00 >11.1870	20.00 0.0600	38.00 11.3250							
IM6/0007	1FABP21A98A151932	1981	FORD	PAIRMONT	140	68701 04-Apr-85 1	13.2300 95.5650	0.7280 306.70	0.2590 210.0	14.40 38.00	12.5510 220.00	3.8000 48.00	12.6130								
								68842 13-Apr-85 2	+0.7440 17.3210	0.5330 437.90	0.1880 20.0 0.08	29.00 >10.2440	25.00 0.0600	29.00 10.0540							
IM6/0008	JN1HZ0459BX404612	1981	NISSAN	TWO-EIGHTY Z	168	45968 12-Apr-85 1	10.4930 5.9620	1.0920 465.90	0.0750 8.0 0.04	11.00 8.9500	12.00 0.0300	11.00 8.9140									
								46029 18-Apr-85 2	+0.3500 2.4300	1.4670 473.00	0.0580 15.0 0.03	25.00 9.0580	20.00 0.0300	22.00 8.8960							
IM6/0014	1FABP21DXBK127627	1981	FORD	FUTURA	256	51033 10-May-85 1	0.4010 3.3730	2.3280 497.80	0.1420 5.0 0.03	29.00 9.4800	5.00 0.0300	25.00 9.5720									
								51093 16-May-85 2	+0.5700 3.7580	1.7770 502.40	0.1530 8.0 0.02	31.00 9.7560	8.00 0.0200	26.00 9.5720							
IM6/0017	JN1PM035BM021730	1981	DATSUM	310	91	105583 06-Jan-85 1	0.5960 8.0180	1.1210 289.30	0.1010 40.0 0.02	56.00 10.2520	50.00 0.0300	52.00 10.3660									
IM6/0036	1MEPB68AXBP646643	1981	MERCURY	CAPRI	140	67748 03-Jul-85 1	11.9220 41.0100	0.2620 426.80	0.3520 390.0	5.80 11.00	10.8130 370.00	6.0000 15.00	11.0260								
IM6/0039	1P3BK21BIBC183648	1981	PLYMOUTH	RELIANT	135	35566 05-Jul-85 1	0.7730 10.2010	1.1330 378.60	0.2880 50.0 0.04	32.00 13.5640	50.00 0.0400	31.00 13.5000									
								35635 11-Jul-85 2	+0.5380 8.8880	1.0610 385.90	0.1530 35.0 0.03	36.00 11.9730	10.00 0.0200	35.00 11.7130							

TABLE A1

TABLE 41

Vehicle #	VIN	M. Year	Make	Model	DISPL ODOMETER	TEST DATE SEQ	P T P				4 MODE IDLE TEST				RESTART IDLE TEST							
							HC	CO	NOx	CO2	CH4	HC	CO	NO	CO2	HC	CO	NO	CO2			
IM7/0115	1G6AD4786D9215107	1983	CADILLAC	DEVILLE	250 35628	16-Apr-85 1	0.5000	4.5470	0.4650	485.40	0.0590	75.0	0.10	1.00	14.1060	20.0	0.0900	6.00	14.1280			
							35690	19-Apr-85	2	0.2810	1.9980	0.8010	489.60	0.0610	28.0	0.02	21.00	10.8010	28.0	0.0300	41.00	10.7430
IM7/0117	1G1AP8778DM132866	1983	CHEVROLET	CAMARO	151 60621	19-Apr-85	1	2.1080	5.2140	1.9610	403.90	0.1010	150.0	0.19	1.00	14.3470	220.0	0.1500	1.00	14.3250		
							60686	24-Apr-85	2	1.6380	4.8430	1.7670	406.10	0.0940	150.0	0.19	1.00	14.3200	190.0	0.1000	1.00	14.2980
IM7/0124	1G2AC270807232442	1983	PONTIAC	J-2000	110 54264	26-Apr-85	1	0.8770	7.6030	0.6710	326.90	0.0670	75.0	0.60	3.00	14.5610	180.0	0.8600	1.00	14.4300		
							54355	08-May-85	2	0.6000	4.1950	0.6660	339.10	0.0530	40.0	0.23	2.00	14.6060	30.0	0.3100	11.00	14.5170
IM7/0131	1G1AD3562C7121472	1982	CHEVROLET	CAVALIER	110 62714	03-May-85	1	0.3780	5.2580	1.4500	415.50	0.0840	5.0	0.03	26.00	8.5480	8.00	0.0200	28.00	8.5130		
							62795	14-May-85	2	0.3170	3.5470	1.4300	423.20	0.0750	0.0	0.01	43.00	8.4430	3.00	0.0200	35.00	8.5310
IM7/0135	1G1AB68C2CY182427	1982	CHEVROLET	CHEVETTE	98 38938	07-May-85	1	0.4260	8.6640	2.4110	339.20	0.0540	50.0	0.28	21.00	14.8050	50.0	0.1000	6.00	14.8050		
							39005	15-May-85	2	0.4870	9.6740	0.6120	349.00	0.0630	20.0	0.10	1.00	14.8050	30.0	0.4000	0.00	14.8050
IM7/0137	1G2AK37A0CP512064	1982	PONTIAC	GRAN PRIX	231 42743	15-May-85	1	4.0770	24.1390	1.1840	425.30	0.1180	620.0	0.85	40.00	13.4360	650.0	0.7500	43.00	13.3940		
							42814	07-Jun-85	2	3.6550	11.6430	1.4210	444.40	0.0670	570.0	0.23	48.00	13.4580	570.0	0.2800	47.00	13.4580
IM7/0143	1G1AC69P7DJ125245	1983	CHEVROLET	CAVALIER	122 35289	06-Jun-85	1	3.4610	50.1300	0.2990	344.60	0.3790	20.0	0.07	3.00	>14.800	20.0	0.0500	2.00	>14.800		
							35356	14-Jun-85	2	1.0670	10.2300	0.3830	372.70	0.0860	10.0	0.04	6.00	>14.800	20.0	0.0400	6.00	14.6020
IM7/0148	2G3AR47A7C2308186	1982	OLDSMOBILE	CUTLASS	231 73064	07-Jun-85	1	1.7890	21.1430	1.3030	451.20	0.1150	680.0	0.65	18.00	14.3830	720.0	0.4900	9.00	14.4050		
							73215	19-Jun-85	2	1.0510	10.5840	1.0040	457.70	0.0830	320.0	0.25	4.00	14.5760	230.0	0.2000	3.00	14.6200
IM7/0150	1G1AC35P607155564	1983	CHEVROLET	CAVALIER	122 30746	12-Jun-85	1	0.5000	8.3340	0.2600	389.30	0.0640	120.0	0.25	1.00	>14.800	180.0	6.0000	33.00	11.3710		
							30804	14-Jun-85	2	0.2230	5.0350	0.2450	362.40	0.3040	10.0	0.02	60.00	14.6240	15.00	0.0200	4.00	>14.800
IM7/0153	1G1AW35E7CB197037	1982	CHEVROLET	MALIBU	229 51272	11-Jun-85	1	2.4230	18.9490	2.2500	452.00	0.0750	600.0	0.17	23.00	9.8410	500.0	0.1800	7.00	9.1110		
							51423	21-Jun-85	2	2.0590	24.1980	2.4000	439.80	0.0930	175.0	0.30	80.00	13.9050	250.0	0.2500	58.00	13.6270
							51449	28-Jun-85	3	2.1390	24.5980	2.3950	432.00	0.0980	280.0	0.40	68.00	13.8190	200.0	0.2000	64.00	9.0680
IM7/0164	1G1AB68C3DY115935	1983	CHEVROLET	CHEVETTE	98 24590	11-Jul-85	1	0.7980	8.2780	0.6530	298.20	0.1310	290.0	3.40	1.00	12.7890	265.0	3.2000	0.00	12.9960		
							24652	17-Jul-85	2	0.4500	3.5450	0.4990	338.50	0.1090	20.0	0.02	72.00	9.1470	20.0	0.0300	90.00	9.2010
IM7/0167	1G4AM69Y8CH433503	1982	BUICK	PARK AVENUE	301 69735	16-Jul-85	1	16.1700	30.5880	3.4310	505.70	0.1150	700.0	0.80	80.00	10.2520	450.0	0.2100	118.00	9.9890		
IM7/0169	1G1AJ08C6CY132405	1982	CHEVROLET	CHEVETTE	98 41566	17-Jul-85	1	4.6510	99.4470	0.5900	225.80	0.4490	200.0	3.10	65.00	12.6830	220.0	4.0000	60.00	12.4160		
							41648	31-Jul-85	2	2.8520	56.3910	0.8390	243.60	0.2710	30.0	0.05	44.00	14.7560	30.0	0.0500	62.00	14.6680
IM7/0172	1G1AM69KOCB160181	1982	CHEVROLET	MALIBU	229 46370	27-Jul-85	1	3.3240	21.9970	1.0560	386.70	0.1210	285.0	2.80	11.00	13.0570	330.0	1.6000	23.00	13.0630		
							46460	06-Aug-85	2	1.2940	22.6390	1.0150	401.70	0.1160	255.0	2.20	4.00	13.4580	230.0	1.4000	3.00	14.1000
							46484	08-Aug-85	3	0.7710	9.3590	1.1450	413.80	0.0750	50.0	0.10	3.00	>14.800	30.0	0.1400	63.00	9.7480
IM7/0201	1G1AZ37K9CB100859	1982	CHEVROLET	MONTE CARLO	229 78522	17-Sep-85	1	5.5170	82.8840	0.9980	410.80	0.6360	1630.0	9.60	24.00	7.8560	880.0	9.3000	6.00	7.0770		
IM8/0103	1B3B218C7DD105976	1983	DODGE	OMNI	135 15827	05-Mar-85	1	0.9130	10.9660	0.6980	360.60	0.4160	70.0	0.03	12.00	7.7240	80.0	0.0300	15.00	7.8590		
							15877	21-Mar-85	2	0.7400	6.1260	0.7370	337.70	0.1330	15.0	0.03	31.00	8.7070	28.0	0.0300	27.00	8.7950

TABLE 41

VEHICLE #	VIN	M. YEAR	MAKE	MODEL	DISPL/ODOMETER	TEST DATE	SEQ#	HC	CO	NOX	CO2	CH4	F T P			4 MODE IDLE TEST				RESTART IDLE TEST			
													HC	CO	NO	CO2	HC	CO	NO	CO2			
IM8/0110	JB3BD4375CT406618	1982	DODGE	CHALLENGER	156	71746	06-Apr-85	1	10.7230	10.5970	1.0370	439.20	10.1170		35.0	10.80	0.04	>14.8400		35.00	14.4000	61.00	14.3470
						71858	18-Apr-85	2	10.4970	5.6560	1.1500	453.90	10.0950		45.0	10.03	116.00	>12.9270		40.00	10.0400	95.00	13.4140
IM8/0113	1FABP0757D7113525	1983	FORD	ESCORT	98	40596	11-Apr-85	1	11.7820	3.7200	2.3970	321.80	0.0630		80.0	10.40	60.00	>12.2610		100.00	10.4200	56.00	12.2000
						40656	17-Apr-85	2	10.8570	3.1760	2.5840	322.50	0.0630		55.0	10.23	70.00	>12.6340		70.00	10.4200	70.00	12.5090
IM8/0119	1FABP044XBT167589	1982	FORD	ESCORT	98	9084	19-Apr-85	1	12.2760	40.4060	1.2290	279.20	0.1180		240.0	2.50	258.00	>12.9900		250.00	2.4000	32.00	13.9750
						9145	24-Apr-85	2	10.4230	3.5150	0.4740	341.40	0.1170		40.0	10.03	24.00	8.8600		38.00	10.0200	27.00	8.9380
IM8/0122	12FABP0128CX137252	1982	FORD	EXP	98	56174	24-Apr-85	1	11.9640	49.0570	0.8630	302.60	10.1780		105.0	12.60	78.00	>13.3510		110.00	12.6000	81.00	13.2880
						56279	02-May-85	2	11.7250	37.2820	0.3790	300.40	0.1330		60.0	10.04	0.38	>8.8130		40.00	10.0400	40.00	9.0450
						56312	10-May-85	3	11.0510	11.1010	0.6130	336.00	0.1110		30.0	10.04	38.00	8.8130		40.00	10.0400	40.00	9.0450
IM8/0123	1C3BA54D7EG255943	1984	CHRYSLER	LASER IE	135	6523	08-May-85	1	18.8900	189.0580	0.1890	1280.20	11.3660		100.0	12.80	10.00	>11.6430		860.00	17.5000	2.00	8.4610
						6584	24-May-85	2	10.1730	2.1500	0.9110	101.50	0.0360		8.0	10.02	4.00	>11.4300		5.00	10.0200	12.00	11.6080
IM8/0125	1FABP10AXCP170215	1982	FORD	MUSTANG	140	62591	02-May-85	1	15.4940	96.8270	1.0750	288.40	0.3840		108.00	12.45	34.00	>11.3250		1130.00	12.1500	44.00	11.0700
						62675	14-May-85	2	11.0250	11.3640	0.8150	514.20	0.1610		10.0	10.03	30.00	>13.9720		10.00	10.0300	30.00	14.0370
IM8/0134	1FABP0148EW239277	1984	FORD	EXP	98	23613	08-May-85	1	10.7240	5.5460	0.3760	381.10	0.2750		15.0	10.03	31.00	>11.6430		20.00	10.0400	21.00	12.5560
						23673	11-May-85	2	10.6710	4.3740	0.4030	402.20	0.2400		10.0	10.02	36.00	>12.5770		10.00	10.0200	36.00	12.6180
IM8/0136	JHMSR5321DS019254	1983	HONDA	CIVIC	91	37073	09-May-85	1	10.5360	2.6610	1.2530	273.30	0.0410		330.0	0.34	1.00	>14.7380		375.00	0.3000	2.00	14.6500
						37139	15-May-85	2	10.5200	2.8570	1.1390	264.00	0.0380		35.0	10.04	5.00	>14.805		60.00	10.0500	30.00	14.7600
IM8/0138	J72XP6169D6632476	1983	TOYOTA	STARLET	70	29809	16-May-85	1	11.2230	2.9470	0.5740	227.70	0.0320		150.0	10.10	1.00	>14.805		150.00	10.1200	1.00	>14.805
						29869	23-May-85	2	10.1680	2.3640	0.6250	229.80	0.0300		20.0	10.07	3.00	>14.800		25.00	10.0800	1.00	>14.805
IM8/0139	1P3BM14A6CD201632	1982	PLYMOUTH	HORIZON	105	56395	17-May-85	1	11.6670	21.9540	1.4140	276.00	0.1160		90.0	0.95	15.00	>8.3560		125.00	10.7800	16.00	8.3390
						56461	23-May-85	2	11.5900	19.7210	1.7420	268.70	0.0980		130.0	0.30	15.00	>8.0590		120.00	10.4000	13.00	7.8050
IM8/0140	JW1HZ0451CX1432727	1982	DATSUM	TWO EIGHTY	170	47471	24-May-85	1	11.4500	9.8100	1.1570	416.50	0.1290		25.0	10.09	3.00	>14.800		30.00	10.0700	7.00	>14.800
						47541	05-Jun-85	2	11.0850	5.5460	1.5220	421.50	0.1060		20.0	10.03	18.00	>14.6900		22.00	10.0400	15.00	14.6900
IM8/0141	1C3BT4666DC163384	1983	CHRYSLER	E CLASS	160	33846	23-May-85	1	10.7390	30.6750	0.8130	409.20	0.2630		130.0	5.60	30.00	>10.9020		130.00	15.6000	36.00	10.9020
						33907	30-May-85	2	10.4010	8.7190	0.7380	429.50	0.1090		15.0	10.02	71.00	>14.4050		20.00	10.0200	62.00	13.5640
IM8/0144	1FABP0524C7109939	1982	FORD	ESCORT	98	52931	31-May-85	1	12.3240	40.7750	0.9180	249.20	0.1700		275.0	5.00	36.00	>10.8630		265.00	14.8000	39.00	10.9800
						52992	06-Jun-85	2	10.6290	6.0400	0.8350	303.60	0.0990		20.0	10.02	34.00	8.9670		20.00	10.0200	40.00	8.7540
IM8/0145	1FABP0123CX118835	1982	FORD	EXP	98	54283	31-May-85	1	13.2160	49.8750	0.5560	298.70	0.3280		430.0	18.70	9.00	>9.3820		440.00	18.6000	14.00	9.4000
						54356	07-Jun-85	2	11.3490	19.4000	0.5520	354.90	0.1140		28.0	10.05	131.00	>13.3940		50.00	10.0900	82.00	14.5140
						54386	13-Jun-85	3	11.2770	9.9910	0.7120	342.40	0.1200		45.0	10.03	71.00	9.2550		45.00	10.0500	66.00	9.1830
IM8/0147	JP3BD43710Y408432	1983	PLYMOUTH	SAPPORO	156	24009	05-Jun-85	1	10.3530	5.9740	0.8860	424.70	0.1090		8.0	10.04	60.00	>13.6490		10.00	10.0400	62.00	13.5850
						24070	11-Jun-85	2	10.3450	5.1420	0.8240	422.00	0.0990		10.0	10.03	44.00	>11.4300		5.00	10.0300	45.00	11.7880
IM8/0151	JW1HU01510DT69875	1983	DATSUM	MAXIMA	146	28497	11-Jun-85	1	11.4970	45.0680	0.4900	399.90	0.1540		180.0	14.70	2.00	>12.1510		175.00	14.6000	2.00	12.1710
						28577	19-Jun-85	2	10.9970	30.4590	0.5400	407.20	0.1180		6.0	10.03	97.00	>14.5760		10.00	10.0300	96.00	14.5760
						28602	21-Jun-85	3	10.8990	28.2210	0.5740	412.40	0.1040		10.0	10.05	76.00	>14.796		8.00	10.0400	96.00	14.0120

TABLE #1

VEHICLE #	VIN	M. YEAR	MAKE	MODEL	DISPL ODOMETER	TEST DATE	SEQ#	HC	CO	NOX	CO2	CH4	HC	CO	NO	CO2	HC	CO	NO	CO2	P T P			4 MODE IDLE TEST			RESTART IDLE TEST		
IM8/0154	1C3BT5668DC263735	1983	CHRYSLER	NEW YORKER	160 0.5560	14-Jun-85 1	41532	0.5560	19.8170	0.8560	471.70	0.2080	50.0	3.40	55.00	12.6010	70.00	4.4000	51.00	12.2730									
							41593	20-Jun-85 2	0.3500	3.3750	0.8130	467.80	0.1080	20.0	0.03	68.00	12.2970	15.00	0.0400	69.00	12.9480								
IM8/0159	JN1HT14S4CT020737	1982	DATSUM	STANZA	120 0.5210	25-Jun-85 1	70347	0.5210	19.6480	0.4540	350.50	0.1400	25.0	0.04	44.00	13.9480	25.00	0.0400	51.00	13.7550									
							70405	02-Jul-85 2	0.3420	15.0000	0.4330	377.50	0.1200	65.0	1.25	64.00	14.5980	90.00	0.7500	53.00	14.0980								
IM8/0166	JNN5T5437DS024905	1983	HONDA	CIVIC	91 0.5300	16-Jul-85 1	46483	0.5300	3.4250	0.8740	288.30	0.0570	300.0	0.30	67.00	>14.800	320.00	0.7000	78.00	14.4920									
							46586	19-Jul-85 2	0.3310	1.9220	0.8720	287.50	0.0440	235.0	0.08	33.00	>14.800	230.00	0.0700	33.00	>14.800								
IM8/0168	1MEBP60245ET61771	1984	MERCURY	LYNX	98 12.1340	17-Jul-85 1	17931	12.1340	52.7470	0.2920	310.20	0.1190	180.0	3.00	41.00	12.7870	180.00	3.1000	25.00	12.7450									
							17996	31-Jul-85 2	0.4170	5.0860	0.5890	344.50	0.1040	18.0	0.03	34.00	9.6380	20.00	0.0300	26.00	9.5090								
IM8/0170	JN1PB04S4C9285552	1982	DATSUM	TWO-TEN	90 1.2880	18-Jul-85 1	40935	1.2880	19.9980	0.4550	305.10	0.3770	610.0	9.60	12.00	7.7040	690.00	9.7000	11.00	7.7210									
							41027	27-Jul-85 2	0.3390	3.0570	0.4880	311.90	0.0980	30.0	0.05	56.00	12.2320	22.00	0.0400	55.00	12.3950								
IM8/0171	1MEBP6449CI643455	1982	MERCURY	LYNX	98 2.8540	24-Jul-85 1	52310	2.8540	48.2500	0.6430	286.00	0.1690	280.0	3.30	63.00	12.5800	260.00	3.0000	66.00	12.5590									
							52372	01-Aug-85 2	0.6690	8.3220	0.4990	367.10	0.1730	40.0	0.03	20.00	9.2190	45.00	0.0200	20.00	>14.800								
IM8/0178	JN1CZ04S1DX752190	1983	DATSUM	TWO-EIGHTY	168 1.0760	06-Aug-85 1	52420	06-Aug-85 1	6.5000	1.4080	416.80	0.0940	12.0	0.04	5.00	>14.800	14.00	0.0400	2.00	>14.800									
							52488	16-Aug-85 2	0.9990	5.3390	1.1620	424.20	0.0880	30.0	0.08	1.00	>14.805	20.00	0.0300	1.00	>14.805								
IM8/0181	JP1AP21B9CA110564	1982	SUBARU	HATCHBACK	97 0.5290	08-Aug-85 1	48373	08-Aug-85 1	4.6150	1.3450	281.50	0.0640	270.0	0.20	4.00	14.5800	350.00	0.2000	3.00	>14.800									
							48454	15-Aug-85 2	0.2650	3.6490	1.0840	277.50	0.0390	250.0	0.15	1.00	14.6940	220.00	0.1000	4.00	>14.805								
IM8/0183	1FABP0442ET173616	1984	FORD	ESCORT	98 1.3380	08-Aug-85 1	17513	08-Aug-85 1	4.3730	0.5260	391.40	0.3150	25.0	0.04	34.00	13.1410	30.00	0.1800	4.00	14.4920									
							17578	20-Aug-85 2	1.2650	4.8890	0.7170	339.60	0.2843	10.0	0.03	41.00	12.4950	16.00	0.0300	34.00	13.8430								
IM8/0184	1FABP0420DM207609	1983	FORD	ESCORT	98 0.5630	16-Aug-85 1	58890	16-Aug-85 1	8.9390	0.5180	347.20	0.1560	50.0	0.04	47.00	11.0310	50.00	0.0400	46.00	10.8750									
							58951	21-Aug-85 2	0.5480	8.8880	0.5020	349.80	0.1530	45.0	0.03	46.00	10.6820	50.00	0.0300	50.00	11.1090								
IM8/0186	1FABP0141EW339429	1984	FORD	EPI	98 0.7280	27-Aug-85 1	29769	27-Aug-85 1	6.3510	0.7700	353.20	0.1570	40.0	0.02	36.00	10.4140	40.00	0.0100	36.00	10.1680									
							29845	04-Sep-85 2	0.7160	7.4380	0.7280	345.30	0.1390	25.0	0.01	33.00	9.7560	30.00	0.0100	33.00	9.8310								
IM8/0190	1VWBB0175CT035264	1982	VOLKSWAGEN	RABBIT	106 0.4930	29-Aug-85 1	56762	29-Aug-85 1	7.3950	2.9640	298.00	0.0520	160.0	4.20	2.00	12.0450	170.00	3.9000	3.00	12.1060									
							56835	05-Sep-85 2	0.1930	0.4050	1.8920	307.00	0.0180	55.0	0.02	110.00	14.1890	50.00	0.0200	119.00	14.3200								
IM8/0191	JP3B34F0EU400392	1984	PLYMOUTH	COLT	98 2.5000	06-Sep-85 1	34351	06-Sep-85 1	8.8860	0.2390	293.90	0.1070	1500.0	0.05	58.00	13.9720	1330.00	0.8000	19.00	14.3860									
	No second sequence																												
IM8/0195	1FABP052CX229658	1982	FORD	ESCORT	98 2.3440	10-Sep-85 1	91073	10-Sep-85 1	79.8770	0.8000	231.50	0.2260	280.0	5.15	53.00	10.8830	270.00	4.9000	59.00	11.0570									
							91933	21-Sep-85 2	1.0180	33.5470	0.2810	357.80	0.3090	65.0	1.30	21.00	11.5890	70.00	1.3000	24.00	11.6280								
IM8/0196	1B3A44D6EG281408	1984	DODGE	DAYTONA	135 15.9540	11-Sep-85 1	31427	11-Sep-85 1	15.5130	0.7000	309.40	0.8030	520.0	7.40	11.00	8.9320	580.00	7.3000	14.00	9.0210									
							31503	19-Sep-85 2	0.4270	3.9490	1.6050	385.40	0.0670	20.0	0.02	25.00	11.1160	20.00	0.0300	22.00	11.0960								
IM8/0200	1FABP0529CT135534	1982	FORD	ESCORT	98 0.8320	17-Sep-85 1	56651	17-Sep-85 1	13.3580	0.5190	357.50	0.1820	95.0	1.30	33.00	10.6520	90.00	1.3500	36.00	9.6010									
							56725	21-Sep-85 2	0.0370	12.6190	0.6080	349.50	0.1210	38.0	0.01	38.00	9.6560	40.00	0.0200	38.00	9.6010								
IM8/0202	1B3A4409EG206170	1984	DODGE	DAYTONA	135 4.6960	18-Sep-85 1	35578	18-Sep-85 1	129.4260	0.7090	309.10	0.6430	340.0	3.20	19.00	10.1960	860.00	7.4000	9.00	7.4890									

TABLE #1

VEHICLE #	VIN	M. YEAR	MAKE	MODEL	(DISPL ODOMETER TEST DATE SBQ)	HC	CO	NOX	CO2	CH4	F T P			4 MODE IDLE TEST			RESTART IDLE TEST		
											HC	CO	NO	CO2	HC	CO	NO	CO2	
					36635 20-Sep-85 2 1.1130	3.7300	3.0310	399.60	0.0730		55.0	0.03	35.00	11.7480	60.00	0.0300	37.00	11.4100	

Table of Vehicle Repair Information

TABLE #2

VEHICLE #	INT.	REPAIR	PARTS COST	TIME	SEQ	CONV	3-WAY	REPAIR
IM5/0002	2	1:19	\$0.00	\$0.00				REMOVE IDLE MIXTURE PLUG AND SET DWELL TO SPEC OF 30
IM5/0005	2	2:30	\$45.00	\$375.00				REPLACE PCV HOSE (KINKED SHUT); INSTALL NEW EFE/CANISTER PURGE TEMP SWITCH; CORRECTLY ROUTE CANISTER PURGE AND EFE HOSES; REPLACE #2 SPARK PLUG; INSTALL NEW ECM AND MIXTURE SOLENOID; "CHECK" BULB; REPLACED THROTTLE POSITION SENSOR; SET ISC TO SPEC. NOTE: EGR VALVE STUCK OPEN/CLOSED; CANISTER SATURATED WITH FUEL.
IM5/0006	2	2:00	\$0.00	\$550.00				INSTALL NEW ECM AND TPS SENSOR. INSTALL NEW O2 SENSOR. REMOVE MIXTURE PLUG AND CENTER DWELL
IM5/0009	2	2:00	\$0.00	\$50.00				REPLACE UPSTREAM CHECK VALVE AND PIPE ASSEMBLY.
IM5/0012	2	1:00	\$0.00	\$80.00				SET FAST IDLE, CURB IDLE, TIMING, AND IDLE MIXTURE DWELL TO SPEC. REPLACE PULSE AIR SHUT OFF SOLENOID. RECONNECT PULSE AIR HOSE TO AIR CLEANER. NOTE, EGR VALVE IS BROKEN.
IM5/0013	2	15:00	\$0.00	\$450.00				INSTALL NEW ECM; TROUBLE CODES 23, 41, 51, AND 54 PRESENT. INSTALL NEW PROM, MIXTURE SCREW AND SET MIXTURE.
	3	1:00	\$0.00	\$50.00				REPLACED O2 SENSOR.
IM5/0015	2	0:30	\$0.00	\$0.00				SET MIXTURE SOLENOID DWELL TO CENTER OF BAND 30'
IM5/0018	2	WARR	WARR	WARR				REPLACED O2 SENSOR; UPSTRAM CHECK VALVE; THROTTLE SPRING. (DECARBON ENGINE FROM RICH CONDITION.)
	3	1:00	\$0.00	\$0.00				RESET ISC MOTOR WITH CRUISE CONTROL DISCONNECTED-IDLE SPEED WAS HANGING UP CAUSING CAR TO RUN TOO RICH.
IM5/0019	2	2:30	\$0.00	\$390.00				INSTALL NEW ECM; PROM; AND TPS SENSOR.
IM5/0022	2	2:00	\$0.00	\$30.00				REPLACE O2 SENSOR; REMOVE IDLE BLEED COVER AND SET DWELL. (NOTE: CAT MAY BE MARGINAL; CANISTER FILTER IS DIRTY.)
	3	1:30	\$0.00	\$310.00				REPLACE ECM.
IM5/0023	2	1:30	\$0.00	\$0.00				SET CARBURATOR PARAMETERS. PROBLEM CANNOT BE PINPOINTED.
IM5/0027	2	1:00	\$0.00	\$35.00				REPLACE O2 SENSOR.
IM5/0028	2	0:30	\$0.00	\$0.00				INSTALL NEW PCV HOSE. SET MIXTURE DWELL.

TABLE #2

VEHICLE #	MT.	SEQ	TIME	CONV	PARTS COST	REPAIR	
						3-WAY	
IM5/0029 2 4:00 \$0.00 \$350.00 INSTALL NEW CHECK VALVE, EGR VALVE, TPS SENSOR, O2 SENSOR, MIXTURE SOLENOID, AND IDLE AIR BLEED. SET TIMING TO SPEC.							
IM5/0030 2 2:00 \$0.00 \$250.00 INSTALL NEW CATALYST							
IM5/0031 2 0:30 \$0.00 \$0.00 SET IDLE MIXTURE USING AIR BLEED SCREW.							
IM5/0033 2 0:30 \$0.00 \$0.00 SET DWELL TO 35' USING MIXTURE SCREW.							
IM5/0037 2 1:00 \$0.00 \$0.00 SET TIMING AND IDLE TO SPEC; CLEAN DISTRIBUTOR CAP.							
IM5/0038 2 2:45 \$0.00 \$0.00 CLEAN IDLE AIR BLEED. REMOVE MIXTURE PLUG AND SET DWELL TO LOWER END OF SPEC.							
IM5/0040 2 0:30 \$0.00 \$0.00 REPLACE VACUUM HOSE GOING TO VACUUM BREAK. SET IDLE TO SPEED TO SPEC.							
IM5/0041 2 1:00 \$0.00 \$0.00 SET IDLE AIR BLEED ADJUSTMENT.							
IM5/0044 2 0:30 \$0.00 \$0.00 SET IDLE MIXTURE AND IDLE SPEED TO SPEC.							
IM5/0048 2 2:00 \$16.00 \$54.00 REPLACE AIR FILTER, AIR PUMP CHECK VALVE, PCV FILTER AND O2 SENSOR.							
IM5/0049 2 1:00 \$12.00 \$0.00 REPLACE AIR AND CANISTER FILTERS.							
IM5/0052 2 6:00 \$100.00 \$700.00 REPLACE CHECK VALVE, AIR FILTER, PCV FILTER, 8 SPARK PLUGS, CARBURATOR, O2 SENSOR, CANISTER FILTER, PCV VALVE, OIL, OIL FILTER, 2 SPARK PLUG WIRES.							
IM6/0001 2 0:30 \$0.00 \$0.00 SET CARB IDLE, ADJUST IDLE CO TO 1.5%.							
IM6/0004 2 2:00 \$150.00 \$0.00 INSTALL NEW AIR PUMP AND BELT; TIGHTLY CLAMP UPSTREAM AIR HOSES; CLEANED CHOKE AREA.							
IM6/0007 2 0:30 \$0.00 \$260.00 INSTALL NEW MCV UNIT.							
IM6/0008 2 0:30 \$0.00 \$150.00 INSTALL NEW O2 SENSOR AND AIR FILTER.							
IM6/0014 2 0:30 \$0.00 \$0.00 RECONNECT EGR.							
IM6/0036 2 1:00 \$0.00 \$140.00 REPLACE O2 SENSOR AND ALL SPARK PLUG WIRES; REPAIR FRESH AIR TUBE. SET CURB IDLE TO SPEC.							

TABLE #2

MT.	REPAIR	PARTS COST			
VEHICLE #	SEQ	TIME	CONV	3-WAY	REPAIR
	3	0:30	\$0.00	\$0.00	SET CURB IDLE TO SPEC.; REPAIR LEAK IN DIVERTER VALVE HOSE.
IM6/0039	2	0:30	\$0.00	\$0.00	SET IDLE SPEED AND TIMING TO SPEC.
IM6/0042					NO SECOND SEQUENCE.
IM6/0043	2	1:00	\$0.00	\$250.00	REPLACE CARBURETOR.
IM6/0045	1	1:30	\$110.00	\$0.00	REPLACE MUFFLER AND EXTENSION PIPE.
	2	1:00	\$0.00	\$0.00	SET TIMING AND IDLE TO SPEC; RECONNECT O2 SENSOR WIRE.
IM6/0046	2	2:00	\$50.00	\$215.00	REPLACE ELECTRONIC CONTROL UNIT, PCV VALVE AND FILTER, O2 SENSOR, AND AIR MANAGEMENT VALVE.
IM6/0051	2	0:10	\$0.00	\$0.00	ADJUST IDLE SPEED TO SPEC.
IM6/0053	2	1:00	\$0.00	\$0.00	ADJUST IDLE MIXTURE TO SPEC.
IM6/0054	1	1:00	\$50.00	\$0.00	INSTALL NEW IDLE MIXTURE LIMITING DEVICE.
	2	0:15	\$1.00	\$0.00	SET IDLE TO SPEC. REPAIR VACUUM HOSE.
IM6/0056	2	1:30	\$12.00	\$0.00	REPLACE PULSE AIR FILTERS. ADJUST TIMING, IDLE MIXTURE, AND IDLE SPEED TO SPEC.
IM6/0057	2	2:00	\$130.00	\$0.00	SET IDLE SPEC TO SPEC. REPLACE BRAKE BOOSTER.
IM7/0101	2	1:30	\$0.00	\$41.00	REPLACE CHECK VALVE, UPSTREAM AIR PIPE, AND O2 SENSOR.
	3	1:30	\$250.00	\$0.00	INSTALL NEW CATALYST.
IM7/0102	2	1:30	\$37.00	\$0.00	REPLACE EGR VALVE; WITH CAR IN DRIVE, CENTER ISC MOTOR TO MIDDLE OF SPEC
IM7/0105	2	0:20	\$0.00	\$35.00	INSTALL NEW O2 SENSOR.
IM7/0107	2	0:20	\$19.00	\$0.00	ADJUST CARB IDLE TO SPEC; INSTALL NEW AIR FILTER.
IM7/0108	2	0:30	\$0.00	\$0.00	SET CURB IDLE TO SPEC.
IM7/0109	2	0:30	\$0.00	\$45.00	INSTALL NEW O2 SENSOR.

TABLE #2

INT.	REPAIR		PARTS COST		
VEHICLE #	SEQ	TIME	CONV	3-WAY	REPAIR
 IM7/0114 NO SECOND SEQUENCE.					
IM7/0115 2 0:30 \$0.00 \$0.00 REMOVE BB FROM AIR MANAGEMENT VALVE.					
IM7/0117 2 0:30 \$0.00 \$0.00 REPAIR BOOT ON #1 SPARK PLUG WIRE; REINSTALL WIRE.					
IM7/0124 2 1:00 \$0.00 \$40.00 INSTALL NEW O2 SENSOR. REPLACE RADIATOR CAP.					
IM7/0131 2 1:30 \$0.00 \$260.00 INSTALL NEW ECM. SET TIMING TO SPEC.					
IM7/0135 2 0:30 \$0.00 \$0.00 RECONNECT PORTED SIGNAL HOSE AT 3-WAY TEE.					
IM7/0137 2 4:00 \$60.00 \$30.00 OVERHAUL CARB. REPLACE VACUUM BREAK AND O2 SENSOR.					
IM7/0143 1 0:30 \$0.00 \$35.00 REPLACED O2 SENSOR. REPLACED MUFFLER AND TAILPIPE.					
2 2:00 \$80.00 \$0.00 REPLACED MUFFLER AND TAILPIPE.					
IM7/0150 2 1:00 \$0.00 \$44.00 INSTALL NEW TPS SENSOR.					
IM7/0153 2 1:00 \$0.00 \$0.00 SET CARB MIXTURE SCREWS AND SET DWELL. ADD 1 CAN OF GM TOP ENGINE CLEANER TO DECARBONIZE MOTOR.					
3 1:00 \$0.00 \$275.00 INSTALL NEW ECM.					
IM7/0164 2 0:30 \$0.00 \$0.00 RECONNECT HOSE TO VACUUM BREAK; RECONNECT HOSE TO HOT AIR DOOR. REMOVE PLUG AND SET MIXTURE DWELL.					
IM7/0167 NO SECOND SEQUENCE.					
IM7/0169 2 3:00 \$0.00 \$275.00 INSTALL NEW ECM, O2 SENSOR, AND AIR FILTER.					
IM7/0172 2 2:00 \$88.00 \$0.00 REPLACE CHECK VALVE AND TUBES.					
3 1:00 \$0.00 \$0.00 SET CARB PARAMETERS TO SPEC USING MIXTURE SCREWS AND IDLE AIR BLEED.					
IM7/0201 NO SECOND SEQUENCE.					
IM8/0103 2 1:15 \$0.00 \$0.00 CLEAN CHOKE AREA OF CARB. SET IDLE MIXTURE; SET CURB IDLE TO 800.					
IM8/0110 2 1:30 \$95.00 \$0.00 INSTALL NEW COIL, COIL WIRE, DISTRIBUTOR CAP, ROTOR, SPARK PLUG WIRE.					

TABLE #2

VEHICLE #	INT.	REPAIR	PARTS COST		
			SEQ	TIME	CONV
REPAIR					
REMOVE IDLE MIXTURE PLUG AND SET CO.					
IM8/0113 2 0:30 \$10.00 \$0.00 REPLACE BROKEN #3 SPARK PLUG WIRE.					
RECONNECT EGR HOSE; REPAIR VACUUM LINE TO DUMP VALVE.					
IM8/0122 2 1:30 \$10.00 \$0.00 REPAIR VACUUM SIGNAL HOSES TO EGR SYSTEM, AIR MANAGEMENT SYSTEM, CANISTER PURGE SYSTEM , AND VACUUM ADVANCE. SET CURB IDLE TO SPEC.					
IM8/0123 2 1:00 WARR WARR INSTALL NEW O2 SENSOR.					
IM8/0125 2 1:30 \$10.00 \$0.00 SET TIMING AND IDLE PARAMETERS TO SPEC. INSTALL AIR PUMP BELT AND TIGHTEN CHECK VALVE CONNECTION.					
IM8/0134 2 0:30 \$0.00 \$0.00 SET CURB IDLE TO SPEC.					
IM8/0136 2 0:30 \$0.00 \$0.00 SET CURB IDLE TO SPEC.					
IM8/0138 2 0:30 \$0.00 \$0.00 SET IDLE SPEED TO SPEC.					
IM8/0139 2 1:00 \$0.00 \$0.00 SET TIMING TO SPEC; REMOVE MIXTURE PLUG AND SET MIXTURE.					
IM8/0140 1 2:00 \$100.00 \$0.00 REPLACE MUFFLER DUE TO EXHAUST LEAK.					
IM8/0141 2 0:30 \$0.00 \$0.00 INSTALL NEW O2 SENSOR.					
IM8/0144 2 1:30 \$0.00 \$10.00 REPLACE TVS FOR AIR SYSTEM. REMOVE MIXTURE PLUG AND SET MIXTURE.					
IM8/0145 2 1:00 \$0.00 \$0.00 SET IDLE SPEED AND MIXTURE. RECONNECT HOSE TO VOTM AND TO AIR CLEANER TEMPERATURE SENSOR.					
IM8/0147 2 0:30 \$0.00 \$0.00 SET IDLE SPEED TO SPEC.					
IM8/0151 2 0:30 \$0.00 \$0.00 SET IDLE MIXTURE.					
IM8/0152 3 0:30 \$0.00 \$110.00 INSTALL NEW O2 SENSOR.					

TABLE #2

VEHICLE #	INT. REPAIR	SEQ TIME	CONV 3-WAY	PARTS COST	REPAIR	
IM8/0154		2 0:30		\$0.00	\$0.00	RECONNECT BOWL VENT HOSE. SET IDLE MIXTURE.
IM8/0159		2 1:00		\$15.00	\$0.00	INSTALL NEW AIR FILTER AND PULSE AIR FILTER; ADJUST IDLE SPEED.
IM8/0166		2 0:30		\$20.00	\$0.00	INSTALL NEW AIR FILTER AND DISTRIBUTOR CAP; ADJUST IDLE SPEED.
IM8/0168		2 2:00		\$0.00	\$0.00	SET IDLE MIXTURE TO SPEC.
IM8/0170		2 2:00		\$10.00	\$0.00	SET TIMING, IDLE SPEED, AND IDLE CO TO SPEC; INSTALL SPARK PLUGS.
IM8/0171		2 1:00		\$0.00	\$0.00	REPAIR HOSES. SET IDLE SPEED AND TIMING TO SPEC.
IM8/0178		2 2:00		\$0.00	\$125.00	INSTALL NEW O2 SENSOR
IM8/0181		2 1:00		\$0.00	\$0.00	SET IDLE MIXTURE AND IDLE SPEED.
IM8/0183		2 0:30		\$0.00	\$0.00	SET IDLE SPEED TO SPEC.
IM8/0184		1 2:00		\$125.00	\$0.00	REPLACE EXHAUST PIPE, TAILPIPE, AND MUFFLER.
		2 0:10		\$0.00	\$0.00	ADJUST IDLE SPEED TO SPEC.
IM8/0186		2 1:10		\$8.00	\$0.00	REPLACE AIR FILTER ELEMENT. SET IDLE MIXTURE AND IDLE SPEED TO SPEC.
IM8/0190		2 1:00		\$0.00	\$0.00	SET IDLE MIXTURE AND IDLE SPEED TO SPEC.
IM8/0191						NO SECOND SEQUENCE.
IM8/0195		2 2:00		\$60.00	\$0.00	REPLACE AIR MANAGEMENT VALVE. SET TIMING AND IDLE SPEED TO SPEC.
IM8/0196		2 1:00		\$0.00	\$30.00	REPLACE O2 SENSOR.
IM8/0200		2 2:00		\$0.00	\$0.00	REMOVE IDLE MIXTURE ADJUSTMENT LIMITER PLUG AND SET IDLE MIXTURE TO SPEC
IM8/0202		2 1:00		\$0.00	\$30.00	REPLACE O2 SENSOR.

Table of Summary of Vehicle Rejection

and

Table of Summary of Vehicle Rejection After First FTP

TABLE NO. 3

REASON FOR REJECTION	Model Year	
	1981	1982+
Failed to meet idle criteria (HC \geq 120 ppm or CO \geq 0.7), and no computer problem codes	12	39
Extensive non-emission related work (on engine, trans- mission, or turbo) was required	2	5
Driveability (i.e., unsafe on dyno)	3	2
Vehicle was extensively modified	0	1
Vehicle was an LDT	1	1
Already partially repaired	0	1
Time ran out on this task	0	1

TABLE NO. 4

SUMMARY OF REJECTION REASONS AFTER FIRST FTP	
VEHICLE NO.	REASON FOR REJECTION
IM6/0017	Vehicle required major engine repairs (approxi- mately \$2000.00) - rings and valve job.
IM6/0042	Vehicle required major engine repairs - rings.
IM7/0114	Non-OE Air Conditioner made maintenance impossible
IM7/0167	Vehicle required major engine repairs - #3 valve guide bad, bad valve cylinders
IM8/0191	Vehicle requires major engine repairs (approx- mately \$1600.00)-turbocharging seals leak, allow- ing oil to pass into turbo cavity