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Technical Report

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Comparison of On-Board Diagnostics to Tailpipe I/M

By

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ABSTRACT

This report summarizes an effort to study the use of a vehicle's on-board diagnostic (OBD) system either as a replacement for or as a complement to the standard tailpipe I/M emissions test for late-model year in-use vehicles.

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Comparison of On-Board Diagnostics
to Tailpipe I/M

1. EXECUTIVE SUMMARY

1.1 Objectives of Work

The primary objective of this program was to compare three types of I/M programs:

- Centralized Tailpipe I/M (e.g., Maryland's Idle Test),
- On-Board Diagnostics (OBD) Only I/M, and
- Tailpipe and OBD combined.

The analyses, for each of those three programs, include estimating:

- the failure rates,
- the errors of commission,
- the excess emissions identified,
- the number of high emitters identified, and
- the cost of the repairs.

This report summarizes the effort to study those two methods (i.e., tailpipe idle emissions and OBD) of testing recent technology cars. The targets were to (1) recruit and test approximately 1,000 late model year (i.e., 1983 and newer) cars at the Maryland I/M lanes and then (2) FTP test, repair, and retest 27 of those 1,000 vehicles.

1.2 Conclusions Reached

1. Two to three current technology times as many 1983 and newer vehicles equipped with OBD would fail an OBD test than would fail a tailpipe I/M idle test (cf. page 10). However, offsetting that are the three tentative results suggesting that:

   - the tailpipe I/M test identified the dirtier vehicles (cf. page 18),

   - the I/M-targetted repairs tended to be more effective in reducing FTP emissions than did the OBD-targetted repairs (cf. page 32), and

   - the I/M-targetted repairs tended to be more costly per effected vehicle but less costly for the entire fleet than did the OBD-targetted repairs (cf. page 33).

   Taken together, these three conclusions suggest that the Maryland-type I/M test is both more effective in reducing FTP emissions as well as more cost effective than an OBD

program. These conclusions ignore, due to lack of FTP data, the significant differences, in both emission levels and OBD failure rates, between the fuel injected vehicles and the carbureted vehicles (cf. pages 10 and 16) and, thus, should be considered to be preliminary.

2. We anticipated that vehicles equipped with Malfunction Indicator Lights (MILs) might exhibit lower OBD failure rates in this program because the owners would likely seek service immediately after a malfunction occurred. However, any effect of MILs on the OBD failure rates of the vehicles in this study was obscured by differences among the manufacturers (cf. page 13).

3. Almost half of the vehicles that failed the official Maryland I/M test were able to pass a similar test at the contractor's laboratory following heavy preconditioning (cf. page 24).

1.3 Assumptions on Which the Work Was Accomplished

The primary assumption on which this testing program was designed were that Maryland's centralized I/M testing and EG&G's OBD checks were each representative of how centralized I/M and OBD programs would perform.

1.4 Options for Additional Work

The conclusions in this report are probably valid only for I/M programs similar to Maryland's (i.e., an idle test preceded by 30 seconds of uncontrolled preconditioning). Similar test programs could be performed to compare OBD with tailpipe I/M in which the tailpipe I/M test is a two-mode test (e.g., 2500 rpm/ idle test or loaded test).

The number of FTP tested vehicles in this project is insufficient to accurately model the three types of I/M programs described in Item 1.1. If the objective is to accurately compare a centralized I/M program that uses an idle test (with uncontrolled preconditioning) to an I/M program based on (or supplemented by) the present type of OBD systems, then a continuation of this project would be needed due to the differences exhibited between carbureted and fuel injected vehicles.

California has published regulations that would expand OBD capabilities beginning with the 1994 model year. This change could drastically alter the conclusions of this program and, thus, would require additional study.

2. PROGRAM DESCRIPTION

2.1 Background and Program Summary

It has been suggested that an I/M program based on, or supplemented by, examining a vehicle's on-board diagnostics (OBD) would be more effective in identifying FTP failures of late model year cars than a program that only measures tailpipe emissions.[1,2,3]* Both GM and CARB have examined this approach.

Also, EPA has investigated some aspects of this hypothesis by analyzing data generated in other programs (e.g., Emission Factor). In the Emission Factor (EF) program, I/M results are approximated by using the four-mode idle test. However, since the EF program was not designed to compare OBD with an actual tailpipe I/M program, it has three basic shortcomings:

1. a limited sample of vehicles with both OBD checks and simulated I/M tests;

2. a limited coverage of those manufacturers and model years with sophisticated OBD systems; and

3. a repair protocol that was not targeted at OBD versus tailpipe I/M questions.

In order to effectively compare an OBD and a tailpipe I/M program, we must:

- Know which vehicles would be identified as "failing" in either or both programs (i.e., failure rates). A judgement on the relative effectiveness of the two approaches could hinge on the sample of vehicles failed by one test but not by the other.

- Characterize the FTP emissions of the cars which fail in either or both programs.

- Determine the effects on FTP emissions of repairs to the identified vehicles. The types of repairs performed on the vehicles will be determined by the test (i.e., OBD or tailpipe) used to identify those vehicles.

- Determine the cost of repairs associated with each program.

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* Numbers in brackets denote references at the end of this report (page 36).

To address those four preceding points, we would ideally conduct a testing program in a region of the country that is not covered by an I/M program so as to avoid both the repairs performed because of the vehicle owner's anticipation of needing to pass the I/M test as well as the reduced tampering rates for emission control components in parts of the country covered by I/M programs.[4,5] However, we chose to make use of Maryland's centralized I/M program because of its potential to produce a large pool of eligible vehicles at a reasonable cost.

For budgetary reasons, this program was implemented in two phases. The first phase ran from August 14, 1987 through December 15, 1987 (during which, vehicles numbered 0001 through 0447 were tested), and the second phase ran from July 5, 1988 through September 30, 1988 (during which, vehicles numbered 0501 through 1322 were tested).

Since this study was to reflect the latest OBD technology, we restricted the test vehicles to the 1983 and later model years. Also, we limited the first phase of this study to General Motors (GM) passenger cars and to some 1984 and later Chrysler passenger cars because of the ease of "reading" their computer malfunction/trouble codes. In the second phase, we were able to add some 1983 and newer Ford passenger cars and 1985 and newer GM vans (i.e., GMC Safari and Chevy Astro). The GM vehicles dominated this study in terms of the number of vehicles tested. This is significant because the 1983 and newer GM vehicles all have Malfunction Indicator Lights (MILs). If these work as intended, owners would seek service immediately after a malfunction occurs. One would then expect relatively few codes to be present at the time of the annual I/M test.

This report summarizes the effort to study those two methods (i.e., OBD and tailpipe emissions) of testing these new technology cars. In this program, the targets were to (1) recruit and test approximately 1,000 late model year (i.e., 1983 and newer) cars at the Maryland I/M lanes and then (2) FTP test, repair, and retest 27 of those vehicles.

2.2 Objectives and Strategy

The primary objective of this program was to compare the failure rates, the errors of commission, the excess emissions identified, the number of high emitters identified, and the cost of the repairs for each of the following three types of I/M programs:

- Centralized Tailpipe I/M (e.g., Maryland's Idle Test),
- OBD Only I/M, and
- Tailpipe and OBD combined.

To accomplish this objective, EPA developed this testing program, the target of which was to recruit and examine approximately 1,000 late-model year (i.e., 1983 and newer) cars and light-trucks that were equipped with ~~sophisticated~~ the latest OBD technology systems whose computer malfunction/trouble codes could easily be "read." This report summarizes the effort to study:

- the vehicles that either had stored trouble codes or had failed a tailpipe I/M idle test,
- the repairs necessary either to eliminate the stored trouble codes or to lower tailpipe emissions to pass the I/M idle test, and
- the FTP emissions preceding and following those repairs.

This program consisted of the following six tasks:

1. OBD testing following the regular I/M test at the Maryland I/M lane (1,269 vehicles),
2. Soliciting volunteers for further testing at VTL,
3. Screening for FTP test safety defects at VTL (27 vehicles),
4. "As Received" testing at VTL (27 vehicles),
5. Diagnosing and repairing the 27 test vehicles, and
6. Post-repair testing at VTL (27 vehicles).

2.3 Testing at the Maryland I/M Lanes

The contractor, EG&G Automotive Research, Inc. (EG&G), screened 1983 and later model year passenger cars that were tested at the official Maryland I/M Stations #7 and #8 (in Prince George's County). These stations were selected because of their proximity to the EG&G testing laboratory in Virginia. (The I/M lane testing was limited to Station #7 for the second phase of this program.) In order to assure that the selection of cars for this program was a representative cross-section, EG&G personnel attempted to examine every 1983 and newer GM and Ford vehicle and every 1984 and newer Chrysler whose OBD codes could be "read" using an OTC Monitor 2000 scanner (manufactured by the OTC Division of the Sealed Power Corporation). Also, the 49 sampling days (18 in the first phase and 31 in the second) were scheduled to occur randomly on the days of the week those two stations were open.

At the Maryland I/M lanes, EG&G technicians recorded the official I/M scores* (HC and CO) for each candidate vehicle. Then, using a Monitor 2000 scanner, those technicians attempted to "read" each vehicle's computer trouble/malfunction codes. The results of this task are given in Appendices A, F, and G.

2.4 Vehicle Testing at VTL

The testing and vehicle repair for this study were performed by EG&G at its Virginia Testing Laboratory (VTL). In the third task, upon receipt of each vehicle at VTL, EG&G road-tested it in the vicinity of the laboratory for approximately ten to fifteen minutes to check for defects which would make testing on the dynamometer unsafe. Such cars would still have been acceptable if they were repairable for a moderate cost not to exceed $200 (e.g., minor repairs to brakes or cooling systems would have been acceptable). As it turned out, no car was rejected from this portion of the program. After completion of the road-test, EG&G analyzed a sample of each vehicle's fuel to determine the lead content. EG&G also checked for lead deposits in the tailpipes by using Plumbtesmo paper. (No lead deposits in the tailpipes nor leaded fuel were detected in any of those 27 vehicles.)

For the "As Received" testing stage, a sequence consisting of three types of tests was performed on each of the vehicles: an FTP test, a 4-Mode Test, and a Restart Idle Test. This sequence of three tests was performed using Indolene fuel.

After EG&G had completed the repairs on the vehicle, the same test sequence (i.e., FTP, 4-Mode, Restart) was repeated, and the vehicle was then returned to its owner.

2.5 Vehicle Maintenance

For the fifth stage of this program, after the preceding test sequence had been performed, EG&G performed an inspection of each vehicle's emission control components. EG&G then performed repairs on each vehicle until the problem (i.e., tailpipe idle emissions or OBD trouble codes) was corrected. After each significant repair, a Maryland-type I/M test was performed. For each vehicle that had initially failed the Maryland I/M test, the repairs were not considered completed until the vehicle was able to pass an official Maryland I/M retest. It must be kept in mind that perhaps more repairs were performed than necessary to pass the I/M emissions test, but not intentionally.

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* The official Maryland test results are the stabilized idle emissions (within 15 to 30 seconds) after the vehicle has been preconditioned at about half throttle for about 15 seconds.

3. "AS RECEIVED" TEST RESULTS

3.1 Testing at the Maryland I/M Lane

EG&G screened 1983 and later model year passenger cars that had just been tested at the official Maryland I/M Stations #7 and #8 (in Prince George's County). These two stations were selected because of their proximity to the EG&G's VTL. In order to assure that the selection of cars for this program was a representative cross-section, EG&G personnel attempted to examine every 1983 and newer GM vehicle and every 1984 and newer Chrysler whose OBD codes could be "read" using an OTC Monitor 2000 scanner. Also, the 49 sampling days were scheduled to (1) avoid the high volume days and (2) occur randomly on the other days of the week that those two stations were open. However, not all eligible vehicles received OBD screening, and no estimate is available on the percentage of captured vehicles. Limiting factors included the effectiveness with which Maryland lane personnel referred candidate vehicles, self-selection by vehicle owners, and the availability of an open slot in EG&G's queue at the moment a candidate vehicle emerged from I/M testing.

EG&G continued to OBD test at the Maryland inspection stations until 27 cars were recruited for additional testing (see "Distribution of the Test Fleet" on page 15).

EG&G's personnel attempted to obtain the codes from a total of 1,269 vehicles that had just been tested in the Maryland I/M program, of which both the I/M tailpipe and OBD codes were obtained for 1,067. The remaining 202 vehicles were excluded at this point in the program (although, one of those 202 was subsequently tested at VTL); 79 were vehicles whose codes should have been readable but were not, because:

- the technician could not access the connector (38 vehicles);
- the scanner would not interface with the vehicle's ECM, possibly due to faulty connectors (27 vehicles);
- power from the cigarette lighter was not available to operate the scanner (7 vehicles); and
- the engine compartment or the ECM had been damaged (7 vehicles).

If this trend were to continue, then 7% of the candidate fleet (i.e., 79/(1067 + 79)) could be lost to an OBD testing program. The remaining 122 vehicles were excluded from this program for various reasons:

- the car either was not equipped with OBD, or the scanner was not designed to read the codes of that model (84 cars);

- either the I/M test was a retest or the car had just been repaired (14 cars) (one of those 14, vehicle 0541, was unintentionally recruited for additional testing at VTL);
- the model year of the car was not correct (12 cars);
- the vehicle owner was not interested (10 cars); and
- the engine had been replaced with a non-OBD system (2 cars).

3.1.1 Distribution of the Test Fleet

The descriptions of the 1,067 test vehicles are given in Appendix A. A summary of those descriptions appears below in Table 3.1:

Table 3.1

Composition of the Sample Fleet Tested at I/M Lanes by Manufacturer and Fuel Metering and Model Year

Manufacturer	Model Year	----- Fuel Metering ----- Fuel Injected	Carbureted	Totals
Chrysler Corp.	1984	8	2	10
	1985	17	8	25
	1986	30	3	33
	1987	16	4	20
	84-87	71	17	88
Ford Motor Co.	1983	1	2	3
	1984	27	9	36
	1985	43	0	43
	1986	47	1	48
	1987	54	0	54
	1988	6	0	6
	83-88	178	12	190
General Motors	1983	23	66	89
	1984	47	121	168
	1985	68†	96	164
	1986	153	87††	240
	1987	82	17	99
	1988	29	0	29
	83-88	402	387	789
TOTALS:	83-88	651	416	1,067

† Includes three 4.3 liter GM vans.
†† Includes two 4.3 liter GM vans.

To obtain some of the vehicle description data (Appendix A), it was necessary to supplement the data gathered by the EG&G's personnel. We used two computer programs to obtain information from the individual Vehicle Identification Numbers (VINs). One program was written for EPA, under an earlier contract, by Energy and Environmental Analysis, Inc. The second program (named "VINDICATOR") was written by the Highway Loss Data Institute (Washington, DC) and was made available to EPA. The results of that decoding are given in Appendix A.

The distribution, by the test results at the lane, of those same 1,067 vehicles appears below as the first line in Table 3.2 (in which "Fail" OBD test means the vehicle has a stored trouble code). The 100 vehicles that had stored codes (95 of which were eligible for this program) and the 58 vehicles that failed the I/M test (39 of which were eligible for this program) are identified in Appendices F and G, respectively. Stratifying by fuel metering system, we obtain the next two distributions in Table 3.2. Since the preponderance of GM vehicles in this study (73.9% of the sample) might be obscuring some of the differences, the analysis was again repeated after stratifying by manufacturer to produce the final nine distributions below.

Table 3.2

Distribution by Strata of the I/M and OBD Test Results

		--- IM/OBD Test Results --			
Strata	Size	Pass/ Pass	Pass/ Fail	Fail/ Pass	Fail/ Fail
None (Entire Fleet)	1,067	88.6%	7.8%	2.5%	1.1%
All Fuel Injected Vehicles	651	84.9%	11.1%	2.5%	1.5%
All Carbureted Vehicles	416	94.2%	2.6%	2.6%	0.5%
Chrysler Vehicles:					
- Carbureted Vehicles	17	94.1%	5.9%	0.0%	0.0%
- Fuel Injected Vehicles	71	74.6%	15.5%	4.3%	5.6%
- All Chrysler Vehicles	88	78.4%	13.6%	3.4%	4.5%
Ford Vehicles:					
- Carbureted Vehicles	12	75.0%	16.7%	0.0%	8.3%
- Fuel Injected Vehicles	178	73.0%	20.8%	5.1%	1.1%
- All Ford Vehicles	190	73.2%	20.5%	4.7%	1.6%
GM Vehicles:					
- Carbureted Vehicles	387	94.8%	2.1%	2.8%	0.3%
- Fuel Injected Vehicles	402	92.0%	6.0%	1.0%	1.0%
- All GM Vehicles	789	93.4%	4.1%	1.9%	0.6%

One obvious manufacturer related difference is that the carbureted GM vehicles appear to react differently to the two tests than do the Ford or Chrysler vehicles. (That is, only 2.4% of the carbureted GM sample exhibited stored codes while 3.1% failed the tailpipe idle I/M test. With Ford and Chrysler, the proportions were reversed with fewer failing I/M than exhibiting stored codes.) However, the Ford and Chrysler samples are too small to be certain of the pattern.

Table 3.1 indicates that this sample of 1,067 vehicles is composed of 1,062 passenger cars and five light-duty trucks (i.e., GM vans). Each of those vans (vehicles 504, 653, 957, 1230, and 1275) both passed the Maryland I/M test and had no stored trouble codes.

If we assume that the Maryland I/M tests and EG&G's OBD checks are representative of how centralized I/M and OBD programs would perform, we can then project the failure rates given in Table 3.2 for the OBD-equipped vehicles (i.e., GM, Ford, and Chrysler) targeted in this study (see Table 3.3). The confidence intervals were calculated by assuming a binomial distribution (i.e., a vehicle either passed or failed each test). The non-overlapping confidence intervals strongly suggest that the difference in failure rates for the centralized tailpipe I/M programs and the OBD programs is real, not just a result of this specific sample. In fact, the data suggest that the failure rate for the OBD check is two to three times the failure rate for the tailpipe idle test.

Table 3.3

Failure Rates by Type of I/M Program

Program	Failure Rate	90% Confid. Interval
Centralized Tailpipe I/M	3.66%	2.7% - 4.6%
OBD Only I/M	8.90%	7.4% -10.4%
Tailpipe and OBD Combined	11.43%	9.8% -13.1%

However, the data in Table 3.2 strongly suggest that the carbureted and fuel injected vehicles respond differently to these two types of tests and that differences exist among these three manufacturers. Repeating the above calculations separately first for the carbureted and fuel injected vehicles and then by manufacturer, we obtain Table 3.4.

Table 3.4

Failure Rates by Type of I/M Program
by Manufacturer and Fuel Metering System

Program	Mfr	-- Fuel Injected -- Fail. Rate	90% Confid. Interval	--- Carbureted --- Fail. Rate	90% Confid. Interval
Tailpipe I/M:					
	All	4.0%	2.7% - 5.3%	3.1%	1.7% - 4.6%
	Chry	9.8%	4.0% -15.7%	0.0%	0.0% - 9.4%
	Ford	6.2%	3.2% - 9.2%	8.3%	0.0% -21.5%
	GM	2.0%	0.8% - 3.2%	3.1%	1.6% - 4.6%
OBD Only I/M:					
	All	12.6%	10.4% -14.8%	3.1%	1.7% - 4.6%
	Chry	20.8%	13.1% -29.1%	5.9%	0.0% -15.3%
	Ford	21.9%	16.8% -27.0%	25.0%	4.4% -45.6%
	GM	7.0%	4.8% - 9.1%	2.3%	1.1% - 3.6%
Combined:					
	All	15.1%	12.7% -17.4%	5.8%	3.8% - 7.7%
	Chry	25.4%	16.8% -33.9%	5.9%	0.0% -15.3%
	Ford	27.0%	21.4% -32.5%	25.0%	4.4% -45.6%
	GM	8.0%	5.7% -10.2%	5.2%	3.3% - 7.1%

A casual inspection of the projections in Table 3.4 for the fleet (i.e., not stratifying by manufacturer) suggests:

- Among the fuel injected vehicles, the failure rate on the OBD check was about three times higher than on the tailpipe idle test.
- The failure rate on the tailpipe idle test for the fuel injected vehicles was virtually the same as for the carbureted vehicles.
- The failure rate on the OBD check for the fuel injected vehicles was about three times higher than for the carbureted vehicles.
- Among the carbureted vehicles, the failure rate on the OBD check was essentially the same as on the tailpipe idle test.

The projections by the individual manufacturers confirms all of the trends for GM, and the first of those observed trends for the other manufacturers. It is difficult to determine, with

a high degree of confidence, if the last three trends hold true for Ford or Chrysler due to the small sample sizes (especially among the carbureted vehicles). (The reason for first calculating the projections for all manufacturers in Table 3.4, instead of going directly to projections for each of the three individual manufacturers, was to avoid the uncertainties that those small samples introduce. That is also the reason we generated Table 3.5 instead of just producing Table 3.6.)

3.1.2 Malfunction Indicator Lights

It has been suggested that owners of vehicles equipped with a Malfunction Indicator Light (MIL) would seek service immediately after a malfunction that triggers the MIL occurs. If that were to occur, then relatively few codes would be present at the time of the annual I/M test. The individual manufacturers (i.e., Chrysler, Ford, and GM) have reported to EPA's Certification Division that:

- all the GM vehicles in this study were equipped with MILs,
- all the fuel injected Chrysler vehicles in this study were equipped with MILs,
- none of the carbureted Chrysler vehicles in this study was equipped with MILs, and
- none of the Ford vehicles in this study was equipped with MILs.

Based on that information, we generated Tables 3.5 (below) and 3.6 (on the following page) comparing the incidence of trouble codes with whether the vehicle is equipped with an MIL.

Table 3.5

Effect of MILs on OBD Failure Rates
by Fuel Metering System

Fuel Meter	MIL ?	Size	Trouble Code Rate	90% Confid. Interval
F.I.	Yes	473	9.1%	6.9% - 11.2%
F.I.	No	179	21.9%	16.8% - 27.0%
Carb	Yes	386	2.3%	1.1% - 3.6%
Carb	No	29	13.8%	3.2% - 24.4%

Although the data in Table 3.5 suggest that equipping a vehicle with an MIL reduces the likelihood that vehicle would have a stored trouble code at the time of its annual I/M test, the results in Table 3.6 are mixed, possibly due to the small sample sizes (e.g., carbureted vehicles without MILs). Those data in Table 3.6 suggest that the differences observed in the Table 3.5 data are probably the result of differences among the manufacturers.

Table 3.6

Effect of MILs on OBD Failure Rates
by Manufacturer and Fuel Metering System

Mfr	Fuel Metr	MIL ?	Smpl Size	OBD Fail Rate	90% Confid. Interval
Chry	F.I.	Yes	71	20.8%	13.1% - 29.1%
Chry	Carb	No	17	5.9%	0.0 - 15.3%
Ford	F.I.	No	178	21.9%	16.8% - 27.0%
Ford	Carb	No	12	25.0%	4.4% - 45.6%
GM	F.I.	Yes	402	7.0%	4.8% - 9.1%
GM	Carb	Yes	387	2.3%	1.1% - 3.6%

3.1.3 Trouble Codes

Summarizing the data on the number of stored trouble codes for each of the vehicles in this program (see Appendix F), we obtain Table 3.7 (on the following page). Examining Table 3.7, we observe that of the 95 vehicles which had stored codes, the vast majority (i.e., almost 70%) had only a single stored code, and 80% had no more than two codes. Of the seven vehicles that had at least five stored codes, only one was recruited for additional testing at VTL (vehicle 528), and none of those six trouble codes exhibited by that vehicle at the I/M lane were present when the car was examined at VTL. For some of those seven vehicles, the large number of codes suggests that the ECMs might have been defective. For the remaining 88 cars (i.e., those having no more than four codes), the most common codes were for the oxygen sensor or the oxygen circuit (25 vehicles), for the EGR system (16 vehicles), for the throttle position sensor (10 vehicles), and for the vehicle speed sensor (9 vehicles). No other code occurred on more than eight percent of those 88 vehicles (i.e., no more than seven times).

Table 3.7

Number of Trouble Codes Per Vehicle
by Manufacturer and Fuel Metering

Number of Codes	----GM---- Carb	FI	-Chrysler- Carb	FI	---Ford--- Carb	FI	Totals
1	9	19	0	13	2	23	66
2	0	4	0	2	0	4	10
3	0	0	1	0	1	5	7
4	0	1	0	0	0	4	5
5	0	0	0	0	0	1	1
6	0	1	0	0	0	0	1
7	0	0	0	0	0	1	1
8	0	3	0	0	0	1	4
TOTALS:	9	28	1	15	3	39	95

GM has suggested that the code for the vehicle speed sensor could be set simply by the off-idle portion of an I/M test (i.e., either a one-half throttle mode or a 2500 rpm mode). Maryland uses a one-half throttle mode to precondition the vehicles. Of the 95 vehicles that had stored codes, only seven had codes only for the vehicle speed sensor; thus, deleting the vehicles that only had a code stored for the vehicle speed sensor would not significantly reduce the estimate of 8.90% (from Table 4.5) of the applicable fleet identified by OBD. However, of those seven vehicles, only two (vehicles numbered 154 and 528) were recruited for additional inspection at VTL, and the vehicle speed sensor code for vehicle number 154 was legitimate (see the mechanic's comments in Appendix E). GM's observation also raises, for future discussion, the more general issue of what types of fault codes should be treated as failures by an OBD-I/M program.

3.2 "As Received" Testing at VTL

Of the 1,067 vehicles (summarized in Table 3.2) which were successfully tested at the Maryland I/M lanes, 26 were recruited for additional testing at VTL. A twenty-seventh car, vehicle number 541, was also recruited for testing at VTL; however, that vehicle should not have been recruited since its I/M test was not its initial test and since commercial repairs (tune-up with replacement of oxygen sensor) had been performed between those two official I/M tests.

EG&G was instructed to recruit, for testing at VTL, a sample of 27 vehicles equally distributed among the following three categories:

1. failed its official I/M test and had a computer trouble code other than one which indicates normal operation,

2. failed its official I/M test but did not have a computer trouble code other than one which indicates normal operation, or

3. passed its official I/M test and had a computer trouble code other than one which indicates normal operation.

3.2.1 Distribution of the Test Fleet

The composition of that sample of 27 vehicles (by failure category, manufacturer, and fuel metering type) appears below in Table 3.8.

Table 3.8

Composition of the Sample Fleet Tested at VTL by Manufacturer, Fuel Metering, and Failure Type

Failure Category: Tailpipe /OBD	Carbureted GM	---- Fuel-Injected --- GM	Ford	Chrysler	Total
Fail/Fail	0	3	1	4*	8*
Fail/Pass	5	2	1	2	10
Pass/Fail	3	3	2	1	9

* One of those 4 Chryslers (i.e., veh. 541) should not have been recruited since it had been repaired prior to the I/M test.

From Table 3.8, we again note that the GM vehicles comprised all of the carbureted vehicles and about half of the fuel injected vehicles in each category that were FTP tested. This preponderance of GM vehicles has the potential to skew the results of the analyses.

Of the 96 vehicles that were eligible but not recruited by EG&G for additional testing, only eight (vehicles numbered 349,

375, 1160, 1182, 1217, 1312, 1317, and 1322) were rejected (after the owners had indicated their willingness to participate in further testing) because the quota for their category ("OBD Only" failures) had been reached. As in most surveys, one of the most common reasons for including or excluding vehicles was the interest of the participants. Eighteen of the vehicle owners did not wish to loan their cars to EG&G for the FTP portion of this program. Also, 66 vehicles, whose owners were interested in participating further, were rejected because they could not be tested in the allotted time. (We required EG&G to recruit the vehicles for testing at VTL by the end of the week following the initial lane inspection.) This inability to quickly test those 66 vehicles was often caused by VTL's being at capacity (possibly because other vehicle owners already elected to participate). Thus, owner self-selection played a role in determining which vehicles were FTP tested.

3.2.2 Distribution of the FTP Emissions of the Test Fleet

The individual FTP results on the 27 vehicles tested at VTL appear in Appendix C and are summarized below in Table 3.9.

Table 3.9

Initial FTP Emissions (Means and Ranges) by Failure Type and by Fuel Metering

Failure Category: Tailpipe/ OBD	Fuel Metr	No. at VTL	% of Smp*	---HC (g/mi)--- Min	Max	Mean	-----CO (g/mi)----- Min	Max	Mean
Fail/Fail	Carb	0	1.6	NA	NA	NA	NA	NA	NA
	F.I.	8	8.2	0.58	4.09	2.11	6.22	64.60	29.17
	F.I.**	7	8.2	0.58	4.09	2.07	6.22	64.60	27.39
Fail/Pass	Carb	5	9.0	0.33	16.49	5.99	4.79	312.55	103.03
	F.I.	5	13.1	0.29	3.05	1.50	4.20	76.21	34.91
Pass/Fail	Carb	3	9.0	0.37	0.95	0.61	2.80	3.42	3.21
	F.I.	6	59.0	0.19	7.46	1.59	1.31	133.33	27.75

* Percent of the fleet of 122 vehicles identified by either idle emissions or by OBD codes.
** Excludes vehicle no. 541

Seven vehicles require special note in the discussion of "as received" FTP emissions:

1. A 1984 Pontiac Grand Prix (No. 224) failed the tailpipe I/M test. But, it had no stored computer trouble codes (not even code '45' for rich operation) even though the inspection after the first FTP indicated extremely rich operation. Since that vehicle had as received emissions (FTP HC 16.49 g/mi and FTP CO 312.51 g/mi) that were substantially higher than those of the other 26 test vehicles, care must be taken so that its inclusion does not obscure the analyses.

2. A 1986 Dodge Aries (No. 388) failed the tailpipe I/M but had no stored computer trouble codes at the Maryland I/M lane. However, when it was inspected at VTL (eight days and 150 miles later), a trouble code for the oxygen sensor had been set. In the following analyses, this vehicle is included among those that failed the tailpipe I/M but had no trouble codes. An alternative analysis could have been performed in which this vehicle is included among those that both failed the tailpipe I/M and had stored trouble codes.

3. A 1986 Plymouth Caravelle (No. 259) had a disconnected wire to its oxygen sensor, and yet no computer trouble code was stored.

4. A 1986 Oldsmobile Calais Supreme (No. 528) passed its official I/M test but had eight stored trouble codes at the time of that I/M test. However, when the vehicle arrived at VTL, no trouble codes were stored. Also, it had passing FTP emissions.

5. A 1986 Chrysler New Yorker (No. 541) was accepted into the program as having trouble codes and failing I/M. Only after testing had begun at VTL did we discover that its I/M failure was not its initial test. In fact, just one day prior to its I/M failure, the vehicle was tuned-up and had its oxygen sensor replaced. If those commercial repairs reduced the emissions, then the inclusion of this vehicle may actually understate the average "as received" emissions.

6. A 1984 Chevrolet Caprice Classic (No. 135) and a 1984 Ford Tempo (No. 1016) were the only two carbureted vehicles examined at the Maryland I/M lanes that both failed the tailpipe I/M and had stored computer trouble codes. Both of these vehicles were recruited by EG&G for additional testing. However, when the EG&G mechanic examined each:

   - Vehicle 135 was rejected because it had a hole in its catalyst that prevented accurate testing.

- Vehicle 1016 was rejected because it had major engine problems (i.e., needed a valve job).

Both of those conditions would have significant effects on the overall emissions of that category of vehicles, but we cannot quantify those effects since these vehicles were not FTP tested.

A casual inspection of the data in Appendix C shows:

1. Of the 12 vehicles with initial FTP CO emissions in excess of 15.00 g/mi, 11 failed the Maryland (tailpipe) I/M test. Five of those 11 also had stored codes. Only one "OBD Only" car had CO emissions this high. Of the 14 vehicles with FTP CO emissions in excess of 10.00 g/mi, only two were <u>not</u> detected by the (tailpipe) idle test. (As before, no FTP tests were performed on vehicles that passed I/M and had no codes.)

2. Of the 13 vehicles with initial FTP HC emissions in excess of 1.00 g/mi, 12 failed the Maryland (tailpipe) I/M test. Six of those 12 also had stored codes. Only one "OBD Only" car had HC emissions this high. (Cars that passed I/M and had no codes were not FTP tested.)

3. None of the 18 vehicles that failed the official I/M tailpipe test was an error of commission vehicle (i.e., had passing FTP emissions). However, two vehicle (Nos. 207 and 528) of the 17 that were identified by OBD were error of commission vehicles.

4. The highest emitting fuel injected vehicle, which also was the third dirtiest FTP-tested vehicle (vehicle no. 1150), was identified only by OBD. However, the OBD targetted repairs were not effective in lowering the FTP emissions. (More on this vehicle on page 24.)

3.3 Statistical Modeling of the FTP As-Received Results

3.3.1 Limitations of Modeling

Great care must be taken, when extrapolating from a sample to the entire population, to be certain that the sample is a random sample. However, our sample of 26 (or 27) vehicles has the following short-comings:

- Lack of Randomness:

  - Only vehicles produced by three manufacturers were tested due to equipment constraints.

  - Even for those three manufacturers, the distribution of test vehicles was not random.

- As discussed on page 4, selecting vehicles from a part of the country already subject to an I/M program has the potential to skew the data.

- Lack of Coverage:

  - Although the data indicate there are both significant differences among those three manufacturers as well as significant differences between the behavior of carbureted and fuel injected vehicles, of the 18 potential strata:

    - 4 have no FTP data,
    - 3 have only a single FTP, and
    - 3 have only two FTPs.

These short-comings, at the very least, call into question any attempt to extrapolate these results to the entire fleet. However, since it is not likely that supplemental data will soon be available, we will extrapolate these data to obtain preliminary results. But, we will qualify these estimates by emphasizing the weaknesses resulting from our limited sample.

3.3.2 Modeling

From the data in Appendix C, we can see that the median "As Received" FTP emissions (both HC and CO) are substantially less than the corresponding mean values in both the stratum containing the nine OBD-only vehicles and in the stratum containing the 10 tailpipe-only vehicles. Also, although the emissions must all be non-negative, the standard deviations exceeded the corresponding mean emission values in each of those strata. (If the emissions were normally distributed, then approximately one-sixth of the fleet would have emissions less than the difference of the mean minus the standard deviation, which, in these cases would be negative.) These conditions suggest that the distributions of the HC and CO emissions in those two strata are asymmetric (specifically, positively skewed). The data from the eight vehicles in the remaining stratum (i.e., vehicles that both failed I/M and had trouble codes) do not require that those distributions must necessarily be asymmetric.

The lognormal distribution is the type of positively skewed distribution that historically has been used to describe emissions.[6] In that distribution, the logarithms of the emissions (rather than the emissions themselves) are assumed to be normally distributed. Calculating the means and standard deviations of the logarithms of the emissions we obtain the data in Table 3.10.

Table 3.10

Means and Standard Deviations of Logarithms of Initial FTP Emissions by Failure Type

Failure Category: Tailpipe/ OBD	FTP Sample Size	--- ln(HC) ---- Mean	St Dev	--- ln(CO) --- Mean	St Dev
Fail/Fail	8	0.5671	0.6987	3.1313	0.7926
Fail/Fail*	7	0.5230	0.7426	3.0460	0.8156
Fail/Pass	10	0.4919	1.3945	3.1815	1.5896
Pass/Fail	9	-.5018	1.0456	1.8247	1.3447

* Excludes vehicle number 541.

If we denote the mean in log-space by μ and the variance in log-space by σ^2, then we can convert the preceding data back into emission-space using the following formulae [6,7]:

$$\text{Mean} = \exp(\mu + {}^1/_2\sigma^2)$$
$$\text{Median} = \exp(\mu)$$
$$\text{Mode} = \exp(\mu - {}^1/_2\sigma^2)$$

Thus, we obtain the results in Tables 3.11 and 3.12 (on the following page). From Table 3.11, we can see that the decision to include or to exclude vehicle 541 has only a moderate effect on the predicted distributions of the emissions of the category of vehicles that both failed the tailpipe I/M test and had stored codes. Since that category comprises less than a third of the vehicles that failed the tailpipe I/M test and only about an eighth of the vehicles that had stored codes, the decision to include or to exclude vehicle 541 has only a minimal effect on the predicted distributions of the overall emissions. For those reasons, we will include vehicle 541 in the remaining analyses. Comparing the sample values (Appendix C) with those predicted values, we observe that these distributions closely model the actual data.

Table 3.11

Predicted Distributions of Initial FTP Emissions by Failure Category

Failure Category: Tailpipe /OBD	Emiss.	Mode	Median	Mean
Fail/Fail	HC	1.381	1.763	2.251
	CO	16.730	22.904	31.356
Fail/Fail*	HC	1.281	1.687	2.223
	CO	15.081	21.031	29.329
Fail/Pass	HC	0.619	1.635	4.324
	CO	6.808	24.083	85.193
Pass/Fail	HC	0.350	0.605	1.046
	CO	2.511	6.201	15.316

* Excludes vehicle 541.

Table 3.12

Predicted Distributions of Initial FTP Emissions by Failure Category For a Hypothetical Fleet of 100,000 Vehicles

Failure Category: Tailpipe /OBD	Emiss.	Number of Vehicles: At Or Below Std	Between 1 & 3 x Std	Between 3 & 5 x Std	Above 5 x Std
Fail/Fail	HC	20	202	437	466
	CO	9	164	225	727
Fail/Pass	HC	407	653	368	1,103
	CO	276	468	302	1,485
Pass/Fail	HC	2,762	3,080	990	947
	CO	2,551	2,458	1,007	1,763

Combining the predicted means of the emissions by failure type (Table 3.11) with the distribution of the test fleet (Table 3.2), we can characterize the FTP emissions of the "failing" vehicles for each type of I/M program. Those

estimates appear below in Table 3.13. Considering that the fuel injected and carbureted vehicles appear to respond differently to each of these I/M programs (from Table 3.4), it would be preferable to repeat the statistical modeling separately for each fuel metering system and then use the distributions from Table 3.2 to determine the following estimates. Unfortunately, not each of the six categories has a sufficient number of FTPs (e.g., the carbureted vehicles that both failed I/M and had stored trouble codes) to permit that level of detail. True, but can at least do fuel injected, as the tailpipe & OBD columns are driven ~~primarily~~ substantially by the carb results, while the combined column is all fuel injected. Doing a fuel injected only comparison will remove the influence of the carb. vehicles. This is important for two reasons 1) The computerized and hence OBD system is generally less sophisticated on carb vehicles. Thus, the latest OBD technology is more accurately represented by fuel injected vehicles. 2) ~~While the dis currently supports that current OBD systems shouldn't be included in the program~~ future vehicles will be almost exclusively fuel injected.

Table 3.13

Predicted Distributions of Initial FTP Emissions of Failing Vehicles by I/M Program Type

Mean Emissions of Failed Vehicles	I/M Program: Tailpipe	OBD	Combined
HC (g/mi)	3.69	1.20	1.89
CO (g/mi)	68.63	17.34	32.36

Thus, while a hypothetical OBD-I/M program would likely fail from two to three times as many vehicles as a Maryland-type I/M program (pg. 12), the higher average emissions of the vehicles identified by the tailpipe idle test appears to compensate.

Rather than examining simply the average emissions, it is more useful to compare the emissions, of the identified vehicles, that exceed some "repairable" limit (e.g., the FTP standard, or 50 percent above the FTP standard, or twice the FTP standard). Combining the means and the variances of the logarithms of the emissions by failure type (Table 3.10) with the distribution of the test fleet (Table 3.2), we can characterize the excess FTP emissions of the "failing" vehicles for each type of I/M program in Table 3.14 (on the following page). Combining the estimated failure rates from Table 3.3 with the predictions of excess emissions from Table 3.14, we note that:

- A tailpipe (idle) I/M identifies vehicles that on average produce more excess FTP emissions than the average vehicle identified by an OBD program:
  - The increase in excess HC ranged from 58% (where excess is the FTP HC > 0.41) to 112% (where excess is the FTP HC > 1.00).

- The increase in excess CO ranged from 82% (where excess is the FTP CO > 3.40) to 123% (where excess is the FTP CO > 10.00).

- Supplementing a tailpipe (idle) I/M with an OBD program produces only a moderate increase (over a tailpipe program) in the excess emissions identified:

  - The increase in excess HC ranged from 32% (where excess is the FTP HC > 0.41) to 45% (where excess is the FTP HC > 1.00).

  - The increase in excess CO ranged from 33% (where excess is the FTP CO > 3.40) to 41% (where excess is the FTP CO > 10.00).

Table 3.14

Predicted Distributions of Excess Initial FTP Emissions of Failing Vehicles by I/M Program Type

	I/M Program		
	Tailpipe	OBD	Combined
Average Excess FTP HC for:			
FTP HC > 0.41 g/mi	3.20	0.83	1.49
FTP HC > 0.61 g/mi	3.03	0.71	1.36
FTP HC > 0.82 g/mi	2.87	0.61	1.25
FTP HC > 1.00 g/mi	2.74	0.53	1.16
Average Excess FTP CO for:			
FTP CO > 3.40 g/mi	62.36	14.02	28.12
FTP CO > 5.10 g/mi	60.82	12.90	26.92
FTP CO > 6.80 g/mi	59.37	11.94	25.87
FTP CO > 10.00 g/mi	56.83	10.42	24.16

Before using the results of these projections, it is important to recall the constraints imposed by the limitation of our sample. (See Section 3.3.1, pages 18-19.)

3.4 Short Test Results

For the 27 vehicles tested at VTL, the emission results on various short tests (i.e., the official Maryland I/M test, the Four-Mode Test, and the Restart Test) are given in Appendix H. The short tests performed by our contractor did not duplicate

the official I/M tests because of differences between the test procedures. Specifically, the official I/M tests were performed at the I/M lane under uncontrolled ambient conditions, with uncontrolled preconditioning, and using tank fuel; while the short tests performed by our contractor's laboratory under controlled ambient conditions, following the FTP (i.e., controlled preconditioning), and using Indolene fuel. With the limitations that these testing differences impose, we can consider comparisons between:

- the official I/M test result (pass/fail) and the idle mode of the Restart Test for the four Fords and

- the official I/M test result and the second idle mode of the Four-Mode Test for the 23 non-Fords. (Short-tests were not performed on a non-Ford, vehicle number 541, in its "as received" condition because its idle speed would not drop below 1600 rpm.)

With these caveats, we observe that three-fourths of the pass/fail determination were repeatable (37 out of the 49 possible cases). However, the repeatability was considerably higher among the official passing I/M tests than among the failing tests, specifically:

- Of the 27 vehicles tested at VTL, only vehicles numbered 067 and 541 "failed" their comparable idle modes while passing the corresponding official I/M tests (i.e., 92.6% agreement on passing scores).

    - All of the nine vehicles that passed their initial official I/M test (i.e., the OBD-only vehicles) also "passed" on their comparable short-test idle mode.

    - Of the 18 vehicles that passed their official I/M retest (i.e., the 18 vehicles that initially failed their official I/M test and then passed after repairs), 16 also "passed" on their comparable short-test idle mode.

- Of the 50 official I/M tests, 49 had comparable idle modes performed. And, of those 49 "paired" tests, 22 were failing official I/M tests. Of those 22 failing I/M tests, 12 (54.5%) also "failed" on the comparable idle mode, or 45.5% of the failing I/M tests were change to passing after heavy (i.e., FTP) preconditioning. This percentage (45.5%) is higher, though comparable, to results from other EPA testing programs. [8]

4. VEHICLE MAINTENANCE

4.1 Vehicle Inspections

Following the initial FTP and preceding any repairs, an inspection of each vehicle's emission control components was performed. For the 27 cars which were FTP tested in this program, the inspections reportedly averaged three hours and 27 minutes (3:27), ranging from 2:30 to 5:20. The two vehicles that required the most time to inspect were vehicles No. 224 (the super-emitter) and No. 647 each having had numerous mechanical problems which required 4:45 and 5:20, respectively. The inspection times for the remaining 25 vehicles averaged 3:19, ranging from 2:30 to 4:00. Even with this time spent on inspections, the mechanic did not check for all conceivable malperformances.

4.2 Repair Procedures

All repairs were performed by EG&G. For each vehicle, EG&G compiled a list of the "trouble code targeted" repairs (obtained by reading the codes) and a list of the "tailpipe emissions targeted" repairs (i.e., those repairs identified during the inspection which were expected to reduce idle emissions). Since the inspection included reading the trouble codes, the "tailpipe targeted repairs" for these 15 vehicles included all of the "trouble code targeted" repairs.

After each significant repair, the mechanic performed a "Maryland type" I/M test (i.e., half-throttle operation for about 15 seconds followed by idle for 30 seconds). If two or more repairs were closely linked, then the Maryland-type I/M test was not performed until after the completion of that set of repairs. These tests were performed immediately following either the car being driven on the road (about 10 minutes at 35-40 mph) or the vehicle being operated at fast idle for 15 minutes. The 15 minutes at fast idle was used to precondition the vehicle only when the traffic was heavy.

The types of repairs performed depended upon the reason(s) the particular vehicle was selected for the program.

1. If the vehicle had failed its official I/M test but did not have a computer trouble code, then EG&G's mechanic decided which repairs and adjustments, in his judgment, would result in significant reductions in idle exhaust emissions and then proceeded to perform those repairs in a systematic fashion until the vehicle's idle emissions passed the I/M test cutpoints (1.20% CO and 220 ppm HC) with a cushion. Generally, disconnected hoses and wires were the first items to be repaired; beyond this, attention was given to the manufacturer's recommended procedures; though, those procedures were not necessarily followed precisely. The mechanic attempted to avoid any

unnecessary repairs and adjustments or actions which were, in his opinion, not likely to affect idle exhaust emissions of HC or CO.

Once EG&G's mechanic believed the vehicle's idle emissions would pass the official I/M test with a cushion, EG&G took the vehicle to be retested at the Maryland I/M lane. If the vehicle passed the official I/M retest, then the vehicle was retested (i.e., FTP and short tests) at EG&G and returned to the owner. If the vehicle did not pass the official retest, then EG&G continued with the repair process until the vehicle passed the official I/M test.

2. If the vehicle had passed its official I/M test but had an engine or emission related computer trouble code, then EG&G's mechanic performed the repairs related to the observed computer trouble code(s). Once the repairs were completed ("completion" of the repairs included the manufacturer's recommended on-road operation to reset the vehicle's adaptive memory), and OBD indication of normal performance was verified, EG&G retested the vehicle and returned it to the owner.

3. If the vehicle had failed its official I/M test and had a computer trouble code, then EG&G's mechanic first performed the repairs related to the observed computer trouble codes. Once these repairs were completed, EG&G retested (FTP and short tests) the vehicle, and then drove it to the Maryland I/M lane to be retested. If the vehicle passed the official I/M retest, then the vehicle was returned to the owner. If the vehicle had not passed the official I/M retest, then EG&G would continue with the remaining "tailpipe emissions targeted" repairs, as in the preceding first case. This situation occurred for five of the eight vehicles in this category, requiring repairs in addition to the OBD-targeted repairs to pass the official I/M retest. Thus, a third sequence test was performed for each of those five.

4.3 Types of Repair

The types of repairs performed appear in Appendix D. From those data, we see that the most frequently performed repairs were the following:

1. for the ten vehicles that failed tailpipe I/M but exhibited no stored codes:

    - 3-way electronics (oxygen sensors) on 5 vehicles,
    - ignition systems (spark plugs or plug wires) on 4 vehicles, and
    - fuel metering systems (of which 3 were fuel injectors) on 5 vehicles.

2. for the nine vehicles that passed tailpipe I/M but had stored codes:

    - 3-way electronics (two oxygen sensors, one throttle position sensor, one EGR position sensor, and one ECM) on 5 vehicles.

3. for the eight vehicles that both failed tailpipe I/M and had stored codes:

    - 3-way electronics (sensors) on all 8 vehicles (mostly oxygen sensors).

Thus, the single most common type of repair performed for the fleet in general was to the vehicles' oxygen sensors, even for the vehicles that did not have any stored trouble codes. However, there is no guarantee that it was always the proper repair simply because it was the most frequent. For example, two of the vehicles that failed tailpipe I/M with no stored codes (at the time of the I/M failure) had their oxygen sensors replaced, but:

- The mechanic noted that vehicle No. 067 (a 2.8 liter, fuel injected 1986 Chevrolet Camaro) was still exhibiting, after repairs, intermittently high idle HC in the same magnitude as its original I/M failure. Also, since the repairs (which included replacing the oxygen sensor and spark plugs) had no significant affect on FTP emissions, it is likely that the vehicle's original I/M failure was due to a problem that was unaffected by these repairs. Thus, replacing the oxygen sensor was probably not the appropriate repair.

- Vehicle No. 388 (a 2.2 liter, fuel injected 1986 Dodge Aries) first had its oxygen sensor replaced, but it continued to fail tailpipe I/M. Chrysler has found that defective injectors in this model cause rich operation, and Chrysler has issued both a voluntary recall and a technical service bulletin (TSB 18-57-86) for these models. That rich operation could explain the oxygen sensor trouble code which had been set by the time the car arrived at VTL. EG&G was able to correct the I/M failure by replacing the defective injector.

A third example is a vehicle that failed tailpipe I/M, had a stored code for its oxygen sensor, and then had that oxygen sensor replaced, but:

- The mechanic noted that vehicle No. 1221 (a 1986 Chevrolet Camaro) continued to exhibit its original problem. Also, replacing the oxygen sensor had no effect on the vehicle's FTP emissions.

4.4 Test Results after Maintenance

Examining the FTP emissions data (both prior to and following repairs) for all 27 test vehicles, we note:

1. The I/M-targetted repairs resulted in the emissions of most vehicles being reduced to near the FTP certification standard or better.

2. The largest reductions in emissions are, as expected, associated with the "dirtiest" cars (with the exception of vehicle number 1150).

3. Since the "dirtiest" cars were usually those identified by tailpipe I/M, the largest reductions in emissions were also associated with the cars that had failed the tailpipe I/M test.

4. The repairs to the "OBD Only" vehicles had, on average, little if any effect on their usually low FTP emissions.

Prior to reaching those conclusions, it was necessary to first examine the effects of the repairs within each of our three strata (failed I/M with/without stored trouble codes and passed I/M with stored trouble codes).

4.4.1 Vehicles Which Failed I/M but Exhibited No Stored Codes

Examining the FTP emissions (pages C-1 and C-2 of Appendix C) both prior to and following the I/M targetted repairs of the ten vehicles that failed the tailpipe I/M test but exhibited no stored codes, we note that for nine of those ten vehicles the I/M targetted repairs resulted in either:

- substantial reductions from the "As Received" FTP emissions or

- the "After I/M Repairs" FTP emissions being reduced to near the FTP certification standard or better.

The only exception to this observation, a 1984 Buick LeSabre (vehicle number 1321), had only a minor repair (i.e., adjusting idle speed) performed to pass the I/M test. However, that repair succeeded in increasing the already extremely high FTP HC and CO emissions. Since this vehicle was repaired during the final week of the program, it is possible that the mechanic felt rushed to complete the repairs. Additional repairs (i.e., beyond those performed for a tailpipe I/M program) were required to affect the FTP emissions.

From the data in Table 4.1 (which summarizes the data from pages C-1 and C-2 in Appendix C), we note that the average FTP HC and CO emissions after passing I/M of the nine vehicles (excluding vehicle 1321) are within five percent of the average

of all ten vehicles if, for vehicle 1321, the emissions after ALL repairs are substituted for the emissions after just the minimum repairs to pass I/M. This observation, along with the substantial increase in FTP emissions corresponding to the first repair, strongly suggests that simply adjusting the idle speed might not have been the appropriate repair.

Table 4.1

Average FTP Emissions of Test Vehicles
Failing Only Tailpipe I/M

Treatment of Data For Vehicle No. 1321	Test Sequence	FTP Emissions HC (g/mi)	CO (g/mi)	NOx (g/mi)
Use First FTP After Passing I/M:	After I/M Rps:	1.807	25.162	0.934
Exclude Veh 1321	After I/M Rps:	0.622	5.123	0.943
Use FTP After Additional Repairs:	After I/M Rps:	0.649	5.088	1.031

Thus, either with using all repairs for vehicle 1321 or with the exclusion of vehicle 1321, the I/M-targetted repairs to the vehicles that failed only the tailpipe I/M test reduced the average FTP HC and CO emissions to within 50 percent of the certification standards.

4.4.2 Vehicles Which Passed I/M but Exhibited Stored Codes

The OBD-targetted repairs to the nine vehicles that passed the tailpipe I/M test but exhibited stored codes resulted in only slight decreases in both FTP HC and CO. Before reaching that conclusion, it was necessary to determine how to deal with two vehicles (numbers 528 and 1150). The emissions for each of the four cases associated with the inclusion or exclusion of those two vehicles are given in Table 4.2 which summarizes the data from pages C-3 and C-4 in Appendix C.)

Eight of the nine vehicles that passed the tailpipe I/M test but exhibited stored codes were FTP tested following repairs. The ninth vehicle, a 1986 Oldsmobile Calais Supreme (No. 528), passed its official I/M test but had eight stored trouble codes at the time of that I/M test. However, when it arrived at VTL, no trouble codes were stored, and it had passing FTP emissions; hence, no repairs were performed. Thus, we can either:

1. include vehicle number 528 and calculate the average emissions both prior to and following repairs of all nine vehicles (in which case, the "As Received" FTP emissions of vehicle 528 would also be used as its emissions after repair) or

2. exclude vehicle number 528 and calculate the average emissions both prior to and following repairs of the remaining eight vehicles.

This approach would base the average emissions on the same number of "As Received" tests as "After Repair" tests.

If we exclude vehicle 528 from the as received tests, then the OBD-targetted repairs resulted in only slight decreases in both average FTP HC and CO, as shown in Table 4.2 (next page). Similarly, if we include its emissions also among the after repairs, then the OBD-targetted repairs resulted in the same slight decreases in both average FTP HC and CO. (Note, if we were to simply compare the average emissions of the nine as-received FTPs with the average of the eight FTPs performed after repairs, we might infer that a slight increase in average FTP HC and CO emissions was associated with the repairs to those vehicles. However, that observation is the result of comparing the average emissions from all nine "as received" tests with the average from only eight "after (OBD-targetted) repairs" tests, since vehicle 528 was not repaired.)

In the analysis of the effects of repair to the vehicles in this stratum, a second potentially troublesome vehicle is a 1986 Mercury Topaz (No. 1150) that had substantially higher FTP emissions than any of the other eight vehicles that also passed their official I/M tests. However the repair performed (replace the EGR position sensor) to clear the trouble code was totally ineffective in reducing the high FTP emissions. The mechanic suggested that its high FTP emissions might have been due to a faulty oxygen sensor and/or a faulty injector. Since its emissions, both as-received and after repairs, are an order of magnitude greater than the corresponding emissions from the other eight vehicles in this category, the inclusion of that vehicle could skew the results.

Thus, the OBD-targetted repairs on the vehicles that passed the tailpipe I/M idle test but exhibited stored trouble codes resulted in only slight changes in FTP emissions, specifically:

- reducing the FTP HC emissions by only 4.0 to 7.9 percent.
- reducing the FTP CO emissions by only 2.5 to 5.3 percent.
- increasing the FTP NO_x emissions by 7.4 to 8.0 percent.

Table 4.2

Average FTP Emissions of Test Vehicles
Failing Only OBD Check

Special Case Vehicles	Test Sequence	FTP Emissions HC (g/mi)	FTP Emissions CO (g/mi)	FTP Emissions NOx (g/mi)
Incl both 528 & 1150:	As Received:	1.263	19.569	0.716
	After OBD Rps:	1.167	18.550	0.770
Exclude 528 but Include 1150:	As Received:	1.381	21.663	0.768
	After OBD Rps:	1.272	20.516	0.829
Include 528 but Exclude 1150:	As Received:	0.489	5.349	0.764
	After OBD Rps:	0.469	5.215	0.821
Excl both 528 & 1150:	As Received:	0.513	5.710	0.830
	After OBD Rps:	0.490	5.557	0.896

4.4.3 Vehicles Which Failed I/M and Exhibited Stored Codes

Finally, for the eight vehicles that both failed the tailpipe I/M test and exhibited stored codes:

- The OBD-targetted repairs plus, if necessary, the additional I/M-targetted repairs resulted in reductions in both FTP HC and CO of approximately 60 percent, with about one-third of the total HC reductions and only one-tenth of the CO reductions due to those additional I/M-targetted repairs.

- The OBD-targetted repairs were sufficient for about one-third of those vehicles (i.e., three of the eight vehicles, or two of the seven vehicles excluding vehicle 541) to also pass the I/M test.

- Associated with the additional repairs beyond the OBD-targetted repairs required by five of the vehicles to pass the official I/M test:

  - Two vehicles had substantial reductions in FTP emissions.

  - One vehicle had slight reductions in FTP emissions.

  - Two vehicles had mixed results.

Finally, among the eight vehicles that both failed the tailpipe I/M test and exhibited stored codes, we must determine how to deal with vehicle 541. Vehicle 541 should not have been recruitted for this program (since it had already been partially repaired). However, the data (i.e., the average emissions either including or excluding 541, summarized in Table 4.3) suggest that its inclusion is acceptable. (That is, regardless of whether we include or exclude vehicle 541, we observe that all repairs reduced the average FTP HC by 63% with the OBD-targetted repairs accounting for two-thirds of that reduction; and all repairs reduced the average FTP CO by 60% with the OBD-targetted repairs accounting for 88 percent of that reduction.

Table 4.3

Average FTP Emissions of Test Vehicles
Failing Both Tailpipe I/M and OBD Check

Treatment of Data For Vehicle 541	Test Sequence	---- FTP Emissions ----- HC (g/mi)	CO (g/mi)	NOx (g/mi)
Include Veh. 541	As Received:	2.109	29.166	1.064
	After OBD Rps:	1.191	13.709	1.206
	After I/M Rps:	0.770	11.845	1.069
Exclude Veh. 541	As Received:	2.067	27.391	1.121
	After OBD Rps:	1.247	12.507	1.289
	After I/M Rps:	0.766	10.377	1.131

4.5 Cost of Repair

Using the repair time and the cost of parts reported by the mechanic, and assuming the typical cost of labor hours to be $35, we can estimate the average repair costs (Table 4.4). The repair time includes only the time the mechanic actually spent on repair work; it does not include either the inspection or diagnostic work which were quite extensive. (However, the inspection and diagnostic procedures were deliberately thorough to ensure that most possible malperformances were found; on many, if not most, of the cars the malperformances which were eventually repaired might have been found in less time.)

Combining the distribution of the test fleet (Table 3.2) with these estimated repair costs, we can estimate the total repair costs for each type of I/M program associated with a hypothetical fleet of 1,000,000 vehicles (Table 4.5).

Table 4.4

Estimated Average Repair Cost by Failure Type for Each Vehicle Repaired

Failure Category	---Average--- Parts ($)	Labor (hr)	Total ($)	% Over $200
Fail Tailpipe, With No Codes	56.50	1:30	109.00	10.0%
Pass Tailpipe, With Codes	43.89	0:40	67.22	11.1%
Fail Tailpipe, With Codes:				
OBD-Targetted Repairs (only)	48.75	0:49	77.19	0%
Plus I/M-Targetted Repairs	164.88	1:48	227.58	62.5%

Table 4.5

Estimated Total Repair Costs for 1,000,000 Vehicles by I/M Program Type

	--------- I/M Program ---------		
	Tailpipe	OBD	Combined
Estimated Number of I/M Failures:	36,550	89,030	114,340
Number of Vehicles Requiring Repairs in Excess of $200	9,560	8,630	18,190
Estimated Total Cost of Repairs ($K)	5,320	6,100	10,550

While the cost of the I/M-targetted repairs to the individual vehicles repaired tended to be more expensive than the OBD-targetted repairs (from Table 4.1), the smaller number of tailpipe failures resulted in the total (i.e., fleet) repair cost being slightly less (12.8%) for the tailpipe I/M program than for the OBD program (from Table 4.2).

5. CONCLUSIONS

Six preliminary qualitative conclusions from this study are:

1. Two to three times as many 1983 and newer vehicles equipped with current OBD designs would fail an OBD test than would fail a tailpipe I/M test similar to Maryland's I/M test.

2. The additional vehicles identified by a supplemental OBD check would not contribute any significant emission excess or emission reduction, because the vehicles that passed I/M but did have stored trouble codes tended, on average, to be the cleanest.

3. The I/M-targetted repairs tended to be both more effective in reducing FTP emissions and more costly than did the OBD-targetted repairs.

4. Any effect on the OBD failure rates of equipping vehicles with Malfunction Indicator Lights (MILs) was obscured by differences among the manufacturers and the small sample sizes.

5. Almost all of the vehicles that passed the official I/M test also tended to "pass" a similar (though not identical) test at the contractor's laboratory.

6. Slightly over half the vehicles that failed the official I/M test also tended to "fail" a similar (though not identical) test at the contractor's laboratory. The differences in preconditioning may account for the fact that almost half of the failing official I/M tests produced passing results at the contractor's laboratory.

California has published regulations that would expand OBD capabilities beginning with the 1994 model year. This change would drastically alter the conclusions of this program and, thus, would require additional study.

EPA is also working on regulations requiring much more sophisticated OBD systems nationally ~~beginning~~ targeted for ~~with~~ the 1994 model year.

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- Systems Control, Inc. (the contractor which operates the Maryland I/M testing) and the Motor Vehicle Administration of the Maryland Department of Transportation for permitting the EG&G personnel to (OBD) test the vehicles at the official I/M stations.

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APPENDIX A

Description of the 1067* Vehicles Tested

Sorted by Vehicle Control Number

* A 1,068TH vehicle (0541) that was inadvertently recruited for FTP testing is also included.

Description of the 1068 Test Vehicles
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	I/M Lane HC	I/M Lane CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	Engine No. Cyl	Engine Displacement/ Fuel Metering	Engine Family (if Availbl)	I/M Test Date	I/M Test Stat/ Lane	I/M Test Time
0001	NO	6	0.00	P	85	GM	CHEV	CHEVETTE	23,440	4	98(1.6L)/2bbl	F1G1.6V2NEA2	08/14/87	7/3	09:05
0002	NO	23	0.03	P	86	GM	CHEV	CAVALIER Wgn	13,137	4	122(2.0L)/FI	G1G2.0V5XAG2	08/14/87	7/3	09:07
0003	NO	5	0.00	P	83	GM	BUIC	PARK AVENUE	23,000	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/14/87	7/3	09:45
0004	NO	7	0.00	P	85	GM	PONT	GRAND SAFARI Wgn	20,720	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/14/87	7/3	10:00
0008	NO	21	0.00	P	85	CHRY	DODG	ARIES	93,923	4	135(2.2L)/2bbl	FCR2.2V2HDH5	08/14/87	7/3	10:46
0009	NO	6	0.00	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	17,763	6	231(3.8L)/FI	G4G3.8V8XEB4	08/14/87	7/3	11:14
0012	NO	13	0.00	P	85	GM	BUIC	REGAL	20,699	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/14/87	7/3	11:34
0013	NO	14	7.00	P	86	GM	OLDS	CUTLASS CALAIS	19,341	4	151(2.5L)/FI	G2G2.5V5TPG9	08/14/87	7/3	11:40
0014	NO	3	0.00	P	85	GM	BUIC	CENTURY T TYPE	25,325	6	231(3.8L)/FI	F4G3.8V8XEB3	08/14/87	7/3	11:47
0015	NO	18	0.01	P	83	GM	CHEV	CELEBRITY	68,722	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/14/87	7/3	11:55
0017	NO	12	0.01	P	86	GM	CHEV	CELEBRITY	29,515	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/14/87	7/2	12:41
0020	NO	11	0.01	P	85	GM	CHEV	CAMARO	25,500	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/14/87	7/2	12:45
0021	NO	12	0.01	P	85	GM	CHEV	CHEVETTE	26,071	4	98(1.6L)/2bbl	F1G1.6V2NEA2	08/14/87	7/2	12:55
0022	NO	3	0.00	P	84	GM	CHEV	CAVALIER CS Wgn	34,200	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/14/87	7/3	12:57
0023	NO	78	0.01	P	86	GM	OLDS	CUTLASS CRUISER Wgn	82,714	6	173(2.8L)/FI	G1G2.8V8XGZX	08/14/87	7/2	13:05
0027	NO	43	0.12	P	85	GM	CHEV	CAVALIER	43,099	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/19/87	8/8	09:05
0028	NO	65	0.13	P	86	CHRY	PLYM	CARAVELLE SPEC ED.	15,436	4	135(2.2L)/FI	GCR2.2V5FFAX	08/19/87	8/2	09:06
0029	YES	5	0.06	P	83	GM	BUIC	SKYHAWK CUSTOM	35,759	4	110(1.8L)/FI	D2G1.8V5TDGX	08/19/87	8/5	09:17
0030	NO	2	0.01	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	21,943	8	307(5.0L)/4bbl	E3G5.0V4LNAX	08/19/87	8/5	09:27
0031	NO	24	0.01	P	85	CHRY	PLYM	RELIANT	53,258	4	135(2.2L)/2bbl	FCR2.2V2HDH5	08/19/87	8/2	09:42
0032	NO	8	0.01	P	83	GM	BUIC	REGAL	38,812	6	231(3.8L)/2bbl	D4G3.8V2NEA3	08/19/87	8/5	09:45
0033	NO	19	0.00	P	85	CHRY	PLYM	CARAVELLE	8,768	4	135(2.2L)/FI	FCR2.2V5HCF2	08/19/87	8/2	09:52
0034	NO	70	0.06	P	84	GM	BUIC	SKYLARK CUSTOM	7,260	4	151(2.5L)/FI	E2G2.5V5TPG7	08/19/87	8/2	10:03
0035	NO	4	0.05	P	85	GM	OLDS	98 REGENCY BRGHM	29,229	6	231(3.8L)/FI	F4G3.8V8XEB3	08/19/87	8/3	10:09
0036	YES	21	0.01	P	86	GM	PONT	6000	13,996	6	173(2.8L)/FI	G1G2.8V8XGZX	08/19/87	8/3	10:16
0037	NO	22	0.00	P	85	GM	OLDS	DELTA 88 ROYALE	36,204	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/19/87	8/	
0038	NO	14	0.01	P	83	GM	PONT	6000 LE	N/A	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/19/87	8/3	10:24
0039	NO	22	0.45	P	84	CHRY	CHRY	LE BARON	12,398	4	135(2.2L)/FI	ECR2.2V5HCF1	08/19/87	8/4	10:25
0040	NO	11	0.01	P	86	CHRY	PLYM	RELIANT SPEC ED.	2,438	4	135(2.2L)/FI	GCR2.5V5HCFX	08/19/87	8/3	10:40
0042	NO	22	0.01	P	84	GM	BUIC	REGAL LIMITED	31,479	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/19/87	8/3	10:58
0043	NO	6	0.01	P	86	CHRY	DODG	600	14,565	4	135(2.2L)/FI	GCR2.5V5HCFX	08/19/87	8/3	11:07
0045	NO	142	0.27	P	85	GM	CHEV	CELEBRITY (Euro)	58,538	4	151(2.5L)/FI	F2G2.5V5TPG8	08/19/87	8/2	11:16
0046	NO	17	0.01	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	38,403	8	307(5.0L)/4bbl	E3G5.0V4NLAX	08/19/87	8/3	11:25
0047	NO	26	0.01	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	22,592	8	307(5.0L)/4bbl	E3G5.0V4NLAX	08/19/87	8/5	11:25
0048	NO	14	0.01	P	83	GM	CHEV	CAVALIER Wgn	32,755	4	122(2.0L)/FI	D1G2.0V5XAJ4	08/19/87	8/2	11:33
0050	NO	8	0.01	P	85	CHRY	PLYM	HORIZON	12,957	4	135(2.2L)/2bbl	FCR2.2V2HDH5	08/19/87	8/3	11:43
0051	NO	18	0.01	P	86	GM	CHEV	CAPRICE CLASSIC	16,297	8	305(5.0L)/4bbl	G1G5.7V4NEA5	08/19/87	8/2	11:48
0052	NO	16	0.01	P	85	GM	BUIC	SOMERSET REGAL	27,818	6	181(3.0L)/FI	F4G3.8V8XEB3	08/19/87	8/2	11:56
0053	NO	14	0.00	P	86	GM	BUIC	CENTURY LIMITED	20,111	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/19/87	8/2	12:02
0054	NO	28	0.01	P	85	GM	CHEV	CHEVETTE	28,347	4	98(1.6L)/2bbl	F1G1.6V2NEA2	08/19/87	8/2	12:05
0055	NO	21	0.01	P	85	GM	CHEV	CAMARO Z28	27,005	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/19/87	8/2	12:17
0057	NO	35	0.01	P	83	GM	CHEV	CHEVETTE SCOOTER	53,065	4	98(1.6L)/2bbl	D1G1.6V2NEAO	08/19/87	8/2	12:33
0059	NO	63	0.34	P	85	GM	PONT	T-1000	27,058	4	98(1.6L)/2bbl	F1G1.6V2NEA2	08/19/87	8/3	12:41

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0061	NO	11	0.00	P	86	GM	OLDS	CUTLASS SUPREME	9,406	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/19/87	8/2	13:03
0063	NO	153	0.37	P	85	GM	CHEV	CAVALIER CS Wgn	45,741	4	122(2.0L)/FI	F1G2.0V5XAG1	08/19/87	8/4	14:27
0065	NO	24	0.00	P	83	GM	OLDS	98 REGENCY	66,356	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/19/87	8/4	14:52
0066	NO	1	0.00	P	86	GM	PONT	6000 LE	12,863	6	173(2.8L)/FI	G1G2.8V8XGZX	08/19/87	8/4	15:21
0067*	NO	272	0.05	F	86	GM	CHEV	CAMARO Z28	18,353	6	173(2.8L)/FI	G1G2.8V8XGZX	08/19/87	8/4	15:28
0068	NO	26	0.03	P	86	GM	BUIC	SKYHAWK CUSTOM	9,077	4	122(2.0L)/FI	G1G2.0V5XAG2	08/19/87	8/4	15:35
0069	YES	45	0.05	P	85	GM	CHEV	CAMARO Z28	16,642	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/19/87	8/4	16:02
0071	NO	31	0.12	P	86	GM	PONT	FIERO	8,904	4	151(2.5L)/FI	G2G2.5V5TPG9	08/19/87	8/4	16:26
0072*	NO	174	1.39	F	85	GM	CHEV	CAVALIER TYPE 10	26,583	4	122(2.0L)/FI	F1G2.0V5XAG1	08/19/87	8/4	16:31
0073	NO	39	0.00	P	84	GM	BUIC	REGAL LIMITED	75,406	6	231(3.8L)/2bbl	E4G3.8V2NEY0	08/19/87	8/4	16:38
0075	NO	14	0.01	P	85	GM	OLDS	CUTLASS SUPREME	18,564	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/19/87	8/4	16:55
0076	NO	5	0.00	P	86	CHRY	DODG	ARIES SPEC ED.	26,064	4	135(2.2L)/FI	GCR2.5V5HCFX	08/19/87	8/4	17:02
0077	NO	2	0.02	P	83	GM	CHEV	CAPRICE CLASSIC Wgn	81,607	8	305(5.0L)/4bbl	D1G5.7V4NDA0	08/19/87	8/4	17:23
0078	NO	17	0.00	P	84	GM	BUIC	LeSABRE CUSTOM	45,779	6	231(3.8L)/2bbl	E4G3.8V2NEY0	08/19/87	8/4	17:28
0079	NO	16	0.00	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	22,617	8	307(5.0L)/4bbl	E3G5.0V4NLAX	08/19/87	8/4	17:32
0080	NO	4	0.00	P	85	GM	OLDS	98 REGENCY	28,349	6	231(3.8L)/FI	F4G3.8V8XEB3	08/19/87	8/4	18:23
0081	NO	206	2.70	F	84	GM	PONT	2000 SUNBIRD	N/A	4	110(1.8L)/FI	E2G1.8V5TDG0	08/19/87	8/4	18:35
0082	NO	4	0.00	P	84	GM	PONT	6000 LE	30,148	6	173(2.8L)/2bbl	E1G2.8V2NNAX	08/19/87	8/4	18:39
0083	NO	1	0.00	P	86	GM	OLDS	CUTLASS CIERA LS	12,613	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/19/87	8/4	18:44
0084	NO	15	0.01	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	10,309	6	231(3.8L)/FI	G4G3.8V8XEB4	08/19/87	8/3	09:35
0085	NO	11	0.01	P	85	GM	OLDS	CUTLASS CIERA LS	50,132	6	181(3.0L)/2bbl	F4G3.8V2NSY6	08/19/87	8/	10:19
0086	NO	21	0.01	P	85	GM	OLDS	CUTLASS SUPREME BRGHM	18,749	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/19/87	8/5	11:50
0087	NO	290	0.08	F	84	GM	OLDS	CUTLASS SUPREME	51,505	6	231(3.8L)/2bbl	E4G3.8V2NEY0	08/21/87	7/2	08:57
0088	NO	87	0.29	P	86	GM	BUIC	LeSABRE CUSTOM	14,082	6	181(3.0L)/FI	G4G3.8V8XEB4	08/21/87	7/3	09:01
0089	NO	26	0.01	P	86	CHRY	CHRY	LE BARON	14,027	4	152(2.5L)/FI	GCR2.5V5HCFX	08/21/87	7/2	09:06
0091	NO	31	0.00	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	45,014	6	231(3.8L)/2bbl	E4G3.8V2NEY0	08/21/87	7/3	10:16
0092	NO	17	0.01	P	83	GM	BUIC	ELECTRA LIMITED	33,703	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/21/87	7/2	10:19
0094	NO	21	0.00	P	83	GM	BUIC	REGAL	13,838	6	231(3.8L)/2bbl	D4G3.8V2NEA3	08/21/87	7/3	10:31
0095	YES	80	0.22	P	86	CHRY	PLYM	RELIANT	24,086	4	135(2.2L)/FI	GCR2.5V5HCFX	08/21/87	7/1	09:16
0096	YES	36	0.01	P	84	GM	BUIC	LeSABRE CUSTOM	23,348	6	252(4.1L)/4bbl	E4G4.1V4NEY7	08/21/87	7/	10:45
0098	NO	8	0.00	P	85	GM	OLDS	CUTLASS SUPREME	28,988	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/21/87	7/3	11:37
0099	NO	41	0.03	P	86	GM	OLDS	CUTLASS CALAIS SUPRM	44,983	4	151(2.5L)/FI	G2G2.5V5TPG9	08/21/87	7/3	12:04
0102	NO	17	0.01	P	86	GM	BUIC	PARK AVENUE	12,589	6	231(3.8L)/FI	G4G3.8V8XEB4	08/21/87	7/2	12:13
0103	NO	9	0.00	P	85	GM	OLDS	DELTA 88 ROY BRGHM LS	28,086	8	307(5.0L)/4bbl	F3G5.0V4NLA0	08/21/87	7/3	12:27
0105	NO	7	0.00	P	86	GM	CHEV	CORVETTE	12,490	8	350(5.7L)/FI	G1G5.7V8DAAX	08/21/87	7/3	12:46
0106	YES	97	0.55	P	85	CHRY	CHRY	ARIES SPEC ED.	N/A	4	135(2.2L)/FI	N/A	08/21/87	7/2	12:46
0107	NO	130	0.37	P	84	GM	BUIC	CENTURY LIMITED	26,260	6	181(3.0L)/2bbl	E4G3.8V2NEY0	08/21/87	7/2	12:48
0108*	NO	240	5.48	F	83	GM	CHEV	CAMARO Z28	65,434	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/21/87	7/3	12:47
0109	NO	10	0.00	P	86	GM	CHEV	CAVALIER Wgn	5,227	4	122(2.0L)/FI	G1G2.0V5XAG2	08/21/87	7/3	13:08
0110	NO	26	0.30	P	84	GM	BUIC	SKYHAWK CUSTOM	23,447	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/21/87	7/2	14:22
0112	NO	25	0.02	P	84	GM	CHEV	CAVALIER CS Wgn	69,914	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/21/87	7/2	14:26
0113	NO	16	0.07	P	85	GM	OLDS	CUTLASS CIERA LS	20,071	4	151(2.5L)/FI	F2G2.5V5TPG8	08/21/87	7/3	14:38

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0114	NO	0	0.00	P	86	GM	OLDS	CUTLASS CIERA LS	13,003	6	231(3.8L)/FI	G4G3.8V8XEB4	08/21/87	7/3	14:53
0115	NO	20	0.01	P	85	GM	OLDS	DELTA 88 ROYALE BRGHM	11,325	8	307(5.0L)/4bbl	F3G5.0V4NLA0	08/21/87	7/2	14:56
0116	NO	48	0.04	P	85	GM	BUIC	SKYLARK CUSTOM	22,121	4	151(2.5L)/FI	F2G2.5V5TPG8	08/21/87	7/2	15:05
0118	NO	13	0.00	P	86	GM	CHEV	CAMARO IROC-Z	14,892	8	305(5.0L)/4bbl	G1G5.7V4NEA5	08/21/87	7/2	15:13
0120	NO	27	0.01	P	84	GM	BUIC	REGAL LIMITED	39,218	6	231(3.8L)/2bbl	E4G3.8V2NEY0	08/21/87	7/	15:30
0121	NO	2	0.00	P	85	GM	CHEV	MONTE CARLO SS	22,271	8	305(5.0L)/4bbl	F1G5.7V4N5A4	08/21/87	7/3	15:33
0123	NO	4	0.01	P	86	GM	OLDS	CUTLASS CIERA LS	28,706	4	151(2.5L)/FI	G2G2.5V5TPG9	08/21/87	7/3	16:02
0124	NO	2	0.00	P	85	GM	BUIC	SOMERSET REGAL	34,209	6	181(3.0L)/FI	F4G3.8V8XEB3	08/21/87	7/3	16:22
0125	NO	60	0.23	P	83	GM	CHEV	CELEBRITY	41,764	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/21/87	7/2	16:42
0126	NO	29	0.02	P	86	GM	OLDS	CUTLASS CIERA LS	13,300	4	151(2.5L)/FI	G2G2.5V5TPG9	08/21/87	7/2	16:54
0128	NO	3	0.00	P	85	GM	OLDS	CUTLASS CIERA LS	13,516	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/26/87	7/3	09:23
0129	NO	13	0.00	P	84	GM	PONT	BONNEVILLE	30,866	6	231(3.8L)/2bbl	E4G3.8V2NEY0	08/26/87	7/3	09:29
0130*	YES	135	1.45	F	83	GM	CHEV	CAVALIER CS	69,418	4	122(2.0L)/FI	D1G2.0V5XAJ4	08/26/87	7/1	09:56
0133	NO	7	0.00	P	84	GM	CHEV	CAVALIER CS	56,796	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/26/87	7/3	11:23
0134	NO	10	0.00	P	86	GM	PONT	GRAND PRIX	29,342	6	231(3.8L)/2bbl	G4G3.8V2NSY7	08/26/87	7/3	11:31
0135	YES	358	8.78	F	84	GM	CHEV	CAPRICE CLASSIC	41,400	6	229(3.8L)/2bbl	E1G3.8V2NDA5	08/26/87	7/2	12:27
0136	NO	9	0.00	P	83	GM	CHEV	CAVALIER CS	48,393	4	122(2.0L)/FI	D1G2.0V5XAJ4	08/26/87	7/3	13:03
0137	NO	20	0.08	P	83	GM	CHEV	CAVALIER	7,120	4	122(2.0L)/FI	D1G2.0V5XAJ4	08/26/87	7/3	13:29
0138	NO	7	0.00	P	85	GM	OLDS	CUTLASS CIERA LS	100,667	4	151(2.5L)/FI	F2G2.5V5TPG8	08/26/87	7/3	13:35
0139	YES	10	0.00	P	85	CHRY	DODG	600	33,204	4	135(2.2L)/FI	FCR2.2V5HCF2	08/26/87	7/3	13:48
0140	NO	26	0.00	P	84	GM	OLDS	CUTLASS CIERA LS	60,170	6	181(3.0L)/2bbl	E4G3.8V2NEY0	08/26/87	7/3	15:27
0141	NO	29	0.00	P	85	GM	OLDS	CUTLASS SUPREME BRGHM	34,334	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/26/87	7/3	15:28
0143	NO	18	0.01	P	83	GM	OLDS	DELTA 88 ROYALE BRGHM	49,984	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/26/87	7/3	16:10
0146	NO	8	0.00	P	85	CHRY	CHRY	LASER	31,492	4	135(2.2L)/FI	FCR2.2V5HCF2	08/26/87	7/3	17:52
0147	NO	34	0.01	P	84	GM	CHEV	CAMARO Z28	33,191	8	305(5.0L)/4bbl	E1G5.7V4NEA3	08/26/87	7/2	18:23
0148	NO	41	0.05	P	85	GM	OLDS	CUTLASS CIERA LS	44,387	4	151(2.5L)/FI	F2G2.5V5TPG8	09/09/87	8/3	09:12
0149	NO	6	0.01	P	84	GM	CHEV	CAPRICE CLASSIC Wgn	24,124	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/09/87	8/3	09:19
0150	NO	15	0.01	P	86	GM	PONT	6000	5,768	6	173(2.8L)/2bbl	G1G2.8V2NNA1	09/09/87	8/3	09:33
0151	NO	12	0.00	P	85	GM	OLDS	CUTLASS CALAIS SUPRM	40,561	6	181(3.0L)/FI	F4G3.8V8XEB3	09/09/87	8/	09:35
0153	NO	3	0.01	P	85	GM	OLDS	DELTA 88 ROYALE BRGHM	22,497	8	307(5.0L)/4bbl	F3G5.0V4NLA0	09/09/87	8/5	10:12
0154*	YES	7	0.01	P	84	GM	BUIC	CENTURY CUSTOM	80,883	6	181(3.0L)/2bbl	E4G3.8V2NEY0	09/09/87	8/3	10:17
0155	NO	15	0.04	P	86	GM	OLDS	CUTLASS CALAIS SUPRM	26,790	4	151(2.5L)/FI	G2G2.5V5TPG9	09/09/87	8/3	10:29
0156	NO	15	0.01	P	85	GM	PONT	PARISIENNE	15,018	8	305(5.0L)/4bbl	F1G5.7V4NEA4	09/09/87	8/3	10:31
0157	NO	531	8.27	F	86	CHRY	DODG	CHARGER	41,634	4	135(2.2L)/FI	GCR2.2V5FAAX	09/09/87	8/2	10:32
0158	NO	11	0.00	P	85	GM	OLDS	CUTLASS CIERA BRGHM	22,359	4	151(2.5L)/FI	F2G2.5V5TPG8	09/09/87	8/3	10:33
0159	NO	13	0.01	P	84	GM	CHEV	CAPRICE CLASSIC	27,674	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/09/87	8/3	11:02
0160	NO	0	0.03	P	85	GM	CHEV	CAVALIER	50,121	4	122(2.0L)/FI	F1G2.0V5XAG1	09/09/87	8/3	11:20
0161	NO	11	0.01	P	86	CHRY	CHRY	LE BARON	23,176	4	135(2.2L)/FI	GCR2.5V5HCFX	09/09/87	8/3	12:25
0162	NO	11	0.00	P	85	GM	CHEV	IMPALA	4,181	6	262(4.3L)/FI	F1G4.3V5NDA7	09/09/87	8/2	14:28
0163	NO	20	0.00	P	84	GM	OLDS	98 REGENCY BRGHM	17,382	8	307(5.0L)/4bbl	E3G5.0V4NBM0	09/09/87	8/2	14:55
0164	NO	15	0.00	P	83	GM	CHEV	CAMARO	27,507	8	305(5.0L)/4bbl	D1G5.7V4NDA0	09/09/87	8/2	15:09
0165	NO	85	0.11	P	87	GM	OLDS	CUTLASS CIERA LS	16,739	4	151(2.5L)/FI	F2G2.5V5TPG8	09/09/87	8/2	16:44

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Description of the 1068 Test Vehicles (Continued)
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Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0166	NO	19	0.03	P	86	GM	BUIC	CENTURY LIMITED	16,774	6	231(3.8L)/FI	G4G3.8V8XEB4	09/09/87	8/2	17:10
0167	NO	28	0.02	P	84	CHRY	PLYM	RELIANT CUSTOM Wgn	40,525	4	135(2.2L)/2bbl	ECR2.2V2HAC4	09/09/87	8/2	18:22
0169	NO	2	0.00	P	86	GM	CHEV	CAPRICE CLASSIC	16,760	8	305(5.0L)/4bbl	G1G5.7V4NEA5	09/15/87	7/3	09:23
0171	NO	9	0.00	P	86	CHRY	DODG	ARIES	15,909	4	135(2.2L)/FI	GCR2.2V5HCFX	09/15/87	7/3	09:35
0172	NO	14	0.00	P	86	GM	OLDS	CUTLASS SUPREME	75,422	8	307(5.0L)/4bbl	G3G5.0V4NLA1	09/15/87	7/3	10:35
0174	NO	52	0.00	P	84	GM	CHEV	CAPRICE CLASSIC	80,302	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/15/87	7/3	11:02
0175	NO	28	0.00	P	86	GM	CADI	FLEETWOOD BROUGHAM	14,067	8	307(5.0L)/4bbl	G3G5.0V4NLA1	09/15/87	7/1	11:07
0176	NO	2	0.02	P	84	GM	BUIC	SKYLARK CUSTOM	28,368	4	151(2.5L)/FI	E2G2.5V5TPG7	09/15/87	7/3	11:09
0178	NO	27	0.01	P	84	GM	PONT	6000 LE Wgn	48,252	6	173(2.8L)/2bbl	E1G2.8V2NNAX	09/15/97	7/2	12:04
0179	NO	16	0.01	P	86	GM	CHEV	CAMARO IROC-Z	35,006	8	305(5.0L)/4bbl	G1G5.7V4NEA5	09/15/87	7/2	12:09
0180	NO	7	0.00	P	83	GM	CHEV	CAVALIER Wgn	19,629	4	122(2.0L)/FI	D1G2.0V5XAJ4	09/15/87	7/3	12:25
0181	YES	7	0.06	P	86	GM	PONT	6000	3,780	4	151(2.5L)/FI	G2G2.5V5TPG9	09/15/87	7/3	12:27
0182	YES	25	0.00	P	85	GM	OLDS	CUTLASS SUPREME BRGHM	12,420	8	307(5.0L)/4bbl	F3G5.0V4NLA0	09/15/87	7/3	13:52
0183	NO	38	0.01	P	87	CHRY	DODG	CHARGER	14,454	4	135(2.2L)/2bbl	HCR2.2V2HDN7	09/15/87	7/2	14:09
0184	NO	1	0.01	P	83	GM	CHEV	CELEBRITY	50,685	6	173(2.8L)/2bbl	D1G2.8V2NNA9	09/15/87	7/3	14:15
0185	NO	2	0.00	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	8,872	6	231(3.8L)/FI	G4G3.8V8XEB4	09/15/87	7/3	15:23
0186	NO	1	0.00	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	46,668	8	307(5.0L)/4bbl	N/A	09/15/87	7/3	15:34
0187	NO	0	0.00	P	86	GM	PONT	6000 LE	16,981	6	173(2.8L)/FI	G1G2.8V8XGZX	09/15/87	7/3	15:45
0190	NO	67	0.09	P	85	GM	CHEV	CELEBRITY (Euro)	45,479	4	151(2.5L)/FI	F2G2.5V5TPG8	09/15/87	7/3	16:31
0191	NO	42	0.02	P	84	GM	OLDS	CUTLASS SUPREME	71,308	8	307(5.0L)/4bbl	E3G5.0V4NBM0	09/15/87	7/3	16:45
0192	NO	49	0.00	P	83	GM	OLDS	DELTA 88 ROYALE BRGHM	42,337	8	307(5.0L)/4bbl	D3G5.0V4ARA9	09/15/87	7/2	16:47
0194	NO	1	0.02	P	83	GM	CHEV	CELEBRITY	69,965	4	151(2.5L)/FI	D2G2.5V5TPG6	09/15/87	7/3	17:05
0195	NO	23	0.01	P	83	GM	CHEV	CELEBRITY	68,014	6	173(2.8L)/2bbl	D1G2.8V2NNA9	09/15/87	7/2	17:13
0196	NO	18	0.08	P	84	GM	OLDS	CUTLASS CIERA LS	19,896	4	151(2.5L)/FI	E2G2.5V5TPG7	09/15/87	7/3	17:20
0197	NO	15	0.00	P	86	GM	CADI	FLEETWOOD BRGHM	18,536	8	307(5.0L)/4bbl	G3G5.0V4NLA1	09/15/87	7/3	18:10
0198	NO	20	0.00	P	86	GM	CHEV	CAMARO Z28	13,579	8	305(5.0L)/4bbl	G1G5.7V4NEA5	09/15/87	7/2	18:21
0199	NO	20	0.05	P	86	GM	OLDS	FIRENZA	12,637	4	110(1.8L)/FI	G2G1.8V5TDG2	09/15/87	7/2	18:27
0200	NO	6	0.00	P	86	GM	OLDS	98 REGENCY	29,803	6	231(3.8L)/FI	G4G3.8V8XEB4	09/19/87	7/3	09:37
0201	NO	4	0.00	P	86	GM	OLDS	CUTLASS SUPREME	N/A	8	307(5.0L)/4bbl	G3G5.0V4NLA1	09/19/87	7/3	09:40
0202	NO	1	0.00	P	85	GM	BUIC	SKYLARK CUSTOM	28,938	6	173(2.8L)/2bbl	F1G2.8V2NNA0	09/19/87	7/3	09:42
0203	NO	1	0.00	P	86	GM	OLDS	CUTLASS CIERA BRGHM	20,738	6	173(2.8L)/2bbl	G1G2.8V2NNA1	09/19/87	7/3	09:46
0204	NO	2	0.00	P	85	GM	PONT	GRAND PRIX	23,873	8	305(5.0L)/4bbl	F1G5.7V4NEA4	09/19/87	7/1	09:56
0205	NO	5	0.00	P	86	GM	OLDS	CUTLASS SALON	14,669	8	307(5.0L)/4bbl	G3G5.0V4NLA1	09/19/87	7/3	10:32
0206	NO	27	0.04	P	84	CHRY	DODG	DAYTONA (Turbo)	27,718	4	135(2.2L)/FI	ECR2.2V5FAA8	09/19/87	7/1	10:39
0207*	YES	6	0.00	P	86	GM	OLDS	CUTLASS CALAIS	16,000	4	151(2.5L)/FI	G2G2.5V5TPG9	09/19/87	7/3	10:43
0209	NO	13	0.00	P	86	GM	PONT	6000	26,729	4	151(2.5L)/FI	G2G2.5V5TPG9	09/19/87	7/1	10:59
0210	NO	1	0.00	P	83	GM	CHEV	CAMARO Z28	54,543	6	173(2.8L)/2bbl	D1G2.8V2NNA9	09/19/87	7/3	00:01
0211	NO	1	0.00	P	85	GM	CHEV	CHEVETTE	36,533	4	98(1.6L)/2bbl	F1G1.6V2NEA2	09/19/87	7/3	12:16
0212	YES	41	0.09	P	83	GM	PONT	2000	78,449	4	110(1.8L)/FI	D2G1.8V5TDGX	09/19/87	7/2	12:25
0213	NO	25	0.00	P	84	GM	BUIC	REGAL LIMITED	47,640	6	231(3.8L)/2bbl	E4G3.8V2NEY0	09/19/87	7/1	14:03
0214	NO	77	0.13	P	84	GM	PONT	GRAND PRIX	41,485	6	231(3.8L)/2bbl	E4G3.8V2NEY0	09/19/87	7/1	14:43
0215	NO	24	0.00	P	84	GM	PONT	FIREBIRD	43,000	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/19/87	7/1	14:50

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Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0217	NO	12	0.00	P	86	GM	BUIC	LeSABRE LIMITED	15,511	6	231(3.8L)/FI	G4G3.8B8XEB4	09/19/87	7/1	15:20
0218	NO	1	0.00	P	87	GM	PONT	GRAND AM	12,219	4	151(2.5L)/FI	H1G2.5V5TPGO	09/19/87	7/3	15:40
0219	NO	2	0.00	P	84	GM	PONT	6000 STE	71,082	6	173(2.8L)/2bbl	E1G2.8V2NNAX	09/19/87	7/3	15:47
0220	NO	0	0.15	P	84	GM	CHEV	CAVALIER TYPE 10	40,240	4	122(2.0L)/FI	E1G2.0V5XAJ5	09/19/87	7/3	16:02
0221	NO	11	0.00	P	86	GM	CHEV	CAPRICE CLASSIC	15,566	6	262(4.3L)/FI	G1G4.3V5NDA8	09/19/87	7/1	16:24
0222	NO	18	0.00	P	83	GM	OLDS	CUTLASS CALAIS	43,332	6	231(3.8L)/2bbl	D4G3.8V2NEA3	09/19/87	7/1	16:26
0223	NO	4	0.00	P	86	GM	CHEV	CAVALIER CS	17,164	4	122(2.0L)/FI	G1G2.0V5XAG2	09/19/87	7/3	16:34
0224*	NO	544	7.20	F	84	GM	PONT	GRAND PRIX LE	44,245	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/24/87	7/2	09:17
0226	NO	37	0.00	P	84	GM	PONT	GRAND PRIX LE	81,226	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/24/87	7/2	09:47
0227*	YES	74	0.01	P	84	GM	BUIC	LeSABRE LIMITED	42,683	8	307(5.0L)/4bbl	E3G5.0V4NLAX	09/24/87	7/2	09:56
0228	NO	14	0.01	P	85	GM	OLDS	CUTLASS SUPREME	19,517	6	231(3.8L)/2bbl	F4G3.8V2NSY6	09/24/87	7/2	09:58
0230	NO	25	0.00	P	83	GM	PONT	GRAND PRIX	37,382	8	305(5.0L)/4bbl	D1G5.7V4NDAO	09/24/87	7/3	10:28
0232	NO	21	0.01	P	85	CHRY	CHRY	LE BARON	16,360	4	135(2.2L)/FI	FCR2.2V5H2F2	09/24/87	7/2	10:34
0234	NO	86	0.05	P	86	GM	BUIC	LeSABRE CUSTOM	6,687	6	181(3.0L)/FI	G4G3.8V8XEB4	09/24/87	7/1	10:47
0235	NO	11	0.00	P	86	GM	OLDS	CUTLASS CIERA BRGHM	17,320	6	173(2.8L)/FI	G1G2.8V8XGZX	09/24/87	7/1	11:07
0236	NO	8	0.00	P	86	CHRY	DODG	ARIES SPEC ED.	61,818	4	135(2.2L)/FI	GCR2.5V5HCFX	09/24/87	7/1	11:27
0238	NO	22	0.05	P	86	GM	PONT	GRAND AM SE	21,258	6	181(3.0L)/FI	G4G3.8V8XEB4	09/24/87	7/3	11:53
0239	NO	23	0.01	P	85	GM	BUIC	CENTURY LIMITED	34,998	6	181(3.0L)/2bbl	F4G3.8V2NSY6	09/24/87	7/2	12:04
0240	NO	8	0.00	P	86	GM	PONT	6000 LE	21,816	6	173(2.8L)/FI	G1G2.8V8XGZX	09/24/87	7/3	12:21
0241	NO	187	0.58	P	84	GM	CHEV	MONTE CARLO SS	41,179	8	305(5.0L)/4bbl	E1G5.0W4NEAX	09/24/87	7/1	12:39
0242	NO	13	0.01	P	86	GM	BUIC	LeSABRE ESTATE Wgn	18,654	8	307(5.0L)/4bbl	G3G5.0V4NLA1	09/24/87	7/2	12:40
0243	NO	43	0.00	P	87	CHRY	DODG	CHARGER	10,367	4	135(2.2L)/2bbl	HCR2.2V2HDH7	09/24/87	7/1	14:19
0244	NO	27	0.01	P	86	GM	CHEV	CAPRICE CLASSIC	12,315	6	262(4.3L)/FI	G1G4.3V5NDAB	09/24/87	7/2	14:25
0245	NO	24	0.01	P	86	GM	PONT	6000 STE	30,600	6	173(2.8L)/FI	G1G2.8V8XGZX	09/24/87	7/1	16:06
0246	NO	1	0.09	P	85	CHRY	CHRY	LASER XE (Turbo)	27,556	4	135(2.2L)/FI	FCR2.2V5FAA9	09/24/87	7/3	16:28
0247	NO	30	0.10	P	84	GM	OLDS	FIRENZA BRGHM	37,026	4	110(1.8L)/FI	E2G1.8V5TDGO	09/24/87	7/3	16:34
0248	NO	13	0.01	P	85	GM	PONT	GRAND PRIX	11,000	8	305(5.0L)/4bbl	F1G5.7V4NEA4	09/24/87	7/	16:39
0249	NO	43	0.01	P	86	CHRY	PLYM	DUSTER	16,568	4	135(2.2L)/2bbl	GCR2.2V2HDH6	09/24/87	7/2	16:50
0250	NO	46	0.22	P	85	GM	CHEV	CAVALIER Wgn	27,938	4	122(2.0L)/FI	F1G2.0V5XAG1	09/24/87	7/3	18:07
0251	NO	62	0.05	P	84	GM	OLDS	FIRENZA Wgn	43,394	4	110(1.8L)/FI	E2G1.8V5TDGO	09/24/87	7/3	18:17
0252	NO	30	0.00	P	85	GM	CHEV	CHEVETTE	24,696	4	98(1.6L)/2bbl	F1G1.6V2NEA2	09/24/87	7/3	18:21
0253	NO	4	0.00	P	86	GM	OLDS	CUTLASS SUPREME	8,982	8	307(5.0L)/4bbl	G3G5.0V4NLA1	09/24/87	7/3	18:27
0254	NO	0	0.00	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	7,345	6	231(3.8L)/FI	G4G3.8V8XEB4	09/24/87	7/3	18:30
0255	NO	17	0.02	P	86	GM	OLDS	98 REGENCY	14,172	6	231(3.8L)/FI	G4G3.8V8XEB4	10/06/87	8/2	09:40
0256	YES	22	0.02	P	86	GM	CHEV	CAVALIER	17,360	4	122(2.0L)/FI	G1G2.0V5XAG2	10/06/87	8/2	09:52
0257	NO	38	0.09	P	85	GM	PONT	2000 SUNBIRD	10,448	4	110(1.8L)/FI	F2G1.8V5TDG1	10/06/87	8/2	10:59
0258*	YES	46	0.73	P	85	CHRY	CHRY	LASER	65,712	4	135(2.2L)/FI	FCR2.2V5HCF2	10/06/87	8/2	11:09
0259*	NO	232	5.02	F	86	CHRY	PLYM	CARAVELLE	25,617	4	152(2.5L)/FI	GCR2.5V5HCFX	10/06/87	8/	11:11
0260	NO	63	0.08	P	85	GM	PONT	6000	55,639	4	151(2.5L)/FI	F2G2.5V5TPG8	10/06/87	8/2	11:59
0261	NO	21	0.01	P	87	GM	OLDS	CUTLASS SUPREME BRGHM	7,441	8	307(5.0L)/4bbl	H2G5.0V4NLA3	10/06/87	7/	13:41
0262	NO	19	0.01	P	85	GM	CHEV	CELEBRITY Wgn	44,656	6	173(2.8L)/2bbl	F1G2.8V2NNAO	10/06/87	7/2	13:47
0263	NO	3	0.00	P	86	GM	OLDS	CUTLASS SUPREME BRGHM	15,560	8	307(5.0L)/4bbl	G3G5.0V4NLA1	10/06/87	7/3	13:54

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0264	YES	1	0.00	P	84	GM	CHEV	CHEVETTE SCOOTER	74,142	4	98(1.6L)/2bbl	E1G1.6V2NEA1	10/06/87	7/3	14:05
0266	NO	85	0.06	P	84	GM	BUIC	CENTURY LIMITED	33,821	4	151(2.5L)/FI	E2G2.5V5TPG7	10/06/87	7/3	14:26
0267	NO	28	0.02	P	85	GM	BUIC	CUSTOM	24,609	4	122(2.0L)/FI	F1G2.0V5XAG1	10/06/87	7/3	14:52
0268	NO	11	0.00	P	86	GM	OLDS	CUTLASS CIERA LS	44,330	6	173(2.8L)/2bbl	G1G2.8V2NNA1	10/06/87	7/1	15:01
0269	NO	3	0.00	P	84	GM	PONT	TRANS AM	24,702	8	305(5.0L)/4bbl	E1G5.7V4NEA3	10/06/87	7/3	15:04
0270	NO	52	0.00	P	83	GM	CHEV	CELEBRITY	67,453	6	173(2.8L)/2bbl	D1G2.8V2NNA9	10/06/87	7/3	15:03
0271*	YES	32	0.00	P	84	GM	PONT	BONNEVILLE LE	46,934	6	231(3.8L)/2bbl	E4G3.8V2NEYO	10/06/87	7/3	15:20
0272	YES	31	0.00	P	84	GM	OLDS	CUTLASS SUPREME	76,755	6	231(3.8L)/2bbl	E4G3.8V2NEYO	10/06/87	7/1	15:21
0273	NO	26	0.15	P	83	GM	CHEV	CELEBRITY	34,183	4	151(2.5L)/FI	D2G2.5V5TPG6	10/06/87	7/1	15:25
0275	NO	1	0.00	P	86	GM	CHEV	CAVALIER Z24	37,131	6	173(2.8L)/FI	G1G2.8V8XGZX	10/06/87	7/3	16:18
0276	NO	92	0.04	P	85	GM	OLDS	CUTLASS CIERA LS	37,529	4	151(2.5L)/FI	F2G2.5V5TPG8	10/06/87	7/3	16:19
0277	NO	2	0.00	P	86	GM	OLDS	CUTLASS CIERA BRGHM	13,442	6	173(2.8L)/FI	G1G2.8V8XGZX	10/06/87	/3	16:26
0278	NO	1	0.00	P	83	GM	BUIC	SKYLARK	65,634	6	173(2.8L)/2bbl	D1G2.8V2NNA9	10/06/87	7/	16:30
0279	NO	1	0.00	P	83	GM	CHEV	MONTE CARLO	18,009	6	229(3.8L)/2bbl	N/A	10/06/87	7/3	16:47
0280	NO	1	0.00	P	86	CHRY	CHRY	NEW YORKER	18,351	4	152(2.5L)/FI	GCR2.5V5HCFX	10/07/87	7/3	10:06
0281	NO	5	0.00	P	85	GM	PONT	PARISIENNE BRGHM	51,578	8	305(5.0L)/4bbl	N/A	10/07/87	7/	10:10
0282	NO	16	0.00	P	85	GM	OLDS	DELTA 88 ROYALE BRGHM	49,722	8	307(5.0L)/4bbl	F3G5.0V4NLAO	10/07/87	7/3	10:28
0283	NO	21	0.01	P	85	CHRY	PLYM	RELIANT LE	26,934	4	135(2.2L)/2bbl	FCR2.2V2HDH5	10/07/87	7/2	11:07
0284	YES	24	0.10	P	85	GM	CHEV	CELEBRITY (Euro)	41,984	4	151(2.5L)/FI	F2G2.5V5TPG8	10/07/87	7/3	11:21
0285	NO	13	0.05	P	84	GM	CHEV	CAVALIER	49,711	4	122(2.0L)/FI	E1G2.0V5XAJ5	10/07/87	7/1	11:41
0287	NO	12	0.00	P	84	GM	CHEV	CELEBRITY Wgn	55,902	6	173(2.8L)/2bbl	E1G2.8V2NNAX	10/07/87	7/2	12:18
0288	YES	10	0.01	P	87	GM	OLDS	DELTA 88 ROYALE BRGHM	12,617	6	231(3.8L)/FI	H2G3.8V8XEB7	10/07/87	7/2	11:53
0289	NO	86	0.15	P	84	GM	CHEV	CAPRICE CLASSIC	72,607	8	305(5.0L)/4bbl	E1G5.7V4NEA3	10/07/87	7/3	12:07
0290	NO	21	0.01	P	86	GM	CHEV	CAPRICE CLASSIC	15,445	6	262(4.3L)/FI	G1G4.3V5NDA8	10/07/87	7/2	12:23
0291	NO	20	0.04	P	86	CHRY	CHRY	NEW YORKER	22,184	4	152(2.5L)/FI	GCR2.5V5HCFX	10/07/87	7/2	12:37
0292	NO	31	0.01	P	85	GM	CHEV	CAVALIER CS	9,766	4	122(2.0L)/FI	F1G2.0V5XAG1	10/07/87	7/2	12:41
0293	NO	183	0.39	P	84	GM	PONT	FIERO 2M4	40,493	4	151(2.5L)/FI	E2G2.5V5TPG7	10/07/87	7/2	13:13
0294	NO	1	0.00	P	86	GM	CHEV	CELEBRITY	19,534	6	173(2.8L)/2bbl	G1G2.8V2NNA1	10/07/87	7/3	13:37
0295	NO	16	0.00	P	85	GM	OLDS	DELTA 88 ROY BRGHM LS	42,346	8	307(5.0L)/4bbl	F3G5.0V4NLAO	10/07/87	7/1	13:44
0296	NO	21	0.00	P	85	GM	BUIC	LeSABRE LIMITED	5,598	8	307(5.0L)/4bbl	F3G5.0V4NLAO	10/07/87	7/1	13:50
0298	NO	12	0.01	P	86	GM	OLDS	DELTA 88 ROYALE	4,233	6	231(3.8L)/FI	G4G3.8V8XEB4	10/07/87	7/2	15:17
0299	NO	14	0.00	P	86	GM	CHEV	CELEBRITY Wgn	47,998	6	173(2.8L)/FI	G1G2.8V8XGZX	10/07/87	/2	15:51
0300	NO	12	0.02	P	84	GM	CHEV	CAVALIER TYPE 10	77,593	4	122(2.0L)/FI	E1G2.0V5XAJ5	10/07/87	7/2	10:00
0301	NO	45	0.04	P	86	GM	OLDS	FIRENZA	12,466	4	122(2.0L)/FI	G1G2.0V5XAG2	10/07/87	7/2	16:19
0303	NO	3	0.00	P	85	GM	CHEV	CELEBRITY	34,992	6	173(2.8L)/2bbl	F1G2.8V2NNAO	10/07/87	7/3	16:51
0304	NO	7	0.00	P	86	CHRY	CHRY	LE BARON	13,775	4	152(2.5L)/FI	GCR2.5V5HCFX	10/07/87	7/3	17:33
0305	NO	14	0.03	P	86	GM	PONT	6000	10,121	4	151(2.5L)/FI	G2G2.5V5TPG9	10/07/87	7/3	17:39
0306	NO	6	0.00	P	84	GM	CHEV	CHEVETTE CS	68,284	4	98(1.6L)/2bbl	E1G1.6V2NEA1	10/07/87	7/3	18:28
0307	NO	2	0.01	P	83	GM	CHEV	CAVALIER CS Wgn	66,944	4	122(2.0L)/FI	D1G2.0V5XAJ4	10/14/87	8/5	10:15
0308	NO	5	0.01	P	86	CHRY	DODG	ARIES LE	1,918	4	152(2.5L)/FI	GCR2.5V5HCFX	10/14/87	8/5	10:19
0309	NO	48	0.00	P	86	GM	BUIC	SKY HAWK Wgn	69,873	4	110(1.8L)/FI	G2G1.8V5TDG2	10/14/87	8/4	10:21

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0310	NO	12	0.01	P	83	GM	OLDS	DELTA 88 ROYALE BRGHM	77,521	8	307(5.0L)/4bbl	D3G5.0V4ARA9	10/14/87	8/3	10:28
0311	NO	4	0.01	P	84	GM	CHEV	CELEBRITY	33,230	6	173(2.8L)/2bbl	E1G2.8V2NNAX	10/14/87	8/5	10:36
0312	NO	6	0.01	P	86	GM	BUIC	PARK AVENUE	5,801	6	231(3.8L)/FI	G4G3.8V8XEB4	10/14/87	8/5	10:46
0313	NO	5	0.00	P	86	GM	BUIC	CENTURY CUSTOM	16,627	6	173(2.8L)/2bbl	G1G2.8V2NNA1	10/14/87	8/4	10:52
0314	YES	250	6.07	F	86	CHRY	DODG	DAYTONA	10,904	4	152(2.5L)/FI	GCR2.5V5HCFX	10/14/87	8/4	11:03
0315	NO	8	0.01	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	14,010	6	231(3.8L)/FI	G4G3.8V8XEB4	10/14/87	8/5	11:10
0317	NO	25	0.01	P	85	GM	CHEV	CAPRICE CLASSIC Wgn	69,034	8	305(5.0L)/4bbl	N/A	10/14/87	8/5	12:03
0318	NO	36	0.01	P	86	GM	CHEV	CAVALIER RS CONV	33,456	6	173(2.8L)/FI	G1G2.8V8XGZX	10/14/87	/4	12:07
0319	NO	8	0.03	P	86	GM	BUIC	CUSTOM	62,955	4	110(1.8L)/FI	G2G1.8V5TDG2	10/14/87	8/5	12:43
0320	NO	15	0.01	P	84	GM	CHEV	CHEVETTE CS	22,150	4	98(1.6L)/2bbl	E1G1.6V2NEA1	10/14/87	8/5	12:48
0321	NO	21	0.00	P	85	GM	OLDS	CUTLASS CIERA LS Wgn	13,795	6	181(3.0L)/2bbl	F4G3.8V2NSY6	10/14/87	8/4	12:59
0322	NO	45	0.19	P	86	GM	OLDS	CUTLASS CIERA LS	19,473	4	151(2.5L)/FI	G2G2.5V5TPG9	10/14/87	8/4	13:03
0323	NO	0	0.00	P	85	CHRY	CHRY	LASER	42,599	4	135(2.2L)/FI	FCR2.2V5HCF2	10/14/87	8/4	13:06
0324	NO	141	0.02	P	84	GM	BUIC	RIVIERA	56,294	6	173(2.8L)/2bbl	N/A	10/14/87	8/5	13:07
0325	NO	22	0.01	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	23,587	6	231(3.8L)/FI	G4G3.8V8XEB4	10/14/87	8/	13:27
0326	NO	32	0.04	P	85	GM	BUIC	CENTURY CUSTOM	16,635	4	151(2.5L)/FI	F2G2.5V5TPG8	10/14/87	8/5	13:28
0327	NO	37	0.30	P	84	GM	PONT	2000 SUNBIRD	69,575	4	110(1.8L)/FI	E2G1.8V5TDGO	10/14/87	8/2	13:29
0328	NO	22	0.00	P	85	GM	OLDS	CUTLASS SUPREME	53,637	6	231(3.8L)/2bbl	F4G3.8V2NSY6	10/14/87	8/4	13:31
0329	NO	30	0.00	P	86	CHRY	CHRY	LE BARON GTS	12,255	4	135(2.2L)/FI	GCR2.5V5HCFX	10/14/87	8/2	13:34
0330	NO	17	0.00	P	85	CHRY	DODG	CHARGER 2.2	30,094	4	135(2.2L)/2bbl	FCR2.2V2HDH5	10/14/87	8/2	13:54
0331	NO	33	0.01	P	85	GM	CHEV	CAPRICE CLASSIC	19,334	8	305(5.0L)/4bbl	N/A	10/14/87	8/5	14:02
0332	NO	40	0.01	P	84	GM	OLDS	98 REGENCY	39,470	8	307(5.0L)/4bbl	E3G5.0V4NLAX	10/14/87	8/2	14:13
0333	NO	37	0.03	P	84	GM	PONT	2000 SUNBIRD	63,361	4	110(1.8L)/FI	E2G1.8V5TDGO	10/14/87	7/2	16:42
0334	NO	22	0.01	P	83	GM	BUIC	REGAL	83,531	6	231(3.8L)/2bbl	D4G3.8V2NEA3	10/14/87	7/2	17:27
0336	NO	17	0.01	P	86	GM	CHEV	CAMARO Z28	6,122	8	305(5.0L)/4bbl	G1G5.7V4NEA5	10/15/87	7/3	10:02
0338	NO	45	0.11	P	86	GM	PONT	GRAND AM	28,131	4	151(2.5L)/FI	G2G2.5V3TPG9	10/15/87	7/2	10:50
0339	NO	6	0.00	P	87	GM	PONT	GRAND AM	10,244	4	151(2.5L)/FI	H1G2.5V5TPGO	10/15/87	7/3	10:59
0340	NO	22	0.00	P	84	GM	CHEV	CAPRICE CLASSIC	44,046	8	305(5.0L)/4bbl	E1G5.7V4NEA3	10/15/87	7/3	11:09
0341	NO	2	0.01	P	86	GM	OLDS	98 REGENCY BRGHM	28,899	6	231(3.8L)/FI	G4G3.8V8XEB4	10/15/87	/3	12:04
0342	NO	5	0.00	P	86	GM	BUIC	REGAL	18,582	8	307(5.0L)/4bbl	G3G5.0V4NLA1	10/15/87	7/3	12:17
0343	NO	6	0.00	P	85	GM	OLDS	DELTA 88 ROYALE	15,970	8	307(5.0L)/4bbl	F3G5.0V4NLAO	10/15/87	7/3	12:27
0344	NO	14	0.01	P	86	GM	CHEV	MONTE CARLO	19,279	8	305(5.0L)/4bbl	G1G5.7V4NEA5	10/15/87	7/2	12:42
0345	NO	6	0.03	P	86	GM	OLDS	CUTLASS CIERA LS	16,297	4	151(2.5L)/FI	G2G2.5V5TPG9	10/15/87	7/3	12:57
0346	NO	12	0.00	P	84	GM	CHEV	CAPRICE CLASSIC	32,402	8	305(5.0L)/4bbl	E1G5.7V4NEA3	10/15/87	7/3	13:16
0348	NO	17	0.01	P	87	GM	PONT	GRAND AM	13,429	4	151(2.5L)/FI	H1G2.5V5TPGO	10/15/87	7/2	14:27
0349	YES	50	0.20	P	87	CHRY	DODG	ARIES LE	30,259	4	135(2.2L)/FI	HCR2.5V5HCFO	10/15/87	7/2	14:43
0350	NO	18	0.00	P	83	GM	OLDS	DELTA 88 ROYALE	59,921	8	307(5.0L)/4bbl	D3G5.0V4ARA9	10/15/87	7/3	14:54
0351	NO	42	0.00	P	84	GM	OLDS	CUTLASS CIERA BRGHM	120,131	6	181(3.0L)/2bbl	E4G3.8V2NEYO	10/15/87	7/3	15:36
0352	NO	31	0.11	P	86	GM	OLDS	CUTLASS CIERA LS	28,503	4	151(2.5L)/FI	N/A	10/15/87	7/3	15:57
0353	NO	22	0.00	P	85	GM	OLDS	CUTLASS SUPREME	34,270	6	231(3.8L)/2bbl	F4G3.8V2NSY6	10/15/87	7/3	16:02
0354	NO	84	0.20	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	38,224	6	231(3.8L)/2bbl	E4G3.8V2NEYO	10/20/87	7/2	09:53
0355	NO	60	0.04	P	84	GM	BUIC	REGAL	53,036	6	231(3.8L)/2bbl	E4G3.8V2NEYO	10/20/87	7/3	10:19
0356	NO	72	0.38	P	84	GM	CHEV	CAVALIER Wgn	91,253	4	122(2.0L)/FI	E1G2.0V5XAJ5	10/20/87	7/2	10:35
0357	NO	41	0.00	P	84	GM	PONT	BONNEVILLE	35,197	6	231(3.8L)/2bbl	E4G3.8V2NEYO	10/20/87	7/3	10:37
0358	NO	2	0.00	P	85	CHRY	DODG	ARIES	27,364	4	135(2.2L)/2bbl	FCR2.2V2HDH5	10/20/87	7/3	10:57
0359	NO	5	0.00	P	85	GM	OLDS	CUTLASS CIERA BRGHM	23,886	6	181(3.0L)/2bbl	F4G3.8V2NSY6	10/20/87	7/3	11:07

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0360	NO	1	0.00	P	83	GM	CHEV	CAVALIER Wgn CS	51,777	4	122(2.0L)/FI	D1G2.0V5XAJ4	10/20/87	7/3	11:33
0361	NO	15	0.02	P	84	GM	CHEV	CAVALIER	26,431	4	122(2.0L)/FI	E1G2.0V5XAJ5	10/20/87	7/2	11:48
0362	NO	50	0.06	P	85	CHRY	CHRY	LE BARON GTS (Turbo)	14,222	4	135(2.2L)/FI	N/A	10/20/87	7/3	12:09
0363	NO	5	0.00	P	84	GM	CHEV	CAVALIER TYPE 10	41,057	4	122(2.0L)/FI	E1G2.0V5XAJ5	10/20/87	7/3	12:20
0364	NO	21	0.02	P	85	GM	CADI	CIMARRON	6,755	4	122(2.0L)/FI	F1G2.0V5XAG1	10/20/87	7/2	12:21
0365	NO	55	0.04	P	86	GM	BUIC	CENTURY ESTATE Wgn	6,773	6	231(3.8L)/FI	G4G3.8V8XEB4	10/20/87	7/3	12:28
0366	NO	14	0.01	P	86	GM	OLDS	CUTLASS SUPREME BRGHM	9,626	8	307(5.0L)/4bbl	G3G5.0V4NLA1	10/20/87	7/2	12:47
0367	NO	16	0.02	P	86	GM	CHEV	CELEBRITY Wgn	37,434	6	173(2.8L)/2bbl	G1G2.8V2NNA1	10/20/87	7/2	13:01
0368*	YES	265	6.43	F	85	CHRY	DODG	600	14,447	4	135(2.2L)/FI	FCR2.2V5HCF2	10/20/87	7/3	13:27
0369	NO	84	0.02	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	47,804	6	231(3.8L)/2bbl	E4G3.8V2NEY0	10/20/87	7/2	16:17
0370	NO	12	0.00	P	85	CHRY	DODG	600	28,354	4	135(2.2L)/FI	FCR2.2V5HCF2	10/20/87	7/3	17:03
0371	NO	70	0.00	P	84	GM	OLDS	CUTLASS CIERA BRGHM	49,947	6	181(3.0L)/2bbl	E4G3.8V2NEY0	10/20/87	7/3	17:07
0372	NO	18	0.00	P	86	GM	OLDS	CUTLASS SUPREME	13,166	6	231(3.8L)/2bbl	G4G3.8V2NSY7	10/20/87	7/3	17:09
0373	NO	25	0.01	P	87	CHRY	PLYM	DUSTER	20,222	4	135(2.2L)/2bbl	HCR2.2V2HDH7	10/20/87	7/3	17:54
0374	NO	15	0.00	P	85	GM	BUIC	REGAL LIMITED	38,095	6	231(3.8L)/2bbl	F4G3.8V2NSY6	10/20/87	7/3	17:58
0375	YES	10	0.00	P	85	CHRY	CHRY	LASER XE	32,770	4	135(2.2L)/FI	FCR2.2V5HCF2	10/20/87	7/2	18:02
0376	NO	16	0.01	P	87	GM	OLDS	CUTLASS CALAIS	8,754	6	181(3.0L)/FI	H2G3.0V8XTBX	10/22/87	8/2	10:04
0378	NO	26	0.01	P	83	GM	BUIC	LeSABRE LIMITED	24,439	8	307(5.0L)/4bbl	D3G5.0V4ARA9	10/22/87	8/5	12:09
0379	NO	5	0.01	P	84	GM	OLDS	DELTA 88 ROYALE	25,311	8	307(5.0L)/4bbl	E3G5.0V4NLAX	10/22/87	8/5	12:28
0380	NO	23	0.01	P	85	GM	BUIC	ELECTRA	54,702	6	231(3.8L)/FI	F4G3.8V8XEB3	10/22/87	8/2	12:30
0382*	NO	383	0.00	F	84	GM	OLDS	CUTLASS SUPREME BRGHM	48,118	8	307(5.0L)/4bbl	E3G5.0V4NLAX	11/14/87	8/4	09:28
0383	NO	39	0.00	P	83	GM	BUIC	REGAL	12,978	6	231(3.8L)/2bbl	D4G3.8V2NEA3	11/14/87	8/2	09:31
0384	NO	36	0.00	P	86	GM	OLDS	CUTLASS SUPREME	26,342	8	307(5.0L)/4bbl	G3G5.0V4NLA1	11/14/87	8/2	10:16
0385	NO	32	0.05	P	85	GM	PONT	2000 SUNBIRD	26,186	4	110(1.8L)/FI	F2G1.8V5TDGI	11/14/87	8/2	10:25
0386	NO	23	0.00	P	84	GM	CHEV	MONTE CARLO	35,544	8	305(5.0L)/4bbl	E1G5.7V4NEA3	11/14/87	8/2	10:27
0388*	NO**	501	4.94	F	86	CHRY	DODG	ARIES LE	26,639	4	135(2.2L)/FI	GCR2.5V5HCFX	11/17/87	7/2	09:45
0389	NO	90	0.20	P	87	GM	CHEV	CAVALIER CS	7,438	4	122(2.0L)/FI	N/A	11/17/87	7/2	09:55
0390	NO	47	0.02	P	85	GM	BUIC	LeSABRE LIMITED	22,789	8	307(5.0L)/4bbl	F3G5.0V4NLA0	11/17/87	7/2	10:08
0391	NO	47	0.05	P	83	GM	OLDS	CUSTOM CRUISER Wgn	50,836	8	307(5.0L)/4bbl	D3G5.0V4ARA9	11/17/87	7/3	10:11
0392	NO	34	0.01	P	84	GM	BUIC	REGAL	44,297	6	231(3.8L)/2bbl	E4G3.8V2NEY0	11/17/87	7/2	10:40
0393	NO	27	0.00	P	85	GM	BUIC	CENTURY LIMITED	31,111	6	181(3.0L)/2bbl	F4G3.8V2NSY6	11/17/87	7/3	10:40
0394	NO	28	0.01	P	85	CHRY	PLYM	HORIZON SE	42,362	4	135(2.2L)/2bbl	FCR2.2V2HDH5	11/17/87	7/2	11:02
0395	NO	21	0.04	P	85	CHRY	CHRY	NEW YORKER (Turbo)	22,616	4	135(2.2L)/FI	FCR2.2V5FAA9	11/17/87	7/2	11:12
0396	NO	105	0.05	P	84	GM	BUIC	PARK AVENUE	48,858	8	307(5.0L)/4bbl	E3G5.0V4NLAX	11/17/87	7/2	11:18
0397	NO	90	0.11	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	45,671	8	307(5.0L)/4bbl	E3G5.0V4NLAX	11/17/87	7/3	11:18
0398	NO	106	0.13	P	84	GM	BUIC	REGAL LIMITED	42,686	6	231(3.8L)/2bbl	E4G3.8V2NEY0	11/17/87	7/2	11:31
0399	NO	77	0.07	P	84	GM	CHEV	CAPRICE CLASSIC	66,783	8	305(5.0L)/4bbl	E1G5.7V4NEA3	11/17/87	7/2	11:38
0400	NO	17	0.01	P	86	GM	CHEV	CELEBRITY	31,599	6	173(2.8L)/2bbl	G1G2.8V2NNA1	11/17/87	7/2	11:44
0401	YES	44	0.01	P	87	GM	OLDS	CUTLASS CALAIS	12,850	4	151(2.5L)/FI	H1G2.5V5TPG0	11/17/87	7/1	11:55
0403	NO	54	0.00	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	30,523	8	307(5.0L)/4bbl	E3G5.0V4NLAX	11/17/87	7/1	12:30
0404	NO	22	0.00	P	86	GM	OLDS	CUTLASS SUPREME BRGHM	11,944	6	231(3.8L)/2bbl	G4G3.8V2NSY7	11/17/87	7/1	12:46
0405	NO	17	0.00	P	85	GM	CHEV	CAPRICE CLASSIC	19,881	8	305(5.0L)/4bbl	F1G5.7V4NEA4	11/17/87	7/2	12:54

* Recruited for additional testing at VTL.
** No trouble codes were set at the I/M lane, but codes were set by the time it reached VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	I/M Lane HC	I/M Lane CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	Engine No. Cyl	Engine Displacement/ Fuel Metering	Engine Family (if Availbl)	I/M Test Date	I/M Test Stat/ Lane	I/M Test Time
0406	NO	18	0.01	P	85	GM	PONT	6000 STE	46,951	6	173(2.8L)/FI	F1G2.8V8XGZ9	11/17/87	7/2	13:06
0407	NO	53	0.04	P	85	GM	OLDS	DELTA 88 ROYALE	51,228	8	307(5.0L)/4bbl	F3G5.0V4NLA0	11/17/87	7/2	13:08
0408	NO	3	0.01	P	86	GM	CHEV	CAVALIER CS	27,715	4	122(2.0L)/FI	G1G2.0V5XAG2	11/17/87	7/3	14:22
0409	NO	10	0.00	P	87	CHRY	DODG	OMNI	12,115	4	135(2.2L)/2bbl	HCR2.2V2HDH7	11/17/87	7/3	14:53
0410	NO	16	0.00	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	37,351	8	307(5.0L)/4bbl	E3G5.0V4NLAX	11/17/87	7/3	15:10
0412	NO	7	0.00	P	83	GM	CHEV	CAVALIER CS	51,870	4	122(2.0L)/FI	D1G2.0V5NDA4	11/17/87	7/3	15:51
0413	NO	18	0.01	P	87	GM	PONT	2000 SUNBIRD	25,600	4	122(2.0L)/FI	H1G2.0V5TDG8	11/17/87	7/2	15:54
0414	NO	26	0.00	P	86	GM	PONT	BONNEVILLE	63,570	6	231(3.8L)/2bbl	G4G3.8V2NSY7	11/17/87	7/3	16:07
0415	NO	3	0.00	P	84	GM	PONT	GRAND PRIX	30,837	8	305(5.0L)/4bbl	N/A	11/17/87	7/3	16:14
0416	NO	5	0.00	P	85	GM	CHEV	CAPRICE CLASSIC	58,798	8	305(5.0L)/4bbl	F1G5.7V4NEA4	11/17/87	7/3	16:24
0417	NO	14	0.01	P	86	GM	OLDS	98 REGENCY BRGHM	24,455	6	231(3.8L)/FI	G4G3.8V8XEB4	11/19/87	8/2	10:01
0418	NO	4	0.07	P	86	GM	OLDS	CUTLASS CALAIS	23,544	4	151(2.5L)/FI	G2G2.5V5TPG9	11/19/87	8/3	10:05
0419	NO	1	0.00	P	85	GM	BUIC	LeSABRE LIMITED	12,723	8	307(5.0L)/4bbl	F3G5.0V4NLA0	11/19/87	8/3	10:38
0421	NO	2	0.00	P	84	GM	CHEV	CELEBRITY	62,906	6	173(2.8L)/2bbl	E1G2.8V2NNAX	11/19/87	8/4	10:46
0422	NO	26	0.15	P	87	GM	CHEV	CAVALIER Wgn	16,567	4	122(2.0L)/FI	H1G2.0V5XAG3	11/19/87	8/4	10:48
0423	NO	21	0.00	P	86	GM	OLDS	CUTLASS SUPREME BRGHM	26,436	8	307(5.0L)/4bbl	G3G5.0V4NLA1	11/19/87	8/3	10:52
0424	NO	18	0.01	P	85	GM	PONT	2000 SUNBIRD	33,842	4	110(1.8L)/FI	F2G1.8V5TDG1	11/19/87	8/2	10:58
0425	NO	17	0.01	P	87	GM	OLDS	98 REGENCY BRGHM	6,842	6	231(3.8L)/FI	H2G3.8V8XEB7	11/19/87	8/3	11:10
0426	NO	31	0.07	P	83	GM	PONT	2000	50,720	4	110(1.8L)/FI	D2G1.8V5TDGX	11/19/87	8/5	11:18
0427	NO	10	0.01	P	86	GM	OLDS	CUTLASS CIERA BRGHM	19,001	6	173(2.8L)/2bbl	G1G2.8V2NNA1	11/19/87	8/3	11:26
0428	NO	50	0.47	P	84	GM	BUIC	CENTURY LIMITED	76,286	6	181(3.0L)/2bbl	E4G3.8V2NEYO	11/19/87	8/5	12:08
0429	NO	40	0.00	P	84	GM	CHEV	CAMARO Z28	41,162	6	173(2.8L)/2bbl	E1G2.8V2NNAX	11/19/87	8/4	12:22
0430	YES	96	0.33	P	86	GM	CHEV	CAVALIER RS	27,603	4	122(2.0L)/FI	G1G2.0V5XAG2	11/19/87	8/4	12:29
0431	NO	3	0.01	P	86	GM	BUIC	SOMERSET LIMITED	27,419	6	181(3.0L)/FI	G4G3.8V8XEB4	11/19/87	8/5	12:32
0432	YES	11	0.01	P	86	GM	BUIC	PARK AVENUE	11,973	6	231(3.8L)/FI	G4G3.8V8XEB4	11/19/87	8/2	13:12
0433	NO	5	0.00	P	86	GM	BUIC	PARK AVENUE	39,279	6	231(3.8L)/FI	G4G3.8V8XEB4	11/19/87	8/4	14:27
0434	NO	26	0.00	P	84	GM	CHEV	CHEVETTE CS	54,541	4	98(1.6L)/2bbl	E1G1.6V2NEA1	11/19/87	8/4	15:05
0435	NO	1	0.01	P	86	GM	OLDS	CUTLASS CIERA BRGHM	22,156	6	173(2.8L)/2bbl	G1G2.8V2NNA1	12/08/87	8/5	11:03
0436*	YES	31	0.01	P	86	GM	CHEV	CAPRICE CLASSIC	56,757	6	262(4.3L)/FI	G1G4.3V5NDA8	12/08/87	8/5	11:07
0437	NO	1	0.01	P	85	GM	BUIC	REGAL	23,907	6	231(3.8L)/2bbl	F4G3.8V2NSY6	12/08/87	8/5	11:14
0438	NO	1	0.01	P	84	GM	PONT	6000 LE	32,059	6	173(2.8L)/2bbl	E1G2.8V2NNAX	12/08/87	8/5	11:24
0440	NO	5	0.01	P	85	GM	OLDS	CUTLASS CIERA LS	17,664	6	181(3.0L)/2bbl	F4G3.8V2NSY6	12/08/87	8/3	11:49
0441	NO	33	0.00	P	84	GM	OLDS	CUTLASS CIERA LS	34,339	6	181(3.0L)/2bbl	E4G3.8V2NEYO	12/08/87	8/4	12:18
0442	NO	3	0.00	P	86	GM	OLDS	CUTLASS CIERA BRGHM	30,016	6	173(2.8L)/2bbl	G1G2.8V2NNA1	12/08/87	8/4	12:24
0443	NO	45	0.00	P	84	GM	OLDS	DELTA 88 ROYALE	68,203	8	307(5.0L)/4bbl	E3G5.0V4NLAX	12/08/87	8/4	12:18
0444	NO	1	0.01	P	87	GM	OLDS	DELTA 88 ROYALE	18,209	6	231(3.8L)/FI	H2G3.8V8XEB7	12/08/87	8/4	12:36
0445	NO	39	0.01	P	86	CHRY	DODG	CHARGER	17,437	4	135(2.2L)/2bbl	GCR2.2V2HDH6	12/08/87	8/5	12:37
0446	NO	16	0.01	P	85	GM	BUIC	PARK AVENUE	23,377	6	231(3.8L)/FI	F4G3.8V8XEB3	12/08/87	8/3	14:33
0447	NO	0	0.00	P	86	GM	BUIC	PARK AVENUE	21,737	6	231(3.8L)/FI	G4G3.8V8XEB4	12/08/87	8/4	14:34
0501	NO	19	0.01	P	87	GM	BUIC	REGAL	11,258	8	307(5.0L)/4bbl	H2G5.0V4NLA3	07/05/88	7/3	09:14
0502	NO	13	0.02	P	87	FORD	FORD	ESCORT GL	11,258	4	113(1.9L)/FI	HFM1.9V5FFF1	07/05/88	7/2	09:12
0503	NO	13	0.01	P	87	GM	OLDS	CUTLASS SROYALE	18,543	6	231(3.8L)/2bbl	H2G3.8V2NSYX	07/05/88	7/3	09:31
0504	NO	180	0.07	P	85	GM	GMC	SAFARI	N/A	6	262(4.3L)/4bbl	F1G4.3T4HHC1	07/05/88	7/2	09:34

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0505	NO	1	0.00	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	17,643	6	231(3.8L)/FI	G4G3.8V8XEB4	07/05/88	7/1	09:49
0506	NO	98	0.08	P	86	GM	OLDS	CUTLASS CALAIS	30,684	4	151(2.5L)/FI	G2G2.5V5TPG9	07/05/88	7/2	09:51
0507	YES	41	0.00	P	85	FORD	MERC	TOPAZ GS	39,818	4	140(2.3L)/FI	FFM2.3V5HCF4	07/05/88	7/1	09:51
0509	YES	24	0.01	P	84	FORD	MERC	GRAND MARQUIS LS	84,119	8	302(5.0L)/FI	EFM5.0V5HBF7	07/05/88	7/2	10:14
0510	NO	13	0.01	P	87	GM	OLDS	DELTA 88 ROYALE	24,100	6	231(3.8L)/FI	H2G3.8V8XEB7	07/05/88	7/2	10:21
0512	NO	10	0.01	P	84	GM	CHEV	CAVALIER	61,988	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/05/88	7/3	10:31
0513	NO	14	0.02	P	85	CHRY	CHRY	LE BARON	71,278	4	135(2.2L)/FI	FCR2.2V5FAA9	07/05/88	7/3	10:33
0514	NO	7	0.01	P	84	GM	CHEV	CAVALIER CS	13,973	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/05/88	7/1	10:37
0515	NO	274	4.26	F	83	GM	CHEV	CHEVETTE	116,394	4	98(1.6L)/2bbl	D1G1.6V2NEA0	07/05/88	7/3	10:46
0516	NO	32	0.00	P	87	FORD	LINC	CONTINENTAL	13,100	8	302(5.0L)/FI	HFM5.0V5HBFX	07/05/88	7/1	10:52
0517	YES	2	0.01	P	85	FORD	FORD	THUNDERBIRD	56,593	8	302(5.0L)/FI	FFM5.0V5HBF8	07/05/88	7/1	10:57
0519	NO	37	0.00	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	61,097	8	307(5.0L)/4bbl	E3G5.0V4NLAX	07/05/88	7/1	11:08
0520	YES	9	0.00	P	87	FORD	FORD	MUSTANG LX	14,000	8	302(5.0L)/FI	HFM5.0V5HBFX	07/05/88	7/1	11:19
0521	NO	23	0.01	P	86	GM	OLDS	CUTLASS SUPREME	25,805	8	307(5.0L)/4bbl	G3G5.0V4NLA1	07/05/88	7/2	11:27
0522	NO	14	0.04	P	86	GM	OLDS	CUTLASS CALAIS	32,674	4	110(1.8L)/FI	G2G2.5V5TPG9	07/05/88	7/3	11:46
0523	YES	17	0.01	P	86	FORD	FORD	TEMPO	10,380	4	140(2.3L)/FI	GFM2.5V5HCF6	07/05/88	7/2	11:50
0525	NO	5	0.01	P	87	GM	PONT	BONNEVILLE	29,293	6	231(3.8L)/FI	H2G3.8V8XEB7	07/05/88	7/3	12:24
0527	NO	22	0.00	P	85	GM	CHEV	IMPALA	31,250	8	305(5.0L)/4bbl	F1G5.7V4NEA4	07/05/88	7/3	12:28
0528*	YES	11	0.01	P	86	GM	OLDS	CUTLASS CALAIS	19,625	6	181(3.0L)/FI	G4G3.8V8XEB4	07/05/88	7/2	12:30
0529	NO	20	0.01	P	85	FORD	FORD	LTD	34,548	6	231(3.8L)/FI	FFM3.8V5HHF8	07/05/88	7/1	12:33
0530	NO	28	0.01	P	86	GM	OLDS	CUTLASS SUPREME	45,089	6	231(3.8L)/2bbl	G4G3.8V2NSY7	07/05/88	7/2	12:35
0531	NO	236	2.57	F	87	FORD	FORD	TAURUS MTS	30,837	4	152(2.5L)/FI	HFM2.5V5HCF7	07/05/88	7/1	12:42
0532	YES	31	0.00	P	85	FORD	FORD	LTD BRGHM	26,300	6	231(3.8L)/FI	FFM3.8V5HHF8	07/06/88	7/3	09:13
0534	NO	15	0.01	P	86	GM	BUIC	REGAL	59,238	8	307(5.0L)/4bbl	G3G5.0V4NLA1	07/06/88	7/3	09:41
0535	NO	21	0.01	P	86	CHRY	DODG	ARIES K	24,838	4	135(2.2L)/FI	GCR2.5V5HCFX	07/06/88	7/3	09:45
0536	NO	6	0.01	P	87	GM	PONT	6000 S/E	29,332	6	173(2.8L)/FI	H1G2.8V8XRZ4	07/06/88	7/3	09:56
0537	NO	37	0.01	P	84	FORD	LINC	TOWN CAR	80,956	8	302(5.0L)/FI	EFM5.0V5HBF7	07/06/88	7/2	10:01
0538	NO	21	0.01	P	86	CHRY	CHRY	NEW YORKER	12,307	4	152(2.5L)/FI	GCR2.5V5HCFX	07/06/88	7/2	10:08
0539	NO	13	0.01	P	84	GM	OLDS	DELTA 88 ROYALE	62,938	8	307(5.0L)/4bbl	E3G5.0V4NLAX	07/06/88	7/2	10:14
0540	NO	21	0.01	P	84	GM	CHEV	CAVALIER TYPE 10	72,980	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/06/88	7/2	10:28
0541+	YES	481	8.33	F	86	CHRY	CHRY	NEW YORKER	63,753	4	152(2.5L)/FI	GCR2.5V5HCFX	07/06/88	7/1	10:36
0542	NO	21	0.01	P	84	FORD	LINC	CONTINENTAL MARK VII	40,010	8	302(5.0L)/FI	EFM5.0V5HBC4	07/06/88	7/2	10:41
0543	YES	1	0.02	P	87	FORD	FORD	ESCORT GL	22,344	4	113(1.9L)/FI	HFM1.9V5FFF1	07/06/88	7/1	10:46
0544	NO	21	0.01	P	85	GM	OLDS	DELTA 88 ROYALE	31,089	8	307(5.0L)/4bbl	F3G5.0V4NLA0	07/06/88	7/2	11:03
0546	YES	4	0.01	P	87	GM	OLDS	DELTA 88 ROYALE BRGHM	6,358	6	231(3.8L)/FI	H2G3.8V8XEB7	07/06/88	7/3	11:10
0547	NO	5	0.02	P	87	CHRY	DODG	ARIES K Wgn	5,024	4	152(2.5L)/FI	NO LABEL	07/06/88	7/3	11:34
0548	YES	42	0.00	P	84	FORD	MERC	MARQUIS BRGHM	59,196	6	231(3.8L)/FI	EFM3.8V5HHF7	07/06/88	7/3	11:44
0549	NO	13	0.00	P	84	GM	CHEV	CELEBRITY	66,808	6	173(2.8L)/2bbl	E1G2.8V2NNAX	07/06/88	7/1	11:44
0550	NO	5	0.00	P	87	GM	CHEV	CAMARO	12,454	8	305(5.0L)/4bbl	H1G5.0V4NTA4	07/06/88	7/3	12:07
0551	NO	13	0.03	P	87	CHRY	DODG	ARIES K Wgn	18,589	4	152(2.5L)/FI	HCR2.5V5FBD1	07/07/88	7/2	09:13
0555	NO	43	0.01	P	86	FORD	LINC	TOWN CAR	25,423	8	302(5.0L)/FI	GFM5.0V5HBF9	07/07/88	7/2	09:26

* Recruited for additional testing at VTL.
\+ Recruited for additional testing at VTL but should have been rejected since its I/M test was a retest.

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0556	NO	135	0.25	P	85	GM	CHEV	CITATION II	46,050	6	173(2.8L)/FI	F1G2.8V8XG29	07/07/88	7/2	09:30
0557	NO	21	0.01	P	84	FORD	MERC	TOPAZ GS	74,048	4	140(2.3L)/1bbl	EFM2.3V1HCK5	07/07/88	7/2	10:09
0558	NO	38	0.01	P	87	GM	OLDS	CUTLASS CIERA	19,712	6	173(2.8L)/FI	H1G2.8V8XRZ4	07/07/88	7/2	10:30
0559	NO	41	0.01	P	83	GM	BUIC	REGAL LIMITED	29,892	6	231(3.8L)/2bbl	D4G3.8V2NEA3	07/07/88	7/2	10:42
0561	NO	26	0.01	P	85	GM	OLDS	DELTA 88 ROYALE	30,447	8	307(5.0L)/4bbl	F3G5.0V4NLA0	07/07/88	7/2	11:15
0562	NO	10	0.00	P	87	FORD	LINC	TOWN CAR	12,353	8	302(5.0L)/FI	HFM5.0V5HBFX	07/07/88	7/	11:26
0563	YES	24	0.01	P	85	FORD	LINC	TOWN CAR	N/A	8	302(5.0L)/FI	FFM5.0V5HBF8	07/07/88	7/2	11:27
0564	NO	56	0.18	P	87	GM	CHEV	CAVALIER RS	6,222	4	122(2.0L)/FI	H1G2.0V5XAG3	07/07/88	7/2	11:28
0565	NO	14	0.04	P	86	GM	PONT	SUNBIRD	22,402	4	110(1.8L)/FI	G2G1.8V5TDG2	07/07/88	7/3	11:47
0566	NO	11	0.01	P	86	GM	CHEV	CAMARO	11,442	6	173(2.8L)/FI	G1G2.8V8XGZX	07/07/88	7/2	11:51
0567	NO	30	0.01	P	84	GM	OLDS	CUTLASS SUPREME	81,097	6	231(3.8L)/2bbl	E4G3.8V2NEY0	07/07/88	7/2	11:35
0568	NO	74	0.08	P	85	GM	OLDS	CUTLASS CALAIS	72,063	4	151(2.5L)/FI	F2G2.5V5TPG8	07/07/88	7/2	11:58
0569	NO	319	4.43	F	85	FORD	FORD	TEMPO GL	43,210	4	140(2.3L)/FI	FFM2.3V5HCF4	07/08/88	7/2	12:00
0571	NO	21	0.01	P	86	GM	PONT	GRAND PRIX	30,904	8	305(5.0L)/4bbl	G1G5.7V4NEA5	07/08/88	7/2	09:44
0572	NO	19	0.01	P	86	GM	CHEV	CAVALIER Wgn	24,649	4	122(2.0L)/FI	G1G2.0V5XAG2	07/08/88	7/2	10:09
0573	NO	21	0.06	P	87	GM	CHEV	CAVALIER CS	23,269	4	122(2.0L)/FI	NO LABEL	07/08/88	7/2	10:21
0574	NO	332	0.00	F	83	GM	OLDS	CUTLASS SUPREME	72,811	6	231(3.8L)/2bbl	D4G3.8V2NEA3	07/08/88	7/2	10:27
0575	NO	11	0.01	P	84	GM	CHEV	CAVALIER TYPE 10	130,010	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/08/88	7/3	10:44
0576	NO	13	0.01	P	86	GM	OLDS	DELTA 88 ROYALE	35,139	6	181(3.0L)/FI	G4G3.8V8XEB4	07/08/88	7/2	10:52
0577	YES	121	0.08	P	84	FORD	MERC	GRAND MARQUIS LS	58,117	8	302(5.0L)/FI	EFM5.0V5HBF7	07/08/88	7/3	10:53
0578	NO	25	0.01	P	83	GM	CADI	CIMARRON	34,205	4	122(2.0L)/FI	D1G2.0V5NDA4	07/08/88	7/2	11:09
0579	NO	25	0.04	P	85	GM	BUIC	SOMERSET REGAL	38,709	4	151(2.5L)/FI	F2G2.5V5TPG8	07/08/88	7/3	11:22
0580	NO	33	0.08	P	84	GM	CHEV	CAVALIER CS	40,184	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/12/88	7/2	09:24
0581	NO	59	0.29	P	87	FORD	FORD	TEMPO LX	11,972	4	140(2.3L)/FI	HFM2.5V5HCF7	07/12/88	7/2	09:35
0582	NO	245	1.04	F	86	FORD	MERC	COUGAR LS XR7	33,041	6	231(3.8L)/FI	GFM3.8V5HHF9	07/12/88	7/2	09:46
0583	NO	43	0.01	P	86	FORD	MERC	LYNX XR3	43,851	4	113(1.9L)/FI	GFM1.9V5HMK9	07/12/88	7/3	10:00
0584	NO	10	0.01	P	87	GM	OLDS	DELTA 88 ROYALE BRGHM	7,725	6	231(3.8L)/FI	H2G3.8V8XEB7	07/12/88	7/2	10:02
0585	NO	36	0.00	P	83	GM	BUIC	RIVIERA	48,816	6	252(4.1L)/4bbl	D4G4.1V4AEA9	07/12/88	7/3	10:19
0586	NO	48	0.08	P	87	FORD	FORD	MUSTANG LX	21,140	4	140(2.3L)/FI	HFM2.3V5FFG7	07/12/88	7/1	10:29
0587	YES	10	0.00	P	84	FORD	MERC	GRAND MARQUIS LS	43,251	8	302(5.0L)/FI	EFM5.0V5HBF7	07/12/88	7/3	10:36
0588	NO	9	0.00	P	83	GM	CHEV	CAMARO	38,232	8	305(5.0L)/4bbl	D1G5.7V4NDA0	07/12/88	7/3	12:06
0589	NO	240	4.87	F	85	FORD	MERC	GRAND MARQUIS LS	60,219	8	302(5.0L)/FI	FFM5.0V5HBF8	07/12/88	7/2	12:08
0590	NO	52	0.01	P	87	FORD	FORD	LTD CROWN VICTORIA LX	6,620	8	302(5.0L)/FI	HFM5.0V5HBFX	07/12/88	7/2	12:38
0591	NO	29	0.01	P	86	GM	BUIC	SKYLARK	44,421	4	151(2.5L)/FI	G2G2.5V5TPG9	07/12/88	7/2	12:48
0592	NO	98	0.26	P	84	GM	OLDS	FIERENZA	21,350	4	110(1.8L)/FI	E2G1.8V5TDG0	07/13/88	7/1	09:13
0593	YES	158	0.05	P	86	GM	CHEV	CAMARO	49,107	6	173(2.8L)/FI	NO LABEL	07/13/88	7/2	09:08
0594	NO	16	0.01	P	86	GM	CHEV	CELEBRITY	50,903	6	173(2.8L)/2bbl	G1G2.8V2NNA1	07/13/88	7/2	09:26
0595	NO	36	0.01	P	86	FORD	FORD	LTD	17,722	6	231(3.8L)/FI	GFM2.8V5HHF9	07/13/88	7/2	09:24
0597	YES	19	0.00	P	85	FORD	FORD	COUNTRY SQUIRE Wgn	42,285	8	302(5.0L)/FI	FFM5.0V5HBF8	07/13/88	7/3	09:50
0598	YES	20	0.01	P	87	FORD	FORD	TEMPO LX	4,866	4	140(2.3L)/FI	HFM2.5V5HCF7	07/13/88	7/2	09:59
0599	YES	20	0.01	P	85	FORD	FORD	LTD CROWN VICTORIA	37,205	8	302(5.0L)/FI	FFM5.0V5HBF8	07/13/88	7/2	10:10
0600	NO	10	0.01	P	86	GM	CHEV	CAPRICE	30,426	6	262(4.3L)/FI	G1G4.3V5NDAB	07/13/88	7/3	10:21
0601	NO	13	0.01	P	87	GM	CHEV	CAPRICE CLASSIC BRGHM	15,328	8	305(5.0L)/4bbl	H1G5.7V4NEA6	07/13/88	7/2	10:32
0602	NO	33	0.00	P	84	GM	BUIC	REGAL LIMITED	26,290	6	231(3.8L)/2bbl	E4G3.8V2NEY0	07/13/88	7/1	10:33
0603	NO	12	0.01	P	86	GM	BUIC	LE SABRE	26,566	6	181(3.0L)/FI	G4G3.8V8XEB4	07/13/88	7/2	10:36

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0604	NO	138	0.17	P	86	FORD	FORD	MUSTANG GT	43,354	8	302(5.0L)/FI	GFM5.0V5HBF9	07/13/88	7/1	10:48
0605	NO	5	0.07	P	85	GM	BUIC	SKYHAWK	39,919	4	122(2.0L)/FI	F1G2.0V5XAG1	07/13/88	7/1	10:45
0606	NO	46	0.01	P	86	FORD	MERC	GRAND MARQUIS LS	8,021	8	302(5.0L)/FI	GFM5.0V5HBF9	07/13/88	7/2	10:50
0607	YES	40	0.02	P	84	FORD	FORD	TEMPO GL	59,212	4	140(2.3L)/1bbl	EFM2.3V1HRFX	07/13/88	7/1	11:06
0608	NO	10	0.01	P	87	GM	OLDS	98 REGENCY	17,031	6	231(3.8L)/FI	H2G3.8V8XEB7	07/13/88	7/2	11:18
0609	NO	19	0.01	P	85	GM	CHEV	IMPALA	39,779	8	305(5.0L)/4bbl	F1G5.7V4NEA4	07/13/88	7/2	11:28
0610	NO	14	0.00	P	86	GM	CHEV	CORVETTE	36,022	8	350(5.7L)/FI	G1G5.7V8DAAX	07/13/88	7/2	11:32
0611	NO	10	0.00	P	86	GM	BUIC	CENTURY LIMITED	23,543	6	173(2.8L)/2bbl	G1G2.8V2NNA1	07/13/88	7/2	11:37
0612	NO	8	0.00	P	87	GM	OLDS	CUTLASS SUPREME	11,821	8	307(5.0L)/4bbl	H2G5.0V4NLA3	07/13/88	7/3	12:01
0613	NO	11	0.06	P	87	GM	CHEV	CAVALIER	9,276	4	122(2.0L)/FI	H1G2.0V5XAG3	07/13/88	7/2	12:54
0615	NO	26	0.02	P	85	GM	OLDS	CUTLASS CALAIS	46,237	4	151(2.5L)/FI	F2G2.5V5TPG8	07/13/88	7/2	13:31
0616	NO	23	0.00	P	86	GM	PONT	BONNEVILLE	76,078	8	305(5.0L)/4bbl	G1G5.7V4NEA5	07/13/88	7/3	13:46
0617	NO	27	0.01	P	86	FORD	MERC	COUGAR LS XR7	35,173	6	231(3.8L)/FI	GFM3.8V5HHF9	07/13/88	7/2	13:53
0618	NO	5	0.05	P	85	GM	BUIC	SKYHAWK	46,392	4	122(2.0L)/FI	F1G2.0V5XAG1	07/13/88	7/1	14:03
0619	NO	2	0.05	P	86	CHRY	DODG	ARIES	11,670	4	152(2.5L)/FI	GCR2.5V5HCFX	07/13/88	7/1	14:09
0620	NO	2	0.05	P	84	GM	OLDS	FIERENZA	45,819	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/13/88	7/1	14:12
0621	NO	49	0.15	P	85	GM	CHEV	CAVALIER CS	22,454	4	122(2.0L)/FI	F1G2.0V5XAG1	07/13/88	7/1	14:56
0622	NO	1	0.00	P	83	FORD	FORD	THUNDERBIRD	49,768	6	231(3.8L)/2bbl	DFM3.8V2GXFO	07/13/88	7/1	15:12
0623	NO	19	0.00	P	87	FORD	MERC	COUGAR LS	15,004	8	302(5.0L)/FI	HFM5.0V5HBFX	07/13/88	7/1	15:09
0624	NO	20	0.01	P	87	GM	BUIC	PARK AVENUE	19,206	6	231(3.8L)/FI	H2G3.8V8XEB7	07/14/88	7/2	09:22
0625	NO	42	0.04	P	85	GM	OLDS	CUTLASS CIERA	17,573	4	151(2.5L)/FI	F2G2.5V5TPG8	07/14/88	7/3	09:24
0626	NO	37	0.01	P	84	GM	OLDS	CUTLASS SUPREME	42,455	6	231(3.8L)/2bbl	E4G3.8V2NEYO	07/14/88	7/2	09:33
0627	NO	27	0.01	P	83	GM	OLDS	98 REGENCY	46,357	8	307(5.0L)/4bbl	D3G5.0V4ARA9	07/14/88	7/2	09:47
0628	NO	19	0.01	P	86	FORD	MERC	COUGAR LS XR7	27,334	6	231(3.8L)/FI	GFM3.8V5HHF9	07/14/88	7/2	09:54
0629	YES	62	0.04	P	87	GM	CHEV	CELEBRITY	15,445	6	173(2.8L)/FI	H1G2.8V8XRZ4	07/14/88	7/2	10:01
0631	NO	14	0.01	P	87	CHRY	CHRY	NEW YORKER	15,080	4	135(2.2L)/FI	HCR2.2V5FAC2	07/14/88	7/2	10:20
0632	NO	7	0.00	P	85	FORD	LINC	TOWN CAR	51,965	8	302(5.0L)/FI	FFM5.0V5HBF8	07/14/88	7/3	10:44
0633	YES	24	0.03	P	87	FORD	FORD	TAURUS GL Wgn	12,355	6	182(3.0L)/FI	HFM3.0V5FEG6	07/14/88	7/2	10:45
0634	NO	23	0.01	P	86	GM	BUIC	SOMERSET REGAL	31,431	4	151(2.5L)/FI	G2G2.5V5TPG9	07/14/88	7/2	10:54
0635	YES	8	0.00	P	87	FORD	MERC	TOPAZ GS	27,889	4	140(2.3L)/FI	HFM2.5V5HCF7	07/14/88	7/3	11:11
0637	NO	31	0.01	P	86	FORD	FORD	MUSTANG	21,671	8	302(5.0L)/FI	GFM5.0V5HBF9	07/14/88	7/2	11:49
0638	NO	15	0.00	P	87	GM	OLDS	CUTLASS CIERA	7,129	4	151(2.5L)/FI	H1G2.5V5TPGO	07/14/88	7/2	12:06
0639	NO	27	0.00	P	84	FORD	FORD	COUNTRY SQUIRE Wgn	98,584	8	302(5.0L)/FI	EFM5.0V5HBF7	07/14/88	7/3	12:08
0640	NO	11	0.01	P	86	GM	OLDS	CUTLASS CIERA	30,379	6	173(2.8L)/FI	G1G2.8V8XGZX	07/14/88	7/2	12:09
0641	NO	10	0.10	P	88	GM	CHEV	BERETTA GT	11,763	6	173(2.8L)/FI	J1G2.8V8XRZ8	07/15/88	7/3	09:24
0643	NO	34	0.01	P	84	GM	CHEV	CAPRICE Wgn	57,234	8	305(5.0L)/4bbl	E1G5.7V4NEA3	07/15/88	7/3	09:44
0644	NO	16	0.01	P	87	GM	BUIC	CENTURY CUSTOM	10,753	4	151(2.5L)/FI	H1G2.5V5TPGO	07/15/88	7/3	09:48
0645	NO	39	0.01	P	84	CHRY	PLYM	HORIZON	52,131	4	135(2.2L)/2bbl	ECR2.2V2HAC4	07/15/88	7/3	09:51
0646	NO	15	0.01	P	87	GM	PONT	GRAND AM	19,627	4	151(2.5L)/FI	H1G2.5V5TPGO	07/15/88	7/3	09:55
0647*	YES	367	3.11	F	85	FORD	FORD	TEMPO GL	43,679	4	140(2.3L)/FI	FFM2.3V5HCF4	07/15/88	7/3	09:58
0648	NO	23	0.00	P	83	GM	OLDS	98 REGENCY BRGHM	77,777	8	307(5.0L)/4bbl	D3G5.0V4ARA9	07/15/88	7/3	10:02

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0651	NO	16	0.01	P	85	FORD	LINC	CONTINENTAL MARK VII	24,700	8	302(5.0L)/FI	FFM5.0V5HBF8	07/15/88	7/2	10:28
0652	NO	1	0.00	P	86	GM	OLDS	98 REGENCY BRGHM	31,973	6	231(3.8L)/FI	G4G3.8V8XEB4	07/15/88	7/3	10:31
0653	NO	8	0.01	P	86	GM	CHEV	ASTRO	43,714	6	262(4.3L)/FI	G1G4.3T5TMG9	07/15/88	7/3	10:33
0654	NO	11	0.00	P	85	GM	OLDS	CUTLASS CIERA	49,933	6	181(3.0L)/2bbl	F4G3.8V2NSY6	07/15/88	7/3	10:56
0655	NO	13	0.01	P	86	GM	CHEV	MONTE CARLO	33,958	8	305(5.0L)/4bbl	G1G5.7V4NEA5	07/15/88	7/3	11:00
0656	NO	15	0.01	P	86	GM	CHEV	CELEBRITY	30,111	6	173(2.8L)/2bbl	G1G2.8V2NNA1	07/15/88	7/2	11:02
0657	NO	25	0.01	P	86	GM	BUIC	PARK AVENUE	23,277	6	231(3.8L)/FI	G4G3.8V8XEB4	07/15/88	7/2	11:11
0658	NO	37	0.01	P	84	GM	OLDS	CUTLASS CIERA BRGHM	16,373	6	181(3.0L)/2bbl	E4G3.8V2NEY0	07/15/88	7/2	11:24
0659	NO	13	0.01	P	87	FORD	MERC	COUGAR LS	9,498	6	231(3.8L)/FI	HFM3.8V5HHFX	07/19/88	7/2	09:54
0660	YES	11	0.01	P	87	FORD	FORD	MUSTANG LX	10,697	4	140(2.3L)/FI	HFM2.3V5FFG7	07/19/88	7/2	09:56
0661	NO	87	0.07	P	86	GM	OLDS	CUTLASS CIERA LS	48,466	6	173(2.8L)/2bbl	G1G2.8V2NNA1	07/19/88	7/2	10:20
0663	NO	17	0.01	P	85	GM	CHEV	CAVALIER	35,005	4	122(2.0L)/FI	F1G2.0V5XAG1	07/19/88	7/2	11:07
0664	NO	240	4.03	F	84	GM	CHEV	CAMARO	49,357	8	305(5.0L)/4bbl	E1G5.7V4NEA3	07/19/88	7/3	11:12
0665	NO	17	0.00	P	85	GM	BUIC	LeSABRE	46,481	8	307(5.0L)/4bbl	F3G5.0V4NLA0	07/19/88	7/3	11:33
0666	NO	39	0.14	P	85	GM	OLDS	CUTLASS CIERA LS	43,713	4	151(2.5L)/FI	F2G2.5V5TPG8	07/19/88	7/3	11:44
0667	NO	97	0.15	P	86	GM	CHEV	CELEBRITY GL	12,141	4	151(2.5L)/FI	G2G2.5V5TPG9	07/19/88	7/3	11:50
0668	NO	234	0.12	F	86	GM	CHEV	CELEBRITY Wgn	47,547	6	173(2.8L)/2bbl	G1G2.8V2NNA1	07/19/88	7/1	12:02
0669	NO	4	0.00	P	87	GM	CHEV	CELEBRITY	21,147	6	173(2.8L)/FI	H1G2.8V8XRZ4	07/19/88	7/1	12:04
0670	NO	15	0.00	P	84	GM	CHEV	CAPRICE CLASSIC	73,862	8	305(5.0L)/4bbl	E1G5.7V4NEA3	07/19/88	7/1	12:10
0671	NO	12	0.00	P	84	FORD	FORD	LTD BRGHM	55,087	6	231(3.8L)/FI	EFM3.8V5HHF7	07/17/88	7/1	12:14
0672	NO	11	0.07	P	86	GM	CHEV	CAVALIER	39,386	4	122(2.0L)/FI	G1G2.0V5XAG2	07/19/88	7/1	12:18
0673	NO	33	0.00	P	86	GM	OLDS	CUTLASS SUPREME	18,540	8	307(5.0L)/4bbl	G3G5.0V4NLA1	07/19/88	7/2	12:30
0674	YES	6	0.00	P	83	GM	OLDS	CUTLASS CRUISER Wgn	51,966	6	231(3.8L)/2bbl	D4G3.8V2NEA3	07/19/88	7/1	12:34
0677	NO	4	0.00	P	86	GM	PONT	6000	34,664	6	173(2.8L)/FI	G1G2.8V8XGZX	07/19/88	7/3	14:12
0678	NO	13	0.00	P	86	GM	CHEV	MONTE CARLO	38,351	8	305(5.0L)/4bbl	G1G5.7V4NEA5	07/19/88	7/1	14:23
0680	NO	5	0.00	P	85	GM	PONT	6000 Wgn	41,180	6	173(2.8L)/2bbl	F1G2.8V2NNA0	07/19/88	7/1	14:33
0681	NO	5	0.00	P	83	FORD	LINC	CONTINENTAL MARK VII	N/A	8	302(5.0L)/FI	DFM5.0V5HLF8	07/19/88	7/1	14:42
0682	NO	5	0.01	P	88	GM	CHEV	CORSICA	7,453	6	173(2.8L)/FI	J1G2.8V8XRZ8	07/19/88	7/1	14:47
0683	NO	15	0.01	P	86	GM	CHEV	CAVALIER	11,394	4	122(2.0L)/FI	G1G2.0V5XAG2	07/19/88	7/2	14:56
0684	NO	26	0.02	P	87	FORD	FORD	TEMPO LX	13,543	4	140(2.3L)/FI	HFM2.5V5HCF7	07/19/88	7/1	15:00
0685	NO	12	0.01	P	84	GM	BUIC	REGAL LIMITED	15,542	6	231(3.8L)/2bbl	E4G3.8V2NEY0	07/19/88	7/3	15:02
0687	NO	13	0.01	P	84	GM	CHEV	CAPRICE CLASSIC	51,824	8	305(5.0L)/4bbl	E1G5.7V4NEA3	07/19/88	7/3	15:20
0688	NO	15	0.05	P	86	GM	OLDS	FIRENZA	37,965	4	110(1.8L)/FI	N/A	07/19/88	7/3	15:27
0689	NO	14	0.01	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	20,921	6	231(3.8L)/FI	G4G3.8V8XEB4	07/19/88	7/2	15:40
0690	NO	16	0.00	P	87	GM	CHEV	MONTE CARLO	20,384	6	262(4.3L)/FI	H1G4.3V5NDA9	07/19/88	7/1	09:16
0691	NO	3	0.00	P	87	GM	CHEV	CAPRICE CLASSIC	16,580	8	305(5.0L)/4bbl	H1G5.7V4NEA6	07/20/88	7/3	09:17
0694	NO	17	0.01	P	87	GM	OLDS	CUTLASS SUPREME BRGHM	24,748	8	307(5.0L)/4bbl	H2G5.0V4NLA3	07/20/88	7/2	09:45
0695	NO	17	0.01	P	84	GM	PONT	6000 LE	19,222	6	173(2.8L)/2bbl	E1G2.8V2NNAX	07/20/88	7/2	09:51
0696	NO	7	0.01	P	86	GM	CHEV	CAVALIER Wgn	8,975	4	122(2.0L)/FI	G1G2.0V5XAG2	07/20/88	7/3	09:53
0698	NO	53	0.05	P	87	GM	BUIC	SKYHAWK	N/A	4	122(2.0L)/FI	H1G2.0V5XAG3	07/20/88	7/2	10:09
0699	NO	8	0.01	P	87	GM	OLDS	DELTA 88 ROYALE BRGHM	19,325	6	231(3.8L)/FI	H2G3.8V8XEB7	07/20/88	7/1	10:13

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	I/M Lane HC	I/M Lane CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	Engine No. Cyl	Engine Displacement/ Fuel Metering	Engine Family (if Availbl)	I/M Test Date	I/M Test Stat/ Lane	I/M Test Time
0700	NO	7	0.00	P	85	GM	CHEV	MONTE CARLO	37,170	8	305(5.0L)/4bbl	F1G5.7V4NEA4	07/20/88	7/3	10:21
0701	NO	34	0.04	P	86	CHRY	DODG	LANCER	N/A	4	135(2.2L)/FI	GCR2.2V5FAAX	07/20/88	7/3	10:26
0702	NO	3	0.00	P	87	GM	CHEV	CAMARO IROC Z-28	7,523	8	350(5.7L)/FI	H1G5.7V8NTA7	07/20/88	7/1	10:29
0703	NO	22	0.01	P	86	GM	CHEV	MONTE CARLO	21,665	8	305(5.0L)/4bbl	G1G5.7V4NEA5	07/20/88	7/2	10:56
0704	YES	16	0.03	P	87	FORD	MERC	TOPAZ LS	28,471	4	140(2.3L)/FI	HFM2.5V5HCF7	07/20/88	7/3	11:08
0705	NO	18	0.12	P	86	GM	OLDS	CUTLASS CIERA	21,017	4	151(2.5L)/FI	G2G2.5V5TPG9	07/20/88	7/3	11:18
0707	NO	0	0.02	P	84	GM	CHEV	CAVALIER TYPE 10	N/A	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/20/88	7/1	11:35
0708	NO	20	0.00	P	87	GM	PONT	GRAND PRIX	42,091	6	231(3.8L)/2bbl	H2G3.8V2NSYX	07/20/88	7/3	11:45
0709	NO	2	0.00	P	87	FORD	FORD	ESCORT GL	24,042	4	113(1.9L)/FI	HFM1.9V5FFF1	07/20/88	7/1	11:50
0710*	YES	33	0.01	P	85	FORD	FORD	TEMPO GL	N/A	4	140(2.3L)/FI	FFM2.3V5HCF4	07/20/88	7/1	11:54
0711	NO	279	3.21	F	87	FORD	FORD	TAURUS GL Wgn	18,857	6	182(3.0L)/FI	HFM3.0V5FEG6	07/20/88	7/1	12:00
0712	NO	1	0.03	P	84	GM	CHEV	CAVALIER TYPE 10	46,064	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/20/88	7/1	12:08
0713	NO	4	0.01	P	83	GM	CHEV	CAVALIER	78,280	4	122(2.0L)/FI	D1G2.0V5XAJ4	07/20/88	7/1	12:24
0714	NO	95	0.06	P	84	GM	CHEV	CELEBRITY	54,817	4	151(2.5L)/FI	E2G2.5V5TPG7	07/20/88	7/2	13:08
0717	NO	26	0.00	P	86	FORD	LINC	TOWN CAR	42,858	8	302(5.0L)/FI	GFM5.0V5HBF9	07/20/88	7/3	13:32
0718	NO	9	0.00	P	84	FORD	LINC	TOWN CAR	34,243	8	302(5.0L)/FI	EFM5.0V5HBF7	07/20/88	7/3	13:45
0723	NO	17	0.01	P	87	GM	BUIC	CENTURY LIMITED	13,238	6	231(3.8L)/FI	H2G3.8V8XEB7	07/20/88	7/2	14:47
0724	NO	0	0.00	P	85	GM	PONT	6000 LE	39,939	6	173(2.8L)/2bbl	F1G2.8V2NNA0	07/20/88	7/1	14:46
0725	NO	65	0.17	P	86	GM	BUIC	LeSABRE	55,472	6	181(3.0L)/FI	G4G3.8V8XEB4	07/20/88	7/2	15:10
0726	NO	50	0.67	P	86	CHRY	DODG	DAYTONA	44,907	4	152(2.5L)/FI	GCR2.5V5HCFX	07/20/88	7/2	15:19
0727	NO	10	0.00	P	85	GM	BUIC	LeSABRE	18,437	8	307(5.0L)/4bbl	F3G5.0V4NLA0	07/20/88	7/3	15:28
0730	NO	21	0.14	P	84	GM	PONT	FIREBIRD	67,366	6	173(2.8L)/2bbl	E1G2.8V2NNAX	07/20/88	7/3	15:40
0731	NO	86	0.33	P	83	GM	CHEV	CAVALIER	109,946	4	122(2.0L)/FI	D1G2.0V5XAJ4	07/20/88	7/2	16:09
0732	NO	12	0.01	P	87	CHRY	PLYM	SUNDANCE	11,427	4	135(2.2L)/FI	HCR2.2V5FAC2	07/20/88	7/2	16:13
0734	NO	11	0.01	P	87	GM	BUIC	LeSABRE	14,017	6	231(3.8L)/FI	H2G3.8V8XEB7	07/20/88	7/2	16:35
0737	YES	16	0.01	P	84	FORD	MERC	COUGAR LS	51,058	6	231(3.8L)/FI	EFM3.8V5HHF7	07/20/88	7/3	16:55
0738	NO	2	0.01	P	86	GM	BUIC	CENTURY CUSTOM	36,743	6	231(3.8L)/FI	G4G3.8V8XEB4	07/20/88	7/3	17:06
0739	NO	7	0.00	P	86	GM	PONT	FIREBIRD	43,666	6	173(2.8L)/FI	G1G2.8V8XGZX	07/20/88	7/3	17:11
0740	NO	69	0.01	P	86	FORD	FORD	THUNDERBIRD	20,417	8	302(5.0L)/FI	GFM5.0V5HBF9	07/22/88	7/3	09:09
0741	NO	41	0.12	P	84	GM	BUIC	SKYHAWK	N/A	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/22/88	7/3	09:16
0742	NO	201	0.13	P	84	GM	OLDS	CUTLASS SUPREME	48,921	6	231(3.8L)/2bbl	E4G3.8V2NEY0	07/22/88	7/3	09:19
0743	YES	17	0.04	P	87	GM	CHEV	CELEBRITY	60,087	4	151(2.5L)/FI	H1G2.5V5TPG0	07/22/88	7/3	09:40
0744	YES	9	0.00	P	86	CHRY	DODG	CHARGER	12,141	4	135(2.2L)/2bbl	GCR2.2V2HDH6	07/22/88	7/3	09:50
0745	NO	10	0.01	P	85	GM	BUIC	RIVIERA	73,074	8	307(5.0L)/4bbl	F3G5.0V4NLA0	07/22/88	7/3	10:05
0747	NO	22	0.01	P	86	GM	BUIC	REGAL	45,746	6	231(3.8L)/2bbl	G4G3.8V2NSY7	07/22/88	7/3	10:23
0748	NO	24	0.01	P	86	CHRY	DODG	600	21,506	4	152(2.5L)/FI	GCR2.5V5HCFX	07/22/88	7/2	10:38
0749	NO	29	0.01	P	86	FORD	FORD	TEMPO	18,119	4	140(2.3L)/FI	GFM2.5V5HCF6	07/22/88	7/2	10:47
0751	NO	18	0.00	P	87	GM	CHEV	CAMARO IROC Z-28	13,326	8	350(5.7L)/FI	H1G5.7V8NTA7	07/22/88	7/3	10:55
0752	NO	10	0.03	P	84	GM	CHEV	CAVALIER TYPE 10	54,924	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/22/88	7/3	10:57
0753	NO	70	0.00	P	86	FORD	FORD	THUNDERBIRD	38,214	8	302(5.0L)/FI	GFM5.0V5HBF9	07/22/88	7/3	11:25
0754	NO	50	0.00	P	86	GM	CHEV	CORVETTE	44,886	8	350(5.7L)/FI	G1G5.7V8DAAX	07/22/88	7/2	11:33

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0756	NO	6	0.01	P	87	GM	OLDS	CUTLASS CALAIS	23,275	4	151(2.5L)/FI	H1G2.5V5TPGO	07/22/88	7/3	11:48
0757	NO	8	0.02	P	86	GM	BUIC	SKYLARK	17,801	4	151(2.5L)/FI	G2G2.5V5TPG9	07/22/88	7/3	13:17
0758	YES	21	0.00	P	87	FORD	FORD	MUSTANG GT	23,129	8	302(5.0L)/FI	HFM5.0V5HBFX	07/22/88	7/1	13:24
0759	NO	54	0.07	P	86	GM	OLDS	CUTLASS CIERA LS	34,230	4	151(2.5L)/FI	G2G2.5V5TPG9	07/22/88	7/1	13:37
0760	NO	18	0.00	P	85	FORD	FORD	LTD	64,951	6	231(3.8L)/FI	FFM3.8V5HHF8	07/22/88	7/1	13:43
0761	NO	15	0.06	P	84	GM	CHEV	CAVALIER CS Wgn	49,243	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/22/88	7/2	13:52
0762	NO	19	0.00	P	85	GM	OLDS	TORONADO BRGHM	38,392	8	307(5.0L)/4bbl	F3G5.0V4NLAO	07/22/88	7/2	14:16
0764	NO	14	0.00	P	87	FORD	FORD	MUSTANG LX	18,372	8	302(5.0L)/FI	HFM5.0V5HBFX	07/22/88	7/3	14:37
0765	NO	4	0.01	P	86	GM	OLDS	98 REGENCY BRGHM	32,516	6	231(3.8L)/FI	G4G3.8V8XEB4	07/22/88	7/3	14:39
0766	NO	10	0.01	P	86	GM	OLDS	CUTLASS SALON	26,961	8	307(5.0L)/4bbl	G3G5.0V4NLA1	07/22/88	7/3	14:58
0767	NO	18	0.00	P	85	FORD	LINC	TOWN CAR	44,218	8	302(5.0L)/FI	FFM5.0V5HBF8	07/22/88	7/2	15:09
0769	YES	74	0.09	P	86	FORD	FORD	TAURUS LX	N/A	6	182(3.0L)/FI	GFM3.0V5FEG5	07/26/88	7/1	09:12
0770	YES	70	0.21	P	86	FORD	FORD	TAURUS	69,397	4	152(2.5L)/FI	GFM2.5V5HCF6	07/26/88	7/3	09:29
0771	YES	34	0.01	P	84	FORD	MERC	COUGAR LS	48,930	6	231(3.8L)/FI	EFM3.8V5HHF7	07/26/88	7/2	09:32
0772	NO	49	0.08	P	88	GM	CHEV	CORSICA	31,243	4	122(2.0L)/FI	J1G2.0V5XAG7	07/26/88	7/1	09:40
0773	NO	50	0.01	P	85	FORD	FORD	LTD	N/A	6	231(3.8L)/FI	FFM3.8V5HHF8	07/26/88	7/2	09:48
0774	NO	66	0.07	P	85	FORD	FORD	TEMPO	N/A	4	140(2.3L)/FI	FFM2.3V5HCF4	07/26/88	7/2	09:56
0775	NO	17	0.01	P	87	GM	OLDS	DELTA 88 ROYALE	6,546	6	231(3.8L)/FI	H2G3.8V8XEB7	07/26/88	7/2	09:59
0776	NO	23	0.00	P	84	FORD	FORD	THUNDERBIRD	62,622	6	231(3.8L)/FI	EFM3.8V5HHF7	07/26/88	7/3	10:23
0777	NO	5	0.01	P	84	GM	PONT	6000 LE	50,850	6	173(2.8L)/2bbl	E1G2.8V2NNAX	07/26/88	7/1	10:25
0778	NO	5	0.00	P	86	GM	BUIC	CENTURY CUSTOM	20,295	4	151(2.5L)/FI	G2G2.5V5TPG9	07/26/88	7/1	10:33
0779	YES	91	0.30	P	87	FORD	FORD	ESCORT GT	18,042	4	113(1.9L)/FI	HFM1.9V5HMKX	07/26/88	7/2	10:44
0780	NO	182	0.42	P	84	GM	OLDS	CUTLASS CIERA BRGHM	38,125	4	151(2.5L)/FI	E2G2.5V5TPG7	07/26/88	7/1	11:01
0781	NO	11	0.01	P	87	GM	PONT	6000 SE	15,316	6	173(2.8L)/FI	H1G2.8V8XRZ4	07/26/88	7/3	11:04
0782	NO	87	0.02	P	88	GM	CHEV	CORSICA	14,798	6	173(2.8L)/FI	J1G2.8V8XRZ8	07/26/88	7/3	11:08
0783	NO	5	0.01	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	25,959	6	231(3.8L)/FI	G4G3.8V8XEB4	07/26/88	7/3	11:34
0784	NO	6	0.00	P	85	FORD	FORD	LTD BRGHM	15,455	6	231(3.8L)/FI	FFM3.8V5HHF8	07/26/88	7/1	12:48
0785	NO	16	0.00	P	87	FORD	MERC	GRAND MARQUIS GS	18,437	8	302(5.0L)/FI	HFM5.0V5HBFX	07/26/88	7/3	13:02
0786	NO	32	0.01	P	86	GM	OLDS	CUTLASS CIERA LS	54,163	4	151(2.5L)/FI	G2G2.5V5TPG9	07/26/88	7/2	13:16
0787	NO	16	0.00	P	86	FORD	FORD	MUSTANG GT	28,429	8	302(5.0L)/FI	GFM5.0V5HBF9	07/26/88	7/2	14:14
0788	NO	29	0.00	P	83	GM	OLDS	DELTA 88 ROYALE	67,168	8	307(5.0L)/4bbl	D3G5.0V4ARA9	07/26/88	7/3	14:21
0791	NO	12	0.00	P	87	FORD	FORD	MUSTANG GT	26,402	8	302(5.0L)/FI	HFM5.0V5HBFX	07/26/88	7/3	14:40
0792	NO	29	0.35	P	83	GM	CHEV	CAPRICE CLASSIC Wgn	72,990	8	305(5.0L)/4bbl	D1G5.7V4NDAO	07/26/88	7/3	14:57
0794	NO	29	0.02	P	86	GM	CHEV	CAVALIER	18,653	4	122(2.0L)/FI	G1G2.0V5XAG2	07/26/88	7/3	15:03
0795	NO	72	0.00	P	84	GM	OLDS	CUTLASS CALAIS	81,068	6	231(3.8L)/2bbl	E4G3.8V2NEYO	07/26/88	7/3	15:12
0800	NO	30	0.01	P	86	GM	CHEV	CELEBRITY Wgn	N/A	6	173(2.8L)/2bbl	N/A	07/26/88	7/2	15:51
0801	NO	10	0.00	P	86	GM	CHEV	CAVALIER	31,982	4	122(2.0L)/FI	G1G2.0V5XAG2	08/02/88	7/1	09:35
0802	NO	97	0.26	P	85	GM	CHEV	CAVALIER	32,978	4	122(2.0L)/FI	F1G2.0V5XAG1	08/02/88	7/3	09:54
0803	NO	4	0.01	P	86	GM	OLDS	DELTA 88 ROYALE	69,585	6	231(3.8L)/FI	NO LABEL	08/02/88	7/3	10:11
0804	NO	35	0.06	P	86	GM	BUIC	CENTURY CUSTOM	17,802	4	151(2.5L)/FI	G2G2.5V5TPG9	08/02/88	7/2	10:13
0805	YES	78	0.00	P	84	FORD	MERC	COUGAR LS	71,984	6	231(3.8L)/FI	EFM3.8V5HHF7	08/02/88	7/3	10:36
0806	YES	7	0.00	P	86	CHRY	PLYM	RELIANT	64,847	4	135(2.2L)/FI	GCR2.5V5HCFX	08/02/88	7/1	10:39

Description of the 1088 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0807	NO	8	0.00	P	87	CHRY	CHRY	LE BARON	20,589	4	135(2.2L)/FI	HCR2.2V5FAC2	08/02/88	7/1	10:43
0808	NO	9	0.00	P	86	GM	CHEV	CAMARO	19,417	8	305(5.0L)/4bbl	G1G5.7V4NEA5	08/02/88	7/1	11:08
0809	NO	17	0.00	P	85	GM	OLDS	CUTLASS SUPREME	10,186	6	231(3.8L)/2bbl	F4G3.8V2NEA3	08/02/88	7/1	11:18
0811	NO	5	0.00	P	87	CHRY	PLYM	SUNDANCE	16,685	4	135(2.2L)/FI	HCR2.2V5FAC2	08/02/88	7/3	11:33
0812	NO	135	0.07	P	85	GM	OLDS	CUTLASS CIERA	73,734	4	151(2.5L)/FI	F2G2.5V5TPG8	08/02/88	7/3	11:50
0813	NO	8	0.00	P	87	GM	OLDS	CUTLASS SUPREME	10,379	6	231(3.8L)/2bbl	H2G3.8V2NSYX	08/02/88	7/3	13:42
0814	NO	19	0.01	P	85	GM	CHEV	CELEBRITY	46,456	4	151(2.5L)/FI	F2G2.5V5TPG8	08/02/88	7/3	14:09
0815	NO	5	0.00	P	87	FORD	MERC	COUGAR LS	24,343	6	231(3.8L)/FI	HFM3.8V5HHFX	08/02/88	7/1	14:29
0816	NO	6	0.00	P	85	GM	BUIC	CENTURY LIMITED	64,101	6	181(3.0L)/2bbl	F4G3.8V2NSY6	08/02/88	7/1	14:35
0817	NO	24	0.00	P	85	CHRY	DODG	LANCER	43,386	4	135(2.2L)/FI	FCR2.2V5HCF2	08/02/88	7/1	14:37
0818	NO	13	0.01	P	86	GM	OLDS	DELTA 88 ROYALE	N/A	6	231(3.8L)/FI	N/A	08/02/88	7/2	14:47
0819	NO	8	0.27	P	85	GM	PONT	GRAND PRIX	68,829	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/02/88	7/1	14:48
0820	NO	23	0.01	P	86	FORD	FORD	MUSTANG	32,361	4	140(2.3L)/1bbl	GFM2.3V1HAF7	08/02/88	7/2	15:14
0821	NO	39	0.01	P	85	GM	OLDS	DELTA 88 ROYALE	62,999	8	307(5.0L)/4bbl	F3G5.0V4NLA0	08/02/88	7/2	15:23
0822	NO	22	0.01	P	87	GM	CHEV	CELEBRITY	9,612	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/02/88	7/2	15:28
0824	NO	18	0.01	P	87	GM	OLDS	CUTLASS CALAIS	12,262	4	151(2.5L)/FI	H1G2.5V5TPG0	08/03/88	7/3	08:58
0825	NO	81	0.25	P	83	GM	OLDS	CUTLASS SUPREME	89,609	6	231(3.8L)/2bbl	D4G3.8V2NEA3	08/03/88	7/1	09:05
0826	NO	27	0.04	P	86	GM	OLDS	DELTA 88 ROYALE	20,107	6	231(3.8L)/FI	G4G3.8V8XEB4	08/03/88	7/2	09:15
0827	YES	17	0.01	P	87	GM	OLDS	CUTLASS CALAIS	17,368	4	151(2.5L)/FI	H1G2.5V5TPG0	08/03/88	7/2	09:17
0828	NO	32	0.00	P	87	FORD	LINC	MARK VII LSC	8,231	8	302(5.0L)/FI	HFM5.0V5HBFX	08/03/88	7/3	09:25
0829	NO	8	0.01	P	84	GM	CHEV	CAMARO	64,994	6	173(2.8L)/2bbl	E1G2.8V2NNAX	08/03/88	7/3	09:33
0832	NO	25	0.01	P	84	FORD	MERC	MARQUIS	67,423	6	231(3.8L)/FI	EFM3.8V5HHF7	08/03/88	7/2	10:09
0833	NO	2	0.01	P	87	CHRY	CHRY	LE BARON	10,929	4	135(2.2L)/FI	HCR2.2V5FAC2	08/03/88	7/3	10:30
0834	NO	10	0.00	P	83	GM	BUIC	PARK AVENUE	44,628	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/03/88	7/3	10:32
0835	NO	5	0.01	P	87	GM	BUIC	SOMERSET	10,583	4	151(2.5L)/FI	H1G2.5V5TPG0	08/03/88	7/3	10:38
0836	NO	262	2.59	F	84	GM	BUIC	LeSABRE LIMITED	23,682	8	307(5.0L)/4bbl	E3G5.0V4NLAX	08/03/88	7/1	10:42
0837	NO	47	0.09	P	86	GM	OLDS	DELTA 88 ROYALE	21,679	6	231(3.8L)/FI	G4G3.8V8XEB4	08/03/88	7/2	10:50
0838	NO	34	0.03	P	87	GM	PONT	GRAND AM LE	38,787	4	151(2.5L)/FI	H1G2.5V5TPG0	08/03/88	7/2	11:00
0839	NO	31	0.01	P	84	FORD	FORD	THUNDERBIRD	68,834	6	231(3.8L)/FI	EFM3.8V5HHF7	08/03/88	7/2	11:25
0841	NO	16	0.01	P	85	GM	PONT	GRAND PRIX	47,562	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/03/88	7/3	13:48
0842	YES	50	0.07	P	87	GM	OLDS	CUTLASS CIERA	16,457	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/03/88	7/2	13:56
0843	NO	28	0.01	P	86	GM	OLDS	98 REGENCY BRGHM	29,883	6	231(3.8L)/FI	G4G3.8V8XEB4	08/03/88	7/3	14:11
0844	NO	29	0.60	P	84	CHRY	CHRY	LE BARON	N/A	4	135(2.2L)/FI	ECR2.2V5HCF1	08/03/88	7/3	14:40
0845	NO	68	0.25	P	87	FORD	FORD	ESCORT EXP	19,326	4	113(1.9L)/FI	HFM1.9V5FFF1	08/03/88	7/1	14:42
0846	NO	48	0.00	P	86	FORD	MERC	GRAND MARQUIS LS	36,613	8	302(5.0L)/FI	GFM5.0V5HBF9	08/03/88	7/1	14:53
0847	NO	0	0.02	P	83	GM	CHEV	CAVALIER Wgn	40,710	4	122(2.0L)/FI	D1G2.0V5XAJ4	08/03/88	7/1	14:57
0848	NO	170	1.07	P	86	FORD	FORD	TAURUS Wgn	30,484	4	152(2.5L)/FI	GFM2.5V5HCF6	08/03/88	7/3	15:24
0849	NO	15	0.01	P	86	GM	PONT	6000 LE Wgn	50,514	6	173(2.8L)/FI	G1G2.8V8XGZX	08/03/88	7/2	15:37
0851	NO	24	0.01	P	86	GM	CHEV	CELEBRITY	74,483	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/04/88	7/2	09:02
0852	NO	7	0.01	P	87	GM	OLDS	DELTA 88 ROYALE	13,293	6	231(3.8L)/FI	H2G3.8V8XEB7	08/04/88	7/3	09:06
0853	NO	8	0.01	P	86	GM	OLDS	CUTLASS SUPREME	10,113	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/04/88	7/3	09:08
0854	NO	16	0.01	P	87	GM	CHEV	CAPRICE CLASSIC	4,942	8	305(5.0L)/4bbl	H1G5.7V4NEA6	08/04/88	7/2	09:14
0855	NO	234	3.47	F	85	GM	PONT	6000 STE	68,085	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/04/88	7/2	09:24

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0856	NO	11	0.01	P	84	GM	CHEV	CAPRICE CLASSIC	34,193	8	305(5.0L)/4bbl	E1G5.7V4NEA3	08/04/88	7/3	09:46
0857	NO	11	0.01	P	86	GM	OLDS	98 REGENCY BRGHM	7,789	6	231(3.8L)/FI	G4G3.8V8XEB4	08/04/88	7/2	09:46
0858	NO	113	0.10	P	84	GM	OLDS	OMEGA	55,523	4	151(2.5L)/FI	E2G2.5V5TPG7	08/04/88	7/2	09:55
0859	NO	5	0.00	P	86	GM	BUIC	CENTURY LIMITED	20,731	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/04/88	7/1	10:20
0860	NO	12	0.00	P	83	GM	CHEV	MONTE CARLO	124,884	6	229(3.8L)/2bbl	D1G3.8V2NDA4	08/04/88	7/1	10:30
0861	NO	15	0.01	P	85	FORD	MERC	GRAND MARQUIS LS	33,847	8	302(5.0L)/FI	FFM5.0V5HBF8	08/04/88	7/2	10:46
0862	NO	31	0.11	P	86	FORD	FORD	TEMPO	15,694	4	140(2.3L)/FI	GFM2.5V5HCF6	08/04/88	7/1	11:14
0864	NO	23	0.01	P	83	GM	PONT	6000 LE	47,155	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/04/88	7/2	11:25
0865	NO	22	0.02	P	86	FORD	LINC	MARK VII	36,711	8	302(5.0L)/FI	GFM5.0V5HBF9	08/04/88	7/1	11:31
0866	NO	92	0.05	P	87	GM	OLDS	CUTLASS CALAIS	11,357	4	151(2.5L)/FI	H1G2.5V5TPG0	08/04/88	7/2	13:38
0867	NO	13	0.01	P	87	GM	OLDS	CUTLASS CALAIS	20,338	4	151(2.5L)/FI	H1G2.5V5TPG0	08/04/88	7/2	13:41
0868	NO	30	0.01	P	87	FORD	FORD	TEMPO	17,914	4	140(2.3L)/FI	HFM2.5V5HCF7	08/04/88	7/3	14:03
0869	NO	11	0.01	P	86	GM	OLDS	CUTLASS CIERA LS	32,176	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/04/88	7/2	14:04
0870	NO	13	0.01	P	88	GM	PONT	6000	12,319	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/04/88	7/3	14:51
0871	NO	21	0.00	P	83	GM	BUIC	CENTURY	37,905	6	181(3.0L)/2bbl	D4G3.8V2NEA3	08/04/88	7/2	14:54
0872	NO	100	0.05	P	87	GM	CHEV	CELEBRITY	26,450	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/04/88	7/3	14:57
0873	YES	11	0.01	P	84	CHRY	DODG	600 ES	33,114	4	135(2.2L)/FI	ECR2.2V5FAA8	08/04/88	7/2	15:16
0875	NO	5	0.01	P	87	GM	CHEV	CELEBRITY	15,360	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/04/88	7/3	16:13
0876	NO	157	0.05	P	84	GM	OLDS	FIRENZA BRGHM Wgn	71,353	4	110(1.8L)/FI	E2G1.8V5TDG0	08/04/88	7/3	16:28
0878	YES	13	0.00	P	84	FORD	FORD	TEMPO GL	58,811	4	140(2.3L)/1bbl	EFM2.3V1HRFX	08/05/88	7/3	09:33
0880	NO	21	0.00	P	85	FORD	MERC	COUGAR LS XR7	56,000	6	231(3.8L)/FI	FFM3.5V5HHF8	08/05/88	7/3	09:53
0881	NO	44	0.01	P	87	FORD	MERC	COUGAR XR7	8,783	8	302(5.0L)/FI	HFM5.0V5HBFX	08/05/88	7/3	10:08
0882	NO	25	0.01	P	84	GM	OLDS	CUTLASS CIERA LS	22,932	6	181(3.0L)/2bbl	E4G3.8V2NEY0	08/05/88	7/2	10:38
0884	NO	7	0.01	P	83	GM	BUIC	SHYLARK LIMITED	76,107	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/05/88	7/3	10:49
0886	NO	18	0.01	P	87	GM	OLDS	CUTLASS SALON	22,572	8	307(5.0L)/4bbl	H2G5.0V4NLA3	08/05/88	7/3	11:16
0887	NO	70	0.00	P	86	FORD	MERC	COUGAR LS XR7	38,042	8	302(5.0L)/FI	GFM5.0V5HBF9	08/05/88	7/3	11:20
0889	NO	51	0.17	P	87	GM	CHEV	CELEBRITY	28,276	4	151(2.5L)/FI	H1G2.5V5TPG0	08/05/88	7/3	11:27
0890	NO	15	0.01	P	85	GM	BUIC	RIVIERA	95,804	8	307(5.0L)/4bbl	UNREADABLE	08/05/88	7/2	11:29
0893	YES	6	0.01	P	85	FORD	FORD	LTD CROWN VICTORIA	29,372	8	302(5.0L)/FI	N/A	08/05/88	7/3	12:09
0895	YES	7	0.01	P	86	FORD	FORD	TAURUS GL	36,002	6	182(3.0L)/FI	GFM3.0V5FEG5	08/05/88	7/3	14:24
0896	NO	83	0.01	P	88	GM	PONT	6000	12,967	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/09/88	7/3	09:39
0897	NO	17	0.04	P	86	GM	OLDS	CUTLASS CALAIS	22,920	4	151(2.5L)/FI	G2G2.5V5TPG9	08/09/88	7/3	09:52
0899	NO	61	0.02	P	84	GM	PONT	FIREBIRD	51,901	8	305(5.0L)/4bbl	E1G5.7V4NEA3	08/09/88	7/2	10:01
0900	NO	47	0.07	P	87	FORD	FORD	ESCORT GL	24,815	4	113(1.9L)/FI	HFM1.9V5FFF1	08/09/88	7/2	10:03
0901	NO	15	0.01	P	85	GM	OLDS	98 REGENCY	39,675	6	231(3.8L)/FI	F4G3.8V8XEB3	08/09/88	7/2	10:07
0902	NO	23	0.00	P	86	GM	PONT	T-1000	21,745	4	98(1.6L)/2bbl	NO LABEL	08/09/88	7/2	10:15
0904	NO	74	0.13	P	85	GM	BUIC	LeSABRE	38,241	8	307(5.0L)/4bbl	F3G5.0V4NLA0	08/09/88	7/2	10:33
0905	NO	5	0.01	P	86	GM	OLDS	DELTA 88 ROYALE	11,339	6	231(3.8L)/FI	G4G3.8V8XEB4	08/09/88	7/3	10:37
0906	NO	20	0.01	P	85	GM	BUIC	REGAL	28,601	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/09/88	7/2	10:38
0907	NO	13	0.01	P	87	GM	PONT	BONNEVILLE LE	14,070	6	231(3.8L)/FI	H2G3.8V8XEB7	08/09/88	7/2	11:25
0909	NO	40	0.01	P	86	FORD	FORD	LTD CROWN VICTORIA	28,704	8	302(5.0L)/FI	GFM5.0V5HBF9	08/09/88	7/2	12:41

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0910	NO	4	0.09	P	88	GM	CHEV	CORSICA	1,256	4	122(2.0L)/FI	J1G2.0V5XAG7	08/09/88	7/1	12:41
0912	NO	21	0.01	P	87	FORD	FORD	THUNDERBIRD	8,368	6	231(3.8L)/FI	HFM3.8V5HHFX	08/09/88	7/2	14:18
0913	NO	15	0.00	P	86	CHRY	DODG	ARIES	11,484	4	135(2.2L)/FI	GCR2.5V5HCFX	08/09/88	7/2	14:20
0914	NO	8	0.01	P	85	FORD	LINC	CONTINENTAL MARK VII	23,276	8	302(5.0L)/FI	FFM5.0V5HBF8	08/09/88	7/3	14:49
0917	NO	14	0.00	P	87	GM	PONT	GRAND AM LE	18,071	4	151(2.5L)/FI	H1G2.5V5TPGO	08/09/88	7/2	15:39
0918	NO	24	0.01	P	84	FORD	FORD	TEMPO GL	67,043	4	140(2.3L)/1bbl	EFM2.3V1HCK5	08/09/88	7/3	16:36
0919	NO	34	0.00	P	87	FORD	MERC	GRAND MARQUIS GS	34,425	8	302(5.0L)/FI	HFM5.0V5HBFX	08/09/88	7/3	16:43
0920	NO	72	0.18	P	87	FORD	FORD	MUSTANG LX	13,601	4	140(2.3L)/FI	HFM2.3V5FFG7	08/09/88	7/2	16:43
0922	NO	26	0.17	P	83	GM	CHEV	CELEBRITY	78,329	4	151(2.5L)/FI	D2G2.5V5TPG6	08/10/88	7/2	10:00
0923	NO	62	0.55	P	87	GM	CHEV	CAVALIER	18,423	4	122(2.0L)/FI	H1G2.0V5XAG3	08/10/88	7/2	10:16
0924	NO	12	0.00	P	86	GM	BUIC	SKYLARK	44,218	6	181(3.0L)/FI	G4G3.8V8XEB4	08/10/88	7/1	10:50
0925	NO	14	0.01	P	87	GM	OLDS	DELTA 88 ROYALE BRGHM	13,029	6	231(3.8L)/FI	H2G3.8V8XEB7	08/10/88	7/2	10:49
0926	NO	15	0.00	P	85	GM	PONT	GRAND PRIX	38,285	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/10/88	7/1	11:02
0928	NO	26	0.00	P	84	GM	OLDS	CUTLASS	47,331	8	307(5.0L)/4bbl	E3G5.0V4NLAX	08/10/88	7/1	12:30
0929	NO	35	0.01	P	86	GM	PONT	PARISIENNE BRGHM	18,437	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/10/88	7/2	13:01
0930	NO	34	0.07	P	87	GM	OLDS	CUTLASS CALAIS	12,263	6	181(3.0L)/FI	H2G3.0V8XTBX	08/10/88	7/3	13:03
0932	YES	7	0.00	P	85	FORD	FORD	LTD CROWN VICTORIA	44,660	8	302(5.0L)/FI	FFM5.0V5HBF8	08/10/88	7/3	13:29
0933	NO	27	0.01	P	86	GM	OLDS	CUTLASS SUPREME	18,641	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/10/88	7/2	13:37
0934	NO	21	0.01	P	85	GM	OLDS	CUTLASS SUPREME BRGHM	15,540	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/10/88	7/2	13:47
0935	NO	31	0.03	P	88	GM	PONT	6000	18,778	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/10/88	7/1	14:11
0936	NO	73	0.05	P	88	GM	CHEV	CELEBRITY	12,263	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/10/88	7/3	14:15
0937	NO	98	0.07	P	88	GM	CHEV	CELEBRITY	13,078	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/10/88	7/2	14:14
0938	NO	15	0.01	P	87	GM	PONT	GRAND AM	3,617	4	151(2.5L)/FI	H1G2.5V5TPGO	08/10/88	7/2	14:23
0939	NO	21	0.03	P	86	GM	CHEV	CELEBRITY	29,623	4	151(2.5L)/FI	G2G2.5V5TPG9	08/10/88	7/2	14:25
0941	NO	41	0.01	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	71,319	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/10/88	7/2	15:44
0942	NO	62	0.03	P	83	GM	OLDS	CUTLASS CIERA LS	38,693	6	181(3.0L)/2bbl	D4G3.8V2NEA3	08/10/88	7/3	16:19
0943	NO	106	0.37	P	84	FORD	FORD	MUSTANG	N/A	4	140(2.3L)/1bbl	EFM2.3V1HPK2	08/10/88	7/3	16:27
0944	NO	13	0.03	P	88	GM	CHEV	CORSICA	17,015	4	122(2.0L)/FI	J1G2.0V5XAG7	08/10/88	7/3	16:34
0946	NO	9	0.00	P	86	CHRY	CHRY	NEW YORKER	11,383	4	152(2.5L)/FI	GCR2.5V5HCFX	08/11/88	7/3	10:04
0947	YES	31	0.01	P	85	FORD	FORD	THUNDERBIRD	31,340	6	231(3.8L)/FI	FFM3.8V5HHF8	08/11/88	7/2	10:20
0948	NO	11	0.01	P	86	GM	OLDS	CUTLASS CRUISER Wgn	N/A	6	173(2.8L)/FI	GAG2.8V8XGZX	08/11/88	7/2	10:24
0949	NO	15	0.01	P	86	GM	CHEV	MONTE CARLO	10,541	8	305(5.0L)/4bbl	G1G5.7V4NEA5	08/11/88	7/2	10:38
0950	NO	100	0.38	P	86	GM	PONT	SUNBIRD SE	43,339	4	110(1.8L)/FI	G2G1.8V5TDG2	08/11/88	7/2	10:40
0951	NO	12	0.01	P	86	GM	BUIC	CENTURY LIMITED	14,402	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/11/88	7/2	10:48
0952	NO	17	0.01	P	85	GM	PONT	BONNEVILLE LE	51,116	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/11/88	7/2	10:59
0953	NO	55	0.06	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	43,195	8	307(5.0L)/4bbl	E3G5.0V4NLAX	08/11/88	7/3	11:02
0954	NO	25	0.01	P	87	FORD	MERC	COUGAR LS	N/A	6	231(3.8L)/FI	HFM3.8V5HHFX	08/11/88	7/2	11:13
0955	NO	29	0.00	P	83	GM	OLDS	DELTA 88 ROYALE	55,705	8	307(5.0L)/4bbl	NO LABEL	08/11/88	7/3	11:17
0956	YES	41	0.04	P	87	GM	CHEV	CELEBRITY	19,838	4	151(2.5L)/FI	H1G2.5V5TPGO	08/11/88	7/3	11:23
0957	NO	23	0.01	P	86	GM	CHEV	ASTRO	43,453	6	262(4.3L)/FI	G1G4.3T5TMG9	08/11/88	7/2	11:31
0958	NO	34	0.01	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	43,852	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/11/88	7/2	11:48
0959	NO	26	0.00	P	84	FORD	MERC	COUGAR LS	N/A	8	302(5.0L)/FI	EFM5.0V5HBF7	08/11/88	7/3	12:00

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0960	NO	28	0.01	P	85	GM	BUIC	LeSABRE	9,472	8	307(5.0L)/4bbl	F3G5.0V4NLAO	08/11/88	7/2	12:08
0961	YES	36	0.09	P	83	GM	CHEV	CAVALIER	75,257	4	110(1.8L)/FI	D2G1.8V5TDGX	08/11/88	7/3	12:52
0962	NO	0	0.00	P	86	FORD	FORD	ESCORT GT	19,421	4	113(1.9L)/FI	GFM1.9V5HMK9	08/11/88	7/2	12:36
0963	NO	124	0.26	P	86	FORD	MERC	SABLE GS	27,419	6	182(3.0L)/FI	GFM3.0V5FEG5	08/11/88	7/3	13:16
0964	NO	131	1.53	F	86	FORD	MERC	TOPAZ GS	42,889	4	140(2.3L)/FI	GFM2.5V5HCF6	08/11/88	7/3	14:38
0965	NO	29	0.00	P	85	FORD	MERC	COUGAR LS XR7	30,331	6	231(3.8L)/FI	FFM3.8V5HHF8	08/11/88	7/3	14:43
0966	NO	12	0.01	P	83	GM	CHEV	CELEBRITY	66,515	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/11/88	7/3	15:45
0968	NO	13	0.01	P	85	GM	OLDS	CUTLASS CIERA	41,552	6	181(3.0L)/2bbl	F4G3.8V2NSY6	08/11/88	7/3	16:20
0969	NO	21	0.01	P	83	GM	PONT	FIREBIRD	74,356	8	305(5.0L)/4bbl	D1G5.7V4NDAO	08/11/88	7/2	16:39
0970	YES	18	0.01	P	84	CHRY	CHRY	NEW YORKER	41,984	4	135(2.2L)/FI	ECR2.2V5FAA8	08/11/88	7/2	16:42
0971	NO	7	0.18	P	88	GM	CHEV	BERETTA	26,049	4	122(2.0L)/FI	J1G2.0V5XAG7	08/11/88	7/3	17:02
0972	NO	21	0.02	P	86	FORD	MERC	TOPAZ LS	23,649	4	140(2.3L)/FI	GFM2.5V5HCF6	08/12/88	7/3	09:55
0973	NO	12	0.00	P	86	GM	OLDS	CUTLASS SUPREME BRGHM	33,915	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/12/88	7/3	10:00
0975	NO	23	0.01	P	84	FORD	FORD	TEMPO GL	19,349	4	140(2.3L)/1bbl	EFM2.3V1HCK5	08/12/88	7/3	10:08
0976	NO	246	0.22	F	87	FORD	FORD	TEMPO LX	23,550	4	140(2.3L)/FI	HFM2.5V5HCF7	08/12/88	7/2	10:36
0977	NO	113	0.09	P	86	GM	OLDS	CUTLASS CALAIS	19,377	4	151(2.5L)/FI	G2G2.5V5TPG9	08/12/88	7/2	10:45
0978	NO	55	0.01	P	84	GM	OLDS	CUTLASS CRUISER Wgn	46,521	6	181(3.0L)/2bbl	E4G3.8V2NEYO	08/12/88	7/2	10:49
0981	NO	8	0.01	P	87	CHRY	DODG	SHADOW	16,960	4	135(2.2L)/FI	HCR2.5V5HCFO	08/12/88	7/3	11:26
0982	NO	30	0.01	P	87	FORD	FORD	MUSTANG GT	14,961	8	302(5.0L)/FI	HFM5.0V5HBFX	08/12/88	7/2	11:45
0984	NO	7	0.00	P	86	FORD	FORD	MUSTANG	12,509	6	231(3.8L)/FI	GFM3.8V5HHF9	08/12/88	7/3	13:12
0986	NO	5	0.00	P	86	GM	BUIC	CENTURY LIMITED	7,764	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/12/88	7/3	13:34
0987	NO	27	0.01	P	84	FORD	LINC	CONTINENTAL MARK VII	28,645	8	302(5.0L)/FI	EFM5.0V5HBF7	08/12/88	7/2	13:43
0988	NO	8	0.00	P	86	GM	PONT	6000	23,542	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/12/88	7/2	14:04
0989	NO	20	0.01	P	85	FORD	MERC	MARQUIS	40,379	6	231(3.8L)/FI	FFM3.8V5HHF8	08/12/88	7/2	14:06
0991	NO	13	0.01	P	83	GM	CHEV	MALIBU	60,364	6	229(3.8L)/2bbl	D1G3.8V2NDA4	08/12/88	7/3	14:30
0992	YES	40	0.00	P	87	FORD	FORD	MUSTANG GT	10,817	8	302(5.0L)/FI	HFM5.0V5HBFX	08/12/88	7/2	14:41
0993	NO	9	0.01	P	86	GM	PONT	6000 LE	29,371	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/12/88	7/3	14:42
0994	NO	5	0.01	P	86	GM	CHEV	CELEBRITY	47,943	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/12/88	7/3	14:51
0995	NO	12	0.17	P	86	GM	BUIC	SKYHAWK	3,930	4	122(2.0L)/FI	NO LABEL	08/12/88	7/3	14:53
0997	NO	2	0.00	P	86	GM	CHEV	CAPRICE CLASSIC Wgn	41,594	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/12/88	7/3	15:08
0998	NO	10	0.00	P	86	FORD	FORD	ESCORT GT	36,805	4	113(1.9L)/FI	GFM1.9V5HMK9	08/12/88	7/3	15:22
0999	NO	17	0.01	P	86	GM	BUIC	SKYHAWK	31,717	4	122(2.0L)/FI	NO LABEL	08/17/88	7/2	15:24
1000	NO	84	0.31	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	69,237	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/12/88	7/3	15:26
1001	NO	20	0.00	P	84	FORD	FORD	LTD CROWN VICTORIA	56,099	8	302(5.0L)/FI	EFM5.0V5HBF7	08/16/88	7/3	09:29
1002	NO	18	0.00	P	87	GM	CHEV	CAPRICE CLASSIC BRGHM	18,977	8	305(5.0L)/4bbl	H1G5.7V4NEA6	08/16/88	7/1	09:40
1003	NO	40	0.00	P	86	FORD	FORD	LTD CROWN VICTORIA	27,200	8	302(5.0L)/FI	GFM5.0V5HBF9	08/16/88	7/3	09:47
1004	NO	17	0.01	P	85	GM	PONT	6000 LE	25,581	6	173(2.8L)/2bbl	F1G2.8V2NNAO	08/16/88	7/2	10:01
1005	NO	13	0.01	P	87	FORD	FORD	TAURUS GT	11,169	6	182(3.0L)/FI	HFM3.0V5FEG6	08/16/88	7/2	10:03
1007	NO	77	0.00	P	85	FORD	FORD	LTD	32,457	6	231(3.8L)/FI	NO LABEL	08/16/88	7/2	10:26
1008	NO	21	0.01	P	87	FORD	FORD	THUNDERBIRD	19,219	6	231(3.8L)/FI	HFM3.8V5HHFX	08/16/88	7/2	10:32
1009	NO	1	0.00	P	86	FORD	FORD	TAURUS	58,663	6	182(3.0L)/FI	GFM3.0V5FEG5	08/16/88	7/1	10:42

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
1010	NO	8	0.01	P	83	GM	OLDS	DELTA 88 ROYALE BRGHM	49,544	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/06/88	7/3	10:56
1011	NO	10	0.02	P	84	GM	CHEV	CAVALIER CS Wgn	60,453	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/16/88	7/3	11:09
1013	NO	24	0.08	P	83	GM	CHEV	CAVALIER	84,931	4	122(2.0L)/FI	D1G2.0V5XAJ4	08/16/88	7/1	11:15
1014	NO	16	0.01	P	85	GM	PONT	6000 Wgn	57,837	6	173(2.8L)/2bbl	F1G2.8V2NNAO	08/16/88	7/2	11:14
1015*	NO	563	9.15	F	86	FORD	FORD	TEMPO	22,509	4	140(2.3L)/FI	GFM2.5V5HCF6	08/16/88	7/1	11:26
1016	YES	529	0.00	F	84	FORD	FORD	TEMPO GL	74,366	4	140(2.3L)/1bbl	EFM2.3V1HRFX	08/16/88	7/1	11:29
1018	NO	15	0.01	P	87	GM	CHEV	CAMARO	10,680	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/16/88	7/3	11:54
1019	NO	37	0.01	P	86	FORD	LINC	TOWN CAR	18,979	8	302(5.0L)/FI	GFM5.0V5HBF9	08/16/88	7/3	12:03
1020	NO	5	0.00	P	85	GM	PONT	6000 LE Wgn	59,465	6	173(2.8L)/2bbl	F1G2.8V2NNAO	08/16/88	7/1	12:07
1021	NO	108	0.18	P	86	GM	BUIC	CENTURY LIMITED	32,776	6	231(3.8L)/FI	G4G3.8V8XEB4	08/16/88	7/1	12:19
1023	NO	9	0.01	P	86	GM	OLDS	CUTLASS SUPREME	29,925	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/16/88	7/3	13:15
1024	NO	86	0.12	P	86	GM	CHEV	CAMARO	41,119	8	305(5.0L)/FI	G1G5.7V8NTA6	08/16/88	7/2	13:27
1025	NO	51	0.16	P	84	GM	CHEV	CAVALIER CS	26,143	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/16/88	7/2	13:29
1026	NO	25	0.02	P	86	FORD	MERC	TOPAZ LS	21,890	4	140(2.3L)/FI	GFM2.5V5HCF6	08/16/88	7/3	13:33
1027	NO	39	0.19	P	84	GM	BUIC	SKYHAWK	42,529	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/16/88	7/3	13:47
1029	NO	12	0.01	P	88	GM	PONT	BONNEVILLE LE	5,044	6	231(3.8L)/FI	J2G3.8V8XEBO	08/16/88	7/2	13:49
1030	NO	29	0.01	P	87	GM	OLDS	CUTLASS SUPREME	12,355	6	231(3.8L)/2bbl	H2G3.8V2NSYX	08/16/88	7/3	13:51
1031	NO	5	0.01	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	24,378	6	231(3.8L)/FI	G4G3.8V8XEB4	08/16/88	7/3	14:09
1032	NO	73	0.32	P	85	CHRY	PLYM	RELIANT	74,671	4	135(2.2L)/2bbl	FCR2.2V2HDH5	08/16/88	7/2	14:20
1033	NO	156	3.23	F	87	FORD	FORD	TEMPO SPORT	20,598	4	140(2.3L)/FI	HFM2.5V5HCF7	08/16/88	7/1	14:42
1034	NO	4	0.01	P	88	GM	CHEV	CELEBRITY	14,592	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/16/88	7/1	15:15
1035	NO	1	0.00	P	88	GM	PONT	6000	15,913	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/16/88	7/1	15:17
1036	NO	29	0.01	P	84	FORD	MERC	MARQUIS	46,429	6	231(3.8L)/FI	NO LABEL	08/16/88	7/3	15:23
1037	NO	24	0.01	P	83	GM	CHEV	CHEVETTE	59,031	4	98(1.6L)/2bbl	D1G1.6V2NEAO	08/16/88	7/3	15:32
1039	NO	28	0.01	P	85	FORD	FORD	THUNDERBIRD	33,833	6	231(3.8L)/FI	FFM3.8V5HHF8	08/16/88	7/2	15:52
1040	NO	18	0.01	P	84	GM	PONT	6000	100,751	6	173(2.8L)/2bbl	E1G2.8V2NNAX	08/16/88	7/2	15:57
1041	NO	17	0.01	P	83	GM	PONT	6000	55,385	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/16/88	7/2	15:59
1043	NO	100	0.04	P	87	GM	OLDS	CUTLASS CIERA LS	23,198	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/16/88	7/3	16:15
1044	NO	19	0.00	P	86	GM	CHEV	MONTE CARLO	34,467	8	305(5.0L)/4bbl	G1G5.7V4NEA5	08/16/88	7/2	16:14
1045	NO	24	0.00	P	86	GM	PONT	TRANS AM	30,955	8	305(5.0L)/FI	G1G5.7V8NTA6	08/16/88	7/3	16:30
1046	NO	117	0.03	P	88	GM	CHEV	CORSICA	8,153	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/16/88	7/3	16:36
1047	NO	11	0.01	P	85	CHRY	DODG	DAYTONA	63,991	4	135(2.2L)/FI	FCR2.2V5HCF2	08/16/88	7/3	16:49
1048	NO	9	0.01	P	87	GM	BUIC	SOMERSET	24,493	4	151(2.5L)/FI	H1G2.5V5TPGO	08/16/88	7/3	16:51
1050	NO	82	0.17	P	84	GM	CHEV	MONTE CARLO	31,876	8	305(5.0L)/4bbl	E1G5.7V4NEA3	08/17/88	7/3	10:02
1051	NO	45	0.00	P	84	FORD	MERC	GRAND MARQUIS LS	42,283	8	302(5.0L)/FI	EFM5.0V5HBF7	08/17/88	7/3	10:06
1052	NO	22	0.00	P	83	GM	BUIC	LeSABRE	24,501	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/17/88	7/3	10:18
1053	YES	28	0.01	P	87	CHRY	DODG	SHADOW	28,985	4	135(2.2L)/FI	HCR2.5V5HCFO	08/17/88	7/2	10:18
1054	NO	45	0.00	P	86	FORD	LINC	TOWN CAR	12,820	8	302(5.0L)/FI	GFM5.0V5HBF9	08/17/88	7/2	10:28
1055	NO	13	0.01	P	87	GM	PONT	GRAND AM	12,914	4	151(2.5L)/FI	H1G2.5V5TPGO	08/17/88	7/3	10:40
1056	NO	85	0.16	P	88	FORD	LINC	MARK VII LSC	27,749	8	302(5.0L)/FI	JFM5.0V5HBF3	08/17/88	7/3	10:55
1057	NO	1	0.00	P	83	GM	CHEV	MALIBU	32,011	6	229(3.8L)/2bbl	D1G3.8V2NDA4	08/17/88	7/1	11:04
1058	NO	54	0.00	P	84	FORD	FORD	LTD Wgn	N/A	6	231(3.8L)/FI	EFM3.8V5HHF7	08/17/88	7/3	11:11
1059	NO	16	0.01	P	85	GM	BUIC	RIVIERA	22,000	8	307(5.0L)/4bbl	F3G5.0V4NLAO	08/17/88	7/2	11:23

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
1060	NO	17	0.01	P	84	GM	OLDS	CUTLASS CRUISER Wgn	48,321	8	307(5.0L)/4bbl	E3G5.0V4NLAX	08/17/88	7/3	11:25
1061	NO	27	0.01	P	86	FORD	FORD	THUNDERBIRD	12,172	6	231(3.8L)/FI	GFM3.8V5HHF9	08/17/88	7/2	11:32
1062	NO	46	0.01	P	86	CHRY	DODG	LANCER	56,910	4	135(2.2L)/FI	GCR2.2V5FAAX	08/17/88	7/3	11:39
1063	NO	5	0.00	P	85	FORD	MERC	COUGAR LS XR7	37,406	6	231(3.8L)/FI	FFM3.8V5HHF8	08/17/88	7/1	11:49
1064	NO	15	0.01	P	86	FORD	LINC	TOWN CAR	N/A	8	302(5.0L)/FI	GFM5.0V5HBF9	08/17/88	7/3	11:52
1065	NO	25	0.01	P	84	GM	PONT	PARISIENNE	35,007	8	305(5.0L)/4bbl	E1G5.7V4NEA3	08/17/88	7/3	12:00
1066	NO	22	0.01	P	85	GM	BUIC	CENTURY CUSTOM	72,694	4	151(2.5L)/FI	F2G2.5V5TPG8	08/17/88	7/2	12:12
1067	NO	17	0.01	P	87	FORD	MERC	COUGAR LS	8,365	6	231(3.8L)/FI	HFM3.8V5HHFX	08/17/88	7/2	12:14
1068	NO	57	0.15	P	85	GM	CHEV	CELEBRITY	48,087	4	151(2.5L)/FI	F2G2.5V5TPG8	08/17/88	7/3	12:23
1069	NO	32	0.01	P	87	GM	CHEV	CELEBRITY	6,116	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/17/88	7/3	13:05
1070	NO	40	0.00	P	87	FORD	FORD	LTD CRN VIC Wgn	26,602	8	302(5.0L)/FI	HFM5.0V5HBFX	08/17/88	7/2	13:19
1072	NO	0	0.00	P	87	CHRY	PLYM	CARAVELLE	22,881	4	152(2.5L)/FI	HCR2.5V5FBD1	08/17/88	7/1	13:37
1073	NO	12	0.00	P	87	FORD	FORD	THUNDERBIRD	12,345	6	231(3.8L)/FI	HFM3.8V5HHFX	08/17/88	7/1	13:38
1075	NO	15	0.01	P	84	FORD	FORD	TEMPO	41,980	4	140(2.3L)/1bbl	EFM2.3V1HRFX	08/17/88	7/2	13:50
1076	NO	12	0.02	P	87	GM	OLDS	CUTLASS CALAIS	26,669	4	151(2.5L)/FI	H1G2.5V5TPG0	08/17/88	7/3	13:57
1077	NO	18	0.01	P	85	GM	OLDS	CUSTOM CRUISER Wgn	38,244	8	307(5.0L)/4bbl	F3G5.0V4NLA0	08/17/88	7/3	14:03
1078	NO	10	0.01	P	87	GM	CHEV	MONTE CARLO	3,824	8	305(5.0L)/4bbl	H1G5.7V4NEA6	08/17/88	7/3	14:21
1079	NO	68	0.08	P	85	GM	OLDS	CUTLASS CIERA	27,465	4	151(2.5L)/FI	F2G2.5V5TPG8	08/17/88	7/3	14:23
1080	NO	88	0.00	P	84	GM	BUIC	CENTURY CUSTOM	51,870	6	181(3.0L)/2bbl	E4G3.8V2NEY0	08/17/88	7/2	14:40
1081	NO	17	0.03	P	85	GM	OLDS	98 REGENCY BRGHM	67,188	6	231(3.8L)/FI	F4G3.8V8XEB3	08/17/88	7/2	14:48
1082	NO	9	0.00	P	87	GM	CHEV	MONTE CARLO	9,224	8	305(5.0L)/4bbl	H1G5.7V4NEA6	08/17/88	7/3	14:50
1083*	NO	209	5.80	F	85	GM	PONT	6000 LE	37,392	6	173(2.8L)/2bbl	F1G2.8V2NNA0	08/17/88	7/2	15:04
1084	NO	8	0.01	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	21,133	8	307(5.0L)/4bbl	E3G5.0V4NLAX	08/17/88	7/3	15:09
1085	NO	37	0.02	P	87	GM	BUIC	SKYHAWK	7,948	4	122(2.0L)/FI	H1G2.0V5TDG8	08/17/88	7/2	15:13
1086	NO	20	0.01	P	85	GM	BUIC	CENTURY LIMITED	46,834	6	181(3.0L)/2bbl	F4G3.8V2NSY6	08/17/88	7/2	15:15
1087	NO	16	0.04	P	88	GM	CHEV	BERETTA	15,994	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/17/88	7/3	15:58
1088	NO	39	0.43	P	83	GM	OLDS	CUTLASS CIERA LS	37,662	4	151(2.5L)/FI	D2G2.5V5TPG6	08/18/88	7/2	10:20
1090	NO	18	0.01	P	83	GM	CADI	CIMARRON	38,772	4	122(2.0L)/FI	D1G2.0V5XAJ4	08/18/88	7/3	10:31
1092	NO	19	0.01	P	84	GM	PONT	TRANS AM	27,798	6	252(4.1L)/4bbl	NO LABEL	08/18/88	7/3	10:41
1094	NO	16	0.02	P	88	GM	PONT	6000	13,420	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/18/88	7/3	10:45
1095	NO	37	0.01	P	88	GM	CHEV	CELEBRITY	11,904	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/18/88	7/2	10:47
1096	NO	42	0.02	P	88	GM	PONT	6000	11,208	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/18/88	7/3	10:48
1097	NO	10	0.01	P	88	GM	CHEV	CELEBRITY	13,337	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/18/88	7/2	10:49
1098	NO	28	0.01	P	85	GM	PONT	BONNEVILLE	69,275	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/18/88	7/2	10:57
1099	NO	25	0.01	P	85	GM	OLDS	CUTLASS SUPREME	51,862	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/18/88	7/2	11:14
1101	NO	12	0.00	P	87	FORD	FORD	TAURUS L	18,071	4	152(2.5L)/FI	HFM2.5V5HCF7	08/18/88	7/2	11:51
1102	NO	35	0.01	P	84	GM	BUIC	CENTURY LIMITED	35,106	6	181(3.0L)/2bbl	E4G3.8V2NEY0	08/18/88	7/3	12:14
1103	NO	27	0.01	P	84	GM	OLDS	CUTLASS CALAIS	32,825	6	231(3.8L)/2bbl	E4G3.8V2NEY0	08/18/88	7/3	13:19
1105	NO	35	0.34	P	84	GM	CHEV	CAVALIER CS	40,788	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/18/88	7/2	13:37
1107	NO	21	0.00	P	87	FORD	FORD	THUNDERBIRD	19,640	6	231(3.8L)/FI	HFM3.8V5HHFX	08/18/88	7/2	14:59
1108	NO	11	0.00	P	86	GM	BUIC	CENTURY LIMITED	18,106	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/18/88	7/2	15:07
1109	NO	12	0.01	P	87	GM	PONT	6000 LE	32,582	4	151(2.5L)/FI	H1G2.5V5TPG0	08/18/88	7/2	15:14

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
1110	NO	15	0.01	P	86	GM	OLDS	CUTLASS CIERA	24,050	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/18/88	7/2	16:11
1112	NO	25	0.01	P	85	FORD	MERC	MARQUIS	55,271	6	231(3.8L)/FI	FFM3.8V5HHF8	08/18/88	7/2	16:32
1114	NO	6	0.01	P	87	GM	OLDS	CUTLASS CIERA	12,665	6	173(2.8L)/FI	N/A	08/19/88	7/3	09:46
1115	NO	21	0.02	P	88	GM	CHEV	CORSICA	13,690	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/19/88	7/3	10:05
1116	NO	15	0.00	P	85	GM	CHEV	MONTE CARLO	19,953	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/19/88	7/3	10:07
1117	NO	22	0.01	P	83	GM	CHEV	MONTE CARLO	49,238	6	229(3.8L)/2bbl	D1G3.8V2NDA4	08/19/88	7/2	10:13
1118	NO	52	0.32	P	83	GM	OLDS	CUTLASS CALAIS	92,978	4	151(2.5L)/FI	D2G2.5V5TPG6	08/19/88	7/3	10:16
1119	YES	36	0.01	P	84	CHRY	CHRY	LE BARON	63,040	4	135(2.2L)/FI	ECR2.2V5HCF1	08/19/88	7/3	10:26
1120	NO	27	0.00	P	83	GM	BUIC	CENTURY	32,968	6	181(3.0L)/2bbl	D4G3.8V2NEA3	08/19/88	7/2	11:04
1121	NO	24	0.01	P	85	GM	OLDS	TORONADO BRGHM	38,221	8	307(5.0L)/4bbl	F3G5.0V4NLA0	08/19/88	7/2	11:08
1122	NO	11	0.01	P	86	GM	BUIC	CENTURY CUSTOM	23,580	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/19/88	7/3	11:19
1123	NO	52	0.01	P	85	GM	OLDS	CUTLASS SUPREME BRGHM	33,347	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/19/88	7/2	11:28
1124	NO	16	0.00	P	84	GM	PONT	BONNEVILLE	62,517	6	231(3.8L)/2bbl	E4G3.8V2NEY0	08/19/88	7/3	11:38
1125	NO	78	0.00	P	86	FORD	MERC	GRAND MARQUIS LS	45,838	8	302(5.0L)/FI	GFM5.0V5HBF9	08/19/88	7/3	11:50
1126	NO	24	0.01	P	85	GM	OLDS	TORONADO BRGHM	23,707	8	307(5.0L)/4bbl	F3G5.0V4NLA0	08/19/88	7/3	12:07
1127	NO	32	0.01	P	85	FORD	MERC	COUGAR LS XR7	53,383	6	231(3.8L)/FI	FFM3.8V5HHF8	08/19/88	7/2	12:11
1128	NO	9	0.01	P	84	GM	CHEV	CAMARO	18,692	6	173(2.8L)/2bbl	E1G2.8V2NNAX	08/19/88	7/3	12:13
1129	NO	20	0.01	P	85	FORD	FORD	THUNDERBIRD	78,573	8	302(5.0L)/FI	FFM5.0V5HBF8	08/19/88	7/2	12:20
1130	NO	31	0.06	P	86	GM	PONT	SUNBIRD	32,648	4	110(1.8L)/FI	G2G1.8V5TDG2	08/19/88	7/2	12:26
1131	NO	21	0.00	P	85	GM	PONT	PARISIENNE	45,930	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/19/88	7/3	13:49
1132*	YES	707	9.61	F	85	CHRY	DODG	DAYTONA	43,356	4	135(2.2L)/FI	FCR2.2V5HCF2	08/19/88	7/2	13:59
1133	NO	6	0.01	P	85	GM	CHEV	CELEBRITY Wgn	54,927	6	173(2.8L)/2bbl	F1G2.8V2NNA0	08/19/88	7/3	14:00
1134	NO	23	0.00	P	85	GM	OLDS	98	46,882	8	307(5.0L)/4bbl	F3G5.0V4NLA0	08/19/88	7/3	14:24
1135	YES	22	0.01	P	85	FORD	LINC	TOWN CAR	32,945	8	302(5.0L)/FI	FFM5.0V5HBF8	08/19/88	7/3	14:30
1136	NO	18	0.00	P	84	FORD	FORD	THUNDERBIRD	51,430	6	231(3.8L)/FI	EFM3.8V5HHF7	08/19/88	7/3	14:32
1137	NO	14	0.01	P	87	CHRY	CHRY	NEW YORKER	18,584	4	135(2.2L)/FI	NO LABEL	08/19/88	7/2	14:42
1138	NO	216	0.14	P	86	FORD	FORD	MUSTANG	22,593	8	302(5.0L)/FI	GFM5.0V5HBF9	08/19/88	7/3	15:06
1139	NO	19	0.00	P	85	FORD	FORD	TEMPO GL	37,771	4	140(2.3L)/FI	FFM2.3V5HCF4	08/19/88	7/3	15:51
1140	NO	6	0.01	P	87	GM	CHEV	CELEBRITY	35,215	4	151(2.5L)/FI	H1G2.5V5TPG0	08/19/88	7/3	15:58
1142	NO	12	0.01	P	85	FORD	MERC	GRAND MARQUIS LS	42,695	8	302(5.0L)/FI	FFM5.0V5HBF8	08/19/88	7/3	16:16
1144	NO	2	0.00	P	87	GM	OLDS	CUTLASS CIERA	23,072	6	231(3.8L)/FI	H2G3.8V8XEB7	08/23/88	7/1	09:50
1145	NO	72	0.05	P	84	FORD	FORD	TEMPO	57,857	4	140(2.3L)/1bbl	NO LABEL	08/23/88	7/2	10:03
1146	NO	75	0.08	P	85	GM	PONT	SUNBIRD	34,581	4	110(1.8L)/FI	F2G1.8V5TDG1	08/23/88	7/2	10:15
1148	NO	4	0.06	P	86	GM	OLDS	CUTLASS CALAIS	34,865	4	151(2.5L)/FI	G2G2.5V5TPG9	08/23/88	7/1	10:50
1149	NO	1	0.01	P	84	FORD	LINC	CONTINENTAL MARK VII	48,568	8	302(5.0L)/FI	EFM5.0V5HBF7	08/23/88	7/1	11:13
1150*	YES	40	0.03	P	86	FORD	MERC	TOPAZ GS	37,847	4	140(2.3L)/FI	GFM2.5V5HCF6	08/23/88	7/1	11:17
1151	NO	37	0.01	P	87	GM	CHEV	CELEBRITY	16,921	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/23/88	7/3	11:10
1152	NO	46	0.07	P	84	GM	BUIC	SKYHAWK	42,538	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/23/88	7/1	11:24
1153	NO	22	0.01	P	85	FORD	LINC	TOWN CAR	52,187	8	302(5.0L)/FI	FFM5.0V5HBF8	08/23/88	7/3	11:23
1154	NO	59	0.00	P	87	FORD	LINC	MARK VII LSC	16,938	8	302(5.0L)/FI	HFM5.0V5HBFX	08/23/88	7/1	11:52
1155	YES	121	1.33	F	87	FORD	MERC	TOPAZ GS	28,214	4	140(2.3L)/FI	HFM2.5V5HCF7	08/23/88	7/3	11:57
1156	NO	92	0.01	P	88	GM	PONT	6000	12,573	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/23/88	7/2	12:07
1157	NO	100	0.00	P	88	GM	PONT	6000	10,341	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/23/88	7/1	12:08

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
1158	NO	39	0.01	P	88	GM	CHEV	CELEBRITY	9,129	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/23/88	7/3	12:09
1159	NO	2	0.00	P	86	GM	CHEV	CELEBRITY	21,614	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/23/88	7/1	13:46
1160	YES	11	0.00	P	87	GM	OLDS	CALAIS	11,658	4	151(2.5L)/FI	H1G2.5V5TPGO	08/23/88	7/1	13:55
1161	NO	30	0.01	P	88	GM	BUIC	CENTURY CUSTOM	16,461	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/23/88	7/3	14:06
1162	NO	17	0.04	P	87	CHRY	DODG	SHADOW	9,715	4	135(2.2L)/FI	HCR2.5V5HCFO	08/23/88	7/3	14:12
1163	NO	14	0.03	P	84	GM	CHEV	CAVALIER Wgn	127,184	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/23/88	7/3	14:35
1164	NO	43	0.01	P	88	FORD	LINC	TOWN CAR	10,789	8	302(5.0L)/FI	JFM5.0V5HBF3	08/23/88	7/2	14:43
1166	NO	7	0.03	P	87	CHRY	DODG	DAYTONA	21,442	4	152(2.5L)/FI	HCR2.5V5FBD1	08/23/88	7/3	15:01
1167	NO	7	0.09	P	87	FORD	FORD	ESCORT PONY	24,575	4	113(1.9L)/FI	HFM1.9V5FFF1	08/23/88	7/3	15:15
1168	NO	38	0.01	P	86	GM	OLDS	CUTLASS SUPREME BRGHM	16,294	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/23/88	7/3	15:19
1169	NO	18	0.09	P	86	GM	OLDS	CUTLASS CIERA LS	42,237	4	151(2.5L)/FI	G2G2.5V5TPG9	08/23/88	7/1	15:35
1171	NO	81	0.18	P	84	GM	PONT	SUNBIRD	55,211	4	110(1.8L)/FI	E2G1.8V5TDGO	08/23/88	7/3	15:45
1172	NO	36	0.01	P	83	GM	CHEV	CAMARO	40,766	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/23/88	7/2	15:52
1174	NO	78	0.29	P	84	GM	OLDS	CUTLASS SUPREME	50,180	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/23/88	7/2	16:15
1176	NO	26	0.01	P	83	GM	BUIC	LeSABRE	59,988	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/23/88	7/3	16:55
1178	NO	65	0.18	P	85	GM	CHEV	CELEBRITY	43,958	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/24/88	7/2	10:15
1179	NO	89	0.06	P	86	GM	OLDS	DELTA 88 ROYALE	25,972	6	231(3.8L)/FI	G4G3.8V8XEB4	08/24/88	7/3	10:20
1180	NO	132	0.30	P	84	GM	OLDS	CUTLASS CIERA LS	30,747	6	181(3.0L)/2bbl	E4G3.8V2NEYO	08/24/88	7/2	10:24
1181	NO	21	0.01	P	87	GM	CHEV	CELEBRITY	29,897	4	151(2.5L)/FI	H1G2.5V5TPGO	08/24/88	7/2	10:30
1182	YES	55	0.36	P	87	FORD	FORD	ESCORT GT	26,262	4	113(1.9L)/FI	HFM1.9V5HHKX	08/24/88	7/2	10:31
1183	NO	9	0.01	P	86	GM	PONT	6000 STE	37,785	6	173(2.8L)/FI	G1G2.8V8XGZX	08/24/88	7/3	10:42
1184	NO	12	0.01	P	86	GM	PONT	6000	44,419	6	181(3.0L)/FI	G4G3.8V8XEB4	08/24/88	7/2	10:43
1185	NO	4	0.01	P	86	CHRY	DODG	ARIES	15,792	4	135(2.2L)/FI	GCR2.5V5HCFX	08/24/88	7/3	10:46
1186	NO	56	0.02	P	84	GM	BUIC	CENTURY LIMITED	33,478	6	181(3.0L)/2bbl	E4G3.8V2NEYO	08/24/88	7/2	10:52
1187	NO	76	1.19	P	84	CHRY	CHRY	E-CLASS	5,760	4	135(2.2L)/FI	ECR2.2V5HCF1	08/24/88	7/3	10:55
1188	NO	7	0.01	P	86	GM	PONT	6000	16,792	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/24/88	7/3	11:03
1190	NO	53	0.01	P	86	GM	OLDS	CUTLASS SUPREME	17,287	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/24/88	7/2	11:16
1191	NO	25	0.01	P	84	FORD	LINC	CONTINENTAL MARK VII	38,795	8	302(5.0L)/FI	EFM5.0V5HBC4	08/24/88	7/3	11:27
1192	NO	22	0.00	P	85	FORD	MERC	COUGAR LS XR7	40,836	6	231(3.8L)/FI	FFM3.8V5HHF8	08/24/88	7/2	11:48
1193	NO	12	0.05	P	84	GM	CHEV	CAVALIER CS Wgn	47,285	4	122(2.0L)/FI	N/A	08/24/88	7/3	13:13
1194	NO	97	0.21	P	85	FORD	FORD	ESCORT	45,912	4	98(1.6L)/FI	FFM1.6V5HMF5	08/24/88	7/2	13:18
1195	NO	50	0.79	P	86	GM	BUIC	CENTURY LIMITED	9,259	4	151(2.5L)/FI	G2G2.5V5TPG9	08/24/88	7/1	13:26
1196	NO	9	0.01	P	84	GM	PONT	6000 STE	33,791	6	173(2.8L)/2bbl	E1G2.8V2NNAX	08/24/88	7/3	13:26
1197	NO	81	0.04	P	88	GM	CHEV	BERETTA	20,783	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/24/88	7/3	13:57
1198	NO	30	0.01	P	83	GM	PONT	GRAND PRIX	63,873	8	305(5.0L)/4bbl	D1G5.7V4NDAO	08/24/88	7/2	14:39
1199	NO	76	0.21	P	85	GM	OLDS	98 REGENCY BRGHM	45,774	6	231(3.8L)/FI	F4G3.8V8XEB3	08/24/88	7/2	14:42
1200	NO	20	0.01	P	85	FORD	LINC	TOWN CAR	26,242	8	302(5.0L)/FI	FFM5.0V5HBF8	08/24/88	7/2	14:53
1201	NO	20	0.01	P	86	GM	PONT	GRAND AM	79,501	4	151(2.5L)/FI	G2G2.5V5TPG9	08/24/88	7/2	14:55
1202	NO	19	0.01	P	83	GM	OLDS	DELTA 88 ROYALE	33,581	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/24/88	7/1	15:08
1204	NO	6	0.00	P	85	GM	CHEV	CAVALIER	42,088	4	122(2.0L)/FI	F1G2.0V5XAG1	08/24/88	7/1	15:25
1205	NO	13	0.00	P	84	FORD	LINC	CONTINENTAL MARK VII	21,860	8	302(5.0L)/FI	EFM5.0V5HBF7	08/24/88	7/3	15:37
1207	NO	10	0.10	P	87	GM	CHEV	CAVALIER	31,140	4	122(2.0L)/FI	H1G2.0V5XAG3	08/24/88	7/3	15:47
1209	NO	12	0.00	P	84	GM	CHEV	CELEBRITY Wgn	41,548	6	173(2.8L)/2bbl	E1G2.8V2NNAX	08/24/88	7/2	16:24

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
1213	NO	13	0.01	P	86	GM	OLDS	CUTLASS SUPREME BRGHM	23,361	6	231(3.8L)/2bbl	G4G3.8V2NSY7	08/25/88	7/3	10:32
1214	NO	6	0.01	P	87	GM	PONT	BONNEVILLE	10,916	6	231(3.8L)/FI	H2G3.8V8XEB7	08/25/88	7/3	10:38
1215	NO	27	0.01	P	86	GM	CHEV	CHEVETTE	23,165	4	98(1.6L)/2bbl	G1G1.6V2NEA3	08/25/88	7/2	10:36
1216	NO	71	0.36	P	83	GM	OLDS	CUTLASS SUPREME BRGHM	66,179	6	231(3.8L)/2bbl	NO LABEL	08/25/88	7/2	10:37
1217	YES	162	0.84	P	86	FORD	FORD	TAURUS	44,095	6	182(3.0L)/FI	GFM3.0V5FEG5	08/25/88	7/3	10:46
1219	NO	86	0.30	P	84	GM	OLDS	CUTLASS CIERA LS	76,167	6	181(3.0L)/2bbl	NO LABEL	08/25/88	7/2	10:56
1220	NO	45	0.13	P	85	GM	CHEV	CAVALIER	47,450	4	122(2.0L)/FI	F1G2.0V5XAG1	08/25/88	7/3	11:07
1221*	YES	371	0.59	F	86	GM	CHEV	CAMARO	66,215	8	305(5.0L)/FI	NO LABEL	08/25/88	7/2	11:09
1222	NO	21	0.01	P	85	GM	CHEV	CAPRICE CLASSIC	51,057	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/25/88	7/3	11:25
1223	NO	40	0.05	P	86	FORD	FORD	TEMPO GL	33,069	4	140(2.3L)/FI	GFM2.5V5HCF6	08/25/88	7/2	11:28
1224	NO	35	0.01	P	86	GM	OLDS	CUTLASS SUPREME	28,427	6	231(3.8L)/2bbl	G4G3.8V2NSY7	08/25/88	7/2	11:29
1225	NO	99	0.30	P	85	GM	PONT	6000 STE	50,745	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/25/88	7/2	11:37
1226	NO	110	0.00	P	85	GM	CHEV	CAPRICE CLASSIC Wgn	81,586	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/25/88	7/3	11:43
1227	NO	24	0.00	P	86	CHRY	DODG	LANCER	43,609	4	135(2.2L)/FI	GCR2.5V5HCFX	08/25/88	7/1	11:54
1228	NO	19	0.00	P	84	FORD	FORD	THUNDERBIRD	72,721	6	231(3.8L)/FI	EFM3.8V5HHF7	08/25/88	7/1	11:57
1229	NO	22	0.03	P	85	GM	OLDS	CUTLASS CALAIS	76,031	4	151(2.5L)/FI	F2G2.5V5TPG8	08/25/88	7/1	13:18
1230	NO	12	0.00	P	85	GM	GMC	SAFARI	108,253	6	262(4.3L)/4bbl	NO LABEL	08/25/88	7/1	13:19
1231	NO	23	0.01	P	85	GM	CHEV	IMPALA	18,160	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/25/88	7/2	13:27
1232	NO	31	0.01	P	84	GM	OLDS	CUTLASS SUPREME	53,287	6	231(3.8L)/2bbl	E4G3.8V2NEY0	08/25/88	7/2	13:29
1233	NO	19	0.01	P	86	GM	BUIC	CENTURY	62,961	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/25/88	7/2	13:35
1234	NO	33	0.07	P	86	GM	BUIC	CENTURY CUSTOM	34,055	4	151(2.5L)/FI	G2G2.5V5TPG9	08/25/88	7/3	13:41
1236	NO	6	0.00	P	84	GM	CHEV	CAPRICE CLASSIC Wgn	26,161	8	305(5.0L)/4bbl	E1G5.7V4NEA3	08/25/88	7/1	13:54
1238	NO	5	0.09	P	87	CHRY	CHRY	LE BARON	18,052	4	152(2.5L)/FI	HCR2.5V5FBD1	08/25/88	7/3	14:23
1239	NO	17	0.02	P	87	GM	CHEV	CELEBRITY	10,477	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/25/88	7/3	14:33
1241	NO	5	0.00	P	87	FORD	FORD	TAURUS GL Wgn	13,135	6	182(3.0L)/FI	HFM3.0V5FEG6	08/25/88	7/1	14:47
1242	NO	19	0.10	P	85	GM	CHEV	CAVALIER	45,220	4	122(2.0L)/FI	F1G2.0V5XAG1	08/25/88	7/3	14:35
1243	NO	4	0.00	P	86	GM	OLDS	CUTLASS CIERA	23,646	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/25/88	7/1	14:50
1245	NO	1	0.00	P	85	GM	OLDS	98 REGENCY BRGHM	21,230	6	231(3.8L)/FI	F4G3.8V8XEB3	08/25/88	7/1	15:19
1247	NO	11	0.00	P	85	GM	OLDS	CUTLASS SALON	39,682	8	307(5.0L)/4bbl	F3G5.0V4NLA0	08/25/88	7/3	15:55
1248	NO	7	0.01	P	83	GM	PONT	BONNEVILLE	89,906	6	231(3.8L)/2bbl	D4G3.8V2NEA3	08/25/88	7/1	16:00
1249	NO	1	0.02	P	87	FORD	FORD	ESCORT GL	21,247	4	113(1.9L)/FI	HFM1.9V5FFF1	08/25/88	7/1	16:27
1250	NO	30	0.01	P	85	GM	BUIC	REGAL	44,818	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/25/88	7/3	16:27
1251	NO	163	0.75	P	85	GM	CHEV	CAVALIER CS Wgn	56,979	4	122(2.0L)/FI	F1G2.0V5XAG1	08/26/88	7/2	09:04
1252	NO	107	0.38	P	86	GM	OLDS	FIRENZA	24,304	4	110(1.8L)/FI	G1G1.8V5TDG2	08/25/88	7/3	09:09
1253	NO	163	0.88	P	83	GM	BUIC	REGAL	102,991	6	231(3.8L)/2bbl	ILLEGIBLE	08/26/88	7/2	09:14
1254	NO	153	0.20	P	83	GM	OLDS	DELTA 88 ROYALE	106,044	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/26/88	7/2	09:18
1255	NO	30	0.01	P	85	FORD	LINC	CONTINENTAL MARK VII	58,245	8	302(5.0L)/FI	FFM5.0V5HBF8	08/26/88	7/2	09:21
1256*	YES	894	2.46	F	86	GM	CHEV	CAVALIER	N/A	6	173(2.8L)/FI	G1G2.8V8XGZX	08/26/88	7/2	09:23
1257	NO	77	0.05	P	85	GM	CHEV	CELEBRITY	36,018	4	151(2.5L)/FI	F2G2.5V5TPG8	08/26/88	7/3	09:37
1258	NO	14	0.01	P	86	GM	BUIC	CENTURY LIMITED	40,859	6	231(3.8L)/FI	G4G3.8V8XEB4	08/26/88	7/2	09:49
1259	NO	33	0.01	P	85	GM	CHEV	MONTE CARLO	72,328	6	262(4.3L)/FI	F1G4.3V5NDA7	08/26/88	7/2	09:51

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
1260	NO	12	0.00	P	86	GM	OLDS	CUTLASS CIERA	36,248	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/26/88	7/3	10:38
1261	NO	12	0.00	P	87	FORD	FORD	MUSTANG GT	9,754	8	302(5.0L)/FI	HFM5.0V5HBFX	08/26/88	7/3	10:42
1262	NO	20	0.01	P	85	FORD	MERC	COUGAR LS XR7	35,216	6	231(3.8L)/FI	FFM3.8V5HHF8	08/26/88	7/3	11:20
1263	NO	13	0.04	P	86	GM	BUIC	SKYHAWK	40,733	4	122(2.0L)/FI	G1G2.0V5XAG2	08/26/88	7/3	11:22
1264	NO	172	0.07	P	85	FORD	FORD	TEMPO GL	56,498	4	140(2.3L)/FI	FFM2.3V5HCF4	08/26/88	7/2	11:31
1266	NO	22	0.01	P	86	GM	OLDS	CUTLASS CALAIS	63,112	4	151(2.5L)/FI	G2G2.5V5TPG9	08/26/88	7/2	11:41
1267	NO	22	0.01	P	86	FORD	MERC	SABLE GS	N/A	6	182(3.0L)/FI	GFM3.0V5FEG5	08/26/88	7/2	11:43
1268	NO	17	0.01	P	87	GM	OLDS	CUTLASS CALAIS	12,382	4	151(2.5L)/FI	H1G2.5V5TPGO	09/01/88	7/2	09:24
1269	NO	7	0.01	P	87	FORD	FORD	TEMPO L	23,957	4	140(2.3L)/FI	HFM2.5V5HCF7	09/01/88	7/3	09:41
1270	NO	19	0.01	P	87	GM	OLDS	CUTLASS SUPREME	17,800	6	231(3.8L)/2bbl	H2G3.8V2NSYX	09/01/88	7/2	09:56
1271	NO	45	0.01	P	84	FORD	LINC	TOWN CAR	34,670	8	302(5.0L)/FI	EFM5.0V5HBF7	09/01/88	7/2	10:01
1272	NO	47	0.00	P	88	FORD	LINC	TOWN CAR	30,445	8	302(5.0L)/FI	JFM5.0V5HBF3	09/01/88	7/3	10:43
1273	YES	346	1.44	F	86	GM	CHEV	CORVETTE	31,517	8	350(5.7L)/FI	G1G5.7V8DAAX	09/01/88	7/3	10:55
1274	NO	30	0.01	P	87	GM	CHEV	CELEBRITY	8,299	6	173(2.8L)/FI	H1G2.8V8XRZ4	09/01/88	7/3	11:16
1275	NO	25	0.01	P	85	GM	CHEV	ASTRO	31,080	6	262(4.3L)/4bbl	F1G4.3T4HHC1	09/01/88	7/3	11:24
1276	NO	75	0.09	P	84	GM	CHEV	CAVALIER TYPE 10	50,764	4	122(2.0L)/FI	E1G2.0V5XAJ5	09/01/88	7/2	12:00
1277	NO	51	0.02	P	87	GM	CHEV	CELEBRITY	19,443	6	173(2.8L)/FI	H1G2.8V8XRZ4	09/01/88	7/3	12:02
1278	NO	6	0.00	P	86	GM	OLDS	DELTA 88 ROYALE	8,926	6	231(3.8L)/FI	G4G3.8V8XEB4	09/01/88	7/3	12:12
1280	NO	29	0.01	P	86	FORD	MERC	COUGAR LS XR7	36,401	6	231(3.8L)/FI	GFM3.8V5HHF9	09/01/88	7/2	12:44
1282	NO	17	0.01	P	87	CHRY	PLYM	SUNDANCE	15,122	4	135(2.2L)/FI	HCR2.5V5HCFO	09/01/88	7/3	14:01
1283	NO	13	0.11	P	86	GM	OLDS	DELTA 88 ROYALE	20,607	6	181(3.0L)/FI	G4G3.8V8XEB4	09/01/88	7/2	14:40
1284	NO	29	0.53	P	83	FORD	FORD	MUSTANG	74,000	8	302(5.0L)/4bbl	DFM5.0V4GMF3	09/01/88	7/2	14:47
1285	NO	24	0.01	P	84	GM	BUIC	SKYHAWK	64,483	4	122(2.0L)/FI	E1G2.0V5XAJ5	09/01/88	7/3	14:54
1286	NO	64	0.04	P	87	GM	OLDS	CUTLASS CIERA	31,448	6	231(3.8L)/FI	H2G3.8V8XEB7	09/01/88	7/2	15:04
1287	NO	18	0.02	P	86	GM	OLDS	CUTLASS CIERA LS	16,667	6	173(2.8L)/FI	G1G2.8V8XGZX	09/01/88	7/3	15:08
1288	NO	24	0.02	P	87	FORD	FORD	TAURUS L Wgn	20,647	6	182(3.0L)/FI	HFM3.0V5FEG6	09/01/88	7/3	15:26
1289	NO	10	0.01	P	86	GM	OLDS	DELTA 88 ROYALE	27,335	6	231(3.8L)/FI	G4G3.8V8XEB4	09/01/88	7/3	15:36
1290*	YES	423	7.56	F	84	CHRY	CHRY	LE BARON	64,175	4	135(2.2L)/FI	ECR2.2V5HCF1	09/01/88	7/3	15:39
1291	NO	21	0.27	P	85	GM	CHEV	CAVALIER CS	77,432	4	122(2.0L)/FI	F1G2.0V5XAG1	09/10/88	7/2	10:11
1292	NO	5	0.01	P	88	FORD	FORD	ESCORT GL	6,622	4	113(1.9L)/FI	JFM1.9V5FFF5	09/10/88	7/3	10:54
1293	NO	12	0.02	P	86	GM	PONT	6000	18,685	4	151(2.5L)/FI	G2G2.5V5TPG9	09/10/88	7/3	11:00
1294	NO	10	0.01	P	87	GM	BUIC	CENTURY CUSTOM	4,290	6	173(2.8L)/FI	H1G2.8V8XRZ4	09/10/88	7/3	11:11
1295	NO	7	0.01	P	86	GM	CHEV	CELEBRITY	34,241	4	151(2.5L)/FI	G2G2.5V5TPG9	09/10/88	7/3	11:17
1296	NO	28	0.01	P	84	GM	PONT	PARISIENNE BRGHM	76,640	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/10/88	7/3	11:20
1297	NO	10	0.04	P	86	GM	OLDS	CUTLASS CALAIS	29,663	4	151(2.5L)/FI	G2G2.5V5TPG9	09/10/88	7/3	11:28
1299	NO	44	0.01	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	39,520	6	231(3.8L)/2bbl	E4G3.8V2NEYO	09/10/88	7/3	12:11
1300	NO	4	0.00	P	86	GM	OLDS	CUTLASS CIERA	40,039	6	173(2.8L)/2bbl	G1G2.8V2NNA1	09/10/88	7/3	12:15
1301	NO	11	0.01	P	88	GM	OLDS	CUTLASS CIERA	19,984	6	173(2.8L)/FI	J1G2.8V8XRZ8	09/10/88	7/3	12:19
1303	NO	51	0.23	P	88	GM	CHEV	CORSICA	28,180	4	122(2.0L)/FI	J1G2.0V5XAG7	09/10/88	7/3	12:27
1304	NO	26	0.05	P	87	GM	PONT	GRAND AM	22,358	4	151(2.5L)/FI	H1G2.5V5TPGO	09/10/88	7/2	12:35
1305	NO	49	0.01	P	84	GM	CHEV	CAMARO Z28	53,840	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/10/88	7/3	12:40
1306	NO	11	0.00	P	86	FORD	MERC	COUGAR LS XR7	26,867	6	231(3.8L)/FI	GFM3.8V5HHF9	09/10/88	7/3	13:41
1308	NO	5	0.01	P	86	GM	CHEV	CELEBRITY	37,376	6	173(2.8L)/2bbl	G1G2.8V2NNA1	09/10/88	7/3	14:23
1309	NO	6	0.01	P	86	GM	OLDS	CUTLASS CIERA LS	10,541	4	151(2.5L)/FI	G2G2.5V5TPG9	09/10/88	7/3	14:43

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Vehicle Control Number

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
1312	YES	24	0.06	P	86	FORD	FORD	TAURUS	34,819	6	182(3.0L)/FI	GFM3.0V5FEG5	09/17/88	7/3	11:21
1313	NO	13	0.01	P	86	GM	OLDS	TORONADO BRGHM	20,124	6	231(3.8L)/FI	G4G3.8V8XEB4	09/17/88	7/2	11:24
1314	NO	19	0.01	P	83	GM	PONT	6000 LE	23,737	6	173(2.8L)/2bbl	D1G2.8V2NNA9	09/17/88	7/2	10:23
1315	NO	49	0.01	P	86	GM	OLDS	CUTLASS CIERA	42,565	6	173(2.8L)/FI	G1G2.8V8XGZX	09/17/88	7/2	10:29
1316	NO	33	0.04	P	83	GM	OLDS	CUTLASS SUPREME	54,572	6	231(3.8L)/2bbl	D4G3.8V2NEA3	09/17/88	7/3	11:33
1317	YES	112	0.21	P	88	FORD	FORD	ESCORT GT	8,354	4	113(1.9L)/FI	JFM1.9V5HMK3	09/17/88	7/2	11:36
1318	NO	18	0.05	P	84	GM	BUIC	SKYHAWK LIMITED	39,862	4	122(2.0L)/FI	E1G2.0V5XAJ5	09/17/88	7/2	12:04
1319	NO	24	0.01	P	85	FORD	FORD	THUNDERBIRD	60,430	6	231(3.8L)/FI	FFM3.8V5HHF8	09/17/88	7/2	12:09
1320	NO	32	0.00	P	88	FORD	FORD	MUSTANG LX	14,486	8	302(5.0L)/FI	JFM5.0V5HBF3	09/17/88	7/2	12:15
1321*	NO	628	0.10	F	84	GM	BUIC	LeSABRE LIMITED	56,695	8	307(5.0L)/4bbl	ILLEGIBLE	09/17/88	7/2	12:28
1322	YES	69	0.01	P	87	GM	CHEV	CELEBRITY	24,224	6	173(2.8L)/FI	N/A	09/17/88	7/1	12:44

*** Recruited for additional testing at VTL.**

APPENDIX B

Description of the 1067* Vehicles Tested

Sorted by Manufacturer/Engine

* A 1,068TH vehicle (0541) that was inadvertently recruited for FTP testing is also included.

Description of the 1068 Test Vehicles
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0039	NO	22	0.45	P	84	CHRY	CHRY	LE BARON	12,398	4	135(2.2L)/FI	ECR2.2V5HCF1	08/19/87	8/4	10:25
0206	NO	27	0.04	P	84	CHRY	DODG	DAYTONA (Turbo)	27,718	4	135(2.2L)/FI	ECR2.2V5FAA8	09/19/87	7/1	10:39
0844	NO	29	0.60	P	84	CHRY	CHRY	LE BARON	N/A	4	135(2.2L)/FI	ECR2.2V5HCF1	08/03/88	7/3	14:40
0873	YES	11	0.01	P	84	CHRY	DODG	600 ES	33,114	4	135(2.2L)/FI	ECR2.2V5FAA8	08/04/88	7/2	15:16
0970	YES	18	0.01	P	84	CHRY	CHRY	NEW YORKER	41,984	4	135(2.2L)/FI	ECR2.2V5FAA8	08/11/88	7/2	16:42
1119	YES	36	0.01	P	84	CHRY	CHRY	LE BARON	63,040	4	135(2.2L)/FI	ECR2.2V5HCF1	08/19/88	7/3	10:26
1187	NO	76	1.19	P	84	CHRY	CHRY	E-CLASS	5,760	4	135(2.2L)/FI	ECR2.2V5HCF1	08/24/88	7/3	10:55
1290*	YES	423	7.56	F	84	CHRY	CHRY	LE BARON	64,175	4	135(2.2L)/FI	ECR2.2V5HCF1	09/01/88	7/3	15:39
0033	NO	19	0.00	P	85	CHRY	PLYM	CARAVELLE	8,768	4	135(2.2L)/FI	FCR2.2V5HCF2	08/19/87	8/2	09:52
0106	YES	97	0.55	P	85	CHRY	CHRY	ARIES SPEC ED.	N/A	4	135(2.2L)/FI	N/A	08/21/87	7/2	12:46
0139	YES	10	0.00	P	85	CHRY	DODG	600	33,204	4	135(2.2L)/FI	FCR2.2V5HCF2	08/26/87	7/3	13:48
0146	NO	8	0.00	P	85	CHRY	CHRY	LASER	31,492	4	135(2.2L)/FI	FCR2.2V5HCF2	08/26/87	7/3	17:52
0232	NO	21	0.01	P	85	CHRY	CHRY	LE BARON	16,360	4	135(2.2L)/FI	FCR2.2V5H2F2	09/24/87	7/2	10:34
0246	NO	1	0.09	P	85	CHRY	CHRY	LASER XE (Turbo)	27,556	4	135(2.2L)/FI	FCR2.2V5FAA9	09/24/87	7/3	16:28
0258*	YES	46	0.73	P	85	CHRY	CHRY	LASER	65,712	4	135(2.2L)/FI	FCR2.2V5HCF2	10/06/87	8/2	11:09
0323	NO	0	0.00	P	85	CHRY	CHRY	LASER	42,599	4	135(2.2L)/FI	FCR2.2V5HCF2	10/14/87	8/4	13:06
0362	NO	50	0.06	P	85	CHRY	CHRY	LE BARON GTS (Turbo)	14,222	4	135(2.2L)/FI	N/A	10/20/87	7/3	12:09
0368*	YES	265	6.43	F	85	CHRY	DODG	600	14,447	4	135(2.2L)/FI	FCR2.2V5HCF2	10/20/87	7/3	13:27
0370	NO	12	0.00	P	85	CHRY	DODG	600	28,354	4	135(2.2L)/FI	FCR2.2V5HCF2	10/20/87	7/3	17:03
0375	YES	10	0.00	P	85	CHRY	CHRY	LASER XE	32,770	4	135(2.2L)/FI	FCR2.2V5HCF2	10/20/87	7/2	18:02
0395	NO	21	0.04	P	85	CHRY	CHRY	NEW YORKER (Turbo)	22,616	4	135(2.2L)/FI	FCR2.2V5FAA9	11/17/87	7/2	11:12
0513	NO	14	0.02	P	85	CHRY	CHRY	LE BARON	71,278	4	135(2.2L)/FI	FCR2.2V5FAA9	07/05/88	7/3	10:33
0817	NO	24	0.00	P	85	CHRY	DODG	LANCER	43,386	4	135(2.2L)/FI	FCR2.2V5HCF2	08/02/88	7/1	14:37
1047	NO	11	0.01	P	85	CHRY	DODG	DAYTONA	63,991	4	135(2.2L)/FI	FCR2.2V5HCF2	08/16/88	7/3	16:49
1132*	YES	707	9.61	F	85	CHRY	DODG	DAYTONA	43,356	4	135(2.2L)/FI	FCR2.2V5HCF2	08/19/88	7/2	13:59
0028	NO	65	0.13	P	86	CHRY	PLYM	CARAVELLE SPEC ED.	15,436	4	135(2.2L)/FI	GCR2.2V5FFAX	08/19/87	8/2	09:06
0040	NO	11	0.01	P	86	CHRY	PLYM	RELIANT SPEC ED.	2,438	4	135(2.2L)/FI	GCR2.5V5HCFX	08/19/87	8/3	10:40
0043	NO	6	0.01	P	86	CHRY	DODG	600	14,565	4	135(2.2L)/FI	GCR2.5V5HCFX	08/19/87	8/3	11:07
0076	NO	5	0.00	P	86	CHRY	DODG	ARIES SPEC ED.	26,064	4	135(2.2L)/FI	GCR2.5V5HCFX	08/19/87	8/4	17:02
0095	YES	80	0.22	P	86	CHRY	PLYM	RELIANT	24,086	4	135(2.2L)/FI	GCR2.5V5HCFX	08/21/87	7/1	09:16
0157	NO	531	8.27	F	86	CHRY	DODG	CHARGER	41,634	4	135(2.2L)/FI	GCR2.2V5FAAX	09/09/87	8/2	10:32
0161	NO	11	0.01	P	86	CHRY	CHRY	LE BARON	23,176	4	135(2.2L)/FI	GCR2.5V5HCFX	09/09/87	8/3	12:25
0171	NO	9	0.00	P	86	CHRY	DODG	ARIES	15,909	4	135(2.2L)/FI	GCR2.2V5HCFX	09/15/87	7/3	09:35
0236	NO	8	0.00	P	86	CHRY	DODG	ARIES SPEC ED.	61,818	4	135(2.2L)/FI	GCR2.5V5HCFX	09/24/87	7/1	11:27
0329	NO	30	0.00	P	86	CHRY	CHRY	LE BARON GTS	12,255	4	135(2.2L)/FI	GCR2.5V5HCFX	10/14/87	8/2	13:34
0388*	NO**	501	4.94	F	86	CHRY	DODG	ARIES LE	26,639	4	135(2.2L)/FI	GCR2.5V5HCFX	11/17/87	7/2	09:45
0535	NO	21	0.01	P	86	CHRY	DODG	ARIES K	24,838	4	135(2.2L)/FI	GCR2.5V5HCFX	07/06/88	7/3	09:45
0701	NO	34	0.04	P	86	CHRY	DODG	LANCER	N/A	4	135(2.2L)/FI	GCR2.2V5FAAX	07/20/88	7/3	10:26
0806	YES	7	0.00	P	86	CHRY	PLYM	RELIANT	64,847	4	135(2.2L)/FI	GCR2.5V5HCFX	08/02/88	7/1	10:39
0913	NO	15	0.00	P	86	CHRY	DODG	ARIES	11,484	4	135(2.2L)/FI	GCR2.5V5HCFX	08/09/88	7/2	14:20
1062	NO	46	0.01	P	86	CHRY	DODG	LANCER	56,910	4	135(2.2L)/FI	GCR2.2V5FAAX	08/17/88	7/3	11:39
1185	NO	4	0.01	P	86	CHRY	DODG	ARIES	15,792	4	135(2.2L)/FI	GCR2.5V5HCFX	08/24/88	7/3	10:46
1227	NO	24	0.00	P	86	CHRY	DODG	LANCER	43,609	4	135(2.2L)/FI	GCR2.5V5HCFX	08/25/88	7/1	11:54

* Recruited for additional testing at VTL.
** No trouble codes were set at the I/M lane, but codes were set by the time it reached VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0349	YES	50	0.20	P	87	CHRY	DODG	ARIES LE	30,259	4	135(2.2L)/FI	HCR2.5V5HCFO	10/15/87	7/2	14:43
0631	NO	14	0.01	P	87	CHRY	CHRY	NEW YORKER	15,080	4	135(2.2L)/FI	HCR2.2V5FAC2	07/14/88	7/2	10:20
0732	NO	12	0.01	P	87	CHRY	PLYM	SUNDANCE	11,427	4	135(2.2L)/FI	HCR2.2V5FAC2	07/20/88	7/2	16:13
0807	NO	8	0.00	P	87	CHRY	CHRY	LE BARON	20,589	4	135(2.2L)/FI	HCR2.2V5FAC2	08/02/88	7/1	10:43
0811	NO	5	0.00	P	87	CHRY	PLYM	SUNDANCE	16,685	4	135(2.2L)/FI	HCR2.2V5FAC2	08/02/88	7/3	11:33
0833	NO	2	0.01	P	87	CHRY	CHRY	LE BARON	10,929	4	135(2.2L)/FI	HCR2.2V5FAC2	08/03/88	7/3	10:30
0981	NO	8	0.01	P	87	CHRY	DODG	SHADOW	16,960	4	135(2.2L)/FI	HCR2.5V5HCFO	08/12/88	7/3	11:26
1053	YES	28	0.01	P	87	CHRY	DODG	SHADOW	28,985	4	135(2.2L)/FI	HCR2.5V5HCFO	08/17/88	7/2	10:18
1137	NO	14	0.01	P	87	CHRY	CHRY	NEW YORKER	18,584	4	135(2.2L)/FI	NO LABEL	08/19/88	7/2	14:42
1162	NO	17	0.04	P	87	CHRY	DODG	SHADOW	9,715	4	135(2.2L)/FI	HCR2.5V5HCFO	08/23/88	7/3	14:12
1282	NO	17	0.01	P	87	CHRY	PLYM	SUNDANCE	15,122	4	135(2.2L)/FI	HCR2.5V5HCFO	09/01/88	7/3	14:01
0167	NO	28	0.02	P	84	CHRY	PLYM	RELIANT CUSTOM Wgn	40,525	4	135(2.2L)/2bbl	ECR2.2V2HAC4	09/09/87	8/2	18:22
0645	NO	39	0.01	P	84	CHRY	PLYM	HORIZON	52,131	4	135(2.2L)/2bbl	ECR2.2V2HAC4	07/15/88	7/3	09:51
0008	NO	21	0.00	P	85	CHRY	DODG	ARIES	93,923	4	135(2.2L)/2bbl	FCR2.2V2HDH5	08/14/87	7/3	10:46
0031	NO	24	0.01	P	85	CHRY	PLYM	RELIANT	53,258	4	135(2.2L)/2bbl	FCR2.2V2HDH5	08/19/87	8/2	09:42
0050	NO	8	0.01	P	85	CHRY	PLYM	HORIZON	12,957	4	135(2.2L)/2bbl	FCR2.2V2HDH5	08/19/87	8/3	11:43
0283	NO	21	0.01	P	85	CHRY	PLYM	RELIANT LE	26,934	4	135(2.2L)/2bbl	FCR2.2V2HDH5	10/07/87	7/2	11:07
0330	NO	17	0.00	P	85	CHRY	DODG	CHARGER 2.2	30,094	4	135(2.2L)/2bbl	FCR2.2V2HDH5	10/14/87	8/2	13:54
0358	NO	2	0.00	P	85	CHRY	DODG	ARIES	27,364	4	135(2.2L)/2bbl	FCR2.2V2HDH5	10/20/87	7/3	10:57
0394	NO	28	0.01	P	85	CHRY	PLYM	HORIZON SE	42,362	4	135(2.2L)/2bbl	FCR2.2V2HDH5	11/17/87	7/2	11:02
1032	NO	73	0.32	P	85	CHRY	PLYM	RELIANT	74,671	4	135(2.2L)/2bbl	FCR2.2V2HDH5	08/16/88	7/2	14:20
0249	NO	43	0.01	P	86	CHRY	PLYM	DUSTER	16,568	4	135(2.2L)/2bbl	GCR2.2V2HDH6	09/24/87	7/2	16:50
0445	NO	39	0.01	P	86	CHRY	DODG	CHARGER	17,437	4	135(2.2L)/2bbl	GCR2.2V2HDH6	12/08/87	8/5	12:37
0744	YES	9	0.00	P	86	CHRY	DODG	CHARGER	12,141	4	135(2.2L)/2bbl	GCR2.2V2HDH6	07/22/88	7/3	09:50
0183	NO	38	0.01	P	87	CHRY	DODG	CHARGER	14,454	4	135(2.2L)/2bbl	HCR2.2V2HDN7	09/15/87	7/2	14:09
0243	NO	43	0.00	P	87	CHRY	DODG	CHARGER	10,367	4	135(2.2L)/2bbl	HCR2.2V2HDH7	09/24/87	7/1	14:19
0373	NO	25	0.01	P	87	CHRY	PLYM	DUSTER	20,222	4	135(2.2L)/2bbl	HCR2.2V2HDH7	10/20/87	7/3	17:54
0409	NO	10	0.00	P	87	CHRY	DODG	OMNI	12,115	4	135(2.2L)/2bbl	HCR2.2V2HDH7	11/17/87	7/3	14:53
0089	NO	26	0.01	P	86	CHRY	CHRY	LE BARON	14,027	4	152(2.5L)/FI	GCR2.5V5HCFX	08/21/87	7/2	09:06
0259*	NO	232	5.02	F	86	CHRY	PLYM	CARAVELLE	25,617	4	152(2.5L)/FI	GCR2.5V5HCFX	10/06/87	8/	11:11
0280	NO	1	0.00	P	86	CHRY	CHRY	NEW YORKER	18,351	4	152(2.5L)/FI	GCR2.5V5HCFX	10/07/87	7/3	10:06
0291	NO	20	0.04	P	86	CHRY	CHRY	NEW YORKER	22,184	4	152(2.5L)/FI	GCR2.5V5HCFX	10/07/87	7/2	12:37
0304	NO	7	0.00	P	86	CHRY	CHRY	LE BARON	13,775	4	152(2.5L)/FI	GCR2.5V5HCFX	10/07/87	7/3	17:33
0308	NO	5	0.01	P	86	CHRY	DODG	ARIES LE	1,918	4	152(2.5L)/FI	GCR2.5V5HCFX	10/14/87	8/5	10:19
0314	YES	250	6.07	F	86	CHRY	DODG	DAYTONA	10,904	4	152(2.5L)/FI	GCR2.5V5HCFX	10/14/87	8/4	11:03
0538	NO	21	0.01	P	86	CHRY	CHRY	NEW YORKER	12,307	4	152(2.5L)/FI	GCR2.5V5HCFX	07/06/88	7/2	10:08
0541+	YES	481	8.33	F	86	CHRY	CHRY	NEW YORKER	63,753	4	152(2.5L)/FI	GCR2.5V5HCFX	07/06/88	7/1	10:36
0619	NO	2	0.05	P	86	CHRY	DODG	ARIES	11,670	4	152(2.5L)/FI	GCR2.5V5HCFX	07/13/88	7/1	14:09
0726	NO	50	0.67	P	86	CHRY	DODG	DAYTONA	44,907	4	152(2.5L)/FI	GCR2.5V5HCFX	07/20/88	7/2	15:19
0748	NO	24	0.01	P	86	CHRY	DODG	600	21,506	4	152(2.5L)/FI	GCR2.5V5HCFX	07/22/88	7/2	10:38
0946	NO	9	0.00	P	86	CHRY	CHRY	NEW YORKER	11,383	4	152(2.5L)/FI	GCR2.5V5HCFX	08/11/88	7/3	10:04

* Recruited for additional testing at VTL.
\+ Recruited for additional testing at VTL but should have been rejected since its I/M test was a retest.

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0547	NO	5	0.02	P	87	CHRY	DODG	ARIES K Wgn	5,024	4	152(2.5L)/FI	NO LABEL	07/06/88	7/3	11:34
0551	NO	13	0.03	P	87	CHRY	DODG	ARIES K Wgn	18,589	4	152(2.5L)/FI	HCR2.5V5FBD1	07/07/88	7/2	09:13
1072	NO	0	0.00	P	87	CHRY	PLYM	CARAVELLE	22,881	4	152(2.5L)/FI	HCR2.5V5FBD1	08/17/88	7/1	13:37
1166	NO	7	0.03	P	87	CHRY	DODG	DAYTONA	21,442	4	152(2.5L)/FI	HCR2.5V5FBD1	08/23/88	7/3	15:01
1238	NO	5	0.09	P	87	CHRY	CHRY	LE BARON	18,052	4	152(2.5L)/FI	HCR2.5V5FBD1	08/25/88	7/3	14:23
1194	NO	97	0.21	P	85	FORD	FORD	ESCORT	45,912	4	98(1.6L)/FI	FFM1.6V5HMF5	08/24/88	7/2	13:18
0583	NO	43	0.01	P	86	FORD	MERC	LYNX XR3	43,851	4	113(1.9L)/FI	GFM1.9V5HMK9	07/12/88	7/3	10:00
0962	NO	0	0.00	P	86	FORD	FORD	ESCORT GT	19,421	4	113(1.9L)/FI	GFM1.9V5HMK9	08/11/88	7/2	12:36
0998	NO	10	0.00	P	86	FORD	FORD	ESCORT GT	36,805	4	113(1.9L)/FI	GFM1.9V5HMK9	08/12/88	7/3	15:22
0502	NO	13	0.02	P	87	FORD	FORD	ESCORT GL	11,258	4	113(1.9L)/FI	HFM1.9V5FFF1	07/05/88	7/2	09:12
0543	YES	1	0.02	P	87	FORD	FORD	ESCORT GL	22,344	4	113(1.9L)/FI	HFM1.9V5FFF1	07/06/88	7/1	10:46
0709	NO	2	0.00	P	87	FORD	FORD	ESCORT GL	24,042	4	113(1.9L)/FI	HFM1.9V5FFF1	07/20/88	7/1	11:50
0779	YES	91	0.30	P	87	FORD	FORD	ESCORT GT	18,042	4	113(1.9L)/FI	HFM1.9V5HMKX	07/26/88	7/2	10:44
0845	NO	68	0.25	P	87	FORD	FORD	ESCORT EXP	19,326	4	113(1.9L)/FI	HFM1.9V5FFF1	08/03/88	7/1	14:42
0900	NO	47	0.07	P	87	FORD	FORD	ESCORT GL	24,815	4	113(1.9L)/FI	HFM1.9V5FFF1	08/09/88	7/2	10:03
1167	NO	7	0.09	P	87	FORD	FORD	ESCORT PONY	24,575	4	113(1.9L)/FI	HFM1.9V5FFF1	08/23/88	7/3	15:15
1182	YES	55	0.36	P	87	FORD	FORD	ESCORT GT	26,262	4	113(1.9L)/FI	HFM1.9V5HHKX	08/24/88	7/2	10:31
1249	NO	1	0.02	P	87	FORD	FORD	ESCORT GL	21,247	4	113(1.9L)/FI	HFM1.9V5FFF1	08/25/88	7/1	16:27
1292	NO	5	0.01	P	88	FORD	FORD	ESCORT GL	6,622	4	113(1.9L)/FI	JFM1.9V5FFF5	09/10/88	7/3	10:54
1317	YES	112	0.21	P	88	FORD	FORD	ESCORT GT	8,354	4	113(1.9L)/FI	JFM1.9V5HMK3	09/17/88	7/2	11:36
0507	YES	41	0.00	P	85	FORD	MERC	TOPAZ GS	39,818	4	140(2.3L)/FI	FFM2.3V5HCF4	07/05/88	7/1	09:51
0569	NO	319	4.43	F	85	FORD	FORD	TEMPO GL	43,210	4	140(2.3L)/FI	FFM2.3V5HCF4	07/08/88	7/2	12:00
0647*	YES	367	3.11	F	85	FORD	FORD	TEMPO GL	43,679	4	140(2.3L)/FI	FFM2.3V5HCF4	07/15/88	7/3	09:58
0710*	YES	33	0.01	P	85	FORD	FORD	TEMPO GL	N/A	4	140(2.3L)/FI	FFM2.3V5HCF4	07/20/88	7/1	11:54
0774	NO	66	0.07	P	85	FORD	FORD	TEMPO	N/A	4	140(2.3L)/FI	FFM2.3V5HCF4	07/26/88	7/2	09:56
1139	NO	19	0.00	P	85	FORD	FORD	TEMPO GL	37,771	4	140(2.3L)/FI	FFM2.3V5HCF4	08/19/88	7/3	15:51
1264	NO	172	0.07	P	85	FORD	FORD	TEMPO GL	56,498	4	140(2.3L)/FI	FFM2.3V5HCF4	08/26/88	7/2	11:31
0523	YES	17	0.01	P	86	FORD	FORD	TEMPO	10,380	4	140(2.3L)/FI	GFM2.5V5HCF6	07/05/88	7/2	11:50
0749	NO	29	0.01	P	86	FORD	FORD	TEMPO	18,119	4	140(2.3L)/FI	GFM2.5V5HCF6	07/22/88	7/2	10:47
0862	NO	31	0.11	P	86	FORD	FORD	TEMPO	15,694	4	140(2.3L)/FI	GFM2.5V5HCF6	08/04/88	7/1	11:14
0964	NO	131	1.53	F	86	FORD	MERC	TOPAZ GS	42,889	4	140(2.3L)/FI	GFM2.5V5HCF6	08/11/88	7/3	14:38
0972	NO	21	0.02	P	86	FORD	MERC	TOPAZ LS	23,649	4	140(2.3L)/FI	GFM2.5V5HCF6	08/12/88	7/3	09:55
1015*	NO	563	9.15	F	86	FORD	FORD	TEMPO	22,509	4	140(2.3L)/FI	GFM2.5V5HCF6	08/16/88	7/1	11:26
1026	NO	25	0.02	P	86	FORD	MERC	TOPAZ LS	21,890	4	140(2.3L)/FI	GFM2.5V5HCF6	08/16/88	7/3	13:33
1150*	YES	40	0.03	P	86	FORD	MERC	TOPAZ GS	37,847	4	140(2.3L)/FI	GFM2.5V5HCF6	08/23/88	7/1	11:17
1223	NO	40	0.05	P	86	FORD	FORD	TEMPO GL	33,069	4	140(2.3L)/FI	GFM2.5V5HCF6	08/25/88	7/2	11:28
0581	NO	59	0.29	P	87	FORD	FORD	TEMPO LX	11,972	4	140(2.3L)/FI	HFM2.5V5HCF7	07/12/88	7/2	09:35
0586	NO	48	0.08	P	87	FORD	FORD	MUSTANG LX	21,140	4	140(2.3L)/FI	HFM2.3V5FFG7	07/12/88	7/1	10:29
0598	YES	20	0.01	P	87	FORD	FORD	TEMPO LX	4,866	4	140(2.3L)/FI	HFM2.5V5HCF7	07/13/88	7/2	09:59
0635	YES	8	0.00	P	87	FORD	MERC	TOPAZ GS	27,889	4	140(2.3L)/FI	HFM2.5V5HCF7	07/14/88	7/3	11:11
0660	YES	11	0.01	P	87	FORD	FORD	MUSTANG LX	10,697	4	140(2.3L)/FI	HFM2.3V5FFG7	07/19/88	7/2	09:56
0684	NO	26	0.02	P	87	FORD	FORD	TEMPO LX	13,543	4	140(2.3L)/FI	HFM2.5V5HCF7	07/19/88	7/1	15:00

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0704	YES	16	0.03	P	87	FORD	MERC	TOPAZ LS	28,471	4	140(2.3L)/FI	HFM2.5V5HCF7	07/20/88	7/3	11:08
0868	NO	30	0.01	P	87	FORD	FORD	TEMPO	17,914	4	140(2.3L)/FI	HFM2.5V5HCF7	08/04/88	7/3	14:03
0920	NO	72	0.18	P	87	FORD	FORD	MUSTANG LX	13,601	4	140(2.3L)/FI	HFM2.3V5FFG7	08/09/88	7/2	16:43
0976	NO	246	0.22	F	87	FORD	FORD	TEMPO LX	23,550	4	140(2.3L)/FI	HFM2.5V5HCF7	08/12/88	7/2	10:36
1033	NO	156	3.23	F	87	FORD	FORD	TEMPO SPORT	20,598	4	140(2.3L)/FI	HFM2.5V5HCF7	08/16/88	7/1	14:42
1155	YES	121	1.33	F	87	FORD	MERC	TOPAZ GS	28,214	4	140(2.3L)/FI	HFM2.5V5HCF7	08/23/88	7/3	11:57
1269	NO	7	0.01	P	87	FORD	FORD	TEMPO L	23,957	4	140(2.3L)/FI	HFM2.5V5HCF7	09/01/88	7/3	09:41
0557	NO	21	0.01	P	84	FORD	MERC	TOPAZ GS	74,048	4	140(2.3L)/1bbl	EFM2.3V1HCK5	07/07/88	7/2	10:09
0607	YES	40	0.02	P	84	FORD	FORD	TEMPO GL	59,212	4	140(2.3L)/1bbl	EFM2.3V1HRFX	07/13/88	7/1	11:06
0878	YES	13	0.00	P	84	FORD	FORD	TEMPO GL	58,811	4	140(2.3L)/1bbl	EFM2.3V1HRFX	08/05/88	7/3	09:33
0918	NO	24	0.01	P	84	FORD	FORD	TEMPO GL	67,043	4	140(2.3L)/1bbl	EFM2.3V1HCK5	08/09/88	7/3	16:36
0943	NO	106	0.37	P	84	FORD	FORD	MUSTANG	N/A	4	140(2.3L)/1bbl	EFM2.3V1HPK2	08/10/88	7/3	16:27
0975	NO	23	0.01	P	84	FORD	FORD	TEMPO GL	19,349	4	140(2.3L)/1bbl	EFM2.3V1HCK5	08/12/88	7/3	10:08
1016	YES	529	0.00	F	84	FORD	FORD	TEMPO GL	74,366	4	140(2.3L)/1bbl	EFM2.3V1HRFX	08/16/88	7/1	11:29
1075	NO	15	0.01	P	84	FORD	FORD	TEMPO	41,980	4	140(2.3L)/1bbl	EFM2.3V1HRFX	08/17/88	7/2	13:50
1145	NO	72	0.05	P	84	FORD	FORD	TEMPO	57,857	4	140(2.3L)/1bbl	NO LABEL	08/23/88	7/2	10:03
0820	NO	23	0.01	P	86	FORD	FORD	MUSTANG	32,361	4	140(2.3L)/1bbl	GFM2.3V1HAF7	08/02/88	7/2	15:14
0770	YES	70	0.21	P	86	FORD	FORD	TAURUS	69,397	4	152(2.5L)/FI	GFM2.5V5HCF6	07/26/88	7/3	09:29
0848	NO	170	1.07	P	86	FORD	FORD	TAURUS Wgn	30,484	4	152(2.5L)/FI	GFM2.5V5HCF6	08/03/88	7/3	15:24
0531	NO	236	2.57	F	87	FORD	FORD	TAURUS MTS	30,837	4	152(2.5L)/FI	HFM2.5V5HCF7	07/05/88	7/1	12:42
1101	NO	12	0.00	P	87	FORD	FORD	TAURUS L	18,071	4	152(2.5L)/FI	HFM2.5V5HCF7	08/18/88	7/2	11:51
0769	YES	74	0.09	P	86	FORD	FORD	TAURUS LX	N/A	6	182(3.0L)/FI	GFM3.0V5FEG5	07/26/88	7/1	09:12
0895	YES	7	0.01	P	86	FORD	FORD	TAURUS GL	36,002	6	182(3.0L)/FI	GFM3.0V5FEG5	08/05/88	7/3	14:24
0963	NO	124	0.26	P	86	FORD	MERC	SABLE GS	27,419	6	182(3.0L)/FI	GFM3.0V5FEG5	08/11/88	7/3	13:16
1009	NO	1	0.00	P	86	FORD	FORD	TAURUS	58,663	6	182(3.0L)/FI	GFM3.0V5FEG5	08/16/88	7/1	10:42
1217	YES	162	0.84	P	86	FORD	FORD	TAURUS	44,095	6	182(3.0L)/FI	GFM3.0V5FEG5	08/25/88	7/3	10:46
1267	NO	22	0.01	P	86	FORD	MERC	SABLE GS	N/A	6	182(3.0L)/FI	GFM3.0V5FEG5	08/26/88	7/2	11:43
1312	YES	24	0.06	P	86	FORD	FORD	TAURUS	34,819	6	182(3.0L)/FI	GFM3.0V5FEG5	09/17/88	7/3	11:21
0633	YES	24	0.03	P	87	FORD	FORD	TAURUS GL Wgn	12,355	6	182(3.0L)/FI	HFM3.0V5FEG6	07/14/88	7/2	10:45
0711	NO	279	3.21	F	87	FORD	FORD	TAURUS GL Wgn	18,857	6	182(3.0L)/FI	HFM3.0V5FEG6	07/20/88	7/1	12:00
1005	NO	13	0.01	P	87	FORD	FORD	TAURUS GT	11,169	6	182(3.0L)/FI	HFM3.0V5FEG6	08/16/88	7/2	10:03
1241	NO	5	0.00	P	87	FORD	FORD	TAURUS GL Wgn	13,135	6	182(3.0L)/FI	HFM3.0V5FEG6	08/25/88	7/1	14:47
1288	NO	24	0.02	P	87	FORD	FORD	TAURUS L Wgn	20,647	6	182(3.0L)/FI	HFM3.0V5FEG6	09/01/88	7/3	15:26
0548	YES	42	0.00	P	84	FORD	MERC	MARQUIS BRGHM	59,196	6	231(3.8L)/FI	EFM3.8V5HHF7	07/06/88	7/3	11:44
0671	NO	12	0.00	P	84	FORD	FORD	LTD BRGHM	55,087	6	231(3.8L)/FI	EFM3.8V5HHF7	07/17/88	7/1	12:14
0737	YES	16	0.01	P	84	FORD	MERC	COUGAR LS	51,058	6	231(3.8L)/FI	EFM3.8V5HHF7	07/20/88	7/3	16:55
0771	YES	34	0.01	P	84	FORD	MERC	COUGAR LS	48,930	6	231(3.8L)/FI	EFM3.8V5HHF7	07/26/88	7/2	09:32
0776	NO	23	0.00	P	84	FORD	FORD	THUNDERBIRD	62,622	6	231(3.8L)/FI	EFM3.8V5HHF7	07/26/88	7/3	10:23
0805	YES	78	0.00	P	84	FORD	MERC	COUGAR LS	71,984	6	231(3.8L)/FI	EFM3.8V5HHF7	08/02/88	7/3	10:36
0832	NO	25	0.01	P	84	FORD	MERC	MARQUIS	67,423	6	231(3.8L)/FI	EFM3.8V5HHF7	08/03/88	7/2	10:09
0839	NO	31	0.01	P	84	FORD	FORD	THUNDERBIRD	68,834	6	231(3.8L)/FI	EFM3.8V5HHF7	08/03/88	7/2	11:25

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
1036	NO	29	0.01	P	84	FORD	MERC	MARQUIS	46,429	6	231(3.8L)/FI	NO LABEL	08/16/88	7/3	15:23
1058	NO	54	0.00	P	84	FORD	FORD	LTD Wgn	N/A	6	231(3.8L)/FI	EFM3.8V5HHF7	08/17/88	7/3	11:11
1136	NO	18	0.00	P	84	FORD	FORD	THUNDERBIRD	51,430	6	231(3.8L)/FI	EFM3.8V5HHF7	08/19/88	7/3	14:32
1228	NO	19	0.00	P	84	FORD	FORD	THUNDERBIRD	72,721	6	231(3.8L)/FI	EFM3.8V5HHF7	08/25/88	7/1	11:57
0529	NO	20	0.01	P	85	FORD	FORD	LTD	34,548	6	231(3.8L)/FI	FFM3.8V5HHF8	07/05/88	7/1	12:33
0532	YES	31	0.00	P	85	FORD	FORD	LTD BRGHM	26,300	6	231(3.8L)/FI	FFM3.8V5HHF8	07/06/88	7/3	09:13
0760	NO	18	0.00	P	85	FORD	FORD	LTD	64,951	6	231(3.8L)/FI	FFM3.8V5HHF8	07/22/88	7/1	13:43
0773	NO	50	0.01	P	85	FORD	FORD	LTD	N/A	6	231(3.8L)/FI	FFM3.8V5HHF8	07/26/88	7/2	09:48
0784	NO	6	0.00	P	85	FORD	FORD	LTD BRGHM	15,455	6	231(3.8L)/FI	FFM3.8V5HHF8	07/26/88	7/1	12:48
0880	NO	21	0.00	P	85	FORD	MERC	COUGAR LS XR7	56,000	6	231(3.8L)/FI	FFM3.5V5HHF8	08/05/88	7/3	09:53
0947	YES	31	0.01	P	85	FORD	FORD	THUNDERBIRD	31,340	6	231(3.8L)/FI	FFM3.8V5HHF8	08/11/88	7/2	10:20
0965	NO	29	0.00	P	85	FORD	MERC	COUGAR LS XR7	30,331	6	231(3.8L)/FI	FFM3.8V5HHF8	08/11/88	7/3	14:43
0989	NO	20	0.01	P	85	FORD	MERC	MARQUIS	40,379	6	231(3.8L)/FI	FFM3.8V5HHF8	08/12/88	7/2	14:06
1007	NO	77	0.00	P	85	FORD	FORD	LTD	32,457	6	231(3.8L)/FI	NO LABEL	08/16/88	7/2	10:26
1039	NO	28	0.01	P	85	FORD	FORD	THUNDERBIRD	33,833	6	231(3.8L)/FI	FFM3.8V5HHF8	08/16/88	7/2	15:52
1063	NO	5	0.00	P	85	FORD	MERC	COUGAR LS XR7	37,406	6	231(3.8L)/FI	FFM3.8V5HHF8	08/17/88	7/1	11:49
1112	NO	25	0.01	P	85	FORD	MERC	MARQUIS	55,271	6	231(3.8L)/FI	FFM3.8V5HHF8	08/18/88	7/2	16:32
1127	NO	32	0.01	P	85	FORD	MERC	COUGAR LS XR7	53,383	6	231(3.8L)/FI	FFM3.8V5HHF8	08/19/88	7/2	12:11
1192	NO	22	0.00	P	85	FORD	MERC	COUGAR LS XR7	40,836	6	231(3.8L)/FI	FFM3.8V5HHF8	08/24/88	7/2	11:48
1262	NO	20	0.01	P	85	FORD	MERC	COUGAR LS XR7	35,216	6	231(3.8L)/FI	FFM3.8V5HHF8	08/26/88	7/3	11:20
1319	NO	24	0.01	P	85	FORD	FORD	THUNDERBIRD	60,430	6	231(3.8L)/FI	FFM3.8V5HHF8	09/17/88	7/2	12:09
0582	NO	245	1.04	F	86	FORD	MERC	COUGAR LS XR7	33,041	6	231(3.8L)/FI	GFM3.8V5HHF9	07/12/88	7/2	09:46
0595	NO	36	0.01	P	86	FORD	FORD	LTD	17,722	6	231(3.8L)/FI	GFM2.8V5HHF9	07/13/88	7/2	09:24
0617	NO	27	0.01	P	86	FORD	MERC	COUGAR LS XR7	35,173	6	231(3.8L)/FI	GFM3.8V5HHF9	07/13/88	7/2	13:53
0628	NO	19	0.01	P	86	FORD	MERC	COUGAR LS XR7	27,334	6	231(3.8L)/FI	GFM3.8V5HHF9	07/14/88	7/2	09:54
0984	NO	7	0.00	P	86	FORD	FORD	MUSTANG	12,509	6	231(3.8L)/FI	GFM3.8V5HHF9	08/12/88	7/3	13:12
1061	NO	27	0.01	P	86	FORD	FORD	THUNDERBIRD	12,172	6	231(3.8L)/FI	GFM3.8V5HHF9	08/17/88	7/2	11:32
1280	NO	29	0.01	P	86	FORD	MERC	COUGAR LS XR7	36,401	6	231(3.8L)/FI	GFM3.8V5HHF9	09/01/88	7/2	12:44
1306	NO	11	0.00	P	86	FORD	MERC	COUGAR LS XR7	26,867	6	231(3.8L)/FI	GFM3.8V5HHF9	09/10/88	7/3	13:41
0659	NO	13	0.01	P	87	FORD	MERC	COUGAR LS	9,498	6	231(3.8L)/FI	HFM3.8V5HHFX	07/19/88	7/2	09:54
0815	NO	5	0.00	P	87	FORD	MERC	COUGAR LS	24,343	6	231(3.8L)/FI	HFM3.8V5HHFX	08/02/88	7/1	14:29
0912	NO	21	0.01	P	87	FORD	FORD	THUNDERBIRD	8,368	6	231(3.8L)/FI	HFM3.8V5HHFX	08/09/88	7/2	14:18
0954	NO	25	0.01	P	87	FORD	MERC	COUGAR LS	N/A	6	231(3.8L)/FI	HFM3.8V5HHFX	08/11/88	7/2	11:13
1008	NO	21	0.01	P	87	FORD	FORD	THUNDERBIRD	19,219	6	231(3.8L)/FI	HFM3.8V5HHFX	08/16/88	7/2	10:32
1067	NO	17	0.01	P	87	FORD	MERC	COUGAR LS	8,365	6	231(3.8L)/FI	HFM3.8V5HHFX	08/17/88	7/2	12:14
1073	NO	12	0.00	P	87	FORD	FORD	THUNDERBIRD	12,345	6	231(3.8L)/FI	HFM3.8V5HHFX	08/17/88	7/1	13:38
1107	NO	21	0.00	P	87	FORD	FORD	THUNDERBIRD	19,640	6	231(3.8L)/FI	HFM3.8V5HHFX	08/18/88	7/2	14:59
0622	NO	1	0.00	P	83	FORD	FORD	THUNDERBIRD	49,768	6	231(3.8L)/2bbl	DFM3.8V2GXFO	07/13/88	7/1	15:12
0681	NO	5	0.00	P	83	FORD	LINC	CONTINENTAL MARK VII	N/A	8	302(5.0L)/FI	DFM5.0V5HLF8	07/19/88	7/1	14:42
0509	YES	24	0.01	P	84	FORD	MERC	GRAND MARQUIS LS	84,119	8	302(5.0L)/FI	EFM5.0V5HBF7	07/05/88	7/2	10:14
0537	NO	37	0.01	P	84	FORD	LINC	TOWN CAR	80,956	8	302(5.0L)/FI	EFM5.0V5HBF7	07/06/88	7/2	10:01
0542	NO	21	0.01	P	84	FORD	LINC	CONTINENTAL MARK VII	40,010	8	302(5.0L)/FI	EFM5.0V5HBC4	07/06/88	7/2	10:41
0577	YES	121	0.08	P	84	FORD	MERC	GRAND MARQUIS LS	58,117	8	302(5.0L)/FI	EFM5.0V5HBF7	07/08/88	7/3	10:53
0587	YES	10	0.00	P	84	FORD	MERC	GRAND MARQUIS LS	43,251	8	302(5.0L)/FI	EFM5.0V5HBF7	07/12/88	7/3	10:36

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0639	NO	27	0.00	P	84	FORD	FORD	COUNTRY SQUIRE Wgn	98,584	8	302(5.0L)/FI	EFM5.0V5HBF7	07/14/88	7/3	12:08
0718	NO	9	0.00	P	84	FORD	LINC	TOWN CAR	34,243	8	302(5.0L)/FI	EFM5.0V5HBF7	07/20/88	7/3	13:45
0959	NO	26	0.00	P	84	FORD	MERC	COUGAR LS	N/A	8	302(5.0L)/FI	EFM5.0V5HBF7	08/11/88	7/3	12:00
0987	NO	27	0.01	P	84	FORD	LINC	CONTINENTAL MARK VII	28,645	8	302(5.0L)/FI	EFM5.0V5HBF7	08/12/88	7/2	13:43
1001	NO	20	0.00	P	84	FORD	FORD	LTD CROWN VICTORIA	56,099	8	302(5.0L)/FI	EFM5.0V5HBF7	08/16/88	7/3	09:29
1051	NO	45	0.00	P	84	FORD	MERC	GRAND MARQUIS LS	42,283	8	302(5.0L)/FI	EFM5.0V5HBF7	08/17/88	7/3	10:06
1149	NO	1	0.01	P	84	FORD	LINC	CONTINENTAL MARK VII	48,568	8	302(5.0L)/FI	EFM5.0V5HBF7	08/23/88	7/1	11:13
1191	NO	25	0.01	P	84	FORD	LINC	CONTINENTAL MARK VII	38,795	8	302(5.0L)/FI	EFM5.0V5HBC4	08/24/88	7/3	11:27
1205	NO	13	0.00	P	84	FORD	LINC	CONTINENTAL MARK VII	21,860	8	302(5.0L)/FI	EFM5.0V5HBF7	08/24/88	7/3	15:37
1271	NO	45	0.01	P	84	FORD	LINC	TOWN CAR	34,670	8	302(5.0L)/FI	EFM5.0V5HBF7	09/01/88	7/2	10:01
0517	YES	2	0.01	P	85	FORD	FORD	THUNDERBIRD	56,593	8	302(5.0L)/FI	FFM5.0V5HBF8	07/05/88	7/1	10:57
0563	YES	24	0.01	P	85	FORD	LINC	TOWN CAR	N/A	8	302(5.0L)/FI	FFM5.0V5HBF8	07/07/88	7/2	11:27
0589	NO	240	4.87	F	85	FORD	MERC	GRAND MARQUIS LS	60,219	8	302(5.0L)/FI	FFM5.0V5HBF8	07/12/88	7/2	12:08
0597	YES	19	0.00	P	85	FORD	FORD	COUNTRY SQUIRE Wgn	42,285	8	302(5.0L)/FI	FFM5.0V5HBF8	07/13/88	7/3	09:50
0599	YES	20	0.01	P	85	FORD	FORD	LTD CROWN VICTORIA	37,205	8	302(5.0L)/FI	FFM5.0V5HBF8	07/13/88	7/2	10:10
0632	NO	7	0.00	P	85	FORD	LINC	TOWN CAR	51,965	8	302(5.0L)/FI	FFM5.0V5HBF8	07/14/88	7/3	10:44
0651	NO	16	0.01	P	85	FORD	LINC	CONTINENTAL MARK VII	24,700	8	302(5.0L)/FI	FFM5.0V5HBF8	07/15/88	7/2	10:28
0767	NO	18	0.00	P	85	FORD	LINC	TOWN CAR	44,218	8	302(5.0L)/FI	FFM5.0V5HBF8	07/22/88	7/2	15:09
0861	NO	15	0.01	P	85	FORD	MERC	GRAND MARQUIS LS	33,847	8	302(5.0L)/FI	FFM5.0V5HBF8	08/04/88	7/2	10:46
0893	YES	6	0.01	P	85	FORD	FORD	LTD CROWN VICTORIA	29,372	8	302(5.0L)/FI	N/A	08/05/88	7/3	12:09
0914	NO	8	0.01	P	85	FORD	LINC	CONTINENTAL MARK VII	23,276	8	302(5.0L)/FI	FFM5.0V5HBF8	08/09/88	7/3	14:49
0932	YES	7	0.00	P	85	FORD	FORD	LTD CROWN VICTORIA	44,660	8	302(5.0L)/FI	FFM5.0V5HBF8	08/10/88	7/3	13:29
1129	NO	20	0.01	P	85	FORD	FORD	THUNDERBIRD	78,573	8	302(5.0L)/FI	FFM5.0V5HBF8	08/19/88	7/2	12:20
1135	YES	22	0.01	P	85	FORD	LINC	TOWN CAR	32,945	8	302(5.0L)/FI	FFM5.0V5HBF8	08/19/88	7/3	14:30
1142	NO	12	0.01	P	85	FORD	MERC	GRAND MARQUIS LS	42,695	8	302(5.0L)/FI	FFM5.0V5HBF8	08/19/88	7/3	16:16
1153	NO	22	0.01	P	85	FORD	LINC	TOWN CAR	52,187	8	302(5.0L)/FI	FFM5.0V5HBF8	08/23/88	7/3	11:23
1200	NO	20	0.01	P	85	FORD	LINC	TOWN CAR	26,242	8	302(5.0L)/FI	FFM5.0V5HBF8	08/24/88	7/2	14:53
1255	NO	30	0.01	P	85	FORD	LINC	CONTINENTAL MARK VII	58,245	8	302(5.0L)/FI	FFM5.0V5HBF8	08/26/88	7/2	09:21
0555	NO	43	0.01	P	86	FORD	LINC	TOWN CAR	25,423	8	302(5.0L)/FI	GFM5.0V5HBF9	07/07/88	7/2	09:26
0604	NO	138	0.17	P	86	FORD	FORD	MUSTANG GT	43,354	8	302(5.0L)/FI	GFM5.0V5HBF9	07/13/88	7/1	10:48
0606	NO	46	0.01	P	86	FORD	MERC	GRAND MARQUIS LS	8,021	8	302(5.0L)/FI	GFM5.0V5HBF9	07/13/88	7/2	10:50
0637	NO	31	0.01	P	86	FORD	FORD	MUSTANG	21,671	8	302(5.0L)/FI	GFM5.0V5HBF9	07/14/88	7/2	11:49
0717	NO	26	0.00	P	86	FORD	LINC	TOWN CAR	42,858	8	302(5.0L)/FI	GFM5.0V5HBF9	07/20/88	7/3	13:32
0740	NO	69	0.01	P	86	FORD	FORD	THUNDERBIRD	20,417	8	302(5.0L)/FI	GFM5.0V5HBF9	07/22/88	7/3	09:09
0753	NO	70	0.00	P	86	FORD	FORD	THUNDERBIRD	38,214	8	302(5.0L)/FI	GFM5.0V5HBF9	07/22/88	7/3	11:25
0787	NO	16	0.00	P	86	FORD	FORD	MUSTANG GT	28,429	8	302(5.0L)/FI	GFM5.0V5HBF9	07/26/88	7/2	14:14
0846	NO	48	0.00	P	86	FORD	MERC	GRAND MARQUIS LS	36,613	8	302(5.0L)/FI	GFM5.0V5HBF9	08/03/88	7/1	14:53
0865	NO	22	0.02	P	86	FORD	LINC	MARK VII	36,711	8	302(5.0L)/FI	GFM5.0V5HBF9	08/04/88	7/1	11:31
0887	NO	70	0.00	P	86	FORD	MERC	COUGAR LS XR7	38,042	8	302(5.0L)/FI	GFM5.0V5HBF9	08/05/88	7/3	11:20
0909	NO	40	0.01	P	86	FORD	FORD	LTD CROWN VICTORIA	28,704	8	302(5.0L)/FI	GFM5.0V5HBF9	08/09/88	7/2	12:41
1003	NO	40	0.00	P	86	FORD	FORD	LTD CROWN VICTORIA	27,200	8	302(5.0L)/FI	GFM5.0V5HBF9	08/16/88	7/3	09:47
1019	NO	37	0.01	P	86	FORD	LINC	TOWN CAR	18,979	8	302(5.0L)/FI	GFM5.0V5HBF9	08/16/88	7/3	12:03
1054	NO	45	0.00	P	86	FORD	LINC	TOWN CAR	12,820	8	302(5.0L)/FI	GFM5.0V5HBF9	08/17/88	7/2	10:28
1064	NO	15	0.01	P	86	FORD	LINC	TOWN CAR	N/A	8	302(5.0L)/FI	GFM5.0V5HBF9	08/17/88	7/3	11:52
1125	NO	78	0.00	P	86	FORD	MERC	GRAND MARQUIS LS	45,838	8	302(5.0L)/FI	GFM5.0V5HBF9	08/19/88	7/3	11:50
1138	NO	216	0.14	P	86	FORD	FORD	MUSTANG	22,593	8	302(5.0L)/FI	GFM5.0V5HBF9	08/19/88	7/3	15:06

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0516	NO	32	0.00	P	87	FORD	LINC	CONTINENTAL	13,100	8	302(5.0L)/FI	HFM5.0V5HBFX	07/05/88	7/1	10:52
0520	YES	9	0.00	P	87	FORD	FORD	MUSTANG LX	14,000	8	302(5.0L)/FI	HFM5.0V5HBFX	07/05/88	7/1	11:19
0562	NO	10	0.00	P	87	FORD	LINC	TOWN CAR	12,353	8	302(5.0L)/FI	HFM5.0V5HBFX	07/07/88	7/	11:26
0590	NO	52	0.01	P	87	FORD	FORD	LTD CROWN VICTORIA LX	6,620	8	302(5.0L)/FI	HFM5.0V5HBFX	07/12/88	7/2	12:38
0623	NO	19	0.00	P	87	FORD	MERC	COUGAR LS	15,004	8	302(5.0L)/FI	HFM5.0V5HBFX	07/13/88	7/1	15:09
0758	YES	21	0.00	P	87	FORD	FORD	MUSTANG GT	23,129	8	302(5.0L)/FI	HFM5.0V5HBFX	07/22/88	7/1	13:24
0764	NO	14	0.00	P	87	FORD	FORD	MUSTANG LX	18,372	8	302(5.0L)/FI	HFM5.0V5HBFX	07/22/88	7/3	14:37
0785	NO	16	0.00	P	87	FORD	MERC	GRAND MARQUIS GS	18,437	8	302(5.0L)/FI	HFM5.0V5HBFX	07/26/88	7/3	13:02
0791	NO	12	0.00	P	87	FORD	FORD	MUSTANG GT	26,402	8	302(5.0L)/FI	HFM5.0V5HBFX	07/26/88	7/3	14:40
0828	NO	32	0.00	P	87	FORD	LINC	MARK VII LSC	8,231	8	302(5.0L)/FI	HFM5.0V5HBFX	08/03/88	7/3	09:25
0881	NO	44	0.01	P	87	FORD	MERC	COUGAR XR7	8,783	8	302(5.0L)/FI	HFM5.0V5HBFX	08/05/88	7/3	10:08
0919	NO	34	0.00	P	87	FORD	MERC	GRAND MARQUIS GS	34,425	8	302(5.0L)/FI	HFM5.0V5HBFX	08/09/88	7/3	16:43
0982	NO	30	0.01	P	87	FORD	FORD	MUSTANG GT	14,961	8	302(5.0L)/FI	HFM5.0V5HBFX	08/12/88	7/2	11:45
0992	YES	40	0.00	P	87	FORD	FORD	MUSTANG GT	10,817	8	302(5.0L)/FI	HFM5.0V5HBFX	08/12/88	7/2	14:41
1070	NO	40	0.00	P	87	FORD	FORD	LTD CRN VIC Wgn	26,602	8	302(5.0L)/FI	HFM5.0V5HBFX	08/17/88	7/2	13:19
1154	NO	59	0.00	P	87	FORD	LINC	MARK VII LSC	16,938	8	302(5.0L)/FI	HFM5.0V5HBFX	08/23/88	7/1	11:52
1261	NO	12	0.00	P	87	FORD	FORD	MUSTANG GT	9,754	8	302(5.0L)/FI	HFM5.0V5HBFX	08/26/88	7/3	10:42
1056	NO	85	0.16	P	88	FORD	LINC	MARK VII LSC	27,749	8	302(5.0L)/FI	JFM5.0V5HBF3	08/17/88	7/3	10:55
1164	NO	43	0.01	P	88	FORD	LINC	TOWN CAR	10,789	8	302(5.0L)/FI	JFM5.0V5HBF3	08/23/88	7/2	14:43
1272	NO	47	0.00	P	88	FORD	LINC	TOWN CAR	30,445	8	302(5.0L)/FI	JFM5.0V5HBF3	09/01/88	7/3	10:43
1320	NO	32	0.00	P	88	FORD	FORD	MUSTANG LX	14,486	8	302(5.0L)/FI	JFM5.0V5HBF3	09/17/88	7/2	12:15
1284	NO	29	0.53	P	83	FORD	FORD	MUSTANG	74,000	8	302(5.0L)/4bbl	DFM5.0V4GMF3	09/01/88	7/2	14:47
0057	NO	35	0.01	P	83	GM	CHEV	CHEVETTE SCOOTER	53,065	4	98(1.6L)/2bbl	D1G1.6V2NEA0	08/19/87	8/2	12:33
0515	NO	274	4.26	F	83	GM	CHEV	CHEVETTE	116,394	4	98(1.6L)/2bbl	D1G1.6V2NEA0	07/05/88	7/3	10:46
1037	NO	24	0.01	P	83	GM	CHEV	CHEVETTE	59,031	4	98(1.6L)/2bbl	D1G1.6V2NEA0	08/16/88	7/3	15:32
0264	YES	1	0.00	P	84	GM	CHEV	CHEVETTE SCOOTER	74,142	4	98(1.6L)/2bbl	E1G1.6V2NEA1	10/06/87	7/3	14:05
0306	NO	6	0.00	P	84	GM	CHEV	CHEVETTE CS	68,284	4	98(1.6L)/2bbl	E1G1.6V2NEA1	10/07/87	7/3	18:28
0320	NO	15	0.01	P	84	GM	CHEV	CHEVETTE CS	22,150	4	98(1.6L)/2bbl	E1G1.6V2NEA1	10/14/87	8/5	12:48
0434	NO	26	0.00	P	84	GM	CHEV	CHEVETTE CS	54,541	4	98(1.6L)/2bbl	E1G1.6V2NEA1	11/19/87	8/4	15:05
0001	NO	6	0.00	P	85	GM	CHEV	CHEVETTE	23,440	4	98(1.6L)/2bbl	F1G1.6V2NEA2	08/14/87	7/3	09:05
0021	NO	12	0.01	P	85	GM	CHEV	CHEVETTE	26,071	4	98(1.6L)/2bbl	F1G1.6V2NEA2	08/14/87	7/2	12:55
0054	NO	28	0.01	P	85	GM	CHEV	CHEVETTE	28,347	4	98(1.6L)/2bbl	F1G1.6V2NEA2	08/19/87	8/2	12:05
0059	NO	63	0.34	P	85	GM	PONT	T-1000	27,058	4	98(1.6L)/2bbl	F1G1.6V2NEA2	08/19/87	8/3	12:41
0211	NO	1	0.00	P	85	GM	CHEV	CHEVETTE	36,533	4	98(1.6L)/2bbl	F1G1.6V2NEA2	09/19/87	7/3	12:16
0252	NO	30	0.00	P	85	GM	CHEV	CHEVETTE	24,696	4	98(1.6L)/2bbl	F1G1.6V2NEA2	09/24/87	7/3	18:21
0902	NO	23	0.00	P	86	GM	PONT	T-1000	21,745	4	98(1.6L)/2bbl	NO LABEL	08/09/88	7/2	10:15
1215	NO	27	0.01	P	86	GM	CHEV	CHEVETTE	23,165	4	98(1.6L)/2bbl	G1G1.6V2NEA3	08/25/88	7/2	10:36
0029	YES	5	0.06	P	83	GM	BUIC	SKYHAWK CUSTOM	35,759	4	110(1.8L)/FI	D2G1.8V5TDGX	08/19/87	8/5	09:17
0212	YES	41	0.09	P	83	GM	PONT	2000	78,449	4	110(1.8L)/FI	D2G1.8V5TDGX	09/19/87	7/2	12:25
0426	NO	31	0.07	P	83	GM	PONT	2000	50,720	4	110(1.8L)/FI	D2G1.8V5TDGX	11/19/87	8/5	11:18
0961	YES	36	0.09	P	83	GM	CHEV	CAVALIER	75,257	4	110(1.8L)/FI	D2G1.8V5TDGX	08/11/88	7/3	12:52

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0081	NO	206	2.70	F	84	GM	PONT	2000 SUNBIRD	N/A	4	110(1.8L)/FI	E2G1.8V5TDGO	08/19/87	8/4	18:35
0247	NO	30	0.10	P	84	GM	OLDS	FIRENZA BRGHM	37,026	4	110(1.8L)/FI	E2G1.8V5TDGO	09/24/87	7/3	16:34
0251	NO	62	0.05	P	84	GM	OLDS	FIRENZA Wgn	43,394	4	110(1.8L)/FI	E2G1.8V5TDGO	09/24/87	7/3	18:17
0327	NO	37	0.30	P	84	GM	PONT	2000 SUNBIRD	69,575	4	110(1.8L)/FI	E2G1.8V5TDGO	10/14/87	8/2	13:29
0333	NO	37	0.03	P	84	GM	PONT	2000 SUNBIRD	63,361	4	110(1.8L)/FI	E2G1.8V5TDGO	10/14/87	7/2	16:42
0592	NO	98	0.26	P	84	GM	OLDS	FIERENZA	21,350	4	110(1.8L)/FI	E2G1.8V5TDGO	07/13/88	7/1	09:13
0876	NO	157	0.05	P	84	GM	OLDS	FIRENZA BRGHM Wgn	71,353	4	110(1.8L)/FI	E2G1.8V5TDGO	08/04/88	7/3	16:28
1171	NO	81	0.18	P	84	GM	PONT	SUNBIRD	55,211	4	110(1.8L)/FI	E2G1.8V5TDGO	08/23/88	7/3	15:45
0257	NO	38	0.09	P	85	GM	PONT	2000 SUNBIRD	10,448	4	110(1.8L)/FI	F2G1.8V5TDG1	10/06/87	8/2	10:59
0385	NO	32	0.05	P	85	GM	PONT	2000 SUNBIRD	26,186	4	110(1.8L)/FI	F2G1.8V5TDGI	11/14/87	8/2	10:25
0424	NO	18	0.01	P	85	GM	PONT	2000 SUNBIRD	33,842	4	110(1.8L)/FI	F2G1.8V5TDG1	11/19/87	8/2	10:58
1146	NO	75	0.08	P	85	GM	PONT	SUNBIRD	34,581	4	110(1.8L)/FI	F2G1.8V5TDG1	08/23/88	7/2	10:15
0199	NO	20	0.05	P	86	GM	OLDS	FIRENZA	12,637	4	110(1.8L)/FI	G2G1.8V5TDG2	09/15/87	7/2	18:27
0309	NO	48	0.00	P	86	GM	BUIC	SKY HAWK Wgn	69,873	4	110(1.8L)/FI	G2G1.8V5TDG2	10/14/87	8/4	10:21
0319	NO	8	0.03	P	86	GM	BUIC	CUSTOM	62,955	4	110(1.8L)/FI	G2G1.8V5TDG2	10/14/87	8/5	12:43
0522	NO	14	0.04	P	86	GM	OLDS	CUTLASS CALAIS	32,674	4	110(1.8L)/FI	G2G2.5V5TPG9	07/05/88	7/3	11:46
0565	NO	14	0.04	P	86	GM	PONT	SUNBIRD	22,402	4	110(1.8L)/FI	G2G1.8V5TDG2	07/07/88	7/3	11:47
0688	NO	15	0.05	P	86	GM	OLDS	FIRENZA	37,965	4	110(1.8L)/FI	N/A	07/19/88	7/3	15:27
0950	NO	100	0.38	P	86	GM	PONT	SUNBIRD SE	43,339	4	110(1.8L)/FI	G2G1.8V5TDG2	08/11/88	7/2	10:40
1130	NO	31	0.06	P	86	GM	PONT	SUNBIRD	32,648	4	110(1.8L)/FI	G2G1.8V5TDG2	08/19/88	7/2	12:26
1252	NO	107	0.38	P	86	GM	OLDS	FIRENZA	24,304	4	110(1.8L)/FI	G1G1.8V5TDG2	08/25/88	7/3	09:09
0048	NO	14	0.01	P	83	GM	CHEV	CAVALIER Wgn	32,755	4	122(2.0L)/FI	D1G2.0V5XAJ4	08/19/87	8/2	11:33
0130*	YES	135	1.45	F	83	GM	CHEV	CAVALIER CS	69,418	4	122(2.0L)/FI	D1G2.0V5XAJ4	08/26/87	7/1	09:56
0136	NO	9	0.00	P	83	GM	CHEV	CAVALIER CS	48,393	4	122(2.0L)/FI	D1G2.0V5XAJ4	08/26/87	7/3	13:03
0137	NO	20	0.08	P	83	GM	CHEV	CAVALIER	7,120	4	122(2.0L)/FI	D1G2.0V5XAJ4	08/26/87	7/3	13:29
0180	NO	7	0.00	P	83	GM	CHEV	CAVALIER Wgn	19,629	4	122(2.0L)/FI	D1G2.0V5XAJ4	09/15/87	7/3	12:25
0307	NO	2	0.01	P	83	GM	CHEV	CAVALIER CS Wgn	66,944	4	122(2.0L)/FI	D1G2.0V5XAJ4	10/14/87	8/5	10:15
0360	NO	1	0.00	P	83	GM	CHEV	CAVALIER Wgn CS	51,777	4	122(2.0L)/FI	D1G2.0V5XAJ4	10/20/87	7/3	11:33
0412	NO	7	0.00	P	83	GM	CHEV	CAVALIER CS	51,870	4	122(2.0L)/FI	D1G2.0V5NDA4	11/17/87	7/3	15:51
0578	NO	25	0.01	P	83	GM	CADI	CIMARRON	34,205	4	122(2.0L)/FI	D1G2.0V5NDA4	07/08/88	7/2	11:09
0713	NO	4	0.01	P	83	GM	CHEV	CAVALIER	78,280	4	122(2.0L)/FI	D1G2.0V5XAJ4	07/20/88	7/1	12:24
0731	NO	86	0.33	P	83	GM	CHEV	CAVALIER	109,946	4	122(2.0L)/FI	D1G2.0V5XAJ4	07/20/88	7/2	16:09
0847	NO	0	0.02	P	83	GM	CHEV	CAVALIER Wgn	40,710	4	122(2.0L)/FI	D1G2.0V5XAJ4	08/03/88	7/1	14:57
1013	NO	24	0.08	P	83	GM	CHEV	CAVALIER	84,931	4	122(2.0L)/FI	D1G2.0V5XAJ4	08/16/88	7/1	11:15
1090	NO	18	0.01	P	83	GM	CADI	CIMARRON	38,772	4	122(2.0L)/FI	D1G2.0V5XAJ4	08/18/88	7/3	10:31
0022	NO	3	0.00	P	84	GM	CHEV	CAVALIER CS Wgn	34,200	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/14/87	7/3	12:57
0110	NO	26	0.30	P	84	GM	BUIC	SKYHAWK CUSTOM	23,447	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/21/87	7/2	14:22
0112	NO	25	0.02	P	84	GM	CHEV	CAVALIER CS Wgn	69,914	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/21/87	7/2	14:26
0133	NO	7	0.00	P	84	GM	CHEV	CAVALIER CS	56,796	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/26/87	7/3	11:23
0220	NO	0	0.15	P	84	GM	CHEV	CAVALIER TYPE 10	40,240	4	122(2.0L)/FI	E1G2.0V5XAJ5	09/19/87	7/3	16:02
0285	NO	13	0.05	P	84	GM	CHEV	CAVALIER	49,711	4	122(2.0L)/FI	E1G2.0V5XAJ5	10/07/87	7/1	11:41
0300	NO	12	0.02	P	84	GM	CHEV	CAVALIER TYPE 10	77,593	4	122(2.0L)/FI	E1G2.0V5XAJ5	10/07/87	7/2	10:00

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0356	NO	72	0.38	P	84	GM	CHEV	CAVALIER Wgn	91,253	4	122(2.0L)/FI	E1G2.0V5XAJ5	10/20/87	7/2	10:35
0361	NO	15	0.02	P	84	GM	CHEV	CAVALIER	26,431	4	122(2.0L)/FI	E1G2.0V5XAJ5	10/20/87	7/2	11:48
0363	NO	5	0.00	P	84	GM	CHEV	CAVALIER TYPE 10	41,057	4	122(2.0L)/FI	E1G2.0V5XAJ5	10/20/87	7/3	12:20
0512	NO	10	0.01	P	84	GM	CHEV	CAVALIER	61,988	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/05/88	7/3	10:31
0514	NO	7	0.01	P	84	GM	CHEV	CAVALIER CS	13,973	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/05/88	7/1	10:37
0540	NO	21	0.01	P	84	GM	CHEV	CAVALIER TYPE 10	72,980	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/06/88	7/2	10:28
0575	NO	11	0.01	P	84	GM	CHEV	CAVALIER TYPE 10	130,010	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/08/88	7/3	10:44
0580	NO	33	0.08	P	84	GM	CHEV	CAVALIER CS	40,184	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/12/88	7/2	09:24
0620	NO	2	0.05	P	84	GM	OLDS	FIERENZA	45,819	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/13/88	7/1	14:12
0707	NO	0	0.02	P	84	GM	CHEV	CAVALIER TYPE 10	N/A	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/20/88	7/1	11:35
0712	NO	1	0.03	P	84	GM	CHEV	CAVALIER TYPE 10	46,064	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/20/88	7/1	12:08
0741	NO	41	0.12	P	84	GM	BUIC	SKYHAWK	N/A	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/22/88	7/3	09:16
0752	NO	10	0.03	P	84	GM	CHEV	CAVALIER TYPE 10	54,924	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/22/88	7/3	10:57
0761	NO	15	0.06	P	84	GM	CHEV	CAVALIER CS Wgn	49,243	4	122(2.0L)/FI	E1G2.0V5XAJ5	07/22/88	7/2	13:52
1011	NO	10	0.02	P	84	GM	CHEV	CAVALIER CS Wgn	60,453	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/16/88	7/3	11:09
1025	NO	51	0.16	P	84	GM	CHEV	CAVALIER CS	26,143	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/16/88	7/2	13:29
1027	NO	39	0.19	P	84	GM	BUIC	SKYHAWK	42,529	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/16/88	7/3	13:47
1105	NO	35	0.34	P	84	GM	CHEV	CAVALIER CS	40,788	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/18/88	7/2	13:37
1152	NO	46	0.07	P	84	GM	BUIC	SKYHAWK	42,538	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/23/88	7/1	11:24
1163	NO	14	0.03	P	84	GM	CHEV	CAVALIER Wgn	127,184	4	122(2.0L)/FI	E1G2.0V5XAJ5	08/23/88	7/3	14:35
1193	NO	12	0.05	P	84	GM	CHEV	CAVALIER CS Wgn	47,285	4	122(2.0L)/FI	N/A	08/24/88	7/3	13:13
1276	NO	75	0.09	P	84	GM	CHEV	CAVALIER TYPE 10	50,764	4	122(2.0L)/FI	E1G2.0V5XAJ5	09/01/88	7/2	12:00
1285	NO	24	0.01	P	84	GM	BUIC	SKYHAWK	64,483	4	122(2.0L)/FI	E1G2.0V5XAJ5	09/01/88	7/3	14:54
1318	NO	18	0.05	P	84	GM	BUIC	SKYHAWK LIMITED	39,862	4	122(2.0L)/FI	E1G2.0V5XAJ5	09/17/88	7/2	12:04
0063	NO	153	0.37	P	85	GM	CHEV	CAVALIER CS Wgn	45,741	4	122(2.0L)/FI	F1G2.0V5XAG1	08/19/87	8/4	14:27
0072*	NO	174	1.39	F	85	GM	CHEV	CAVALIER TYPE 10	26,583	4	122(2.0L)/FI	F1G2.0V5XAG1	08/19/87	8/4	16:31
0160	NO	0	0.03	P	85	GM	CHEV	CAVALIER	50,121	4	122(2.0L)/FI	F1G2.0V5XAG1	09/09/87	8/3	11:20
0250	NO	46	0.22	P	85	GM	CHEV	CAVALIER Wgn	27,938	4	122(2.0L)/FI	F1G2.0V5XAG1	09/24/87	7/3	18:07
0267	NO	28	0.02	P	85	GM	BUIC	CUSTOM	24,609	4	122(2.0L)/FI	F1G2.0V5XAG1	10/06/87	7/3	14:52
0292	NO	31	0.01	P	85	GM	CHEV	CAVALIER CS	9,766	4	122(2.0L)/FI	F1G2.0V5XAG1	10/07/87	7/2	12:41
0364	NO	21	0.02	P	85	GM	CADI	CIMARRON	6,755	4	122(2.0L)/FI	F1G2.0V5XAG1	10/20/87	7/2	12:21
0605	NO	5	0.07	P	85	GM	BUIC	SKYHAWK	39,919	4	122(2.0L)/FI	F1G2.0V5XAG1	07/13/88	7/1	10:45
0618	NO	5	0.05	P	85	GM	BUIC	SKYHAWK	46,392	4	122(2.0L)/FI	F1G2.0V5XAG1	07/13/88	7/1	14:03
0621	NO	49	0.15	P	85	GM	CHEV	CAVALIER CS	22,454	4	122(2.0L)/FI	F1G2.0V5XAG1	07/13/88	7/1	14:56
0663	NO	17	0.01	P	85	GM	CHEV	CAVALIER	35,005	4	122(2.0L)/FI	F1G2.0V5XAG1	07/19/88	7/2	11:07
0802	NO	97	0.26	P	85	GM	CHEV	CAVALIER	32,978	4	122(2.0L)/FI	F1G2.0V5XAG1	08/02/88	7/3	09:54
1204	NO	6	0.00	P	85	GM	CHEV	CAVALIER	42,088	4	122(2.0L)/FI	F1G2.0V5XAG1	08/24/88	7/1	15:25
1220	NO	45	0.13	P	85	GM	CHEV	CAVALIER	47,450	4	122(2.0L)/FI	F1G2.0V5XAG1	08/25/88	7/3	11:07
1242	NO	19	0.10	P	85	GM	CHEV	CAVALIER	45,220	4	122(2.0L)/FI	F1G2.0V5XAG1	08/25/88	7/3	14:35
1251	NO	163	0.75	P	85	GM	CHEV	CAVALIER CS Wgn	56,979	4	122(2.0L)/FI	F1G2.0V5XAG1	08/26/88	7/2	09:04
1291	NO	21	0.27	P	85	GM	CHEV	CAVALIER CS	77,432	4	122(2.0L)/FI	F1G2.0V5XAG1	09/10/88	7/2	10:11

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0002	NO	23	0.03	P	86	GM	CHEV	CAVALIER Wgn	13,137	4	122(2.0L)/FI	G1G2.0V5XAG2	08/14/87	7/3	09:07
0068	NO	26	0.03	P	86	GM	BUIC	SKYHAWK CUSTOM	9,077	4	122(2.0L)/FI	G1G2.0V5XAG2	08/19/87	8/4	15:35
0109	NO	10	0.00	P	86	GM	CHEV	CAVALIER Wgn	5,227	4	122(2.0L)/FI	G1G2.0V5XAG2	08/21/87	7/3	13:08
0223	NO	4	0.00	P	86	GM	CHEV	CAVALIER CS	17,164	4	122(2.0L)/FI	G1G2.0V5XAG2	09/19/87	7/3	16:34
0256	YES	22	0.02	P	86	GM	CHEV	CAVALIER	17,360	4	122(2.0L)/FI	G1G2.0V5XAG2	10/06/87	8/2	09:52
0301	NO	45	0.04	P	86	GM	OLDS	FIRENZA	12,466	4	122(2.0L)/FI	G1G2.0V5XAG2	10/07/87	7/2	16:19
0408	NO	3	0.01	P	86	GM	CHEV	CAVALIER CS	27,715	4	122(2.0L)/FI	G1G2.0V5XAG2	11/17/87	7/3	14:22
0430	YES	96	0.33	P	86	GM	CHEV	CAVALIER RS	27,603	4	122(2.0L)/FI	G1G2.0V5XAG2	11/19/87	8/4	12:29
0572	NO	19	0.01	P	86	GM	CHEV	CAVALIER Wgn	24,649	4	122(2.0L)/FI	G1G2.0V5XAG2	07/08/88	7/2	10:09
0672	NO	11	0.07	P	86	GM	CHEV	CAVALIER	39,386	4	122(2.0L)/FI	G1G2.0V5XAG2	07/19/88	7/1	12:18
0683	NO	15	0.01	P	86	GM	CHEV	CAVALIER	11,394	4	122(2.0L)/FI	G1G2.0V5XAG2	07/19/88	7/2	14:56
0696	NO	7	0.01	P	86	GM	CHEV	CAVALIER Wgn	8,975	4	122(2.0L)/FI	G1G2.0V5XAG2	07/20/88	7/3	09:53
0794	NO	29	0.02	P	86	GM	CHEV	CAVALIER	18,653	4	122(2.0L)/FI	G1G2.0V5XAG2	07/26/88	7/3	15:03
0801	NO	10	0.00	P	86	GM	CHEV	CAVALIER	31,982	4	122(2.0L)/FI	G1G2.0V5XAG2	08/02/88	7/1	09:35
0995	NO	12	0.17	P	86	GM	BUIC	SKYHAWK	3,930	4	122(2.0L)/FI	NO LABEL	08/12/88	7/3	14:53
0999	NO	17	0.01	P	86	GM	BUIC	SKYHAWK	31,717	4	122(2.0L)/FI	NO LABEL	08/17/88	7/2	15:24
1263	NO	13	0.04	P	86	GM	BUIC	SKYHAWK	40,733	4	122(2.0L)/FI	G1G2.0V5XAG2	08/26/88	7/3	11:22
0389	NO	90	0.20	P	87	GM	CHEV	CAVALIER CS	7,438	4	122(2.0L)/FI	N/A	11/17/87	7/2	09:55
0413	NO	18	0.01	P	87	GM	PONT	2000 SUNBIRD	25,600	4	122(2.0L)/FI	H1G2.0V5TDG8	11/17/87	7/2	15:54
0422	NO	26	0.15	P	87	GM	CHEV	CAVALIER Wgn	16,567	4	122(2.0L)/FI	H1G2.0V5XAG3	11/19/87	8/4	10:48
0564	NO	56	0.18	P	87	GM	CHEV	CAVALIER RS	6,222	4	122(2.0L)/FI	H1G2.0V5XAG3	07/07/88	7/2	11:28
0573	NO	21	0.06	P	87	GM	CHEV	CAVALIER CS	23,269	4	122(2.0L)/FI	NO LABEL	07/08/88	7/2	10:21
0613	NO	11	0.06	P	87	GM	CHEV	CAVALIER	9,276	4	122(2.0L)/FI	H1G2.0V5XAG3	07/13/88	7/2	12:54
0698	NO	53	0.05	P	87	GM	BUIC	SKYHAWK	N/A	4	122(2.0L)/FI	H1G2.0V5XAG3	07/20/88	7/2	10:09
0923	NO	62	0.55	P	87	GM	CHEV	CAVALIER	18,423	4	122(2.0L)/FI	H1G2.0V5XAG3	08/10/88	7/2	10:16
1085	NO	37	0.02	P	87	GM	BUIC	SKYHAWK	7,948	4	122(2.0L)/FI	H1G2.0V5TDG8	08/17/88	7/2	15:13
1207	NO	10	0.10	P	87	GM	CHEV	CAVALIER	31,140	4	122(2.0L)/FI	H1G2.0V5XAG3	08/24/88	7/3	15:47
0772	NO	49	0.08	P	88	GM	CHEV	CORSICA	31,243	4	122(2.0L)/FI	J1G2.0V5XAG7	07/26/88	7/1	09:40
0910	NO	4	0.09	P	88	GM	CHEV	CORSICA	1,256	4	122(2.0L)/FI	J1G2.0V5XAG7	08/09/88	7/1	12:41
0944	NO	13	0.03	P	88	GM	CHEV	CORSICA	17,015	4	122(2.0L)/FI	J1G2.0V5XAG7	08/10/88	7/3	16:34
0971	NO	7	0.18	P	88	GM	CHEV	BERETTA	26,049	4	122(2.0L)/FI	J1G2.0V5XAG7	08/11/88	7/3	17:02
1303	NO	51	0.23	P	88	GM	CHEV	CORSICA	28,180	4	122(2.0L)/FI	J1G2.0V5XAG7	09/10/88	7/3	12:27
0194	NO	1	0.02	P	83	GM	CHEV	CELEBRITY	69,965	4	151(2.5L)/FI	D2G2.5V5TPG6	09/15/87	7/3	17:05
0273	NO	26	0.15	P	83	GM	CHEV	CELEBRITY	34,183	4	151(2.5L)/FI	D2G2.5V5TPG6	10/06/87	7/1	15:25
0922	NO	26	0.17	P	83	GM	CHEV	CELEBRITY	78,329	4	151(2.5L)/FI	D2G2.5V5TPG6	08/10/88	7/2	10:00
1088	NO	39	0.43	P	83	GM	OLDS	CUTLASS CIERA LS	37,662	4	151(2.5L)/FI	D2G2.5V5TPG6	08/18/88	7/2	10:20
1118	NO	52	0.32	P	83	GM	OLDS	CUTLASS CALAIS	92,978	4	151(2.5L)/FI	D2G2.5V5TPG6	08/19/88	7/3	10:16
0034	NO	70	0.06	P	84	GM	BUIC	SKYLARK CUSTOM	7,260	4	151(2.5L)/FI	E2G2.5V5TPG7	08/19/87	8/2	10:03
0176	NO	2	0.02	P	84	GM	BUIC	SKYLARK CUSTOM	28,368	4	151(2.5L)/FI	E2G2.5V5TPG7	09/15/87	7/3	11:09
0196	NO	18	0.08	P	84	GM	OLDS	CUTLASS CIERA LS	19,896	4	151(2.5L)/FI	E2G2.5V5TPG7	09/15/87	7/3	17:20
0266	NO	85	0.06	P	84	GM	BUIC	CENTURY LIMITED	33,821	4	151(2.5L)/FI	E2G2.5V5TPG7	10/06/87	7/3	14:26
0293	NO	183	0.39	P	84	GM	PONT	FIERO 2M4	40,493	4	151(2.5L)/FI	E2G2.5V5TPG7	10/07/87	7/2	13:13
0714	NO	95	0.06	P	84	GM	CHEV	CELEBRITY	54,817	4	151(2.5L)/FI	E2G2.5V5TPG7	07/20/88	7/2	13:08
0780	NO	182	0.42	P	84	GM	OLDS	CUTLASS CIERA BRGHM	38,125	4	151(2.5L)/FI	E2G2.5V5TPG7	07/26/88	7/1	11:01
0858	NO	113	0.10	P	84	GM	OLDS	OMEGA	55,523	4	151(2.5L)/FI	E2G2.5V5TPG7	08/04/88	7/2	09:55

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0045	NO	142	0.27	P	85	GM	CHEV	CELEBRITY (Euro)	58,538	4	151(2.5L)/FI	F2G2.5V5TPG8	08/19/87	8/2	11:16
0113	NO	16	0.07	P	85	GM	OLDS	CUTLASS CIERA LS	20,071	4	151(2.5L)/FI	F2G2.5V5TPG8	08/21/87	7/3	14:38
0116	NO	48	0.04	P	85	GM	BUIC	SKYLARK CUSTOM	22,121	4	151(2.5L)/FI	F2G2.5V5TPG8	08/21/87	7/2	15:05
0138	NO	7	0.00	P	85	GM	OLDS	CUTLASS CIERA LS	100,667	4	151(2.5L)/FI	F2G2.5V5TPG8	08/26/87	7/3	13:35
0148	NO	41	0.05	P	85	GM	OLDS	CUTLASS CIERA LS	44,387	4	151(2.5L)/FI	F2G2.5V5TPG8	09/09/87	8/3	09:12
0158	NO	11	0.00	P	85	GM	OLDS	CUTLASS CIERA BRGHM	22,359	4	151(2.5L)/FI	F2G2.5V5TPG8	09/09/87	8/3	10:33
0165	NO	85	0.11	P	87	GM	OLDS	CUTLASS CIERA LS	16,739	4	151(2.5L)/FI	F2G2.5V5TPG8	09/09/87	8/2	16:44
0190	NO	67	0.09	P	85	GM	CHEV	CELEBRITY (Euro)	45,479	4	151(2.5L)/FI	F2G2.5V5TPG8	09/15/87	7/3	16:31
0260	NO	63	0.08	P	85	GM	PONT	6000	55,639	4	151(2.5L)/FI	F2G2.5V5TPG8	10/06/87	8/2	11:59
0276	NO	92	0.04	P	85	GM	OLDS	CUTLASS CIERA LS	37,529	4	151(2.5L)/FI	F2G2.5V5TPG8	10/06/87	7/3	16:19
0284	YES	24	0.10	P	85	GM	CHEV	CELEBRITY (Euro)	41,984	4	151(2.5L)/FI	F2G2.5V5TPG8	10/07/87	7/3	11:21
0326	NO	32	0.04	P	85	GM	BUIC	CENTURY CUSTOM	16,635	4	151(2.5L)/FI	F2G2.5V5TPG8	10/14/87	8/5	13:28
0568	NO	74	0.08	P	85	GM	OLDS	CUTLASS CALAIS	72,063	4	151(2.5L)/FI	F2G2.5V5TPG8	07/07/88	7/2	11:58
0579	NO	25	0.04	P	85	GM	BUIC	SOMERSET REGAL	38,709	4	151(2.5L)/FI	F2G2.5V5TPG8	07/08/88	7/3	11:22
0615	NO	26	0.02	P	85	GM	OLDS	CUTLASS CALAIS	46,237	4	151(2.5L)/FI	F2G2.5V5TPG8	07/13/88	7/2	13:31
0625	NO	42	0.04	P	85	GM	OLDS	CUTLASS CIERA	17,573	4	151(2.5L)/FI	F2G2.5V5TPG8	07/14/88	7/3	09:24
0666	NO	39	0.14	P	85	GM	OLDS	CUTLASS CIERA LS	43,713	4	151(2.5L)/FI	F2G2.5V5TPG8	07/19/88	7/3	11:44
0812	NO	135	0.07	P	85	GM	OLDS	CUTLASS CIERA	73,734	4	151(2.5L)/FI	F2G2.5V5TPG8	08/02/88	7/3	11:50
0814	NO	19	0.01	P	85	GM	CHEV	CELEBRITY	46,456	4	151(2.5L)/FI	F2G2.5V5TPG8	08/02/88	7/3	14:09
1066	NO	22	0.01	P	85	GM	BUIC	CENTURY CUSTOM	72,694	4	151(2.5L)/FI	F2G2.5V5TPG8	08/17/88	7/2	12:12
1068	NO	57	0.15	P	85	GM	CHEV	CELEBRITY	48,087	4	151(2.5L)/FI	F2G2.5V5TPG8	08/17/88	7/3	12:23
1079	NO	68	0.08	P	85	GM	OLDS	CUTLASS CIERA	27,465	4	151(2.5L)/FI	F2G2.5V5TPG8	08/17/88	7/3	14:23
1229	NO	22	0.03	P	85	GM	OLDS	CUTLASS CALAIS	76,031	4	151(2.5L)/FI	F2G2.5V5TPG8	08/25/88	7/1	13:18
1257	NO	77	0.05	P	85	GM	CHEV	CELEBRITY	36,018	4	151(2.5L)/FI	F2G2.5V5TPG8	08/26/88	7/3	09:37
0013	NO	14	7.00	P	86	GM	OLDS	CUTLASS CALAIS	19,341	4	151(2.5L)/FI	G2G2.5V5TPG9	08/14/87	7/3	11:40
0071	NO	31	0.12	P	86	GM	PONT	FIERO	8,904	4	151(2.5L)/FI	G2G2.5V5TPG9	08/19/87	8/4	16:26
0099	NO	41	0.03	P	86	GM	OLDS	CUTLASS CALAIS SUPRM	44,983	4	151(2.5L)/FI	G2G2.5V5TPG9	08/21/87	7/3	12:04
0123	NO	4	0.01	P	86	GM	OLDS	CUTLASS CIERA LS	28,706	4	151(2.5L)/FI	G2G2.5V5TPG9	08/21/87	7/3	16:02
0126	NO	29	0.02	P	86	GM	OLDS	CUTLASS CIERA LS	13,300	4	151(2.5L)/FI	G2G2.5V5TPG9	08/21/87	7/2	16:54
0155	NO	15	0.04	P	86	GM	OLDS	CUTLASS CALAIS SUPRM	26,790	4	151(2.5L)/FI	G2G2.5V5TPG9	09/09/87	8/3	10:29
0181	YES	7	0.06	P	86	GM	PONT	6000	3,780	4	151(2.5L)/FI	G2G2.5V5TPG9	09/15/87	7/3	12:27
0207*	YES	6	0.00	P	86	GM	OLDS	CUTLASS CALAIS	16,000	4	151(2.5L)/FI	G2G2.5V5TPG9	09/19/87	7/3	10:43
0209	NO	13	0.00	P	86	GM	PONT	6000	26,729	4	151(2.5L)/FI	G2G2.5V5TPG9	09/19/87	7/1.	10:59
0305	NO	14	0.03	P	86	GM	PONT	6000	10,121	4	151(2.5L)/FI	G2G2.5V5TPG9	10/07/87	7/3	17:39
0322	NO	45	0.19	P	86	GM	OLDS	CUTLASS CIERA LS	19,473	4	151(2.5L)/FI	G2G2.5V5TPG9	10/14/87	8/4	13:03
0338	NO	45	0.11	P	86	GM	PONT	GRAND AM	28,131	4	151(2.5L)/FI	G2G2.5V3TPG9	10/15/87	7/2	10:50
0345	NO	6	0.03	P	86	GM	OLDS	CUTLASS CIERA LS	16,297	4	151(2.5L)/FI	G2G2.5V5TPG9	10/15/87	7/3	12:57
0352	NO	31	0.11	P	86	GM	OLDS	CUTLASS CIERA LS	28,503	4	151(2.5L)/FI	N/A	10/15/87	7/3	15:57
0418	NO	4	0.07	P	86	GM	OLDS	CUTLASS CALAIS	23,544	4	151(2.5L)/FI	G2G2.5V5TPG9	11/19/87	8/3	10:05
0506	NO	98	0.08	P	86	GM	OLDS	CUTLASS CALAIS	30,684	4	151(2.5L)/FI	G2G2.5V5TPG9	07/05/88	7/2	09:51
0591	NO	29	0.01	P	86	GM	BUIC	SKYLARK	44,421	4	151(2.5L)/FI	G2G2.5V5TPG9	07/12/88	7/2	12:48
0634	NO	23	0.01	P	86	GM	BUIC	SOMERSET REGAL	31,431	4	151(2.5L)/FI	G2G2.5V5TPG9	07/14/88	7/2	10:54
0667	NO	97	0.15	P	86	GM	CHEV	CELEBRITY GL	12,141	4	151(2.5L)/FI	G2G2.5V5TPG9	07/19/88	7/3	11:50
0705	NO	18	0.12	P	86	GM	OLDS	CUTLASS CIERA	21,017	4	151(2.5L)/FI	G2G2.5V5TPG9	07/20/88	7/3	11:18
0757	NO	8	0.02	P	86	GM	BUIC	SKYLARK	17,801	4	151(2.5L)/FI	G2G2.5V5TPG9	07/22/88	7/3	13:17
0759	NO	54	0.07	P	86	GM	OLDS	CUTLASS CIERA LS	34,230	4	151(2.5L)/FI	G2G2.5V5TPG9	07/22/88	7/1	13:37

* Recruited for additional testing at VTL.

Description of the 1088 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0778	NO	5	0.00	P	86	GM	BUIC	CENTURY CUSTOM	20,295	4	151(2.5L)/FI	G2G2.5V5TPG9	07/26/88	7/1	10:33
0786	NO	32	0.01	P	86	GM	OLDS	CUTLASS CIERA LS	54,163	4	151(2.5L)/FI	G2G2.5V5TPG9	07/26/88	7/2	13:16
0804	NO	35	0.06	P	86	GM	BUIC	CENTURY CUSTOM	17,802	4	151(2.5L)/FI	G2G2.5V5TPG9	08/02/88	7/2	10:13
0897	NO	17	0.04	P	86	GM	OLDS	CUTLASS CALAIS	22,920	4	151(2.5L)/FI	G2G2.5V5TPG9	08/09/88	7/3	09:52
0939	NO	21	0.03	P	86	GM	CHEV	CELEBRITY	29,623	4	151(2.5L)/FI	G2G2.5V5TPG9	08/10/88	7/2	14:25
0977	NO	113	0.09	P	86	GM	OLDS	CUTLASS CALAIS	19,377	4	151(2.5L)/FI	G2G2.5V5TPG9	08/12/88	7/2	10:45
1148	NO	4	0.06	P	86	GM	OLDS	CUTLASS CALAIS	34,865	4	151(2.5L)/FI	G2G2.5V5TPG9	08/23/88	7/1	10:50
1169	NO	18	0.09	P	86	GM	OLDS	CUTLASS CIERA LS	42,237	4	151(2.5L)/FI	G2G2.5V5TPG9	08/23/88	7/1	15:35
1195	NO	50	0.79	P	86	GM	BUIC	CENTURY LIMITED	9,259	4	151(2.5L)/FI	G2G2.5V5TPG9	08/24/88	7/1	13:26
1201	NO	20	0.01	P	86	GM	PONT	GRAND AM	79,501	4	151(2.5L)/FI	G2G2.5V5TPG9	08/24/88	7/2	14:55
1234	NO	33	0.07	P	86	GM	BUIC	CENTURY CUSTOM	34,055	4	151(2.5L)/FI	G2G2.5V5TPG9	08/25/88	7/3	13:41
1266	NO	22	0.01	P	86	GM	OLDS	CUTLASS CALAIS	63,112	4	151(2.5L)/FI	G2G2.5V5TPG9	08/26/88	7/2	11:41
1293	NO	12	0.02	P	86	GM	PONT	6000	18,685	4	151(2.5L)/FI	G2G2.5V5TPG9	09/10/88	7/3	11:00
1295	NO	7	0.01	P	86	GM	CHEV	CELEBRITY	34,241	4	151(2.5L)/FI	G2G2.5V5TPG9	09/10/88	7/3	11:17
1297	NO	10	0.04	P	86	GM	OLDS	CUTLASS CALAIS	29,663	4	151(2.5L)/FI	G2G2.5V5TPG9	09/10/88	7/3	11:28
1309	NO	6	0.01	P	86	GM	OLDS	CUTLASS CIERA LS	10,541	4	151(2.5L)/FI	G2G2.5V5TPG9	09/10/88	7/3	14:43
0218	NO	1	0.00	P	87	GM	PONT	GRAND AM	12,219	4	151(2.5L)/FI	H1G2.5V5TPGO	09/19/87	7/3	15:40
0339	NO	6	0.00	P	87	GM	PONT	GRAND AM	10,244	4	151(2.5L)/FI	H1G2.5V5TPGO	10/15/87	7/3	10:59
0348	NO	17	0.01	P	87	GM	PONT	GRAND AM	13,429	4	151(2.5L)/FI	H1G2.5V5TPGO	10/15/87	7/2	14:27
0401	YES	44	0.01	P	87	GM	OLDS	CUTLASS CALAIS	12,850	4	151(2.5L)/FI	H1G2.5V5TPGO	11/17/87	7/1	11:55
0638	NO	15	0.00	P	87	GM	OLDS	CUTLASS CIERA	7,129	4	151(2.5L)/FI	H1G2.5V5TPGO	07/14/88	7/2	12:06
0644	NO	16	0.01	P	87	GM	BUIC	CENTURY CUSTOM	10,753	4	151(2.5L)/FI	H1G2.5V5TPGO	07/15/88	7/3	09:48
0646	NO	15	0.01	P	87	GM	PONT	GRAND AM	19,627	4	151(2.5L)/FI	H1G2.5V5TPGO	07/15/88	7/3	09:55
0743	YES	17	0.04	P	87	GM	CHEV	CELEBRITY	60,087	4	151(2.5L)/FI	H1G2.5V5TPGO	07/22/88	7/3	09:40
0756	NO	6	0.01	P	87	GM	OLDS	CUTLASS CALAIS	23,275	4	151(2.5L)/FI	H1G2.5V5TPGO	07/22/88	7/3	11:48
0824	NO	18	0.01	P	87	GM	OLDS	CUTLASS CALAIS	12,262	4	151(2.5L)/FI	H1G2.5V5TPGO	08/03/88	7/3	08:58
0827	YES	17	0.01	P	87	GM	OLDS	CUTLASS CALAIS	17,368	4	151(2.5L)/FI	H1G2.5V5TPGO	08/03/88	7/2	09:17
0835	NO	5	0.01	P	87	GM	BUIC	SOMERSET	10,583	4	151(2.5L)/FI	H1G2.5V5TPGO	08/03/88	7/3	10:38
0838	NO	34	0.03	P	87	GM	PONT	GRAND AM LE	38,787	4	151(2.5L)/FI	H1G2.5V5TPGO	08/03/88	7/2	11:00
0866	NO	92	0.05	P	87	GM	OLDS	CUTLASS CALAIS	11,357	4	151(2.5L)/FI	H1G2.5V5TPGO	08/04/88	7/2	13:38
0867	NO	13	0.01	P	87	GM	OLDS	CUTLASS CALAIS	20,338	4	151(2.5L)/FI	H1G2.5V5TPGO	08/04/88	7/2	13:41
0889	NO	51	0.17	P	87	GM	CHEV	CELEBRITY	28,276	4	151(2.5L)/FI	H1G2.5V5TPGO	08/05/88	7/3	11:27
0917	NO	14	0.00	P	87	GM	PONT	GRAND AM LE	18,071	4	151(2.5L)/FI	H1G2.5V5TPGO	08/09/88	7/2	15:39
0938	NO	15	0.01	P	87	GM	PONT	GRAND AM	3,617	4	151(2.5L)/FI	H1G2.5V5TPGO	08/10/88	7/2	14:23
0956	YES	41	0.04	P	87	GM	CHEV	CELEBRITY	19,838	4	151(2.5L)/FI	H1G2.5V5TPGO	08/11/88	7/3	11:23
1048	NO	9	0.01	P	87	GM	BUIC	SOMERSET	24,493	4	151(2.5L)/FI	H1G2.5V5TPGO	08/16/88	7/3	16:51
1055	NO	13	0.01	P	87	GM	PONT	GRAND AM	12,914	4	151(2.5L)/FI	H1G2.5V5TPGO	08/17/88	7/3	10:40
1076	NO	12	0.02	P	87	GM	OLDS	CUTLASS CALAIS	26,669	4	151(2.5L)/FI	H1G2.5V5TPGO	08/17/88	7/3	13:57
1109	NO	12	0.01	P	87	GM	PONT	6000 LE	32,582	4	151(2.5L)/FI	H1G2.5V5TPGO	08/18/88	7/2	15:14
1140	NO	6	0.01	P	87	GM	CHEV	CELEBRITY	35,215	4	151(2.5L)/FI	H1G2.5V5TPGO	08/19/88	7/3	15:58
1160	YES	11	0.00	P	87	GM	OLDS	CALAIS	11,658	4	151(2.5L)/FI	H1G2.5V5TPGO	08/23/88	7/1	13:55
1181	NO	21	0.01	P	87	GM	CHEV	CELEBRITY	29,897	4	151(2.5L)/FI	H1G2.5V5TPGO	08/24/88	7/2	10:30
1268	NO	17	0.01	P	87	GM	OLDS	CUTLASS CALAIS	12,382	4	151(2.5L)/FI	H1G2.5V5TPGO	09/01/88	7/2	09:24
1304	NO	26	0.05	P	87	GM	PONT	GRAND AM	22,358	4	151(2.5L)/FI	H1G2.5V5TPGO	09/10/88	7/2	12:35

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0020	NO	11	0.01	P	85	GM	CHEV	CAMARO	25,500	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/14/87	7/2	12:45
0027	NO	43	0.12	P	85	GM	CHEV	CAVALIER	43,099	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/19/87	8/8	09:05
0037	NO	22	0.00	P	85	GM	OLDS	DELTA 88 ROYALE	36,204	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/19/87	8/	
0055	NO	21	0.01	P	85	GM	CHEV	CAMARO Z28	27,005	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/19/87	8/2	12:17
0069	YES	45	0.05	P	85	GM	CHEV	CAMARO Z28	16,642	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/19/87	8/4	16:02
0406	NO	18	0.01	P	85	GM	PONT	6000 STE	46,951	6	173(2.8L)/FI	F1G2.8V8XGZ9	11/17/87	7/2	13:06
0556	NO	135	0.25	P	85	GM	CHEV	CITATION II	46,050	6	173(2.8L)/FI	F1G2.8V8XG29	07/07/88	7/2	09:30
0855	NO	234	3.47	F	85	GM	PONT	6000 STE	68,085	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/04/88	7/2	09:24
1178	NO	65	0.18	P	85	GM	CHEV	CELEBRITY	43,958	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/24/88	7/2	10:15
1225	NO	99	0.30	P	85	GM	PONT	6000 STE	50,745	6	173(2.8L)/FI	F1G2.8V8XGZ9	08/25/88	7/2	11:37
0023	NO	78	0.01	P	86	GM	OLDS	CUTLASS CRUISER Wgn	82,714	6	173(2.8L)/FI	G1G2.8V8XGZX	08/14/87	7/2	13:05
0036	YES	21	0.01	P	86	GM	PONT	6000	13,996	6	173(2.8L)/FI	G1G2.8V8XGZX	08/19/87	8/3	10:16
0066	NO	1	0.00	P	86	GM	PONT	6000 LE	12,863	6	173(2.8L)/FI	G1G2.8V8XGZX	08/19/87	8/4	15:21
0067*	NO	272	0.05	F	86	GM	CHEV	CAMARO Z28	18,353	6	173(2.8L)/FI	G1G2.8V8XGZX	08/19/87	8/4	15:28
0187	NO	0	0.00	P	86	GM	PONT	6000 LE	16,981	6	173(2.8L)/FI	G1G2.8V8XGZX	09/15/87	7/3	15:45
0235	NO	11	0.00	P	86	GM	OLDS	CUTLASS CIERA BRGHM	17,320	6	173(2.8L)/FI	G1G2.8V8XGZX	09/24/87	7/1	11:07
0240	NO	8	0.00	P	86	GM	PONT	6000 LE	21,816	6	173(2.8L)/FI	G1G2.8V8XGZX	09/24/87	7/3	12:21
0245	NO	24	0.01	P	86	GM	PONT	6000 STE	30,600	6	173(2.8L)/FI	G1G2.8V8XGZX	09/24/87	7/1	16:06
0275	NO	1	0.00	P	86	GM	CHEV	CAVALIER Z24	37,131	6	173(2.8L)/FI	G1G2.8V8XGZX	10/06/87	7/3	16:18
0277	NO	2	0.00	P	86	GM	OLDS	CUTLASS CIERA BRGHM	13,442	6	173(2.8L)/FI	G1G2.8V8XGZX	10/06/87	/3	16:26
0299	NO	14	0.00	P	86	GM	CHEV	CELEBRITY Wgn	47,998	6	173(2.8L)/FI	G1G2.8V8XGZX	10/07/87	/2	15:51
0318	NO	36	0.01	P	86	GM	CHEV	CAVALIER RS CONV	33,456	6	173(2.8L)/FI	G1G2.8V8XGZX	10/14/87	/4	12:07
0566	NO	11	0.01	P	86	GM	CHEV	CAMARO	11,442	6	173(2.8L)/FI	G1G2.8V8XGZX	07/07/88	7/2	11:51
0593	YES	158	0.05	P	86	GM	CHEV	CAMARO	49,107	6	173(2.8L)/FI	NO LABEL	07/13/88	7/2	09:08
0640	NO	11	0.01	P	86	GM	OLDS	CUTLASS CIERA	30,379	6	173(2.8L)/FI	G1G2.8V8XGZX	07/14/88	7/2	12:09
0677	NO	4	0.00	P	86	GM	PONT	6000	34,664	6	173(2.8L)/FI	G1G2.8V8XGZX	07/19/88	7/3	14:12
0739	NO	7	0.00	P	86	GM	PONT	FIREBIRD	43,666	6	173(2.8L)/FI	G1G2.8V8XGZX	07/20/88	7/3	17:11
0849	NO	15	0.01	P	86	GM	PONT	6000 LE Wgn	50,514	6	173(2.8L)/FI	G1G2.8V8XGZX	08/03/88	7/2	15:37
0948	NO	11	0.01	P	86	GM	OLDS	CUTLASS CRUISER Wgn	N/A	6	173(2.8L)/FI	GAG2.8V8XGZX	08/11/88	7/2	10:24
1183	NO	9	0.01	P	86	GM	PONT	6000 STE	37,785	6	173(2.8L)/FI	G1G2.8V8XGZX	08/24/88	7/3	10:42
1256*	YES	894	2.46	F	86	GM	CHEV	CAVALIER	N/A	6	173(2.8L)/FI	G1G2.8V8XGZX	08/26/88	7/2	09:23
1287	NO	18	0.02	P	86	GM	OLDS	CUTLASS CIERA LS	16,667	6	173(2.8L)/FI	G1G2.8V8XGZX	09/01/88	7/3	15:08
1315	NO	49	0.01	P	86	GM	OLDS	CUTLASS CIERA	42,565	6	173(2.8L)/FI	G1G2.8V8XGZX	09/17/88	7/2	10:29
0536	NO	6	0.01	P	87	GM	PONT	6000 S/E	29,332	6	173(2.8L)/FI	H1G2.8V8XRZ4	07/06/88	7/3	09:56
0558	NO	38	0.01	P	87	GM	OLDS	CUTLASS CIERA	19,712	6	173(2.8L)/FI	H1G2.8V8XRZ4	07/07/88	7/2	10:30
0629	YES	62	0.04	P	87	GM	CHEV	CELEBRITY	15,445	6	173(2.8L)/FI	H1G2.8V8XRZ4	07/14/88	7/2	10:01
0669	NO	4	0.00	P	87	GM	CHEV	CELEBRITY	21,147	6	173(2.8L)/FI	H1G2.8V8XRZ4	07/19/88	7/1	12:04
0781	NO	11	0.01	P	87	GM	PONT	6000 SE	15,316	6	173(2.8L)/FI	H1G2.8V8XRZ4	07/26/88	7/3	11:04
0822	NO	22	0.01	P	87	GM	CHEV	CELEBRITY	9,612	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/02/88	7/2	15:28
0842	YES	50	0.07	P	87	GM	OLDS	CUTLASS CIERA	16,457	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/03/88	7/2	13:56
0872	NO	100	0.05	P	87	GM	CHEV	CELEBRITY	26,450	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/04/88	7/3	14:57
0875	NO	5	0.01	P	87	GM	CHEV	CELEBRITY	15,360	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/04/88	7/3	16:13
1018	NO	15	0.01	P	87	GM	CHEV	CAMARO	10,680	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/16/88	7/3	11:54

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
1043	NO	100	0.04	P	87	GM	OLDS	CUTLASS CIERA LS	23,198	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/16/88	7/3	16:15
1069	NO	32	0.01	P	87	GM	CHEV	CELEBRITY	6,116	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/17/88	7/3	13:05
1114	NO	6	0.01	P	87	GM	OLDS	CUTLASS CIERA	12,665	6	173(2.8L)/FI	N/A	08/19/88	7/3	09:46
1151	NO	37	0.01	P	87	GM	CHEV	CELEBRITY	16,921	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/23/88	7/3	11:10
1239	NO	17	0.02	P	87	GM	CHEV	CELEBRITY	10,477	6	173(2.8L)/FI	H1G2.8V8XRZ4	08/25/88	7/3	14:33
1274	NO	30	0.01	P	87	GM	CHEV	CELEBRITY	8,299	6	173(2.8L)/FI	H1G2.8V8XRZ4	09/01/88	7/3	11:16
1277	NO	51	0.02	P	87	GM	CHEV	CELEBRITY	19,443	6	173(2.8L)/FI	H1G2.8V8XRZ4	09/01/88	7/3	12:02
1294	NO	10	0.01	P	87	GM	BUIC	CENTURY CUSTOM	4,290	6	173(2.8L)/FI	H1G2.8V8XRZ4	09/10/88	7/3	11:11
1322	YES	69	0.01	P	87	GM	CHEV	CELEBRITY	24,224	6	173(2.8L)/FI	N/A	09/17/88	7/1	12:44
0641	NO	10	0.10	P	88	GM	CHEV	BERETTA GT	11,763	6	173(2.8L)/FI	J1G2.8V8XRZ8	07/15/88	7/3	09:24
0682	NO	5	0.01	P	88	GM	CHEV	CORSICA	7,453	6	173(2.8L)/FI	J1G2.8V8XRZ8	07/19/88	7/1	14:47
0782	NO	87	0.02	P	88	GM	CHEV	CORSICA	14,798	6	173(2.8L)/FI	J1G2.8V8XRZ8	07/26/88	7/3	11:08
0870	NO	13	0.01	P	88	GM	PONT	6000	12,319	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/04/88	7/3	14:51
0896	NO	83	0.01	P	88	GM	PONT	6000	12,967	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/09/88	7/3	09:39
0935	NO	31	0.03	P	88	GM	PONT	6000	18,778	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/10/88	7/1	14:11
0936	NO	73	0.05	P	88	GM	CHEV	CELEBRITY	12,263	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/10/88	7/3	14:15
0937	NO	98	0.07	P	88	GM	CHEV	CELEBRITY	13,078	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/10/88	7/2	14:14
1034	NO	4	0.01	P	88	GM	CHEV	CELEBRITY	14,592	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/16/88	7/1	15:15
1035	NO	1	0.00	P	88	GM	PONT	6000	15,913	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/16/88	7/1	15:17
1046	NO	117	0.03	P	88	GM	CHEV	CORSICA	8,153	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/16/88	7/3	16:36
1087	NO	16	0.04	P	88	GM	CHEV	BERETTA	15,994	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/17/88	7/3	15:58
1094	NO	16	0.02	P	88	GM	PONT	6000	13,420	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/18/88	7/3	10:45
1095	NO	37	0.01	P	88	GM	CHEV	CELEBRITY	11,904	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/18/88	7/2	10:47
1096	NO	42	0.02	P	88	GM	PONT	6000	11,208	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/18/88	7/3	10:48
1097	NO	10	0.01	P	88	GM	CHEV	CELEBRITY	13,337	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/18/88	7/2	10:49
1115	NO	21	0.02	P	88	GM	CHEV	CORSICA	13,690	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/19/88	7/3	10:05
1156	NO	92	0.01	P	88	GM	PONT	6000	12,573	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/23/88	7/2	12:07
1157	NO	100	0.00	P	88	GM	PONT	6000	10,341	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/23/88	7/1	12:08
1158	NO	39	0.01	P	88	GM	CHEV	CELEBRITY	9,129	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/23/88	7/3	12:09
1161	NO	30	0.01	P	88	GM	BUIC	CENTURY CUSTOM	16,461	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/23/88	7/3	14:06
1197	NO	81	0.04	P	88	GM	CHEV	BERETTA	20,783	6	173(2.8L)/FI	J1G2.8V8XRZ8	08/24/88	7/3	13:57
1301	NO	11	0.01	P	88	GM	OLDS	CUTLASS CIERA	19,984	6	173(2.8L)/FI	J1G2.8V8XRZ8	09/10/88	7/3	12:19
0015	NO	18	0.01	P	83	GM	CHEV	CELEBRITY	68,722	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/14/87	7/3	11:55
0038	NO	14	0.01	P	83	GM	PONT	6000 LE	N/A	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/19/87	8/3	10:24
0108*	NO	240	5.48	F	83	GM	CHEV	CAMARO Z28	65,434	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/21/87	7/3	12:47
0125	NO	60	0.23	P	83	GM	CHEV	CELEBRITY	41,764	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/21/87	7/2	16:42
0184	NO	1	0.01	P	83	GM	CHEV	CELEBRITY	50,685	6	173(2.8L)/2bbl	D1G2.8V2NNA9	09/15/87	7/3	14:15
0195	NO	23	0.01	P	83	GM	CHEV	CELEBRITY	68,014	6	173(2.8L)/2bbl	D1G2.8V2NNA9	09/15/87	7/2	17:13
0210	NO	1	0.00	P	83	GM	CHEV	CAMARO Z28	54,543	6	173(2.8L)/2bbl	D1G2.8V2NNA9	09/19/87	7/3	00:01
0270	NO	52	0.00	P	83	GM	CHEV	CELEBRITY	67,453	6	173(2.8L)/2bbl	D1G2.8V2NNA9	10/06/87	7/3	15:03
0278	NO	1	0.00	P	83	GM	BUIC	SKYLARK	65,634	6	173(2.8L)/2bbl	D1G2.8V2NNA9	10/06/87	7/	16:30
0864	NO	23	0.01	P	83	GM	PONT	6000 LE	47,155	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/04/88	7/2	11:25
0884	NO	7	0.01	P	83	GM	BUIC	SHYLARK LIMITED	76,107	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/05/88	7/3	10:49

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0966	NO	12	0.01	P	83	GM	CHEV	CELEBRITY	66,515	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/11/88	7/3	15:45
1041	NO	17	0.01	P	83	GM	PONT	6000	55,385	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/16/88	7/2	15:59
1172	NO	36	0.01	P	83	GM	CHEV	CAMARO	40,766	6	173(2.8L)/2bbl	D1G2.8V2NNA9	08/23/88	7/2	15:52
1314	NO	19	0.01	P	83	GM	PONT	6000 LE	23,737	6	173(2.8L)/2bbl	D1G2.8V2NNA9	09/17/88	7/2	10:23
0082	NO	4	0.00	P	84	GM	PONT	6000 LE	30,148	6	173(2.8L)/2bbl	E1G2.8V2NNAX	08/19/87	8/4	18:39
0178	NO	27	0.01	P	84	GM	PONT	6000 LE Wgn	48,252	6	173(2.8L)/2bbl	E1G2.8V2NNAX	09/15/97	7/2	12:04
0219	NO	2	0.00	P	84	GM	PONT	6000 STE	71,082	6	173(2.8L)/2bbl	E1G2.8V2NNAX	09/19/87	7/3	15:47
0287	NO	12	0.00	P	84	GM	CHEV	CELEBRITY Wgn	55,902	6	173(2.8L)/2bbl	E1G2.8V2NNAX	10/07/87	7/2	12:18
0311	NO	4	0.01	P	84	GM	CHEV	CELEBRITY	33,230	6	173(2.8L)/2bbl	E1G2.8V2NNAX	10/14/87	8/5	10:36
0324	NO	141	0.02	P	84	GM	BUIC	RIVIERA	56,294	6	173(2.8L)/2bbl	N/A	10/14/87	8/5	13:07
0421	NO	2	0.00	P	84	GM	CHEV	CELEBRITY	62,906	6	173(2.8L)/2bbl	E1G2.8V2NNAX	11/19/87	8/4	10:46
0429	NO	40	0.00	P	84	GM	CHEV	CAMARO Z28	41,162	6	173(2.8L)/2bbl	E1G2.8V2NNAX	11/19/87	8/4	12:22
0438	NO	1	0.01	P	84	GM	PONT	6000 LE	32,059	6	173(2.8L)/2bbl	E1G2.8V2NNAX	12/08/87	8/5	11:24
0549	NO	13	0.00	P	84	GM	CHEV	CELEBRITY	66,808	6	173(2.8L)/2bbl	E1G2.8V2NNAX	07/06/88	7/1	11:44
0695	NO	17	0.01	P	84	GM	PONT	6000 LE	19,222	6	173(2.8L)/2bbl	E1G2.8V2NNAX	07/20/88	7/2	09:51
0730	NO	21	0.14	P	84	GM	PONT	FIREBIRD	67,366	6	173(2.8L)/2bbl	E1G2.8V2NNAX	07/20/88	7/3	15:40
0777	NO	5	0.01	P	84	GM	PONT	6000 LE	50,850	6	173(2.8L)/2bbl	E1G2.8V2NNAX	07/26/88	7/1	10:25
0829	NO	8	0.01	P	84	GM	CHEV	CAMARO	64,994	6	173(2.8L)/2bbl	E1G2.8V2NNAX	08/03/88	7/3	09:33
1040	NO	18	0.01	P	84	GM	PONT	6000	100,751	6	173(2.8L)/2bbl	E1G2.8V2NNAX	08/16/88	7/2	15:57
1128	NO	9	0.01	P	84	GM	CHEV	CAMARO	18,692	6	173(2.8L)/2bbl	E1G2.8V2NNAX	08/19/88	7/3	12:13
1196	NO	9	0.01	P	84	GM	PONT	6000 STE	33,791	6	173(2.8L)/2bbl	E1G2.8V2NNAX	08/24/88	7/3	13:26
1209	NO	12	0.00	P	84	GM	CHEV	CELEBRITY Wgn	41,548	6	173(2.8L)/2bbl	E1G2.8V2NNAX	08/24/88	7/2	16:24
0202	NO	1	0.00	P	85	GM	BUIC	SKYLARK CUSTOM	28,938	6	173(2.8L)/2bbl	F1G2.8V2NNAO	09/19/87	7/3	09:42
0262	NO	19	0.01	P	85	GM	CHEV	CELEBRITY Wgn	44,656	6	173(2.8L)/2bbl	F1G2.8V2NNAO	10/06/87	7/2	13:47
0303	NO	3	0.00	P	85	GM	CHEV	CELEBRITY	34,992	6	173(2.8L)/2bbl	F1G2.8V2NNAO	10/07/87	7/3	16:51
0680	NO	5	0.00	P	85	GM	PONT	6000 Wgn	41,180	6	173(2.8L)/2bbl	F1G2.8V2NNAO	07/19/88	7/1	14:33
0724	NO	0	0.00	P	85	GM	PONT	6000 LE	39,939	6	173(2.8L)/2bbl	F1G2.8V2NNAO	07/20/88	7/1	14:46
1004	NO	17	0.01	P	85	GM	PONT	6000 LE	25,581	6	173(2.8L)/2bbl	F1G2.8V2NNAO	08/16/88	7/2	10:01
1014	NO	16	0.01	P	85	GM	PONT	6000 Wgn	57,837	6	173(2.8L)/2bbl	F1G2.8V2NNAO	08/16/88	7/2	11:14
1020	NO	5	0.00	P	85	GM	PONT	6000 LE Wgn	59,465	6	173(2.8L)/2bbl	F1G2.8V2NNAO	08/16/88	7/1	12:07
1083*	NO	209	5.80	F	85	GM	PONT	6000 LE	37,392	6	173(2.8L)/2bbl	F1G2.8V2NNAO	08/17/88	7/2	15:04
1133	NO	6	0.01	P	85	GM	CHEV	CELEBRITY Wgn	54,927	6	173(2.8L)/2bbl	F1G2.8V2NNAO	08/19/88	7/3	14:00
0017	NO	12	0.01	P	86	GM	CHEV	CELEBRITY	29,515	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/14/87	7/2	12:41
0053	NO	14	0.00	P	86	GM	BUIC	CENTURY LIMITED	20,111	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/19/87	8/2	12:02
0083	NO	1	0.00	P	86	GM	OLDS	CUTLASS CIERA LS	12,613	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/19/87	8/4	18:44
0150	NO	15	0.01	P	86	GM	PONT	6000	5,768	6	173(2.8L)/2bbl	G1G2.8V2NNA1	09/09/87	8/3	09:33
0203	NO	1	0.00	P	86	GM	OLDS	CUTLASS CIERA BRGHM	20,738	6	173(2.8L)/2bbl	G1G2.8V2NNA1	09/19/87	7/3	09:46
0268	NO	11	0.00	P	86	GM	OLDS	CUTLASS CIERA LS	44,330	6	173(2.8L)/2bbl	G1G2.8V2NNA1	10/06/87	7/1	15:01
0294	NO	1	0.00	P	86	GM	CHEV	CELEBRITY	19,534	6	173(2.8L)/2bbl	G1G2.8V2NNA1	10/07/87	7/3	13:37
0313	NO	5	0.00	P	86	GM	BUIC	CENTURY CUSTOM	16,627	6	173(2.8L)/2bbl	G1G2.8V2NNA1	10/14/87	8/4	10:52
0367	NO	16	0.02	P	86	GM	CHEV	CELEBRITY Wgn	37,434	6	173(2.8L)/2bbl	G1G2.8V2NNA1	10/20/87	7/2	13:01
0400	NO	17	0.01	P	86	GM	CHEV	CELEBRITY	31,599	6	173(2.8L)/2bbl	G1G2.8V2NNA1	11/17/87	7/2	11:44
0427	NO	10	0.01	P	86	GM	OLDS	CUTLASS CIERA BRGHM	19,001	6	173(2.8L)/2bbl	G1G2.8V2NNA1	11/19/87	8/3	11:26
0435	NO	1	0.01	P	86	GM	OLDS	CUTLASS CIERA BRGHM	22,156	6	173(2.8L)/2bbl	G1G2.8V2NNA1	12/08/87	8/5	11:03

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0442	NO	3	0.00	P	86	GM	OLDS	CUTLASS CIERA BRGHM	30,016	6	173(2.8L)/2bbl	G1G2.8V2NNA1	12/08/87	8/4	12:24
0594	NO	16	0.01	P	86	GM	CHEV	CELEBRITY	50,903	6	173(2.8L)/2bbl	G1G2.8V2NNA1	07/13/88	7/2	09:26
0611	NO	10	0.00	P	86	GM	BUIC	CENTURY LIMITED	23,543	6	173(2.8L)/2bbl	G1G2.8V2NNA1	07/13/88	7/2	11:37
0656	NO	15	0.01	P	86	GM	CHEV	CELEBRITY	30,111	6	173(2.8L)/2bbl	G1G2.8V2NNA1	07/15/88	7/2	11:02
0661	NO	87	0.07	P	86	GM	OLDS	CUTLASS CIERA LS	48,466	6	173(2.8L)/2bbl	G1G2.8V2NNA1	07/19/88	7/2	10:20
0668	NO	234	0.12	F	86	GM	CHEV	CELEBRITY Wgn	47,547	6	173(2.8L)/2bbl	G1G2.8V2NNA1	07/19/88	7/1	12:02
0800	NO	30	0.01	P	86	GM	CHEV	CELEBRITY Wgn	N/A	6	173(2.8L)/2bbl	N/A	07/26/88	7/2	15:51
0851	NO	24	0.01	P	86	GM	CHEV	CELEBRITY	74,483	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/04/88	7/2	09:02
0859	NO	5	0.00	P	86	GM	BUIC	CENTURY LIMITED	20,731	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/04/88	7/1	10:20
0869	NO	11	0.01	P	86	GM	OLDS	CUTLASS CIERA LS	32,176	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/04/88	7/2	14:04
0951	NO	12	0.01	P	86	GM	BUIC	CENTURY LIMITED	14,402	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/11/88	7/2	10:48
0986	NO	5	0.00	P	86	GM	BUIC	CENTURY LIMITED	7,764	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/12/88	7/3	13:34
0988	NO	8	0.00	P	86	GM	PONT	6000	23,542	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/12/88	7/2	14:04
0993	NO	9	0.01	P	86	GM	PONT	6000 LE	29,371	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/12/88	7/3	14:42
0994	NO	5	0.01	P	86	GM	CHEV	CELEBRITY	47,943	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/12/88	7/3	14:51
1108	NO	11	0.00	P	86	GM	BUIC	CENTURY LIMITED	18,106	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/18/88	7/2	15:07
1110	NO	15	0.01	P	86	GM	OLDS	CUTLASS CIERA	24,050	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/18/88	7/2	16:11
1122	NO	11	0.01	P	86	GM	BUIC	CENTURY CUSTOM	23,580	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/19/88	7/3	11:19
1159	NO	2	0.00	P	86	GM	CHEV	CELEBRITY	21,614	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/23/88	7/1	13:46
1188	NO	7	0.01	P	86	GM	PONT	6000	16,792	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/24/88	7/3	11:03
1233	NO	19	0.01	P	86	GM	BUIC	CENTURY	62,961	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/25/88	7/2	13:35
1243	NO	4	0.00	P	86	GM	OLDS	CUTLASS CIERA	23,646	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/25/88	7/1	14:50
1260	NO	12	0.00	P	86	GM	OLDS	CUTLASS CIERA	36,248	6	173(2.8L)/2bbl	G1G2.8V2NNA1	08/26/88	7/3	10:38
1300	NO	4	0.00	P	86	GM	OLDS	CUTLASS CIERA	40,039	6	173(2.8L)/2bbl	G1G2.8V2NNA1	09/10/88	7/3	12:15
1308	NO	5	0.01	P	86	GM	CHEV	CELEBRITY	37,376	6	173(2.8L)/2bbl	G1G2.8V2NNA1	09/10/88	7/3	14:23
0052	NO	16	0.01	P	85	GM	BUIC	SOMERSET REGAL	27,818	6	181(3.0L)/FI	F4G3.8V8XEB3	08/19/87	8/2	11:56
0124	NO	2	0.00	P	85	GM	BUIC	SOMERSET REGAL	34,209	6	181(3.0L)/FI	F4G3.8V8XEB3	08/21/87	7/3	16:22
0151	NO	12	0.00	P	85	GM	OLDS	CUTLASS CALAIS SUPRM	40,561	6	181(3.0L)/FI	F4G3.8V8XEB3	09/09/87	8/	09:35
0088	NO	87	0.29	P	86	GM	BUIC	LeSABRE CUSTOM	14,082	6	181(3.0L)/FI	G4G3.8V8XEB4	08/21/87	7/3	09:01
0234	NO	86	0.05	P	86	GM	BUIC	LeSABRE CUSTOM	6,687	6	181(3.0L)/FI	G4G3.8V8XEB4	09/24/87	7/1	10:47
0238	NO	22	0.05	P	86	GM	PONT	GRAND AM SE	21,258	6	181(3.0L)/FI	G4G3.8V8XEB4	09/24/87	7/3	11:53
0431	NO	3	0.01	P	86	GM	BUIC	SOMERSET LIMITED	27,419	6	181(3.0L)/FI	G4G3.8V8XEB4	11/19/87	8/5	12:32
0528*	YES	11	0.01	P	86	GM	OLDS	CUTLASS CALAIS	19,625	6	181(3.0L)/FI	G4G3.8V8XEB4	07/05/88	7/2	12:30
0576	NO	13	0.01	P	86	GM	OLDS	DELTA 88 ROYALE	35,139	6	181(3.0L)/FI	G4G3.8V8XEB4	07/08/88	7/2	10:52
0603	NO	12	0.01	P	86	GM	BUIC	LE SABRE	26,566	6	181(3.0L)/FI	G4G3.8V8XEB4	07/13/88	7/2	10:36
0725	NO	65	0.17	P	86	GM	BUIC	LeSABRE	55,472	6	181(3.0L)/FI	G4G3.8V8XEB4	07/20/88	7/2	15:10
0924	NO	12	0.00	P	86	GM	BUIC	SKYLARK	44,218	6	181(3.0L)/FI	G4G3.8V8XEB4	08/10/88	7/1	10:50
1184	NO	12	0.01	P	86	GM	PONT	6000	44,419	6	181(3.0L)/FI	G4G3.8V8XEB4	08/24/88	7/2	10:43
1283	NO	13	0.11	P	86	GM	OLDS	DELTA 88 ROYALE	20,607	6	181(3.0L)/FI	G4G3.8V8XEB4	09/01/88	7/2	14:40
0376	NO	16	0.01	P	87	GM	OLDS	CUTLASS CALAIS	8,754	6	181(3.0L)/FI	H2G3.0V8XTBX	10/22/87	8/2	10:04
0930	NO	34	0.07	P	87	GM	OLDS	CUTLASS CALAIS	12,263	6	181(3.0L)/FI	H2G3.0V8XTBX	08/10/88	7/3	13:03

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0871	NO	21	0.00	P	83	GM	BUIC	CENTURY	37,905	6	181(3.0L)/2bbl	D4G3.8V2NEA3	08/04/88	7/2	14:54
0942	NO	62	0.03	P	83	GM	OLDS	CUTLASS CIERA LS	38,693	6	181(3.0L)/2bbl	D4G3.8V2NEA3	08/10/88	7/3	16:19
1120	NO	27	0.00	P	83	GM	BUIC	CENTURY	32,968	6	181(3.0L)/2bbl	D4G3.8V2NEA3	08/19/88	7/2	11:04
0107	NO	130	0.37	P	84	GM	BUIC	CENTURY LIMITED	26,260	6	181(3.0L)/2bbl	E4G3.8V2NEYO	08/21/87	7/2	12:48
0140	NO	26	0.00	P	84	GM	OLDS	CUTLASS CIERA LS	60,170	6	181(3.0L)/2bbl	E4G3.8V2NEYO	08/26/87	7/3	15:27
0154*	YES	7	0.01	P	84	GM	BUIC	CENTURY CUSTOM	80,883	6	181(3.0L)/2bbl	E4G3.8V2NEYO	09/09/87	8/3	10:17
0351	NO	42	0.00	P	84	GM	OLDS	CUTLASS CIERA BRGHM	120,131	6	181(3.0L)/2bbl	E4G3.8V2NEYO	10/15/87	7/3	15:36
0371	NO	70	0.00	P	84	GM	OLDS	CUTLASS CIERA BRGHM	49,947	6	181(3.0L)/2bbl	E4G3.8V2NEYO	10/20/87	7/3	17:07
0428	NO	50	0.47	P	84	GM	BUIC	CENTURY LIMITED	76,286	6	181(3.0L)/2bbl	E4G3.8V2NEYO	11/19/87	8/5	12:08
0441	NO	33	0.00	P	84	GM	OLDS	CUTLASS CIERA LS	34,339	6	181(3.0L)/2bbl	E4G3.8V2NEYO	12/08/87	8/4	12:18
0658	NO	37	0.01	P	84	GM	OLDS	CUTLASS CIERA BRGHM	16,373	6	181(3.0L)/2bbl	E4G3.8V2NEYO	07/15/88	7/2	11:24
0882	NO	25	0.01	P	84	GM	OLDS	CUTLASS CIERA LS	22,932	6	181(3.0L)/2bbl	E4G3.8V2NEYO	08/05/88	7/2	10:38
0978	NO	55	0.01	P	84	GM	OLDS	CUTLASS CRUISER Wgn	46,521	6	181(3.0L)/2bbl	E4G3.8V2NEYO	08/12/88	7/2	10:49
1080	NO	88	0.00	P	84	GM	BUIC	CENTURY CUSTOM	51,870	6	181(3.0L)/2bbl	E4G3.8V2NEYO	08/17/88	7/2	14:40
1102	NO	35	0.01	P	84	GM	BUIC	CENTURY LIMITED	35,106	6	181(3.0L)/2bbl	E4G3.8V2NEYO	08/18/88	7/3	12:14
1180	NO	132	0.30	P	84	GM	OLDS	CUTLASS CIERA LS	30,747	6	181(3.0L)/2bbl	E4G3.8V2NEYO	08/24/88	7/2	10:24
1186	NO	56	0.02	P	84	GM	BUIC	CENTURY LIMITED	33,478	6	181(3.0L)/2bbl	E4G3.8V2NEYO	08/24/88	7/2	10:52
1219	NO	86	0.30	P	84	GM	OLDS	CUTLASS CIERA LS	76,167	6	181(3.0L)/2bbl	NO LABEL	08/25/88	7/2	10:56
0085	NO	11	0.01	P	85	GM	OLDS	CUTLASS CIERA LS	50,132	6	181(3.0L)/2bbl	F4G3.8V2NSY6	08/19/87	8/	10:19
0239	NO	23	0.01	P	85	GM	BUIC	CENTURY LIMITED	34,998	6	181(3.0L)/2bbl	F4G3.8V2NSY6	09/24/87	7/2	12:04
0321	NO	21	0.00	P	85	GM	OLDS	CUTLASS CIERA LS Wgn	13,795	6	181(3.0L)/2bbl	F4G3.8V2NSY6	10/14/87	8/4	12:59
0359	NO	5	0.00	P	85	GM	OLDS	CUTLASS CIERA BRGHM	23,886	6	181(3.0L)/2bbl	F4G3.8V2NSY6	10/20/87	7/3	11:07
0393	NO	27	0.00	P	85	GM	BUIC	CENTURY LIMITED	31,111	6	181(3.0L)/2bbl	F4G3.8V2NSY6	11/17/87	7/3	10:40
0440	NO	5	0.01	P	85	GM	OLDS	CUTLASS CIERA LS	17,664	6	181(3.0L)/2bbl	F4G3.8V2NSY6	12/08/87	8/3	11:49
0654	NO	11	0.00	P	85	GM	OLDS	CUTLASS CIERA	49,933	6	181(3.0L)/2bbl	F4G3.8V2NSY6	07/15/88	7/3	10:56
0816	NO	6	0.00	P	85	GM	BUIC	CENTURY LIMITED	64,101	6	181(3.0L)/2bbl	F4G3.8V2NSY6	08/02/88	7/1	14:35
0968	NO	13	0.01	P	85	GM	OLDS	CUTLASS CIERA	41,552	6	181(3.0L)/2bbl	F4G3.8V2NSY6	08/11/88	7/3	16:20
1086	NO	20	0.01	P	85	GM	BUIC	CENTURY LIMITED	46,834	6	181(3.0L)/2bbl	F4G3.8V2NSY6	08/17/88	7/2	15:15
0279	NO	1	0.00	P	83	GM	CHEV	MONTE CARLO	18,009	6	229(3.8L)/2bbl	N/A	10/06/87	7/3	16:47
0860	NO	12	0.00	P	83	GM	CHEV	MONTE CARLO	124,884	6	229(3.8L)/2bbl	D1G3.8V2NDA4	08/04/88	7/1	10:30
0991	NO	13	0.01	P	83	GM	CHEV	MALIBU	60,364	6	229(3.8L)/2bbl	D1G3.8V2NDA4	08/12/88	7/3	14:30
1057	NO	1	0.00	P	83	GM	CHEV	MALIBU	32,011	6	229(3.8L)/2bbl	D1G3.8V2NDA4	08/17/88	7/1	11:04
1117	NO	22	0.01	P	83	GM	CHEV	MONTE CARLO	49,238	6	229(3.8L)/2bbl	D1G3.8V2NDA4	08/19/88	7/2	10:13
0135	YES	358	8.78	F	84	GM	CHEV	CAPRICE CLASSIC	41,400	6	229(3.8L)/2bbl	E1G3.8V2NDA5	08/26/87	7/2	12:27
0014	NO	3	0.00	P	85	GM	BUIC	CENTURY T TYPE	25,325	6	231(3.8L)/FI	F4G3.8V8XEB3	08/14/87	7/3	11:47
0035	NO	4	0.05	P	85	GM	OLDS	98 REGENCY BRGHM	29,229	6	231(3.8L)/FI	F4G3.8V8XEB3	08/19/87	8/3	10:09
0080	NO	4	0.00	P	85	GM	OLDS	98 REGENCY	28,349	6	231(3.8L)/FI	F4G3.8V8XEB3	08/19/87	8/4	18:23
0380	NO	23	0.01	P	85	GM	BUIC	ELECTRA	54,702	6	231(3.8L)/FI	F4G3.8V8XEB3	10/22/87	8/2	12:30
0446	NO	16	0.01	P	85	GM	BUIC	PARK AVENUE	23,377	6	231(3.8L)/FI	F4G3.8V8XEB3	12/08/87	8/3	14:33
0901	NO	15	0.01	P	85	GM	OLDS	98 REGENCY	39,675	6	231(3.8L)/FI	F4G3.8V8XEB3	08/09/88	7/2	10:07
1081	NO	17	0.03	P	85	GM	OLDS	98 REGENCY BRGHM	67,188	6	231(3.8L)/FI	F4G3.8V8XEB3	08/17/88	7/2	14:48

* Recruited for additional testing at VTL.

Description of the 1088 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
1199	NO	76	0.21	P	85	GM	OLDS	98 REGENCY BRGHM	45,774	6	231(3.8L)/FI	F4G3.8V8XEB3	08/24/88	7/2	14:42
1245	NO	1	0.00	P	85	GM	OLDS	98 REGENCY BRGHM	21,230	6	231(3.8L)/FI	F4G3.8V8XEB3	08/25/88	7/1	15:19
0009	NO	6	0.00	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	17,763	6	231(3.8L)/FI	G4G3.8V8XEB4	08/14/87	7/3	11:14
0084	NO	15	0.01	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	10,309	6	231(3.8L)/FI	G4G3.8V8XEB4	08/19/87	8/3	09:35
0102	NO	17	0.01	P	86	GM	BUIC	PARK AVENUE	12,589	6	231(3.8L)/FI	G4G3.8V8XEB4	08/21/87	7/2	12:13
0114	NO	0	0.00	P	86	GM	OLDS	CUTLASS CIERA LS	13,003	6	231(3.8L)/FI	G4G3.8V8XEB4	08/21/87	7/3	14:53
0166	NO	19	0.03	P	86	GM	BUIC	CENTURY LIMITED	16,774	6	231(3.8L)/FI	G4G3.8V8XEB4	09/09/87	8/2	17:10
0185	NO	2	0.00	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	8,872	6	231(3.8L)/FI	G4G3.8V8XEB4	09/15/87	7/3	15:23
0200	NO	6	0.00	P	86	GM	OLDS	98 REGENCY	29,803	6	231(3.8L)/FI	G4G3.8V8XEB4	09/19/87	7/3	09:37
0217	NO	12	0.00	P	86	GM	BUIC	LeSABRE LIMITED	15,511	6	231(3.8L)/FI	G4G3.8B8XEB4	09/19/87	7/1	15:20
0254	NO	0	0.00	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	7,345	6	231(3.8L)/FI	G4G3.8V8XEB4	09/24/87	7/3	18:30
0255	NO	17	0.02	P	86	GM	OLDS	98 REGENCY	14,172	6	231(3.8L)/FI	G4G3.8V8XEB4	10/06/87	8/2	09:40
0298	NO	12	0.01	P	86	GM	OLDS	DELTA 88 ROYALE	4,233	6	231(3.8L)/FI	G4G3.8V8XEB4	10/07/87	7/2	15:17
0312	NO	6	0.01	P	86	GM	BUIC	PARK AVENUE	5,801	6	231(3.8L)/FI	G4G3.8V8XEB4	10/14/87	8/5	10:46
0315	NO	8	0.01	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	14,010	6	231(3.8L)/FI	G4G3.8V8XEB4	10/14/87	8/5	11:10
0325	NO	22	0.01	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	23,587	6	231(3.8L)/FI	G4G3.8V8XEB4	10/14/87	8/	13:27
0341	NO	2	0.01	P	86	GM	OLDS	98 REGENCY BRGHM	28,899	6	231(3.8L)/FI	G4G3.8V8XEB4	10/15/87	/3	12:04
0365	NO	55	0.04	P	86	GM	BUIC	CENTURY ESTATE Wgn	6,773	6	231(3.8L)/FI	G4G3.8V8XEB4	10/20/87	7/3	12:28
0417	NO	14	0.01	P	86	GM	OLDS	98 REGENCY BRGHM	24,455	6	231(3.8L)/FI	G4G3.8V8XEB4	11/19/87	8/2	10:01
0432	YES	11	0.01	P	86	GM	BUIC	PARK AVENUE	11,973	6	231(3.8L)/FI	G4G3.8V8XEB4	11/19/87	8/2	13:12
0433	NO	5	0.00	P	86	GM	BUIC	PARK AVENUE	39,279	6	231(3.8L)/FI	G4G3.8V8XEB4	11/19/87	8/4	14:27
0447	NO	0	0.00	P	86	GM	BUIC	PARK AVENUE	21,737	6	231(3.8L)/FI	G4G3.8V8XEB4	12/08/87	8/4	14:34
0505	NO	1	0.00	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	17,643	6	231(3.8L)/FI	G4G3.8V8XEB4	07/05/88	7/1	09:49
0652	NO	1	0.00	P	86	GM	OLDS	98 REGENCY BRGHM	31,973	6	231(3.8L)/FI	G4G3.8V8XEB4	07/15/88	7/3	10:31
0657	NO	25	0.01	P	86	GM	BUIC	PARK AVENUE	23,277	6	231(3.8L)/FI	G4G3.8V8XEB4	07/15/88	7/2	11:11
0689	NO	14	0.01	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	20,921	6	231(3.8L)/FI	G4G3.8V8XEB4	07/19/88	7/2	15:40
0738	NO	2	0.01	P	86	GM	BUIC	CENTURY CUSTOM	36,743	6	231(3.8L)/FI	G4G3.8V8XEB4	07/20/88	7/3	17:06
0765	NO	4	0.01	P	86	GM	OLDS	98 REGENCY BRGHM	32,516	6	231(3.8L)/FI	G4G3.8V8XEB4	07/22/88	7/3	14:39
0783	NO	5	0.01	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	25,959	6	231(3.8L)/FI	G4G3.8V8XEB4	07/26/88	7/3	11:34
0803	NO	4	0.01	P	86	GM	OLDS	DELTA 88 ROYALE	69,585	6	231(3.8L)/FI	NO LABEL	08/02/88	7/3	10:11
0818	NO	13	0.01	P	86	GM	OLDS	DELTA 88 ROYALE	N/A	6	231(3.8L)/FI	N/A	08/02/88	7/2	14:47
0826	NO	27	0.04	P	86	GM	OLDS	DELTA 88 ROYALE	20,107	6	231(3.8L)/FI	G4G3.8V8XEB4	08/03/88	7/2	09:15
0837	NO	47	0.09	P	86	GM	OLDS	DELTA 88 ROYALE	21,679	6	231(3.8L)/FI	G4G3.8V8XEB4	08/03/88	7/2	10:50
0843	NO	28	0.01	P	86	GM	OLDS	98 REGENCY BRGHM	29,883	6	231(3.8L)/FI	G4G3.8V8XEB4	08/03/88	7/3	14:11
0857	NO	11	0.01	P	86	GM	OLDS	98 REGENCY BRGHM	7,789	6	231(3.8L)/FI	G4G3.8V8XEB4	08/04/88	7/2	09:46
0905	NO	5	0.01	P	86	GM	OLDS	DELTA 88 ROYALE	11,339	6	231(3.8L)/FI	G4G3.8V8XEB4	08/09/88	7/3	10:37
1021	NO	108	0.18	P	86	GM	BUIC	CENTURY LIMITED	32,776	6	231(3.8L)/FI	G4G3.8V8XEB4	08/16/88	7/1	12:19
1031	NO	5	0.01	P	86	GM	OLDS	DELTA 88 ROYALE BRGHM	24,378	6	231(3.8L)/FI	G4G3.8V8XEB4	08/16/88	7/3	14:09
1179	NO	89	0.06	P	86	GM	OLDS	DELTA 88 ROYALE	25,972	6	231(3.8L)/FI	G4G3.8V8XEB4	08/24/88	7/3	10:20
1258	NO	14	0.01	P	86	GM	BUIC	CENTURY LIMITED	40,859	6	231(3.8L)/FI	G4G3.8V8XEB4	08/26/88	7/2	09:49
1278	NO	6	0.00	P	86	GM	OLDS	DELTA 88 ROYALE	8,926	6	231(3.8L)/FI	G4G3.8V8XEB4	09/01/88	7/3	12:12
1289	NO	10	0.01	P	86	GM	OLDS	DELTA 88 ROYALE	27,335	6	231(3.8L)/FI	G4G3.8V8XEB4	09/01/88	7/3	15:36
1313	NO	13	0.01	P	86	GM	OLDS	TORONADO BRGHM	20,124	6	231(3.8L)/FI	G4G3.8V8XEB4	09/17/88	7/2	11:24
0288	YES	10	0.01	P	87	GM	OLDS	DELTA 88 ROYALE BRGHM	12,617	6	231(3.8L)/FI	H2G3.8V8XEB7	10/07/87	7/2	11:53
0425	NO	17	0.01	P	87	GM	OLDS	98 REGENCY BRGHM	6,842	6	231(3.8L)/FI	H2G3.8V8XEB7	11/19/87	8/3	11:10
0444	NO	1	0.01	P	87	GM	OLDS	DELTA 88 ROYALE	18,209	6	231(3.8L)/FI	H2G3.8V8XEB7	12/08/87	8/4	12:36
0510	NO	13	0.01	P	87	GM	OLDS	DELTA 88 ROYALE	24,100	6	231(3.8L)/FI	H2G3.8V8XEB7	07/05/88	7/2	10:21
0525	NO	5	0.01	P	87	GM	PONT	BONNEVILLE	29,293	6	231(3.8L)/FI	H2G3.8V8XEB7	07/05/88	7/3	12:24

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0546	YES	4	0.01	P	87	GM	OLDS	DELTA 88 ROYALE BRGHM	6,358	6	231(3.8L)/FI	H2G3.8V8XEB7	07/06/88	7/3	11:10
0584	NO	10	0.01	P	87	GM	OLDS	DELTA 88 ROYALE BRGHM	7,725	6	231(3.8L)/FI	H2G3.8V8XEB7	07/12/88	7/2	10:02
0608	NO	10	0.01	P	87	GM	OLDS	98 REGENCY	17,031	6	231(3.8L)/FI	H2G3.8V8XEB7	07/13/88	7/2	11:18
0624	NO	20	0.01	P	87	GM	BUIC	PARK AVENUE	19,206	6	231(3.8L)/FI	H2G3.8V8XEB7	07/14/88	7/2	09:22
0699	NO	8	0.01	P	87	GM	OLDS	DELTA 88 ROYALE BRGHM	19,325	6	231(3.8L)/FI	H2G3.8V8XEB7	07/20/88	7/1	10:13
0723	NO	17	0.01	P	87	GM	BUIC	CENTURY LIMITED	13,238	6	231(3.8L)/FI	H2G3.8V8XEB7	07/20/88	7/2	14:47
0734	NO	11	0.01	P	87	GM	BUIC	LeSABRE	14,017	6	231(3.8L)/FI	H2G3.8V8XEB7	07/20/88	7/2	16:35
0775	NO	17	0.01	P	87	GM	OLDS	DELTA 88 ROYALE	6,546	6	231(3.8L)/FI	H2G3.8V8XEB7	07/26/88	7/2	09:59
0852	NO	7	0.01	P	87	GM	OLDS	DELTA 88 ROYALE	13,293	6	231(3.8L)/FI	H2G3.8V8XEB7	08/04/88	7/3	09:06
0907	NO	13	0.01	P	87	GM	PONT	BONNEVILLE LE	14,070	6	231(3.8L)/FI	H2G3.8V8XEB7	08/09/88	7/2	11:25
0925	NO	14	0.01	P	87	GM	OLDS	DELTA 88 ROYALE BRGHM	13,029	6	231(3.8L)/FI	H2G3.8V8XEB7	08/10/88	7/2	10:49
1144	NO	2	0.00	P	87	GM	OLDS	CUTLASS CIERA	23,072	6	231(3.8L)/FI	H2G3.8V8XEB7	08/23/88	7/1	09:50
1214	NO	6	0.01	P	87	GM	PONT	BONNEVILLE	10,916	6	231(3.8L)/FI	H2G3.8V8XEB7	08/25/88	7/3	10:38
1286	NO	64	0.04	P	87	GM	OLDS	CUTLASS CIERA	31,448	6	231(3.8L)/FI	H2G3.8V8XEB7	09/01/88	7/2	15:04
1029	NO	12	0.01	P	88	GM	PONT	BONNEVILLE LE	5,044	6	231(3.8L)/FI	J2G3.8V8XEBO	08/16/88	7/2	13:49
0032	NO	8	0.01	P	83	GM	BUIC	REGAL	38,812	6	231(3.8L)/2bbl	D4G3.8V2NEA3	08/19/87	8/5	09:45
0094	NO	21	0.00	P	83	GM	BUIC	REGAL	13,838	6	231(3.8L)/2bbl	D4G3.8V2NEA3	08/21/87	7/3	10:31
0222	NO	18	0.00	P	83	GM	OLDS	CUTLASS CALAIS	43,332	6	231(3.8L)/2bbl	D4G3.8V2NEA3	09/19/87	7/1	16:26
0334	NO	22	0.01	P	83	GM	BUIC	REGAL	83,531	6	231(3.8L)/2bbl	D4G3.8V2NEA3	10/14/87	7/2	17:27
0383	NO	39	0.00	P	83	GM	BUIC	REGAL	12,978	6	231(3.8L)/2bbl	D4G3.8V2NEA3	11/14/87	8/2	09:31
0559	NO	41	0.01	P	83	GM	BUIC	REGAL LIMITED	29,892	6	231(3.8L)/2bbl	D4G3.8V2NEA3	07/07/88	7/2	10:42
0574	NO	332	0.00	F	83	GM	OLDS	CUTLASS SUPREME	72,811	6	231(3.8L)/2bbl	D4G3.8V2NEA3	07/08/88	7/2	10:27
0674	YES	6	0.00	P	83	GM	OLDS	CUTLASS CRUISER Wgn	51,966	6	231(3.8L)/2bbl	D4G3.8V2NEA3	07/19/88	7/1	12:34
0825	NO	81	0.25	P	83	GM	OLDS	CUTLASS SUPREME	89,609	6	231(3.8L)/2bbl	D4G3.8V2NEA3	08/03/88	7/1	09:05
1216	NO	71	0.36	P	83	GM	OLDS	CUTLASS SUPREME BRGHM	66,179	6	231(3.8L)/2bbl	NO LABEL	08/25/88	7/2	10:37
1248	NO	7	0.01	P	83	GM	PONT	BONNEVILLE	89,906	6	231(3.8L)/2bbl	D4G3.8V2NEA3	08/25/88	7/1	16:00
1253	NO	163	0.88	P	83	GM	BUIC	REGAL	102,991	6	231(3.8L)/2bbl	ILLEGIBLE	08/26/88	7/2	09:14
1316	NO	33	0.04	P	83	GM	OLDS	CUTLASS SUPREME	54,572	6	231(3.8L)/2bbl	D4G3.8V2NEA3	09/17/88	7/3	11:33
0042	NO	22	0.01	P	84	GM	BUIC	REGAL LIMITED	31,479	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/19/87	8/3	10:58
0073	NO	39	0.00	P	84	GM	BUIC	REGAL LIMITED	75,406	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/19/87	8/4	16:38
0078	NO	17	0.00	P	84	GM	BUIC	LeSABRE CUSTOM	45,779	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/19/87	8/4	17:28
0087	NO	290	0.08	F	84	GM	OLDS	CUTLASS SUPREME	51,505	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/21/87	7/2	08:57
0091	NO	31	0.00	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	45,014	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/21/87	7/3	10:16
0120	NO	27	0.01	P	84	GM	BUIC	REGAL LIMITED	39,218	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/21/87	7/	15:30
0129	NO	13	0.00	P	84	GM	PONT	BONNEVILLE	30,866	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/26/87	7/3	09:29
0213	NO	25	0.00	P	84	GM	BUIC	REGAL LIMITED	47,640	6	231(3.8L)/2bbl	E4G3.8V2NEYO	09/19/87	7/1	14:03
0214	NO	77	0.13	P	84	GM	PONT	GRAND PRIX	41,485	6	231(3.8L)/2bbl	E4G3.8V2NEYO	09/19/87	7/1	14:43
0271*	YES	32	0.00	P	84	GM	PONT	BONNEVILLE LE	46,934	6	231(3.8L)/2bbl	E4G3.8V2NEYO	10/06/87	7/3	15:20
0272	YES	31	0.00	P	84	GM	OLDS	CUTLASS SUPREME	76,755	6	231(3.8L)/2bbl	E4G3.8V2NEYO	10/06/87	7/1	15:21
0354	NO	84	0.20	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	38,224	6	231(3.8L)/2bbl	E4G3.8V2NEYO	10/20/87	7/2	09:53
0355	NO	60	0.04	P	84	GM	BUIC	REGAL	53,036	6	231(3.8L)/2bbl	E4G3.8V2NEYO	10/20/87	7/3	10:19
0357	NO	41	0.00	P	84	GM	PONT	BONNEVILLE	35,197	6	231(3.8L)/2bbl	E4G3.8V2NEYO	10/20/87	7/3	10:37
0369	NO	84	0.02	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	47,804	6	231(3.8L)/2bbl	E4G3.8V2NEYO	10/20/87	7/2	16:17
0392	NO	34	0.01	P	84	GM	BUIC	REGAL	44,297	6	231(3.8L)/2bbl	E4G3.8V2NEYO	11/17/87	7/2	10:40

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0398	NO	106	0.13	P	84	GM	BUIC	REGAL LIMITED	42,686	6	231(3.8L)/2bbl	E4G3.8V2NEYO	11/17/87	7/2	11:31
0567	NO	30	0.01	P	84	GM	OLDS	CUTLASS SUPREME	81,097	6	231(3.8L)/2bbl	E4G3.8V2NEYO	07/07/88	7/2	11:35
0602	NO	33	0.00	P	84	GM	BUIC	REGAL LIMITED	26,290	6	231(3.8L)/2bbl	E4G3.8V2NEYO	07/13/88	7/1	10:33
0626	NO	37	0.01	P	84	GM	OLDS	CUTLASS SUPREME	42,455	6	231(3.8L)/2bbl	E4G3.8V2NEYO	07/14/88	7/2	09:33
0685	NO	12	0.01	P	84	GM	BUIC	REGAL LIMITED	15,542	6	231(3.8L)/2bbl	E4G3.8V2NEYO	07/19/88	7/3	15:02
0742	NO	201	0.13	P	84	GM	OLDS	CUTLASS SUPREME	48,921	6	231(3.8L)/2bbl	E4G3.8V2NEYO	07/22/88	7/3	09:19
0795	NO	72	0.00	P	84	GM	OLDS	CUTLASS CALAIS	81,068	6	231(3.8L)/2bbl	E4G3.8V2NEYO	07/26/88	7/3	15:12
0941	NO	41	0.01	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	71,319	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/10/88	7/2	15:44
0958	NO	34	0.01	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	43,852	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/11/88	7/2	11:48
1000	NO	84	0.31	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	69,237	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/12/88	7/3	15:26
1103	NO	27	0.01	P	84	GM	OLDS	CUTLASS CALAIS	32,825	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/18/88	7/3	13:19
1124	NO	16	0.00	P	84	GM	PONT	BONNEVILLE	62,517	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/19/88	7/3	11:38
1174	NO	78	0.29	P	84	GM	OLDS	CUTLASS SUPREME	50,180	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/23/88	7/2	16:15
1232	NO	31	0.01	P	84	GM	OLDS	CUTLASS SUPREME	53,287	6	231(3.8L)/2bbl	E4G3.8V2NEYO	08/25/88	7/2	13:29
1299	NO	44	0.01	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	39,520	6	231(3.8L)/2bbl	E4G3.8V2NEYO	09/10/88	7/3	12:11
0012	NO	13	0.00	P	85	GM	BUIC	REGAL	20,699	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/14/87	7/3	11:34
0075	NO	14	0.01	P	85	GM	OLDS	CUTLASS SUPREME	18,564	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/19/87	8/4	16:55
0086	NO	21	0.01	P	85	GM	OLDS	CUTLASS SUPREME BRGHM	18,749	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/19/87	8/5	11:50
0098	NO	8	0.00	P	85	GM	OLDS	CUTLASS SUPREME	28,988	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/21/87	7/3	11:37
0128	NO	3	0.00	P	85	GM	OLDS	CUTLASS CIERA LS	13,516	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/26/87	7/3	09:23
0141	NO	29	0.00	P	85	GM	OLDS	CUTLASS SUPREME BRGHM	34,334	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/26/87	7/3	15:28
0228	NO	14	0.01	P	85	GM	OLDS	CUTLASS SUPREME	19,517	6	231(3.8L)/2bbl	F4G3.8V2NSY6	09/24/87	7/2	09:58
0328	NO	22	0.00	P	85	GM	OLDS	CUTLASS SUPREME	53,637	6	231(3.8L)/2bbl	F4G3.8V2NSY6	10/14/87	8/4	13:31
0353	NO	22	0.00	P	85	GM	OLDS	CUTLASS SUPREME	34,270	6	231(3.8L)/2bbl	F4G3.8V2NSY6	10/15/87	7/3	16:02
0374	NO	15	0.00	P	85	GM	BUIC	REGAL LIMITED	38,095	6	231(3.8L)/2bbl	F4G3.8V2NSY6	10/20/87	7/3	17:58
0437	NO	1	0.01	P	85	GM	BUIC	REGAL	23,907	6	231(3.8L)/2bbl	F4G3.8V2NSY6	12/08/87	8/5	11:14
0809	NO	17	0.00	P	85	GM	OLDS	CUTLASS SUPREME	10,186	6	231(3.8L)/2bbl	F4G3.8V2NEA3	08/02/88	7/1	11:18
0819	NO	8	0.27	P	85	GM	PONT	GRAND PRIX	68,829	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/02/88	7/1	14:48
0906	NO	20	0.01	P	85	GM	BUIC	REGAL	28,601	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/09/88	7/2	10:38
0934	NO	21	0.01	P	85	GM	OLDS	CUTLASS SUPREME BRGHM	15,540	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/10/88	7/2	13:47
1099	NO	25	0.01	P	85	GM	OLDS	CUTLASS SUPREME	51,862	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/18/88	7/2	11:14
1123	NO	52	0.01	P	85	GM	OLDS	CUTLASS SUPREME BRGHM	33,347	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/19/88	7/2	11:28
1250	NO	30	0.01	P	85	GM	BUIC	REGAL	44,818	6	231(3.8L)/2bbl	F4G3.8V2NSY6	08/25/88	7/3	16:27
0134	NO	10	0.00	P	86	GM	PONT	GRAND PRIX	29,342	6	231(3.8L)/2bbl	G4G3.8V2NSY7	08/26/87	7/3	11:31
0372	NO	18	0.00	P	86	GM	OLDS	CUTLASS SUPREME	13,166	6	231(3.8L)/2bbl	G4G3.8V2NSY7	10/20/87	7/3	17:09
0404	NO	22	0.00	P	86	GM	OLDS	CUTLASS SUPREME BRGHM	11,944	6	231(3.8L)/2bbl	G4G3.8V2NSY7	11/17/87	7/1	12:46
0414	NO	26	0.00	P	86	GM	PONT	BONNEVILLE	63,570	6	231(3.8L)/2bbl	G4G3.8V2NSY7	11/17/87	7/3	16:07
0530	NO	28	0.01	P	86	GM	OLDS	CUTLASS SUPREME	45,089	6	231(3.8L)/2bbl	G4G3.8V2NSY7	07/05/88	7/2	12:35
0747	NO	22	0.01	P	86	GM	BUIC	REGAL	45,746	6	231(3.8L)/2bbl	G4G3.8V2NSY7	07/22/88	7/3	10:23
1213	NO	13	0.01	P	86	GM	OLDS	CUTLASS SUPREME BRGHM	23,361	6	231(3.8L)/2bbl	G4G3.8V2NSY7	08/25/88	7/3	10:32
1224	NO	35	0.01	P	86	GM	OLDS	CUTLASS SUPREME	28,427	6	231(3.8L)/2bbl	G4G3.8V2NSY7	08/25/88	7/2	11:29
0503	NO	13	0.01	P	87	GM	OLDS	CUTLASS SROYALE	18,543	6	231(3.8L)/2bbl	H2G3.8V2NSYX	07/05/88	7/3	09:31
0708	NO	20	0.00	P	87	GM	PONT	GRAND PRIX	42,091	6	231(3.8L)/2bbl	H2G3.8V2NSYX	07/20/88	7/3	11:45
0813	NO	8	0.00	P	87	GM	OLDS	CUTLASS SUPREME	10,379	6	231(3.8L)/2bbl	H2G3.8V2NSYX	08/02/88	7/3	13:42
1030	NO	29	0.01	P	87	GM	OLDS	CUTLASS SUPREME	12,355	6	231(3.8L)/2bbl	H2G3.8V2NSYX	08/16/88	7/3	13:51
1270	NO	19	0.01	P	87	GM	OLDS	CUTLASS SUPREME	17,800	6	231(3.8L)/2bbl	H2G3.8V2NSYX	09/01/88	7/2	09:56

Description of the 1088 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0585	NO	36	0.00	P	83	GM	BUIC	RIVIERA	48,816	6	252(4.1L)/4bbl	D4G4.1V4AEA9	07/12/88	7/3	10:19
0096	YES	36	0.01	P	84	GM	BUIC	LeSABRE CUSTOM	23,348	6	252(4.1L)/4bbl	E4G4.1V4NEY7	08/21/87	7/	10:45
1092	NO	19	0.01	P	84	GM	PONT	TRANS AM	27,798	6	252(4.1L)/4bbl	NO LABEL	08/18/88	7/3	10:41
0162	NO	11	0.00	P	85	GM	CHEV	IMPALA	4,181	6	262(4.3L)/FI	F1G4.3V5NDA7	09/09/87	8/2	14:28
1259	NO	33	0.01	P	85	GM	CHEV	MONTE CARLO	72,328	6	262(4.3L)/FI	F1G4.3V5NDA7	08/26/88	7/2	09:51
0221	NO	11	0.00	P	86	GM	CHEV	CAPRICE CLASSIC	15,566	6	262(4.3L)/FI	G1G4.3V5NDA8	09/19/87	7/1	16:24
0244	NO	27	0.01	P	86	GM	CHEV	CAPRICE CLASSIC	12,315	6	262(4.3L)/FI	G1G4.3V5NDAB	09/24/87	7/2	14:25
0290	NO	21	0.01	P	86	GM	CHEV	CAPRICE CLASSIC	15,445	6	262(4.3L)/FI	G1G4.3V5NDA8	10/07/87	7/2	12:23
0436*	YES	31	0.01	P	86	GM	CHEV	CAPRICE CLASSIC	56,757	6	262(4.3L)/FI	G1G4.3V5NDA8	12/08/87	8/5	11:07
0600	NO	10	0.01	P	86	GM	CHEV	CAPRICE	30,426	6	262(4.3L)/FI	G1G4.3V5NDAB	07/13/88	7/3	10:21
0690	NO	16	0.00	P	87	GM	CHEV	MONTE CARLO	20,384	6	262(4.3L)/FI	H1G4.3V5NDA9	07/19/88	7/1	09:16
1024	NO	86	0.12	P	86	GM	CHEV	CAMARO	41,119	8	305(5.0L)/FI	G1G5.7V8NTA6	08/16/88	7/2	13:27
1045	NO	24	0.00	P	86	GM	PONT	TRANS AM	30,955	8	305(5.0L)/FI	G1G5.7V8NTA6	08/16/88	7/3	16:30
1221*	YES	371	0.59	F	86	GM	CHEV	CAMARO	66,215	8	305(5.0L)/FI	NO LABEL	08/25/88	7/2	11:09
0077	NO	2	0.02	P	83	GM	CHEV	CAPRICE CLASSIC Wgn	81,607	8	305(5.0L)/4bbl	D1G5.7V4NDAO	08/19/87	8/4	17:23
0164	NO	15	0.00	P	83	GM	CHEV	CAMARO	27,507	8	305(5.0L)/4bbl	D1G5.7V4NDAO	09/09/87	8/2	15:09
0230	NO	25	0.00	P	83	GM	PONT	GRAND PRIX	37,382	8	305(5.0L)/4bbl	D1G5.7V4NDAO	09/24/87	7/3	10:28
0588	NO	9	0.00	P	83	GM	CHEV	CAMARO	38,232	8	305(5.0L)/4bbl	D1G5.7V4NDAO	07/12/88	7/3	12:06
0792	NO	29	0.35	P	83	GM	CHEV	CAPRICE CLASSIC Wgn	72,990	8	305(5.0L)/4bbl	D1G5.7V4NDAO	07/26/88	7/3	14:57
0969	NO	21	0.01	P	83	GM	PONT	FIREBIRD	74,356	8	305(5.0L)/4bbl	D1G5.7V4NDAO	08/11/88	7/2	16:39
1198	NO	30	0.01	P	83	GM	PONT	GRAND PRIX	63,873	8	305(5.0L)/4bbl	D1G5.7V4NDAO	08/24/88	7/2	14:39
0147	NO	34	0.01	P	84	GM	CHEV	CAMARO Z28	33,191	8	305(5.0L)/4bbl	E1G5.7V4NEA3	08/26/87	7/2	18:23
0149	NO	6	0.01	P	84	GM	CHEV	CAPRICE CLASSIC Wgn	24,124	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/09/87	8/3	09:19
0159	NO	13	0.01	P	84	GM	CHEV	CAPRICE CLASSIC	27,674	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/09/87	8/3	11:02
0174	NO	52	0.00	P	84	GM	CHEV	CAPRICE CLASSIC	80,302	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/15/87	7/3	11:02
0215	NO	24	0.00	P	84	GM	PONT	FIREBIRD	43,000	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/19/87	7/1	14:50
0224*	NO	544	7.20	F	84	GM	PONT	GRAND PRIX LE	44,245	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/24/87	7/2	09:17
0226	NO	37	0.00	P	84	GM	PONT	GRAND PRIX LE	81,226	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/24/87	7/2	09:47
0241	NO	187	0.58	P	84	GM	CHEV	MONTE CARLO SS	41,179	8	305(5.0L)/4bbl	E1G5.OW4NEAX	09/24/87	7/1	12:39
0269	NO	3	0.00	P	84	GM	PONT	TRANS AM	24,702	8	305(5.0L)/4bbl	E1G5.7V4NEA3	10/06/87	7/3	15:04
0289	NO	86	0.15	P	84	GM	CHEV	CAPRICE CLASSIC	72,607	8	305(5.0L)/4bbl	E1G5.7V4NEA3	10/07/87	7/3	12:07
0340	NO	22	0.00	P	84	GM	CHEV	CAPRICE CLASSIC	44,046	8	305(5.0L)/4bbl	E1G5.7V4NEA3	10/15/87	7/3	11:09
0346	NO	12	0.00	P	84	GM	CHEV	CAPRICE CLASSIC	32,402	8	305(5.0L)/4bbl	E1G5.7V4NEA3	10/15/87	7/3	13:16
0386	NO	23	0.00	P	84	GM	CHEV	MONTE CARLO	35,544	8	305(5.0L)/4bbl	E1G5.7V4NEA3	11/14/87	8/2	10:27
0399	NO	77	0.07	P	84	GM	CHEV	CAPRICE CLASSIC	66,783	8	305(5.0L)/4bbl	E1G5.7V4NEA3	11/17/87	7/2	11:38
0415	NO	3	0.00	P	84	GM	PONT	GRAND PRIX	30,837	8	305(5.0L)/4bbl	N/A	11/17/87	7/3	16:14
0643	NO	34	0.01	P	84	GM	CHEV	CAPRICE Wgn	57,234	8	305(5.0L)/4bbl	E1G5.7V4NEA3	07/15/88	7/3	09:44
0664	NO	240	4.03	F	84	GM	CHEV	CAMARO	49,357	8	305(5.0L)/4bbl	E1G5.7V4NEA3	07/19/88	7/3	11:12
0670	NO	15	0.00	P	84	GM	CHEV	CAPRICE CLASSIC	73,862	8	305(5.0L)/4bbl	E1G5.7V4NEA3	07/19/88	7/1	12:10
0687	NO	13	0.01	P	84	GM	CHEV	CAPRICE CLASSIC	51,824	8	305(5.0L)/4bbl	E1G5.7V4NEA3	07/19/88	7/3	15:20
0856	NO	11	0.01	P	84	GM	CHEV	CAPRICE CLASSIC	34,193	8	305(5.0L)/4bbl	E1G5.7V4NEA3	08/04/88	7/3	09:46
0899	NO	61	0.02	P	84	GM	PONT	FIREBIRD	51,901	8	305(5.0L)/4bbl	E1G5.7V4NEA3	08/09/88	7/2	10:01

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
1050	NO	82	0.17	P	84	GM	CHEV	MONTE CARLO	31,876	8	305(5.0L)/4bbl	E1G5.7V4NEA3	08/17/88	7/3	10:02
1065	NO	25	0.01	P	84	GM	PONT	PARISIENNE	35,007	8	305(5.0L)/4bbl	E1G5.7V4NEA3	08/17/88	7/3	12:00
1236	NO	6	0.00	P	84	GM	CHEV	CAPRICE CLASSIC Wgn	26,161	8	305(5.0L)/4bbl	E1G5.7V4NEA3	08/25/88	7/1	13:54
1296	NO	28	0.01	P	84	GM	PONT	PARISIENNE BRGHM	76,640	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/10/88	7/3	11:20
1305	NO	49	0.01	P	84	GM	CHEV	CAMARO Z28	53,840	8	305(5.0L)/4bbl	E1G5.7V4NEA3	09/10/88	7/3	12:40
0004	NO	7	0.00	P	85	GM	PONT	GRAND SAFARI Wgn	20,720	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/14/87	7/3	10:00
0121	NO	2	0.00	P	85	GM	CHEV	MONTE CARLO SS	22,271	8	305(5.0L)/4bbl	F1G5.7V4N5A4	08/21/87	7/3	15:33
0156	NO	15	0.01	P	85	GM	PONT	PARISIENNE	15,018	8	305(5.0L)/4bbl	F1G5.7V4NEA4	09/09/87	8/3	10:31
0204	NO	2	0.00	P	85	GM	PONT	GRAND PRIX	23,873	8	305(5.0L)/4bbl	F1G5.7V4NEA4	09/19/87	7/1	09:56
0248	NO	13	0.01	P	85	GM	PONT	GRAND PRIX	11,000	8	305(5.0L)/4bbl	F1G5.7V4NEA4	09/24/87	7/	16:39
0281	NO	5	0.00	P	85	GM	PONT	PARISIENNE BRGHM	51,578	8	305(5.0L)/4bbl	N/A	10/07/87	7/	10:10
0317	NO	25	0.01	P	85	GM	CHEV	CAPRICE CLASSIC Wgn	69,034	8	305(5.0L)/4bbl	N/A	10/14/87	8/5	12:03
0331	NO	33	0.01	P	85	GM	CHEV	CAPRICE CLASSIC	19,334	8	305(5.0L)/4bbl	N/A	10/14/87	8/5	14:02
0405	NO	17	0.00	P	85	GM	CHEV	CAPRICE CLASSIC	19,881	8	305(5.0L)/4bbl	F1G5.7V4NEA4	11/17/87	7/2	12:54
0416	NO	5	0.00	P	85	GM	CHEV	CAPRICE CLASSIC	58,798	8	305(5.0L)/4bbl	F1G5.7V4NEA4	11/17/87	7/3	16:24
0527	NO	22	0.00	P	85	GM	CHEV	IMPALA	31,250	8	305(5.0L)/4bbl	F1G5.7V4NEA4	07/05/88	7/3	12:28
0609	NO	19	0.01	P	85	GM	CHEV	IMPALA	39,779	8	305(5.0L)/4bbl	F1G5.7V4NEA4	07/13/88	7/2	11:28
0700	NO	7	0.00	P	85	GM	CHEV	MONTE CARLO	37,170	8	305(5.0L)/4bbl	F1G5.7V4NEA4	07/20/88	7/3	10:21
0841	NO	16	0.01	P	85	GM	PONT	GRAND PRIX	47,562	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/03/88	7/3	13:48
0926	NO	15	0.00	P	85	GM	PONT	GRAND PRIX	38,285	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/10/88	7/1	11:02
0952	NO	17	0.01	P	85	GM	PONT	BONNEVILLE LE	51,116	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/11/88	7/2	10:59
1098	NO	28	0.01	P	85	GM	PONT	BONNEVILLE	69,275	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/18/88	7/2	10:57
1116	NO	15	0.00	P	85	GM	CHEV	MONTE CARLO	19,953	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/19/88	7/3	10:07
1131	NO	21	0.00	P	85	GM	PONT	PARISIENNE	45,930	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/19/88	7/3	13:49
1222	NO	21	0.01	P	85	GM	CHEV	CAPRICE CLASSIC	51,057	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/25/88	7/3	11:25
1226	NO	110	0.00	P	85	GM	CHEV	CAPRICE CLASSIC Wgn	81,586	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/25/88	7/3	11:43
1231	NO	23	0.01	P	85	GM	CHEV	IMPALA	18,160	8	305(5.0L)/4bbl	F1G5.7V4NEA4	08/25/88	7/2	13:27
0051	NO	18	0.01	P	86	GM	CHEV	CAPRICE CLASSIC	16,297	8	305(5.0L)/4bbl	G1G5.7V4NEA5	08/19/87	8/2	11:48
0118	NO	13	0.00	P	86	GM	CHEV	CAMARO IROC-Z	14,892	8	305(5.0L)/4bbl	G1G5.7V4NEA5	08/21/87	7/2	15:13
0169	NO	2	0.00	P	86	GM	CHEV	CAPRICE CLASSIC	16,760	8	305(5.0L)/4bbl	G1G5.7V4NEA5	09/15/87	7/3	09:23
0179	NO	16	0.01	P	86	GM	CHEV	CAMARO IROC-Z	35,006	8	305(5.0L)/4bbl	G1G5.7V4NEA5	09/15/87	7/2	12:09
0198	NO	20	0.00	P	86	GM	CHEV	CAMARO Z28	13,579	8	305(5.0L)/4bbl	G1G5.7V4NEA5	09/15/87	7/2	18:21
0336	NO	17	0.01	P	86	GM	CHEV	CAMARO Z28	6,122	8	305(5.0L)/4bbl	G1G5.7V4NEA5	10/15/87	7/3	10:02
0344	NO	14	0.01	P	86	GM	CHEV	MONTE CARLO	19,279	8	305(5.0L)/4bbl	G1G5.7V4NEA5	10/15/87	7/2	12:42
0571	NO	21	0.01	P	86	GM	PONT	GRAND PRIX	30,904	8	305(5.0L)/4bbl	G1G5.7V4NEA5	07/08/88	7/2	09:44
0616	NO	23	0.00	P	86	GM	PONT	BONNEVILLE	76,078	8	305(5.0L)/4bbl	G1G5.7V4NEA5	07/13/88	7/3	13:46
0655	NO	13	0.01	P	86	GM	CHEV	MONTE CARLO	33,958	8	305(5.0L)/4bbl	G1G5.7V4NEA5	07/15/88	7/3	11:00
0678	NO	13	0.00	P	86	GM	CHEV	MONTE CARLO	38,351	8	305(5.0L)/4bbl	G1G5.7V4NEA5	07/19/88	7/1	14:23
0703	NO	22	0.01	P	86	GM	CHEV	MONTE CARLO	21,665	8	305(5.0L)/4bbl	G1G5.7V4NEA5	07/20/88	7/2	10:56
0808	NO	9	0.00	P	86	GM	CHEV	CAMARO	19,417	8	305(5.0L)/4bbl	G1G5.7V4NEA5	08/02/88	7/1	11:08
0949	NO	15	0.01	P	86	GM	CHEV	MONTE CARLO	10,541	8	305(5.0L)/4bbl	G1G5.7V4NEA5	08/11/88	7/2	10:38
1044	NO	19	0.00	P	86	GM	CHEV	MONTE CARLO	34,467	8	305(5.0L)/4bbl	G1G5.7V4NEA5	08/16/88	7/2	16:14

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO	_	Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0550	NO	5	0.00	P	87	GM	CHEV	CAMARO	12,454	8	305(5.0L)/4bbl	H1G5.0V4NTA4	07/06/88	7/3	12:07
0601	NO	13	0.01	P	87	GM	CHEV	CAPRICE CLASSIC BRGHM	15,328	8	305(5.0L)/4bbl	H1G5.7V4NEA6	07/13/88	7/2	10:32
0691	NO	3	0.00	P	87	GM	CHEV	CAPRICE CLASSIC	16,580	8	305(5.0L)/4bbl	H1G5.7V4NEA6	07/20/88	7/3	09:17
0854	NO	16	0.01	P	87	GM	CHEV	CAPRICE CLASSIC	4,942	8	305(5.0L)/4bbl	H1G5.7V4NEA6	08/04/88	7/2	09:14
1002	NO	18	0.00	P	87	GM	CHEV	CAPRICE CLASSIC BRGHM	18,977	8	305(5.0L)/4bbl	H1G5.7V4NEA6	08/16/88	7/1	09:40
1078	NO	10	0.01	P	87	GM	CHEV	MONTE CARLO	3,824	8	305(5.0L)/4bbl	H1G5.7V4NEA6	08/17/88	7/3	14:21
1082	NO	9	0.00	P	87	GM	CHEV	MONTE CARLO	9,224	8	305(5.0L)/4bbl	H1G5.7V4NEA6	08/17/88	7/3	14:50
0003	NO	5	0.00	P	83	GM	BUIC	PARK AVENUE	23,000	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/14/87	7/3	09:45
0065	NO	24	0.00	P	83	GM	OLDS	98 REGENCY	66,356	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/19/87	8/4	14:52
0092	NO	17	0.01	P	83	GM	BUIC	ELECTRA LIMITED	33,703	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/21/87	7/2	10:19
0143	NO	18	0.01	P	83	GM	OLDS	DELTA 88 ROYALE BRGHM	49,984	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/26/87	7/3	16:10
0192	NO	49	0.00	P	83	GM	OLDS	DELTA 88 ROYALE BRGHM	42,337	8	307(5.0L)/4bbl	D3G5.0V4ARA9	09/15/87	7/2	16:47
0310	NO	12	0.01	P	83	GM	OLDS	DELTA 88 ROYALE BRGHM	77,521	8	307(5.0L)/4bbl	D3G5.0V4ARA9	10/14/87	8/3	10:28
0350	NO	18	0.00	P	83	GM	OLDS	DELTA 88 ROYALE	59,921	8	307(5.0L)/4bbl	D3G5.0V4ARA9	10/15/87	7/3	14:54
0378	NO	26	0.01	P	83	GM	BUIC	LeSABRE LIMITED	24,439	8	307(5.0L)/4bbl	D3G5.0V4ARA9	10/22/87	8/5	12:09
0391	NO	47	0.05	P	83	GM	OLDS	CUSTOM CRUISER Wgn	50,836	8	307(5.0L)/4bbl	D3G5.0V4ARA9	11/17/87	7/3	10:11
0627	NO	27	0.01	P	83	GM	OLDS	98 REGENCY	46,357	8	307(5.0L)/4bbl	D3G5.0V4ARA9	07/14/88	7/2	09:47
0648	NO	23	0.00	P	83	GM	OLDS	98 REGENCY BRGHM	77,777	8	307(5.0L)/4bbl	D3G5:0V4ARA9	07/15/88	7/3	10:02
0788	NO	29	0.00	P	83	GM	OLDS	DELTA 88 ROYALE	67,168	8	307(5.0L)/4bbl	D3G5.0V4ARA9	07/26/88	7/3	14:21
0834	NO	10	0.00	P	83	GM	BUIC	PARK AVENUE	44,628	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/03/88	7/3	10:32
0955	NO	29	0.00	P	83	GM	OLDS	DELTA 88 ROYALE	55,705	8	307(5.0L)/4bbl	NO LABEL	08/11/88	7/3	11:17
1010	NO	8	0.01	P	83	GM	OLDS	DELTA 88 ROYALE BRGHM	49,544	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/06/88	7/3	10:56
1052	NO	22	0.00	P	83	GM	BUIC	LeSABRE	24,501	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/17/88	7/3	10:18
1176	NO	26	0.01	P	83	GM	BUIC	LeSABRE	59,988	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/23/88	7/3	16:55
1202	NO	19	0.01	P	83	GM	OLDS	DELTA 88 ROYALE	33,581	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/24/88	7/1	15:08
1254	NO	153	0.20	P	83	GM	OLDS	DELTA 88 ROYALE	106,044	8	307(5.0L)/4bbl	D3G5.0V4ARA9	08/26/88	7/2	09:18
0030	NO	2	0.01	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	21,943	8	307(5.0L)/4bbl	E3G5.0V4LNAX	08/19/87	8/5	09:27
0046	NO	17	0.01	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	38,403	8	307(5.0L)/4bbl	E3G5.0V4NLAX	08/19/87	8/3	11:25
0047	NO	26	0.01	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	22,592	8	307(5.0L)/4bbl	E3G5.0V4NLAX	08/19/87	8/5	11:25
0079	NO	16	0.00	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	22,617	8	307(5.0L)/4bbl	E3G5.0V4NLAX	08/19/87	8/4	17:32
0163	NO	20	0.00	P	84	GM	OLDS	98 REGENCY BRGHM	17,382	8	307(5.0L)/4bbl	E3G5.0V4NBMO	09/09/87	8/2	14:55
0186	NO	1	0.00	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	46,668	8	307(5.0L)/4bbl	N/A	09/15/87	7/3	15:34
0191	NO	42	0.02	P	84	GM	OLDS	CUTLASS SUPREME	71,308	8	307(5.0L)/4bbl	E3G5.0V4NBMO	09/15/87	7/3	16:45
0227*	YES	74	0.01	P	84	GM	BUIC	LeSABRE LIMITED	42,683	8	307(5.0L)/4bbl	E3G5.0V4NLAX	09/24/87	7/2	09:56
0332	NO	40	0.01	P	84	GM	OLDS	98 REGENCY	39,470	8	307(5.0L)/4bbl	E3G5.0V4NLAX	10/14/87	8/2	14:13
0379	NO	5	0.01	P	84	GM	OLDS	DELTA 88 ROYALE	25,311	8	307(5.0L)/4bbl	E3G5.0V4NLAX	10/22/87	8/5	12:28
0382*	NO	383	0.00	F	84	GM	OLDS	CUTLASS SUPREME BRGHM	48,118	8	307(5.0L)/4bbl	E3G5.0V4NLAX	11/14/87	8/4	09:28
0396	NO	105	0.05	P	84	GM	BUIC	PARK AVENUE	48,858	8	307(5.0L)/4bbl	E3G5.0V4NLAX	11/17/87	7/2	11:18
0397	NO	90	0.11	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	45,671	8	307(5.0L)/4bbl	E3G5.0V4NLAX	11/17/87	7/3	11:18
0403	NO	54	0.00	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	30,523	8	307(5.0L)/4bbl	E3G5.0V4NLAX	11/17/87	7/1	12:30
0410	NO	16	0.00	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	37,351	8	307(5.0L)/4bbl	E3G5.0V4NLAX	11/17/87	7/3	15:10
0443	NO	45	0.00	P	84	GM	OLDS	DELTA 88 ROYALE	68,203	8	307(5.0L)/4bbl	E3G5.0V4NLAX	12/08/87	8/4	12:18
0519	NO	37	0.00	P	84	GM	OLDS	CUTLASS SUPREME BRGHM	61,097	8	307(5.0L)/4bbl	E3G5.0V4NLAX	07/05/88	7/1	11:08
0539	NO	13	0.01	P	84	GM	OLDS	DELTA 88 ROYALE	62,938	8	307(5.0L)/4bbl	E3G5.0V4NLAX	07/06/88	7/2	10:14

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0836	NO	262	2.59	F	84	GM	BUIC	LeSABRE LIMITED	23,682	8	307(5.0L)/4bbl	E3G5.OV4NLAX	08/03/88	7/1	10:42
0928	NO	26	0.00	P	84	GM	OLDS	CUTLASS	47,331	8	307(5.0L)/4bbl	E3G5.OV4NLAX	08/10/88	7/1	12:30
0953	NO	55	0.06	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	43,195	8	307(5.0L)/4bbl	E3G5.OV4NLAX	08/11/88	7/3	11:02
1060	NO	17	0.01	P	84	GM	OLDS	CUTLASS CRUISER Wgn	48,321	8	307(5.0L)/4bbl	E3G5.OV4NLAX	08/17/88	7/3	11:25
1084	NO	8	0.01	P	84	GM	OLDS	DELTA 88 ROYALE BRGHM	21,133	8	307(5.0L)/4bbl	E3G5.OV4NLAX	08/17/88	7/3	15:09
1321*	NO	628	0.10	F	84	GM	BUIC	LeSABRE LIMITED	56,695	8	307(5.0L)/4bbl	ILLEGIBLE	09/17/88	7/2	12:28
0103	NO	9	0.00	P	85	GM	OLDS	DELTA 88 ROY BRGHM LS	28,086	8	307(5.0L)/4bbl	F3G5.OV4NLAO	08/21/87	7/3	12:27
0115	NO	20	0.01	P	85	GM	OLDS	DELTA 88 ROYALE BRGHM	11,325	8	307(5.0L)/4bbl	F3G5.OV4NLAO	08/21/87	7/2	14:56
0153	NO	3	0.01	P	85	GM	OLDS	DELTA 88 ROYALE BRGHM	22,497	8	307(5.0L)/4bbl	F3G5.OV4NLAO	09/09/87	8/5	10:12
0182	YES	25	0.00	P	85	GM	OLDS	CUTLASS SUPREME BRGHM	12,420	8	307(5.0L)/4bbl	F3G5.OV4NLAO	09/15/87	7/3	13:52
0282	NO	16	0.00	P	85	GM	OLDS	DELTA 88 ROYALE BRGHM	49,722	8	307(5.0L)/4bbl	F3G5.OV4NLAO	10/07/87	7/3	10:28
0295	NO	16	0.00	P	85	GM	OLDS	DELTA 88 ROY BRGHM LS	42,346	8	307(5.0L)/4bbl	F3G5.OV4NLAO	10/07/87	7/1	13:44
0296	NO	21	0.00	P	85	GM	BUIC	LeSABRE LIMITED	5,598	8	307(5.0L)/4bbl	F3G5.OV4NLAO	10/07/87	7/1	13:50
0343	NO	6	0.00	P	85	GM	OLDS	DELTA 88 ROYALE	15,970	8	307(5.0L)/4bbl	F3G5.OV4NLAO	10/15/87	7/3	12:27
0390	NO	47	0.02	P	85	GM	BUIC	LeSABRE LIMITED	22,789	8	307(5.0L)/4bbl	F3G5.OV4NLAO	11/17/87	7/2	10:08
0407	NO	53	0.04	P	85	GM	OLDS	DELTA 88 ROYALE	51,228	8	307(5.0L)/4bbl	F3G5.OV4NLAO	11/17/87	7/2	13:08
0419	NO	1	0.00	P	85	GM	BUIC	LeSABRE LIMITED	12,723	8	307(5.0L)/4bbl	F3G5.OV4NLAO	11/19/87	8/3	10:38
0544	NO	21	0.01	P	85	GM	OLDS	DELTA 88 ROYALE	31,089	8	307(5.0L)/4bbl	F3G5.OV4NLAO	07/06/88	7/2	11:03
0561	NO	26	0.01	P	85	GM	OLDS	DELTA 88 ROYALE	30,447	8	307(5.0L)/4bbl	F3G5.OV4NLAO	07/07/88	7/2	11:15
0665	NO	17	0.00	P	85	GM	BUIC	LeSABRE	46,481	8	307(5.0L)/4bbl	F3G5.OV4NLAO	07/19/88	7/3	11:33
0727	NO	10	0.00	P	85	GM	BUIC	LeSABRE	18,437	8	307(5.0L)/4bbl	F3G5.OV4NLAO	07/20/88	7/3	15:28
0745	NO	10	0.01	P	85	GM	BUIC	RIVIERA	73,074	8	307(5.0L)/4bbl	F3G5.OV4NLAO	07/22/88	7/3	10:05
0762	NO	19	0.00	P	85	GM	OLDS	TORONADO BRGHM	38,392	8	307(5.0L)/4bbl	F3G5.OV4NLAO	07/22/88	7/2	14:16
0821	NO	39	0.01	P	85	GM	OLDS	DELTA 88 ROYALE	62,999	8	307(5.0L)/4bbl	F3G5.OV4NLAO	08/02/88	7/2	15:23
0890	NO	15	0.01	P	85	GM	BUIC	RIVIERA	95,804	8	307(5.0L)/4bbl	UNREADABLE	08/05/88	7/2	11:29
0904	NO	74	0.13	P	85	GM	BUIC	LeSABRE	38,241	8	307(5.0L)/4bbl	F3G5.OV4NLAO	08/09/88	7/2	10:33
0960	NO	28	0.01	P	85	GM	BUIC	LeSABRE	9,472	8	307(5.0L)/4bbl	F3G5.OV4NLAO	08/11/88	7/2	12:08
1059	NO	16	0.01	P	85	GM	BUIC	RIVIERA	22,000	8	307(5.0L)/4bbl	F3G5.OV4NLAO	08/17/88	7/2	11:23
1077	NO	18	0.01	P	85	GM	OLDS	CUSTOM CRUISER Wgn	38,244	8	307(5.0L)/4bbl	F3G5.OV4NLAO	08/17/88	7/3	14:03
1121	NO	24	0.01	P	85	GM	OLDS	TORONADO BRGHM	38,221	8	307(5.0L)/4bbl	F3G5.OV4NLAO	08/19/88	7/2	11:08
1126	NO	24	0.01	P	85	GM	OLDS	TORONADO BRGHM	23,707	8	307(5.0L)/4bbl	F3G5.OV4NLAO	08/19/88	7/3	12:07
1134	NO	23	0.00	P	85	GM	OLDS	98	46,882	8	307(5.0L)/4bbl	F3G5.OV4NLAO	08/19/88	7/3	14:24
1247	NO	11	0.00	P	85	GM	OLDS	CUTLASS SALON	39,682	8	307(5.0L)/4bbl	F3G5.OV4NLAO	08/25/88	7/3	15:55
0061	NO	11	0.00	P	86	GM	OLDS	CUTLASS SUPREME	9,406	8	307(5.0L)/4bbl	G3G5.OV4NLA1	08/19/87	8/2	13:03
0172	NO	14	0.00	P	86	GM	OLDS	CUTLASS SUPREME	75,422	8	307(5.0L)/4bbl	G3G5.OV4NLA1	09/15/87	7/3	10:35
0175	NO	28	0.00	P	86	GM	CADI	FLEETWOOD BROuGHAM	14,067	8	307(5.0L)/4bbl	G3G5.OV4NLA1	09/15/87	7/1	11:07
0197	NO	15	0.00	P	86	GM	CADI	FLEETWOOD BRGHM	18,536	8	307(5.0L)/4bbl	G3G5.OV4NLA1	09/15/87	7/3	18:10
0201	NO	4	0.00	P	86	GM	OLDS	CUTLASS SUPREME	N/A	8	307(5.0L)/4bbl	G3G5.OV4NLA1	09/19/87	7/3	09:40
0205	NO	5	0.00	P	86	GM	OLDS	CUTLASS SALON	14,669	8	307(5.0L)/4bbl	G3G5.OV4NLA1	09/19/87	7/3	10:32
0242	NO	13	0.01	P	86	GM	BUIC	LeSABRE ESTATE Wgn	18,654	8	307(5.0L)/4bbl	G3G5.OV4NLA1	09/24/87	7/2	12:40
0253	NO	4	0.00	P	86	GM	OLDS	CUTLASS SUPREME	8,982	8	307(5.0L)/4bbl	G3G5.OV4NLA1	09/24/87	7/3	18:27
0263	NO	3	0.00	P	86	GM	OLDS	CUTLASS SUPREME BRGHM	15,560	8	307(5.0L)/4bbl	G3G5.OV4NLA1	10/06/87	7/3	13:54
0342	NO	5	0.00	P	86	GM	BUIC	REGAL	18,582	8	307(5.0L)/4bbl	G3G5.OV4NLA1	10/15/87	7/3	12:17
0366	NO	14	0.01	P	86	GM	OLDS	CUTLASS SUPREME BRGHM	9,626	8	307(5.0L)/4bbl	G3G5.OV4NLA1	10/20/87	7/2	12:47
0384	NO	36	0.00	P	86	GM	OLDS	CUTLASS SUPREME	26,342	8	307(5.0L)/4bbl	G3G5.OV4NLA1	11/14/87	8/2	10:16

* Recruited for additional testing at VTL.

Description of the 1068 Test Vehicles (Continued)
Sorted by Manufacturer/Engine

Veh No.	Stored OBD Code	--I/M Lane-- HC	CO		Mdl Yr	Mfg	Make	Model	Odomtr (mile)	------Engine------ No. Cyl	Displacement/ Fuel Metering	Engine Family (if Availbl)	----- I/M Test ----- Date	Stat/ Lane	Time
0423	NO	21	0.00	P	86	GM	OLDS	CUTLASS SUPREME BRGHM	26,436	8	307(5.0L)/4bbl	G3G5.0V4NLA1	11/19/87	8/3	10:52
0521	NO	23	0.01	P	86	GM	OLDS	CUTLASS SUPREME	25,805	8	307(5.0L)/4bbl	G3G5.0V4NLA1	07/05/88	7/2	11:27
0534	NO	15	0.01	P	86	GM	BUIC	REGAL	59,238	8	307(5.0L)/4bbl	G3G5.0V4NLA1	07/06/88	7/3	09:41
0673	NO	33	0.00	P	86	GM	OLDS	CUTLASS SUPREME	18,540	8	307(5.0L)/4bbl	G3G5.0V4NLA1	07/19/88	7/2	12:30
0766	NO	10	0.01	P	86	GM	OLDS	CUTLASS SALON	26,961	8	307(5.0L)/4bbl	G3G5.0V4NLA1	07/22/88	7/3	14:58
0853	NO	8	0.01	P	86	GM	OLDS	CUTLASS SUPREME	10,113	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/04/88	7/3	09:08
0929	NO	35	0.01	P	86	GM	PONT	PARISIENNE BRGHM	18,437	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/10/88	7/2	13:01
0933	NO	27	0.01	P	86	GM	OLDS	CUTLASS SUPREME	18,641	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/10/88	7/2	13:37
0973	NO	12	0.00	P	86	GM	OLDS	CUTLASS SUPREME BRGHM	33,915	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/12/88	7/3	10:00
0997	NO	2	0.00	P	86	GM	CHEV	CAPRICE CLASSIC Wgn	41,594	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/12/88	7/3	15:08
1023	NO	9	0.01	P	86	GM	OLDS	CUTLASS SUPREME	29,925	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/16/88	7/3	13:15
1168	NO	38	0.01	P	86	GM	OLDS	CUTLASS SUPREME BRGHM	16,294	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/23/88	7/3	15:19
1190	NO	53	0.01	P	86	GM	OLDS	CUTLASS SUPREME	17,287	8	307(5.0L)/4bbl	G3G5.0V4NLA1	08/24/88	7/2	11:16
0261	NO	21	0.01	P	87	GM	OLDS	CUTLASS SUPREME BRGHM	7,441	8	307(5.0L)/4bbl	H2G5.0V4NLA3	10/06/87	7/	13:41
0501	NO	19	0.01	P	87	GM	BUIC	REGAL	11,258	8	307(5.0L)/4bbl	H2G5.0V4NLA3	07/05/88	7/3	09:14
0612	NO	8	0.00	P	87	GM	OLDS	CUTLASS SUPREME	11,821	8	307(5.0L)/4bbl	H2G5.0V4NLA3	07/13/88	7/3	12:01
0694	NO	17	0.01	P	87	GM	OLDS	CUTLASS SUPREME BRGHM	24,748	8	307(5.0L)/4bbl	H2G5.0V4NLA3	07/20/88	7/2	09:45
0886	NO	18	0.01	P	87	GM	OLDS	CUTLASS SALON	22,572	8	307(5.0L)/4bbl	H2G5.0V4NLA3	08/05/88	7/3	11:16
0105	NO	7	0.00	P	86	GM	CHEV	CORVETTE	12,490	8	350(5.7L)/FI	G1G5.7V8DAAX	08/21/87	7/3	12:46
0610	NO	14	0.00	P	86	GM	CHEV	CORVETTE	36,022	8	350(5.7L)/FI	G1G5.7V8DAAX	07/13/88	7/2	11:32
0754	NO	50	0.00	P	86	GM	CHEV	CORVETTE	44,886	8	350(5.7L)/FI	G1G5.7V8DAAX	07/22/88	7/2	11:33
1273	YES	346	1.44	F	86	GM	CHEV	CORVETTE	31,517	8	350(5.7L)/FI	G1G5.7V8DAAX	09/01/88	7/3	10:55
0702	NO	3	0.00	P	87	GM	CHEV	CAMARO IROC Z-28	7,523	8	350(5.7L)/FI	H1G5.7V8NTA7	07/20/88	7/1	10:29
0751	NO	18	0.00	P	87	GM	CHEV	CAMARO IROC Z-28	13,326	8	350(5.7L)/FI	H1G5.7V8NTA7	07/22/88	7/3	10:55
0653	NO	8	0.01	P	86	GM	CHEV	ASTRO	43,714	6	262(4.3L)/FI	G1G4.3T5TMG9	07/15/88	7/3	10:33
0957	NO	23	0.01	P	86	GM	CHEV	ASTRO	43,453	6	262(4.3L)/FI	G1G4.3T5TMG9	08/11/88	7/2	11:31
0504	NO	180	0.07	P	85	GM	GMC	SAFARI	N/A	6	262(4.3L)/4bbl	F1G4.3T4HHC1	07/05/88	7/2	09:34
1230	NO	12	0.00	P	85	GM	GMC	SAFARI	108,253	6	262(4.3L)/4bbl	NO LABEL	08/25/88	7/1	13:19
1275	NO	25	0.01	P	85	GM	CHEV	ASTRO	31,080	6	262(4.3L)/4bbl	F1G4.3T4HHC1	09/01/88	7/3	11:24

APPENDIX C

Descriptions and FTP Results for the 27 Cars Tested at VTL

All of the means of the emissions (HC, CO, NOx) are arithmetic. The fuel economy means are harmonic.

Descriptions of Test Vehicles
Failing Only Tailpipe I/M

Control Number	Model Year	Make/Model	--- Engine ---- Displacement/ Fuel Metering
IBD/0067	1986	Chevrolet Camaro Z28	173(2.8) / FI
IBD/0072	1985	Chevrolet Cavalier	122(2.0) / FI
IBD/0108	1983	Chevrolet Camaro Z28	173(2.8) / 2bbl
IBD/0224	1984	Pontiac Grand Prix LE	305(5.0) / 4bbl
IBD/0259	1986	Plymouth Caravelle	156(2.5) / FI
IBD/0382	1984	Oldsmobile Cutlass Supreme Brougham	307(5.0) / 4bbl
IBD/0388	1986	Dodge Aries LE	135(2.2) / FI
IBD/1015	1986	Ford Tempo	140(2.3) / FI
IBD/1083	1985	Pontiac 6000 LE	173(2.8) / 2bbl
IBD/1321	1984	Buick LeSabre Limited	307(5.0) / 4bbl

FTP Emissions of Test Vehicles
Failing Only Tailpipe I/M

Control Number	Test Sequence	FTP Emissions HC (g/mi)	CO (g/mi)	NOx (g/mi)	Fuel Economy (mpg)
IBD/0067	As Received:	0.39	4.20	0.40	18.71
	After I/M Rps:	0.32	4.26	0.39	18.02
IBD/0072	As Received:	0.29	5.66	0.36	27.10
	After I/M Rps:	0.21	3.34	0.37	26.29
IBD/0108	As Received:	0.76	4.79	0.69	18.15
	After I/M Rps:	0.39	1.77	0.60	20.01
IBD/0224	As Received:	16.49	312.55	0.73	10.32
	After I/M Rps:	2.68	12.48	3.91	17.71
IBD/0259	As Received:	1.41	48.85	0.44	21.24
	After I/M Rps:	0.16	2.33	0.50	23.82
IBD/0382	As Received:	3.13	8.64	0.60	15.36
	After I/M Rps:	0.65	4.60	0.83	17.55
IBD/0388	As Received:	3.05	76.21	0.37	19.33
	After I/M Rps:	0.29	5.34	0.56	23.96
IBD/1015	As Received:	2.35	39.62	0.55	22.23
	After I/M Rps:	0.53	4.65	0.67	24.46
IBD/1083	As Received:	0.33	7.99	0.65	20.07
	After I/M Rps:	0.37	7.34	0.68	19.62
IBD/1321	As Received:	9.25	181.16	1.03	9.73
	After I/M Rps:	12.47	205.51	0.83	9.25
	Add. Repairs:	0.89	4.77	1.80	15.32
Means:	As Received:	3.745	68.967	0.582	16.5604
	After I/M Rps:	1.807	25.162	0.934	18.4969

Means excluding vehicle no. 1321:

As Received:	3.133	56.501	0.532	17.9614
After I/M Rps:	0.622	5.123	0.943	20.8082

Means using "Add. Repairs" to simulate "After I/M Rps" for vehicle no. 1321:

After I/M Rps:	0.649	5.088	1.031	20.0855

Descriptions of Test Vehicles
Failing Only OBD Check

Control Number	Model Year	Make/Model	--- Engine ---- Displacement/ Fuel Metering
IBD/0154	1984	Buick Century Custom	181(3.0) / 2bbl
IBD/0207	1986	Oldsmobile Cutlass Calais	151(2.5) / FI
IBD/0227	1984	Buick LeSabre Limited	307(5.0) / 4bbl
IBD/0258	1985	Chrysler Laser	135(2.2) / FI
IBD/0271	1984	Pontiac Bonneville LE	231(3.8) / 2bbl
IBD/0436	1986	Chevrolet Caprice Classic	262(4.3) / FI
IBD/0528	1986	Oldsmobile Cutlass Calais	181(3.0) / FI
IBD/0710	1985	Ford Tempo GL	140(2.3) / FI
IBD/1150	1986	Mercury Topaz GS	140(2.3) / FI

FTP Emissions of Test Vehicles
Failing Only OBD Check

Control Number	Test Sequence	FTP Emissions HC (g/mi)	CO (g/mi)	NOx (g/mi)	Fuel Economy (mpg)
IBD/0154	As Received:	0.52	3.41	0.81	20.33
	After OBD Rps:	0.57	4.40	0.98	19.32
IBD/0207	As Received:	0.19	1.31	0.39	24.99
	After OBD Rps:	0.31	2.52	0.22	24.91
IBD/0227	As Received:	0.37	3.42	0.83	16.05
	After OBD Rps:	0.37	3.04	0.87	16.18
IBD/0258	As Received:	0.66	12.75	0.52	26.37
	After OBD Rps:	0.61	9.45	0.61	21.15
IBD/0271	As Received:	0.95	2.80	0.51	19.30
	After OBD Rps:	0.69	3.00	0.81	19.92
IBD/0436	As Received:	0.52	8.53	2.27	19.20
	After OBD Rps:	0.49	8.07	2.38	19.49
IBD/0528	As Received:	0.32	2.82	0.30	20.76
IBD/0710	As Received:	0.39	7.75	0.58	23.70
	After OBD Rps:	0.39	8.42	0.51	23.90
IBD/1150	As Received:	7.46	133.33	0.33	17.95
	After OBD Rps:	6.75	125.23	0.36	18.40
Means:	As Received:	1.263	19.569	0.716	20.4826
	After OBD Rps:	1.272	20.516	0.829	20.0658

Means excluding vehicle no. 1150:

As Received:	0.489	5.349	0.764	20.8503
After OBD Rps:	0.490	5.557	0.896	20.3287

Means excluding vehicle no. 528:

As Received:	1.381	21.663	0.768	20.4485

Means using "As Recv" to simulate "After OBD Rps" for Veh 528:

After OBD Rps:	1.167	18.550	0.770	20.1406

And, then excluding vehicle no. 1150:

After OBD Rps:	0.469	5.215	0.821	20.3817

Descriptions of Test Vehicles
Failing Both Tailpipe I/M and OBD Check

Control Number	Model Year	Make/Model	--- Engine ---- Displacement/ Fuel Metering
IBD/0130	1983	Chevrolet Cavalier CS	122(2.0) / FI
IBD/0368	1985	Dodge 600	135(2.2) / FI
IBD/0541*	1986	Chrysler New Yorker	152(2.5) / FI
IBD/0647	1985	Ford Tempo GL	140(2.3) / FI
IBD/1132	1985	Dodge Daytona	135(2.2) / FI
IBD/1221	1986	Chevrolet Camaro	305(5.0) / FI
IBD/1256	1986	Chevrolet Cavalier CS	173(2.8) / FI
IBD/1290	1984	Chrysler Le Baron	135(2.2) / FI

* Vehicle number 541 should not have been recruited since just one day prior to its I/M failure, it was commercially repaired (tuned-up with its oxygen sensor replaced.

FTP Emissions of Test Vehicles
Failing Both Tailpipe I/M and OBD Check

Control Number	Test Sequence	FTP Emissions HC (g/mi)	CO (g/mi)	NOx (g/mi)	Fuel Economy (mpg)
IBD/0130	As Received:	0.58	16.46	0.47	25.71
	After I/M Rps:	0.24	5.05	1.10	24.18
IBD/0368	As Received:	2.51	64.60	0.50	21.04
	After I/M Rps:	0.22	2.75	0.92	25.29
IBD/0541*	As Received:	2.40	41.59	0.66	19.94
	After I/M Rps:	0.80	22.12	0.63	21.05
IBD/0647	As Received:	2.06	10.32	0.67	22.55
	After OBD Rps:	1.11	9.83	0.62	24.03
	After I/M Rps:	0.78	7.26	0.70	20.96
IBD/1132	As Received:	4.09	42.06	0.82	19.90
	After OBD Rps:	2.30	26.15	0.90	20.63
	After I/M Rps:	0.38	5.53	1.06	22.13
IBD/1221	As Received:	2.93	19.41	3.64	17.23
	After OBD Rps:	2.92	19.46	3.57	17.37
	After I/M Rps:	2.30	19.91	2.33	16.77
IBD/1256	As Received:	0.66	6.22	0.87	20.66
	After OBD Rps:	0.96	9.82	0.75	20.47
	After I/M Rps:	0.65	5.64	0.77	20.57
IBD/1290	As Received:	1.64	32.67	0.88	22.34
	After OBD Rps:	0.98	14.49	1.16	23.35
	After I/M Rps:	0.79	26.50	1.04	16.71
Means:	As Received:	2.109	29.166	1.064	20.9218
	After OBD Rps:	1.191	13.709	1.206	21.7546
	After I/M Rps:	0.770	11.845	1.069	18.7081
Means excluding vehicle no. 541:					
	As Received:	2.067	27.391	1.121	21.0700
	After OBD Rps:	1.247	12.507	1.289	21.8591
	After I/M Rps:	0.766	10.377	1.131	18.4154

APPENDIX D

Description of the Repairs Performed on the 27 Cars Repaired in This Program

Description of the Repairs Performed
on the 10 Cars
Failing Only Tailpipe I/M

Veh No.	-- Repair -- Time Hr:Min	Parts ($)	--- I/M Scores --- Initial HC/CO	Final HC/CO	Type of Repairs
0067	1:30	50	272/0.05	12/0.01	Replaced oxygen sensor & spark plugs.
0072	1:00	150	174/1.39	297/1.79	Replaced fuel injector nozzle.
	0:30	35		115/0.36	Replaced oxygen sensor
0108	2:30	0	240/5.48	11/0.01	Repaired vacuum leak by reconnecting the hoses to the air bypass, air management, secondary vacuum break, and hot air door. The idle speed and mixture were reset.
0224	2:00	100	544/7.20	86/0.04	Replaced canister TVS switch, canister purge control valve, oxygen sensor, and spark plugs.
0259	0:30	0	232/5.02	8/0.00	Reconnected wire to oxygen sensor.
0382	0:30	35	383/0.00	259/0.41	Replaced spark plugs.
	0:30	0		44/0.01	Reconnected plug wire.
0388	2:00	90	501/4.94	31/0.00	Replaced oxygen sensor, spark plugs, & fuel injector.
1015	1:00	70	563/9.15	35/0.05	Replaced fuel injector.
1083	0:30	0	209/5.80	40/0.22	Reconnected hose to secondary vacuum break.
1321	0:30	0	628/0.10	51/0.01	Adjust base idle speed.
	2:00	35		N.A.	Replaced canister purge control valve and transmission cable.

Summary of the Repairs Performed on the 10 Cars Failing Only Tailpipe I/M

System Repaired	Vehicle Number 067	072	108	224	259	382	388	1015	1083	1321	TOT
Fuel Metering System:											
Fuel Injector(s)	.	X	.	.	.	.	X	X	.	.	3
Set Idle CO	.	.	X	.	.	.	.	.	.	.	1
Set Idle Speed	.	.	X	.	.	.	.	.	.	X	2
Ignition System:											
Spark Plugs	X	.	.	X	.	X	X	.	.	.	4
Plugs Wires	.	.	.	.	.	X	.	.	.	.	1
3-Way Electronics:											
Oxygen Sensor	X	X	.	X	X	.	X	.	.	.	5
TPS	.	.	.	.	.	.	.	.	.	.	-
EGR Pos Sensor	.	.	.	.	.	.	.	.	.	.	-
MAP Sensor	.	.	.	.	.	.	.	.	.	.	-
AFS	.	.	.	.	.	.	.	.	.	.	-
ECM	.	.	.	.	.	.	.	.	.	.	-
Evap. Control System	.	.	.	X	.	.	.	.	.	*	1
EGR System	.	.	.	.	.	.	.	.	.	.	-
Supplementary AIR	.	.	.	.	.	.	.	.	.	.	-
Repair Vacuum Leaks	.	.	X	.	.	.	.	.	X	.	2
Speedometer Cable	.	.	.	.	.	.	.	.	.	.	-
Transmission Cable	.	.	.	.	.	.	.	.	.	*	-
Clear Codes (nothing else)	.	.	.	.	.	.	.	.	.	.	-

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* Additional repairs performed to reduce FTP emissions AFTER passing I/M.

Description of the Repairs Performed
on the 9 Cars
Failing Only OBD Check

Veh No.	-- Repair -- Time Hr:Min	Parts ($)	-- I/M Scores -- Initial HC/CO	Final HC/CO	Type of Repairs
0154	0:30	0	7/0.01	N.A.	Reconnected speedometer cable at transmission.
0207	0:30	35	6/0.00	N.A.	Replaced oxygen sensor.
0227	0:30	0	74/0.01	N.A.	None. (Cleared ECM of codes & none reappeared.)
0258	1:00	50	46/0.73	N.A.	Replaced oxygen sensor & both exhaust donuts (at the exhaust manifold). Welded air tube to the catlayst.
0271	1:30	75	32/0.00	N.A.	Repalced EGR control solenoid & cleared codes.
0436	1:00	185	31/0.01	N.A.	Replaced ECM.
0528	0:00	0	11/0.01	N.A.	No repairs. Codes did not reappear.
0710	0:30	20	33/0.01	N.A.	Replaced TPS switch.
1150	0:30	30	40/0.03	N.A.	Replaced EGR position sensor.

Summary of the Repairs Performed on the 9 Cars Failing Only OBD Check

System Repaired	Vehicle Number 154	207	227	258	271	436	528	710	1150	TOT
Fuel Metering System:										
Fuel Injector(s)	.	.	.	.	.	.	.	.	.	-
Set Idle CO	.	.	.	.	.	.	.	.	.	-
Set Idle Speed	.	.	.	.	.	.	.	.	.	-
Ignition System:										
Spark Plugs	.	.	.	.	.	.	.	.	.	-
Plugs Wires	.	.	.	.	.	.	.	.	.	-
3-Way Electronics:										
Oxygen Sensor	.	X	.	X	.	.	.	.	.	2
TPS	.	.	.	.	.	.	.	X	.	1
EGR Pos Sensor	.	.	.	.	.	.	.	.	X	1
MAP Sensor	.	.	.	.	.	.	.	.	.	-
AFS	.	.	.	.	.	.	.	.	.	-
ECM	.	.	.	.	.	X	.	.	.	1
Evap. Control System	.	.	.	.	.	.	.	.	.	-
EGR System	.	.	.	.	X	.	.	.	.	1
Supplementary AIR	.	.	.	X	.	.	.	.	.	1
Repair Vacuum Leaks	.	.	.	.	.	.	.	.	.	-
Speedometer Cable	X	.	.	.	.	.	.	.	.	1
Transmission Cable	.	.	.	.	.	.	.	.	.	-
Clear Codes (nothing else)	.	.	X	.	.	.	X	.	.	2

Description of the Repairs Performed
on the 8 Cars
Failing Both Tailpipe I/M and OBD Check

Veh No.	-- Repair -- Time Hr:Min	Parts ($)	--- I/M Scores --- Initial HC/CO	Final HC/CO	Type of Repairs
0130	0:30	35	135/1.45	5/0.00	Replaced oxygen sensor.
0368	1:00	50	265/6.43	204/3.55	Replaced oxygen sensor.
	0:30	20		8/0.00	Replaced spark plugs.
0541*	1:00	30	481/8.33	21/0.01	Replaced TPS. Cleared codes.
0647	0:30	20	367/3.11	370/1.03	Replaced TPS.
	2:20	200		135/0.05	Replaced fuel injector, plugs, MAP sensor, & oxygen sensor.
1132	1:00	40	707/9.61	1406/10.01	Replaced oxygen sensor.
	1:00	164		11/0.01	Replaced fuel injector.
1221	0:30	35	371/0.59	1225/1.54	Replaced oxygen sensor.
	2:00	350		95/0.59	Replaced mass air flow sensor.
1256	1:00	160	894/2.46	569/1.72	Replaced mass air flow sensor.
	0:30	30		8/0.00	Replaced oxygen sensor.
1290	0:30	0	423/7.56	391/4.64	Reconnected oxygen sensor lead.
	2:00	185		51/1.17	Replaced oxygen sensor & fuel injector.

Summary of the Repairs Performed on the 8 Cars Failing Both Tailpipe I/M and OBD Check

System Repaired	Vehicle Number 130	368	541	647	1132	1221	1256	1290	TOTALS Clear Codes	Pass I/M
Fuel Metering System:										
Fuel Injector(s)	.	.	.	*	*	.	.	*	-	3
Set Idle CO	.	.	.	.	.	.	.	.	-	-
Set Idle Speed	.	.	.	.	.	.	.	.	-	-
Ignition System:										
Spark Plugs	.	X	.	*	.	.	.	.	1	2
Plugs Wires	.	.	.	.	.	.	.	.	-	-
3-Way Electronics:										
Oxygen Sensor	X	X	.	.	X	X	*	X	5	6
TPS	.	.	X	X	.	.	.	.	2	2
EGR Pos Sensor	.	.	.	.	.	.	.	.	-	-
MAP Sensor	.	.	.	*	.	.	.	.	-	1
AFS	.	.	.	.	.	*	X	.	1	2
ECM	.	.	.	.	.	.	.	.	-	-
Evap. Control System	.	.	.	.	.	.	.	.	-	-
EGR System	.	.	.	.	.	.	.	.	-	-
Supplementary AIR	.	.	.	.	.	.	.	.	-	-
Repair Vacuum Leaks	.	.	.	.	.	.	.	.	-	-
Speedometer Cable	.	.	.	.	.	.	.	.	-	-
Transmission Cable	.	.	.	.	.	.	.	.	-	-
Clear Codes (nothing else)	.	.	.	.	.	.	.	.	-	-

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* Additional repairs performed to pass I/M AFTER performing OBD-targetted repairs.

APPENDIX E

EG&G Mechanic's Narrative Comments on the 15 Cars Which Were Inspected

Veh. No.	Test Sequence	Mechanic's Comments
0067	As Received:	The vehicle is clean most of the time. Once in a while, the HC reading stays around 200 ppm after flushing. Spark plug gaps are worn to 0.057. Possible reasons are: 1.) spark plug breakdown, or 2.) poor injection patterns causing plugs or oxygen sensor to get "shot" of raw gas, or 3.) the catalyst may be getting cold since no air pump system. Initial I/M test: 272 HC and 0.05% CO.
	After Repair:	New spark plugs were installed at the correct gap. The gaps on the original plugs were worn so wide that the engine was "breaking" down, and the oxygen sensor was getting wet with gas. The mechanic considered that to be a single problem, and replaced both components at once. The mechanic belives that replacing either the plugs or the oxygen sensor (individually) would not correct the problem or make a "dependable" change in tailpipe readings. The CO is 0.02% and HC is 35 ppm. The car still has intermittently high HC (175 ppm) readings after a hot restart which followed a 45 minute soak. The I/M results after repair were 12 ppm HC and 0.01% CO.
0072	As Received:	The throttle body injector has very poor (scattered) spray pattern. Due to an oversight, a fuel sample was not drawn for lead analysis. Initial I/M test: 174 ppm HC and 1.39% CO.
	After Repair:	The fuel injector nozzle was replaced. The HC is 160 ppm, and CO is 0.35%. But the car failed the official reinspection. (Failing I/M test: 297 ppm HC and 1.79% CO.) The oxygen sensor was then replaced because of deposits present from staying wet with gas (no codes). Those deposits may have "burned" off with the replacement of the injector, but there is no way of knowing how long it would take, or if it would clean up. The HC is 90 ppm, and CO is 0.30%. The I/M results after repair were 115 HC and 0.36% CO.

Veh. No.	Test Sequence	Mechanic's Comments
0108	As Received:	The hose connector was not connected to the TVS on the side of the air cleaner. This disabled the hot air door, the air management valve, the air bypass valve, and the secondary vacuum break, as well as creating a vacuum leak. The carburetor plug is missing, and the dwell is 48°-54°. The electric wire to the choke is poorly connected. The initial inspection: 240 ppm HC, 5.48% CO.
	After Repair:	The hose that was disconnected operated 4 or 5 different emission control components. The carburetor had obviously been richened to compensate for this vacuum leak. The vacuum leak was repaired by reconnecting the hoses to the air bypass, air management, secondary vacuum break, and hot air door. The idle speed and mixture were reset. There is very little difference in tailpipe readings, but the catalyst should not "load-up" as easily. Reinspection results: 11 ppm HC, 0.01% CO.
0130	As Received:	The computer has two stored codes (13 & 44) both of which suggest a bad oxygen sensor. The oxygen sensor is covered with green deposits. Initial inspection: 135 ppm HC, 1.45% CO.
	After Repair:	A new oxygen sensor was installed. The CO is now 0.10%, and HC is 110 ppm. Reinspection results: 5 HC, 0.00% CO.
0154	As Received:	The computer has a stored code (24) for the vehicle speed sensor. The speedometer cable was disconnected at the transmission. Initial passing I/M test: 7 HC, 0.01% CO.
	After Repair:	The speedometer cable was reconnected at the transmission.
0207	As Received:	The computer has a stored code (13) for the oxygen sensor circuit. Initial passing I/M test: 6 HC and 0.00% CO.
0207	After Repair:	The oxygen sensor was covered with white deposits. A new oxygen sensor was installed, and the code cleared. HC is 140 ppm, and CO is still 0.05%.

Veh. No.	Test Sequence	Mechanic's Comments
0224	As Received:	The canister TVS has failed in the open position. The canister purge valve has failed in such a way as to expose the bowl in the carburetor to manifold vacuum. The engine has been seeing large amounts of liquid gas. The oxygen sensor has so much carbon on it that the vents are almost covered. No stored codes were present. Initial I/M test: 544 ppm HC, 7.20% CO.
	After Repair:	The mechanic believed the problems with this car are so interrelated, that it would be completely meaningless to repair components individually. The mechanic replaced: the canister TVS, the canister purge control valve (diaphragms leaking), and spark plugs (fouled with wet gas). This produced readings of 215 ppm and 0.32%. The oxygen sensor was replaced (due to heavy carbon deposits) producing readings of 150 ppm HC and 0.23% CO. A representative from the GM Technical Center was consulted concerning the lack of stored codes. He indicated that it is possible for engines to pass raw gas without necessarily setting codes. Also, the vehicle may not have seen this condition for a long enough time. No other problems were identified; however, the mechanic suspected that the catalyst might not be fully functional. Reinspection results: 86 ppm HC, 0.04% CO.
0227	As Received:	The OTC Monitor 2000 shows code 42 present which can be 1) EST control, 2) error in distributor or C-3 system, or 3) fuel cutoff solenoid high. The third code is not applicable. Also, using the GM ground tool, no trouble code exists. Initial passing I/M test: 74 HC and 0.01% CO.
	After Repair:	The ECM was cleared of any codes and rechecked with both the Monitor 2000 and the GM ground tool method. The ECM remained clear of codes.

Veh. No.	Test Sequence	Mechanic's Comments
0258	As Received:	The downstream air tube is broken in two between the catalyst and the check valve. Code 21 is present in the computer which is the oxygen sensor circuit. The exhaust manifold donut gasket is leaking right below the oxygen sensor location. Initial passing I/M test: 46 HC and 0.73% CO.
	After Repair:	Replaced the oxygen sensor and the exhaust donut at the exhaust manifold location. The air tube to the catalyst (which was broken in two) was repaired (welded) to prevent the background from going out of spec. CO is 0.30 and HC is 110 with the tube welded.
0259	As Received:	The oxygen sensor is disconnected. It has probably been disconnected for some time since the connector is corroded. No codes are present. The engine is most likely staying in open loop status all of the time. Initial inspection: 232 ppm HC, 5.02% CO.
	After Repair:	The oxygen sensor was reconnected. The CO is 0.025%, HC is 115 ppm. Reinspection results: 8 ppm HC, 0.00% CO.
0271	As Received:	Code 53 is present. This is a hard fault since it reappears without the engine being turned on. Initial passing I/M test: 32 HC and 0.00% CO.
	After Repair:	The wire under the bracket is crimped and grounded causing full EGR anytime throttle is open. Replaced the solenoid and cleared ECM. CO is 0.03%, HC is 75 ppm. Tailpipe is probably cleaner due to quicker catalyst recovery from less EGR.

Veh. No.	Test Sequence	Mechanic's Comments
0368	As Received:	The computer has oxygen sensor circuit code (21) present. The spark plugs are breaking down intermittently. Initial I/M test: 265 ppm HC, 6.43% CO.
	After Repair:	A new oxygen sensor was installed. CO is 0.02%, and HC is 70 ppm. Vehicle failed reinspection. (Failing I/M test: 204 ppm HC and 3.55% CO.) New plugs were installed since the old ones did not burn off the carbon. Reinspection results: 8 ppm HC, 0.00% CO.
0382	As Received:	The number 6 spark plug is fouled almost completely with oil. Initial inspection: 383 ppm HC, 0.00% CO.
	After Repair:	New spark plugs were installed. The vehicle may have internal oil, valve guide problem. The vehicle failed reinspection. (Failing I/M retest: 259 ppm HC and 0.41% CO.) A spark plug wire was found to be off; that condition was corrected. Reinspection results: 44 ppm HC, 0.01% CO.
0388	As Received:	Code 52 (oxygen sensor circuit) is now present. Initial inspection: 501 ppm HC, 4.94% CO.
	After Repair:	A new oxygen sensor was installed. The CO came down to about 2% and the HC to about 200 ppm. The spark plugs began to break down during main. New plugs were installed, but no change in tailpipe. New fuel injector installed. CO is now 0.025% and HC is 35 ppm. Reinspection results: 31 ppm HC, 0.00% CO.
0436	As Received:	Code 32 (EGR system failure) is present; although, the EGR valve operates properly. Code 45 (rich exhaust indicated) is listed as an intermittent code that may not always be a failure type code. Initial passing I/M test: 31 HC and 0.01% CO.
0436	After Repair:	ECM replaced (per diagnostic chart #32). Codes 32 & 45 were cleared and did not return with the new computer. The new ECM did not make a big difference in the already low tailpipe values, but the idle speed was lowered (from 1000 to 550 rpm).

Veh. No.	Test Sequence	Mechanic's Comments
0528	As Received:	This vehicle had 8 trouble codes (12 - 15, 21 - 24) present during the initial lane inspection; however, none exists at this time. Possible causes are over 50 ignition cycles or a possible intermittent ECM ground problem that would be impossible to verify. Vehicle released to owner with no repairs nor further testing.
0541	As Received:	The tailpipe readings are 14 ppm HC, 0.02% CO. Codes 24 & 52 present. Code 24 is a discrepency in the throttle position circuit. Code 52 means the O2 sensor is seeing a rich condition, but is not always a reflection of a bad O2. The throttle position sensor was found to have a dead spot at approximately one-quarter throttle. This can cause a rich condition or even send the computer into a default (full rich) mode. However, depending on the engine load, time spent at the "dead spot" position, etc., the engine can give clean or dirty results. Similarly, the O2 could be fouled or be in good condition. Initial inspection: 481 ppm HC, 9.12% CO. Note: There are no "as received" short cycle data because the idle would not drop below 1600 rpm.
	After Repair:	The TPS was found to have a dead spot at one-quarter throttle and was replaced. The codes were cleared and did not reappear. The CO is 0.01, HC 3ppm. Reinspection results: 21 ppm HC, 0.01% CO.
0647	As Received:	Code 23 (TPS out of range) is present. Injector spray pattern is "heavy." Plugs are worn and have a very wide gap. Oxygen sensor is somewhat carboned up. MAP sensor has silicon gel plugging the vacuum port. Ford has a TSB out for this problem. Initial I/M test: 367 ppm HC, 3.11% CO.

Veh. No.	Test Sequence	Mechanic's Comments
0647	After OBD Targetted Repairs:	Code 23 was cleared from the computer, and the vehicle was driven about 20 minutes. Code 23 reset in the computer. The TPS switch was replaced and the code did not reappear. The tailpipe readings are not very stable or repeatable due to the other engine related problems, but the computer is now clear of any trouble codes. The HC is 200 ppm, and the CO is 0.09%. Both readings are very erratic depending on just one or two seconds of idle time. Failing I/M retest: 370 ppm HC, 1.03% CO.
0647	After I/M Targetted Repairs:	The HC is 358 ppm, and the CO is 0.13%. Replacing the fuel injectors brought the readings down to 200 ppm HC and 0.08% CO. However, the readings still have a very critical "idle time" fluctuation, and the car should not be trusted for lane inspection. The spark plugs were replaced next to rule out any erratic breakdown of firing. The readings were 410 ppm HC and 0.09% CO. After driving the vehicle, a Code 22 (MAP sensor) had been set. The gel in the vacuum fitting finally set a code. The MAP sensor was replaced and the code did not reappear. The readings were 347 ppm HC and 0.13% CO. The carboned up O2 sensor was replaced, the computer cleared, and the vehicle driven. The readings were 98 ppm HC and 0.00% CO, and no codes appeared. The previously erratic idle emission levels were showing a consistent downward trend as the computer "relearned." The car was the returned to the Maryland I/M lane and retested. FTP failure can now be attributed to computer relearning and catalyst cleaning up. Results from second reinspection: 135 ppm HC, 0.05% CO.
0710	As Received:	Code 23 (TPS out of range) is present. The codes were cleared, and code 23 reappears. This indicates a "hard" fault. Initial inspection: 33 ppm HC, 0.01% CO.
	After Repair:	Replaced TVS switch per code 23. Drove the vehicle for 20 minutes and rechecked computer for codes. No codes were present. Final readings: 30 ppm HC, 0.00% CO.

Veh. No.	Test Sequence	Mechanic's Comments
1015	As Received:	There are no codes present; however, the injector is metering an excessive amount of fuel. Initial inspection: 563 ppm HC, 9.15% CO.
1015	After Repair:	Replaced fuel injector, CO is 0.00% and HC is 50 ppm. The original injector was without a doubt metering too much gas. No codes ever appeared in the computer. Reinspection results: 35 ppm HC, 0.05% CO.
1083	As Received:	The vacuum hose to the secondary vacuum break is disconnected and open. This may or may not cause an emission problem. The open hose should normally drive the engine lean; however, under certain conditions the O2 sensor may see the leak and send a full rich code to the computer. This will explain the larger discrepancy between the very high I/M lane CO results and the moderate "as received" FTP values. Initial inspection: 209 ppm HC, 5.80% CO.
1083	After Repair:	Reconnected the hose to the secondary vacuum break. The vacuum leak probably contributed more to the high idle CO than did the lack of operation of the vacuum break. CO is now 0.00% and HC is 0 ppm. Reinspection results: 40 ppm HC, 0.22% CO.
1132	As Received:	Code 21 is present, indicating an intermittent O2 sensor circuit. Initial inspection: 707 ppm HC, 9.61% CO.
1132	After OBD Targetted Repairs:	Replaced O2 sensor. Failing reinspection results: 1406 ppm HC, 10.01% CO.
1132	After I/M Targetted Repairs:	The injector is still putting out too much fuel. There is no way of knowing if the injector itself is bad or if the O2 sensor is actually "telling" the injector to meter excessive fuel. The fuel injector was replaced. The code for the O2 sensor did not reappear after the O2 sensor was replaced; however, a new emission component (e.g., sensor, catalyst, carburetor, or injector) can sometimes hide a problem temporarily. Passing reinspection results: 11 ppm HC, 0.01% CO.

Veh. No.	Test Sequence	Mechanic's Comments
1150	As Received:	Idle tailpipe is clean. Code 34 (EGR out of control limits) is present. Initial inspection: 40 ppm HC, 0.03% CO.
1150	After Repair:	EGR position sensor replaced per code 34. Note: Idle tailpipe is clean. However, the poor numbers on the FTP are probably due to a bad O2 sensor and/or injector, but no code was set to indicate this.
1221	As Received:	Code 13 (O2 sensor circuit) is present. Initial inspection: 371 ppm HC, 0.59% CO.
1221	After OBD Targetted Repairs:	The O2 sensor was replaced, and the code did not reappear. However, the engine is slipping in and out of closed loop at idle speeds. Failing reinspection results: 1225 ppm HC, 1.54% CO.
1221	After I/M Targetted Repairs:	This vehicle is very unusual. After racing the engine and returning to idle, the computer intermittently slips into and out of closed loop. When the engine is in closed loop, the tailpipe readings are clean; when in open loop, they are dirty with HC about 1500 ppm. Replacing the O2 sensor had eliminated the trouble code but had not helped this problem. As a first step, the mass airflow sensor was replaced. This car has the Bosch style "hot wire" system, and the wire can become carboned and cool down causing the car to go to open loop. The tailpipe readings were still much too high with 1332 ppm HC and 0.47% CO. The spark plugs were replaced next. (There was not an obvious problem with the plugs, but there is always a chance of a cracked insulator.) Replacing the plugs did not change the tailpipe readings. The problem is that the minimum air flow had been increased. When the engine is flushed out, the computer advances the timing, and when returning to idle (in neutral only) the advance was not eliminated. The base idle or minimum air flow screw was adjusted and the timing advance during idle in neutral was corrected. The HC is now 131 ppm and the CO is 0.45%. Passing reinspection results: 95 ppm HC, 0.59% CO.

Veh. No.	Test Sequence	Mechanic's Comments
1256	As Received:	Code 45 (rich exhaust indicated) is present. The odometer on this vehicle is not functional. Initial inspection: 894 ppm HC, 2.46% CO.
1256	After OBD Targetted Repairs:	The flow chart diagnostic for code 45 was performed and indicated a bad mass air flow sensor. This was replaced and the code did not reappeared in the computer. Idle CO is 0.00% and HC is 10 ppm. Failing reinspection results: 569 ppm HC, 1.72% CO.
1256	After I/M Targetted Repairs:	The O2 sensor was replaced. (The O2 may have been fouled and had a problem with "warm up" time. There is not a procedure to determine whether the O2 was bad before or after the mass air flow sensor failed. The code 45 just meant that rich exhaust was indicated.) Passing reinspection results: 8 ppm HC, 0.00% CO.
1290	As Received:	Code 21 is present which means the O2 sensor has gone more than 5 seconds without emitting a voltage signal. The wire lead to the O2 sensor is not connected (i.e., not pushed in entirely). Also, the the timing was measured at 18° BTDC compared to a spec of only 6° BTDC. Initial inspection: 423 ppm HC, 7.56% CO.
1290	After OBD Targetted Repairs:	The metal bullet connector to the O2 sensor was found to be making only a "touching" contact inside the rubber insulator. The bullet was snapped together, and the rubber insulator was repositioned. This corrected the code 21 problem but did not clean up the tailpipe emissions adequately. The timing is still advanced 12° beyond the spec. Failing reinspection results: 391 ppm HC, 4.64% CO.

Veh. No.	Test Sequence	Mechanic's Comments
1290	After I/M Targetted Repairs:	The O2 sensor was removed and replaced. (Some red deposits were present.) The tailpipe was still too high: CO about 3.1% and HC is 331 ppm. Since both the HC and CO are high, the fuel injector was replaced. This lowered the tailpipe to 95 ppm HC and 1.10% CO. This was better but not clean enough to chance a reinspection attempt. Finally, the timing was set to the 6° spec. This step was taken last because base timing usually affects only HC with not much change to CO. However, it did help in this case, and the final readings were: 35 ppm HC and 0.65% CO. Reinspection results: 51 ppm HC, 1.17% CO.
1321	As Received:	The idle speed is set so high that the air pump dumps continuously at idle in neutral. The hot air tube to the choke is broken, and the choke is set notches in the lean direction. The decel dashpot is frozen in the closed position (a rear brake job was performed prior to the FTP). Initial I/M inspection: 628 ppm HC, 0.10% CO.
1321	After Passing I/M:	All that was needed to pass the I/M reinspection was to reduce the idle speed from 1050 rpm down to 800 rpm. The air pump now does not dump at idle, and the tailpipe readings are 12 ppm HC and 0.00% CO. Reinspection results: 51 ppm HC, 0.01% CO. The hot air tube to the choke is still broken, and the choke is set very lean. The decel control diaphragm is stuck in the closed position.

Veh. No.	Test Sequence	Mechanic's Comments
1321	After Add. Repairs:	The canister control TVS broke in two during this inspection, and it was replaced as an initial step. The plastic had been weakened by raw gas. The readings after replacing the TVS were 598 ppm HC, 1.3% CO. This is not an indication of idle conditions but an erratic carryover of raw gas entering the carburetor during the off idle flushing procedure. The canister purge control valve was then removed and found to be full of gas. This was also replaced, and the readings came down to 47 ppm HC and 0.01% CO. The code 45 (O2 sensor rich) did not reoccur after clearing the ECM and then road testing the vehicle. In addition, the transmission shift cable had failed sometime during the testing process, and this was also replaced. The mechanic suspects that the original condition of the air pump dumping at the higher idle speed was only coincidental (i.e., unrelated) with the failed canister control valve "loading up" the carburetor at the higher flush out rpm.

APPENDIX F

Trouble Codes of the 100* Vehicles with Stored Codes at the Maryland I/M Lane

* The trouble codes for 95 of those 100 vehicles were read following the initial I/M test. The trouble codes for the remaining 5 were read following a retest.

Vehicle Number	Vehicle Description Year/Make/Model	Stored Codes
IBD/0029	83 Buick Skyhawk	Vehicle speed sensor (code 24)
IBD/0036	83 Pontiac 6000	No distributor reference pulse, coolant sensor, idle and WOT switch error, Manifold Air Temperature (MAT) sensor, & vehicle speed sensor (12, 14, 15, 21, 23, & 24)
IBD/0069	85 Chevy Camaro	Mass air flow sensor low (34)
IBD/0095	86 Plymouth Reliant	Vehicle speed & oxygen sensors (15 & 52)
IBD/0096	84 Buick Le Sabre	Rich exhaust indication (45)
IBD/0106	85 Dodge Aries	Oxygen sensor circuit (21)
IBD/0130	83 Chevy Cavalier	Oxygen sensor circuit & lean exhaust indication (13 & 44)
IBD/0135	84 Chevy Caprice	Rich exhaust indication (45)
IBD/0139	85 Dodge 600	Vehicle speed sensor & oxygen sensor circuit (15 & 21)
IBD/0154	87 Buick Century	Vehicle speed sensor (24)
IBD/0181	86 Pontiac 6000	Vehicle speed sensor (24)
IBD/0182	83 Olds Cutlass	Mass air flow sensor low (34)
IBD/0207	86 Olds Calais	Oxygen sensor circuit (13)
IBD/0212	83 Pontiac 2000	Oxygen sensor circuit & electronic spark control (13 & 42)
IBD/0227	84 Buick Le Sabre	Fuel cutoff solenoid high (42)
IBD/0256	86 Chevy Cavalier	No distributor reference pulse, oxygen sensor circuit, coolant sensor high, throttle position sensor, throttle position, Manifold Air Temperature (MAT) sensor, vehicle speed sensor (12 - 14, 21 - 24).
IBD/0258	85 Chrysler Laser	Oxygen sensor circuit (21)

Vehicle Number	Vehicle Description Year/Make/Model	Stored Codes
IBD/0264	84 Chevy Chevette	Throttle position high (21)
IBD/0271	84 Pont. Bonneville	EGR vacuum control (53)
IBD/0272	84 Olds Cutlass	Coolant sensor (14)
IBD/0284	85 Chevy Celebrity	Lean exhaust indication (44)
IBD/0288	87 Olds Delta 88	Barometric Pressure sensor or EGR (32)
IBD/0314	86 Dodge Daytona	Oxygen sensor (52)
IBD/0349	87 Dodge Aries	Vehicle speed sensor (15)
IBD/0368	85 Dodge 600	Oxygen sensor circuit (21)
IBD/0375	85 Chrysler Laser	Shift indicator light circuit (37)
IBD/0401	87 Olds Calais	Idle Air Control (IAC) error & Electronic Spark Timing (EST) error (35 & 42)
IBD/0430	86 Chevy Cavalier	Vehicle speed sensor (24)
IBD/0432	86 Buick Park Ave	No distributor reference pulse, oxygen sensor circuit, coolant sensor high, coolant switch, throttle position sensor, throttle position, MAT sensor, vehicle speed sensor (12 - 14, 21 - 24).
IBD/0436	86 Chevy Caprice	Barometric Pressure sensor or EGR (32) & rich exhaust indication (45)
IBD/0507	85 Mercury Topaz	TPS out of range (23)
IBD/0508*	85 Buick Skylark	Oxygen sensor circuit & lean exhaust indication (13 & 44)
IBD/0509	84 Merc Grnd Mrquis	No Tach (18) & EGR Vavle Position (EVP) sensor out of limits (31)

* Vehicle was not at the I/M lane for its initial test.

Vehicle Number	Vehicle Description Year/Make/Model	Stored Codes
IBD/0517	85 Ford Thunderbird	Manifold Air Pressure (MAP) sensor out of range (22)
IBD/0520	87 Ford Mustang	Neutral drive switch (NDS) failed closed (67)
IBD/0523	86 Ford Tempo	TPS voltage low (63) (intermittent)
IBD/0528	86 Olds Cutlass Cal	No distributor reference pulse, oxygen sensor circuit, coolant sensor high, coolant switch, throttle position sensor, throttle position, MAT sensor, vehicle speed sensor (12 - 14, 21, 22 - 24).
IBD/0532	85 Ford LTD Broughm	RPM out of spec (13) (intermittent)
IBD/0541*	86 Chry New Yorker	Throttle position circuit sensor, fuel (no current ti logic module), fan control relay circuit, & oxygen feedback system rich (24, 27, 35, & 52)
IBD/0543	87 Ford Escort	Fuel pump circuit failure (87) (intermittent)
IBD/0546	87 Olds Delta 88	Vehicle speed sensor (24)
IBD/0548	84 Merc Grnd Mrquis	Neutral drive switch (NDS) failed closed (67)
IBD/0563	85 Linc Town Car	No Tach (18) (intermittent)
IBD/0577	84 Merc Grnd Mrquis	Engine Coolant Temperature (ECT) sensor out of range, EVP out of limits, ECT input too high, TPS input too high, Air Change Temperature (ACT) sensor too high, electrical charging under voltage, & electrical charging over voltage (21, 31, 51, 53-55, & 65)

* Vehicle was not at the I/M lane for its initial test.

Vehicle Number	Vehicle Description Year/Make/Model	Stored Codes
IBD/0587	84 Merc Grnd Mrquis	ECT out of range, EVP out of limits, system always rich, ECT input too high, TPS input too high, ACT (VAT) too high, ECT input too low, & TPS input too low (21, 31, 42, 51, 53, 54, 61, & 63)
IBD/0593	86 Chevy Camaro	MAP sensor low (34)
IBD/0597	85 Ford Crown Vict	Profile Ignition Pick-UP (PIP) was erratic (continuous test), No Tach, EVP out of limits, system always lean, & ACT (VAT) too low (grounded wire) (14, 18, 31, 41, & 64)
IBD/0598	87 Ford Tempo	TPS voltage low & power interrupt detected (63 & 78)
IBD/0599	85 Ford Crown Vict	EVP out of limits (31)
IBD/0607	84 Ford Tempo	EVP out of limits (31)
IBD/0629	87 Chevy Celebrity	MAP sensor low (34)
IBD/0633	87 Ford Taurus	254° F indicated, ACT (circuit grounded) (64)
IBD/0635	87 Ford Topaz	Servo leaks up during IVSC, insufficient TP change, & TPS circuit input low at max DC motor extension (28, 73, & 93)
IBD/0647	85 Ford Tempo	No Tach, Barometric Pressure (BP) sensor out of range, & TPS out of range (18, 22, & 23)
IBD/0660	87 Ford Mustang	PIP circuit fault (14)
IBD/0674	83 Olds Cutlass Cru	Electronic spark control (42)
IBD/0704	87 Mercury Topaz LS	Power interrupt detected (78)
IBD/0710	85 Ford Tempo	TPS out of range (23)
IBD/0737	84 Mercury Cougar	RPM out of spec (13) (normal idle)
IBD/0743	87 Chevy Celebrity	Coolant sensor high temp, fuel cutoff relay/circuit shorted (14 & 42)

Vehicle Number	Vehicle Description Year/Make/Model	Stored Codes
IBD/0744	86 Dodge Cherger	Battery feed for computer memory (14)
IBD/0758	87 Ford Mustang	EVP voltage above closed limit (sonic) (34)
IBD/0769	86 Ford Taurus LX	NDS = drive or acc = on (engine off) (67)
IBD/0770	86 Ford Taurus	NDS = drive or acc = on (engine off) (67)
IBD/0771	84 Mercury Cougar	RPM out of spec (extended idle), MAP out of range, & EVP out of limits (13, 22, & 31)
IBD/0779	87 Ford Escort GT	Oxygen sensor circuit indicates system lean, oxygen sensor circuit indicates system rich, & NDS circuit open - A/C on during self test (41, 42, & 67)
IBD/0805	84 Mercury Cougar	RPM out of spec (normal idle) & ECT input too low (13 & 61)
IBD/0806	86 Plymouth Reliant	Vehicle speed sensor (15)
IBD/0827	87 Olds Calais	EST error (42)
IBD/0842	87 Olds Cutlass Cie	Oxygen sensor circuit (13)
IBD/0873	84 Dodge 600 ES	Battery feed to logic module was recently lost (12)
IBD/0878	84 Ford Tempo	TPS input too low (63) (intermittent)
IBD/0893	85 Ford Crown Vict	PIP was erratic (continuous test), No Tach (IPM), EVP out of limits (14, 18, 31)
IBD/0895	86 Ford Taurus GL	Pressure Feedback EGR (PFE) too high (34)
IBD/0916*	84 Ford Tempo	EVP out of limits & TPS input too low (31 & 63)

* Vehicle was not at the I/M lane for its initial test.

Vehicle Number	Vehicle Description Year/Make/Model	Stored Codes
IBD/0932	85 Ford Crown Vict	PIP was erratic (continuous test), No Tach (IPM) (14, 18)
IBD/0940*	84 Chrysler Laser	Oxygen sensor circuit & feedback system (21 & 51)
IBD/0947	85 Ford Thunderbird	EVP out of limits (31)
IBD/0956	87 Chevy Celebrity	EST error (42)
IBD/0961	83 Chevy Cavalier	Lean exhaust indication (44)
IBD/0970	84 Chry New Yorker	Charge temperature sensor circuit (23)
IBD/0992	87 Ford Mustang	NDS circuit open; failed closed - circuit grounded (67)
IBD/1016	84 Ford Tempo	MAP out of range, TPS out of range, & EVP out of limits (22, 23, & 31)
IBD/1053	87 Dodge Shadow	Speed control servo (34)
IBD/1119	84 Chrysler Lebaron	Oxygen sensor circuit (21)
IBD/1132	85 Dodge Daytona	Oxygen sensor circuit (21)
IBD/1135	85 Linc Town Car	PIP was erratic (continuous test), No Tach, MAP out of range, & system always rich (14, 18, 22, & 42)
IBD/1150	86 Mercury Topaz	EGR valve out of limits (34)
IBD/1155	87 Mercury Topaz	RPM out of spec, -40° F indicated ACT sensor circuit open, & power interrupt detected (13, 54, & 78)
IBD/1160	87 Olds Calais	coolant sensor high temp, IAC, EST error, & oxygen sensor rich (14, 35, 42, & 45)

* Vehicle was not at the I/M lane for its initial test.

Vehicle Number	Vehicle Description Year/Make/Model	Stored Codes
IBD/1182	87 Ford Escort	Oxygen sensor circuit indicates system lean, oxygen sensor circuit indicates system rich, oxygen sensor lean at WOT, & NDS circuit open - A/C on during self test (41, 42, 43, & 67)
IBD/1217	86 Ford Taurus	PFE sensor exceeds low limit (32)
IBD/1221	86 Chevy Camaro	Oxygen sensor circuit (13)
IBD/1256	86 Chevy Cavalier	Rich exhaust indication (45)
IBD/1273	86 Chevy Corvette	Barometric Pressure sensor or EGR (32)
IBD/1281*	83 Pontiac J2000	Electronic spark control (42)
IBD/1290	84 Chrysler Lebaron	Oxygen sensor circuit (21)
IBD/1312	86 Ford Taurus	PFE sensor exceeds low limit (32)
IBD/1317	88 Ford Escort GT	Oxygen sensor circuit indicates system lean, oxygen sensor circuit indicates system rich, adaptive lean limit reached, & adaptive rich limit reached (41, 42, 85, & 86)
IBD/1322	87 Chevy Celebrity	MAP sensor low (34)

* Vehicle was not at the I/M lane for its initial test.

APPENDIX G

I/M Scores of the 58* Vehicles that Failed I/M at the Maryland I/M Lane

* The trouble codes were read for 46 of those 58 vehicles following the I/M test. Seven of those 46 I/M tests were retests. Thus, only 39 of those 58 vehicles were eligible to be recruited for additional testing at VTL.

Description of the 58 Vehicles Failing I/M

Veh No.	OBD CODE	-I/M HC	Lane- CO	Mdl Yr	MAKE	MODEL	No. Cyl	----- Engine ------ Displacement/ Fuel Metering
0058	---	737	2.30	78	OLDS	ROYALE	?	NO DATA
0064	---	294	4.19	83	CHEV	CHEVETTE	4	98(1.6L)/2bbl
0067	No	272	0.05	86	CHEV	CAMARO Z28	6	173(2.8L)/FI
0072	No	174	1.39	85	CHEV	CAVALIER TYPE 10	4	122(2.0L)/FI
0081	No	206	2.70	84	PONT	2000 SUNBIRD	4	110(1.8L)/FI
0087	No	290	0.08	84	OLDS	CUTLASS SUPREME	6	231(3.8L)/2bbl
0093*	---	531	8.69	84	CHRY	NEW YORKER	4	156(2.6L)/2bbl
0108	No	240	5.48	83	CHEV	CAMARO Z28	6	173(2.8L)/2bbl
0130	Yes	135	1.45	83	CHEV	CAVALIER CS	4	122(2.0L)/FI
0135	Yes	358	8.78	84	CHEV	CAPRICE CLASSIC	6	229(3.8L)/2bbl
0157	---	531	8.27	86	DODG	CHARGER	4	135(2.2L)/FI
0170	---	885	10.00	82	CHEV	MONTE CARLO	6	229(3.8L)/2bbl
0224	No	544	7.20	84	PONT	GRAND PRIX LE	8	305(5.0L)/4bbl
0259	No	232	5.02	86	PLYM	CARAVELLE	4	152(2.5L)/FI
0314	Yes	250	6.07	86	DODG	DAYTONA	4	152(2.5L)/FI
0368	Yes	265	6.43	85	DODG	600	4	135(2.2L)/FI
0377	---	243	2.80	86	OLDS	TORONADO BROUGHAM	6	231(3.8L)/FI
0382	No	383	0.00	84	OLDS	CUTLASS SUPREME BROUGHAM	8	307(5.0L)/4bbl
0388	No +	501	4.94	86	DODG	ARIES LE	4	135(2.2L)/FI
0508*	Yes	623	9.28	85	BUIC	SKYHAWK	4	110(1.8L)/FI
0515	No	274	4.26	83	CHEV	CHEVETTE	4	98(1.6L)/2bbl
0531	No	236	2.57	87	FORD	TAURUS MTS	4	152(2.5L)/FI
0533	---	255	0.13	83	FORD	ESCORT	4	98(1.6L)/2bbl
0541**	Yes	481	8.33	86	CHRY	NEW YORKER	4	152(2.5L)/FI
0545	---	142	1.46	84	CHRY	NEW YORKER	4	156(2.6L)/2bbl
0569	No	319	4.43	85	FORD	TEMPO GL	4	140(2.3L)/FI
0574	No	332	0.00	83	OLDS	CUTLASS SUPREME	6	231(3.8L)/2bbl

* Retest Vehicle (Not Eligible)

** Retest Vehicle (Unintentionally recruited)

\+ No codes at I/M lane, but codes were set later.

Description of the 58 Vehicles Failing I/M
(Continued)

Veh No.	OBD CODE	-I/M HC	Lane- CO	Mdl Yr	MAKE	MODEL	No. Cyl	Engine Displacement/ Fuel Metering
0582	No	245	1.04	86	MERC	COUGAR LS XR7	6	231(3.8L)/FI
0589	No	240	4.87	85	MERC	GRAND MARQUIS LS	8	302(5.0L)/FI
0647	Yes	367	3.11	85	FORD	TEMPO GL	4	140(2.3L)/FI
0664	No	240	4.03	84	CHEV	CAMARO	8	305(5.0L)/4bbl
0668	No	234	0.12	86	CHEV	CELEBRITY WAGON	6	173(2.8L)/2bbl
0711	No	279	3.21	87	FORD	TAURUS GL WAGON	6	182(3.0L)/FI
0798	---	122	1.49	86	FORD	ESCORT	4	113(1.9L)/2bbl
0836	No	262	2.59	84	BUIC	LeSABRE LIMITED	8	307(5.0L)/4bbl
0855	No	234	3.47	85	PONT	6000 STE	6	173(2.8L)/FI
0874	---	442	8.54	?	PLYM	RELIANT	?	NO DATA
0916*	No	282	0.21	84	FORD	TEMPO GL	4	140(2.3L)/1bbl
0940*	No	523	1.38	84	CHRY	LASER	4	135(2.2L)/FI
0964	No	131	1.53	86	MERC	TOPAZ GS	4	140(2.3L)/FI
0976	No	246	0.22	87	FORD	TEMPO LX	4	140(2.3L)/FI
1015	No	563	9.15	86	FORD	TEMPO	4	140(2.3L)/FI
1016	No	529	0.00	84	FORD	TEMPO GL	4	140(2.3L)/1bbl
1033	No	156	3.23	87	FORD	TEMPO SPORT	4	140(2.3L)/FI
1049*	No	204	3.31	84	FORD	TEMPO GL	4	140(2.3L)/1bbl
1083	No	209	5.80	85	PONT	6000 LE	6	173(2.8L)/2bbl
1132	Yes	707	9.61	85	DODG	DAYTONA	4	135(2.2L)/FI
1141*	No	267	5.26	83	MERC	LYNX	4	98(1.6L)/2bbl
1143*	---	154	2.03	84	DODG	600	4	135(2.2L)/FI
1155	No	121	1.33	87	MERC	TOPAZ GS	4	140(2.3L)/FI
1211	---	141	1.80	83	BUIC	REGAL	6	231(3.8L)/2bbl
1212*	No	111	1.21	86	MERC	SABLE GS	4	152(2.5L)/FI
1221	Yes	371	0.59	86	CHEV	CAMARO	8	305(5.0L)/FI
1240	---	55	1.57	85	FORD	ESCORT	4	98(1.6L)/2bbl
1256	Yes	894	2.46	86	CHEV	CAVALIER	6	173(2.8L)/FI
1273	No	346	1.44	86	CHEV	CORVETTE	8	350(5.7L)/FI
1290	Yes	423	7.56	84	CHRY	LE BARON	4	135(2.2L)/FI
1321	No	628	0.10	84	BUIC	LeSABRE LIMITED	8	307(5.0L)/4bbl

* Retest Vehicle (Not Eligible)

APPENDIX H

I/M, Four-Mode, and Restart Test Results of the 27 Vehicles Tested at VTL

I/M, Four-Mode, and Restart Test Results

Veh No.	Test Sequence	I/M Scores HC	I/M Scores CO	Four-Mode Test: Idle-in-N HC	Idle-in-N CO	2500 RPM HC	2500 RPM CO	Idle-in-N HC	Idle-in-N CO	Idle-in-D HC	Idle-in-D CO	Restart Test: 2500 RPM HC	2500 RPM CO	Idle-in-N HC	Idle-in-N CO
0067	As Received	272	0.05	130	.05	30	.04	30	.05	50	.05	30	.04	430	1.40
0067	After I/M Rps	12	0.01	200	.05	30	.04	350	.10	140	.08	30	.03	30	.03
0072	As Received	174	1.39	220	1.30	40	.10	180	.70	N/A	N/A	140	.70	180	.70
0072	After I/M Rps	115	0.36	20	.03	20	.04	50	.15	N/A	N/A	30	.05	50	.10
0108	As Received	240	5.48	40	.05	30	.04	40	.05	20	.03	45	.04	30	.03
0108	After I/M Rps	11	0.01	30	.03	40	.05	25	.04	25	.04	80	.05	30	.04
0130	As Received	135	1.45	600	8.80	40	.05	60	.14	250	3.30	40	.06	30	.05
0130	After Repairs	5	0.00	30	.03	20	.03	30	.03	20	.03	20	.03	25	.03
0154	As Received	7	0.01	40	.02	50	.75	40	.04	40	.03	35	.02	30	.02
0154	After OBD Rps	N/A	N/A	60	.04	50	.40	80	.05	60	.04	30	.04	35	.04
0207	As Received	6	0.00	20	.03	20	.05	20	.04	N/A	N/A	20	.03	20	.04
0207	After OBD Rps	N/A	N/A	180	.17	25	.05	40	.06	N/A	N/A	20	.03	30	.05
0224	As Received	544	7.20	650	5.50	1300	10.00	1000	10.00	800	9.80	1400	10.00	950	10.00
0224	After I/M Rps	86	0.04	160	.40	70	.60	140	.15	160	.15	40	.10	60	.10
0227	As Received	74	0.01	60	.04	40	.40	40	.04	30	.04	20	.04	30	.04
0227	After OBD Rps	N/A	N/A	65	.03	35	.03	40	.03	30	.03	20	.03	25	.03
0258	As Received	46	0.73	80	.40	60	.48	70	.30	70	.30	50	.30	70	.50
0258	After OBD Rps	N/A	N/A	70	.10	60	.36	50	1.20	100	.70	40	.06	80	.80
0259	As Received	232	5.02	280	4.30	350	7.80	180	1.50	140	1.40	300	7.20	280	4.80
0259	After I/M Rps	8	0.00	25	.03	30	.05	20	.04	20	.04	40	.05	25	.04
0271	As Received	32	0.00	50	.03	50	.03	40	.03	60	.03	60	.03	40	.03
0271	After OBD Rps	N/A	N/A	60	.04	40	.05	70	.04	80	.04	50	.04	70	.04
0368	As Received	265	6.43	40	.05	40	.04	800	7.00	850	7.00	40	.04	40	.04
0368	After Repairs	8	0.00	20	.04	20	.04	25	.04	20	.04	30	.05	25	.04
0382	As Received	383	0.00	30	.04	1300	1.40	70	.05	40	.04	1300	3.20	70	.04
0382	After I/M Rps	44	0.01	60	.02	60	.25	30	.02	20	.02	30	.02	30	.02
0388	As Received	501	4.94	650	6.00	470	6.30	500	3.60	260	2.00	330	4.50	200	1.80
0388	After I/M Rps	31	0.00	30	.03	28	.02	20	.02	30	.02	30	.04	30	.02
0436	As Received	31	0.01	8	2.20	2	1.10	12	1.10	8	2.20	6	2.20	14	2.20
0436	After OBD Rps	N/A	N/A	4	1.10	4	1.10	4	1.10	4	1.10	4	1.10	4	1.10

I/M, Four-Mode, and Restart Test Results (Continued)

Veh No.	Test Sequence	I/M Scores HC	I/M Scores CO	Four-Mode Test: Idle-in-N HC	Idle-in-N CO	2500 RPM HC	2500 RPM CO	Idle-in-N HC	Idle-in-N CO	Idle-in-D HC	Idle-in-D CO	Restart Test: 2500 RPM HC	2500 RPM CO	Idle-in-N HC	Idle-in-N CO
0528	As Received	11	0.01	14	.02	14	.02	14	.02	14	.02	14	.02	10	.02
0541	As Received	481	8.33	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
0541	After Repairs	21	0.01	42	.54	319	1.18	330	.65	124	.55	163	1.76	74	.85
0647	As Received	367	3.11	138	.05	29	.04	109	.04	86	.04	43	.06	131	.05
0647	After OBD Rps	370	1.03	77	.70	16	.05	143	.21	170	.69	40	.07	156	.16
0647	After I/M Rps	135	0.05	491	.75	52	.03	267	.03	571	1.62	45	.03	178	.03
0710	As Received	33	0.01	119	1.46	24	.04	27	.03	100	.87	22	.03	25	.03
0710	After OBD Rps	N/A	N/A	77	1.36	13	.02	16	.01	45	.10	10	.02	21	.01
1015	As Received	563	9.15	393	4.19	15	.01	186	.75	N/A	N/A	22	.01	322	3.25
1015	After I/M Rps	35	0.05	45	.07	22	.03	91	.08	N/A	N/A	15	.01	30	.03
1083	As Received	209	5.80	183	1.87	45	.18	21	.03	25	.08	22	.14	15	.02
1083	After I/M Rps	40	0.22	170	3.70	45	.30	15	.03	154	1.84	15	.09	15	.03
1132	As Received	707	9.61	581	7.16	186	4.85	890	5.86	2158	7.86	45	.11	485	5.12
1132	After OBD Rps	1406	10.01	22	.03	60	.70	375	4.98	1606	6.49	60	.85	485	5.12
1132	After I/M Rps	11	0.01	15	.01	15	.09	30	.01	15	.01	15	.04	15	.01
1150	As Received	40	0.03	45	.44	15	.03	15	.01	15	.03	15	.01	15	.01
1150	After OBD Rps	N/A	N/A	75	.52	30	.01	30	.01	270	4.58	30	.03	30	.01
1221	As Received	371	0.59	466	.52	75	.56	340	.52	186	.46	37	.21	448	.52
1221	After OBD Rps	1225	1.54	542	.60	60	.48	430	.56	203	.52	30	.24	154	.44
1221	After I/M Rps	95	0.59	122	.44	45	.44	122	.40	138	.40	30	.27	106	.44
1256	As Received	894	2.46	305	.19	15	.01	504	.90	357	1.26	15	.01	15	.01
1256	After OBD Rps	569	1.72	30	.03	15	.03	106	.09	154	.65	15	.01	22	.02
1256	After I/M Rps	8	0.00	122	.09	15	.02	203	.24	220	.75	15	.03	15	.01
1290	As Received	423	7.56	170	2.08	154	2.63	220	1.92	122	.60	122	1.46	253	2.26
1290	After OBD Rps	391	4.64	154	1.61	154	3.14	154	1.46	122	.48	75	1.01	203	1.84
1290	After I/M Rps	51	1.17	45	.56	15	.06	45	.44	30	.01	15	.04	45	.56
1321	As Received	628	0.10	106	.19	448	6.82	122	.19	30	.03	1779	8.05	45	.06
1321	After I/M Rps	51	0.01	45	.01	1263	7.33	60	.03	30	.03	2296	8.80	60	.04
1321	Add. Repairs	N/A	N/A	154	.33	60	.03	60	.01	75	.30	91	.40	45	.01

* "As Received" short tests were not performed on Vehicle No. 541 because its idle speed would not drop below 1600 rpm.